Atlantic Off-site Housing Innovation Project: Development of an Innovative Roadmap to Build Housing in Atlantic Canada

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Disclaimers

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Executive Summary

Atlantic Canada is experiencing sustained housing supply pressures driven by population growth, labour shortages, rising construction costs, and regulatory and delivery constraints. While off-site construction (OSC) is not a universal solution to the region's housing challenges, it has the potential to contribute meaningfully to increased housing delivery when supported by appropriate policy, financing, procurement, workforce, and logistics systems. Despite growing interest across governments and industry, the adoption and scaling of OSC and Modern Methods of Construction (MMC) in Atlantic Canada remain constrained by system-level barriers rather than construction capability.

This project was undertaken to develop the **Atlantic Off-Site Housing Innovation Roadmap**, which identifies these barriers and outlines practical, regionally appropriate actions to support the effective use of OSC within the housing delivery system. Led by the University of New Brunswick's Off-site Construction Research Centre (OCRC) and funded by the Atlantic Canada Opportunities Agency (ACOA), the project responds to the need for coordinated, evidence-based guidance to support decision-making across Atlantic Canada. The roadmap was informed by a multi-stage research and engagement process that included policy and by-law reviews across all four Atlantic provinces, interviews with industry and public-sector stakeholders, and regional workshops engaging over 235 participants. This approach ensured that findings reflect both regulatory context and on-the-ground delivery experience.

The findings confirm that OSC is technically permissible across Atlantic Canada. However, inconsistent municipal implementation, duplicated inspections, fragmented approval processes, and misalignment between factory-based workflows and conventional procurement, financing, and insurance practices continue to increase project risk and limit scalability. Additional constraints include workforce availability and OSC-specific skills gaps, as well as transportation and logistics challenges related to oversized-load permitting and seasonal restrictions. At the same time, the research indicates that the region has existing manufacturing capacity and industry interest that could be better activated through clearer approval pathways, more predictable demand, and coordinated action. In response, the roadmap sets out a **coordinated, phased framework** of initiatives organized across five focus areas:

- **Policy and regulatory systems**, aimed at improving consistency, clarity, and efficiency in approvals and inspections
- **Financing and insurance**, addressing cash-flow, risk, and valuation challenges specific to OSC.
- **Procurement models and contracts**, focused on enabling earlier manufacturer involvement and aligning contracts with factory-based delivery.
- **Skilled workforce and skills development**, supporting training pathways and year-round employment in factory and site settings.
- **Transportation and logistics**, targeting planning, permitting, and damage-reduction challenges associated with modular delivery.

The roadmap is designed as an adaptive implementation framework that can be applied incrementally across jurisdictions. A phased implementation plan and accompanying dashboard provide a mechanism to track progress, support accountability, and refine priorities over time.

Collectively, the roadmap provides a practical foundation for governments, industry partners, housing authorities, and researchers to strengthen coordination, reduce delivery risk, and support the appropriate scaling of OSC as part of a broader strategy to increase housing supply in Atlantic Canada. The initiatives identified are also expected to contribute to productivity improvements in all forms of building construction within the region. **Participation by governments, industry partners, and academic institutions in this research does not constitute a commitment to the report's recommendations or implementation.**

Table of Contents

Figures

Tables

Glossary

ADU (Accessory Dwelling Unit):

This report uses ADU to mean Accessory Dwelling Unit and to encompass the following definitions:

- Backyard Suite: a self-contained subordinate dwelling unit that is located within an accessory building or structure. (Halifax)
- Garden Suite: an additional dwelling unit placed or erected in the rear yard of an existing single unit dwelling lot. (Moncton)
- Accessory Dwelling Unit: a Dwelling Unit for a caretaker or essential worker accessory to a Permitted Use when the unit is included in the main Building or, in the case of land uses such as Agriculture, Forestry or Salvage Yards, when the Dwelling Unit is situate on the same property as the Use and forms part of the Use, and which shall not exceed 80 metres square. (St. John's)
- Accessory Dwelling Unit: an independent secondary housing unit located on the same lot or parcel of land as an existing single-family home. ADUs could be a separate dwelling, attached to or within an accessory building (such as an existing detached garage) or an in-law suite in an existing home. ADUs have separate entrances and independent living, cooking, and washroom amenities. (Charlottetown)
- Garden Suite: a self-contained Dwelling Unit that is located in the Rear Yard of a Single-detached Dwelling. (general)

AHJ: Authority Having Jurisdiction: the governmental body responsible for the enforcement of a regulation or the official or agency designated by that body to exercise such a function.

BCH: Build Canada Homes: a federal agency tasked with building affordable homes, supporting builders with financing, and encouraging innovative building methods.

CANB: Construction Association of New Brunswick: Federation of associations designed to perform a coordinating function for reaching consensus and to effectively present the construction industry's collective views to various client groups.

CANS: Construction Association of Nova Scotia: Industry association representing the construction Industry in Nova Scotia.

CAPEI: Construction Association of PEI: Industry association representing the construction industry in Prince Edward Island.

CMHC: Canada Mortgage and Housing Corporation: a financial institution providing housing finance solutions and delivering the government's housing programs.

DAL: Dalhousie University

HICC: Housing, Infrastructure and Communities Canada: Federal department lead by the Deputy Minister of Housing, Infrastructure and Communities Canada. The mission of the department is to make public infrastructure more sustainable, inclusive, and climate resilient, and housing more available and affordable.

HRM: Halifax Regional Municipality

LMIA: A Labour Market Impact Assessment (LMIA) is a document that an employer in Canada may need to get before hiring a foreign worker. A positive LMIA will show that there is a need for a foreign worker to fill the job. It will also show that no Canadian worker or permanent resident is available to do the job.

MMC: Modern Methods of Construction, including all forms of Off-site Construction, such as 3D volumetric modules, 2D structural panels, prefabricated components, and non-structural sub-assemblies, as well as On-site Construction innovations, including digital tools, robotics, advanced processes, and accelerated assembly methods.

Modules: See Category 1 of MMC Framework. Modules are fully enclosed, box-like units produced in a factory. They range from structural-only shells to fully finished rooms with interior fit-out, services, and external cladding. Once transported to site, modules are assembled to form a complete building.

MUN: Memorial University of Newfoundland

NB: New Brunswick (Canadian province)

NBC: National Building Code: document containing technical requirements for the design and construction of new buildings, as well as the alteration, change of use and demolition of existing buildings.

NBHC: New Brunswick Housing Corporation: responsible for creating the conditions for safe, affordable and accessible housing for all New Brunswickers. Builds, maintains and operates provincially owned housing, develops and delivers housing programs and initiatives, and provide residential tenancy services.

NL: Newfoundland and Labrador (Canadian province)

NLCA: Newfoundland and Labrador Construction Association: Industry association representing the construction industry in Newfoundland and Labrador.

NLHC: Newfoundland and Labrador Housing Corporation: a crown corporation whose mandate is to develop and administer housing assistance policy and programs for the benefit of low to moderate income households throughout the province.

Nova Scotia Department of Growth & Development: The Department of Growth and Development drives economic growth and productivity by creating the conditions for communities, businesses and households to thrive. Includes housing programs for housing developers and providers, as well as people with low and modest income (including families, seniors and individuals with special needs).

NRC: National Research Council: Government of Canada organization focused on research and innovation with a mission of advancing knowledge, applying leading-edge technologies, and working with other innovators to find creative, relevant and sustainable solutions to Canada's current and future economic, social and environmental challenges.

NS: Nova Scotia (Canadian province)

NSPHA: Nova Scotia Provincial Housing Agency: responsible for maintaining, managing and operating safe and suitable public housing for low-income Nova Scotians. Operates and maintains public housing units across the province in a variety of building styles.

OCRC: Off-site Construction Research Centre: A research centre focused on off-site construction at the University of New Brunswick's Fredericton campus.

OSC: Off-site Construction

PEI Housing Corporation: A crown Corporation of the Department of Housing and Communities which shares the responsibility for social housing in the province with nine local housing authorities to maintain safe and affordable housing. The Corporation administers the province's social housing program, delivers programs to support home renovations and works closely with developers to support new construction projects to create affordable housing units.

PEI: Prince Edward Island (Canadian province)

StatsCan: Statistics Canada: National statistical office ensuring Canadians have the key information on Canada's economy, society and environment that they require to function effectively as citizens and decision makers.

UNB: The University of New Brunswick

UPEI: The University of Prince Edward Island

1.0 Introduction

1.1 Project context: housing supply challenges in Atlantic Canada

Atlantic Canada is experiencing one of the most significant housing challenges in its recent history. Since 2020, rapid population growth and increased migration toward urban centres have driven housing demand across Atlantic Canada. Concurrently, labour shortages, rising construction material costs and regulatory complexities have constrained housing supply, intensifying affordability and availability pressures across all housing types. While national studies estimate that Canada requires between 3.5 and 5 million additional homes within the next decade, the implications for Atlantic Canada are proportionally more significant given recent population growth, labour constraints, and limited housing supply across the region.

Although each province faces its own combination of labour shortages, regulatory bottlenecks, industry capability and capacity and infrastructure limitations, the underlying challenge is shared: **the current pace and method of housing delivery are insufficient to close the growing supply gap**. Recognizing the scale of this issue, the four Atlantic provinces and the federal government began coordinated discussions in 2022 to explore collective strategies to accelerate housing supply. These conversations highlighted the need for a sector-wide shift toward more productive, scalable construction approaches.

1.2 Project purpose and relevance

The project responds directly to the region's need for actionable, evidence-based strategies that can meaningfully increase housing production capacity. Through extensive engagement with provincial governments and federal partners, the UNB Off-site Construction Research Centre (OCRC) identified a critical gap: Atlantic Canada lacks a unified framework to assess opportunities, understand constraints, and leverage the potential of modern methods of construction (MMC). While off-site construction (OSC) **represents** promising approach within a broader suite of housing delivery solutions, industry participants consistently noted the absence of coordinated guidance, common definitions, and shared priorities across the region.

This project fills that gap by developing an *Atlantic Offsite Housing Innovation Roadmap* (hereinafter, the "roadmap"). The *roadmap* is intended to accelerate adoption of factory-built and prefabricated housing solutions, strengthen collaboration across provinces, and align innovation efforts with ongoing national initiatives aimed at modernizing construction and increasing productivity within the housing sector. In doing so, it supports informed decision-making across the region by considering MMC in a broader context.

1.3 Scope and approach

The project takes a regional, multi-method approach to understanding the conditions shaping the use of off-site construction in Atlantic Canada. Engagement activities included municipalities, provincial departments, industry leaders, manufacturers, builders, academics and related organizations across all four provinces. The project focuses on assessing the five primary barriers and enablers that influence the adoption and scalability of off-site construction: policy and regulatory processes, procurement practices, financing and insurance, workforce capacity, and transportation and logistics constraints. This approach provided insights into where the region is positioned today, and what changes are needed to support greater use of OSC in housing delivery.

Through global knowledge gained by the OCRC, structured interviews with industry leaders, focused workshops with 235+ Atlantic Canadians, and advisory committee guidance, the project gathers evidence, identifies gaps, and captures diverse perspectives to develop a regional *roadmap* with key initiatives, recommendations and timelines.

Beyond the *roadmap*, the project team took the opportunity to develop a Canadian MMC definition framework, an important step to advancing the industry both regionally, and across the country. Primarily adapted from the UK Modern Methods of Construction (MMC) framework (2019), this definition framework ensures alignment of the terms used when referring to innovative methods of construction. The outcome is a seven-category MMC framework that provides clear and standardized definitions of building methods, and how they fit into Canada's construction environment. An overview of the seven categories is shown in **Figure 1** and the details of this framework are outlined in **Appendix G: Canadian Modern Methods of Construction (MMC) definition framework**. Importantly, this report focuses on the broader scope of OSC across multiple categories (Categories 1 through 4, including full volumetric modular, panelized and other types of prefabricated components).

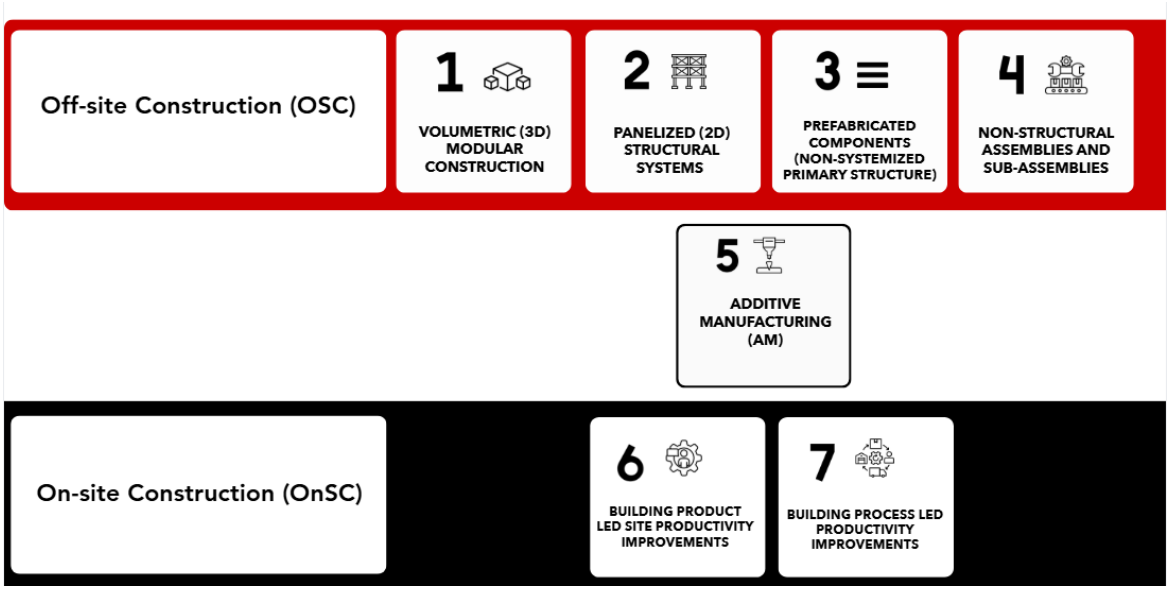

Figure 1: Overview of Canadian MMC Definition Framework

1.4 Alignment with federal and provincial housing strategies

Both federal and provincial governments have identified increased housing supply, improved productivity, and innovation in construction as essential components of their housing strategies. CMHC's national housing initiatives emphasize the need for scalable solutions that address labour shortages, regulatory and permitting complexity, construction timelines, and support affordability challenges. The federal Build Canada Homes (BCH) initiative includes a project portal with active RFQs for housing development across Canada. BCH also emphasizes modern methods of construction and prioritizes Canadian-made materials and regional production hubs to strengthen domestic industry (Government of Canada, 2025). Realizing this potential will require clear sustainable demand and targeted industry support, particularly for manufacturers whose capacity to scale requires significant investment and is closely tied to demand certainty. At the provincial level, provincial housing action plans across Atlantic Canada call for greater collaboration, streamlined processes, and new methods of delivering housing more efficiently.

MMC are often cited as having the potential to align with these priorities by reducing build times, improving consistency quality, and supporting medium- and high-density forms. **However, realizing these benefits is contingent on enabling conditions such as workforce availability, regulatory alignment, sustainable demand, and industry readiness**. This project enables the region to build on existing policy direction by providing a

coordinated, evidence-driven roadmap that identifies how modernized construction can contribute to meeting provincial and federal housing targets.

By grounding the *roadmap* in regional needs while aligning with national mandates, this initiative positions Atlantic Canada as a leader in modern housing delivery and supports broader efforts to transform Canada's construction sector.

2.0 Background

2.1 Housing demand and supply in Atlantic Canada

Canada's housing market continues to face an unprecedented supply–demand imbalance. National analyses indicate that population growth and household formation have far outpaced the rate of new housing completions since the early 2010s, contributing to record-low vacancy rates and accelerating prices across most provinces (CMHC, 2025; Thompson & Globerman, 2025). CMHC estimates that housing starts would need to nearly double from approximately 240,000 per year to over 430,000–480,000 units annually by 2035 to meet projected demand, as summarized by Figure 2 (CMHC, 2025).

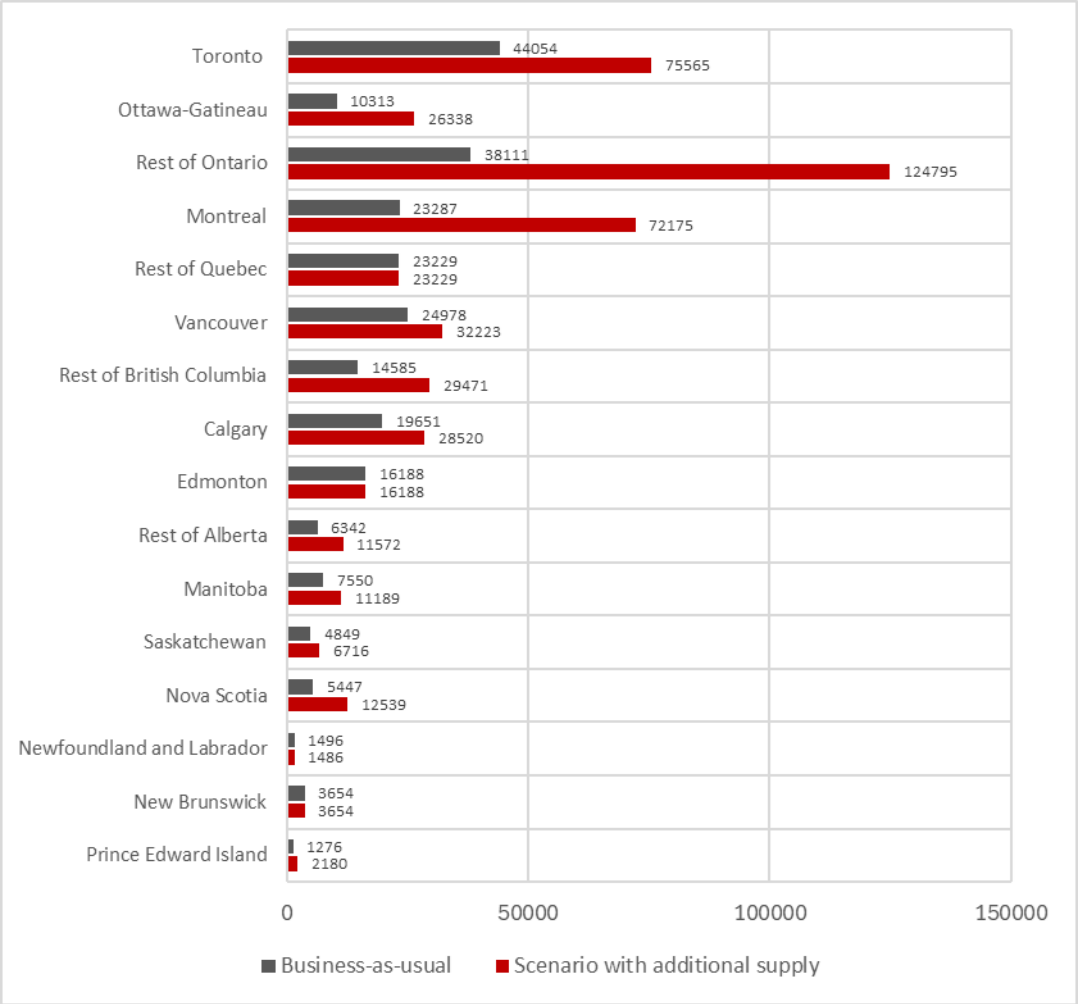

Figure 2: Projected annual housing starts, 2025 to 2035 (CMHC calculations)

While attention often centres on Ontario and British Columbia, recent national analyses highlight that smaller regions such as Atlantic Canada face an equally severe housing imbalance. The pandemic accelerated in-migration in the Atlantic region from central Canada and abroad, producing demographic surges that existing construction systems have struggled to accommodate (CMHC, 2025). However, the region's housing-construction sector remains capacity-constrained, characterized by labour shortages and an aging workforce that has begun to limit employment growth (Labour Market Analysis Directorate – Service Canada, 2023). In addition to workforce constraints, regulatory fees, permitting timelines, and approval inefficiencies contribute materially to housing costs and delivery delays, further limiting the sector's ability to respond quickly to rising demand (CMHC, 2022). Complementary analysis by Altus Group (2024) similarly identifies prolonged permitting and approval processes as a significant barrier to accelerating new housing delivery.

Housing supply across Atlantic Canada is shaped by limited construction capacity, high costs, regulatory complexities and uneven regional development. Nova Scotia's Provincial Housing Needs Assessment estimates a need for approximately 71,600 total new housing units between 2023 and 2027, increasing to 104,800 total new units by 2032, to address projected population growth and housing affordability pressures (Government of Nova

Scotia, 2023). Recent housing activity has increased, with Nova Scotia housing starts reaching a seasonally adjusted annualized rate of roughly 9,000 units in mid-2025 (Statistics Canada, Table 34-10-0158-01). In New Brunswick, affordability challenges persist, despite Moncton's rental vacancy rate rose from 1.5% in 2021 to 3.8% in 2025, rents increased by more than 35% (CMHC, 2025; Government of New Brunswick, 2022). On Prince Edward Island, an average of about 2,000 units is required to stabilize the market. Although vacancy rates remain low compared to other jurisdictions, Charlottetown's vacancy rate increased to 1.7% in 2025, following three consecutive years with a vacancy rate below 1 percent (Government of Prince Edward Island, 2024; CMHC, 2025).Meanwhile, according to the Newfoundland and Labrador Housing Corporation (NLHC) affordability and supply challenges persist within the provincial public housing system due to an aging housing stock, high building costs, and limited private-sector participation (NLHC, 2025).

Collectively, these trends indicate that housing availability remains well below estimated need, and affordability pressures are intensifying. Thus, without significant increases in annual housing starts, the Atlantic provinces are unlikely to close the supply gap this decade.

2.2 Overview of Off-site Construction (OSC) methods

Off-site Construction is planning & designing of construction activities to enable building or infrastructure elements to be pre-manufactured in a controlled environment, transported to site, and then rapidly 'assembled' rather than 'constructed' on-site. Although growing interest and policy initiatives have encouraged its adoption, OSC still represents only a small share of construction market, reflecting challenges related to standardisation, logistics, financing, and regulatory consistency (Modular Building Institute, 2024).

Research links different types of OSC to notable performance benefits, including enhanced productivity, quality control, schedule certainty, worker safety, and material-waste reduction, achieved through industrialised, digitally enabled workflows (CMHC, 2025; Broadhead et al., 2023). These advantages are increasingly recognized in innovation programs that view OSC as a mechanism to accelerate housing supply and meet sustainability goals. At the same time, persistent challenges such as limited regulatory alignment, fragmented supply chains, and high transport costs for large modules, continue to hinder widespread adoption, particularly in smaller regional markets (Modular Building Institute, 2024).

The United Kingdom's Modern Methods of Construction (MMC) definition framework provides a structured taxonomy that is increasingly used to conceptualise off-site and innovative building techniques (Cast Consultancy, 2019). The MMC framework identifies seven categories:

1. Pre-manufacturing: 3D primary structural systems
2. Pre-manufacturing: 2D primary structural systems
3. Pre-manufactured components: Non-systemized primary structures
4. Additive manufacturing
5. Pre-manufacturing: Non structural assemblies and sub-assemblies
6. On-site Building Product-led Site Labour Reduction / Productivity Improvements
7. Site Process-led Labour Reduction / Productivity Improvements

This classification situates OSC within a continuum of innovation from high-volume modular factories to digitally enabled site processes, emphasising how industrialization, standardization, and digital integration can drive systemic productivity gains (UK MHCLG, 2019). Aligning OSC practices within this MMC continuum supports clearer

benchmarking, encourages standardization, and highlights pathways for scaling industrialized housing delivery suited to diverse climatic and regulatory contexts.

2.3 Status of OSC in Atlantic Canada

OSC activity in Atlantic Canada is expanding gradually as the building industry pursues more efficient and sustainable delivery models. A minimum of five volumetric modular companies has existed in the region (particularly in New Brunswick) for over 30 years, and modular housing has become a leading regional innovation pathway, supported by several established manufacturers. According to Deloitte's Atlantic Innovation Initiative (2024), which focused only volumetric modular manufacturers, companies in New Brunswick estimate that sustainable demand could increase their production capacity by nearly 2.5 times, with further gains possible through automation and digitalization. A preliminary capacity analysis conducted by Off-site Construction Research Centre in June 2025 indicates that New Brunswick's volumetric manufacturers can deliver approximately 15–20 percent of the country's volumetric modular housing, a share that continues to grow. Industrial capacity, however, remains uneven across provinces: PEI and Newfoundland and Labrador host smaller or newer manufacturers, while Nova Scotia's sector is still emerging but expanding, reflecting differing levels of maturity across the Atlantic OSC ecosystem.

Despite this progress, widespread adoption remains constrained by shortages of skilled labour, high transportation costs and width limits, limited public understanding of modular products, and municipal permitting delays (Build Force Canada, 2025). Across Atlantic Canada, housing supply continues to lag population growth and household formation, with sustained pressures evident across all four provinces. Current OSC output satisfies only a fraction of overall housing demand in the region, underscoring OSC's potential role in closing the supply gap if supported through coordinated policies and industry action.

Several recent studies emphasise the need for stronger coordination between governments, industry, and research institutions to enable large-scale OSC adoption. Suggested strategies include establishing regional procurement frameworks to ensure demand certainty, harmonizing building codes and permitting processes, and expanding training programs for OSC-related trades (CMHC, 2025). Studies further highlight the potential of collaborative networks to facilitate innovation, standardised design catalogues, and pilot projects that demonstrate scalability. Collectively, these insights underscore the importance of aligning policy, industry capacity, and workforce development to fully realise the benefits of off-site construction across the region.

Beyond the OSC businesses' capacity to build housing in and for Atlantic Canada, there is a significant opportunity for this sector to be a key economic driver in the region. Between the robust transportation network in New Brunswick and the deep seaports across the region, there is potential to leverage this sector to supply North and Central Canada as well as Europe and South America with permanent and temporary housing. Investment in this sector creates year-round sustainable jobs for the skilled workforce and presents an opportunity to attract domestic and international based software and equipment companies to the region. Building relationships through the triple helix model of innovation (academia-government-industry) attracts these businesses to expand in the region. This opportunity is best supported through coordinated action across industry, government, and academia, with consistent policy and procurement alignment. This is an opportunity to leverage the expertise in several research institutions in supporting areas of expertise (e.g., University of New Brunswick has one of the first engineering, computer science and forestry programs in the country while Université de Moncton, University of PEI and Memorial University faculties of engineering boast expertise in sustainability and industrial engineering and Dalhousie University is home to not only a mature engineering program but also the only Architecture and

Planning programs in Atlantic Canada). These institutions play a supporting role by contributing applied research, workforce development, and innovation capacity alongside industry and government partners.

2.4 Enablers and barriers to OSC

Growing pressures on housing supply have increased interest in OSC because of its potential to deliver units more efficiently and predictably than conventional methods. However, these benefits depend heavily on the overall systems governing the real estate and construction sector rather than the method of construction alone. The Roadmap to Transform the Canadian Construction Industry highlights the need for regulatory alignment, modernized procurement, financial readiness, and stronger workforce capacity to support industrialized construction at scale (NRC, 2025). CMHC similarly finds that OSC performance is constrained when projects move through processes designed for site-built delivery, a point also reinforced by CSA Group (CMHC, 2023; CSA Group, 2021). Overall, the literature points to five categories that shape OSC implementation: **policy and regulatory landscape, financial systems, procurement models, skilled workforce, and transportation and logistics**.

2.4.1 Policy and regulatory landscape

OSC, alongside conventional site-built construction, continues to face permitting and regulatory challenges in many parts of Canada. Projects often face duplicated inspections and administrative delays, largely because permitting systems are still structured around site-built construction (CMHC, 2023). Municipal authorities also have limited familiarity with OSC, and existing review procedures do not consistently address factory-built components (SHBC, 2024; Harvey, 2016). Inconsistent interpretation of building code requirements and the absence of a clear approval pathway for OSC add further uncertainty (NRC, 2025).

Clearer adoption, education and appreciation of modular certification standards such as CSA A277 can reduce duplicated inspections and support recognition of factory-completed work (CSA Group, 2021). Formal approval pathways for industrialized construction, improved inter-jurisdictional coordination, and standardized permitting tools can create more predictable review processes (NRC, 2025). Additional supports such as early submission requirements and training for local government staff can further streamline decision-making (Harvey, 2016; McKinsey & Company, 2019).

2.4.2 Financial systems

Financial systems create challenges for OSC, since many lenders and funding programs still rely on risk and valuation practices developed for site-built projects. These systems use progress-claim schedules based on on-site milestones, such as foundation completion, framing, or enclosure. Because modular projects complete most work in the factory, traditional progress-claim structures do not align with the actual production sequence. Thus, these models do not consistently account for factory production, transport, or installation, creating uncertainty in how OSC assets are financed and insured (CMHC, 2023; CSA Group, 2021). Smaller manufacturers also face difficulty securing bonding, investment, and working capital due to limited market data and inconsistent recognition of factory-completed work (Harvey, 2016; CMHC, 2023).

Improved financial tools can better support manufacturing-based delivery. Lenders and insurers can reduce uncertainty by developing valuation methods that recognize factory-completed work and by adjusting risk assessments to reflect modular processes (CMHC, 2023). Dedicated loan products, clearer insurance guidance, and bonding programs tailored to smaller manufacturers can improve access to capital and support scaling (CSA Group, 2021; Harvey, 2016).

2.4.3 Procurement models

Procurement practices are a significant constraint for OSC, largely because they were built around site-based delivery models. Public procurement processes typically define project scope, performance requirements, budget, and schedule, while allowing the market to determine the most suitable construction approach. Where possible, procurement frameworks should remain method-neutral while ensuring that modern methods of construction including volumetric modular, panelized, hybrid and conventional on-site methods that use product and process improvements to optimize the site-based workforce (e.g., MMC framework categories 6 and 7) can compete fairly based on best value, demonstrable and societal outcomes. However, many existing procurement approaches do not adequately reflect the distinct processes and financial structures associated with OSC approaches thus eliminating OSC methods as a solution for project delivery.

Conventional design–bid–build processes delay manufacturer involvement in OSC projects, creating late design freeze decisions and misalignment between design and factory production requirements (CMHC, 2023). Contract terms and payment schedules based on on-site progress also fail to reflect the upfront costs of manufacturing, increasing risk for manufacturers (Aghlmand Azarian et al., 2025; Harvey, 2016). From a competition perspective, fair procurement does not depend on favouring any single construction method. Instead, it requires procurement frameworks that are method-neutral in principle, while flexible enough to accommodate different delivery models. Without this flexibility, procurement processes may inadvertently favour site-built construction, limiting the application of OSC.

More suitable procurement models, progress claims and contract templates support earlier manufacturer involvement. Integrated approaches such as design–build improve alignment between design and factory capabilities (McKinsey & Company, 2019). Models such as multi-year offtake agreements can also provide predictable demand for manufacturers, enabling investments in capacity and lowering unit costs through economies of scale. Contract language that addresses modular sequencing, delivery, and installation requirements can reduce disputes, while payment structures tied to factory milestones improve cash flow and reduce risk (Aghlmand Azarian et al., 2025).

2.4.4 Skilled workforce

Canada's construction labour market faces demographic pressures that affect OSC adoption. BuildForce Canada projects that 269,000 workers (21% of the labour force) will retire by 2034, contributing to a hiring requirement of 380,500 workers (BuildForce Canada, 2025). These estimates do not include labour required for emerging federal nation-building initiatives, which are expected to place additional pressure on the construction workforce. Complementary analyses suggest the potential labour requirement may be substantially higher when policy-driven demand is included. Deloitte (2025), drawing on national workforce scenarios, estimates that total construction hiring needs could exceed 800,000 workers over the coming decade. Persistent job vacancies indicate ongoing difficulty recruiting skilled trades (Statistics Canada, 2025). These shortages limit the availability of workers experienced in OSC design, digital coordination, and factory-based production (Aghlmand Azarian et al., 2025). Workforce pressures are pronounced as well, with several Atlantic provinces facing some of the highest retirement rates in the country (BuildForce Canada, 2025). In addition, recent federal budget commitments in defence and energy infrastructure are expected to increase demand for skilled construction labour, placing further pressure on an already constrained workforce, particularly in regions with high retirement rates and limited labour mobility (Government of Canada, 2025).

While this report is focused primarily on residential construction, it is important to note that residential and non-residential construction draw from overlapping pools of skilled trades and technical professionals. BuildForce Canada (2025) reports that non-residential employment, particularly in industrial, commercial, and institutional (ICI) projects, is projected to rise by up to 17% by 2034. BuildForce emphasizes that the projected growth in the residential construction sector will create stronger demands on the construction labour force, noting that "market conditions for most trades and occupations in the non-residential sector are expected to remain strained in the near term" (2025).

Specifically in Atlantic Canada, all provinces experienced increases in overall construction activity in 2024, with projected growth in the residential sector through 2034. New Brunswick, Nova Scotia, and Newfoundland and Labrador are also projected for growth in non-residential construction through 2034 (BuildForce, 2025). These trends emphasize that a housing-focused labour surge could inadvertently strain essential ICI projects, such as hospitals, schools, and public infrastructure. The projected growth and overlapping workforce shortages in the industry highlight the need for coordinated workforce planning, mentorship, and knowledge transfer, ensuring that housing investments strengthen, rather than strain, the broader construction labour force.

While OSC can improve productivity and shift work towards factory-based environments, it does not reduce the overall need for skilled trades, supervisors, and technical professionals. Where appropriate skills and systems are in place, OSC can support higher labour productivity by enabling greater output per hour worked through parallel production, controlled factory environments, and reduced on-site rework (Aghlmand Azarian et al., 2025). OSC reallocates labour demand across different phases and settings of the construction process. Therefore, its contribution to housing supply depends on workforce strategies that are coordinated across the industry, inclusive of multiple trades and delivery models. Training and capacity-building initiatives can help address labour market gaps. While partnerships between manufacturers, post-secondary institutions, and training organizations can support targeted upskilling (Harvey, 2016). Increased exposure to OSC through demonstration projects and early-stage integration can also strengthen industry familiarity (CMHC, 2023). Stable project pipelines assist manufacturers in attracting and retaining skilled labour in a tight labour market (BuildForce Canada, 2025).

2.4.5 Transportation and logistics

Transportation remains a significant and unique constraint for OSC in Canada. Transporting volumetric modular units often requires oversized-load permits across multiple jurisdictions, creating administrative delays (CSA Group, 2021). Provincial differences in allowable module dimensions, along with narrow road conditions and infrastructure limitations, further complicate delivery (Harvey, 2016). Long distances and harsh weather also raise transportation costs and risk (NRC, 2025).

Harmonized transportation requirements and clearer oversized-load policies strengthen coordination across jurisdictions and supports more efficient logistics (NRC, 2025). Standards such as CSA Z250 provide structured guidance for logistics, transportation, and installation planning (CSA Group, 2021). Incorporating transportation constraints early in design improves coordination and reduces disruptions during delivery (SHBC, 2024).

Although the literature reflects national conditions, these system-level challenges are also highly relevant to Atlantic Canada because of the region's scale, institutional capacity, and market structure. Many local and provincial government departments operate with small planning and inspection teams, which can make it difficult to develop specialized review procedures for factory-built components. The region also has a smaller manufacturing base and fewer lenders or insurers familiar with modular assets, creating added uncertainty for

financing and delivery. Geographic dispersion, interprovincial transport distances, and weather-related disruptions further affect the movement of large modules. These conditions suggest that the systemic issues identified nationally are not only applicable to Atlantic Canada but may, in several cases, be intensified by the region's smaller scale and limited institutional capacity.

2.5 Sustainability and affordability considerations

OSC supports both environmental and economic goals by improving how housing is designed, built, and delivered (Deloitte, 2024). Life-cycle studies indicate that modular and other off-site systems generally produce lower embodied carbon than conventional site-built methods due to reduced waste, shorter on-site work, and more efficient logistics. A life-cycle assessment of typical residential homes in the United States found that modular construction has lower average environmental impacts than conventional methods across multiple impact categories (Quale et al., 2012). Beyond carbon reductions, factory-based production enables more precise material control and waste segregation, substantially reducing construction waste relative to on-site approaches. One comparative analysis found that modular methods can reduce overall waste generation by up to 83 percent in some case studies (Loizou et al., 2021). International frameworks also emphasize industrialized and flexible building methods as key enablers of circular construction. The World Green Building Council (2022) highlights design for disassembly, reuse of prefabricated elements, and standardized components as strategies that directly align with modular approaches.

In addition to environmental and cost outcomes, sustainability in the context of off-site construction also encompasses schedule performance, build quality, and worker safety. A critical review of modular construction literature finds that modular methods tend to shorten overall project timelines relative to conventional on-site delivery by enabling concurrent factory production and site preparation, as well as reducing weather-dependent delays (Kamali & Hewage, 2016; Pervez et al., 2022). Off-site production in controlled factory environments has also been associated with improved quality outcomes and reduced defects compared with on-site construction (Botchway & Pan, 2022; Egege, 2018). Off-site approaches have been linked to safer working environments with fewer high-risk activities and lower exposure to on-site hazards, because much of the labour is relocated indoors and site work is reduced (Egege, 2018; Pervez et al., 2022). From an affordability perspective, off-site delivery offers more predictable schedules and potential cost control. Repetitive manufacturing and standardized designs enable economies of scale, while parallel factory production and on-site work can shorten project timelines. Evidence from global syntheses shows that modular delivery can reduce construction durations by roughly 20–50% and lower total costs by 10-20% when production volumes are consistent and approval pathways are streamlined (Kamali, Hewage, 2016).

However, several studies note that OSC can involve higher upfront capital costs, particularly for manufacturing setup, design coordination, transportation, and early-stage procurement (Harvey, 2016; McKinsey & Company, 2019). While factory-based production may increase initial project expenditures, evidence suggests that total project costs can be lower over the full delivery lifecycle when schedule compression, reduced rework, improved quality control, and lower financing and contingency costs are considered (Kamali & Hewage, 2016). As a result, the cost competitiveness of OSC is highly context-dependent and influenced by factors such as production volume, procurement structure, financing conditions, and regulatory certainty. Market size, geographic location, transportation distances, workforce availability, land costs, and local regulatory conditions all influence whether modular delivery is economically viable or cost-competitive for a given project. In smaller or remote markets, limited demand volumes and higher logistics costs can reduce the cost advantages of factory-based production, indicating that OSC is not universally applicable as an affordability strategy across all project types or locations.

In Atlantic Canada, efforts to improve housing affordability and environmental performance are increasingly linked to collaboration and innovation in delivery. Regional discussions have identified shared manufacturing hubs, standardized design catalogues, and coordinated procurement approaches as potential mechanisms to strengthen production efficiency and lower costs. These strategies align with broader federal priorities on green building and embodied carbon reduction, positioning OSC as a pathway to expand housing supply while reducing environmental impacts across the region. Additional detail on this topic has been attached as **Appendix E: Sustainability and climate change considerations**.

2.6 Public infrastructure considerations

Wrap-around and public infrastructure plays a critical role in enabling population growth and new residential development. It provides essential services that make communities livable, functional, and promote a high quality of life. Inadequate infrastructure systems can constrain housing supply, increase development costs, and limit the ability of municipalities to accommodate new residents (CMHC, 2025).

While wrap-around, public and civil infrastructure were not part of the primary scope of the roadmap **Appendix F: Infrastructure's role in housing development** explores the state and availability of infrastructure that is required and enables residential development in Atlantic Canada. It identifies knowledge gaps that limit a true understanding of the capacity available to support new development and provides recommended actions for provincial governments in Atlantic Canada.

2.7 Lessons learned from other countries

Experience from countries with similar characteristics to Atlantic Canada such as Scotland, Ireland, New Zealand, and Sweden shows that OSC performs best when it is treated as a core housing strategy. The relevance of these international examples to Atlantic Canada varies by context. Ireland's experience is most comparable in terms of housing pressures, reliance on public procurement, and the use of standardized housing programs to support MMC adoption in a relatively small national market. New Zealand shares similarities with Atlantic Canada in its geographically dispersed population, regional supply chains, and use of off-site construction to deliver housing in remote and infrastructure-constrained areas. Scotland offers relevant lessons for rural, island, and peripheral communities, where logistics, transport constraints, and weather conditions shape housing delivery. Sweden differs more significantly in scale and industrial maturity, but remains instructive due to its long-term, systems-based approach to industrialized house building and policy coordination. Across these contexts, governments and industry have used OSC to respond to housing pressures in small or peripheral markets, rural and island communities, and regions facing skills shortages and productivity challenges (Lessing, 2015; Scottish Government, 2019). Although the policy frameworks and governance structures differ across these countries, several common lessons emerge that are directly relevant to Atlantic Canada, as summarized by Figure 3.

1. Establish clear policy direction for OSC: International examples show that OSC adoption increases when governments clearly state that it is part of their housing delivery approach. Ireland's MMC Roadmap and Housing for All policy demonstrate how clear policy direction can normalize off-site delivery across government programs (Department of Housing, Local Government and Heritage (DHLGH), & Department of Enterprise, Trade and Employment (DETE), 2023). Sweden provides another example, where industrialized house building is supported by long-standing national policies promoting innovation, timber construction, and productivity improvements (Lessing, 2015).

2. Build stable, multi-year procurement pipelines: Countries that use OSC at scale generally provide manufacturers with consistent, predictable demand. Ireland supports this with standardised house types and procurement criteria that favour MMC (National Economic and Social Council, 2024). New Zealand's Kāinga Ora uses multi-year framework agreements for off-site manufacturing to maintain steady production (Kāinga Ora – Homes and Communities, 2022).

3. Standardize technical pathways and certification: Countries with maturing OSC markets reduce regulatory uncertainty by developing consistent approval routes and technical standards. Ireland's MMC definitions and certification pathways help streamline permitting and build confidence among regulators and lenders (DHLGH & DETE, 2023). New Zealand's BuiltReady modular certification program provides a recognized national pathway that shortens consenting processes (Lin et al., 2022).

4. Strengthen workforce and industrial capability: Scaling OSC requires skills in digital design, manufacturing, and quality assurance, which are not always part of conventional construction training. Scotland highlights the need for modernized training aligned with off-site construction methods (Scottish Government, 2019). Ireland links its MMC strategy to national upskilling programs and research partnerships to expand industry capability (NESC, 2024).

5. Integrate logistics planning early: Remote and island regions benefit from OSC when logistics are considered during early project design. Scotland's island housing projects show that ferry capacities, narrow road networks, and weather conditions must shape module specifications and delivery planning (Scottish Government, 2023). New Zealand also emphasizes early coordination of transport routes and installation sequencing to avoid delays (Shahzad, 2011).

6. Coordinate systems: OSC scales when multiple systems evolve together rather than through piecemeal reforms. Sweden's industrialized housing model demonstrates that product platforms, supply chains, and regulatory frameworks must reinforce each other to achieve consistent performance (Lessing, 2015). Ireland's MMC roadmap similarly integrates regulation, procurement, certification, and skills within a unified national framework (DHLGH & DETE, 2023).

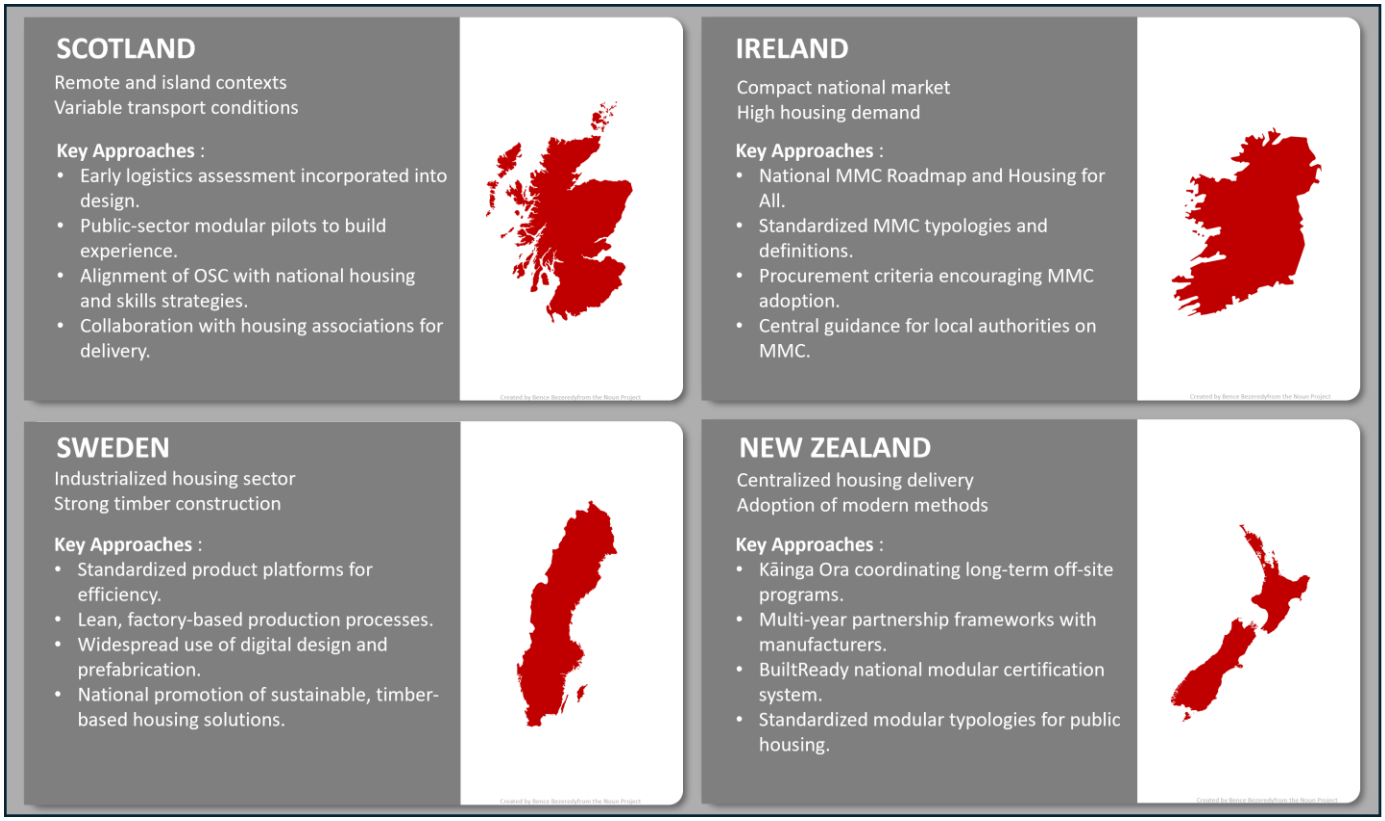

Figure 3: International practices relevant to Atlantic Canada

2.8 Gaps in Knowledge

Though Canada's OSC sector is expanding nationally, there remains a pronounced absence of region-specific evidence for the Atlantic provinces. Existing studies provide broad overviews but rarely consider the region's unique demographic, geographic, and policy conditions. The CSA Group (2021) highlights inconsistencies in data collection, certification, and permitting practices across provinces, leaving smaller markets such as New Brunswick, Newfoundland and Labrador, Nova Scotia, and Prince Edward Island underrepresented in national analyses. For example, the uneven application of the CSA A277 factory-certification standard and the absence of harmonized inspection and approval processes continue to create regulatory uncertainty and limit cross-provincial collaboration (CSA Group, 2021; Deloitte, 2024). Furthermore, the region lacks pilot and demonstration projects required to validate MMC approaches under Atlantic conditions, despite national calls for evidence-based innovation and regional demonstration programs to support housing and decarbonization goals (Natural Resources Canada [NRCan], 2023).

This project seeks to address major gaps in the understanding and application of off-site and modern methods of construction across Atlantic Canada. It focuses on improving coordination among government, industry, and research partners through a regional roadmap and the establishment of an innovation network. These initiatives aim to align building standards, streamline approval and certification processes, and support pilot projects that demonstrate practical, affordable, and sustainable housing solutions tailored to the region's context.

3.0 Methodology

3.1 Overview

Figure 4 depicts the multi-stage methodology used to develop the roadmap. The methodology comprises several steps including: a review of previous work in Canada (e.g., the *Roadmap to Transform the Canadian Construction Industry*), a policy and by-law review, industry expert interviews, and a series of workshops to form the core of the data collection process. This data was then analyzed with supporting evidence from a desktop document review to develop an innovative roadmap to increase housing supply in Atlantic Canada.

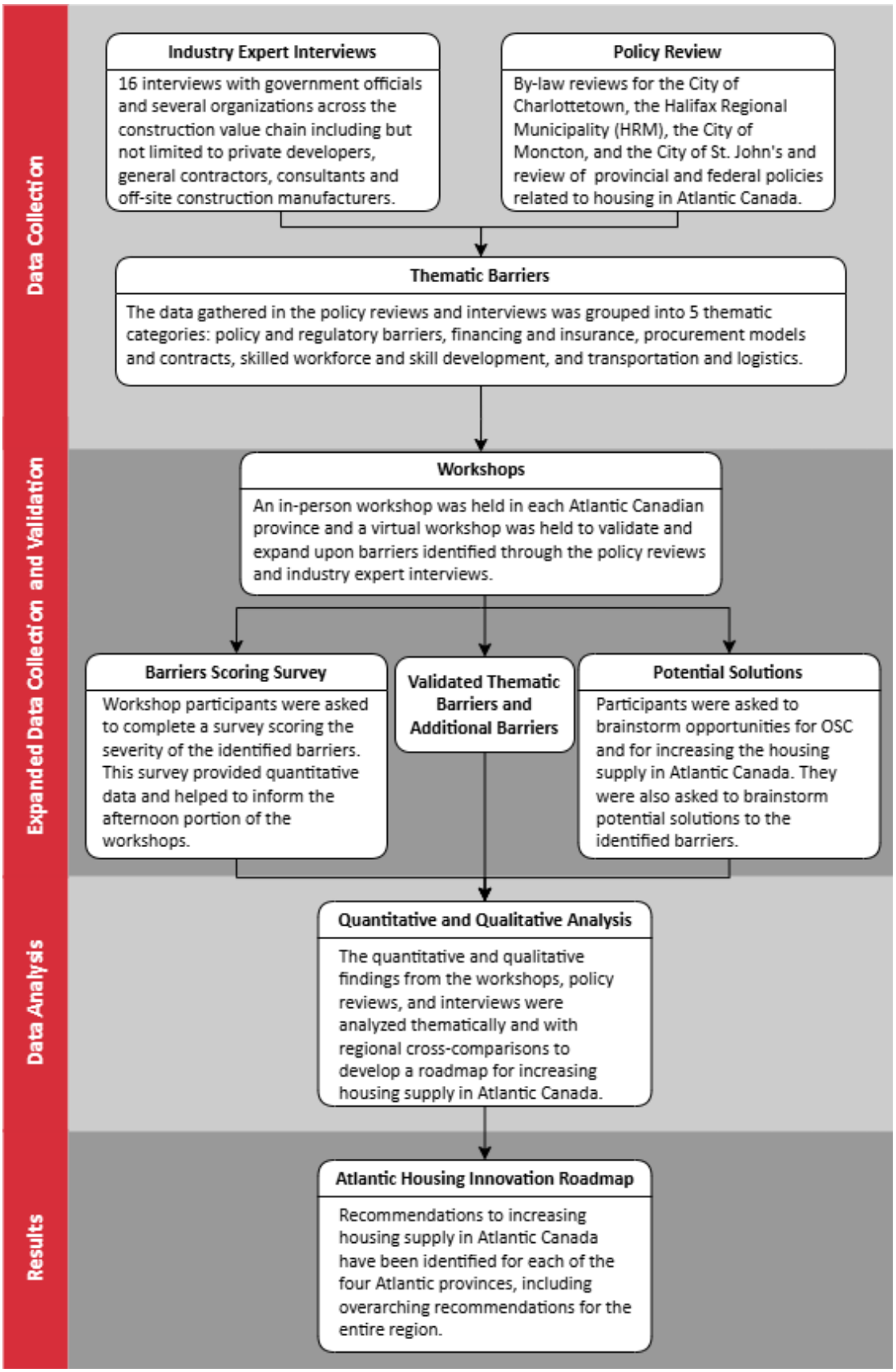

Figure 4: Overview of roadmap methodology

3.2 Data Collection

3.2.1 Policy and by-law review

A policy and by-law review was conducted to evaluate the current regulatory environment. **The researchers conducted the review through the lens of volumetric modular construction (VMC or category 1 in the MMC Definitions Framework) since it moves the highest percentage (up to 95%) of construction activity off-site compared to other types of OSC and thus faces a broad range of regulatory barriers relevant to OSC. Therefore, the findings around VMC are expected to apply across a range MMC categories, with less factory-intensive methods likely facing a subset of the barriers identified for VMC.** The review was completed across three levels of government: federal, provincial, and local to identify enablers and barriers. While the review was for larger urban centres in each of the Atlantic provinces, t**he researchers recognize that constraints in smaller and rural communities may differ**. This gap in review was addressed by hosting both in-person and virtual workshops. For a complete list of the policy documents reviewed, refer to **Appendix C: Documents for policy review**.

The provincial policy review examined how legislation and regulatory systems shape the feasibility of VMC across Atlantic Canada. The review focused on provincial frameworks governing planning legislation, building code administration, fire and life safety requirements, inspection processes, and transportation rules for oversized loads which are the areas that directly influence VMC project approvals and implementation.

Since provincial legislation is operationalized at the municipal level, the analysis included a detailed review of one representative municipality (the largest) in each province: Moncton (New Brunswick), Halifax Regional Municipality (Nova Scotia), Charlottetown (Prince Edward Island), and St. John's (Newfoundland and Labrador). These studies illustrate how provincial rules translate into local zoning, permitting, design review, and inspection pathways. Although not representative of all municipalities, they provide practical insight into how provincial systems affect real project conditions.

All documents were assessed using a 15-point screening framework, as outlined in **Table 1**. This framework provides a consistent method for identifying regulatory barriers and enablers and allows for structured comparison across jurisdictions. The review emphasized volumetric modular construction, as this method is most sensitive to regulatory delays, on-site approvals, and duplicated inspection requirements. The analysis therefore focused on areas where provincial or municipal legislation may create procedural uncertainty, duplicated compliance steps, or delays that affect modular project timelines and cost predictability. While many of the criteria assessed also affect housing development more broadly, the screening framework focuses on how these requirements interact with the specific dimensional, logistical, inspection, and financing characteristics of volumetric modular construction, and where they may constrain VMC uniquely or more severely than site-built construction.

Table 1: *15- Point screening framework*

Criteria	Impact on VMC
Height Limits	Volumetric modular buildings increase the overall height of a building because each module (or box) is structurally complete. Modular buildings in a 10 m zone limit may result in less storeys if built using VMC vs. conventional methods. Under an 18 m cap, modular typically reaches five storeys, while conventional may reach five–six. Height caps measured in feet or meters rather than storeys may reduce the buildable density, affect return on investment on a per-square-foot basis, and limit the range of feasible volumetric modular housing offerings.
Transportation / Delivery Access	Modules are typically oversized loads requiring adequate road width, turning radii, oversized load permits, and clearance.
Parking / Site Layout	Crane placement and staging areas are required for installation. Strict or unclear parking and layout rules can slow down projects and restrict feasible on-site setup. In addition, minimum parking requirements for new homes can be prohibitive to increasing density, using land that could otherwise support more units, reduce density and limit VMC infill or small-lot projects.
Design Review Requirements	Many jurisdictions require new buildings to conform to prescribed architectural styles, materials, etc. Requirements such as design compatibility and heritage rules that mandate traditional materials and design specifications may go against the benefit of OSC through standardized designs and factory-selected materials. These processes can introduce delays, require redesigns, and reduce the potential cost and schedule advantages of VMC.
Density Limit	Zoning restrictions or maximum unit-per-area rules can limit the number of modules on a site. These limits particularly affect infill projects and accessory dwelling units (ADUs), reducing potential density and the economic viability of modular developments.
Material Restriction	Some jurisdictions (often in heritage zones or properties) restrict certain material types which can conflict with typical manufacturing processes, impacting cost and speed.
Permit Penalties	Permit penalties refer to fees, fines, or re-application costs triggered when permits expire, approvals lapse, prescribed timelines are exceeded, or additional reviews or re-submissions are required, including costs associated with extended municipal review processes. For VMC, such penalties can increase project costs and schedule risk, as delays in permitting or inspections may disrupt coordination between factory production and site readiness.
Lot Size	Minimum lot size requirements can prevent volumetric modular infill and restricts density.
Infrastructure Costs	Savings of all types of developments including volumetric modular projects can be offset by high connection/servicing fees reducing housing affordability.
Inspections	Depending on the AHJ, volumetric modular construction involves both factory inspections and often duplicate on-site inspections. Unclear jurisdictional responsibilities or duplicate inspections can create delays and added cost.
Fire Safety Standards	All modules in volumetric modular construction must meet fire separation and assembly standards in alignment with the NBC; misalignment between factory-built modules and local fire codes can complicate approvals.

Criteria	Impact on VMC
Mobile / Manufactured Home Restrictions	Outdated definitions may improperly categorize modular housing as a "manufactured home", leading to restrictive zoning that limits where modern modular units can be built.
Building Size Minimums	Minimum dwelling sizes can eliminate tiny homes or smaller homes which are often used for affordable housing or rapid deployment and may limit use of small ADUs and when combined with setback, stepback, or easement requirements, may reduce the effective buildable envelope and economies of scale.
Insurance	Insurance requirements may not be adapted to modular risk profiles (factory production and site assembly); gaps can lead to higher premiums, increased housing costs and project delays.
Financial Flow / Modular Payout	Most volumetric modular builders (or panelized manufacturers) require earlier payments or down payments which ensures cost certainty for the owner and reduces risk (e.g., increased material costs) to the manufacturer; conventional project financing focused on on-site project progress does not align with VMC workflows.

3.2.2 Industry expert interviews

In-depth interviews were conducted with key industry experts in the real estate and construction sectors throughout Atlantic Canada. These interviews served to gather insights on the opportunities and barriers facing the industry. Sixteen interviews were conducted with municipal government officials, general contractors, manufacturers, and industry experts. The interviews were semi-structured with a list of open-ended questions guiding the discussion. The questions focused on barriers to off-site construction and conditions associated with project success. Discussions centered around five main categories: policy and regulatory, procurement models and contracts, financing and insurance, skilled workforce and skill development, and transportation and logistics. A conversational format allowed for flexibility to further investigate emerging themes. A list of questions used to guide these interviews can be found in **Appendix A: Industry expert interview questions**.

Information gathered through the policy reviews and industry expert interviews was thematically grouped into tables corresponding to the five categories. These tables (see **Appendix B: Thematic barriers tables**) clearly organized the collected data and informed the topics of workshop discussions.

3.2.3 Engagement overview and participation statistics

A total of 16 interviews were completed with participants across the construction value chain in Atlantic Canada. Interviewees included:

- Municipal government officials
- MMC manufacturers
- General contractors
- Financial institutions
- Industry associations
- Other industry leaders and subject matter experts

The distribution of interview participation is summarized in **Figure *5***.

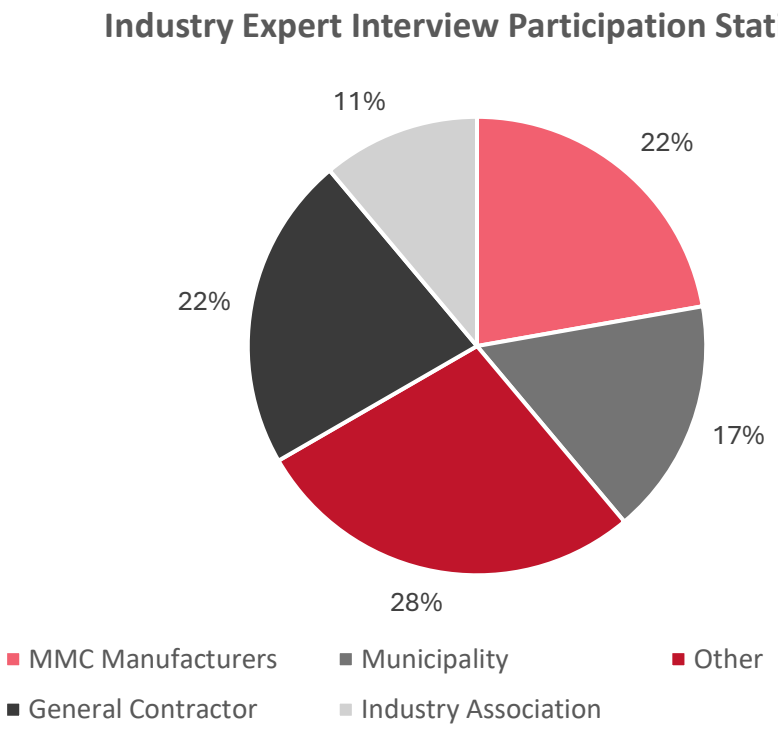

Figure 5: Industry expert interview participation statistics

The interviews were conducted in a semi structured format using a consistent set of open-ended questions, allowing participants to share both detailed experiences and broader perspectives. While the questions guided discussion around known barriers and success conditions, the conversational approach allowed for exploration of additional themes, and the sharing of lessons learned, or experiences encountered in the OSC project delivery process.

Discussions centered around five primary categories that influence the adoption and scalability of OSC in the region:

- Policy and regulatory frameworks
- Financing and insurance considerations
- Procurement models and contracting approaches
- Skilled workforce and skills development
- Transportation and logistics barriers

3.2.4 Workshops: validation and expansion

Full-day workshops were held in HRM, Charlottetown, Moncton, and St. John's, and a half day workshop was held virtually. The purpose of the workshops was to validate and expand upon barriers identified through the industry expert interviews and policy and by-law reviews, prioritize key barriers and solutions, and synthesize solutions for **increasing housing supply in Atlantic Canada**. There were over 350 registered for the workshops and a total of 235 attendees. The breakdown by workshop location is shown in **Figure *6***.

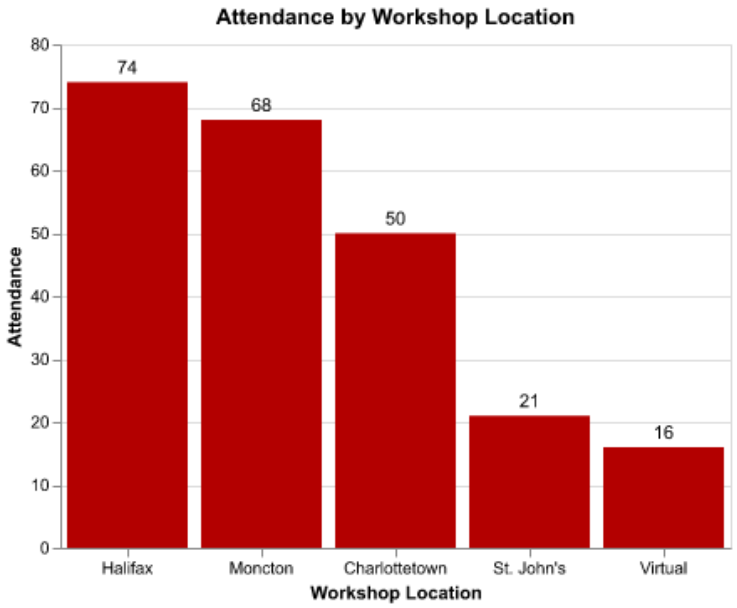

Figure 6: Workshop attendance summary

These workshops began by level-setting the audience with a background presentation on OSC, a presentation of the first version of the Canadian MMC definition framework, and relevant data about the housing crisis. The remainder of the workshop schedule consisted of group activities, roundtable and large group discussions, and a survey to score barriers to OSC. The schedule varied slightly across the four workshops; however, the structure and flow were consistent. **Table 2** shows the workshop schedule for the St. John's workshop. Additional workshop materials can be found in **Appendix H: Workshop materials**.

Table 2: *Workshop schedule for St. John's*

Time	Activity
8:30 – 9:00	Arrival and continental breakfast
9:00 – 9:15	Welcome, objectives & introductions
9:15 – 9:45	Framing presentation
9:45 – 10:45	Roundtable 1: Barriers to increasing housing supply through OSC
10:45 – 11:00	Nutrition break
11:00 – 12:00	Roundtable 2: Opportunities to increase housing supply through OSC
12:30 – 1:15	Lunch
1:15 – 14:00	Lightning talks with industry experts
14:00 – 14:15	Nutrition break
14:15 – 15:45	Roundtable 3: Pathways forward, insight and synthesis
15:45 – 16:00	Wrap-up and next steps

Throughout the group activities, participants were asked to review the thematic barriers tables, identify any significant barriers missing and validate the barriers listed in the tables. They were also asked to identify specific opportunities for OSC to play a role in overcoming barriers to increasing housing supply. **Table 3** shows a barrier table for a single category (policy and regulatory). The tables for all other categories can be found in **Appendix B: Thematic barriers tables**.

***Table 3**: Barriers table for policy and regulatory category*

	Barriers identified
1. POLICY AND REGULATORY	**1.1 Permitting delays, duplication, and inconsistency**
	1.1.a. Bureaucratic permitting delays - Often long and inconsistent. **1.1.b. Permitting inconsistency across municipalities /provinces** - Some issue permits for entire building, others only for site connections, increasing compliance costs and limiting cross-jurisdictional delivery **1.1.c. Redundant structural verification and engineering stamps** - Identical modules require separate stamps; duplicate checks delay projects. **1.1.d. Redundant inspections despite CSA A277 certification** - Plumbing, electrical, and framing re-inspected on site. **1.1.e. New/unfamiliar inspectors** - Many officials have never seen modular projects. **1.1.f. No modular-specific permitting checklists or fast-track processes** - Handled case by case. **1.1.g. Permitting not digitized** - Manual paper processes cause delays. **1.1.h. Mandatory quarterly in-person audits** **1.1.i. Fragmented municipal processes** - Overlapping approvals, no project lead, lack of coordination between departments.
	1.2 Complexities in applying codes, standards and certifications
	1.2.a. Unfamiliarity with modular standards - Officials often confuse CSA A277 with Z240. **1.2.b. Split authority issues** - Unclear whether provincial permits cover work split between plant and site. **1.2.c. Cross-province plant work** - If modules are built outside the province, unclear who governs and whether CSA certification is accepted. **1.2.d. Accreditation acceptance unclear** - No standard policy on whether plant-level accreditation (e.g., HVAC) can replace on-site inspection. **1.2.e. CSA certification access and cost** - Particularly expensive/difficult in some provinces where certifiers must be brought in (reported in NL). **1.2.f. Lack of CSA-certified manufacturers in some provinces** (reported in NL).
	1.3 Zoning restrictions, unclear interpretations, and local bylaws (fire, noise, height)
	1.3.a. Zoning change delays - Slow to rezone land for modular use. **1.3.b. Zoning restrictions** - Some subdivisions still exclude modular homes. **1.3.c. Zoning interpretation issues** - No distinction between modular (CSA A277) and manufactured/mobile homes (CSA Z240) **1.3.d. Height restrictions in local bylaws** - E.g., waterfront protections, view corridors, or condo height reductions. **1.3.e. Stricter fire/sprinkler rules** - Particularly for taller residential buildings. **1.3.f. Noise bylaws** - Limit construction hours, affecting scheduling. **1.3.g. Poor communication of bylaw changes to manufacturers**
	1.4 Policy misalignment across governments and unclear municipal processes
	1.4.a. CMHC promotes modular but hasn't adapted rules - Creates a gap between policy intent and actual practice. **1.4.b. Conflicting policy goals** - Affordability targets vs. energy-efficiency requirements (higher efficiency raises costs, undermining affordability). **1.4.c. Scaling limitations** - Modular mostly limited to wood-frame, low-rise and it is difficult to apply policies consistently to mid/high-rise projects. **1.4.d. Disconnect between municipal, provincial, and federal levels** - Policies are not aligned, sometimes contradictory. **1.4.e. Contrast between municipalities** - Urban cores (e.g., HRM) restrictive, suburban municipalities more permissive, increasing delivery risk across jurisdictions.

Participants also completed a survey for scoring the severity of barriers. Barriers were scored on a scale of 1 to 5, with 1 being a low barrier and 5 being a severe barrier. The results of these surveys serve as quantitative data on the severity of various challenges in different regions. These results also helped to guide an activity where participants completed ***solution development forms*** corresponding to the highest rated barriers in each thematic category.

3.3 Data analysis

3.3.1 Descriptive statistical summary of rankings

The results from the survey taken during the workshops were used to support a quantitative understanding of the barriers impact on housing projects across the Atlantic provinces. Statistical summaries of the scores were used to reveal regional differences and identify the most pertinent barriers in each province across thematic categories. This data was also used to compare the severity between categories in each province.

3.3.2 Thematic analysis and regional cross-comparisons

Qualitative data from industry expert interviews, workshop discussions, and policy and literature reviews were analyzed to identify recurring and overarching themes across the Atlantic region. These findings were then compared across provinces to highlight both shared and province-specific challenges. The qualitative insights were integrated with quantitative data to create a coherent narrative connecting the two forms of evidence, ensuring both depth and contextual understanding of regional conditions. Interconnections between barriers were mapped to reveal systemic challenges affecting OSC and housing across the Atlantic region.

3.3.3 Solution development and roadmap synthesis

Having identified the key barriers affecting Atlantic Canada, targeted solutions were developed to address these specific challenges. Solutions were synthesized based on the results of the solution development forms from the workshops (which corresponded to the top-rated barriers in each thematic category), key takeaways from industry expert interviews, and findings from the literature review. The solutions generated through this analysis are the fundamental component of the overall *roadmap* focused on enabling and scaling OSC as one approach to **increasing housing supply across the region**. The solution development form is shown in **Figure *7***.

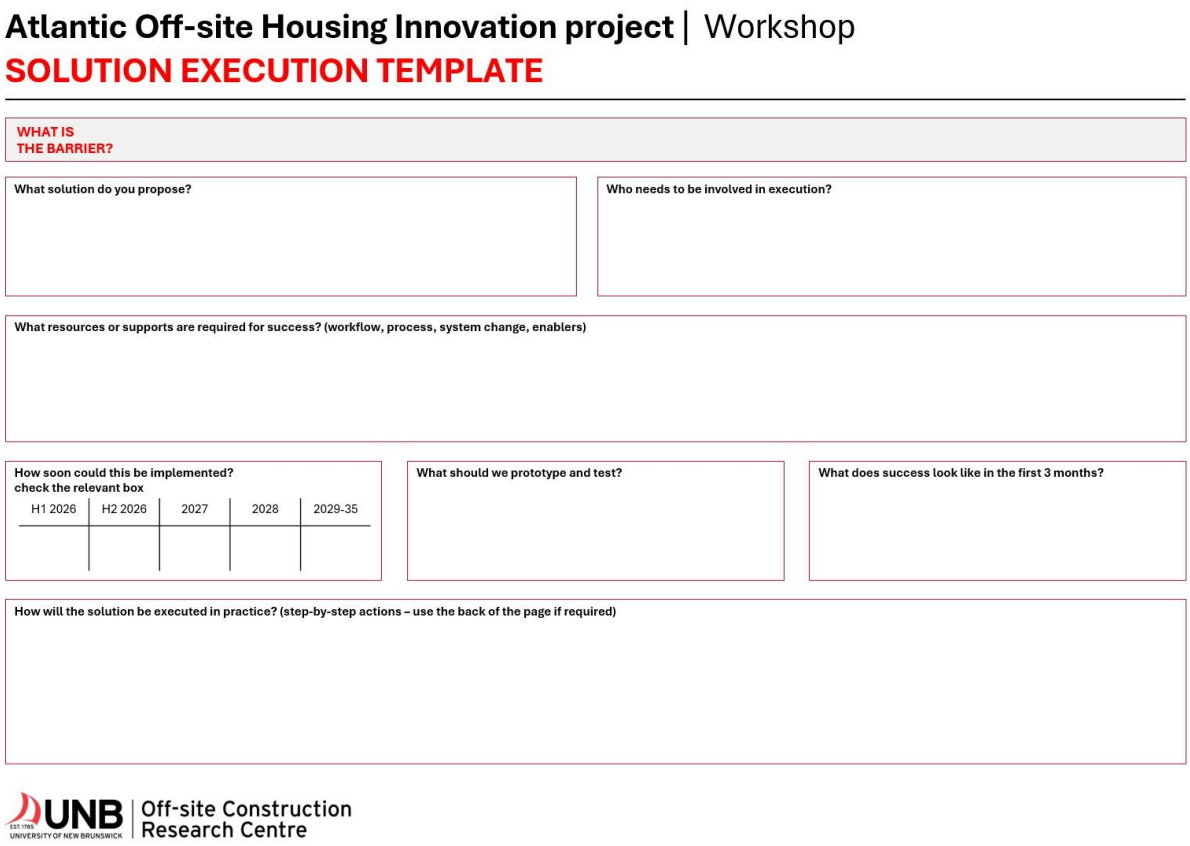

Figure 7: Solution development form

In the *roadmap*, each proposed solution includes actionable steps, proposed roles and responsibilities of recommend participants in the initiatives, supporting industry participants, and an anticipated timeline and impact level. This aims to provide clear guidance for implementation and prioritization. The *roadmap* comprises of a coordinated set of short, medium, and long-term actions intended to address systemic barriers to OSC to increase the housing supply in Atlantic Canada.

3.4 Data validation

At the beginning of this project, an advisory committee was established with representatives from each Atlantic province. These partners and industry leaders provided strategic oversight and domain expertise throughout the project. An overview of the reporting structure is shown in **Figure *8***.

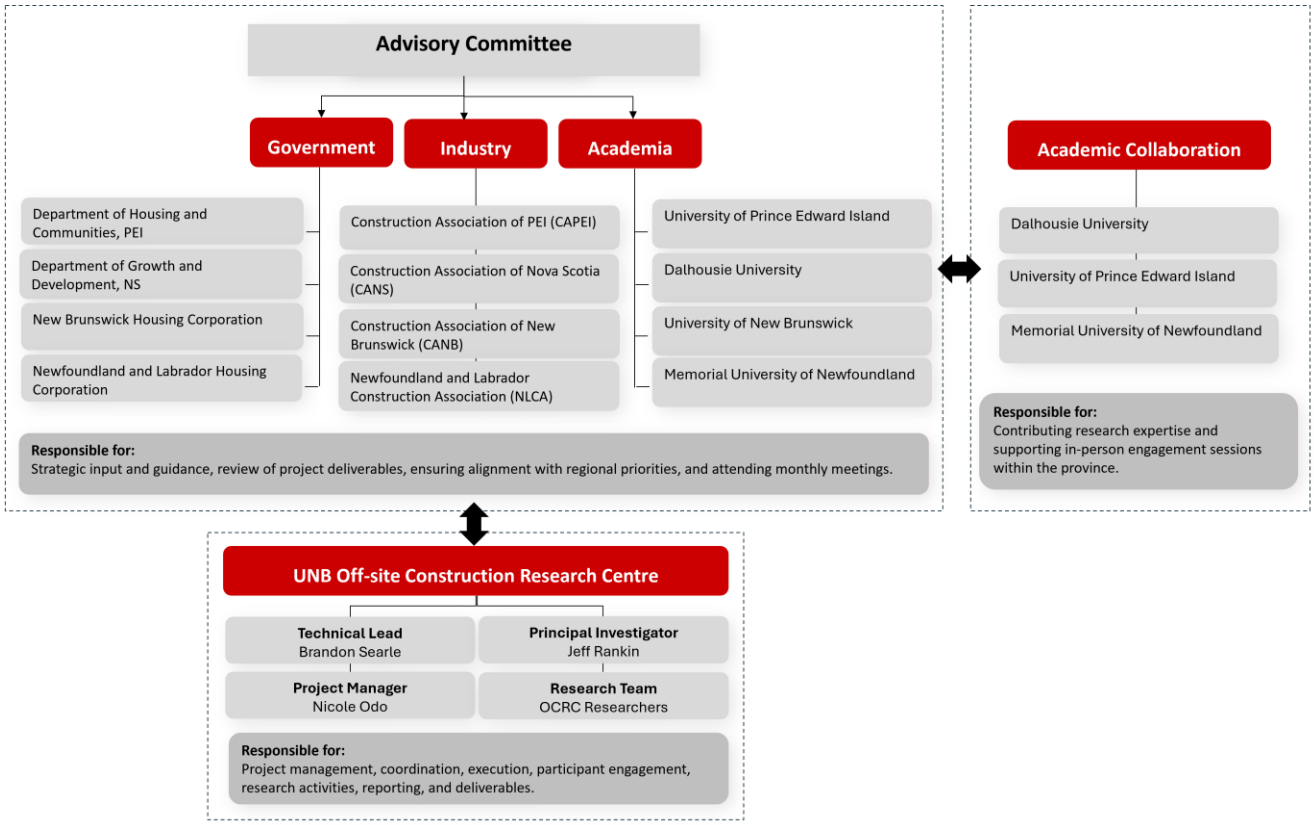

Figure 8: Project reporting structure overview

The committee's role included advising on industry standards, innovative practices, and emerging academic insights relevant to the Atlantic context. A structured engagement plan was developed to support ongoing communication, with scheduled meetings, defined feedback mechanisms, and clear documentation of input and recommendations. This committee reviewed an interim report of the *roadmap*, and their feedback was incorporated accordingly.

Beyond the committee, the OCRC included members of the construction community to provide insights into some deliverables (e.g., the Canadian MMC Definition Framework). This included representation from several professional and trade associations, accrediting bodies, academic institutions, trade schools, and the wider construction industry.

4.0 Results

4.1 Provincial policy and regulatory review

Provincial governments play a central role in shaping the regulatory conditions that affect the adoption of OSC, and all of MMC, across Atlantic Canada. While municipalities implement zoning, land-use rules, and permitting processes, these systems operate within provincial legislation that governs building codes, planning frameworks, fire safety, inspections, and development standards. In practice, municipalities may adopt bylaws or local

requirements that exceed provincial minimums, resulting in variation in how provincial frameworks are applied across jurisdictions. Thus, understanding provincial-level policies is essential for assessing the baseline regulatory environment, while recognizing that municipal interpretation and implementation can materially influence project feasibility and delivery outcomes.

This section provides a comparative overview of the provincial regulatory landscape in New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. The analysis examines how provincial planning acts, building code regulations, transportation rules, and housing policies interact with the practical realities of construction delivery, identifying where provincial regulatory systems support or constrain the uptake of MMC across the region. A complete list of all acts, regulations, and policy documents reviewed for this analysis is provided in **Appendix C: Documents for policy review**.

Note: The analysis was completed through the lens of VMC (MMC category 1) as it is known that the VMC approach to projects moves more tasks to the factory than any other type of OSC method. It should also be noted that these reviews focused on urban centres and the conditions can vary considerably in rural contexts.

4.1.1 New Brunswick

The New Brunswick policy review focused on the regulatory framework that applies to development in the City of Moncton. The assessment considered the municipal by-laws that guide land use, permitting, inspections, subdivision processes, and housing-related approvals, along with the provincial requirements that relate to building regulation, community planning, fire safety, and the movement of oversized or restricted loads. Each document was assessed using the 15-criteria screening framework to understand how these systems affect the delivery of volumetric modular construction.

Key Findings:

- **Transportation and Delivery Constraints:**
  - Provincial spring weight restrictions narrow the delivery window for modules in VMC. In New Brunswick, oversize permits for pre-manufactured homes and modular units restrict allowable dimensions:
    - Trip permits allow extreme widths up to 5.50 m (including eaves), lengths up to 32.0 m, and heights up to 4.88 m on chassis.
    - Annual or quarterly permits are more limited, with maximum widths of 4.72 m, heights of 4.50 m, and the same 32.0 m length limit.
  - Varying and stringent permitting requirements for oversize-loads narrow the delivery window for OSC components.
  - Municipal rules that limit the stopping time of heavy vehicles (over 4,500 kg) add further challenges for module staging and on-site placement.

- **Prescriptive Design and Architectural Requirements:**
  - In Moncton's Downtown, Mixed Use (MU), Urban Residential (UR), Neighbourhood Convenience (NC) and certain R2U zones (Urban Dwelling Zone or Urban Residential Dwelling Zone), the zoning by-law establishes detailed design controls, including minimum fenestration ratios and façade articulation requirements. Façades longer than 18 m must incorporate jogs or recesses at least every 9 m, and compact single-unit dwellings must provide varied façades and colours on adjacent and opposite lots. These zone-specific requirements can impact the benefits gained through OSC.

- Heritage-designated areas impose strict architectural compatibility expectations, making standardized OSC façades less feasible without customization. **While this is a constraint, it is recognized that certain areas of cities and communities need to be kept as heritage designated zones, which may lead to projects in those zones being executed using a different form of OSC (e.g., unfinished exterior panels under category 2 in the MMC Definition Framework).**

• **Density, Lot Size, and Site Layout Restrictions:**
  - Minimum lot size and frontage standards across residential zones generally range from approximately 460–558 m² for single, two, and three-unit dwellings, with compact single-unit dwellings allowed on smaller lots (around 350 m²). Four-unit dwellings typically require 490–600 m², townhomes require about 180 m² per unit, and multiple-unit dwellings range from roughly 557–800 m² depending on zone. These standards limit opportunities for compact infill and higher-density VMC on small urban lots.
  - Separation distance requirements and caps on additional dwelling units further constrain higher-density VMC development, limiting the potential to maximize units on a given lot and negatively impacting the benefits of OSC.

• **Inspection and Code Compliance Challenges:**
  - While New Brunswick's Building Code Regulation recognizes CSA A277 as an acceptable standard for factory-built units, this pathway is not explicitly adopted within all municipalities. In practice, municipal building officials' default to the standard on-site inspection sequence under the National Building Code. As a result, VMC units may undergo full on-site review of framing, ventilation, and final occupancy, which can create duplicate inspections, increased costs, project delays and unclear roles and responsibilities amongst project teams.

• **Restrictions in Mobile and Manufactured Dwelling Zones:**
  - There are specific areas zoned for mobile and manufactured dwellings which may cause confusion. VMC modules sit on a permanent foundation and are governed by the CSA A277 standard whereas mobile or manufactured dwellings sit on a non-permanent foundation and are governed by a less rigid standard – CSA Z240. **Without a clear definition of a mobile and manufactured dwelling compared to modular dwelling, building officials, planners, architects or other member of the project team may misinterpret the rules and not consider VMC as a solution to build housing.**

• **Financial and Servicing Requirements:**
  - Municipal grant programs and subdivision approvals require full servicing and final completion before funds or approvals are released. This creates timing challenges for VMC projects that depend on earlier milestone payments aligned with factory production schedules.

Overall, Moncton's regulatory environment does not explicitly prohibit OSC, but the cumulative effect of transportation load and timing limits, prescriptive design rules, large minimum lot sizes, and non-recognition of factory inspections can create substantive procedural and cost barriers for all forms of OSC with increased emphasis on VMC.

4.1.2 Nova Scotia

As part of the Nova Scotia policy review, the provincial legislation and municipal planning frameworks that influence the feasibility of VMC were examined. This included an assessment of the province's building regulations,

municipal governance frameworks, transportation rules, and fire-safety requirements. At the municipal level, Halifax Regional Municipality's (HRM) zoning and land-use frameworks, built-form and design standards, environmental and shoreline protections, servicing expectations, and development approval processes across key growth areas were analyzed. Each document was evaluated using the 15-criteria screening framework to determine how provincial and municipal systems influence VMC delivery.

Key Findings:

- **Height Controls:**
  - The Centre Plan height precincts cap most built-up areas at 11 m, 14 m, 20 m, 26 m, 33.5 m, or 45 m, with only a few areas exceeding these limits. Using metres of measurement rather than storeys directly impacts VMC.
  - Exceedingly as-of-right heights require bonus zoning contributions, density offsets, and compliance with detailed massing, step back, and shadow rules.
  - View plane protections from the Citadel impose absolute height caps (e.g., no development may penetrate rampart sightlines), which may limit VMC mid-rise formats.

- **Density and Design Requirements**

  - The HRM Design Manual requires façade articulation every 20–30 m and material variation across two or more storeys.
  - Areas under the Centre Plan / Regional Centre / Downtown / urban core, HRM requires podium-tower massing, where upper floors must step back from the lower podium. This breaks the vertical alignment needed for standardized VMC modules.
  - Flat roofs, commonly used in VMC, are not permitted in large areas (e.g., Sackville Drive, suburban residential zones) unless screened or modified.
  - Suburban design rules apply to few areas which require minimum 4:12 pitched roof slopes, projecting rooflines, and architectural features (e.g., dormers, covered entries), which lead to customization and negatively impact the benefits of all forms of OSC, with increased emphasis on VMC.

- **Lot Sizes and Servicing Constraints**
  - In non-serviced suburban and rural areas of HRM, minimum lot sizes are generally large and vary by zone and servicing context, with many zones prescribing minimums in the range of approximately 20,000 sq ft to 40,000 sq ft. This constraint limits opportunities for higher-density development regardless of construction method.
  - Many suburban and rural HRM zones permit only one main dwelling per lot. While backyard suites are permitted in all residential zones, they do not materially enable multi-unit or higher density development and therefore may limit opportunities for multi-unit VMC.

- **Material Restrictions in Heritage and Downtown Areas**
  - Heritage conservation districts and Downtown Halifax prohibit vinyl siding, corrugated metal panels, EIFS (synthetic stucco), and plastic/composite cladding. These are materials commonly used in factory-built exteriors; OSC projects would need custom finishing to comply with HRM's approved material in heritage conservation districts. **It is recognized that certain areas of cities and communities need to be kept as**

heritage designated zones, which may lead to projects in those zones being executed using a different form of OSC (e.g., unfinished exterior panels under category 2 in the MMC Definition Framework).

- **Parking, Access, and Street Design Barriers**
    - Many Centre Plan streets are designed for narrow curb-to-curb widths, protected bike lanes, and reduced turning radii, which complicate the delivery of OSC components, likely requiring additional approvals impacting project costs and schedule.
    - Corner lots and collector roads require sightline triangles of 4.5 m x 4.5 m, impacting crane placement and module staging options, negatively impacting project cost and schedule.
    - Outside the Centre Plan area, required parking ratios (e.g., 1 space per unit, 0.5 for small units) for suburban and rural areas add additional space demands for infill sites.

- **Inspection and Building Code Alignment**
    - Nova Scotia recognizes CSA A277, which is an enabler.
    - HRM still requires on-site inspections for foundations, plumbing, electrical, ventilation, insulation, and life-safety systems and full permit sets showing compliance with applicable Land Use By-Laws. Additional documentation to verify equivalency for factory-installed systems is also required. This reduces but does not eliminate duplicated inspections for factory built OSC units.
    - Multiple inspections prior to occupancy, inconsistent application of code requirements, and unclear responsibility for utility connections and easements can add cost, delay project completion, and increase liability risk for all projects but worsened for OSC built projects.

Overall, Nova Scotia does not restrict VMC, and the provincial recognition of CSA A277 offers a structural advantage for OSC projects. However, the development framework in HRM adds several steps for VMC delivery. These factors do not prevent VMC but can extend timelines for site-specific approvals and increase the level of customization required for standardized VMC designs.

4.1.3 Prince Edward Island

As part of the PEI policy review, provincial and municipal frameworks related to land use, permitting, inspections, transportation, servicing, and construction were reviewed. At the municipal level, policies and standards used by the City of Charlottetown were examined, including zoning and development direction, design expectations, official planning guidance, heritage and architectural requirements, and servicing standards. At the provincial level, legislation governing planning, building codes, fire prevention, and highway transportation was reviewed, including provisions for oversize loads and seasonal weight limits. Each document was evaluated using the 15-criteria screening framework to determine how provincial and municipal systems influence VMC delivery.

Key Findings:

- **Transportation and Delivery Constraints**
    - Seasonal spring weight restrictions limit when OSC components can be moved on, off or across PEI. These restrictions include maximum axle loads for heavy trucks being lowered on roads that are not designated as all-weather highways, overweight permits not being issued, enforcement being stepped up and fines for violations (reaching several thousands of dollars).

- Oversize-load permits impose strict routing and timing conditions, and non-resident carriers face additional restrictions on intra-provincial haulage. This impacts key benefits to VMC including a shortened schedule on the project.

• Zoning and Density Restrictions

- Most residential zones in Charlottetown limit building heights to 12 metres, a change to "storeys" as the unit of measure would remove this barrier to VMC buildings.
- Modular and mini-home developments within manufactured-home zones are capped at 20 units per hectare.

• Design and Heritage Compatibility Requirements

- Multi-unit housing and heritage-area development are subject to design review emphasizing traditional materials, façade patterns, roof forms, and massing which presents a barrier to OSC.
- Factory-applied finishes and standardized VMC façades often require additional detailing or customization to satisfy compatibility requirements, impacting project cost and speed. **It is recognized that certain areas of cities and communities need to be kept as heritage designated zones, which may lead to projects in those zones being executed using a different form of OSC (e.g., unfinished exterior panels under category 2 in the MMC Definition Framework).**

• Lot Size, Frontage

- Large minimum lot sizes (e.g., 660 m^2) and frontage requirements (e.g., 18 metres) restrict use of smaller parcels suitable for VMC infill.

• Inspection and Code Compliance Challenges

- Although PEI's Building Codes Act recognizes CSA A277 factory certification and exempts factory-built components from duplicate inspection, municipal implementation remains unclear. Charlottetown's current permitting and inspection processes follow conventional site-built workflows, which may lead inspectors to conduct additional on-site reviews of factory-completed elements. This creates uncertainty, potential duplication, added coordination requirements and overall increased costs for VMC projects.

• Financial and Administrative Requirements

- Rezoning, variance, design review, and development permit fees increase early administrative costs.

Overall, PEI's regulatory environment allows VMC in principle, but several regulatory features add complexity to project delivery. **The province's housing strategy explicitly identifies modular and prefabricated construction as a tool to accelerate housing supply and reduce administrative barriers, indicating potential for future alignment between provincial direction and municipal implementation, even though current processes remain highly traditional in their expectations.**

4.1.4 Newfoundland and Labrador

As part of the Newfoundland and Labrador policy review, provincial and municipal frameworks related to land use, zoning, design standards, inspections, fire safety, and construction were assessed. At the municipal level, policies and standards used by the City of St. John's were reviewed. Municipal by-laws related to fire safety, accessibility, and development processes were also reviewed. Each document was evaluated using the 15-criteria screening framework to determine how provincial and municipal systems influence VMC delivery.

Key Findings:

- **Height and Density Constraints**
  - Most residential zones limit height to approximately 10 metres, and proposals above 18 metres require a Land Use Report, adding significant time and public consultation to all development projects. Changing from a maximum height to be measured in "storeys" rather than "metres" will help remove the height restriction barrier.
  - Low-density zoning and limited permitted dwelling types in Residential 1, 2 and 3 zones restricted multi-unit VMC unless rezoning is pursued. St. John's 2024 housing-text amendment expanded permitted housing types in many residential zones to include triplexes, four-plexes, small apartment buildings, tiny homes, backyard suites, and cluster developments. This regulatory change should open new pathways for VMC development.

- **Design and Heritage Requirements**
  - Design expectations related to façade treatment, exterior materials, and neighbourhood character increase the level of customization required for standardized VMC units. **It is recognized that certain areas of cities and communities need to be kept as heritage designated zones, which may lead to projects in those zones being executed using a different form of OSC (e.g., unfinished exterior panels under category 2 in the MMC Definition Framework).**
  - Heritage Areas require traditional architectural forms and materials, limiting flexibility for modern finishes.

- **Lot Size, Site Layout**

  Minimum lot sizes (often 450 m² per dwelling unit) and front-yard and side-yard setbacks limit modular infill opportunities.

- **Transportation and Access**
  - Required right-of-way widths and turning radii in the Development Design Manual may not readily accommodate oversize modular deliveries, requiring case-by-case coordination.

Overall, Newfoundland and Labrador permits OSC, but the development approval pathways in St. John's are aligned with municipal processes designed for conventional site-built housing delivery. Current zoning, design expectations, servicing requirements, and inspection processes add several steps for OSC proposals and can extend timelines for VMC delivery. Recent updates to the Envision Development Regulations signal a gradual shift toward broader housing options, but modular-specific pathways have not yet been formalized. Many challenges are practical in nature, relating to implementation consistency and municipal capacity.

4.1.5 Common regulatory trends and gaps

Across the four Atlantic provinces, the policy review identified several consistent regulatory patterns that influence the feasibility of OSC with emphasis on VMC. While each province operates under different planning and building legislation, several themes emerged that collectively shape how modular projects move through approvals.

1. Prescriptive Design Standards that Limit Standardization

All provinces apply design requirements based on traditional architectural expectations, including façade treatments, and material guidelines. These standards are generally oriented toward site-built construction and often require projects to incorporate custom exterior features.

2. Large Minimum Lot Sizes and Low-Density Zoning in Rural and Suburban Areas
Minimum lot sizes, frontage requirements, and low-density zoning remain common across the region. These conditions limit opportunities for all forms of development to maximize housing supply and specifically limit infill, small-lot VMC homes, and multi-unit VMC developments unless rezoning is pursued.

3. Transportation and Delivery Constraints due to Seasonal Limits
Seasonal load restrictions and municipal street conditions create constraints for transporting and placing OSC components. These limitations add scheduling risks for large VMC components that must be delivered within specific time windows and need to be considered by all project proponents when planning a VMC housing build.

4. Limited Recognition of Factory Certification at the Municipal Level
Although several Atlantic provinces recognize CSA A277 as a valid factory-certification standard, municipal implementation remains unclear. Most municipal inspection systems rely on full on-site review of framing, mechanical systems, and life-safety components. This results in duplicated inspections and reduces the efficiency of factory certification. Clearer alignment between factory certification, municipal inspections, and provincial trade and apprenticeship frameworks is needed to maintain certified trades and public safety standards across both factory and site work.

5. Traditional Approvals Processes Not Aligned with Modular Timelines
Rezoning, variance, design review, heritage approval, and subdivision processes often involve multiple sequential steps. These timelines do not align well with VMC projects as the civil site work and manufacturing of the building can happen simultaneously with the modules being completed in a factory much quicker than a conventional build. This benefits the project owner by providing a shortened schedule and cost certainty but requires additional planning before construction and a unique payment schedule compared to site-built construction.

Across the Atlantic provinces, OSC fits within existing regulatory frameworks, but these frameworks were largely created for conventional, site-built development. **Due to this, OSC project proposals often move through processes that do not fully account for factory-based production, leading to additional coordination, interpretation, reviews, inspections and, ultimately, increased costs and project delays.** Although these conditions do not act as outright barriers, they do reveal areas where planning, permitting, and inspection systems could be adjusted to enable the predictability, timelines and benefits for OSC project delivery.

4.2 Industry expert interviews

Industry expert interviews were conducted before the workshops to establish a foundation of qualitative insights before undertaking broader engagement activities. These discussions provided an in-depth understanding of opportunities, challenges and enabling conditions associated with all forms of OSC in Atlantic Canada, from the perspective of manufacturers, municipalities, and other industry participants such as developers, general contractors, trade associations and financial institutions. The interviews captured information from those involved in development, permitting, design, manufacturing, and construction, helping to shape the themes explored during later workshops and analysis.

The interviews also validated several early assumptions about the barriers facing the sector and highlighted emerging areas of interest that informed the design of subsequent engagement sessions. The findings from these interviews are summarized in the subsections that follow.

4.2.1 Summary of key themes from interviews

Interviews with manufacturers, municipalities, and other industry participants including developers, general contractors, and financial professionals across Atlantic Canada revealed many consistent barriers for OSC. These barriers limit the scalability, cost competitiveness, reliability, and adoption of OSC. The following tables (Table 4 to Table 8) synthesize these themes into five categories and identify recommendations for improvement.

Table 4: *Policy and regulatory related findings interviews*

Category: Policy and regulatory barriers	
Issues Identified	**Description of what was heard**
Inconsistent interpretation of codes	Municipal inspectors vary widely in their understanding of CSA A277 vs Z240 standards leading to inconsistent or unnecessary requirements. CSA standards (A277, Z240) are recognized nationally, but municipalities vary in understanding and application. Some staff unfamiliar with certifications, causing over-review and delays
Redundant inspections and re stamping	Several municipalities require repeat on-site inspections despite factory certification. Identical OSC units often require individual engineering stamps, adding cost and time. Even with CSA-certified factory components, on-site inspections are required for plumbing, electrical, and framing, adding time and cost
Slow and fragmented permitting processes	Major delays were attributed to: • unclear jurisdiction between city and fire marshal, • lengthy fire marshal reviews (6 to 12 months), • slow approvals in larger urban centres. Subjective processes and fragmentation between zoning, building, and fire inspection departments adds complexity.
Height and zoning restrictions	Local bylaws impose different height limits and zoning rules for VMC homes, creating potential delays or variance applications
Net-zero code implementation	New provincial net-zero standards require training and time to allow the industry to mature; limited municipal guidance and insufficient training may lead to increases in costs and a barrier to development.
Lack of OSC literacy among authorities having jurisdiction (AHJs)	Manufacturers emphasized that many AHJs do not understand how OSC systems are engineered, certified, or assembled, leading to over review, delays, and requests for unnecessary redesign.
Misalignment across government levels	Within local government departments, or across the three levels of government, policies often conflict or are applied inconsistently, creating uncertainty and delays to projects.
Municipal red tape and silos	Permitting departments operate in isolation, limiting communication and holistic project management.
High fees and tax burdens	Rising permit fees, CMHC premiums, and unclear recapture or capital gains taxes increase project costs.
Recommendations from manufacturers: • Harmonized code interpretation between municipalities and provinces. • Pre-approved OSC design catalogues or “plan ready” templates, subject to local stamping requirements. • Elimination of duplicate inspections for units built in a CSA A277 certified factory.	

Category: Policy and regulatory barriers
• Early identification and prioritization of OSC permitting files. • OSC education programs for planners, building officials, designers and other AHJ staff. Recommendations from municipalities: • Develop consistent guidance on CSA A277 and Z240 standards to reduce variability in municipal reviews. • Accept factory CSA certifications for plumbing, electrical, and framing systems where possible. • Implement streamlined on-site inspection protocols focused on installation verification rather than full re-inspection. • Introduce digital permitting systems to improve application tracking and reduce delays. • Provide explicit guidance on how OSC units are classified under existing zoning bylaws. • Consider updating by-laws to allow flexibility for VMC buildings without requiring variances unnecessarily. • Provide early guidance and resources to all builders to ensure compliance with upcoming net-zero regulations. Other recommendations: • Align policies and requirements across municipal, provincial, and federal levels to reduce conflicts and streamline permitting. • Eliminate silos within permitting and project review departments to facilitate integrated planning and faster approvals. • Include the finance office at provincial or federal levels in decision-making otherwise it will be difficult to make real progress and changes. • Pre-designate OSC-supportive planning zones within municipalities to reduce zoning uncertainty and streamline approvals for housing projects.

Table 5: *Procurement related findings from interviews*

Category: Procurement barriers	
Issues Identified	**Description of what was heard**
Traditional plans and specs tenders do not fit OSC workflows	OSC must be integrated into early design. Retrofitting OSC into conventional RFPs increases cost and reduces feasibility (particularly with VMC).
Generic procurement language	RFPs often lump panelized and volumetric together under “modular,” creating: • mismatched expectations, • inconsistent pricing, • confusion among evaluators and bidders.
Upfront design effort without compensation	Some public projects using a design-build RFP are overly prescriptive and require significant design work pre bid, presenting a significant cost to proponents and potentially discouraging VMC.
Government procurement timelines conflict with factory production windows	This results in: • idle factory capacity, • delayed material procurement, • missed seasonal installation windows.

Category: Procurement barriers	
Bundling of projects are needed for economies of scale (e.g., offtake agreements)	Manufacturers stated that creating sustainable demand through offtake agreements with muti-year contracts for a minimum number of units will help decrease cost and significantly speed up production.
Traditional procurement models	Standard contracts (e.g., CCDC-2 contracts or design-build procurement) may not ensure the benefits of OSC are realized. Integrated project delivery (IPD) or design-build (DB) approaches are emerging but not widely used.
Lack of municipal expertise	Some staff struggle to draft contracts or guide OSC-specific procurement, particularly in smaller municipalities.
Lack of structured procurement processes	Large multi-family and VMC projects often lack clear frameworks defining roles between manufacturers, GCs, and developers, leading to inefficiencies.
Misalignment of roles and responsibilities	Manufacturers are experts in the plant, GCs manage on-site; without clear delineation, project delivery suffers, especially for complex on-site work.

Recommendations from manufacturers:

- Develop OSC-specific procurement pathways with standardized language, evaluation criteria that reflect OSC workflows, and recognition of CSA A277 certification to avoid redundant quality reviews
- Embed manufacturers early in the design phase
- Depending on project size, compensate pre-bid design work to prevent artificially inflated bids when detailed design packages are required prior to award
- Performance based RFP and the use of standardized VMC design templates
- Create offtake agreements to maximize benefits of VMC, lower cost and increase speed.

Recommendations from municipalities:

- Consider OSC-specific contract templates or guidelines to align with off-site fabrication schedules.
- Provide training or reference materials for municipal staff on OSC project procurement or hire an OSC integrator to support in this process.
- Establish a knowledge-sharing network across municipalities to leverage lessons from successful OSC projects.

Other recommendations:

- Standardize procurement approaches for off-site construction, with clearly defined roles for site work vs. factory work. Projects of eight units or higher should have a design-build team including the core design team (led by the architect), general contractor and OSC manufacturer. If the architect and GC do not have VMC expertise, include the OSC integrator which can be an external consultant or the responsibility of the OSC manufacturer.

Table 6: *Financial and insurance related findings from interviews*

Category: Financial and insurance barriers	
Issues Identified	**Description of what was heard**
Banks and governments rarely provide upfront payments	The cost certainty benefits of VMC are only achievable due to the nature of procuring materials in bulk on a regular basis and knowing the costs of operations. As a result, manufacturers require down payments and a payment schedule that is not tied to on-site project progress. Traditional financing models release funds based on site progress despite up to 90%

Category: Financial and insurance barriers	
	of the work being completed in a factory, creating severe cash flow issues.
Insurance fragmentation and cost	Multiple parties across the supply chain are required to purchase separate insurance policies for the same products. Lack of OSC specific insurance products. One manufacturer reported paying $20,000 in additional premiums due to unclear liability requirements.
Bonding constraints	Particularly acute for projects above $30M, creating barriers for local firms.
Risk premiums from subcontractors and GCs	Due to unfamiliarity with OSC systems, bids are inflated, adding cost to projects.
Access to financing and insurance	Costs to certify and insure VMC units can be high, and local lenders may be unfamiliar with OSC projects. Developers face challenges securing progress payments, bridging factory costs, and managing high interest rates.
Infrastructure and development charges	Not a large factor to development in Atlantic Canada, but varying rules around infrastructure fees, development charges and permitting fees.
Insurance coverage gaps	Uncertainty over builder's risk versus manufacturer responsibility for modules in transit or storage creates additional risk.
Recommendations from manufacturers: • Develop OSC specific insurance packages with continuous coverage from factory to site. • Introduce milestone-based financing tied to inspections, photos, or secure storage (mirroring elevator industry practices). • Adopt CCDC contract templates and then adapt to make a VMC specific template. With a focus on doing this for CCDC-14 Design-Build. Recommendations from municipalities: • Engage with lenders and insurers to improve understanding of VMC and CSA certification. • Develop guidelines or case studies demonstrating risk mitigation and cost savings from VMC projects. Other recommendations: • Increase lender and insurer familiarity with OSC projects, including standardized acceptance of factory certification and progress draws. • Explore financial incentives, such as reduced fees or tax adjustments, to improve project feasibility and support affordable housing objectives.	

***Table 7**: Skilled workforce and skills development related findings from interviews*

Category: Skilled workforce and skills development	
Issues Identified	**Description of what was heard**
Shortage of OSC experienced trades and GCs	Many installation delays stemmed from inexperienced site contracts responsible for the set and fit-out of module, particularly for roofing, siding, and assembly.
Catch 22 for local contractors	Cannot win OSC projects without experience; cannot gain experience without winning projects. Create an ecosystem for the supply chain to mature.

Category: Skilled workforce and skills development	
Training gaps among engineers and designers	Lack of knowledge about OSC structural systems, certification pathways, and factory production constraints.
Seasonal labour shortages	Particularly in peak periods, where reliance on temporary foreign workers is limited by LMIA caps, highlighting the need to strengthen local workforce capacity.
Newcomer architects, engineers and trades unfamiliar with wood frame construction	Cited as an important but solvable gap with appropriate training.
Shortage of skilled trades	Gaps in qualified carpenters, framers and other licensed or experienced trades (e.g., Red Seal–certified or equivalent) create persistent capacity gaps.
Lack of municipal staff capacity	Building official, building inspector, planners and other staff in local government are often understaffed and undertrained, slowing review timelines.
Need for OSC-specific training	Municipal staff, inspectors, and builders require training for net-zero compliance and VMC project familiarity.
Skilled workforce shortages	Shortages affect both on-site trades and factory staff; PMs, superintendents, etc. often lack OSC experience.
Need for specialized training	Coordination of modules, tolerances, lifting, and on-site integration requires specific skills not widespread in the region.
Recommendations from manufacturers: • One-week onboarding course for immigrant workers on Canadian codes and cold climate construction. • Partnerships between local GCs and national OSC experienced firms. • Training programs for designers and engineers on OSC design. Recommendations from municipalities: • Provide training or reference materials for municipal staff to ensure familiarity with OSC certifications. • Offer training programs and workshops on new net-zero standards. • Support local training programs and apprenticeships for trade schools demonstrating what working in a factory is like (e.g., using automated equipment). • Encourage knowledge-sharing across municipalities to reduce inconsistencies and improve efficiency. Other recommendations: • Develop industry-wide OSC training programs designed to be broadly accessible across the construction workforce.	

Table 8: *Transportation and logistics related findings from interviews*

Category: Transportation and logistics	
Issues Identified	**Description of what was heard**
Spring weight restrictions	Requires projects to be scheduled around thaw season or units stored until restrictions lift, which needs to be considered when procuring housing projects.
Crane availability shortages	Projected to worsen as VMC uptake increases.
Urban site constraints	Tight lots, limited staging space, and distant storage yards create significant operational inefficiencies. Having an experienced OSC or VMC integrator (either consultant, GC or manufacturer) can help overcome this through project management and planning.

Category: Transportation and logistics	
Site unreadiness delays	Factories complete units long before sites are prepared, resulting in storage issues, potential for increased insurance needs, and rework risks.
Limited laydown and staging areas	Storage for modules close to site is often constrained
Seasonal/geographic constraints	Island and rural locations face transport challenges and weather-related delays; cranes may have weight limits complicating installation.
Physical constraints	Module size, road clearances, bridges, and underpasses limit transport options; provincial escort and permit rules differ, adding complexity.
Coordination challenges	Storage, staging, and on-site sequencing require careful planning to avoid delays; rework responsibility is often unclear and contract dependent.

Recommendations from manufacturers:

- Ensure an experienced OSC or VMC integrator is part of the project team who can ensure the following recommendations are considered:
    - Work with municipalities to pre-approve staging yards close to urban project sites
    - Develop a provincial list of certified crane operators and encourage pre-booking agreements for public builds
    - Create OSC delivery route maps identifying height restrictions, weight limits, bridge capacities, turning radii for oversized delivery vehicles
    - Implement a "site readiness certification" before factory production begins and require that foundations, utilities and access roads are completed and verified prior to factory fabrication
    - Standardize site coordination requirements such as anchoring, sequencing, crane pads, access, inspections, to be included in OSC RFQs and RFPs
- Support development of regional transportation partnerships

Recommendations from municipalities:

- Identify and designate adequate storage areas near project sites to accommodate OSC component deliveries
- Plan projects around seasonal weight restrictions and weather-related limitations
- Consider temporary or shared laydown zones for multiple projects to reduce delays

Other recommendations:

- Implement consistent transportation and logistics guidelines, including clear rules for permits, escorts, and module staging.

4.2.2 Cross-sector collaboration findings

Across municipalities, manufacturers, developers, general contractors, trade contractors and financial industry participants, a consistent theme emerged: successful OSC projects depend heavily on effective collaboration across sectors. Key findings from the interviews include:

- **Municipal-Developer coordination**
    - Municipal red tape and silos within permitting departments hinder projects, with one interview suggesting a need to "remove the disconnect between local, provincial, and federal governments" and "eliminate silos within permitting departments."
    - Council and bureaucratic delays create risk for developers, and municipalities in the suburbs are more collaborative because they "actively welcome growth and tax revenue," implying that alignment with municipal priorities improves project feasibility.

- **Manufacturer-General Contractor collaboration**
    - Manufacturers are "plant experts but often lack GC skills to coordinate on-site work," and a procurement approach where the manufacturer focuses on factory work and the GC manages site work was recommended.
    - Sub-trades experience a steep learning curve due to variation between manufacturers; projects with experienced crews succeed more consistently.
- **Finance-Construction collaboration**
    - Emphasized that flexible financing and early engagement with builders can reduce risk.
    - Interest rates, CMHC fees, and insurance premiums compound costs and create risks that the projects will not be economical, suggesting coordinated financial policy changes are needed to support OSC projects.
    - To gain financial benefits of OSC, owners and funders must create sustainable demand to leverage economies of scale. Exploring procurement methods for multiples sites simultaneously (e.g., through offtake agreements) should be explored.
- **Training and knowledge sharing across sectors**
    - Identified that municipal staff, PMs, and sub-trades often lack experience with OSC methods, including tolerances, lifting, and connection points.
    - Municipal staff also require training on new codes and all forms of OSC.
- **Cross-Provincial logistics coordination**
    - Transportation of modules across provinces is challenging, especially in island or rural areas. Coordination with provincial transportation authorities was noted as the builder's responsibility in PEI and NL, but projects run more smoothly when all industry participants communicate early.

These interviews demonstrate that collaboration is necessary to reduce permitting delays, clarify roles and responsibilities, improve financing options, and build workforce capacity. Procurement methods that emphasize early engagement, clear division of responsibilities between manufacturers and GCs, standardized inspection and certification processes, and coordinated transport planning are the most frequently cited strategies for improving off-site construction outcomes in Atlantic Canada.

4.3 Barrier and opportunity analysis

4.3.1 Overview of the preliminary barriers identified

An analysis of barriers identified through the policy review process, industry expert interviews, and regional workshops revealed a range of challenges to OSC and increasing housing supply in Atlantic Canada. While each province faces unique circumstances, most barriers fall into five broad categories: policy and regulatory, procurement models and contracts, financing and insurance, skilled workforce and skills development, and transportation and logistics. **Table 9** provides an overview of these categories, including descriptions and illustrative examples.

Table 9: *Overview of categories of barriers*

Category	Description	Examples
Policy and Regulatory	Barriers related to government policies, regulations, zoning, and permitting processes that inhibit or complicate OSC adoption and housing development.	• Permitting inconsistency across municipalities/provinces • Zoning restrictions • Conflicting policy goals
Financing and Insurance	Financial and risk-related barriers that make it difficult to fund, insure, or secure investment for OSC projects.	• Unclear insurance coverage • Payments linked to progress claims based on on-site progress • Restrictions with some CMHC funding streams
Procurement Models and Contracts	Challenges in how projects are procured and contracts are structured affecting OSC implementation.	• Procurement timelines misaligned with OSC production schedules • Lack of volumetric modular-friendly designs • Lack of procurement frameworks suitable for OSC
Skilled Workforce and Skills Development	Barriers related to labour availability, training, and knowledge needed to implement OSC effectively.	• Labour shortages across all forms of construction • Knowledge gaps among building officials, trades, designers, architects, planners and engineers • Municipal staff shortages
Transportation and Logistics	Barriers in transporting OSC components, site access issues, and supply chain constraints.	• Crane and heavy-lifting capacity are limited • Inconsistent oversize load permitting processes between jurisdictions • Tight urban sites

4.3.2 Regional barriers – what we heard

Regional workshops held across Atlantic Canada highlighted a consistent set of barriers affecting the adoption and scaling OSC. Participants from industry, government, and related organizations identified challenges based on their direct experience within provincial and municipal housing delivery systems. The barriers presented below list those identified during the five workshops and are organized using unique identifiers and thematic sub-categories.

What we heard

POLICY AND REGULATORY			Workshop locations				
Sub-category	**ID**	**Barriers to OSC**	**NB**	**PEI**	**NS**	**NL**	**Virtual**
Attitudes and Knowledge Gaps	B_PR1	Lack of alignment in terminology from funders. Ambiguity in terminology leading to confusion.	✓				
	B_PR2	Lack of emphasis of the impact of housing on population health.	✓				
	B_PR3	Misalignment between the promotion and institutional acceptance of OSC, where OSC is publicly endorsed by political leaders but not consistently supported or preferred by government departments.	✓	✓	✓	✓	✓
Codes and Standards	B_PR4	The regulatory environment is complex and fragmented, as national, provincial, and local codes are difficult to navigate.	✓	✓	✓	✓	✓
Government Coordination	B_PR5	Limited communication and coordination across government agencies.	✓	✓	✓	✓	✓
	B_PR6	Certain existing policies are outdated and require updating.				✓	
Inspections	B_PR7	Duplicate inspection requirements create inefficiencies in the approval and construction process.	✓	✓	✓	✓	✓
Permitting and Approvals	B_PR8	Heritage Conservation Act identifies heritage places in unincorporated areas, providing a barrier for housing.	✓				
	B_PR9	Approval and permitting processes are slow, complex, and costly.	✓	✓	✓	✓	✓

Figure 9: What we heard - Policy and regulatory barriers

What we heard

FINANCING AND INSURANCE			Workshop locations				
Sub-category	ID	Barriers to OSC	NB	PEI	NS	NL	Virtual
Access to CMHC Funding	B_FI1	CMHC policies do not align with OSC timelines, delivery methods, or cost structure.	✓	✓	✓	✓	✓
	B_FI2	Restrictions on funding non-residential space in new buildings.	✓	✓	✓	✓	✓
	B_FI3	Lack of clarity on how to access CMHC programs and funding streams.	✓	✓	✓	✓	✓
	B_FI4	CMHC data for rural areas is outdated or inaccurate.	✓	✓	✓	✓	✓
Access to Financing	B_FI5	Banks and lenders do not fully understand or accept modular/off-site construction due to high perceived risks in OSC.	✓	✓	✓	✓	✓
	B_FI6	Limited financing options for small-scale ownership(e.g., single units, duplexes) force many buyers to rely on high-interest lenders.	✓	✓	✓	✓	✓
	B_FI7	Financing rules, mortgage products, and banking policies are outdated and not suited for OSC.	✓	✓	✓	✓	✓
	B_FI8	Limited competition among funding providers.			✓		
Cost Structure	B_FI9	Small manufacturers face bonding challenges that limit their ability to participate in projects.	✓		✓		
	B_FI10	Multi-unit residential building (MURB) volumetric modular construction are significantly more expensive.		✓			
	B_FI11	High upfront costs and misaligned payment milestones create cash-flow challenges.	✓	✓	✓	✓	✓
Incentives & Policy	B_FI12	There are no tax incentives, subsidies, or financial supports tailored to OSC.	✓	✓	✓	✓	✓
	B_FI13	Government fees add additional affordability challenges.	✓	✓	✓	✓	✓
Insurance	B_FI14	There are coverage gaps, overlapping insurance requirements, and unclear responsibility transfers between the factory, transporter, and on-site contractor.	✓	✓	✓	✓	✓
	B_FI15	Insurance premiums are higher for mass timber or wood-based modular systems.	✓	✓	✓	✓	✓
	B_FI16	Insurance regulations are not tailored to offsite fabrication risks (Atlantic).	✓	✓	✓	✓	✓

Figure 10: What we heard - Financing and insurance barriers

What we heard

PROCUREMENT MODELS AND CONTRACTS			Workshop locations				
Sub-category	**ID**	**Barriers to OSC**	**NB**	**PEI**	**NS**	**NL**	**Virtual**
Competition and Market Dynamics	B_PM1	Lowest bid procurement often fails to capture the full value and impact of time savings, environmental factors, etc.	✓	✓	✓	✓	✓
	B_PM2	Limited number of CSA-certified modular manufacturers restricts competition, increases costs, and limits supplier confidence to scale.	✓	✓	✓	✓	✓
	B_PM3	Low-bid procurement models do not quantify the benefits of some forms of OSC (cost certainty, shortened schedule, reduction in environmental impact, safer for the skilled workforce) which makes OSC solutions less competitive than stick-built construction.	✓	✓	✓	✓	✓
	B_PM4	Lack of value-based procurement approaches.	✓	✓	✓	✓	✓
	B_PM5	Unclear demand and supply conditions create a “chicken-or-egg” problem, limiting competition and complicating procurement planning.	✓	✓	✓	✓	✓
	B_PM6	Procurement and approval processes often require projects to be structured as design-build to create more competition.			✓		
	B_PM7	Limited land availability reduces the number of modular projects that can be procured.			✓		
	B_PM8	Lack of defined roles and responsibilities leading to inaccurate pricing from sub-contractors.		✓			
Design and Standards	B_PM9	Designs are typically developed for traditional construction and only later adapted for OSC, resulting in redesign, delays, and inefficiencies.	✓	✓	✓	✓	✓
	B_PM10	Modular builds from other regions may not be designed to meet local performance standards (e.g., hurricane-force winds).			✓	✓	
	B_PM11	RFP formats lack flexibility and are overly prescriptive and project-specific.	✓				
Manufacturing and Supply Chain	B_PM12	Limited OSC manufacturing capacity and an under-developed supply chain create dependency on imports, transport bottlenecks, and long lead times.	✓	✓	✓	✓	✓
Procurement Processes	B_PM13	Contracting practices for MMC projects are inconsistent across jurisdictions and clients.	✓	✓	✓	✓	✓
	B_PM14	Procurement is oriented toward traditional construction reducing acceptance for OSC approaches.	✓	✓	✓	✓	✓
	B_PM15	New entrants to construction are not familiar with RFP processes.	✓				
	B_PM16	Lack of schedule regulations and enforcements.	✓	✓			
	B_PM17	Prefabrication work is often excluded from trade agreements and scopes of work, making coordination more difficult.	✓	✓	✓	✓	✓
	B_PM18	Lack of site access or information for bidders to accurately estimate on-site works.	✓				

Figure 11: What we heard - Procurement models and contracts barriers

What we heard

SKILLED WORKFORCE AND SKILLS DEVELOPMENT			Workshop locations				
Sub-category	**ID**	**Barriers to OSC**	**NB**	**PEI**	**NS**	**NL**	**Virtual**
Awareness, Culture and Mindset	B_WD1	Workforce resistance to OSC exists due to lack of familiarity, fear of job loss, or cultural hesitation toward new methods.	✓	✓	✓	✓	✓
	B_WD2	Low awareness and misconceptions about OSC quality, aesthetics, and durability.	✓	✓	✓	✓	✓
	B_WD3	Limited promotion of modular construction within the industry and workforce.	✓	✓	✓	✓	✓
Skilled Trades and Labour Availability	B_WD4	Low enrollment has resulted in the closure of OSC-related training programs, such as those at NSCC.			✓		
	B_WD5	Few contractors have OSC experience, limiting participation.			✓		
	B_WD6	Foreign-trained workers face barriers to credential recognition, and culturally appropriate training programs for Indigenous communities are limited.			✓		
	B_WD7	Limited access to specialized equipment operators (e.g., cranes, certified operators).	✓	✓	✓	✓	✓
	B_WD8	Limited capacity and in planning and building offices which can slow project delivery.	✓	✓	✓	✓	✓
	B_WD9	Overall workforce availability is insufficient to support scaling of modular construction.	✓	✓	✓	✓	✓
	B_WD10	Lack of clear, unified training pathways or standards for OSC across Canada.	✓	✓	✓	✓	✓
	B_WD11	Shortage of skilled trades needed for OSC construction (design, assembly, mass timber, mechanical/electrical, etc.).	✓				
	B_WD12	Rural factory locations limit skilled workforce access and reduce available workforce pools.	✓	✓	✓	✓	✓
	B_WD13	Staff shortages in public offices (planning, permitting, fire inspection) delay projects.	✓				
	B_WD14	New building inspectors are inexperienced.				✓	
	B_WD15	Skill gaps among workforce.	✓	✓	✓	✓	✓
Workforce Retention and Recruitment	B_WD16	Difficulty attracting youth, women, diverse groups, and newcomers to construction trades.	✓	✓	✓	✓	✓
	B_WD17	Workplace cultures are not consistently inclusive or culturally appropriate, limiting participation from Indigenous peoples and other underrepresented groups.	✓				
	B_WD18	Workforce retention challenges due to high living costs, housing affordability, and job security concerns in the construction sector.	✓	✓	✓	✓	✓

Figure 12: What we heard - Skilled workforce and skills development barriers

What we heard

TRANSPORTATION AND LOGISTICS			Workshop locations				
Sub-category	**ID**	**Barriers to OSC**	**NB**	**PEI**	**NS**	**NL**	**Virtual**
Damage and Protection	B_TL1	Responsibility and liability for damage during manufacturing, transportation, and installation are unclear among manufacturers, haulers, and general contractors.	✓	✓	✓	✓	✓
	B_TL2	Modules are susceptible to denting, corner damage, and structural movement during loading and unloading.	✓	✓	✓	✓	✓
	B_TL3	Moisture protection practices, including barriers and wrapping, are inconsistent.	✓	✓	✓	✓	✓
Module size and road restrictions	B_TL4	Escort and permit rules for oversized modules (often >12 ft wide) vary across jurisdictions.	✓	✓	✓	✓	✓
	B_TL5	Module width or height is constrained by bridge clearances, turning radii, and road widths.	✓	✓	✓	✓	✓
	B_TL6	Modules must be designed to match available island transport equipment.				✓	
	B_TL7	Ferry costs add major expense for panelized construction.				✓	
Site access and Storage constraints	B_TL8	Limited staging and storage space near construction sites.	✓	✓	✓	✓	✓
	B_TL9	Seasonal road weight restrictions affect transportation timelines.	✓	✓	✓	✓	✓
	B_TL10	Difficult access in dense urban areas (tight roads, overhead utilities).			✓		

Figure 13: What we heard - Transportation and Logistics barriers

To further understand the relative significance of these barriers, participants were asked to assess their severity during the workshops. During the workshops, participants were asked to complete a survey scoring the severity of certain barriers to build more housing using OSC on a scale of 1 (low) to 5 (high). Figure 14 and Figure 15 show visual summaries of the mean scores for each barrier across the five workshops.

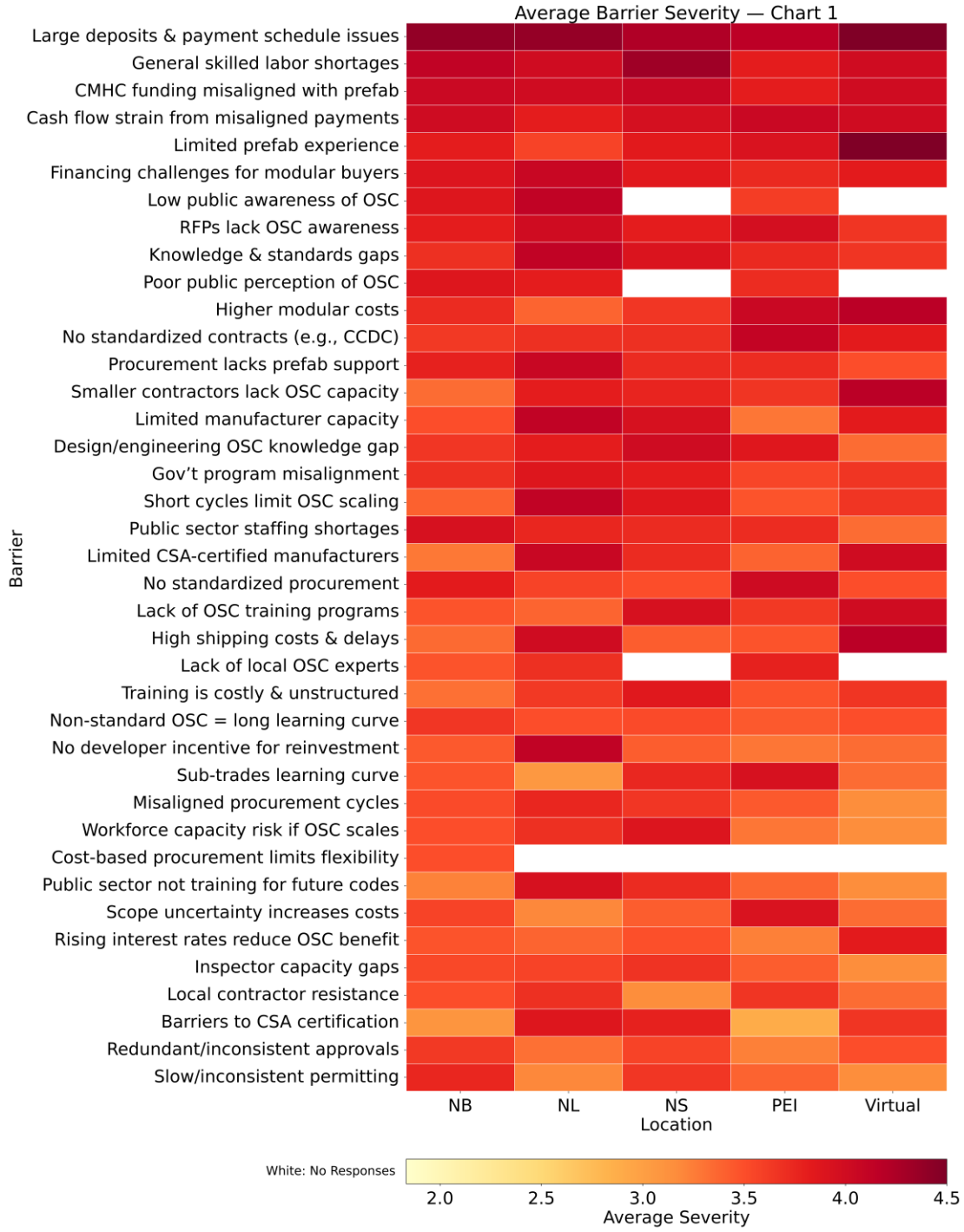

Figure 14: Barrier severity scores summary (1)

Figure 15: Barrier severity scores summary (2)

The results from the workshop surveys were used to determine the top five most severely rated barriers to OSC at each workshop location and common themes emerged across Atlantic Canada. **Table 10** shows the top five barriers based on *what we heard* from each workshop survey. Barriers occurring from multiple locations are noted in italics.

Table 10: *Top five barriers by workshop survey (with reoccurring barriers highlighted)*

Location	#1 Barrier	#2 Barrier	#3 Barrier	#4 Barrier	#5 Barrier
NB	***Large deposits and payment schedule issues***	***Skilled workforce shortages***	***CMHC funding misaligned with prefab***	***Cash flow strain from misaligned payments***	Public sector staffing shortages
NL	***Large deposits and payment schedule issues***	Limited manufacturer capacity	Knowledge and standards gaps	Low public awareness of OSC	No developer incentive for reinvestment
NS	***Skilled workforce shortages***	***Large deposits & payment schedule issues***	***CMHC funding misaligned with prefab***	Design/engineering OSC knowledge gap	***Cash flow strain from misaligned payments***
PEI	***Large deposits and payment schedule issues***	No standardized contracts (e.g., CCDC)	Unclear scope across supply chain	***Cash flow strain from misaligned payments***	***Higher modular costs***
Virtual	***Large deposits and payment schedule issues***	Limited experience in prefab	High shipping costs and delays	Smaller contractors lack OSC capacity	***Higher modular costs***

Many of the top barriers identified relate to funding with the CMHC and other financial institutions not lining up with the requirements for OSC due to payments being released based on conventional stick-built construction milestones (on-site project progress). These cashflow timelines are tied to conventional construction milestones and do not allow for deposits to manufacturers or payment schedules tied to in factory project progress. These findings informed the development of targeted initiatives to address the most critical and recurring barriers identified across the workshops.

4.3.3 Barriers and initiatives

Building on the barriers identified through the regional workshops, this section presents the corresponding initiatives developed to address these challenges. The initiatives were synthesized based on solution development forms completed during the regional workshops along with key insights from industry expert interviews and findings from the literature review. These initiatives are grouped into sub-categories, and each initiative has an expected timeline, ease of implementation, and potential impact score out of 10, as summarized by Table 11 to

Table **15**. Definitions and scoring criteria for the table columns are provided in Table 16.

Table 11: *Policy and regulatory*

Sub-Category	ID	Initiative	Barrier ID	Timeline	Ease of Implementation	Impact (of 10)
Attitudes and Knowledge Gaps	PR1	Adopt the MMC Definition Framework across government department and leverage the definitions in policies, procurement documents, and contracts.	B_PR1	Year 1	Easy	7
	PR2	Develop an NB Healthy Housing Planning Note linking housing and year-round safe employment to population health.	B_PR2	Year 2	Easy	6
	PR3	Support public and private sector education and create a regional MMC approval pathway supported by awareness programs.	B_PR3	Year 2	Medium	9
Codes and Standards	PR4	Work with NRC and the necessary codes, committees and commissions to establish a technical committee to update codes for MMC and educate planners and officials.	B_PR4	Year 4	Medium	8
Government Coordination	PR5	Establish the Atlantic Off-site Housing Innovation Network with a clear mandate including monthly (or quarterly inter-provincial meetings) with up to two points-of-contact reporting back to provincial committees.	B_PR5	Year 1	Easy	8
	PR6	Designate a MMC Liaison Officer in NL. This individual should ideally have expertise in conventional, panelized (category 2) and volumetric modular (category 1) construction.	B_PR6	Year 2	Easy	7
Inspections	PR7	Standardize and promote CSA A277 adoption across municipalities through aligned policy, inspection practices, and inspector training.	B_PR7	Year 2	Medium	9
Permitting and Approvals	PR8	Encourage MMC solutions (e.g., categories 2-4, 6 and 7) that meet Heritage Conservation Act requirements.	B_PR8	Year 1	Easy	7
	PR9	Review permitting, by-laws, zoning and pre-construction workflows to remove barriers (e.g., costs, redundant processes, complex approvals, etc.) to all forms of housing supply. This may be done through removal of pre-construction costs, digitizing workflows, educating industry, etc.	B_PR9	Year 4	Medium	9

Table 12: *Financing and insurance*

Sub-Category	ID	Initiative	Barrier ID	Timeline	Ease of Implementation	Impact (of 10)
Access to CMHC Funding	FI2	Collaborate with CMHC to establish a CMHC–regional coordination group.	B_FI1 B_FI2 B_FI3 B_FI4	Year 2	Medium	9
Access to Financing	FI3	Create and share lending briefs with private and institutional investors to expand financing options.	B_FI5 B_FI6 B_FI7 B_FI8	Year 2	Easy	8
Cost Structure	FI4	Use MURB projects as case studies to identify cost reductions for MURBs that use MMC.	B_FI9	Year 1	Medium	9
	FI5	Add MMC-friendly (particularly for categories 1 to 4) payment structures and liquidity supports.	B_FI10	Year 2	Medium	9
	FI1	Introduce MMC manufacturer pre-qualification based on CSA A277 certification.	B_FI11	Year 3	Medium	8
Incentives & Policy	FI6	Establish a pre-manufactured index with fee reductions and expedited approvals.	B_FI12 B_FI13	Year 4	Medium	8
Insurance	FI7	Work with insurers to develop a unified OSC insurance products aligned with MMC (categories 1 to 4) with clear liability transfer.	B_FI14 B_FI15 B_FI16	Year 2	Medium	9

Table 13: *Procurement models and contracts*

Sub-Category	ID	Initiative	Barrier ID	Timeline	Ease of Implementation	Impact (of 10)
Competition and Market Dynamics	PM1	Collaborate across the four provinces to identify a method to score proponents beyond lowest bid that captures benefits of time savings (speed), environmental, social and cultural KPIs.	B_PM1	Year 2	Medium	8
	PM2	Create a funding stream (through Opportunities NB, Invest NS, Innovation PEI and NL's department of IET) for manufacturers to access and become CSA certified.	B_PM2	Year 3	Easy	9
	PM3	Use RFIs and/or RFQs to gain information about manufacturers in the region, pre-qualify proponents (there may be an opportunity to leverage the Build Canada Homes data collected through their MMC RFI). (PM3)	B_PM3 B_PM4	Year 1	Easy	9
	PM4	Provinces and non-profit housing providers to publish a rolling 3–4-year forecast of OSC-suitable public housing projects across the region.	B_PM5	Year 2	Easy	9
	PM5	Use a procurement approach that allows for the manufacturer to be involved in a design assist role during the design phase (e.g., design-build CCDC-14).	B_PM6	Year 2	Easy	7
	PM6	Work with federal and provincial governments to identify serviced or partially serviced small sites and combine them to tender larger projects to one development or design-build team.	B_PM7	Year 2	Medium	7
	PM7	Develop a standardized OSC cost library (e.g., RSMeans-aligned) with supply-chain education to improve cost certainty and procurement outcomes	B_PM8	Year 4	Medium	8
Design and Standards	PM8	Require an OSC or MMC integrator role as part of the project team using the definition identified by NRCan. The integrator may be a consultant, contractor or manufacturer.	B_PM9	Year 1	Medium	9
	PM9	Ensure CSA A277 certification and compliance with the building code of the final building location.	B_PM10	Year 1	Easy	9
	PM10	Use a procurement approach that enables performance-based on projects where MMC will be used.	B_PM11	Year 1	Easy	8
Manufacturing and Supply Chain	PM11	Issue bundled OSC procurement approaches (e.g., offtake agreements) to de-risk capacity investment in the regional manufacturers and add regional logistics supports.	B_PM12	Year 3	Medium	9
Procurement Processes	PM12	Collaborate with CCDC and across the region to create contract templates for MMC to ensure consistency across the region.	B_PM13	Year 4	Medium	8
	PM13	Encourage tenders to consider MMC categories 1 to 4 alternatives.	B_PM14	Year 1	Easy	8
	PM14	After PM3, create consistent RFP processes across the four provinces and provide annual FAQs and training sessions.	B_PM15	Year 2	Easy	7
	PM15	Include clear schedule requirements in contracts and link payments to project signing, factory-based project progress, delivery and installation milestones.	B_PM16	Year 1	Easy	9
	PM16	Define OSC-specific responsibilities in trade scopes and use a standardized site-readiness checklist.	B_PM17	Year 1	Medium	8
	PM17	Where possible, include detailed site information in RFPs (geotechnical, laydown areas, overhead constraints, site images).	B_PM18	Year 1	Medium	8

Table 14: *Skilled workforce and skills development*

Sub-Category	ID	Initiative	Barrier ID	Timeline	Ease of Implementation	Impact (of 10)
Awareness, Culture & Mindset	WD1	Host OSC industry events (tours, seminars) targeting skilled trades.	B_WD1	Year 1	Easy	9
	WD2	Launch OSC awareness campaigns, docuseries, and industry-wide marketing.	B_WD2	Year 1	Easy	9
	WD3	Promote OSC careers through coordinated awareness campaigns and industry events.	B_WD3	Year 1	Easy	8
Skilled Trades & Labour Availability	WD4	Collaborate across Atlantic post-secondary institutions to integrate MMC training and micro-credentials.	B_WD4 B_WD5	Year 2	Medium	9
	WD5	Create streamlined credential recognition for internationally trained workers and engage and work with Indigenous communities.	B_WD6	Year 2	Medium	8
	WD6	Collaborate across trade associations to offer heavy equipment and crane operations in workforce outreach.	B_WD7	Year 2	Difficult	8
	WD7	Work with post-secondary institutions to increase size and staffing in planning and building offices across the region.	B_WD8	Year 2	Medium	8
	WD8	Invest in factory optimization (i.e., digitized processes, automation, etc.) and training to increase capacity and recruitment.	B_WD9	Year 1	Medium	9
	WD9	Build on the AMC certificate to develop a national curriculum aligned with apprenticeships.	B_WD10	Year 4	Medium	8
	WD10	Expand MMC-focused skilled workforce training, fast-track continuous education opportunities, and industry-supported apprenticeships.	B_WD11	Year 3	Easy	8
	WD11	Provide relocation incentives and additional workforce benefits (e.g., housing).	B_WD12	Year 3	Difficult	7
	WD12	Identify training for provincial and municipal staff (including engineers, planners, inspectors, architects, project managers, trades, etc.) to educate on leveraging MMC in projects.	B_WD13 B_WD14	Year 4	Medium	9
	WD13	Collaborate with trade associations to offer training for conventional builders on installation, fit out and handover of category 1 and 2 MMC projects	B_WD15	Year 2	Easy	7
Workforce Retention & Recruitment	WD14	Highlight MMC employment benefits and support bursaries, scholarships, mentorships, and DEI training.	B_WD16	Year 1	Medium	9
	WD15	Consult Indigenous communities to identify workforce initiatives.	B_WD17	Year 1	Easy	8
	WD16	Enable long-term year-round employment through offtake agreements and enhanced benefits.	B_WD18	Year 3	Difficult	9

Table 15: *Transportation and logistics*

Sub-Category	ID	Initiative	Barrier ID	Timeline	Ease of Implementation	Impact (of 10)
Damage and Protection	TL1	Ensure conflict resolution for OSC component damages is included in contracts.	B_TL1	Year 1	Easy	7
	TL2	Collaborate with the R&D based organizations to better understand and minimize damages from transportation and erection. Produce a document top help mitigate these risks.	B_TL2 B_TL3	Year 2	Easy	8
Module size and road restrictions	TL3	Collaborate regionally to document overload escort and permit requirements in a single reference.	B_TL4	Year 4	Medium	9
	TL4	Using resources created from TL5, consider developing design guidelines that account for manufacturing, transportation, and assembly by province based on transportation and logistics constraints.	B_TL5 B_TL6	Year 4	Medium	7
	TL5	Develop a regional logistics framework and database map for oversized loads in collaboration with provincial and municipal transportation authorities, ferry operators, energy authorities and other groups who maintain infrastructure in the right-of-way.	B_TL7	Year 2	Easy	8
Site access and Storage constraints	TL6	In parallel to TL5, identify designated transportation routes with temporary staging yards for critical projects.	B_TL8 B_TL9	Year 1	Difficult	8

To support prioritization, initiatives were grouped based on their relative impact and ease of implementation. Figure 16 groups initiatives by impact score and ease of implementation, creating four categories to prioritize implementation. Priority Actions (high impact, easier to implement) should be prioritized, while Strategic Investments (high impact, medium-difficult to implement) warrant dedicated planning and resources. Targeted Improvements (low-medium impact, easier to implement) can be addressed incrementally, and Potential Considerations (low-medium impact, medium-difficult to implement) should be visited as capacity allows.

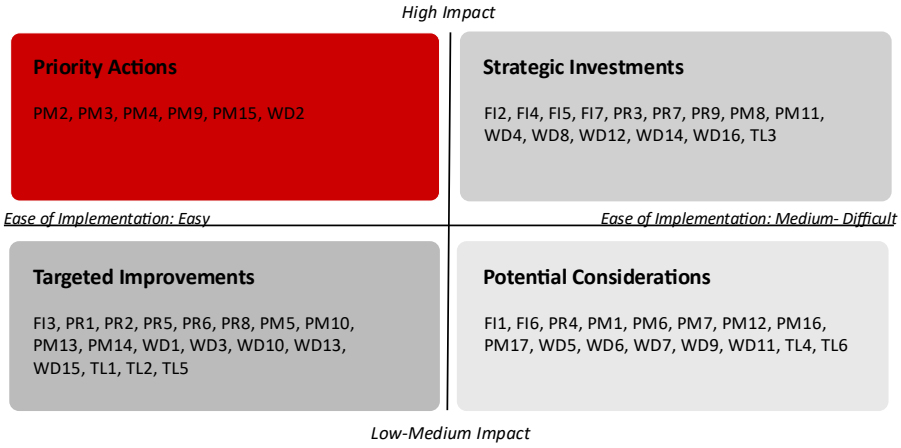

Figure 16: Roadmap initiative priority groupings

4.3.4 Key actions and implementation strategies

To expand upon the initiatives in Table 11 to

Table 15

, other key features were identified for each barrier-initiative pair. These features are outlined in Table 16. These features were used to create dashboard layouts to explain each barrier and corresponding initiative. Table 16 explains how each feature in the dashboards should be interpreted and outlines the purpose of each field, including how initiatives are categorized, who is involved, the expected timelines, and how implementation progress will be measured. These definitions were developed through workshop discussions, interviews, and internal analysis to ensure consistency across the dashboards and to provide a clear reference for understanding how each initiative is structured, assessed, and implemented.

Table 16: *Description of dashboard features*

Table Column	Description
Identifier (ID)	Represents the unique identifier assigned to each initiative in the report and dashboard.
Category	The main barrier or opportunity category associated with the initiative (e.g., Policy & Regulatory, Procurement, Financing & Insurance, Workforce, Transportation & Logistics).
Sub-Category	A more granular classification within the main category (e.g., permitting, insurance, contracts, training, module transport).
Description	Brief description of the barrier the initiative aims to address.
Initiatives	Lists the key actions or strategic initiatives identified in the report to achieve the intended goals.
Owner(s)	Entities with an identified potential for leading and driving the implementation of the initiative. The key leading entities were identified through workshop discussions and interviews.
Contributor(s)	Groups who participate in, contribute to, or are affected by the initiative.
Contributor / Owner Type	Classifies owners and industry participants into standardized types (e.g., Government, Industry, Financial Institutions, Training Institutions, Manufacturers). This enables dashboard users to filter initiatives by who is involved
Expected Timeline	Indicates the expected timeframe needed to implement the initiative. The timeline reflects the sequencing identified during workshops and internal analysis, considering the level of effort, regulatory changes required, and coordination needed for successful delivery. Year 1 indicates one year after the creation of the Network and working groups outlined in Section 5, Year 2 indicates 2 years, and so forth.
Ease of Implementation	The ease of implementation is determined by analyzing key challenges identified through industry expert discussions. The initiatives are classified into three levels based on their feasibility and the extent of challenges they face: • **Easy**: The initiative can be implemented with minimal challenges. Regulatory requirements are clear, market readiness is high, and necessary funding, infrastructure, and workforce capacity are already in place. Little to no coordination or system change is required. • **Medium**: The initiative requires moderate effort and some adjustment. Financial, regulatory, or logistical considerations may create minor delays, and successful delivery may depend on targeted coordination between departments or industry

Table Column	Description
	partners. Existing systems can support the initiative, but enhancements or clarifications may be needed. • **Difficult**: The initiative faces significant challenges and will require substantial coordination, investment, or policy change. Barriers may include high costs, unclear risk allocation, fragmented responsibilities, cultural or organizational resistance, and capacity shortages. Implementation is feasible but depends on strong leadership, clear guidance, and sustained participant commitment.
Impact (Out of 10)	The expected impact of each initiative was rated on a scale from 1 (low) to 10 (high). These scores are based on feedback from workshops, interviews, and survey responses, providing a balanced assessment of how meaningful each initiative could be.
Metrics	Outlines the indicators used to assess each initiative's progress, focusing on measures such as cost, time, efficiency, and participant experience. These indicators were developed through discussions held during workshops and interviews, where participants helped identify which measures best capture the challenges these initiatives are intended to address. Using these indicators allows progress to be monitored consistently and supports adjustments during implementation.
Scope of Implementation	**Location (national, regional or local)** Shows whether the initiative should be applied nationally or adapted to a particular region or local area. In some cases, certain initiatives may need to be tested at the local or provincial scale before being expanded more broadly.
Prerequisite Initiative(s)	Lists the key actions that need to occur first for the initiative to work. These steps were shaped through workshop discussions and team input to ensure they match practical project requirements.

To support implementation and monitoring, the initiatives were translated into a series of structured dashboards. These dashboards provide a structured overview of each barrier and corresponding initiatives using the fields and definitions outlined in **Table 16**. **Figure 17** shows an example of the dashboard layout.

The dashboards are included in an interactive interface that enables users to filter and navigate the full set of dashboards based on the category, sub-category, province or workshop location, and contributor/owner type. This intends to facilitate locating relevant information for specific users. The interactive web app can be accessed at the following link. https://atlantic-roadmap-7cam.onrender.com/. The dashboard slides are also available in **Appendix I: Implementation Dashboards**.

The web app also contains a tab titled *Initiative Tracking* which is used to track the implementation of initiatives across Atlantic Canada. There are separate columns for each province since some initiatives are

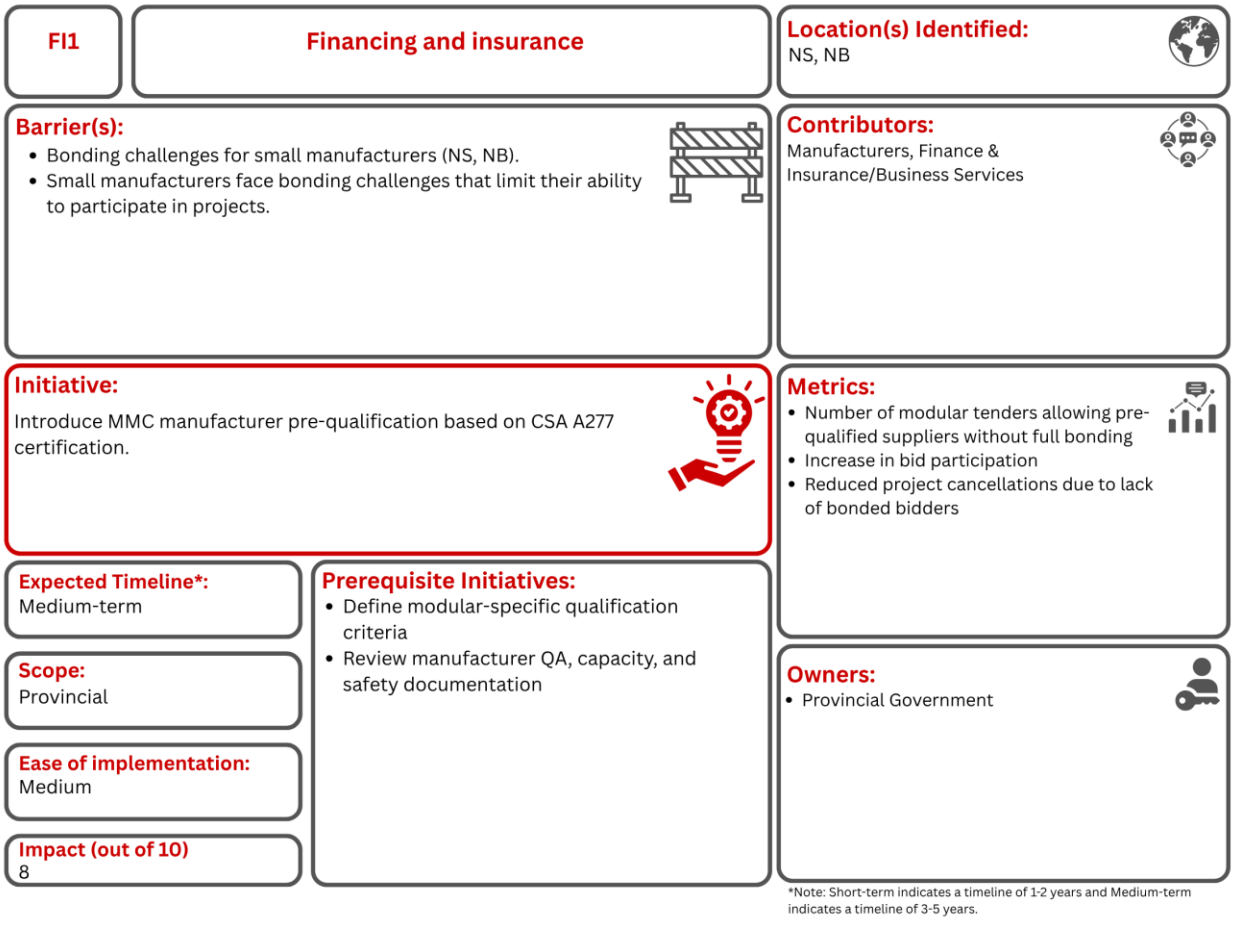

Figure 17: Dashboard example

provincially independent while others are collaborative efforts for the Atlantic region. This table displays

the state of each initiative: Pending, in progress, or completed/in action. When available, additional notes about metrics used to update this data are also displayed in this table.

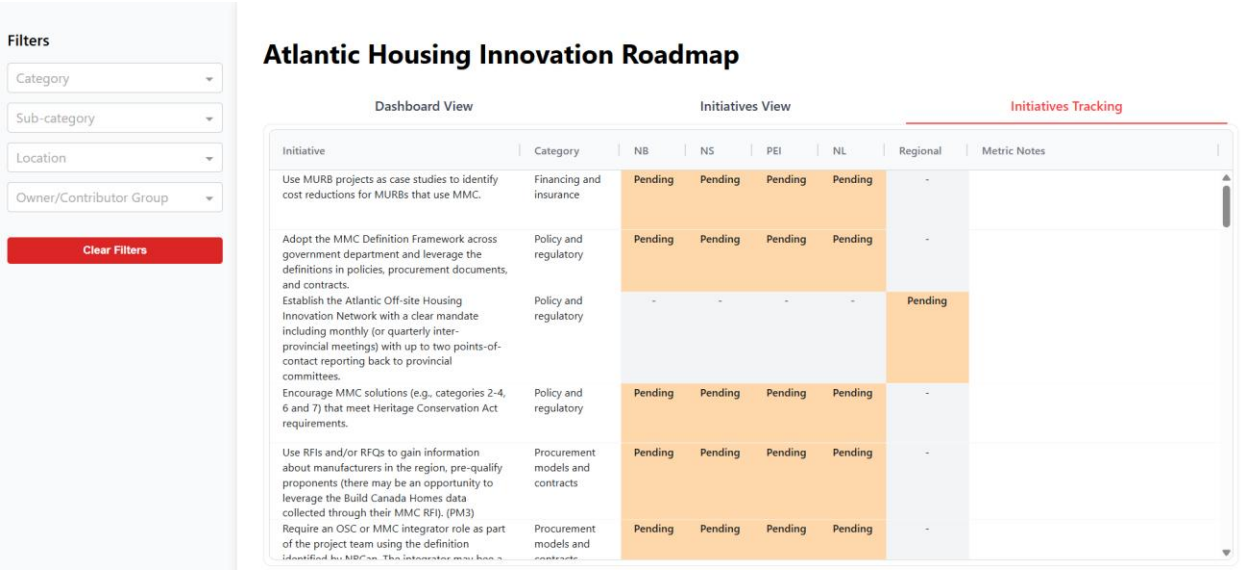

Figure 18: Atlantic Housing Innovation Roadmap initiative tracking view

4.3.5 Phased implementation plan

Figure 19 and **Figure 20** display the initiatives according to their expected timeline for implementation (from the establishment of the Network and working groups outlined in Section 5) and are divided into two groups: collaborative initiatives and provincially independent initiatives. Collaborative initiatives involve a coordinated effort across Atlantic Canada. The provincially independent initiatives are actions which apply to each province individually, with lessons learned shared regionally.

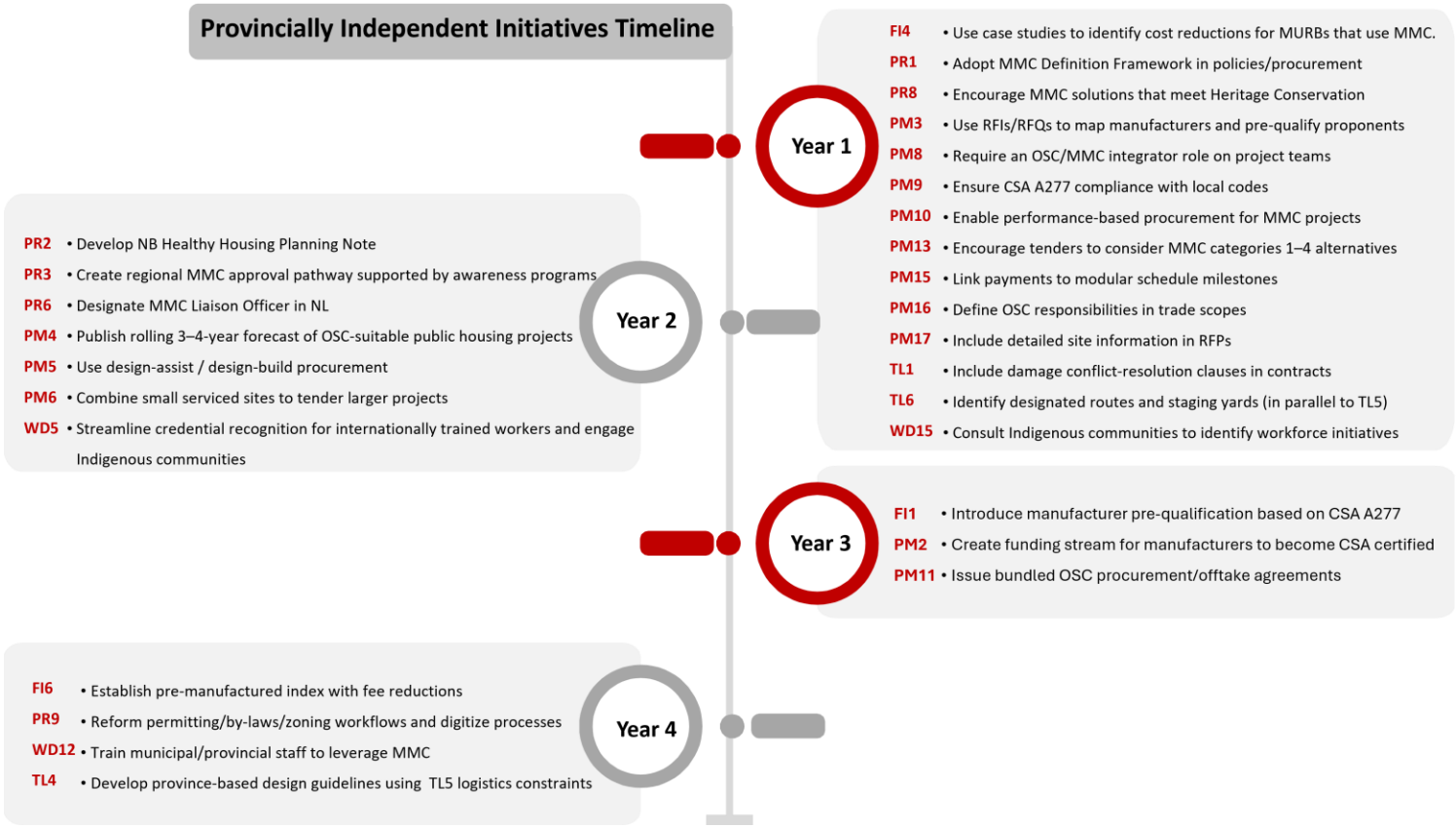

Figure 19: Provincial independent implementation roadmap initiatives (2026–2029)

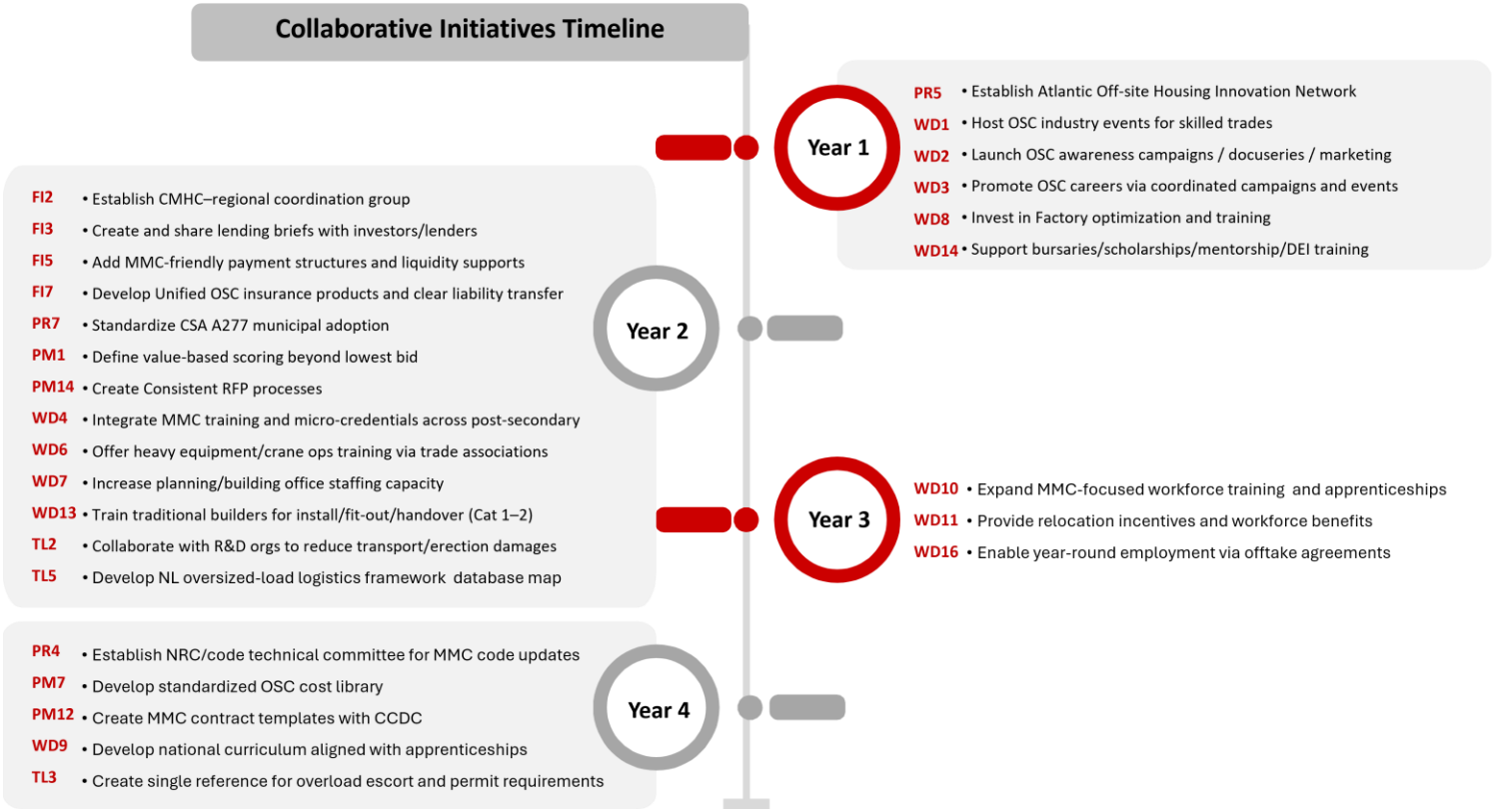

Figure 20: Collaborative implementation roadmap initiatives (2026–2029)

5.0 Conclusions and Recommendations

This section synthesizes the findings from the policy and by-law review, industry expert interviews, and regional workshops and translates them into evidence-based conclusions and actionable recommendations. It summarizes the key system-level constraints affecting OSC in Atlantic Canada, outlining how these findings are addressed through the Atlantic Off-Site Housing Innovation Roadmap.

5.1 Summary of challenges

This study confirms that OSC has the potential to contribute meaningfully to increase housing delivery in Atlantic Canada, but its adoption is constrained by system-level barriers rather than technical feasibility. Across all four provinces, OSC is generally permitted under existing codes and standards; however, inconsistent implementation, fragmented processes, and limited alignment across housing delivery systems continue to create uncertainty and risk for projects.

Findings from policy reviews, interviews, and regional workshops highlight that regulatory and permitting processes remain largely designed for conventional site-built construction. Limited familiarity with factory-based delivery, duplicated inspections, and inconsistent interpretation of standards such as CSA A277 contribute to longer approval timelines and reduced predictability. **These challenges are amplified in smaller municipalities with limited capacity and resources.**

Financing and insurance systems were identified as critical constraints to scaling OSC. Many lenders and insurers continue to rely on valuation and risk frameworks developed for site-built construction, which often fail to recognize factory-completed work. This misalignment limits access to working capital, increases financing risk, and constrains industry growth, particularly for small and medium-sized manufacturers.

Procurement systems also present significant barriers to scaling OSC. Traditional procurement models often delay manufacturer involvement and rely on payment structures tied to on-site milestones, which do not align with factory-based production nor do they allow the sector to realize the true benefits of OSC. These conditions increase financial risk for manufacturers and limit opportunities for standardization and efficient production planning.

Workforce availability remains a cross-cutting challenge affecting both off- and on-site construction. **While OSC can improve productivity and provide more stable, year-round employment, it does not eliminate the need for skilled trades and technical professionals.** Instead, it shifts labour demand across factory and site environments, underscoring the need for coordinated workforce planning, training pathways, and immigration alignment.

Transportation and logistics present additional challenges unique to the Atlantic context. Oversized-load permitting, infrastructure limitations, interprovincial variability, and, in some regions, shipping capacity and costs, increase delivery complexity and cumulative expense. These constraints highlight the importance of early integration of transportation considerations into project design and planning.

5.2 Summary of solutions

The challenges identified highlight the need for a coordinated, system-level response. The Atlantic Off-Site Housing Innovation Roadmap directly responds to the barriers identified through the policy review,

interviews, and workshops. **The roadmap does not promote OSC as a universal solution**; instead, it identifies targeted initiatives designed to remove the specific constraints observed in the results. The roadmap translates the barriers identified through the policy review, industry interviews, and workshops into a coordinated set of actions that can be applied by governments, housing authorities, and industry partners over time. The roadmap aligns regulatory, financing, procurement, workforce, and logistics interventions so that improvements in one area are reinforced by progress in others.

The roadmap is structured to support phased decision-making, enabling jurisdictions and organizations to prioritize near-term actions that reduce immediate delivery risk while laying the groundwork for medium- and long-term capacity building. Its design recognizes that Atlantic Canada's housing ecosystem is multi-jurisdictional and capacity constrained. The accompanying implementation dashboard provides a mechanism to track progress, identify gaps, and support accountability. Together, the roadmap and dashboard are intended to function as a framework that can evolve as policies change, capacity grows, and new evidence emerges, supporting continuous improvement in how OSC contributes to housing supply in Atlantic Canada.

5.3 Governance framework for an Atlantic Off-site Housing Innovation Network

The results of this project indicate that no single organization or level of government can implement the roadmap independently. Regulatory responsibilities are spread across different authorities, procurement decisions are distributed across multiple bodies, and industry capacity spans provincial boundaries. Thus, **the report recommends establishing an Atlantic Off-Site Housing Innovation Network** to support roadmap implementation, as described by **Figure 21**. The Atlantic Off-Site Housing Innovation Network (hereinafter referred to as "the Network") will be a collaborative body with a mandate to advance OSC housing solutions across Atlantic Canada.

The Network will exist to:

- Improve coordination among housing delivery organizations, including manufacturers, developers, regulators, and public-sector partners.
- Support the alignment of standards, certifications, and approval processes across the four Atlantic provinces.
- Strengthen regional capacity in manufacturing, workforce development, supply chains, and innovation.
- Serve as a unified voice for the off-site construction and housing sector in Atlantic Canada.

The Network is structured to ensure balanced representation across industry, government, and academic/training institutions from all four Atlantic provinces.

Representation will include, but is not limited to, industry and professional associations (including representatives from all phases of the housing development life cycle), provincial and municipal governments, housing authorities and non-profit housing providers, Indigenous community representatives, research and training institutions, and financial and insurance experts. Table 17 identifies potential organizations to represent key membership groups from each province.

Table 17: *Potential representation for the Network*

Industry Groups	Research and Training	Government
• Architects' associations • Construction associations • Developers, builders, manufacturers, and owners • Engineers' associations • Finance and insurance organizations • Homebuilders' associations • Nonprofit housing organizations • Planners	• Colleges • Universities	• Indigenous communities • Municipalities • Relevant provincial government departments (e.g., Housing, Transportation and Infrastructure, Finance and Treasury, Economic Development, Local Government and Development, Education and Skills Development, Intergovernmental Affairs). • Relevant federal government departments and agencies

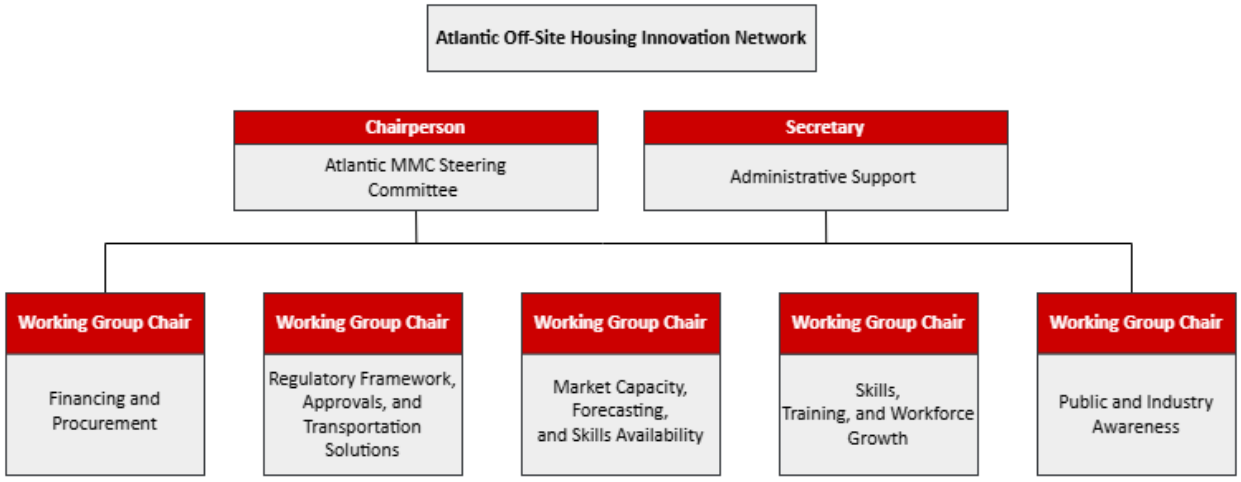

Figure 21: Draft of potential organizational chart for the Network governance structure and working groups

5.3.1 Governance Structure: Atlantic MMC Steering Committee

A steering committee should provide strategic oversight and guidance for the Network. The responsibilities of the steering committee should be to:

- Represent the interests of the Network
- Set strategic priorities and determine annual deliverables for the Network's working groups
- Oversee partnerships and finances
- Ensure balanced representation across provinces and sectors
- Engage with CMHC, BCH, and other federal partners to align programs, policies, and funding mechanisms with off-site construction approaches

The committee should include representation from all Atlantic provinces and include a mix of public and private sector members. This should include representatives from at least one construction association,

engineers' association, planners institute, and architects' association, as well as the CHBA. The committee should also include representatives from provincial housing organizations in all four Atlantic provinces, as well as representation from the finance and insurance sectors. The committee will elect a Chair and Vice-Chair from its members to serve fixed terms. The Chair and Vice-Chair should be responsible for providing leadership to the steering committee, setting meeting agendas, presiding over meetings, and representing the Network externally.

Given the scope and scale of the initiatives identified in the *roadmap*, the Network requires a dedicated Secretary to provide administrative support. The Secretary should be responsible for the management and operational aspects of the Network (e.g., information management, tracking the status of initiatives, coordination within and across working groups, and supporting working groups as required).

5.3.2 Governance Structure: Functional Working Groups

Functional working groups should be established to advance specific priorities identified by the Network and to deliver specific initiatives determined by the steering committee.

Each working group should include a chairperson or co-chairs appointed by the steering committee and representation from members across provinces and relevant sectors with expertise or experience in the field of the working group. The working groups would be responsible for delivering on the objectives defined by the steering committee. Working groups may be standing or time-limited, depending on their mandate and scope.

At a high level, the working groups would be responsible for implementing initiatives in three phases: knowledge creation, knowledge mobilization, and knowledge dissemination (Figure 22). Knowledge creation involves generating new evidence, frameworks, and tools, that address gaps in understanding or practice. Specifically, this involves developing financing models, procurement templates, or regulatory guidance relevant to OSC. Knowledge mobilization focuses on translating knowledge into actionable insights and strategies to inform decision-making, investment, and planning across Atlantic Canada. In the context of the working groups this includes market assessments, capacity forecasting, and workforce analysis. Knowledge dissemination involves sharing findings, best practices, and innovations are broadly with industry, government, and the public. Together, these three phases form a continuous cycle to support evidence-based action, building regional capacity, and supporting OSC housing solutions across Atlantic Canada

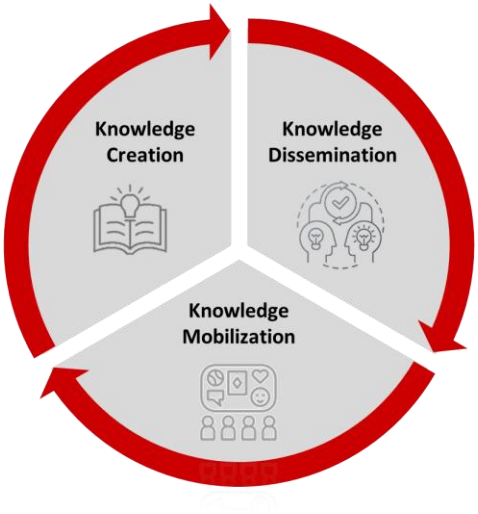

Figure 22: Working group knowledge cycle

Recommended Functional Working Groups:

- **WG 1 Knowledge Creation – Financing and Procurement:** This working group will develop integrated financing and procurement approaches to support OSC projects across the housing lifecycle. It will examine public, private, and blended financing approaches while advancing procurement frameworks suited to off-site construction. The group will create templates and guidance to reduce barriers, improve cost certainty and cash flow schedules, and address payment structures and insurance considerations throughout the project delivery process. The group will also support the development of standard post-project evaluations of OSC pilot projects compared to conventional construction methods to inform future investment, policy, and procurement decisions. These evaluations include assessing project costs, schedule performance, defects and warranty outcomes, and lifecycle costing over long-term time periods.
- **WG 2 Knowledge Creation – Regulatory Framework, Approvals, and Transportation Solutions**: This working group will address regulatory, approval, and logistical challenges related to off-site construction. It will focus on code interpretation and the alignment of standards across jurisdictions, while also examining transportation requirements and constraints associated with OSC delivery. The group will identify opportunities to streamline permitting and approvals, support regulatory consistency, and enable innovation while maintaining safety and quality outcomes. It will also address practical transportation considerations related to module size, routing, permitting, storage, and scheduling, with the goal of improving efficiency, reducing delays, and supporting the reliable transportation of off-site housing products across Atlantic Canada.
- **WG 3 Knowledge Mobilization – Market Capacity, Forecasting, and Skills Availability:** This working group will focus on understanding and strengthening regional off-site construction capacity. It will assess current and projected manufacturing capacity, supply chain readiness, and skills availability across Atlantic Canada. The group will support market forecasting to inform investment, workforce planning, and policy decisions.
- **WG 4 Knowledge Mobilization – Skills, Training, and Workforce Growth:** This working group will address workforce needs related to off-site construction, including manufacturing, transportation, and installation. It will work to align industry needs with education and training programs, address

credential recognition, and support workforce mobility across Atlantic Canada. The working group will ensure training programs are accessible across all employer models and will incorporate ICI labour stability modelling to ensure housing acceleration aligns with critical infrastructure delivery.

- **WG 5 Knowledge Dissemination – Public and Industry Awareness:** This working group will support knowledge sharing and public awareness related to off-site construction. It will plan and deliver events, workshops, and communications activities to promote awareness and understanding of off-site construction among industry, government, and the public. It will also share best practices related to module protection, storage, handling, and support continuous improvement by capturing and disseminating lessons learned and proven innovations across projects and jurisdictions.

This list of working groups is not exhaustive and will evolve as priorities are identified. For example, additional working groups focused on sustainability and infrastructure in the contexts of housing (see **Appendix E: Sustainability and climate change considerations** and **Appendix F: Infrastructure's role in housing development**) could be established to address these areas as work progresses.

Figure 23 shows potential working groups and corresponding initiatives. *The initiatives in italics are those marked as provincially independent.*

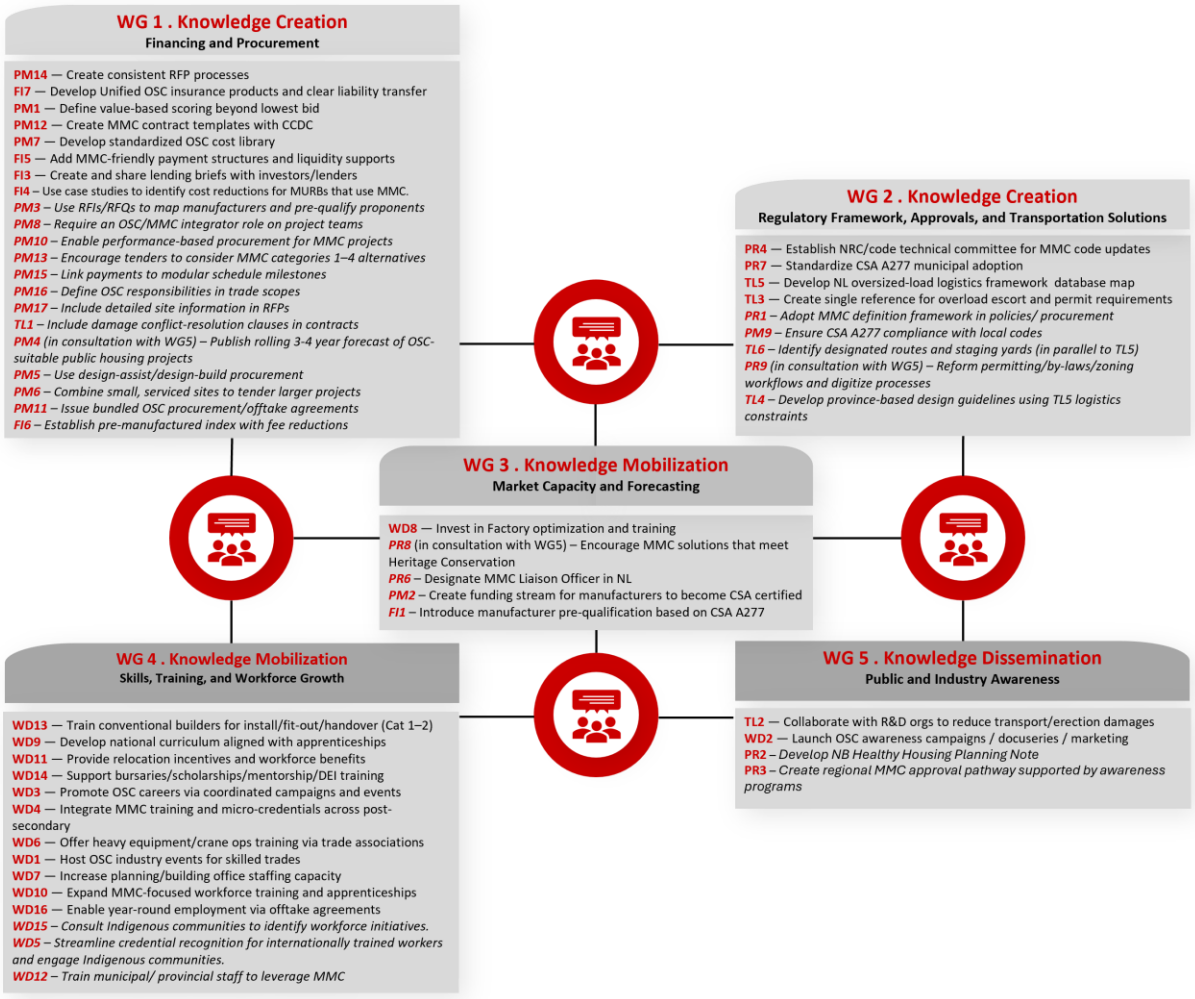

Figure 23: Draft working groups and potential initiatives for consideration

5.4 Terms of reference framework for committee and working groups

A formal Terms of Reference for the Atlantic MMC Steering Committee and Working Groups should be established by the Steering Committee following its establishment. The Terms of Reference for the committee and each working group should address the following:

- Scope and mandate
- Membership and governance structure
- Functional duration and meeting frequency
- Potential initiatives to be addressed by working groups (informed by **Figure *23***).

Appendix J: Draft of Potential Terms of Reference contains potential Terms of Reference for the Network's Steering Committee and Working Groups as a reference for the Steering Committee's consideration.

Note the potential initiatives for the working groups are identified in Figure 23: *Draft working groups and potential* initiatives***.***

5.5 Future work and development needs

As implementation of the Atlantic Off-Site Housing Innovation Roadmap progresses, additional research and development will be required to support effective delivery, learning, and adaptation over time. These future efforts focus on strengthening coordination, governance, and system-level capacity to ensure the roadmap remains responsive to evolving policy, market, and institutional conditions.

- **Industry-led coordination models:** Discussion has begun amongst private MMC manufacturers to create an *MMC Atlantic committee*. Future work is needed to explore governance structures, mandates, and operating models including how such a body could support ongoing collaboration between industry, governments, housing authorities, and related organizations.
- **Ongoing learning and alignment:** Future work could examine the role of regular convenings, such as annual meetings of steering committees and working groups, in supporting information sharing, cross-jurisdictional alignment, and continuous refinement of implementation approaches.
- **Administrative and resourcing needs:** Additional development is needed to understand the level and type of administrative support required to sustain coordination over time, including potential funding models and host arrangements that support continuity, monitoring, and communication across provinces.
- **Provincial mobilization and implementation pathways:** Comparative analysis of how provinces mobilize internally within existing governance and institutional structures could support the development of adaptable implementation models that balance regional coordination with jurisdiction-specific needs.

This future work emphasize that successful implementation of the roadmap will depend on continued learning and coordination beyond the life of this study. Addressing these areas can ensure that governance structures and implementation approaches evolve alongside policy changes, capacity growth, and emerging evidence, supporting sustained progress in the adoption and scaling of MMC across Atlantic Canada.

5.5.1 Key Limitations

This study undertook significant review and data collection; however, three (3) key limitations have been identified:

(1) Limited engagement with Indigenous communities: the study did not include formal engagement with Indigenous communities in the region. Some initiatives identify the importance of Indigenous community consultation, and this should be prioritized ahead of formalizing the Atlantic MMC Steering Committee and associated Working Groups.

(2) Sustainability and climate change considerations: **Appendix E: Sustainability and climate change considerations** provides a high-level review of the sustainability, resiliency and climate change considerations when initiating a housing study for the region. Additional initiatives and work are needed to complete this aspect of the study.

(3) Infrastructure's role in housing development: **Appendix F: Infrastructure's role in housing development** provides a high-level review of the need to think holistically when developing housing (whether on-site, off-site or any form of MMC). A full strategy for civil infrastructure should be developed and may be something individual provinces mobilize to do in collaboration with municipalities.

Acknowledgements

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Appendix A: Industry expert interview questions

Section 1: Barriers to Off-Site Construction

1. **Policy and Regulatory Barriers**

Specifically, focusing on *specific* municipal, provincial, or federal policies that have helped or hindered off-site housing construction.

Discuss potential policy changes that could support off-site housing construction.

2. **Procurement and Financial Barriers**

How have procurement processes acted as a barrier to OSC projects? What makes procurement processes effective for OSC?

Describe any challenges faced accessing financing, insurance, or investment for off-site construction?

3. **Workforce, Labour, and Skills Development**

Discuss any workforce-related issues limiting off-site construction capabilities or capacity (e.g., lack of skilled labour, training needs, etc.).

4. **Transportation and Logistics Barrier**

Discuss any transportation and logistics barriers limiting off-site construction housing projects.

5. Perceived Significance of Barriers

For each of the following barrier categories, please rate how significantly they hinder off-site construction, using the following scale:

1 = Not a Barrier
2 = Minor Barrier
3 = Moderate Barrier
4 = Significant Barrier
5 = Critical Barrier

A. Policy and Regulatory Barriers
B. Procurement Barriers
C. Financial Services Barriers
D. Workforce, Labour, and Skills Development
E. Transportation and Logistics

Of the above, which category is the most critical barrier and why?

6. **Additional barriers**

Please describe any barriers not captured by the categories outlined in the previous questions.

Section 2: Details on Specific Projects

In this section, we ask you to consider both successful and challenging OSC projects to help us understand the conditions that support or hinder OSC. In general, this section focuses on discussing specific experiences of OSC projects, including successes, challenges, key stakeholders, and lessons learned.

1. Please consider a specific project involving OSC that you consider to be successful.

Project Details:

Location (Municipality):

Project Size (e.g., number of units, square footage, etc.):

Project Timeline (start and end dates or duration):

Project Performance:

- What aspects of the project went particularly well?
- Which stakeholders or companies were involved, and how did they influence the project?
- What barriers did the project face and how were they addressed?
- What lessons were learned that could help reduce barriers in future projects?

2. Please consider a specific project involving OSC that faced significant barriers.

Project Details:

Location (Municipality):

Project Size (e.g., number of units, square footage, etc.):

Project Timeline (start and end dates or duration):

Project Performance:

- What were the main barriers encountered during this project?
- Despite challenges, were there any aspects of the project that went well?
- Which stakeholders or companies were involved, and how did they influence the project?
- What lessons were learned that could help reduce barriers in future projects?

3. If you wish to discuss details on other specific projects, we invite you to do so.

Project Details:

Location (Municipality):

Project Size (e.g., number of units, square footage, etc.):

Project Timeline (start and end dates or duration):

Project Performance:

- What aspects of the project went particularly well?
- What barriers did the project face and how were they addressed?
- Which stakeholders or companies were involved, and how did they influence the project?
- What lessons were learned that could help reduce barriers in future projects?

Appendix B: Thematic barriers tables

	Barriers identified
1. POLICY AND REGULATORY	**1.1 Permitting delays, duplication, and inconsistency**
	1.1.a. Bureaucratic permitting delays - Often long and inconsistent.
	1.1.b. Permitting inconsistency across municipalities /provinces - Some issue permits for entire building, others only for site connections.
	1.1.c. Redundant structural verification and engineering stamps - Identical modules require separate stamps; duplicate checks delay projects.
	1.1.d. Redundant inspections despite CSA A277 certification - Plumbing, electrical, and framing re-inspected on site.
	1.1.e. New/unfamiliar inspectors - Many officials have never seen modular projects.
	1.1.f. No modular-specific permitting checklists or fast-track processes - Handled case by case.
	1.1.g. Permitting not digitized - Manual paper processes cause delays.
	1.1.h. Mandatory quarterly in-person audits
	1.1.i. Fragmented municipal processes - Overlapping approvals, no project lead, lack of coordination between departments.
	1.2 Complexities in applying codes, standards and certifications
	1.2.a. Unfamiliarity with modular standards - Officials often confuse CSA A277 with Z240.
	1.2.b. Split authority issues - Unclear whether provincial permits cover work split between plant and site.
	1.2.c. Cross-province plant work - If modules are built outside the province, unclear who governs and whether CSA certification is accepted.
	1.2.d. Accreditation acceptance unclear - No standard policy on whether plant-level accreditation (e.g., HVAC) can replace on-site inspection.
	1.2.e. CSA certification access and cost - Particularly expensive/difficult in some provinces where certifiers must be brought in (reported in NL).
	1.2.f. Lack of CSA-certified manufacturers in some provinces - Reported in NL.
	1.3 Zoning restrictions, unclear interpretations, and local bylaws (fire, noise, height)
	1.3.a. Zoning change delays - Slow to rezone land for modular use.
	1.3.b. Zoning restrictions - Some subdivisions still exclude modular homes.
	1.3.c. Zoning interpretation issues - No distinction between modular (CSA A277) and manufactured/mobile homes (CSA Z240)
	1.3.d. Height restrictions in local bylaws - E.g., waterfront protections, view corridors, or condo height reductions.
	1.3.e. Stricter fire/sprinkler rules - Particularly for taller residential buildings.
	1.3.f. Noise bylaws - Limit construction hours, affecting scheduling.
	1.3.g. Poor communication of bylaw changes to manufacturers
	1.4 Policy misalignment across governments and unclear municipal processes

	1.4.a. CMHC promotes modular but hasn't adapted rules - Creates a gap between policy intent and actual practice. **1.4.b. Conflicting policy goals** - Affordability targets vs. energy-efficiency requirements (higher efficiency raises costs, undermining affordability). **1.4.c. Scaling limitations** - Modular mostly limited to wood-frame, low-rise and it is difficult to apply policies consistently to mid/high-rise projects. **1.4.d. Disconnect between municipal, provincial, and federal levels** - Policies are not aligned, sometimes contradictory. **1.4.e. Contrast between municipalities** - Urban cores (e.g., HRM) restrictive, suburban municipalities more welcoming to growth as reported in NS.

	Barriers identified
2. PROCUREMENT MODELS AND CONTRACTS	**2.1 RFPs and tendering processes are not OSC-friendly**
	2.1.a. RFPs not well-structured or modular-aware - Lack clarity and don't distinguish between modular methods (volumetric vs. panelized). **2.1.b. Traditional tendering not modular-friendly** - Based on plans/specs rather than early OSC integration. **2.1.c. Procurement timelines misaligned with modular schedules** - Standard cycles clash with modular's front-loaded manufacturing. **2.1.d. Government open-competition rules may conflict with modular** - Procurement rules require broad competition, but modular projects need specialized bidders, creating a mismatch. **2.1.e. Bundling not supported** - Modular is cost-effective when economies of scale are realized, but current procurement doesn't allow bundled projects.
	2.2 Confusion over roles and responsibilities
	2.2.a. Scope confusion throughout the supply chain **2.2.b. Lack of procurement frameworks** - No clear systems to define responsibilities between manufacturers, GCs, and sub-trades. **2.2.c. Ineffective project leadership** - Developers/consultants without modular or construction management experience struggle to coordinate projects.
	2.3 Lack of modular-friendly design integration and standardized detail
	2.3.a. Lack of modular-friendly design - Architects/engineers often design for traditional builds, raising costs and inefficiency. **2.3.b. Design inflexibility in procurement** - Rigid designs procured without adapting to site conditions (e.g., rock excavation mismatches). **2.3.c. No standardized detail library** - Lack of pre-approved modular details for foundations, MEP connections, etc.
	2.4 Contractor capacity issues
	2.4.a. Large GCs avoid small residential OSC projects - Overhead costs too high for smaller-scale work. **2.4.b. Smaller GCs lack resources/experience** - Can't manage OSC procurement effectively, limiting their participation. **2.4.c. Local contractor resistance** - Fear that modular work reduces local economic benefits.
	2.5 Supply chain and sourcing challenges
	2.5.a. Limited CSA-certified supply base in some provinces due to cost of CSA certification **2.5.b. Sub-trade learning curve** - Each manufacturer builds differently, so trades must relearn for every project, slowing installation. **2.5.c. Cross-border sourcing** - U.S. procurement considered too risky due to asset security issues. **2.5.d. Interprovincial vs. local sourcing** - Developers sometimes procure from other provinces for cost savings, but local suppliers are preferred for trust and ease of coordination.

	Barriers identified
3. FINANCING AND INSURANCE	**3.1 Financing flows and payment structures**
	3.1.a. Modular requires large upfront deposits - E.g., 50%/50% factory payment model, but banks/government follow traditional draw schedules. **3.1.b. No payments for off-site work until delivery** - Creates severe cash flow strain. **3.1.c. Progressive draws are mismatched with modular's front-loaded speed**. **3.1.d. Delayed payments** - Creates storage and financing risks for completed modules. **3.1.e. No standard for modular progress claims** - Modular builders face cash flow strain because payment milestones don't exist for factory work **3.1.f. High capital requirements disadvantage smaller/new firms** - Lenders prefer established players.
	3.2 Cost escalation and pricing uncertainty
	3.2.a. I**nflated bids and risk premiums** - Subcontractors are unfamiliar with modular leads **3.2.b. Municipal "plan-ready" initiatives raise oversight and cost-control concerns**. **3.2.c. High interest rates and rising financing costs** - Makes projects financially unfeasible. **3.2.d. Interest losses erase modular's promised schedule and cost savings**.
	3.3 Insurance and liability gaps
	3.3.a. Unclear insurance coverage - This is during factory production, storage, and transport (builder's risk vs. manufacturer responsibility). **3.3.b. Ownership/liability uncertainty** - If modules are damaged, destroyed, or company goes bankrupt before installation. **3.3.c. Higher insurance premiums** - Due to lack of standardized practices. **3.3.d. Bonding/insurance harder for large modular projects** - Restricts ability to bid on bigger jobs.
	3.4 CMHC and government program misalignment
	3.4.a. CMHC rules and fees - Creates delays, costs, and administrative burdens. **3.4.b. June 2025 CMHC rule changes** - This increased difficulty in accessing financing. **3.4.c. CMHC restrictions** - Before they allowed funding once modules arrived onsite; recent changes are an improvement but are not universal. **3.4.d. Policy contradictions** - CMHC promotes modular, but financing rules still lag.
	3.5 Infrastructure and municipal finance issues
	3.5.a. Development charges (DCs) absent - Creates long-term infrastructure funding gaps, temporarily covered by federal grants (e.g., HAF). **3.5.b. Contentious infrastructure costs** - Debates over homeowner vs. city responsibility. **3.5.c. Capital regeneration challenges** - No municipal mechanisms for reinvestment or tax support on new greenfield/undeveloped land.

	Barriers identified
4. SKILLED WORKFORCE AND SKILLS DEVELOPMENT	**4.1 Workforce shortages**
	4.1.a. Significant labour shortages - Across construction and prefab sectors.
	4.1.b. Workforce capacity risk - If modular scales quickly, there won't be enough trained workers to meet demand.
	4.1.c. Municipal staff shortages - Less experienced inspectors to process permits efficiently.
	4.2 Limited modular skills and knowledge gaps
	4.2.a. Workforce has limited prefab experience - This is creating a steep learning curve.
	4.2.b. Sub-trades must relearn each project - Since every manufacturer builds differently, slowing work.
	4.2.c. Project managers and site supervisors often lack modular expertise.
	4.2.d. Skill mismatch between manufacturers and GCs - Factories vs. site management creates disconnects.
	4.2.e. Knowledge gap among designers/engineers - Non-modular friendly plans.
	4.3 Training Barriers
	4.3.a. Training is expensive and time-consuming - Discourages adoption.
	4.3.b. Province not proactive - Not proactive in funding/supporting training for upcoming net-zero code (2025).
	4.3.c. Internationally trained workforce/engineers - Often lack Canadian wood-frame and climate-specific construction knowledge.
	4.3.d. Lack of structured training programs.

	Barriers identified
5.TRANSPORTATION AND LOGISTICS	**5.1 Urban site and storage challenges**
	5.1.a. Tight/urban sites - Makes module delivery and installation difficult.
	5.1.b. Hard to secure nearby laydown/storage areas - Sometimes multiple locations needed.
	5.1.c. Urban transport constraints - E.g., negotiating with residents, rerouting parking creates slow delivery.
	5.2 Module size and road restrictions
	5.2.a. Module size restricted - Due to bridges, power lines, and highway clearances.
	5.2.b. Seasonal weight restrictions - E.g., spring bans require special permits or exemptions.
	5.3 Interprovincial and island transport barriers
	5.3.a. Island-specific barriers - Crossing Confederation Bridge to PEI may require closures or restrictions as reported in PEI.
	5.3.b. Importing modules - Costly and slow due to shipping distance as reported in NL.
	5.3.c. Escort/permit rules vary by province - No national standard.
	5.3.d. Permit timelines differ widely across jurisdictions.
	5.4 Equipment and installation constraints
	5.4.a. Crane and heavy-lifting capacity are limited - Scheduling and permitting can delay projects.
	5.4.b. Precise site leveling required - Prefab tolerances allow less flexibility than stick-built methods.
	5.4.c. Slow foundation systems - Can delay logistics and module placement.
	5.5 Costs, delays and responsibilities
	5.5.a. High shipping costs - This raises project prices.
	5.5.b. Delays in transport - Undermines modular's time savings.
	5.5.c. Rework responsibilities unclear - Manufacturers may send distant crews instead of using local trades

Appendix C: Documents for policy review

Table C.1: *Policy review document list*

Act and/or Regulation reviewed	Version	Province
City of Moncton Zoning by-law # Z-222	2025	New Brunswick
The City of Monton Municipal Plan	2024	New Brunswick
Building By-law # Z-422	2022	New Brunswick
Residential Properties By-Law # Z-507	2007	New Brunswick
Proper Numbering of Buildings and Lots By-Law # Z-602	2002	New Brunswick
Heritage By-Law # Z-1116	2016	New Brunswick
Subdivision By-Law # Z-323	2023	New Brunswick
Affordable Housing – Building Permit and Planning Fee Equivalent Grant Policy – New Construction	2022	New Brunswick
Affordable Housing – Building Permit and Planning Fee Equivalent Grant Policy – Repair and Renewal	2022	New Brunswick
Affordable Housing – Prioritization Policy for Developments	2020	New Brunswick
Heritage Conservation Grant	2021	New Brunswick
F-13 - Fire Prevention Act	2023	New Brunswick
NB Building Code Administration Act	2020	New Brunswick
ENVISION ST. JOHN'S Development Regulations	2025	Newfoundland and Labrador
Rezoning & Amendments Process	2022	Newfoundland and Labrador
Housing Text Amendment	2022	Newfoundland and Labrador
Development Design Manual	2025	Newfoundland and Labrador
The St. John's Building By-Law	2001	Newfoundland and Labrador
The St. John's Residential Property Standards By-Law	1990	Newfoundland and Labrador
The St. John's Electrical By-Law	1993	Newfoundland and Labrador
The St. John's Fire Department By-Law	1996	Newfoundland and Labrador
The St. John's Plumbing By-Law	1993	Newfoundland and Labrador
The Commercial Maintenance By-Law of the City of St. John's	1977	Newfoundland and Labrador
St. John's Heritage By-Law	2021	Newfoundland and Labrador
St. John's Pool By-Law	2004	Newfoundland and Labrador
St. John's Sign By-Law	2020	Newfoundland and Labrador
Buildings Accessibility Regulations	2018	Newfoundland and Labrador
Fire Protection Services Regulations	2012	Newfoundland and Labrador
Occupancy and Maintenance Regulations	2024	Newfoundland and Labrador
Protected Road Zoning Regulations	2006	Newfoundland and Labrador
Building Code Bylaw	2024	Prince Edward Island
City Of Charlottetown Zoning And Development By-Law	2017	Prince Edward Island
City Of Charlottetown Official Plan	2019	Prince Edward Island
Fees By-Law	2023	Prince Edward Island
MUNICIPAL DESIGN GUIDELINES DOCUMENT	2023	Prince Edward Island
Heritage Preservation By-Law	2019	Prince Edward Island
Design Guidelines for the Preservation of Historic Resources	1993	Prince Edward Island
Lot Grading Guidelines	2007	Prince Edward Island

Nuisance By-Law	2017	Prince Edward Island
Permanent Street Closure By-Law	1995	Prince Edward Island
Fire Prevention By-Law	2012	Prince Edward Island
PEI Planning Act	2023	Prince Edward Island
PEI Building Codes Act	2024	Prince Edward Island
PEI Fire Prevention Act	2023	Prince Edward Island
PEI Highway Traffic Act	2024	Prince Edward Island
PEI - Spring Weight Restrictions	2025	Prince Edward Island
PEI Housing Strategy	2024	Prince Edward Island
Building bylaw	2023	Nova Scotia
Building Service Connections By-law	2014	Nova Scotia
Fire Prevention By-Law	2003	Nova Scotia
Heritage Property By-Law	2014	Nova Scotia
Heritage Conservation District (Barrington Street) By-law	2014	Nova Scotia
Schmidtville Heritage Conservation By-law	2018	Nova Scotia
Old South Suburb Heritage Conservation District By-law	2020	Nova Scotia
Land-lease Communities By-law	2023	Nova Scotia
Standards for Residential Occupancies By-law	2016	Nova Scotia
On-Street Parking Permits By-law	2018	Nova Scotia
Controlled Access Streets By-Law	2012	Nova Scotia
Truck Routes By-law	2014	Nova Scotia
Mobile Homes and Parks	2023	Nova Scotia
Mobile Home Park By-law	2023	Nova Scotia
The Local Improvement Policy	2017	Nova Scotia
Second Unit Incentive Program		Nova Scotia
Nova Scotia Building Code Regulations	2025	Nova Scotia
Fire Safety Regulations	2025	Nova Scotia
What We Heard Report	2024	Nova Scotia
Timberlea/Lakeside/Beechville Municipal Planning Strategy	2024	Nova Scotia
Land Use By-law for Timberlea/Lakeside/Beechville	2024	Nova Scotia
Beaver Bank, Hammonds Plains and Upper Sackville Municipal Planning Strategy	2025	Nova Scotia
Land Use By-law for Beaver Bank, Hammonds Plains and Upper Sackville	2025	Nova Scotia
Bedford Municipal Planning Strategy	2025	Nova Scotia
Land Use By-law for Bedford	2025	Nova Scotia
Planning District 5 (Chebucto Peninsula) Municipal Planning Strategy	2025	Nova Scotia
Land Use By-law for Planning District 5	2024	Nova Scotia
Cole Harbour/Westphal Municipal Planning Strategy	2025	Nova Scotia
Land Use By-law for Cole Harbour/Westphal	2025	Nova Scotia
Dartmouth Municipal Planning Strategy	2025	Nova Scotia
Land Use By-law for Dartmouth	2025	Nova Scotia
Eastern Passage/Cow Bay Municipal Planning Strategy	2024	Nova Scotia
Land Use By-law for Eastern Passage/Cow Bay	2025	Nova Scotia
Eastern Shore (East) Municipal Planning Strategy	2023	Nova Scotia

Land Use By-law for Eastern Shore (East)	2024	Nova Scotia
Eastern Shore (West) Municipal Planning Strategy	2023	Nova Scotia
Land Use Bylaw for Eastern Shore (West)	2025	Nova Scotia
Halifax Mainland Municipal Planning Strategy	2025	Nova Scotia
Land Use By-law for Halifax Mainland	2025	Nova Scotia
Downtown Halifax Municipal Planning Strategy	2024	Nova Scotia
Downtown Halifax Land Use By-law	2024	Nova Scotia
Planning Districts 8 & 9 Municipal Planning Strategy	2023	Nova Scotia
Land Use Bylaw for Planning Districts 8 & 9	2024	Nova Scotia
Lawrencetown Municipal Planning Strategy	2023	Nova Scotia
Land Use By-law for Lawrencetown	2024	Nova Scotia
North Preston, Lake Major, Lake Loon, Cherry Brook and East Preston Municipal Planning Strategy	2023	Nova Scotia
Land Use By-Law for North Preston, Lake Major, Lake Loon, Cherry Brook and East Preston	2024	Nova Scotia
Planning District 4 Municipal Planning Strategy	2023	Nova Scotia
Land Use Bylaw for Planning District 4	2025	Nova Scotia
Regional Centre Municipal Planning Strategy	2025	Nova Scotia
Regional Centre Land Use By-Law	2025	Nova Scotia
Sackville Municipal Planning Strategy	2025	Nova Scotia
Land Use By-law for Sackville	2025	Nova Scotia
Sackville Drive Municipal Planning Strategy	2025	Nova Scotia
Land Use By-law for Sackville Drive	2025	Nova Scotia
Planning Districts 14 and17 Municipal Planning Strategy	2023	Nova Scotia
Land Use By-law for Planning Districts 14 and17	2025	Nova Scotia
Planning Districts 1 and 3 Municipal Planning Strategy	2023	Nova Scotia
Land Use By-law for Planning Districts 1 and 3	2024	Nova Scotia
Suburban Housing Accelerator Secondary Municipal Planning Strategy	2025	Nova Scotia
Suburban Housing Accelerator Land Use By-law	2025	Nova Scotia

Appendix D: Identified opportunities for scaling OSC

During the workshops, participants were asked to identify opportunities that could support the wider adoption of OSC across Atlantic Canada. Their input offered practical, experience-based perspectives on the types of actions and initiatives that would support OSC development throughout the region. The table below outlines these ideas gathered throughout the workshops, organized by category.

Table D.1: *Workshop opportunities for scaling OSC identified*

Category	Opportunities
Policy & Regulatory	• Reduce red tape to speed up processes • Ensure governments own policies do not run counter to increasing supply (e.g. interest rates, taxation, codes and standards) • Invest in R&D for lower or cost neutral solutions to be pursued before regulation that increases cost. • Avoid adding costs through code changes • Increase communication between departments on changes and proposals • Increase access to public lands for affordable housing • Increase consultation with non-profits on community needs (“nothing about us without us”) • Promote ADUs in certain zoning areas • Increase consumer awareness of OSC product types • Consider promoting multi-generational housing when appropriate • Adapt use of existing buildings • Increase private-public partnerships and government incentives for housing • Create example codes/by-laws for municipalities to adapt, improve cross-jurisdictions regulations. • Ensuring uniformity and compliance in regulations across all municipalities. • Create CSA certification rebate programs to increase of certified pants • Leverage Preferred builder program for accelerated permitting process which benefits builders at scale/repetition like OSC. •Leverage testing result requirements to occupancy to unburden initial permitting and hold construction to account, thereby unburdening building inspectors that may not be familiar with OSC.
Procurement Models & Contracts	• Funding for developers from Accelerator Fund • Bridge financing from CMHC • Ensure proper planning of OSC projects to reduce costs • Utilize funding programs through Build Canada Homes • Use standardization to lower risks for insurers (lower rates) • Updating in financial institutions to support modular/OSC • Support municipal grants to offset costs • Remove development costs for supportive housing • Relaxing requirements necessary to recognize modular homes as permanent homes
Financing & Insurance	• Develop clear, standardized procurement frameworks and contract templates tailored to modular and off-site construction.

	• Shift toward value-based selection methods that evaluate project performance and long-term outcomes instead of lowest bid. • Adopt flexible procurement approaches such as design-build, progressive design-build, and integrated project delivery (IPD) to support modular delivery. • Strengthen collaboration and risk-sharing between manufacturers, contractors, and clients within contracts. • Improve awareness and technical understanding of modular procurement among government agencies and municipalities. • Publish provincial or regional procurement best-practice guides focused on off-site construction. • Align procurement scheduling and production planning to minimize delays and cost overruns. • Coordinate regionally to share qualified modular suppliers and bidder lists. • Integrate modular procurement language and expertise into public-sector contracting frameworks. • NS: Apply lessons from shipbuilding and large industries to improve modular contracting. • Pilot fixed-rate procurement cycles to give suppliers predictable pricing windows. • PEI: Adapt procurement models to accommodate PEI's limited manufacturing capacity and smaller market size, ensuring processes remain flexible and scalable. • Remove restrictive tendering rules or specification requirements that unintentionally exclude modular manufacturers from bidding. • Create simplified procurement pathways specifically designed to support not-for-profit and community developers that lack capacity to navigate complex RFP structures.
Skilled Workforce & Skills Development	• Expand modular and off-site construction training in trade schools, colleges, and universities. • Introduce targeted up-skilling, micro-credentials, and apprenticeships for modular manufacturing and installation. • Strengthen collaboration among government, educational institutions, and industry to develop modular-specific training pathways. • Increase public and professional awareness of modular construction through education and outreach. • Address skilled labour shortages through cross-trade, multi-disciplinary training. • Support inclusive, diverse, and gender-equitable participation in construction trades and technical programs. • NS: Partner NSCC with modular manufacturers to create dedicated modular design and construction programs. • Incentivize apprenticeships with wage subsidies and guaranteed placements aligned to modular delivery. • PEI: Apply a tiered upskilling model (inspired by BC) tailored to PEI's smaller workforce scale. • Engage First Nation youth through modular apprenticeships and inclusive workforce programs. • NL: Facilitate direct apprenticeships with modular manufacturers operating within or partnering with NL. • Offer external exposure opportunities (e.g., UK modular programs, London Build) to bring added innovation.

Transportation & Logistics	• Increase modular manufacturing capacity to relieve factory bottlenecks and support consistent transport-ready output. • Improve productivity at the facility level to enable timely logistics, smoother dispatching, and faster delivery. • Encourage regional collaboration across Atlantic provinces to share manufacturing capacity, transportation fleets, and material resources. • Support local production of modular components (wall systems, insulation, structural panels) to reduce shipping costs and reliance on imported materials. • Promote “shell-only” modular delivery models to simplify transport and rely on local contractors for finishing, reducing transport complexity. • Use AI and digital tools to optimize logistics planning, routing, scheduling, and load coordination. • Showcase modular transport and installation methods through public expos, demonstrations, and education sessions to improve awareness. • NS: Cubit produces SIPs (Structural Insulated Panels) supplying most modular materials in-province. • Pre-chased, pre-installed, pre-vapor-barriered wall panels reduce inspection and skill needs. • Higher-end mini homes (16’ width) designed for single-truck delivery. • Create provincial platforms such as NCCAs Expo to promote modular transport education and showcase local production.

Appendix E: Sustainability and climate change considerations

Climate Change and Sustainability in Atlantic Canada

Atlantic Canadians continue to experience a changing climate, which has impacts on housing, the environment, infrastructure, and public health and safety. Residential development continues to be affected by climate change and impacts include:

- Increased risk of flood damage from intense rainfall events and coastal inundation, leading to flooding, erosion, and degraded water quality
- Increased risk of wind damage to structural and cladding systems from hurricanes, tropical storms, and other windstorms
- Increased risk of water infiltration through cladding and envelope systems during combined intense rainfall and wind events
- More intense heat, including more 30 C days and more tropical nights (nights hotter than 35 C), leading to increased cooling loads and impacts on human health and safety
- More wildfire events, leading to smoke and interface fire risk, leading to risks to homes, infrastructure and, most importantly, human health and safety
- Drought potential due to warmer temperatures, leading to reduced potable water access

To respond to a changing climate and achieve Canada's climate goals, considerations for sustainable and climate resilient housing are needed, protecting the health and safety of Atlantic Canadians, their homes, the public investment in social and affordable housing, and ensuring that decisions made today do not negatively impact future generations through environmental, social, and economic decisions. The 2030 National Building Code of Canada is also expected to include embodied carbon and thermal comfort considerations, as well as updates to the tiered performance path. To meet current and expected requirements, **initiatives that are aligned with the needs and maturity of the local, regional and national supply chain, and incentivize climate resilient and sustainable technologies should be prioritized**.

Federal and Provincial Climate and Sustainable Buildings Initiatives

There are several federal and provincial initiatives that are addressing climate change and sustainability and will have an impact to any off-site housing strategy in the Atlantic region.

Canada is a signatory to the Paris Agreement, a legally binding international treaty that aims to hold global warming to below 2°C above pre-industrial levels while working to limit global warming to below 1.5°C above pre-industrial levels (United Nations, n.d.). To meet its Paris Agreement commitments, Canada has committed to reducing greenhouse gas (GHG) emissions by 40-45% below 2005 levels by 2030 and committed to net-zero GHG emissions by 2050 (Environment and Climate Change Canada, 2022). Several actions have come out of the need to achieve these targets, including the ***Canada Green Buildings Strategy***, released in 2024, that has established priorities for new building construction and existing buildings with the goal of increasing sustainability in the buildings sector (Government of Canada, 2024). The second strategic priority ***Build green and affordable from the start***, recognizes the need in Canada to

build between 3.5 and 5 million homes by 2030 and emphasizes the need to reduce embodied carbon, improve energy efficiency and operational carbon, include climate resilient strategies, and provide housing that is affordable to build, operate, and maintain through good building practices upfront. Full building electrification (i.e., not relying on natural gas, propane, oil, for heating) for new construction is also emphasized. The Green Buildings Strategy also identifies key areas that the provinces, territories, and municipal governments have authority over. This includes policy setting and regional expertise; standards and regulation, including energy labelling requirements through the EnerGuide rating system; and investments and workforce development.

Provincially, buildings, including residential environments, are addressed in each province's approach to climate change action.

New Brunswick

New Brunswick's Climate Change Action Plan 2022 – 2027 (GNB, n.d.) requires improved energy performance of buildings. This includes:

- Incrementally adopting more stringent tiers of the National Energy Code for Buildings 2020;
- The goal of having new construction be net-zero ready by 2030; and
- By 2030, have in place energy labelling performance disclosure at time of residential sale

While published in 2010 and last updated in 2011, New Brunswick's current Green Building Policy for New Construction and Major Renovations (NB GBP; 2011) covers all provincially owned buildings that are over 500m^2 and social housing projects three stories or less in height and under 600m^2. The policy lays out specific energy, water, and other indoor environmental requirements for social housing projects.

Newfoundland and Labrador

Newfoundland and Labrador has a *Build Better Buildings Policy*, which includes requirements for provincially owned and funded buildings, including Leadership in Energy and Environmental Design (LEED) Silver certification.

In Newfoundland's Climate Mitigation Plan, it is anticipated that 10,000 homes can fuel switch to renewable electricity based on current agreements and support (Government of Newfoundland and Labrador, n.d.). The plan also notes that next steps include improving energy performance of the residential sector, through application of energy code requirements, ban on installing fossil fuel heating systems in new construction, and mandatory energy labeling for new home construction. The plan also references LEED Silver requirements for public buildings per the Build Better Buildings Policy.

Nova Scotia

Nova Scotia's climate change plan includes housing related targets, including to "support the construction and renovation of net-zero homes and multi-unit" (Government of Nova Scotia, 2022). The province has also invested resources into helping homebuilders build net-zero and net-zero ready homes through training. Energy efficiency upgrades have also been supported by the provincial government through various programs. The provincial climate plan also includes multiple funding initiatives to support net-zero housing, including the EnergyForward New Homes Program (Efficiency NS, 2026), the Affordable Rental

Construction Pilot (Government of Nova Scotia, 2024), and the Affordable Multifamily Housing Program (Efficiency Nova Scotia, 2026).

Nova Scotia Provincial Housing Agency (NSPHA) is investing in housing through accessibility, sustainability, and modular construction. This includes requiring energy efficiency measures such as insulation, heat pumps, and ventilation.

Nova Scotia has recently published a directive prioritizing the use of wood for construction and heating in public buildings and partially funded non-public buildings (Government of Nova Scotia, 2025). This will support local economic development, use local building materials, and help reduce embodied carbon.

Prince Edward Island

In Prince Edward Island's (PEI) 2040 Net Zero Framework, sustainable buildings are addressed in *Pillar 2: Transition to Efficient and Cleaner Buildings*. This pillar includes constructing more energy efficient homes and buildings with a target of 65-70% reduction by 2030 and 85-95% reduction by 2040. Mandatory energy labelling is anticipated by 2030.

PEI's Climate Adaptation Plan (Government of Prince Edward Island, 2022) contains 24 actions to adapt to climate change. *Action 9 Home Adaptation Renovations and Upgrades* include an anticipated "Resilient Homes Program" that will help homeowners, developers, tenants, and landlords improve climate resilience of their homes. This program is aimed at existing residential environments however would be beneficial for homebuilders as well.

Workforce Capacity and Capability

While initiatives and policies outlined by the four Atlantic provinces are encouraging, there is both a capacity and capability consideration for the construction workforce. BuildForce Canada (2025) forecasts significant retirements and shortages in the construction sector over the next ten years. Table E.1 summarizes these forecasted shortages.

Table E.1: *Summary of forecasted construction workforce shortage (BuildForce, 2025)*

Province	Total workforce (2025)	Workforce retirements	Workforce shortage
New Brunswick	32,500	6,500	1,900
Newfoundland and Labrador	21,000	6,100	2,200
Nova Scotia	35,800	8,400	6,600
Prince Edward Island	7,910	1,680	80

While BuildForce Canada does a good job of analyzing and forecasting the shortage, it is important to note that the shortage assumes new entrants to the sector which could be heavily influenced by federal policies. Furthermore, the analysis does not take the capabilities of the sector into account (e.g., a carpenter retiring with 30+ years experience being replaced by a new red seal carpenter is not necessarily replacing like for like). Finally, with new building requirements coming out, there may be some re-skilling required which may impact the sectors productivity in the short term.

For these reasons, aligning initiatives with local and regional workforce capacity and capability is key. Training and education in collaboration with the provincial construction associations, trade associations,

community colleges and universities will also mitigate this risk as the industry undertakes sustainable building initiatives.

Sustainable and Climate Resilient Housing

Canadians spend over 90% of their time indoors, with most of that time in their homes. Homes need to provide shelter, keeping residents safe from the elements and a changing climate, a place that makes them feel healthy and restored, and one that is easy, accessible, and affordable to operate.

From a sustainability and climate perspective, housing has a big role to play ensuring that throughout its lifecycle, design, construction, use, and end of life, it is healthy, has limited environmental impact, and is resilient. Three areas with respect to sustainable and climate resilient housing have been reviewed due to regulatory requirements, importance on human health and wellbeing, and alignment with off-site construction.

Energy performance

Buildings account for over 18% of Canada's greenhouse gas emissions and will play a key role in achieving the Paris agreement targets as well as other provincial requirements (Government of Canada, 2024). Amongst all four provinces, ongoing and improved energy efficiency of buildings is required. For part 9 buildings, this falls within section 9.36 of the National Building Code (NBC), while non-part 9 buildings must adhere to the National Energy Code for Buildings (NECB). Changes to part 9 of the NBC 2020 include (Efficiency Canada, 2023):

- Performance requirements for HVAC systems
- Reference to and alignment with EnerGuide as a compliance path
- Voluntary airtightness testing
- Five tiers for performance requirements of part 9 buildings with prescriptive solutions for tiers 1 and 2. The performance requirements are based off improvements over NBC 9.36 2015 (National Building Code, 2025; Efficiency Canada, 2023):
    - Tier 1: 0% improvement
    - Tier 2: 10% improvement
    - Tier 3: 20% improvement
    - Tier 4: 40% improvement
    - Tier 5: 70% improvement*

* Close to Net-Zero Home Canadian Homebuilders Association's Net Zero Energy Ready standard, and the Passive House standard

The current iteration of the NECB (2020) also includes tiered performance paths (Lombardi, M., 2024):

- Tier 1: NECB 2020 baseline
- Tier 2: Minimum 25% energy savings compared with Tier 1
- Tier 3: Minimum 50% energy savings compared with Tier 1
- Tier 4: Minimum 60% energy savings compared with Tier 1

To date, the Atlantic provinces have adopted the following tiers of the NECB 2020 (CBHCC, 2025), as summarized by Table E.2:

Table E.2: *NECB 2020 tier adoption*

Province	NECB 2020 Tier adoption (and date in effect)
New Brunswick	Tier 2 (May 1, 2025)
Nova Scotia	Tier 1 (April 1, 2025) Anticipated: Tier 2: April 1, 2027 Tier 3: April 1, 2029
Prince Edward Island	Tier 1 (March 31, 2024)
Newfoundland and Labrador	Currently under review

Nova Scotia is the only province in the region that has anticipated dates for progressively adopting more stringent tiers. Buildings that are in pre-design in 2026 may not be ready for permitting until 2027 or later and should anticipate having to adhere to tier 2, with a similar logic following the anticipated adoption of tier 3 in 2029 and projects in pre-design in 2028. Tier 1 allows both prescriptive path compliance as well as performance path compliance (through energy modelling) while tiers 2-4 only allow performance path compliance. **This means that all non-part 9 residential buildings will need to show compliance with tier 2 and above through energy modelling (Lombardi, M., 2024).** Energy modelling through an integrative design process will support the choice of envelope systems and performance, passively reducing energy load, as well as mechanical and electrical equipment choices.

Renewable energy generation on-site also offers a way to reduce grid connected energy consumption. When considering off-site construction, that is independent of site characteristics conducive to geothermal and/or wind, solar photovoltaic and solar thermal are the two best options. The federal goal is that by 2030 all new buildings are net-zero ready, and as utility rates continue to rise, having PV and/or solar thermal ready infrastructure in place will appeal to end-user and reduce energy from the grid, lowering overall operational carbon footprint.

Indoor air quality

Indoor air quality (IAQ) is an important component of overall indoor environmental quality of a building. The factors that contribute to IAQ include:

- Outdoor air quality
- Filtration
- Building materials
- Pollutant sources (e.g., sources of combustion, cleaning chemicals, radon)
- Ventilation
- Humidity
- Construction

Poor outdoor air quality due to localized pollution (i.e., traffic) or more acute shocks (e.g., wildfire smoke events) can negatively impact IAQ. Filtration on incoming outdoor air and airtight envelopes can help reduce impact on IAQ.

The materials that are used in a building also contribute to poor IAQ. Paints and coatings, adhesives and sealants, flooring, manufactured wood products, and wall panels, can emit volatile organic compounds and semi-volatile organic compounds that can contribute to acute and chronic health issues.

Sources of pollution that can negatively affect IAQ during construction include dust and mold due to the wetting of porous materials. Due to its controlled environment, OSC practices will likely reduce the amount of construction generated contaminants and the potential for mold growth (MEEA, 2024). Radon, a naturally occurring gas, can be high in parts of Atlantic Canada (Take Action on Radon, 2025). While all new construction is required to have a rough-in for radon remediation, post-occupancy testing is not required. Additionally, there is a relationship between building energy efficiency practices and increased radon concentrations (Health Canada, 2023). Testing, during at least the three coldest months of the year, is the only way to know if a home has high radon concentrations. The most effective way to decrease radon concentrations when they are high is through active sub-slab depressurization (Health Canada, 2025).

Building ventilation, bringing in outdoor air and exhausting indoor air, improves IAQ through cleaning out contaminants, increasing oxygen levels, and removing CO2. Heat recovery ventilators (HRV) and energy recovery ventilators (ERV) help save energy by pre-heating incoming air with the heat from exhausted air, and in the case of ERV, control moisture to increase or decrease humidity levels when needed (NRCan, 2025). Humidity levels in buildings should be between 30-55% for optimal health (Health Canada, 2018). All newly constructed residential buildings, including part 9 buildings, now require mechanical ventilation, which may include HRVs or ERVs.

Intense rainfall events and coastal flooding can impact indoor air quality through potential mold growth. Mold can negatively impact health by causing respiratory, skin, and other issues, sometimes leading to severe health consequences (Health Canada, 2023). Quick and effective drying and replacement of materials post-flooding event is crucial.

Building Materials and Durability

A significant sustainability benefit with off-site construction is the reduction in waste due to efficient and controlled construction methods. Embodied carbon, which considers the greenhouse gas emissions from the extraction, production, construction, use, and end-of-life of building materials may also be reduced when compared with conventional construction due to reduced material waste, optimized designs through generative design, and opportunities for design for disassembly and end-of-life reuse (Thibault, D. et al, 2024). Panelized systems that can easily be replaced due to failure also helps reduce embodied carbon and waste during the occupancy phase.

Currently, there are no embodied carbon requirements within Atlantic Canada. However, a few jurisdictions across the country now have established embodied carbon thresholds for new construction projects (City of Vancouver, 2025). The federal government is also requiring whole building life-cycle analysis on their own buildings (GOC, 2025). The structure and envelope, notably the building insulation, are the major contributors to embodied carbon in buildings.

Building envelope performance is an important factor in reducing energy loads and creating a healthy indoor environment. OSC may improve envelope performance due to precision cutting and assembly during manufacturing, increasing airtightness, reducing energy losses, and improving overall thermal comfort (Wu, C., 2022).

Recommendations for Sustainable and Climate Resilient Housing

When undertaking an off-site housing strategy for Atlantic Canada, there are several sustainability opportunities for the region, provinces, and sectors to consider. Several actions are recommended to help respond to a changing climate, achieve increasingly stringent performance requirements, reducing impact on the environment, and optimizing human health and wellbeing. These actions can be summarized into three categories: (1) policy and regulatory; (2) training and education; and (3) data and information.

Note: ease of implementation and impact scores are based on subject matter expertise both domestically and internationally.

Policy and Regulatory

1. Update and/or create provincial Green Buildings Policy that align with holistic best practices and are aligned with the entire Atlantic Region. This policy should apply to all forms of provincially funded buildings, including housing and private residential development that is partially funded.

Item	Description
Opportunity	Contribute to meeting provincial, federal, and international climate goals by reducing greenhouse gas emissions and energy consumption, reduce impact on environment, improve health and wellbeing of building occupants.
Challenges	May take several years to develop or update a policy and implement the policy across the region.
Implementation timeline	Complete by 2028
Building typology	All forms of buildings (regardless of built on or off-site).
Location(s)	Atlantic Canada
Champions	Various provincial departments within each of the provinces.
Metrics	Number of green buildings policies that are created/updated to meet best practices as of 2026.
Prerequisites	N/A
Owners	Various provincial departments within each of the provinces.
Scope	Provincial in collaboration with other provinces in the region
Ease of Implementation	Medium
Impact (out of 10)	9

2. Require measures beyond operational energy and carbon for residential development. Embed holistic sustainability into Green Buildings Policies. Sustainable design goes beyond energy and carbon, which are captured in the NBC and NECB. Areas to consider include:

- Healthy building strategies around building materials, natural and electric light, acoustic performance, inclusive design features, active design features, water quality, indoor air quality, etc.
- Sustainable building materials, including the use of low carbon materials like wood and low carbon concrete (e.g., using fly ash and/or Portland limestone cement), and other natural building materials
- Water efficient fixture requirements
- Building envelope performance, including incentivizing airtightness testing
- Climate resilient design strategies based on regional risks such as space for increased outdoor air filtration on ventilation systems, envelope detailing to reduce wind driven rain impacts, cladding that is interface fire resilient, mechanical cooling through the use of heat pumps for hot days and nights, passive cooling strategies through natural ventilation and exterior shading, flood resilient strategies, such as not placing mechanical systems on the lowest level and flood resilient materials in flood prone areas.

Item	Description
Opportunity	Ensure green building policies are holistic, benefitting environmental and human health as well as including climate resilience requirements.
Challenges	May take several years to develop a policy and implement.
Implementation timeline	2026 - 2028
Building typology	All forms of buildings (regardless of built on or off-site).
Location(s)	Atlantic Canada
Champions	Various provincial departments within each of the provinces.
Metrics	Number of green buildings policies that are created/updated to include holistic considerations as of 2027.
Prerequisites	In-development green buildings policies
Owners	Various provincial departments within each of the provinces as well as industry associations.
Scope	Provincial
Ease of Implementation	Medium
Impact (out of 10)	10

Training and Education

3. Continue to provide net-zero training. This training should be given to design, construction, and building operations and maintenance industry (e.g., on-going maintenance, service and repair technicians) on net-zero ready design, construction, and building operations, in anticipation for 2030 requirements to be net-zero ready.

Item	Description
Opportunity	Contribute to meeting provincial, federal, and international climate goals by reducing greenhouse gas emissions and energy consumption through design, construction, and building operations.
Challenges	Potential difficulties accessing design, construction and operations professionals, availability of funding
Implementation timeline	2026 – 2030.
Building method	All forms of residential buildings (regardless of built on or off-site).
Location(s)	Atlantic Canada
Champions	Provincial construction associations and home builders' associations
Metrics	Number of people trained annually.
Prerequisites	N/A
Owners	Provincial and municipal governments, off-site housing manufacturers, developers, provincial construction associations, provincial homebuilders' associations, provincial engineering and architecture associations, trade schools and universities.
Scope	Provincial
Ease of Implementation	High
Impact (out of 10)	8

4. Provide training to homeowners and renters on operating a net-zero ready home. Homeowners and renters, in single family and multi-unit residential buildings, may not know how to use the mechanical systems required in a net-zero ready home. This knowledge gap may reduce energy performance and reduce indoor environmental quality.

Item	Description
Opportunity	Contribute to provincial climate goals, improve affordability of building operations, reduce energy consumption and greenhouse gas emissions, and improve indoor environmental quality
Challenges	Potential difficulties accessing homeowners and renters, availability of funding
Implementation timeline	2026 – 2030.
Building typology	All forms of residential buildings (including on- and off-site).
Location(s)	Atlantic Canada

Item	Description
Champions	Provincial power corporations and local power utilities, municipal governments, provincial homebuilders' associations, real estate industry
Metrics	Number of homeowners and renters that participate in training programs. Number of training programs offered annually.
Prerequisites	N/A
Owners	Provincial power corporations and local power utilities, energy efficiency NGOs
Scope	Provincial
Ease of Implementation	High
Impact (out of 10)	8

5. Provide climate resilient design training. This training would help the industry design, build, and operate homes to be climate resilient and more accessible.

Item	Description
Opportunity	Ensure that new construction and buildings that undergo major renovations can respond to climatic impacts through resilient and accessible design and operations, reducing potential damage to assets, harm to vulnerable populations, and associated costs.
Challenges	Potential difficulties accessing design, construction and operations professionals, availability of funding
Implementation timeline	2026 – 2030.
Building typology	All forms of residential buildings (including on- and off-site).
Location(s)	Atlantic Canada
Champions	Provincial and municipal governments, off-site housing manufacturers, developers, provincial construction associations, provincial homebuilders' associations, provincial engineering and architecture associations, building material suppliers.
Metrics	Number of people trained annually.
Prerequisites	N/A
Owners	Provincial and municipal government departments, homebuilders' associations, provincial construction associations
Scope	Provincial

Item	Description
Ease of Implementation	Medium
Impact (out of 10)	10

6. **Prepare industry for upcoming home energy labelling requirements.** This should be through educational opportunities directed to homebuilders, designers, and the real estate industry.

Items	Description
Opportunity	Start to inform and educate all professions associated with design, construction, operations, and sales of residential buildings on upcoming home energy labelling requirements so they can adapt accordingly.
Challenges	N/A
Implementation timeline	2026 – 2030.
Building typology	All forms of residential buildings (including on- and off-site).
Location(s)	Atlantic Canada
Champions	Provincial power corporations and local power utilities
Metrics	Number of training sessions offered and people trained annually
Prerequisites	N/A
Owners	Provincial and municipal governments, off-site housing manufacturers, developers, provincial construction associations, provincial homebuilders' associations, provincial engineering and architecture associations, trade schools and universities, real estate industry.
Scope	Provincial
Ease of Implementation	High
Impact (out of 10)	10

Data and Information

6. Conduct post-occupancy evaluations (including radon testing). Create a process to conduct post-occupancy evaluations on multi-unit residential developments. Include evaluating energy and water performance, user experience, and indoor environmental quality

Item	Description
Opportunity	Improve overall operations of buildings, reducing greenhouse gas emissions, energy consumption, potable water use, and occupant health and wellbeing.

Item	Description
Challenges	There may be limited local knowledge on process and evaluation of conducting post-occupancy evaluations, notably around user experience and indoor environmental quality.
Implementation timeline	2026 – 2030.
Building typology	All forms of residential buildings (including on- and off-site).
Location(s)	Atlantic Canada
Champions	Provincial and municipal governments including housing corporations
Metrics	Number of POEs conducted annually on provincially funded or partially funded multi-unit residential buildings.
Prerequisites	N/A
Owners	Provincial and municipal governments, provincial housing corporations, owners of multi-unit residential buildings.
Scope	Provincial
Ease of Implementation	Medium
Impact (out of 10)	10

Supply Chain Readiness

7. **Conduct a market analysis on local supply chain readiness to meet sustainability and climate goals.** This should be done to understand availability of materials/technologies and associated costs local to Atlantic Canada.

Items	Description
Opportunity	Better understand availability of local building materials and technology supply and identify gaps in the market to meet climate and sustainability targets affordably.
Challenges	Industry engagement with analysis.
Implementation timeline	2026 – 2029
Building typology	All forms of residential buildings (including on- and off-site).
Location(s)	Atlantic Canada
Champions	Manufacturers, suppliers, and quantity surveyors.
Metrics	N/A

Items	Description
Prerequisites	N/A
Owners	TBD
Scope	Atlantic Region
Ease of Implementation	Medium
Impact (out of 10)	10

Appendix F: Infrastructure's role in housing development

Introduction

Public infrastructure plays a critical role in enabling population growth and new residential development. It provides essential services that make communities livable, functional, and promote a high quality of life. Inadequate infrastructure systems can constrain housing supply, increase development costs, and limit the ability of municipalities to accommodate new residents [1].

This section explores the state and availability of infrastructure that is required and enable residential development in Atlantic Canada. It identifies knowledge gaps that limit a true understanding of the capacity available to support new development and provides recommended actions for provincial governments in Atlantic Canada.

"Housing-enabling" infrastructure is a loosely defined term that includes infrastructure systems that directly support new housing development by providing essential services that support quality of life and protect the environment [2], [3]. Each of these systems performs a distinct but interrelated function to enable communities to support new housing developments:

- **Water.** Provides safe, reliable drinking water through supply, treatment, storage, and distribution systems. Adequate supply and distribution capacity is essential to serve new homes and communities.
- **Wastewater.** Collects and treats sewage to protect public health and the environment. Includes collection sewers, pumping stations, and treatment facilities that must be sized to handle both existing flows and flows from new development.
- **Stormwater**. Manages rainfall and runoff to prevent flooding, protect waterways, and maintain drainage performance. Infrastructure includes ditches, pipes, culverts, management facilities, and green infrastructure systems.
- **Transportation.** Supports the movement of people and goods through roads, bridges, sidewalks, transit systems, active transportation routes, and traffic control systems.
- **Solid Waste Management.** Includes collection systems, transfer stations, recycling facilities, and landfills needed to safely manage waste generated by growing populations.
- **Public Service Facilities**. Buildings and facilities that support essential community needs such as schools, hospitals, emergency services, libraries, and recreation centres. These services must expand in step with population growth to ensure quality of life.
- **Energy.** Electricity generation, transmission, and distribution systems required to power homes, businesses, and community services.

- **Telecommunications.** Broadband networks, cellular towers, fibre-optic systems, and other digital infrastructure that provide reliable internet and communication services. Increasingly essential for economic participation, emergency response, and modern living.

Infrastructure Scale

Infrastructure can be categorized based on its scale, from minor systems that deliver services to individual homes or subdivisions, to major systems that service entire areas or communities, as summarized by Table F.1. This classification (developed by the Canadian Urban Institute) provides a useful framework for understanding the different types of infrastructure investments needed to support new housing development [2].

Table F.1: *Infrastructure scale system*

Scale	Description	Examples
Local (On-site)	Directly services individual properties and connects them to the district system.	Local roads, sidewalks, streetlights, local W/WW/SWM lines.
Community (Neighbourhood)	Shared infrastructure systems that service an entire area or neighbourhood.	Collector roads, trunk W/WW/SWM lines, pump stations, recreation facilities, elementary schools.
District (System)	Major infrastructure assets that provide system or municipal-wide capacity and regional connectivity.	Arterial roads, water supply and wastewater treatment facilities, public transit, landfills, power generation and transmission.

In the context of new housing, development is often constrained by the availability of community or district-level infrastructure, not local, which is readily constructed as part of new developments [2], [3], [4]. Most notably, a lack of available water supply or wastewater treatment capacity can significantly curtail development opportunities. These issues are foreseeable, through effective management and forecasting of infrastructure demand and supply.

For the purposes of this report, subsequent analyses are primarily focused on the following asset types[1]:

1. Water
2. Wastewater
3. Stormwater
4. Roads
5. Active Transportation (bike lanes, sidewalks, trails, etc.)

While the other asset types listed above (energy, public service facilities, telecommunications) are essential for new housing development, and an opportunity for OSC manufacturers and the regional construction industry to build, they are recognized as beyond the scope of this analysis. However, the same

[1] Notably, these asset types are predominantly owned by local governments. Significant exceptions are major roads in rural communities, which are often recognized as highways and owned and operated by the provincial government.

principles and practices apply, and ensuring sufficient capacity of infrastructure systems will be essential to supporting new housing development.

State of Infrastructure

Atlantic Canada is one of the country's oldest regions. Saint John, NB, became Canada's first incorporated city in 1785, and this long history is reflected in the age of its infrastructure. Many public infrastructure systems were built decades before modern design standards, with significant development occurring in the post-World War II period of 1950-1970 [5].

According to 2022 self-reported data from Canada's public infrastructure owners, a substantial share[2] of assets are classified in "Poor" or "Very Poor" condition (see Figure F.1) [6]. While Atlantic Canada's proportion of deteriorated assets is similar to national averages, several categories stand out. Active Transportation and Stormwater infrastructure show relatively higher rates of disrepair, suggesting historically lower levels of reinvestment and potentially limited capacity to support population growth [6].

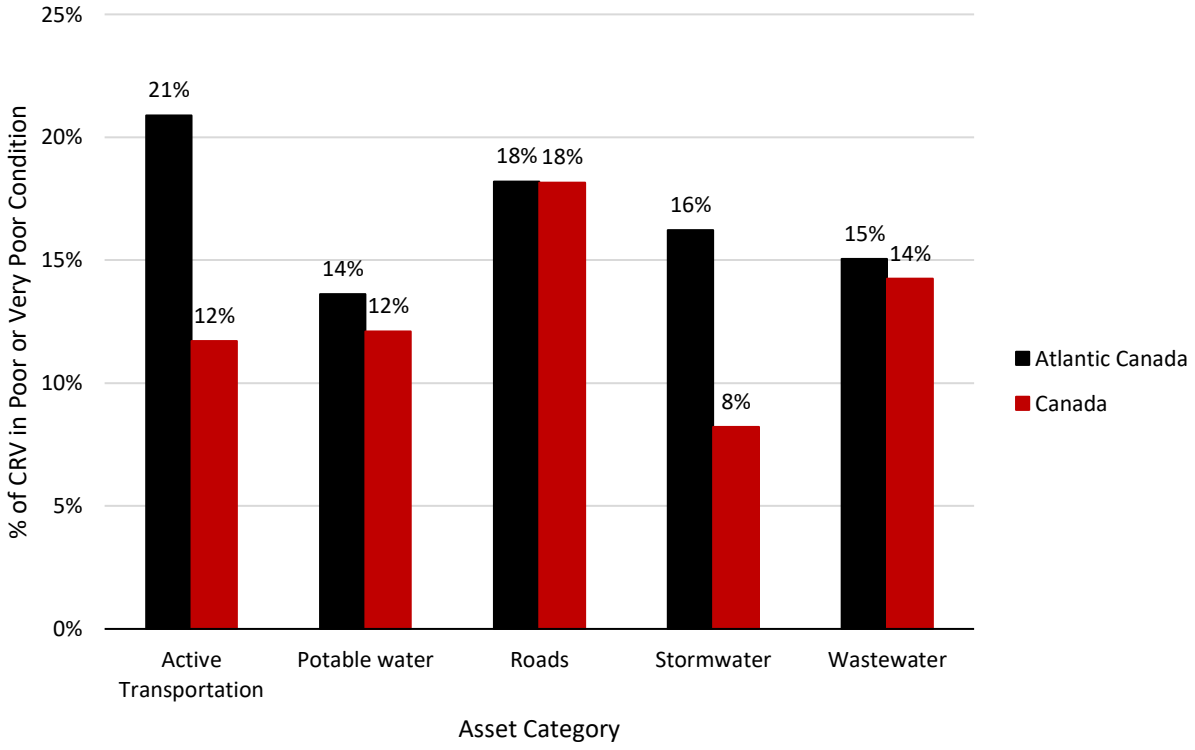


Figure F.1: Asset category percent in poor or very poor condition comparison between Atlantic Canada and rest of Canada

Beyond physical condition, data quality remains a significant challenge across the region. Atlantic Canada's infrastructure owners have some of the highest proportions of infrastructure with an "Unknown" condition rating (see Figure F.2). For example, 45% of road assets in the region lack a documented

[2] In the CCPIS survey, results are weighted by an asset's Current Replacement Value (CRV). CRV is defined as the "*approximate cost at the present time (in current dollars) that would be required to replace the assets owned or leased by your organization, including demolition costs. Excludes land costs and overhead (administration).*"

condition assessment, compared to just 7% nationally. Similar data gaps are evident in Active Transportation and Wastewater systems. Potable water data quality aligns with national trends, while stormwater data quality appears comparatively stronger, possibly reflecting recent upgrades or focused assessments.

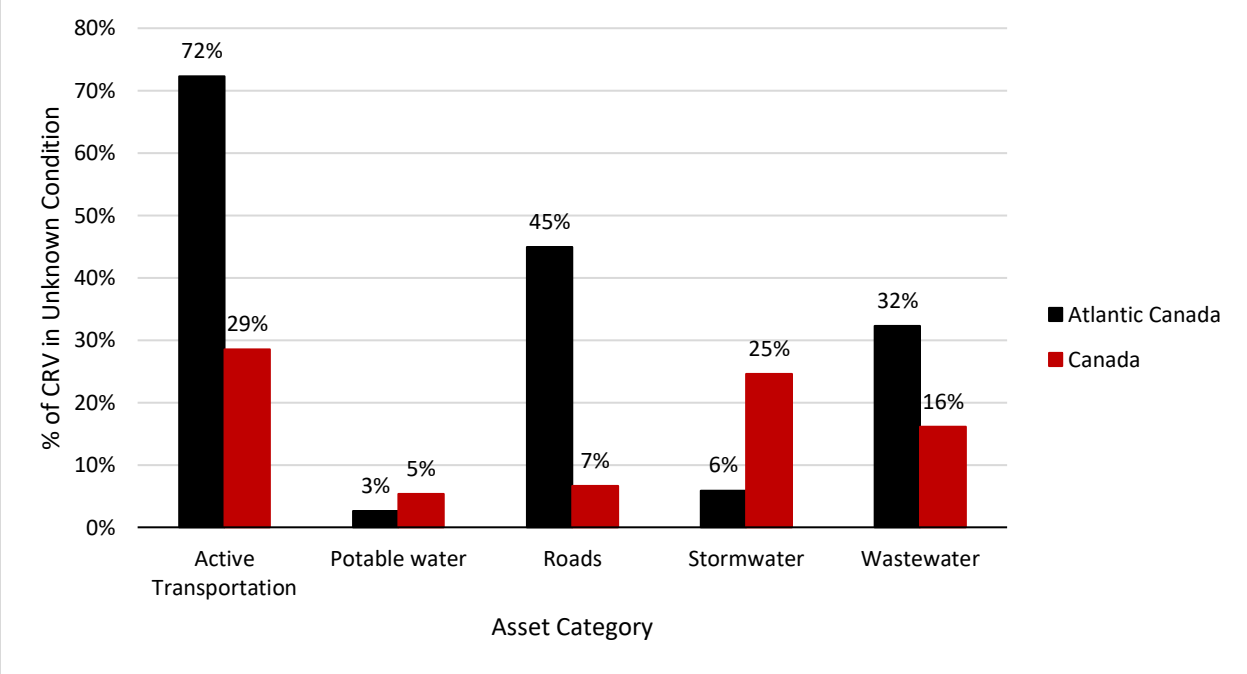


Figure F.2: Asset category percent in unknown condition comparison between Atlantic Canada and rest of Canada

These gaps, both in physical condition and in the underlying data, limit the ability of infrastructure owners to fully understand existing system condition, plan reinvestment needs, and evaluate how infrastructure condition may impact new housing development.

Capacity for Growth

Despite the limited data availability, the following analysis was conducted in an effort to explore the capacity of infrastructure to support growth. This high-level review of water and wastewater infrastructure data is guided by the following questions:

1. How much additional water and wastewater capacity (i.e., demand) is generated from new population and housing units?
2. How much of that demand can existing systems absorb?
3. What is a reasonable estimate of infrastructure investments needed to accommodate growth?
4. What data gaps limit the ability to answer these questions conclusively?

Regional Context

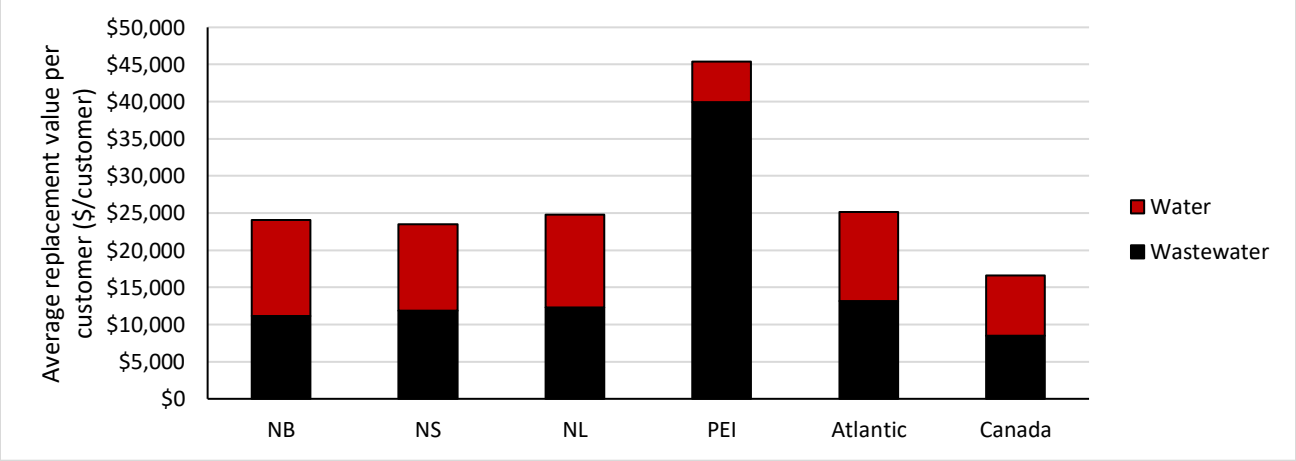
Atlantic Canada's ability to support new housing development is closely tied to the performance, condition, and capacity of its water and wastewater infrastructure systems. Atlantic Canada is characterized by a highly fragmented utility landscape, a high proportion of small systems, and unique urban–rural service patterns. These factors influence the capital investment required to service new

households and the feasibility of accommodating future growth. In Atlantic Canada, water treatment plants serve approximately one-third, and wastewater facilities serve about one-fifth, the number of customers compared to the national average. Consequently, the cost burden of major capital investments is distributed among a smaller customer base[3] [6], [7], [8].

Table F.2: *Average # of Customers per Water and Wastewater Treatment Facility*

Region	Average # of Customers per Water Treatment Plant	Average # of Customers per Wastewater Treatment Facility
New Brunswick	6,932	10,392
Nova Scotia	9,604	7,758
Newfoundland and Labrador	4,145	12,293
Prince Edward Island	6,338	3,173
Atlantic Canada	6,387	8,524
National Average	*17,899*	*38,733*

As a result of these structural inefficiencies, the total cost of infrastructure required to service residents in the region is generally higher than in other parts of the country. The average replacement value of water and wastewater assets in Atlantic Canada is **$25,120 per customer,** roughly 50% higher than the national average of $16,614 [6], [7], [8]. Significantly elevated per customer costs are found in Prince Edward Island, primarily driven due to elevated wastewater servicing costs (interestingly, water costs are significantly lower than their peers).



Demand Forecasting

Forecasting the additional demand anticipated due to population growth and new housing developments is difficult to determine precisely but can be approximated using current residential consumption rates and population growth forecasts. In summary, the estimated increase in water and wastewater capacity needed to support a population growth of 474,726 (medium-growth scenario 1 from 2021 to 2036) is 113.8 ML/day and 185.8 ML/day, respectively [9].

[3] Average number of customers per facility is calculated by dividing the total population serviced values from the Biennial Drinking Water Plants and Municipal Wastewater Systems survey in Canada by the number of facilities included in the CCPIS survey.

Table F.3: *Water Demand Forecast*

Province	Average daily residential use per capita of the population served (L/p/day)	Estimated population growth (2021 to 2036)[4]	Estimated average increase in daily residential use (ML/day)
New Brunswick	243	182,190	44.3
Nova Scotia	220	199,417	43.9
Newfoundland and Labrador	402	39,650	15.9
Prince Edward Island	181	53,469	9.7
Atlantic Canada Total	**275**	**474,726**	**113.8**

Table F.4: *Wastewater Demand Forecast*

Province	Average daily residential use per capita of the population served (L/p/day)[5]	Estimated population growth (2021 to 2036)[4]	Estimated average increase in daily residential use (ML/day)
New Brunswick	397	182,190	72.4
Nova Scotia	403	199,417	80.3
Newfoundland and Labrador	445	39,650	17.7
Prince Edward Island	290	53,469	15.5
Atlantic Canada Total	**406**	**474,726**	**185.8**

Additional factors that can influence per capita demand estimates, include [10], [11], [12], [13]:

- **Commercial and industrial land use** – the estimates above are for residential consumption *exclusively*. Additional demands for commercial and industrial land uses needed to support employment will likely also be required.
- **Housing type** – detached single family homes typically consume more water than multi-family residential buildings.
- **Housing fixtures** – homes equipped with low-flow fixtures consume less water.
- **Water metering and volumetric rates** – homes with water meters and volumetric water billing result in lower consumption rates.
- **Water conservation practices** – communities with strong water conservation practices (e.g. public education, lawn watering restrictions) use less water.
- **Infrastructure condition** – aging infrastructure systems result in higher rates of water loss and inflow & infiltration.

Existing System Capacity and Investment Needs

Assessing the available capacity of existing water and wastewater systems in Atlantic Canada is not currently possible. Unlike condition or financial data, there is limited publicly accessible information on the capacity[6] and constraints for systems. Even when high-level figures are available, they rarely capture

[4] Assumes a medium-growth scenario.

[5] Estimates generated by comparing total vs. residential water consumption rates in the Biennial Drinking Water Survey.

[6] The 2022 Canada Core Public Infrastructure Survey did ask local governments about the maximum design capacity of their water and wastewater systems. However, the data was aggregated for *all* non-linear assets (including supply plants, pumping stations, reservoirs, treatment facilities), providing an overstated value of system capacity. The total capacity of supply plants and treatment facilities were not readily available, but may prove to be a valuable source of data in future analysis.

the operational realities of how much capacity can be used reliably and in compliance with regulatory requirements.

Oftentimes there is a focus on district-level infrastructure capacity for water and wastewater systems (i.e. water supply plants and wastewater treatment facilities). While this is an essential step in determining the capacity of the system, it does not fully reflect the system's true capacity. While many water supply plants and wastewater treatment facilities operate below their *theoretical* design limits, their effective capacity is often constrained by environmental factors such as water quality requirements, changes in source water availability, or the assimilative capacity of receiving waters. Moreover, bottlenecks occurring *outside* the supply plants or treatment facilities can limit capacity. Restrictions in transmission mains, gravity sewers, pumping stations, and storage reservoirs can limit capacity volumes regardless of supply and treatment capabilities.

Because these systems are influenced by numerous interconnected factors, additional data collection and engineering analysis are needed to accurately estimate the available capacity and system headroom. Municipalities typically lack consolidated, publicly available information on these constraints, making it difficult to estimate how much new development existing systems can support.

Order of Magnitude Investment Estimates

Despite the limited information available for assessing province-wide capacity, an order-of-magnitude estimate for the scale of infrastructure investment required to support additional housing can be made based on the average replacement value of infrastructure per household. This method calculates the total value of existing infrastructure and divides it by the total number of households served.

The resulting metric, expressed as $/household, provides a coarse indicator of how much capital is embedded in the system for each housing unit. By multiplying this unit cost by the projected increase in housing unit, a broad estimate of the magnitude of future capital investment may be determined. This assumes that all new housing development will likely occur in an urban area that would require local servicing (i.e. housing units are not supported by on-site domestic wells and septic systems).

Using this approach, there is an estimated **$25.5 billion (2021$) of additional infrastructure asset CRV** needed to support an increase in population of 474,726. This estimate is exclusively for roads[7], active transportation, water, wastewater, and stormwater assets in an urban area. This is recognized as a Class 5 estimate, with an estimated range between $12.8 billion (-50%) and $51.1 billion (+100%). Notable limitations of this approach are described below.

Table F.5: *Average CRV per Household [6]*

Asset Type	NB	NS	PE	NL
Roads	$32,830	$48,433	$92,977	$57,499
Active Transportation	$3,583	$9,941	$2,654	$1,711
Stormwater	$8,155	$5,612	$9,229	$6,499
Potable Water	$29,690	$25,729	$12,691	$28,710
Wastewater	$26,108	$26,575	$94,676	$28,286
Total ($)	**$100,366**	**$116,291**	**$212,227**	**$122,705**

[7] Does not include associated road infrastructure such as streetlights and traffic signals.

Table F.6: *Order of Magnitude Estimates*

Province	Average CRV / Household	Anticipated Housing Growth (2021-2036)[8]	Estimated Infrastructure CRV Growth, $B (2021-2036)
NB	$100,366	79,213	$8.0
NS	$116,291	90,644	$10.5
PE	$212,227	23,247	$4.9
NL	$122,705	17,239	$2.1
Total		**210,344**	**$25.5**

Limitations

While this approach is useful for high-level planning and analysis, it has several limitations (listed below). Based on the author's experience and judgment, the estimate is most likely conservative estimate that would likely be revised down as more accurate data and information is collected.

1. **Linear Supply-Demand Relationship.** The analysis assumes that the relationship between existing system capacity, cost, and demand is linear. Infrastructure systems exhibit economies of scale and density. Larger, more densely constructed systems generally have lower cost per unit of demand than smaller and sprawling systems, meaning that using a province-wide average can overstate required investment in urban centres and understate needs in rural areas [14].
2. **No Excess Capacity.** The method implicitly assumes that existing infrastructure is appropriately sized relative to demand. In practice, many systems have excess capacity. Conversely, systems could face significant constraints that would require a non-linear increase in supply.
3. **No Consideration of Performance.** A significant limitation is that this approach ignores the distinction between capacity and performance. Replacement cost values include all system components, but the limiting factor for growth may not be reflected in the total asset base. For example, a single undersized pump station or trunk sewer with limited wet-weather capacity will not show up in the average cost metric, even though it may represent the true constraint on accommodating additional units. The approach also does not account for service level increases, regulatory, environmental, or water quality factors that may drive capital needs independently of demand.
4. **Replacement Value Uncertainties**. Lastly, this methodology relies on self-reported asset replacement values, which may be incomplete or inconsistent across jurisdictions [6]. Some communities use depreciated book value, others use current replacement cost, and others do not maintain asset valuations at all. Without standardized, comparable asset data, any cost-per-unit estimate will carry considerable uncertainty. Additionally, replacement values are inherently sensitive to changing market conditions. Fluctuations in construction costs, labour availability, material prices, and supply chain constraints can significantly influence actual replacement costs

[8] Anticipated housing growth calculated by dividing the estimated population increase (Statistics Canada Table: 17-10-0057-01) by the average household size (Statistics Canada, 2021 Census of Population).

over time. Procurement policies and requirements, such as local sourcing or "Buy Canadian" provisions, may further increase costs relative to baseline estimates. As a result, reported replacement values may not fully reflect the true cost of delivering infrastructure under current or future market and policy conditions.

For these reasons, the "*average replacement cost per capita*" method should be treated strictly as a screening-level indicator, suitable only for establishing broad investment ranges. More precise estimates require system-specific capacity assessments and engagement with individual utilities.

Integrating Infrastructure and Land-Use Planning

Integrated land use and infrastructure planning is essential to ensuring that growth occurs in a fiscally responsible and environmentally sustainable manner. Housing development cannot be considered independently of the infrastructure systems required to support it. When land use decisions are not aligned with infrastructure capacity and long-term financial needs, communities can face higher servicing costs, reduced levels of service, reduced overall infrastructure condition, increased environmental impacts, and greater challenges meeting regulatory and climate resiliency requirements. Most notably, there are significant economies of scale and density for public infrastructure. Owners that can maximize the number of housing units per unit length of infrastructure will spread the costs over a higher number of taxpayers and users.

Across the Atlantic provinces, there is broad (but often high-level) policy recognition of the need to coordinate land use decisions with infrastructure planning.

- New Brunswick's *Statements of Public Interest* states that new development should occur in areas with existing or planned public infrastructure and services (SP.5) [15].
- Nova Scotia's *Statements of Provincial Interest* states that planning documents must "*promote the efficient use of existing infrastructure and reduce the need for new municipal infrastructure*," encouraging municipalities to prioritize intensification and avoid unnecessary expansion [16].
- Prince Edward Island's Planning Act includes a provincial interest that the Minister shall have regard to ensure "*the adequate provision and efficient use" of a broad range of public services (including water, wastewater, stormwater, transportation, waste management, and communications) when planning for development*" [17].
- Newfoundland and Labrador does not currently include equivalent policy language emphasizing the integration of land use and infrastructure planning.

While these policies signal intent, they generally stop short of setting out detailed requirements, standards, or mechanisms to ensure that growth decisions are grounded in infrastructure capacity assessments, asset management practices, or long-term financial viability.

A comparison with Ontario highlights the potential benefits of a more comprehensive and direct approach. Ontario's Provincial Planning Statement contains explicit, enforceable expectations for infrastructure and land use planning. The policy emphasizes that infrastructure and public service facilities *must* [18]:

- be provided efficiently while accommodating projected needs,

- be financially viable over their lifecycle and supported by asset management planning,
- and be integrated with land use planning and growth management.

Ontario requires municipalities to optimize existing infrastructure before considering new systems and to consider adaptive re-use opportunities. This more prescriptive policy framework ensures that growth decisions are explicitly tied to infrastructure capacity and long-term financial sustainability. In contrast, provinces in Atlantic Canada offer general statements of intent but lack clear requirements that link municipal plans to infrastructure requirements.

Infrastructure Financing

Housing-enabling infrastructure, particularly water, wastewater, stormwater, roads, and active transportation assets, are predominantly owned and maintained by local governments. As a result, municipalities carry a significant share of the financial responsibility for ensuring that existing systems are adequately sustained and can meet rising demand and that new growth is supported by infrastructure.

However, the fiscal capacity of local governments in Atlantic Canada is inherently limited. Municipalities rely primarily on property taxes, user fees, and government transfers to fund infrastructure investments, each of which have constraints and limitations. Property tax increases are politically sensitive and may disproportionately affect existing residents, while user fees must balance revenue generation with affordability and equity considerations. Unlike federal and provincial governments, municipalities have few diversified revenue tools and limited ability to borrow for large system expansions.

One mechanism increasingly being explored in Atlantic Canada is the use of development charges (DCs) or similar growth-related fees. These have been used for decades in Ontario to require developers to contribute to the cost of infrastructure needed to service new development. In principle, DCs operate under the "*growth pays for growth*" model, reducing the burden on existing taxpayers. However, they are controversial and can increase upfront costs for developers, which can translate into higher new housing prices, affecting affordability and potentially discouraging new construction. This raises a fundamental policy question: *Should the cost of new infrastructure needed to support growth be borne primarily by new homeowners, or shared across the wider population at the local, provincial, or federal level?*

There is no simple answer. If growth pays for growth, housing affordability may suffer. If growth is subsidized, the financial burden shifts to existing residents who may not directly benefit from new infrastructure investments. If provinces provide subsidies or increase transfers, they must balance these commitments with competing priorities such as healthcare and education.

Given these pressures, provincial governments in Atlantic Canada may need to consider broader and innovative infrastructure financing models for infrastructure owners. Potential options include:

- **Enhanced provincial or federal transfers** targeted specifically at housing-enabling infrastructure[9].

[9] The author acknowledges that Federal and Provincial governments have recognized this opportunity, with several new funding sources now being made available to local governments to support infrastructure investments.

- **Tax policy tools**, such as allocating a portion of HST or corporate income tax for municipal infrastructure reinvestment.
- **Private-sector participation**, including public-private partnerships (P3s), utility rate models, or developer-led infrastructure servicing in strategic areas.
- **Value capture mechanisms**, where increases in land value resulting from public infrastructure investments are partially recouped to fund those same improvements.

Ultimately, sustainable housing development in the region will require aligning infrastructure needs with financing capacity, while ensuring that funding approaches are equitable, transparent, and support long-term viability. A coordinated effort across all orders of government, supported by innovative financing mechanisms and clear provincial policy direction, will be essential to closing the infrastructure funding gap and enabling new housing supply across Atlantic Canada.

Recommendations

The analysis presented in this report underscores the importance of infrastructure in enabling housing development across Atlantic Canada. However, there are several critical challenges that limit the ability of infrastructure owners and policymakers to make informed decisions about where new housing can be readily supported. In response to the challenges identified in this report, the following opportunities have been identified:

1. Conduct Provincial or Regional Infrastructure Needs Assessment Studies. Provincial governments should work collaboratively with municipal and regional governments to develop standardized data collection and reporting frameworks to more accurately determine infrastructure capacity constraints that may limit growth and new housing developments.

Barrier	Lack of consistent, reliable data on infrastructure capacity to support housing growth
Opportunity	Establish standardized provincial or regional infrastructure capacity assessments to inform housing-enabling investments
Location(s)	Atlantic Canada
Stakeholders	• Provincial governments • Municipalities • Regional planning authorities • W/W utilities
Metrics	% of municipalities (by population) with infrastructure capacity constraints assessed
Prerequisites	• Standardized methodology to assess infrastructure capacity • Data-sharing agreements
Owners	Provincial governments / regional planning authorities
Expected Timeline	2026 – 2028
Scope	Sub-Provincial (Regional)
Ease of Implementation	Medium
Impact (out of 10)	7

2. Mandate Integrated Land-Use and Infrastructure Planning. Local governments in Atlantic Canada are generally encouraged to prioritize development and land use in a manner that efficiently uses existing infrastructure systems. However, there is no legislative requirement for infrastructure owners to demonstrate a feasible long-term strategy and plan to ensure anticipated population growth and housing development can be supported while maintaining financial and environmental sustainability. Provinces should embed this requirement in planning legislation.

Barrier	Land-use decisions are often disconnected from long-term infrastructure capacity/availability
Opportunity	Mandate integrated land-use and infrastructure planning through provincial planning legislation
Location(s)	Atlantic Canada
Stakeholders	• Provincial planning departments • Municipalities • W/WW Utilities • Developers • Housing agencies
Metrics	% of provinces with legislative requirements for integrated land-use and infrastructure planning
Prerequisites	• Planning legislation amendments
Owners	Provincial governments
Expected Timeline	2029
Scope	Provincial
Ease of Implementation	Low
Impact (out of 10)	9

3. Support Skills Development and Technical Capacity. Many infrastructure owners (particularly small-sized municipalities) lack the technical expertise and resources to analyze infrastructure data and assess long-term infrastructure needs to support growth. Provincial governments should invest in training, support programs, and/or shared-resourcing models to strengthen municipal planning capabilities.

Barrier	Limited technical capacity in small municipalities to analyze infrastructure data and plan for growth
Opportunity	Invest in skills development, shared services, and technical support for municipal infrastructure planning
Location(s)	Atlantic Canada
Stakeholders	• Provincial governments • Municipalities • Post-secondary institutions • Municipal and professional associations
Metrics	# of staff trained % of municipalities with a “Competent” or higher maturity level of asset management planning for housing-enabling infrastructure[10]

[10] Housing-enabling infrastructure is assumed to be potable water, wastewater, stormwater, roads, and active transportation. Data for this metric is available in the Canada Core Public Infrastructure Survey.

Prerequisites	• Training curricula • Dedicated funding programs • Partnerships with post-secondary institutions
Owners	Provincial governments
Expected Timeline	2028
Scope	Provincial
Ease of Implementation	High
Impact (out of 10)	8

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Appendix G: Canadian Modern Methods of Construction (MMC) definition framework

Modern Methods of Construction (MMC) focuses on improving sector productivity, quality, and efficiency by integrating innovative techniques into the way buildings and communities are delivered. MMC includes all forms of Off-site Construction (OSC), such as 3D volumetric modules, 2D structural panels, prefabricated components, and non-structural sub-assemblies, as well as On-site Construction (OnSC) innovations, including digital tools, robotics, advanced processes, and accelerated assembly methods.

MMC covers both product-led innovations that increase the supply of industrialized building elements and process-led innovations that enhance productivity on job sites. Together, these approaches strengthen industry capacity, reduce inefficiencies, and support the evolution of Canada's construction sector.

Purpose and context

The Canadian MMC definition framework is primarily adapted from the UK Modern Methods of Construction Framework (2019). To ensure global alignment, definition frameworks from Australia, New Zealand, Singapore, and other European jurisdictions were also reviewed.

Where possible, the Canadian version maintains international consistency to support:

- knowledge exchange
- labour mobility
- supply chain integration

However, several adjustments were necessary where the Canadian context, including building codes, procurement practices, climate conditions, and terminology, required modification.

The outcome is a seven-category MMC system that provides a clear, standardized, and future-ready understanding of how innovative building methods fit into Canada's construction environment.

This framework includes all forms of:

- Off-site Construction (OSC)
- On-site process- and product-led innovations
- Additive Manufacturing (AM) elements that can be produced off-site or on-site

Methodology

The development of the Canadian MMC Framework followed a structured, multi-stage process designed to ensure international alignment, national relevance, and expert validation. Each step built on the previous one to create a comprehensive and future-ready definition framework for Canada. **Figure G.*1*** is an overview of MMC framework methodology.

Identify industry need

The process began by examining long-standing productivity challenges and systemic barriers within the Canadian construction sector. These included regulatory inconsistencies, fragmented terminology, labour and procurement constraints, and limited adoption of modern construction methods. Recognizing these industry needs established the foundation for designing a modernized MMC definition tailored to Canada.

Review international MMC frameworks

A detailed review of leading international frameworks was conducted to ensure alignment with global best practices.

Key references included:

- UK Modern Methods of Construction (MMC) Framework (2019)
- MMC frameworks used in Australia and New Zealand

This review helped identify established MMC categories, definitions, and classification principles that could inform the Canadian version.

Adapt the framework to the Canadian context

International MMC structures were then mapped against Canadian construction realities, including:

- National and provincial building codes
- Procurement and contracting practices
- Labour and training systems
- Climate and regional variations
- Common Canadian terminology and industry norms
- This step ensured the framework would be both globally compatible and locally applicable.

Define the Canadian MMC categories

Using insights from international models and Canadian requirements, the framework's seven MMC categories were defined:

- Volumetric (3D) Modular Construction
- Panelized (2D) Structural Systems
- Prefabricated Components (Non-systemized Primary Structure)
- Non-Structural Assemblies and Sub-Assemblies
- Additive Manufacturing
- Building product led site productivity improvements
- Building process led productivity improvements

These categories reflect the full spectrum of off-site and on-site construction innovations in Canada.

Revision and refinement

The draft framework underwent multiple cycles of internal review and refinement to ensure clarity, accuracy, and alignment with Canadian practice. Revisions included adjustments to terminology, reorganization of sub-categories, and refinement of definitions to better reflect Canadian industry language and expectations.

Validation with a national expert committee

The revised framework was presented to a national expert committee composed of representatives from:

- Industry
- Government
- Academia
- Manufacturing
- Professional associations

Their feedback informed the final adjustments to ensure the framework was technically sound, industry-aligned, and nationally supported.

Finalization of the framework

After incorporating expert feedback and confirming alignment with the broader Canadian construction ecosystem, the MMC framework was finalized. The completed version provides a clear, standardized classification system that supports productivity improvement, regulatory harmonization, and knowledge exchange across Canada.

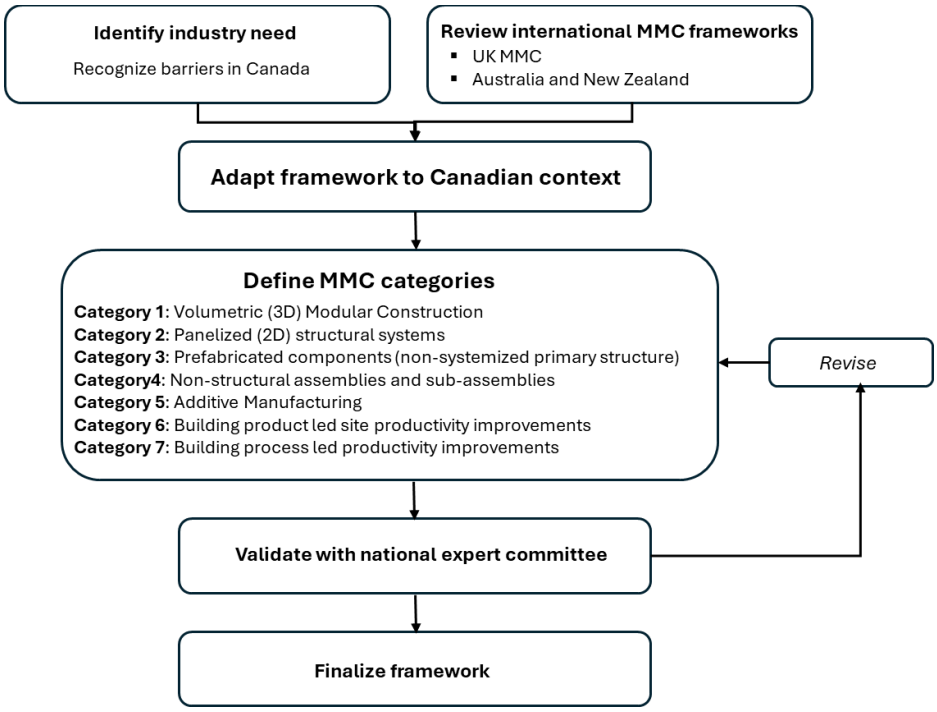

Figure G.1: Overview of MMC framework methodology

Results and MMC Categories

The Canadian MMC definition framework organizes innovative construction methods into seven categories, reflecting the full spectrum of off-site and on-site techniques that enhance productivity, quality, speed, and safety. These categories are aligned with international MMC standards but adapted to match Canadian building codes, terminology, and industry practices.

Together, they encompass everything from fully volumetric modular buildings to advanced digital tools and product-led on-site innovations.

Each category includes multiple sub-types that represent different levels of factory completion, integration, or on-site optimization. The list below provides a clear and structured overview of all seven MMC categories.

Category 1 – Volumetric (3D) Modular Construction

Volumetric modular construction involves producing fully enclosed, box-like units in a factory. These modules may range from structural-only shells to fully finished rooms with interior fit-out, services, and external cladding. Once transported to site, the modules are assembled to form a complete building.

Sub-categories:

- **1a. Structural module only** – all interior and exterior work completed on-site.
- **1b. Module with interior fit-out** – a volumetric unit with walls, floors, and basic MEP systems pre-installed, including interior fit-out such as finishes and fixtures.
- **1c. Fully enclosed module** – includes interior fit-out, exterior cladding, and roofing.
- **1d. Structural turnkey module with service pods** – includes integrated bathroom/kitchen pods, ready for final connections.

Category 2 – Panelized (2D) Structural Systems

Panelized systems consist of flat structural elements, such as walls, floors, and roofs, manufactured in a factory and assembled on-site. They range from open structural frames to fully insulated panels with internal linings and exterior finishes.

Sub-categories:

- **2a. Structural framing panels** – Open-frame wall, floor, stair, or roof panels fabricated off-site and completed with insulation, finishes, and services on-site.
- **2b. Insulated panel systems** – Panels pre-fitted with insulation and internal wall linings (e.g., drywall or sheathing) in the factory.
- **2c. Fully integrated panels** – Panels delivered with factory-installed insulation, interior finishes, exterior cladding, windows, and door openings.
- **2d. Externally finished panels** - Panels delivered with factory-installed exterior cladding to achieve a weatherproof envelope; interior insulation, linings, and services are completed on-site.

Category 3 – Prefabricated Components (Non-Systemized Primary Structure)

These components support part of a structure but are not full structural systems. They are often used for foundations, partial framing, or building elements that integrate with other construction systems on-site.

Sub-categories:

- **3a. Driven or screw piles**- Factory-made foundation elements installed by driving or screwing into the ground.
- **3b. prefabricated pile caps or ring beams**- Factory-made foundation elements used to connect piles and create a stable base for structural systems.
- **3c. Non-structural columns, walls, and beams (Individual or integrated assemblies)**
- **3d. Floor finishes**
- **3e. Prefabricated staircases**
- **3f. Pre-assemble roof structure -** Trusses, spandrels.

Category 4 – Non-Structural Assemblies and Sub-Assemblies

This category includes prefabricated building services elements that simplify on-site installation. Although not part of the structural system, these assemblies significantly accelerate project delivery by integrating mechanical, electrical, service, or interior components off-site.

Sub-categories:

- **4a. Bathroom and kitchen pods (individual or combined)**

- **4b. Non-structural façade assemblies -** Glazing, solid cladding, metalwork.
- **4c. Prefabricated roof sections -** Roof cassettes engineered to support their own weight.
- **4d. In-unit M&E service assemblies -** Utility cupboards, service hubs.
- **4e. In-unit M&E distribution assemblies**
- **4f. Infrastructure M&E assemblies -** vertical risers / main distribution.
- **4g. Infrastructure M&E assemblies- central** plant & equipment
- **4h. Floor cassettes with horizontal services / finishes**
- **4i. Partition cassettes with horizontal & vertical services / finishes**
- **4j. Door sets: pre-hung, finished with ironmongery**
- **4k. Offsite elevators and shafts**

Category 5 – Additive Manufacturing (AM)

Additive Manufacturing, commonly known as 3D printing, uses digitally controlled fabrication to create building components layer by layer. AM enables new geometric capabilities and reduces labour-intensive site tasks, with applications both on-site and off-site.

Sub-categories:

- **5a. On-site large-scale printing**
- **5b. Off-site component printing**
- **5c. Hybrid/repair applications**

Category 6 – Building product led site productivity improvements

Category 6 focuses on Improving construction efficiency by developing building materials to be quicker, easier, and safer to install; involving manufacturing building products in larger formats, pre-cut configurations, or with simplified jointing features.

Sub-categories:

- **6a. Large-format products** - Products manufactured in larger sizes to reduce the number of elements to be handled and installed on-site.
  Example: Large-format masonry blocks, jumbo plasterboards, large pre-cut cladding panels.
- **6b. Pre-cut or pre-sized products** - Products manufactured or pre-processed to specific sizes or shapes before delivery.
  Example: Pre-cut timber framing kits, pre-cut steel rebar packages.
- **6c. Simplified jointing or connection systems -** Products designed with simplified or integrated connectors to speed up on-site assembly.
  Example: Click-in façade systems, self-aligning floor tiles, modular jointing clips.

Category 7 – Building process led productivity improvements

Category 7 includes improving on-site efficiency through innovative techniques, digital tools, automation, and robotics. Aim to enhance productivity by optimizing skilled workforce utilization, reducing waste, and streamlining workflows directly at the construction site.

Sub-categories:

- **7a. On-site mechanization and automation** - Robotic and mechanized systems to reduce manual site work.
- **7b. Digital and data-driven tools** - Advanced digital technologies for monitoring, layout, and site optimization.
- **7c. Advanced prefabrication aids** - Supporting prefabricated elements and temporary systems to minimize conventional site work.
- **7d. Lean management practices** - Process-focused methods to improve productivity and reduce waste.

The benefits of the Canadian MMC definition framework

The development of the Canadian MMC Framework marks an important milestone in modernizing and transforming the country's construction sector. By identifying industry needs, analyzing international best practices, and adapting them to the Canadian context, this framework establishes a clear, standardized, and future-ready classification system for modern constructions. All industry participants in the construction sector will benefit from the clarity, standardization, and alignment provided by this framework, in the following forms:

Construction Industry

- General contractors, construction managers, and trade contractors gain clarity and reduced risk, enabling better workforce planning and project delivery.
- Developers and real estate firms gain confidence in cost, speed, and quality expectations for MMC projects.
- Manufacturers and suppliers benefit from standardized definitions that support procurement, regulatory acceptance, and product development.
- Architects, engineers, and consultants gain improved understanding of MMC and DfMA, enabling clearer RFPs and better project coordination.

Government and Regulatory Bodies (All Levels)

- Enables policymaking, funding allocation, and harmonized regulations.
- Provides inspectors and code authorities with clear definitions.
- Supports federal departments such as Public Services and Procurement Canada (PSPC) and provincial infrastructure agencies by creating clearer pathways for modernized project delivery.
- Helps municipalities and housing providers meet new housing mandates with faster approvals and compliance.

Financial Institutions and Insurers

- Creates standardized risk profiles.
- Supports new financial and insurance products tailored to MMC.
- Reduces uncertainty and accelerates investment in innovative construction.

Industry Associations and Trade Bodies

- Improves clarity in advocacy, standard setting, and industry coordination.

Labour and Workforce Organizations

- Helps workforce prepare for evolving work environments.
- Supports safer and more equitable adoption of new technologies and construction methods.

Universities, Colleges, and Training Institutions

- Facilitates curriculum development aligned with industry needs.
- Supports skills and competency pathways for both professional and trade programs.

Indigenous Governments and Community Housing Providers

- Supports MMC-enabled housing delivery that is culturally appropriate, rapid, durable, and cost-effective.
- Provides tools to modernize community infrastructure.

Conclusions and Recommendations

The seven MMC categories capture the full spectrum of emerging and established methods that can significantly improve productivity, quality, safety, and environmental performance. This framework also provides the terminology and structure required to support harmonized policy, procurement, and regulatory pathways across provinces and territories.

Validated through national expert consultation, the framework supports a shared understanding among government, industry, academia, finance, and training partners. It offers a foundation for addressing long-standing challenges related to fragmented terminology, unclear risk profiles, limited data, and inconsistent adoption of advanced construction methods.

Ultimately, the Canadian MMC Framework enables the construction sector to deliver housing, infrastructure, and community buildings at a scale, pace, and quality that meets the country's urgent needs, while positioning Canada as a global leader in industrialized construction innovation.

Recommendations

To fully realize the benefits of the Canadian MMC Framework, the following actions are recommended for government, industry, and sector partners:

1. Integrate MMC definitions into policy, codes, and procurement

- Embed the MMC categories into national and provincial building codes, design guidelines, and approval pathways.
- Modernize public procurement models to recognize modern construction methods.

2. Enable finance and insurance products tailored to MMC

- Develop standardized risk profiles based on the MMC categories.

- Support pilot projects that demonstrate how MMC reduces defects, delays, and cost uncertainty.

3. Strengthen workforce training and capacity development

- Align MMC categories with updated training programs in universities, colleges, and trades.
- Provide transition pathways for existing workers affected by automation or new technologies.

4. Support Industry adoption through incentives and demonstration projects

- Launch federal and provincial incentive programs for MMC deployment in housing, schools, healthcare, and infrastructure.
- Invest in demonstration projects to showcase the benefits of Categories 1–7 across different building types.

5. Establish a National MMC Data and Benchmarking Program

- Collect standardized data on cost, productivity, quality, speed, carbon performance, and labour impacts.
- Use data insights to support evidence-based policymaking and investment decisions.

The Canadian MMC Framework provides the foundation needed to modernize construction practices, accelerate housing delivery, and improve productivity across the country. By adopting the recommendations outlined above, Canada can build a more resilient, efficient, sustainable, and globally competitive construction sector, one that meets the needs of its communities today and supports innovation for decades to come.

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CANADIAN

MODERN METHODS OF CONSTRUCTION (MMC)

MMC DEFINITION SUMMARY

Modern Methods of Construction (MMC) focuses on improving sector **productivity**, quality, and efficiency by integrating **innovative** techniques to shape the future of our cities and communities. MMC includes all forms of Off-site Construction (OSC) such as 3D volumetric modules, 2D structural panels, prefabricated components, and non-structural assemblies. It also includes On-site Construction (OnSC) **innovations**, which focus on **products** that increase site-based **productivity** (building product led site productivity improvements) and **processes** that increase **productivity** (building process led site productivity improvements).

STANDARD BUILDING SYSTEMS FOR CATEGORIES 1 TO 4

Concrete Systems
(e.g., precast concrete, prestressed concrete, etc.)

Steel Systems
(e.g., light-gauge steel (LGS), cold formed steel (CFS), hot-rolled steel (HRS))

Timber (Wood Frame) Systems
(e.g., light wood framing, mass timber (cross-laminated timber (CLT)), glued laminated timber (glulam), etc.)

Composite Systems

***Note**: In addition to the listed systems, integrated or hybrid systems may also be utilized to meet specific project requirements.*

MODERN METHODS OF CONSTRUCTION (MMC) AND INDUSTRIALIZED CONSTRUCTION (IC) IN THE CANADIAN CONTEXT

MMC and IC include a range of approaches aiming to significantly increase productivity in the Canadian construction industry through policy and integration of mechanization, automation, and advanced manufacturing technologies

Modern Methods of Construction (MMC) is a broad term that refers to any innovative building method that improves how we design and construct buildings. It includes both offsite approaches (like prefabricated panels and modular units) and onsite innovations (like digital tools, robotics, or faster assembly methods).

Industrialized Construction (IC) is a more specific approach within MMC. It focuses on applying manufacturing and industrial processes to the construction of buildings and infrastructure — using factories to standardize, automate and scale. IC emphasizes **repeatability, precision, and scalability**.

CANADIAN MMC DEFINITION FRAMEWORK

The Canadian MMC definition framework is primarily adapted from the Modern Methods of Construction (MMC) framework developed in the United Kingdom. To strengthen global alignment, we also reviewed and considered relevant definition frameworks from other leading jurisdictions, including Australia and New Zealand. Wherever possible, the Canadian version maintains consistency with established international categories to support knowledge exchange, labour mobility, and supply chain integration. Adjustments have been introduced where Canadian context—such as building codes, procurement practices, and terminology—requires modification. The result is a seven-category system that provides a comprehensive and future-ready understanding of "Modern Methods of Construction" in building construction, supported by clear and standardized terminology.

This framework covers all forms of off-site construction (OSC) (including volumetric modular, panelized, prefabricated products), on-site process and product-led innovations, and additive manufacturing (AM) elements which can be produced either off-site or directly on-site depending on project needs.

This document was developed by the **Off-site Construction Research Centre (OCRC)** at the **University of New Brunswick (UNB)** to enhance stakeholder education and awareness and provide clarity on the different forms of off-site and on-site construction methods that improve productivity in the sector. This framework is focused on the technical definition of Modern Methods of Construction. While we recognize that various systemic barriers are critical enablers of adoption, these considerations fall outside the scope of this definition framework and are addressed in complementary research and policy workstreams.

WHY DO WE NEED A MODERN METHODS OF CONSTRUCTION (MMC) FRAMEWORK?

Productivity trends in the Canadian construction sector continue to be challenged, affecting all building and infrastructure types, limiting the sector's ability to efficiently deliver projects at scale. In 2025, the University of New Brunswick Off-site Construction Research Centre partnered with the National Research Council of Canada to deliver the Roadmap to Transform the Canadian Construction Industry and followed up with the delivery of the Atlantic Off-site Housing Innovation Strategy. Through consultation with 600+ industry representatives, barriers and opportunities to MMC were identified. The core barriers impeding sector productivity focused on **Policy and Regulatory, Procurement and Contracts, and Finance and Insurance**.

A national MMC framework is an initial step to overcoming these barriers. It is essential to address Canada's long-standing productivity stagnation and meeting the country's housing and infrastructure targets and net-zero goals. A harmonized definition framework standardizes terminology in policy, regulatory, building codes, procurement and contracts, and further helps the finance and insurance sector to create products that enable the country to build at an **unprecedented pace**. The MMC framework supports the efficient and sustainable provision of housing, healthcare, education, and other critical infrastructure across the country, ultimately enhancing the resilience and competitiveness of Canada's construction sector.

This MMC framework is essential to:

- **Accelerate the delivery of housing, healthcare, education and other infrastructure needs.**
- **Standardize communication across jurisdictions and reduce confusion.**
- **Enable better data collection and benchmarking of the current capacity and capability of the sector.**
- **Guide the development of public policy and incentive programs.**
- **Incentivize investment in innovation through business case development and allowing for long-term planning.**
- **Support workforce and skills development for both professional services and trade programs.**
- **Position Canada as an international leader to support trade and export opportunities and enable global knowledge exchange.**

WHO WILL BENEFIT FROM THE CANADIAN MMC DEFINITION FRAMEWORK?

All members of the value chain playing a role in the construction sector will benefit from the adoption of this framework.

CONSTRUCTION INDUSTRY

- **General contractors, construction managers and trade contractors** have more clarity and reduced risk allowing for workforce planning, supply chain coordinator and project delivery models.
- **Developers and real estate firms** gain confidence to invest in MMC projects as the framework helps assess cost, speed and quality of the various products and building typologies.
- **Manufacturers and suppliers** benefit from standardized definitions supporting policy, procurement contracts and regulatory acceptance.
- **Architects, engineers and consultants** benefit from a better understanding of MMC products and design for manufacturing and assembly (DfMA) and improve clarity on RFPs.

FINANCIAL INSTITUTIONS AND INSURERS

supports the creation of a standardized risk profile and enables the creation of financial and insurance products that specifically support and de-risk MMC adoption.

INDUSTRY ASSOCIATION AND TRADE BODIES

provides clarity to support communication and advocacy efforts.

WHO WILL BENEFIT FROM THE CANADIAN MMC DEFINITION FRAMEWORK?

GOVERNMENT AND REGULATORY BODIES AT ALL LEVELS

- **Policy makers** are supported in funding allocation, regulatory harmonization across all levels of government and provide inspectors and code authorities with clear definitions.
- **Federal government departments** such as Public Services and Procurement Canada (PSPC), as well as provincial infrastructure agencies responsible for the design, construction, and maintenance of public buildings, are supported by providing standardized MMC terminology and clearer pathways to modernized project delivery.
- **Municipalities and housing providers** can meet public infrastructure and new housing obligations under evolving legislation, enabling alternative delivery method that accelerates approvals and compliance.

WORKFORCE ORGANIZATIONS

Supports workforce organizations, employers, and training institutions in preparing for evolving work environments and facilitating safe and equitable workforce transitions across the construction sector.

UNIVERSITIES, TRADE SCHOOLS AND TRAINING INSTITUTIONS

supports the structuring and development of curriculum that aligns with skills and competency requirements in practice.

INDIGENOUS GOVERNMENTS AND COMMUNITY HOUSING PROVIDERS

clarifies the potential for MMC solutions to deliver culturally appropriate public infrastructure while also supporting local capacity-building, training, and skills development in construction.

MMC CATEGORIES

Off-site Construction (OSC)

1 VOLUMETRIC (3D) MODULAR CONSTRUCTION

2 PANELIZED (2D) STRUCTURAL SYSTEMS

3 PREFABRICATED COMPONENTS (NON-SYSTEMIZED PRIMARY STRUCTURE)

4 NON-STRUCTURAL ASSEMBLIES AND SUB-ASSEMBLIES

5 ADDITIVE MANUFACTURING (AM)

On-site Construction (OnSC)

6 BUILDING PRODUCT LED SITE PRODUCTIVITY IMPROVEMENTS

7 BUILDING PROCESS LED PRODUCTIVITY IMPROVEMENTS

CATEGORY 1

VOLUMETRIC (3D) MODULAR CONSTRUCTION

This method involves creating fully enclosed, box-like units in a factory setting. These modules are transported to the site and assembled to form permanent buildings. The level of factory work can vary, from basic structure-only units to fully finished rooms with interior fittings and exterior finishes.

Note: *volumetric (3D) modular buildings sit on a permanent foundation and would be governed by CSA A277-Procedure for certification of prefabricated buildings, modules, and panels.*

CATEGORY 1

1a. Structural module only

all interior and exterior work completed on-site.

1b. Module with interior fit-out

a volumetric unit with walls, floors, and basic MEP systems pre-installed, including interior fit-out such as finishes and fixtures.

1c. Fully enclosed module

includes interior fit-out, exterior cladding, and roofing.

1d. Structural turnkey module with service pods

includes integrated bathroom/kitchen pods, ready for final connections.

CATEGORY 2

PANELIZED (2D) STRUCTURAL SYSTEMS

Flat structural elements like walls, floors, and roofs are prefabricated in a factory. These panels arethen brought to the construction site for assembly. The complexity can range from basic frames to fully insulated and finished panels.

Note: *depending on the level of finish in the factory, some panelized (2D) structural systems would be governed by CSA A277-Procedure for certification of prefabricated buildings, modules, and panels.*

CATEGORY 2

2a. Structural framing panels

Open-frame wall, floor, stair, or roof panels fabricated off-site and completed with insulation, finishes, and services on-site.

2b. Insulated panel systems

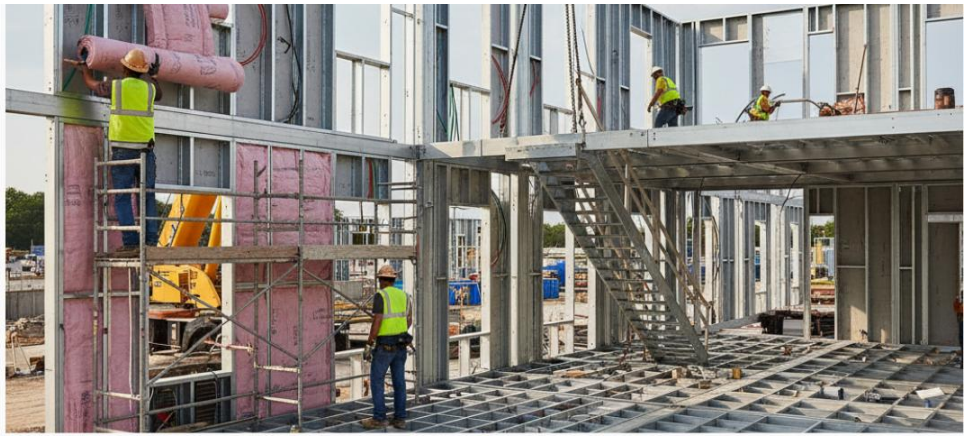
Panels pre-fitted with insulation and internal wall linings (e.g., drywall or sheathing) in the factory.

2c. Fully integrated panels

Panels delivered with factory-installed insulation, interior finishes, exterior cladding, windows, and door openings.

2d. Externally finished panels

Panels delivered with factory-installed exterior cladding to achieve a weatherproof envelope; interior insulation, linings, and services are completed on-site.



CATEGORY 3

PREFABRICATED COMPONENTS (NON-SYSTEMIZED PRIMARY STRUCTURE)

These are prefabricated building components that support part of the structure but are not part of a full system. They are typically used for foundations, floors, or partial frames and can be combined with other construction systems on-site.

CATEGORY 3

3a. Driven or screw piles
Factory-made foundation elements installed by driving or screwing into the ground.

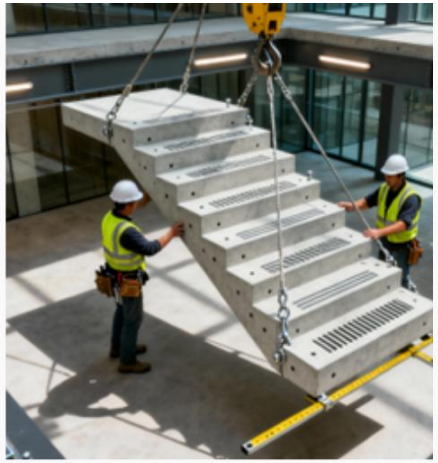
3b. Pre-fabricated pile caps or ring beams
Factory-made foundation elements used to connect piles and create a stable base for structural systems.

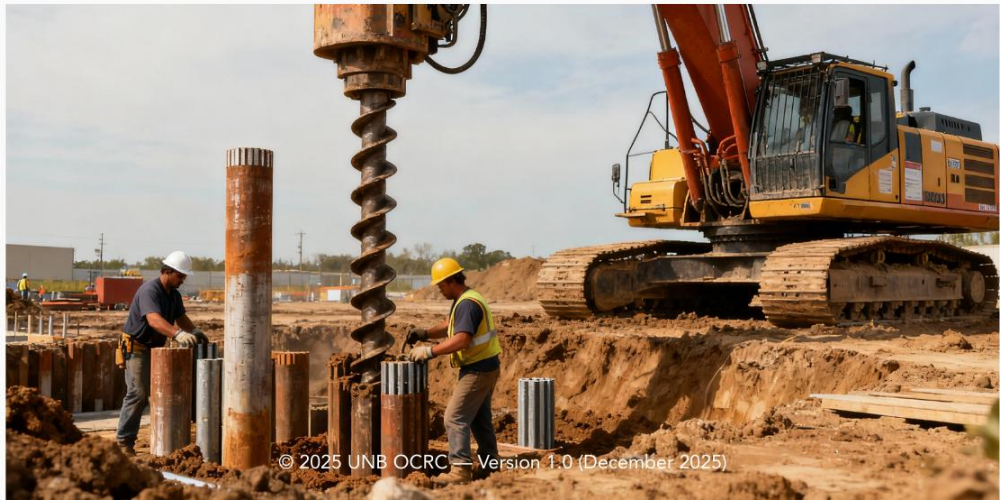
3c. Non-structural columns, walls , and beams (Individual or integrated assemblies)

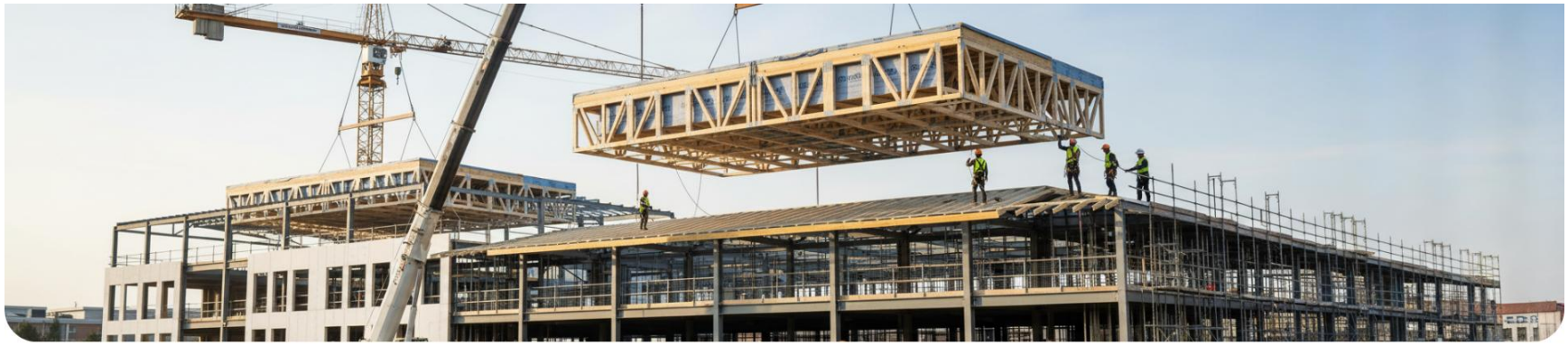
3d. Floor finishes

3e. Prefabricated staircases

3f. Pre-assemble roof structure
Trusses, spandrels







CATEGORY 4

NON-STRUCTURAL ASSEMBLIES AND SUB-ASSEMBLIES

This category includes prefabricated building services components that simplify installation on-site. These do not form the main structure but include parts like bathrooms, utility pods, or pre-installed mechanical and electrical systems.

Note: *depending on the level of finish in the factory, some panelized (2D) structural systems would be governed by CSA A277-Procedure for certification of prefabricated buildings, modules, and panels.*

CATEGORY 4

4a. Bathroom and kitchen pods (individual or combined)

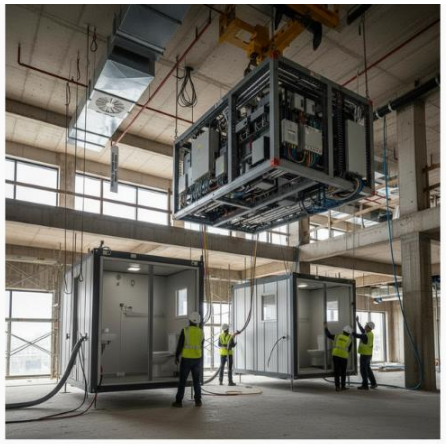
4b. Non-structural façade assemblies
Glazing, solid cladding, metalwork

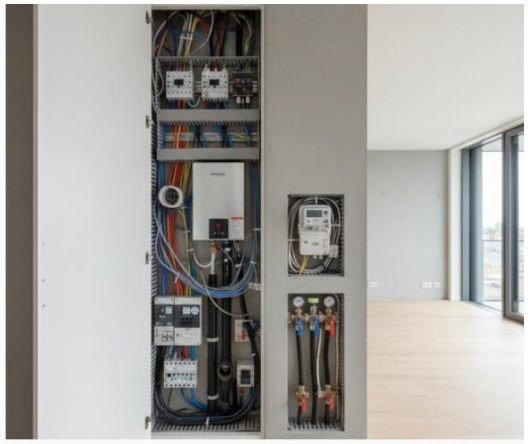
4c. Prefabricated roof sections
Roof cassettes engineered to support their own weight.

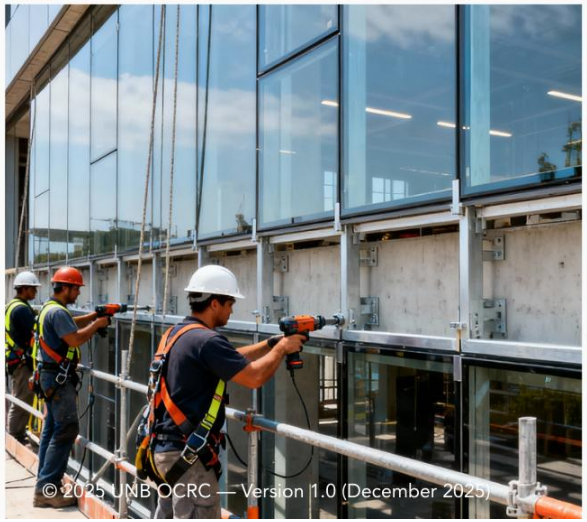
4d. In-unit M&E service assemblies
Utility cupboards, service hubs

4e. In-unit M&E distribution assemblies

4f. Infrastructure M&E assemblies
vertical risers / main distribution







CATEGORY 4

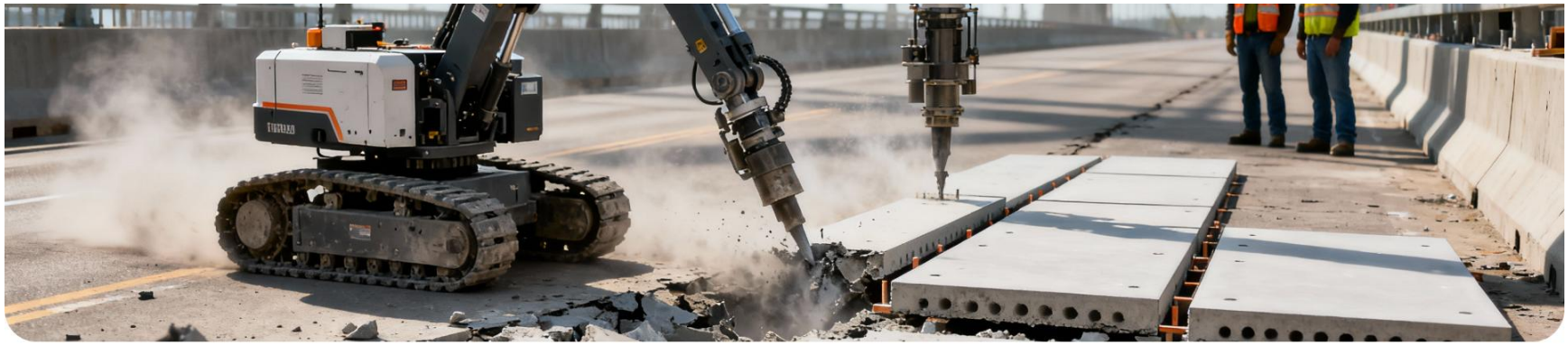
4g. Infrastructure M&E assemblies
central plant & equipment

4h. Floor cassettes with horizontal services / finishes added

4i. Partition cassettes with horizontal and vertical services / finishes added

4j. Door sets
pre-hung, finished with ironmongery

4k. Offsite elevators and shafts



CATEGORY 5

ADDITIVE MANUFACTURING

Often referred to as 3D printing, this innovative technique uses digital designs to fabricate building components layer by layer, either on site or remotely.
Creation of geometrically complex structures that would be difficult or impossible to achieve with traditional methods, while also improving productivity and workplace safety

CATEGORY 5

5a. On-site large-scale printing

5b. Off-site component printing

5c. Hybrid/repair applications

CATEGORY 6

BUILDING PRODUCT LED SITE PRODUCTIVITY IMPROVEMENTS

Improving construction efficiency by developing building materials to be quicker, easier, and safer to install; involving manufacturing building products in larger formats, pre-cut configurations, or with simplified jointing features.

CATEGORY 6

6a. Large-format products

Products manufactured in larger sizes to reduce the number of elements to be handled and installed on-site.

Example: Large-format masonry blocks, jumbo plasterboards, large pre-cut cladding panels.

6b. Pre-cut or pre-sized products

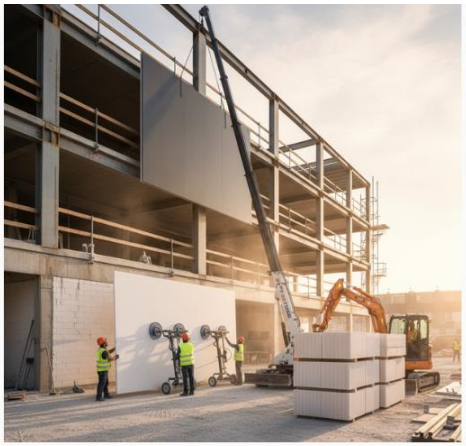
Products manufactured or pre-processed to specific sizes or shapes before delivery.

Example: Pre-cut timber framing kits, pre-cut steel rebar packages.

6c. Simplified jointing or connection systems

Products designed with simplified or integrated connectors to speed up on-site assembly.

Example: Click-in façade systems, self-aligning floor tiles, modular jointing clips.



CATEGORY 7

BUILDING PROCESS LED PRODUCTIVITY IMPROVEMENTS

Improving on-site efficiency through innovative techniques, digital tools, automation, and robotics. Aim to enhance productivity by optimizing skilled workforce utilization, reducing waste, and streamlining workflows directly at the construction site.

CATEGORY 7

7a. On-site mechanization and automation

Robotic and mechanized systems to reduce manual site work.

7b. Digital and data-driven tools

Advanced digital technologies for monitoring, layout, and site optimization.

7c. Advanced prefabrication aids

Supporting prefabricated elements and temporary systems to minimize conventional site work.

7d. Lean management practices

Process-focused methods to improve productivity and reduce waste.

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THIS FRAMEWORK IS OPEN TO INTERPRETATION, SUGGESTIONS, AND IMPROVEMENTS.

Please feel free to contact the team at the **UNB Off-site Construction Research Centre.**

UNB OCRC:
offsiteconstruction@unb.ca

Appendix H: Workshop materials

Below are the workshop slides used at the workshop in Moncton, NB. The workshop materials across the four in person workshops were very similar, with some region-specific materials presented at each workshop.

Acknowledgement

"We respectfully acknowledge that New Brunswick is situated on the unceded and unsurrendered territories of the Wolastoqey, Mi'gmaw, and Peskotomuhkati peoples. We seek to repair and rebuild meaningful relationships with Indigenous peoples and honour these lands which hold the hopes of future generations."

OFF-SITE CONSTRUCTION RESEARCH CENTRE

Introduction to the OCRC Team

Brandon Searle, Director of Innovation

Jeff Rankin, Professor and Executive Director

Scout McKee, Data Analyst

Rejsha Khoteja, Project EIT

Sadaf Montazeri, Digital Research Analyst

Project Background

- **Atlantic Off-site Housing Innovation project**
- **Funded by ACOA and governed by an advisory committee including:**
  - NL Housing Corporation, Government of PEI, NS Department of Growth and Development and Housing NB
  - NLCA, CAPEI, CANS and CANB
  - Memorial University, University of PEI, Dalhousie University and the University of New Brunswick
- **Develop a framework with common terminologies and definitions**
- **Identify barriers to increasing housing supply through off-site construction**
- **Provide the four provinces with an actionable strategy to collaborate and increase housing in the region.**

Workshop Objectives

- Discuss the current state of off-site construction (OSC) in Atlantic Canada
- Validate the barriers to OSC based on ***what we heard*** and identify others
- Identify opportunities and solutions to overcome the barriers
- Group discussion and identifying KPIs and the who, what, when, how for each action / solution

Agenda

Time	Activity
8:30 – 9:00	Arrival and continental breakfast
9:00 – 9:15	Welcome and objectives
9:15 – 9:45	Framing presentation
9:45 – 10:45	Roundtable 1: Barriers to increasing housing supply through OSC
10:45 – 11:00	Nutrition break
11:00 – 12:00	Roundtable 2: Opportunities to increase housing supply through OSC
12:00 – 12:45	Lunch
12:45 – 13:45	Lightning talks with industry experts
13:45 – 14:00	Nutrition break
14:00 – 15:30	Roundtable 3: Pathways forward, insight and synthesis
15:30 – 16:00	Wrap-up and next steps

What and Why Off-site Construction?

Off-site Construction

Fundamental idea

- Instead of bringing all your tools and materials to the jobsite, bring the materials to you where you have your tools set up.
- Complete prep work where all your tools are set up.
- Bring only the tooled components and end products the jobsite.

What is Off-site Construction (OSC)?

National Institute of Building Sciences (NIBS): *Off-site construction is the process of designing, planning, fabricating, and assembling building components away from the construction site.*

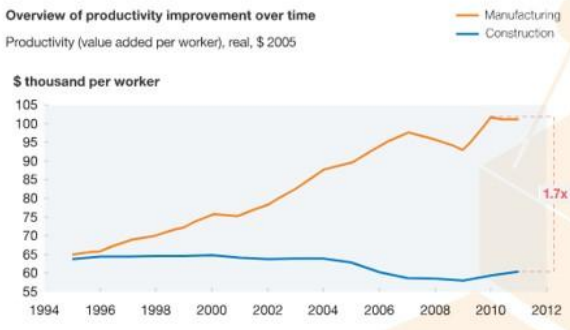
Wikipedia: *Offsite construction refers to the planning, design, manufacture and assembly of building elements at a location other than their final installed location to support the rapid speed of, and efficient construction of a permanent structure.*

ChatGPT: *Off-site construction refers to the planning, design, fabrication, and assembly of building components away from the final building site. These components are then transported and installed on-site. This approach contrasts with traditional on-site construction, where most work is performed at the building location. Off-site construction can take various forms, including modular construction, panelized construction, volumetric construction, precast concrete construction, prefabricated MEP, etc.*

Why OSC?

McKinsey & Company

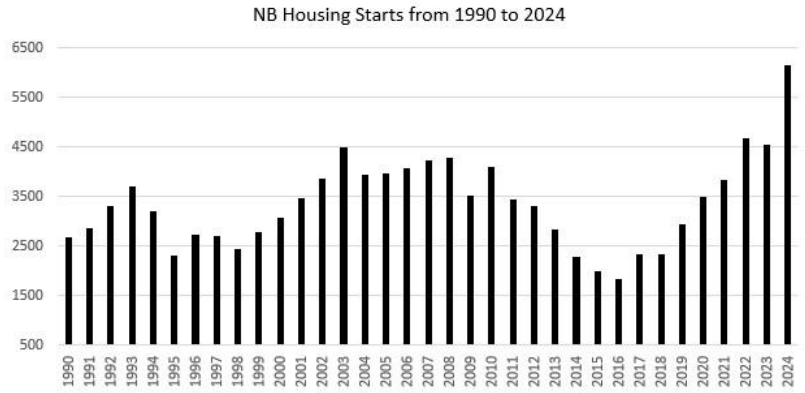
Productivity in manufacturing has nearly doubled, whereas in construction it has remained flat.



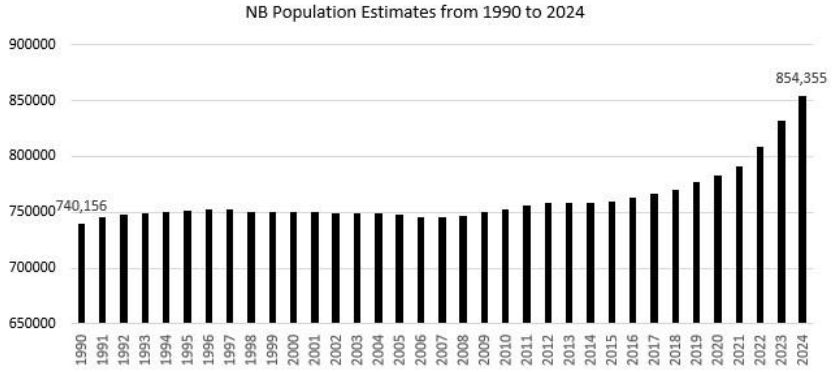
Source: Expert interviews; IHS Global Insight (Belgium, France, Germany, Italy, Spain, United Kingdom, United States); World Input-Output Database

McKinsey&Company

Housing Starts in New Brunswick – Statistics Canada



Population Trends in New Brunswick – Statistics Canada



Why OSC in the Atlantic region?

- Housing Shortages
- Population Growth
- Skilled Labour Shortages
- Regulatory and Permitting
- Increasing Construction Costs
- Geographic and Climate Challenges
- Strong Manufacturing Ability
- Aging and Vulnerable Population

Barriers and limitations to OSC

Design

- Design and construction culture
- Projects not designed for off-site
- Late design changes

Logistics

- Distance from factory to site
- Transportation issues (permitting, routes, etc.)
- Site operations

Supply chain and procurement

- Financing and insurance
- Lack of understanding of the supply chain
- Current procurement models

Examples of OSC

NL: ALT Hotel, St. John's

- Developer : Groupe Germain Hotels (ALT Hotels) with Marco Group
- Key Features:
  - 5-storey, 148-room hotel built using modular construction.
  - 92 pre-finished modules built off-site and craned into place.
  - Includes two levels of underground parking integrated into the structure.

Source: https://marcogroup.ca/projects/alt-hotel/

Examples of OSC

NB: Boars Head Road & Woodward Avenue, Saint John

- Owner : New Brunswick Housing Corporation
- Project Team: Kent Homes
- Key Features:
  - Two new 10-unit modular buildings built for single adults (non-elderly) including accessible units.
  - Use of surplus provincial land.
  - Modular buildings are nearing completion / ready to open within months.

Source: https://d2940.cms.socastsrm.com/2025/08/28/2-affordable-housing-sites-opening-soon-in-saint-john/

Examples of OSC

PEI: 203 Fitzroy Street, Charlottetown

- Owner: CMHA PEI
- Project Team: 720 Modular, Kent Homes, Nine Yards Studio, Leading Edge Group
- Key Features:
  - 28-unit, 4-storey modular apartment (affordable housing)
  - Modules built off-site by Kent Homes; rapid crane set April 2022
  - Reduced construction time and minimized disruption in downtown Charlottetown
  - Opened Nov 2022

Source: https://pei.cmha.ca/cmha-pei-division-203-fitzroy-project/

Examples of OSC

NS: Citadel Homes Affordable Housing, Digby

- Developer : Citadel Homes Ltd.
- Key Features:
  - Completed 8-unit modular affordable housing project.
  - Will house approximately 24 residents (seniors, families, individuals).
  - Quicker assembly and less time exposed to weather / site delays.

Source: https://www.citadelhomesns.ca/completed-homes/nova-scotia-affordable-housing-project

Benefits and advantages to OSC

- Increased productivity
- Less noise pollution
- Reduction in GHG emissions
- Cost and schedule certainty
- Shortened schedule
- Increased safety and quality

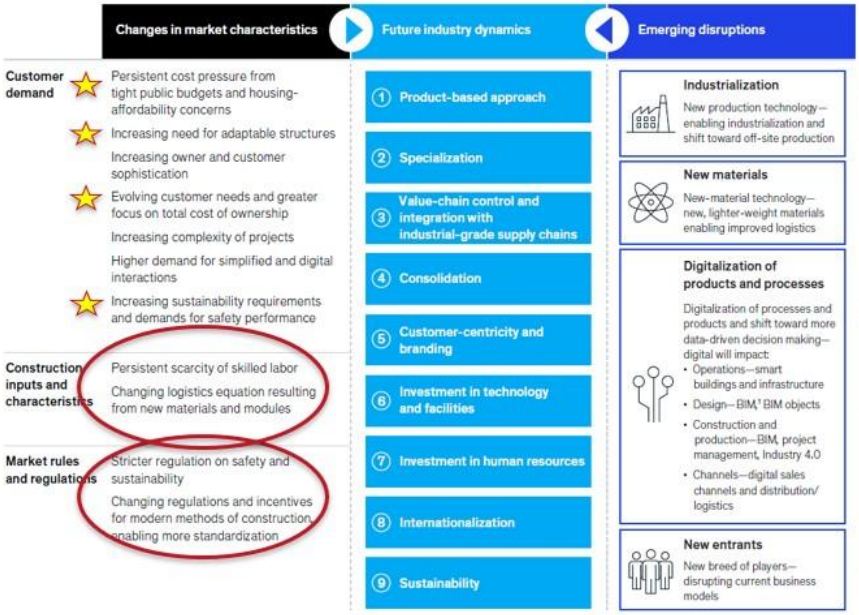
transform ways of working.

Changes in market characteristics		Future industry dynamics	Emerging disruptions
Customer demand	Persistent cost pressure from tight public budgets and housing-affordability concerns Increasing need for adaptable structures Increasing owner and customer sophistication Evolving customer needs and greater focus on total cost of ownership Increasing complexity of projects Higher demand for simplified and digital interactions Increasing sustainability requirements and demands for safety performance	1 Product-based approach 2 Specialization 3 Value-chain control and integration with industrial-grade supply chains 4 Consolidation 5 Customer-centricity and branding 6 Investment in technology and facilities 7 Investment in human resources 8 Internationalization 9 Sustainability	**Industrialization** ★ New production technology—enabling industrialization and shift toward off-site production **New materials** New-material technology—new, lighter-weight materials enabling improved logistics **Digitalization of products and processes** Digitalization of processes and products and shift toward more data-driven decision making—digital will impact: • Operations—smart buildings and infrastructure • Design—BIM,[1] BIM objects • Construction and production—BIM, project management, Industry 4.0 • Channels—digital sales channels and distribution/logistics **New entrants** ★ New breed of players—disrupting current business models
Construction inputs and characteristics	Persistent scarcity of skilled labor Changing logistics equation resulting from new materials and modules		
Market rules and regulations	Stricter regulation on safety and sustainability Changing regulations and incentives for modern methods of construction, enabling more standardization		

Off-site construction enablers

[1] Building-information modeling.

transform ways of working.



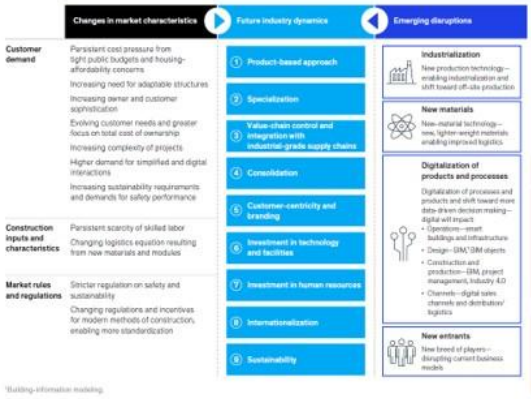
OFF-SI [1]Building-information modeling.

Current industry trends

McKinsey & Company – The new normal in construction

Exhibit A

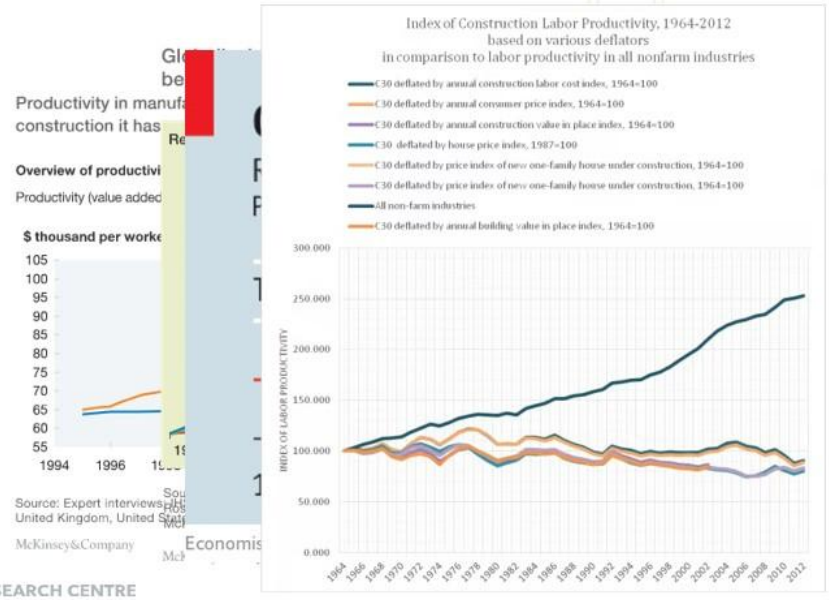
Changing characteristics and emerging disruptions will drive change in the industry and transform ways of working.



[1]Building-information modeling.

Why OSC?

Financial Times



Why OSC?

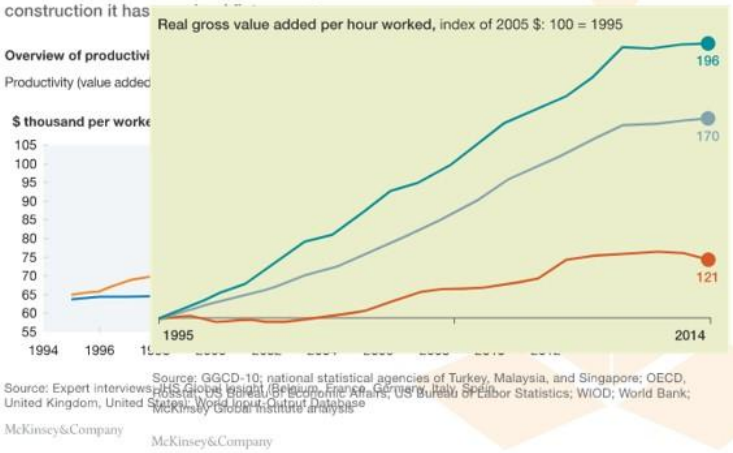
The Economist

Why OSC?

McKinsey & Company

Globally, labor-productivity growth in construction lags far behind that of manufacturing or the total economy.

Productivity in manufacturing has nearly doubled, whereas in construction it has



Source: Expert interviews; IHS Global Insight (Belgium, France, Germany, Italy, Spain, United Kingdom, United States); World Input-Output Database

McKinsey&Company

Source: GGCD-10; national statistical agencies of Turkey, Malaysia, and Singapore; OECD, Rosstat, US Bureau of Economic Affairs; US Bureau of Labor Statistics; WIOD; World Bank; McKinsey Global Institute analysis

McKinsey&Company

Construction Labour Data – BuildForce Canada 2025

Off –Site Construction (OSC)

Category 2

Panelized (2D) structural systems

Flat structural elements like walls, floors, and roofs are prefabricated in a factory. These panels are then brought to the construction site for assembly. The complexity can range from basic frames to fully insulated and finished panels.

- **2a. Structural framing panels** – open-frame wall, floor, stair, or roof panels fabricated off-site and completed with insulation, finishes, and services on-site
- **2b. Insulated panel systems** – panels pre-fitted with insulation and internal wall linings (e.g., drywall or sheathing) in the factory
- **2c. Fully integrated panels** – panels delivered with factory-installed insulation, interior finishes, exterior cladding, windows, and door openings
- **2d. Externally finished panels -** Panels delivered with factory-installed exterior cladding to achieve a weatherproof envelope; interior insulation, linings, and services are completed on-site.

Standard Building Systems

- **Timber (Wood Frame) Systems**

Lightweight wood framing
Mass timber (e.g., cross-laminated timber (CLT), glued laminated timber (glulam))

- **Steel Systems**

Light-gauge steel framing (LGS)
Hot-rolled steel frame

- **Concrete Systems**
- **Composite Systems**

Off –Site Construction (OSC)

Category 1

Volumetric (3D) Modular Construction

This method involves creating fully enclosed, box-like units in a factory setting. These modules are transported to the site and assembled to form buildings. The level of factory work can vary, from basic structure-only units to fully finished rooms with interior fittings and exterior finishes.

- **1a. Structural module only** – all interior and exterior work completed on-site
- **1b. Module with interior fit-out** – walls, floors, and basic MEP systems pre-installed
- **1c. Fully enclosed module** – includes interior fit-out, exterior cladding, and roofing
- **1d. Turnkey module with service pods** – includes integrated bathroom/kitchen pods, ready for final connections

Standard Building Systems

- **Timber (Wood Frame) Systems**

Lightweight wood framing
Mass timber (e.g., cross-laminated timber (CLT), glued laminated timber (glulam))

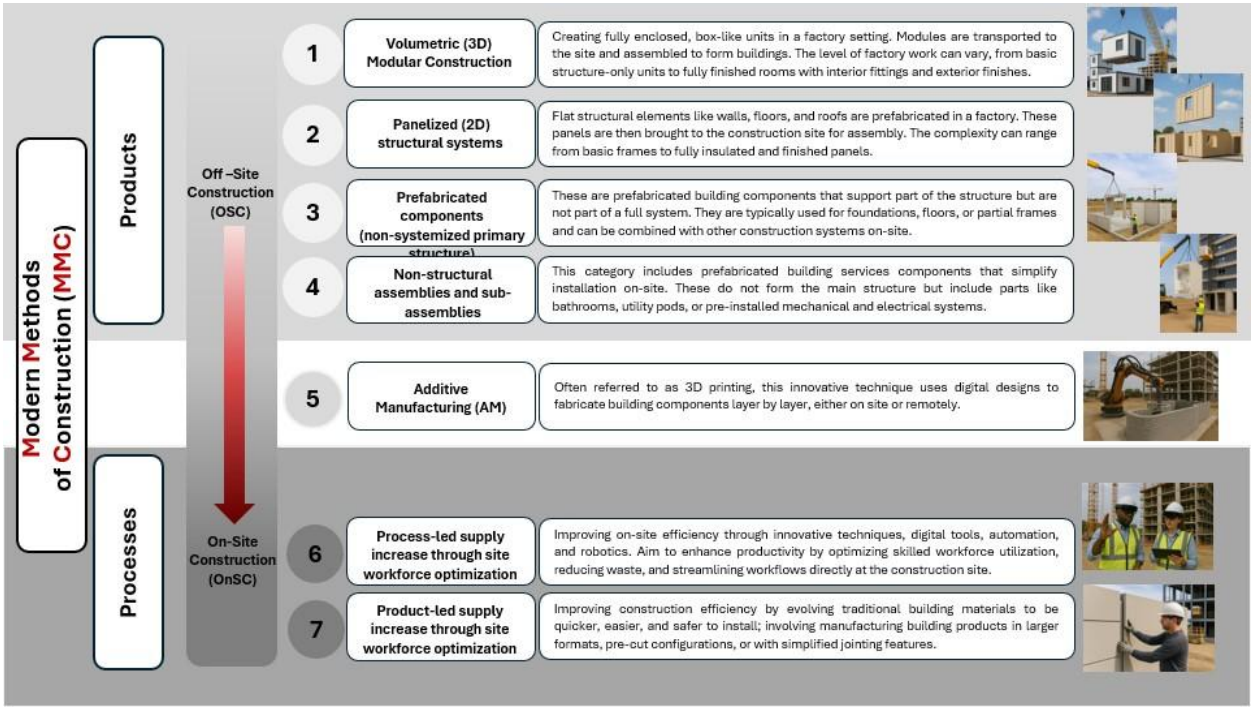
- **Steel Systems**

Light-gauge steel framing (LGS)
Hot-rolled steel frame

- **Concrete Systems**
- **Composite Systems**

***Note**: In addition to the listed systems, integrated or hybrid systems may also be utilized to meet specific project requirements.*


Modern Methods of Construction (MMC)
Products
Off –Site Construction (OSC)
Involves the production of building components in controlled factory environments, which are then transported and assembled at the construction site.
Rapid construction
Cost certainty
Increase supply
Reduced embodied carbon
Reduced construction waste
Processes
On-Site Construction (OnSC)
Involves assembling and constructing building components directly at the final location using a combination of skilled workforce, equipment, and on-location technologies.
Design flexibility
Skilled workforce
Weather dependency
Longer timelines
Higher risks


Modern Methods of Construction (MMC)
Products
Off –Site Construction (OSC)
1
Volumetric (3D) Modular Construction
Creating fully enclosed, box-like units in a factory setting. Modules are transported to the site and assembled to form buildings. The level of factory work can vary, from basic structure-only units to fully finished rooms with interior fittings and exterior finishes.
2
Panelized (2D) structural systems
Flat structural elements like walls, floors, and roofs are prefabricated in a factory. These panels are then brought to the construction site for assembly. The complexity can range from basic frames to fully insulated and finished panels.
3
Prefabricated components (non-systemized primary structure)
These are prefabricated building components that support part of the structure but are not part of a full system. They are typically used for foundations, floors, or partial frames and can be combined with other construction systems on-site.
4
Non-structural assemblies and sub-assemblies
This category includes prefabricated building services components that simplify installation on-site. These do not form the main structure but include parts like bathrooms, utility pods, or pre-installed mechanical and electrical systems.
5
Additive Manufacturing (AM)
Often referred to as 3D printing, this innovative technique uses digital designs to fabricate building components layer by layer, either on site or remotely.
Processes
On-Site Construction (OnSC)
6
Process-led supply increase through site workforce optimization
Improving on-site efficiency through innovative techniques, digital tools, automation, and robotics. Aim to enhance productivity by optimizing skilled workforce utilization, reducing waste, and streamlining workflows directly at the construction site.
7
Product-led supply increase through site workforce optimization
Improving construction efficiency by evolving traditional building materials to be quicker, easier, and safer to install; involving manufacturing building products in larger formats, pre-cut configurations, or with simplified jointing features.

Who will benefit from the Canadian MMC definition framework?

All stakeholders playing a role in the construction sector will benefit from this framework.

- **Construction industry –**
  - General contractors, construction managers and trade contractors have more clarity and reduced risk allowing for workforce planning, supply chain coordinator and project delivery models.
  - Developers and real estate firms gain confidence to invest in MMC projects as the framework helps assess cost, speed and quality of the various products and building typologies.
  - Manufacturers and suppliers benefit from standardized definitions supporting policy, procurement contracts and regulatory acceptance
  - Architects, engineers and consultants benefit from a better understand of MMC products and design for manufacture and assembly (DfMA) and improve clarity on RFPs
- **Government and regulatory bodies –** enables policymaking, funding allocation, program design, regulatory harmonization across all levels of government and provides inspectors and code authorities with clear definitions.
- **Financial institutions and insurers –** helps create a more standardized risk profile and enables creation of certain financial products.
- **Industry association and trade bodies** – clarity in advocacy work with clear definitions.
- **Labour and workforce organizations** – helps unions prepare for evolving work environments and encourages safe and equitable workforce transition.
- **Universities, trade schools and training institutions** – support effective curriculum development and understanding the industry's needs for skills and competency requirements.

Why do we need a Modern Methods of Construction (MMC) framework?

Canada needs a MMC framework to increase productivity and scale innovation in the construction sector. This common definition framework will help address urgent needs to build housing, healthcare, education and all forms of buildings and infrastructure in the country. This MMC framework is essential to:

- **Accelerate housing, healthcare, education and infrastructure delivery.**
- **Standardize across jurisdictions and reduce confusion**
- **Enable better data collection and benchmarking of the current capacity and capability of the sector**
- **Guide public policy and incentive programs**
- **Incentivize investment in innovation through business case development and allowing for long-term planning**
- **Support workforce and skills development for both professional services and trade programs.**
- **Position Canada as an international leader to support trade and export opportunities and enable global knowledge exchange**

What is Modern Methods of Construction (MMC) in the Canadian context?

A range of approaches aiming to significantly increase productivity in the Canadian construction industry through the integration of **mechanization**, **automation**, and **advanced manufacturing technologies**.

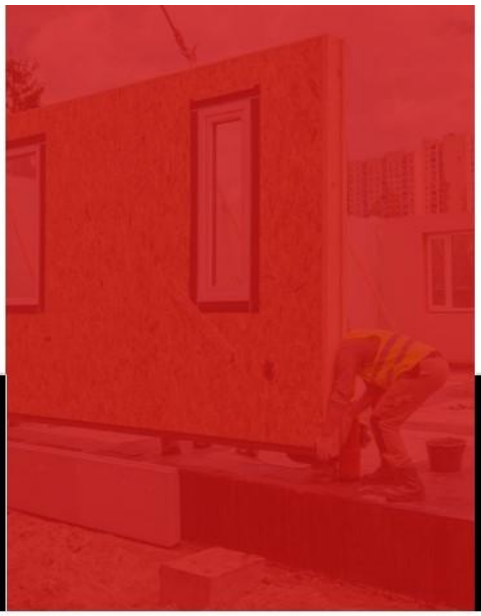
What is the Canadian MMC definition framework?

The Canadian MMC definition framework is an adaptation of the modern methods of construction (MMC) framework developed in the United Kingdom. It is presented as a seven-category system designed to provide a comprehensive and future-ready understanding of "Modern Methods of Construction" in building construction, using clear and standardized terminology.

This framework covers all forms of off-site construction (OSC) (including volumetric modular, panelized, prefabricated products), on-site process and product-led innovations, and additive manufacturing (AM) elements which can be produced either off-site or directly on-site depending on project needs.

This document was developed by the Off-site Construction Research Centre (OCRC) at the University of New Brunswick (UNB) to enhance stakeholder education and awareness and provide clarity on the different forms of off-site and on-site construction methods that improve productivity in the sector. It is meant to help remove regulatory, financial, procurement and other barriers that impede the use of innovative construction solutions that increase supply to deliver critical infrastructure for Canada.

UNB | Off-site Construction Research Centre



MMC Definition Summary

Modern Methods of Construction (MMC) is a range of approaches that improves productivity, quality, and efficiency in the construction industry by integrating automation, mechanization, and advanced manufacturing techniques. MMC includes Off-site Construction (OSC), which involves the factory production of components such as 3D volumetric modules, 2D structural panels, prefabricated components, non-structural assemblies— all transported and assembled on-site. It also includes On-site Construction (OnSC) innovations, which focus on product-led supply increase through site workforce optimization (using pre-cut, large-format, or simplified jointing materials) and process-led strategies (applying digital tools, robotics, automation, and lean workflows to enhance site efficiency). In addition, Additive Manufacturing (AM) elements, which can be produced either off-site or directly on-site depending on project needs.

CANADIAN

MODERN METHODS OF CONSTRUCTION (MMC)

Canadian Modern Methods of Construction Framework (version 1.0)

BCH Immediate Actions

- **Six federal sites and 4,000 factory-built homes**
  - Dartmouth, Longueuil, Ottawa, Toronto, Winnipeg, Edmonton
- **New fund partnerships**
  - $1.5B Canada Rental Protection Fund
  - $1B transitional & supportive housing
  - Nunavut partnership: ~700 homes (30% OSC)
- **Goals**
  - Double housing construction in Canada
  - Accelerate delivery → 365 days/year construction
  - Lower housing costs, expand affordability, reduce homelessness

Build Canada Homes update (as of Sep. 14)

- Build Canada Homes (BCH) under Housing, Infrastructure & Communities Canada (HICC), led by Ana Bailão with initial funding of $13 billion
- **Mandate:**
  - Build deeply affordable and community housing
  - Support transitional/supportive housing
  - Deliver affordable middle-class options through partnerships.
- **Approach:**
  - Use public lands (88 federal sites)
  - Streamlined approvals for large-scale builds
  - Factory-built, prefabricated, modular, mass timber and other modern methods of construction
  - Prioritize Canadian-made lumber, steel, aluminum, etc.

Construction Labour Data – BuildForce Canada 2025

- 28% of NB's construction workforce is 55+ and nearing retirement.
- By 2034, 20% of the 2024 construction labour force in NB is expected to retire.
- New local hires (~ 6,700) will help but may lack skills/experience.
- Potential for skilled labour shortages in the province.
- Potential labour shortfall: ~ 1,700 workers if no additional recruitment is made.
- OSC can help address some labour shortages by reducing the need for on-site workers.

Off –Site Construction (OSC)

Category 3

Prefabricated components (non-systemized primary structure)

These are prefabricated building components that support part of the structure but are not part of a full system. They are typically used for foundations, floors, or partial frames and can be combined with other construction systems on-site.

3a.Driven or screw piles;
3b. Pre-fabricated pile caps or ring beams
3c. Columns, walls and/or beams;
3d. Floors;
3e. Integrated columns and walls and beams;
3f. Staircases;
3g. Roofs

Moncton Policy Review

Major Criteria	Potential Barriers to OSC
Design & Aesthetics	Downtown/Mixed Used/Urban Residential Zones: 50% ground-floor windows; façades >18 m need recesses
Materials	90% traditional façade materials (brick, wood, stucco); vinyl/plastic restricted
Height & Density	Garden suites max 6 m; 2 - 4 storey caps depending on zones
Transport & Access	Oversize load permits; spring thaw (Mar–May) bans delivery; tree clearance rules
Lot Size & Layout	Compact unit = min 350 m² lot; four-unit dwelling = 490–600 m²
Inspections	Multiple inspections for pre-backfill, framing, drywall, occupancy.
Financial Flow / Payouts	Subdivision servicing fees upfront; grants released only after completion & inspection

Moncton Policy Review

- Reviewed 12 documents (by-laws, municipal policies, provincial acts)
- Applied 15-criterion framework
- Focus: Barriers for Off-Site Construction (OSC)

Overall observation

- Moncton's regulatory environment includes strict design, material, inspections and zoning controls.
- Several requirements could complicate OSC delivery, especially in heritage areas and for modular transport.
- OSC projects in Moncton must be carefully planned to align with aesthetic/material standards, transportation rules, and zoning/lot size limits.

Policy Review

To evaluate the current regulatory environment for volumetric modular housing across federal, provincial and municipal levels, identifying enablers, barriers, contradictions and gaps

Scope:

- Municipal, provincial and federal policy review
- Municipalities: St. John's, Moncton, Charlottetown and Halifax.
- Provinces : Newfoundland and Labrador, New Brunswick, PEI and Nova Scotia
  - **Municipal by-laws**: Building by-laws, Land-use, Zoning, Heritage, Municipal plans
  - **Provincial policies**: Highways acts, Building codes, Planning Acts, Fire Prevention
  - **Federal:** National Building Code, National Fire Code, housing strategies/initiatives, immigration policies

Pre-workshop interviews and review

- **Interviewed 20+ industry stakeholders across Atlantic Canada**
- Surveyed for feedback on barriers to housing in the region with a focus on OSC
  - Policy and Regulatory Barriers
  - Procurement and Contract Barriers
  - Financial and Insurance Barriers
  - Workforce, Labour, and Skills Development
  - Transportation and Logistics
- Completed a policy and by-law review for four largest municipalities
  - Moncton, NB
  - Halifax, NS
  - Charlottetown, PEI
  - St. John's, NL

What we heard?

On-site Construction (OnSC)

Category 7

Product-led supply increase through site workforce optimization

Improving construction efficiency by developing building materials to be quicker, easier, and safer to install; involving manufacturing building products in larger formats, pre-cut configurations, or with simplified jointing features.

7a. Large-format products
Products manufactured in larger sizes to reduce the number of elements to be handled and installed on-site.
Example: Large-format masonry blocks, jumbo plasterboards, large pre-cut cladding panels.

7b. Pre-cut or pre-sized products
Products manufactured or pre-processed to specific sizes or shapes before delivery.
Example: Pre-cut timber framing kits, pre-cut steel rebar packages.

7c. Simplified jointing or connection systems
Products designed with simplified or integrated connectors to speed up on-site assembly.
Example: Click-in façade systems, self-aligning floor tiles, modular jointing clips.

On-site Construction (OnSC)

Category 6

Process-led supply increase through site workforce optimization

Improving on-site efficiency through innovative techniques, digital tools, automation, and robotics. Aim to enhance productivity by optimizing skilled workforce utilization, reducing waste, and streamlining workflows directly at the construction site.

6a. On-site mechanization and automation
Robotic and mechanized systems to reduce manual site work.

6b. Digital and data-driven tools
Advanced digital technologies for monitoring, layout, and site optimization.

6c. Advanced prefabrication aids
Supporting prefabricated elements and temporary systems to minimize conventional site work.

6d. Lean management practices
process-focused methods to improve productivity and reduce waste.

Off –Site Construction (OSC) | On-Site Construction (OnSC)

Category 5

Additive Manufacturing

Often referred to as 3D printing, this innovative technique uses digital designs to fabricate building components layer by layer, either on site or remotely.

Creation of geometrically complex structures that would be difficult or impossible to achieve with traditional methods, while also improving productivity and workplace safety

- **Design flexibility**
- **Reduced material waste**
- **Construction processes automation**

Off –Site Construction (OSC)

Category 4

Non-structural assemblies and sub-assemblies

This category includes prefabricated building services components that simplify installation on-site. These do not form the main structure but include parts like bathrooms, utility pods, or pre-installed mechanical and electrical systems.

3D	**4a**. Bathroom pods; **4b**. Kitchen pods; **4c**. Bathroom and kitchen pods combined; **4d**. Mechanical and electrical (M&E) pods **4e**. Façade assemblies;
2D	**4f**. Roof assemblies
M&E assemblies	**4g**. In-unit assemblies; **4h**. Vertical risers; **4i**. Central plant; **4j**. Floor cassettes; **4k**. Wall cassettes; **4h**. Pre-hung door sets

Wrap-Up and Next Steps

Compile workshop findings for each workshop:

Nova Scotia, PEI, New Brunswick, Newfoundland and Labrador, and virtual

Develop a strategy with actions and KPIs in the short, mid and long-term

1) For the region

2) Specifics / changes by province

Circulate with steering advisory committee for input and validation

Finalize and present the Atlantic Off-site Housing Innovation strategy

Session 3: Insights and Synthesizing

Group discussion

Share solutions and ideas identified in session 3

Presentation solution execution worksheets

- Each table present in order of themes

45 mins

Session 3: Pathways Forward – Solution Execution

Table discussion

Working in a group complete the worksheets for the most prominent barriers and solutions identified this morning

Worksheets for each theme separated by table

- Select the theme / table to work on
- As a group, complete the Solution Development Forms

45 mins

SESSION 3

Pathways Forward – Solution Development Worksheets, insight and synthesis

NUTRITION BREAK

15 minutes

Panel Discussion

Steven Léger
Director of Business Development, Supreme Homes

Shallyn Murray
Co-Owner, Nine Yards Architecture

Craig Mitchell,
Partner, Project Development, 720 Modular

Panel Discussion with Industry Experts

60 minutes

LUNCH BREAK

45 minutes

Session 2: Opportunities to Increase Housing Supply in the Region (solutions)

Full Group Discussions

Group Instructions

- Discuss and highlight the opportunities or solutions to overcome identified barriers
- Share insights by table and discuss how to best overcome the barriers
- Rank all the barriers by group

Think about

- Who are the primary stakeholders to execute the solutions?
- What resources needed to execute the solutions?

30 mins

Session 2: Opportunities to Increase Housing Supply in the Region (solutions)

Table-based discussion

What are the opportunities for OSC to increase housing supply?

Discuss & Organize Ideas

- Identify solutions for the barriers
- Group the solutions into the barrier themes:
  - *Policy and Regulatory*
  - *Procurement and Contracts*
  - *Finance and Insurance*
  - *Workforce, Labour and Skills Development*
  - *Transportation and Logistics*

20 mins

Individual Idea Generation

What are the opportunities for OSC to increase housing supply?

Brainstorm & Share!

- Jot down your solutions to the barriers on post-it notes at your table.

15 mins

Objectives:

- Identify opportunities for OSC in the province/ region
- Brainstorm solutions that address the barriers

Structure:

- Full-group discussion
- Breakout groups (based on stakeholder type / "specialty" area)
- Group summary

Roundtable 2

Opportunities to Increase Housing Supply in the Region (solutions)

NUTRITION BREAK

15 minutes

Session 1: Barriers to increasing housing supply through OSC
Full Group Discussion

Share Insights

- Discuss and highlight the key barriers and some experiences from your table.
- When ready, take it in turns to read out your ideas, one at a time
- The facilitator will capture these barriers

20 mins

Session 1: Barriers to increasing housing supply through OSC
Table-based discussion

Discuss at your table & organize ideas

- Share and review the ideas written on post-it notes.
- Group and prioritize the barriers.
- Add new insights based on group discussions.

Guiding Questions

- Are there certain policies or by-laws that have slowed down your projects?
- Any barriers due to the type of project delivery (procurement or contracts) or issues with finance and insurance?
- Any issues with finding members of the skilled workforce or lack of skills to execute OSC projects?

20 mins

Session 1: Barriers to increasing housing supply through OSC
Individual Idea Generation

Do you agree with the barriers? What are the largest barriers to increasing housing supply using off-site construction technology?

Brainstorm as a group

- Do you agree with these barriers? Have we missed any barriers (write them down)

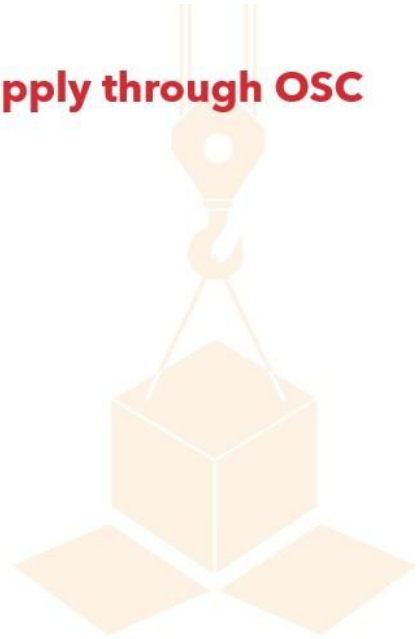
Guiding Questions

- Are there certain policies or by-laws that have slowed down your projects?
- Any barriers due to the type of project delivery (procurement or contracts) or issues with finance and insurance?
- Any issues with finding members of the skilled workforce or lack of skills to execute OSC projects?

20 mins

Barriers to increasing housing supply through OSC

- List of barriers on each table
  - Policy and Regulatory Barriers
  - Procurement and Contract Barriers
  - Financial and Insurance Barriers
  - Workforce, Labour, and Skills Development
  - Transportation and Logistics



Roundtable 1

Barriers to increasing housing supply through OSC

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EST. 1785
UNIVERSITY OF NEW BRUNSWICK

Appendix I: Implementation Dashboards

FI1

Financing and insurance

Location(s) Identified:
NS, NB

Barrier(s):
- Bonding challenges for small manufacturers (NS, NB).
- Small manufacturers face bonding challenges that limit their ability to participate in projects.

Contributors:
Manufacturers, Finance & Insurance/Business Services

Initiative:
Introduce MMC manufacturer pre-qualification based on CSA A277 certification.

Metrics:
- Number of modular tenders allowing pre-qualified suppliers without full bonding
- Increase in bid participation
- Reduced project cancellations due to lack of bonded bidders

Expected Timeline*:
Year 3

Scope:
Provincial

Ease of implementation:
Medium

Impact (out of 10)
8

Prerequisite Initiatives:
- Define modular-specific qualification criteria
- Review manufacturer QA, capacity, and safety documentation

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

FI2

Financing and insurance

Location(s) Identified:
Atlantic

Barrier(s):
- CMHC policies do not align with OSC timelines, delivery methods, or cost structure (Atlantic).
- Restrictions on funding non-residential space in new buildings (Atlantic).
- Lack of clarity on how to access CMHC programs and funding streams (Atlantic).
- CMHC data for rural areas is outdated/incorrect (Atlantic).

Contributors:
Developers & General Contractors, Technical Professionals, Finance & Insurance/Business Services

Initiative:
Collaborate with CMHC to establish a CMHC–regional coordination group.

Metrics:
- Reduced CMHC approval time for modular files
- Increase in successful modular applications

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Collect standard modular factory timelines from local manufacturers
- Compare with CMHC approval timelines
- Identify specific misalignment points
- Draft modular timeline recommendations

Owners:
- Provincial Government, Federal Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

FI3

Financing and insurance

Location(s) Identified:
Atlantic, NS

Barrier(s):

- Banks and lenders do not fully understand or accept modular/off-site construction because of high perceived risks in OSC (Atlantic).
- Limited financing options for small-scale ownership (e.g., single units, duplexes) force many buyers to rely on high-interest lenders (Atlantic).
- Financing rules, mortgage products, and banking policies are outdated for OSC (Atlantic).
- Lack of competition among funding providers (NS).

Contributors:
Federal Government, Finance & Insurance/Business Services

Initiative:

Create and share lending briefs with private and institutional investors to expand financing options.

Metrics:

- Number of lenders adopting the brief
- Reduction in financing rejections for modular
- Increase in modular mortgage approvals
- Reduced reliance on one or two banks
- Increase in competitive interest rates for modular

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:

- Gather modular timeline + risk data from manufacturers

Owners:

- Provincial Government, Finance & Insurance/Business Services

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

FI4

Financing and insurance

Location(s) Identified:
PEI

Barrier(s):
- Multi-unit residential building (MURB) volumetric modular construction are significantly more expensive (PEI).

Contributors:
Manufacturers, Developers & General Contractors, Transportation & Logistics Providers, Finance & Insurance/Business Services

Initiative:
Use MURB projects as case studies to identify cost reductions for MURBs that use MMC.

Metrics:
- Reduction in module transport cost
- Number of projects participating in shared logistics
- Increased adoption of modular for multi-unit builds

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Map annual modular demand (public + private) in PEI
- Identify suppliers shipping to PEI and shipment patterns
- Pre-negotiate ferry/logistics windows
- Pre-qualify crane + install contractors willing to participate
- Develop cost-sharing model among participating projects

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

FI5

Financing and insurance

Location(s) Identified:
Atlantic

Barrier(s):
- High upfront costs and misaligned payment milestones create cash-flow challenges.(Atlantic).

Contributors:
Manufacturers, Developers & General Contractors, Technical Professionals

Initiative:
Add MMC-friendly (particularly for categories 1 to 4) payment structures and liquidity supports.

Metrics:
- Number of RFPs using performance-based criteria
- Reduction in redesign hours
- Fewer modular bids rejected due to prescriptive design conflicts
- Increase in modular participation in tenders

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Update design scopes to remove prescriptive structural and layout requirements
- Provide architects a set of modular design parameters (module sizes, grid, spans)
- Include modular considerations during concept/schematic design stages

Owners:
- Provincial Government, Technical Professionals

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

FI6

Financing and insurance

Location(s) Identified:
Atlantic

Barrier(s):
- There are no tax incentives, subsidies, or financial supports tailored to OSC (Atlantic).
- Government fees add additional affordability challenges (Atlantic).

Contributors:
Manufacturers, Federal Government, Developers & General Contractors, Indigenous & Community Organizations

Initiative:
Establish a pre-manufactured index with fee reductions and expedited approvals.

Metrics:
- Number of modular units delivered under the credit
- Reduction in per-unit cost for provincial housing builds
- Increase in manufacturer production volume

Expected Timeline*:
Year 4

Scope:
Provincial, regional

Ease of implementation:
Medium

Impact (out of 10)
8

Prerequisite Initiatives:
- Determine per-unit credit value (e.g., $2,000–$5,000/unit)
- Set eligibility (affordable housing, supportive housing, repeatable modular designs)
- Secure small annual budget allocation
- Develop simple claim process at delivery or installation

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

FI7

Financing and insurance

Location(s) Identified:
Atlantic

Barrier(s):

- There are coverage gaps, overlapping insurance requirements, and unclear responsibility transfers between the factory, transporter, and on-site contractor (Atlantic).
- Higher insurance premiums for mass timber or wood-based modular systems (Atlantic). Insurance premiums are higher for mass timber or wood-based modular systems.
- Insurance regulations are not tailored to offsite fabrication risks (Atlantic).

Contributors:
Manufacturers, Federal Government, Developers & General Contractors, Transportation & Logistics Providers, Finance & Insurance/Business Services

Initiative:

Work with insurers to develop a unified OSC insurance products aligned with MMC (categories 1 to 4) with clear liability transfer.

Metrics:

- Number of modular projects using wrap-up all-risk coverage
- Reduction in duplicated premiums
- Fewer liability disputes
- Warranty acceptance rate for modular modules
- Lower overall insurance cost per unit

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:

- Manufacturers + developers jointly approach insurance brokers
- Brokers prepare integrated wrap-up policy options
- Legal teams insert handover protocol clauses into modular contracts

Owners:

- Manufacturers, Developers & General Contractors, Finance & Insurance/Business Services

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM1

Procurement models and contracts

Location(s) Identified:
Atlantic

Barrier(s):
- Lowest bid procurement often fails to capture the full value and impact of time savings, environmental factors, etc.

Contributors:
Provincial Government, Academic and Training Institutions, Industry Association

Initiative:
Collaborate across the four provinces to identify a method to score proponents beyond lowest bid that captures benefits of time savings (speed), environmental, social and cultural KPIs.

Metrics:
- KPIs identified

Expected Timeline*:
Year 1

Prerequisite Initiatives:
-

Scope:
Provincial, regional

Owners:
- Provincial Government

Ease of implementation:
Medium

Impact (out of 10)
8

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM2

Procurement models and contracts

Location(s) Identified:
Atlantic

Barrier(s):
- Only few CSA-certified modular manufacturers, limiting competition, raising costs, and preventing suppliers from scaling confidently (Atlantic). Limited number of CSA-certified modular manufacturers restricts competition, increases costs, and limits supplier confidence to scale.

Contributors:
Manufacturers, Developers & General Contractors, Finance & Insurance/Business Services

Initiative:
Create a funding stream (through Opportunities NB, Invest NS, Innovation PEI and NL's department of IET) for manufacturers to access and become CSA certified.

Metrics:
- Increase in number of pre-qualified modular suppliers
- Reduction in average bid prices
- Number of projects receiving more than 1–2 bids

Expected Timeline*:
Year 3

Scope:
Regional

Ease of implementation:
Easy

Impact (out of 10)
9

Prerequisite Initiatives:
- Compile list of CSA A277/A660-certified manufacturers in ON/QC
- Create modular-specific pre-qualification criteria
- Issue pre-qualification call

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM3

Procurement models and contracts

Location(s) Identified:
Atlantic

Barrier(s):

- Low-bid procurement models do not quantify the benefits of some forms of OSC (cost certainty, shortened schedule, reduction in environmental impact, safer for the skilled workforce) which makes OSC solutions less competitive than stick-built construction (Atlantic).
- Lack of value-based procurement approaches (Atlantic).

Contributors:
Manufacturers, Developers & General Contractors, Municipal Government

Initiative:

Use RFIs and/or RFQs to gain information about manufacturers in the region, pre-qualify proponents (there may be an opportunity to leverage the Build Canada Homes data collected through their MMC RFI). (PM3)

Metrics:

- Number of RFPs using separated cost line items
- Increase in modular bids submitted
- Reduction in modular bid disqualification due to upfront costs

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Easy

Impact (out of 10)
9

Prerequisite Initiatives:

- Update procurement templates to require separated cost line items
- Provide short internal guidance to evaluators

Owners:

- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM4

Procurement models and contracts

Location(s) Identified:
Atlantic

Barrier(s):
- Unclear demand and supply conditions create a “chicken-or-egg” problem, limiting competition and complicating procurement planning (Atlantic).

Contributors:
Manufacturers, Developers & General Contractors, Municipal Government

Initiative:
Provinces and non-profit housing providers to publish a rolling 3–4-year forecast of OSC-suitable public housing projects across the region.

Metrics:
- Number of modular projects included in forecast
- Manufacturer participation in bids
- Increase in factory expansion/production planning

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Easy

Impact (out of 10)
9

Prerequisite Initiatives:
- Identify which upcoming public housing projects are modular-compatible
- Collect capital plans from municipalities + provinces

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM5

Procurement models and contracts

Location(s) Identified:
NS

Barrier(s):
- Projects may need to be approved as design-build to create more competition (NS).
- Procurement and approval processes often require projects to be structured as design-build to create more competition.

Contributors:
Manufacturers, Developers & General Contractors, Municipal Government

Initiative:
Use a procurement approach that allows for the manufacturer to be involved in a design assist role during the design phase (e.g., design-build CCDC-14).

Metrics:
- Increase in number of modular bidders
- Reduction in redesign hours or change orders

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Easy

Impact (out of 10)
7

Prerequisite Initiatives:
- Identify modular-suitable projects early
- Issue RFPs using design–build method

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM6

Procurement models and contracts

Location(s) Identified:
NS

Barrier(s):
- Limited land availability reduces the number of modular projects that can be procured(NS).

Contributors:
Manufacturers, Municipal Government, Technical Professionals

Initiative:
Work with federal and provincial governments to identify serviced or partially serviced small sites and combine them to tender larger projects to one development or design-build team.

Metrics:
- Number of parcels identified and pre-cleared
- Number of parcels included in modular tenders
- Increase in modular-suitable land availability

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Medium

Impact (out of 10)
7

Prerequisite Initiatives:
- Inventory small provincial & municipal parcels
- Basic servicing and access assessments
- Municipal confirmation of allowable uses

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM7

Procurement models and contracts

Location(s) Identified:
PEI

Barrier(s):
- Lack of defined roles and responsibilities leading to inaccurate pricing from sub-contractors (PEI)

Contributors:
Provincial Government, Manufacturers, Developers & General Contractors

Initiative:
Develop a standardized OSC cost library (e.g., RSMeans-aligned) with supply-chain education to improve cost certainty and procurement outcomes

Metrics:
- Number of manufacturers using the directory
- Reduction in estimate variability between suppliers
- Fewer lender RFIs about project costing

Expected Timeline*:
Year 4

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
8

Prerequisite Initiatives:
- Collect baseline cost data from Atlantic manufacturers (module production, transport, installation).
- Create standardized cost bands (Low/Medium/High) for modules, logistics, and site work.

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM8

Procurement models and contracts

Location(s) Identified:
Atlantic

Barrier(s):

- Designs are developed for traditional construction and only adapted to OSC methods later which causes redesign and inefficiencies (Atlantic).
- Designs are typically developed for traditional construction and only later adapted for OSC, resulting in redesign, delays, and inefficiencies.

Contributors:
Manufacturers, Developers & General Contractors, Technical Professionals

Initiative:

Require an OSC or MMC integrator role as part of the project team using the definition identified by NRCan. The integrator may bee a consultant, contractor or manufacturer.

Metrics:

- Fewer redesign hours
- Reduction in change orders
- Number of projects identifying modular feasibility early

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:

- Early design teams receive modular design parameters (grid, module sizes, MEP zones)
- Consultation with manufacturers during concept design
- Include modular feasibility as a required step in RFP scopes

Owners:

- Provincial Government, Technical Professionals

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM9

Procurement models and contracts

Location(s) Identified:
NL, NS

Barrier(s):
- Modular builds from other regions may not be designed to meet local performance standards (e.g., hurricane-force winds) (NS, NL).

Contributors:
Manufacturers, Technical Professionals, Finance & Insurance/Business Services

Initiative:
Ensure CSA A277 certification and compliance with the building code of the final building location.

Metrics:
- Reduction in redesign requests post-award
- Number of proposals with compliant stamped engineering

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Easy

Impact (out of 10)
9

Prerequisite Initiatives:
- Add requirement for stamped structural verification in all modular RFPs
- Provide bidders with local wind/snow/climate indices
- Require early coordination with Atlantic-licensed engineers

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM10

Procurement models and contracts

Location(s) Identified:
NB

Barrier(s):
- Lack of flexible RFP formats - they are too structured and project specific (NB).
- RFP formats lack flexibility and are overly prescriptive and project-specific.

Contributors:
Manufacturers, Developers & General Contractors, Technical Professionals

Initiative:
Use a procurement approach that enables performance-based on projects where MMC will be used.

Metrics:
- Number of RFPs using performance-based requirements
- Increase in modular submissions
- Reduction in redesign/change-order costs

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:
- Identify which requirements can be performance-based instead of prescriptive
- Train evaluators on comparing modular proposals
- Update RFP templates to include flexible requirements

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM11

Procurement models and contracts

Location(s) Identified:
Atlantic

Barrier(s):
- Limited OSC manufacturing capacity and an under-developed supply chain create dependency on imports, transport bottlenecks, and long lead times (Atlantic).

Contributors:
Manufacturers, Developers & General Contractors, Municipal Government, Transportation & Logistics Providers, Finance & Insurance/Business Services

Initiative:
Issue bundled OSC procurement approaches (e.g., offtake agreements) to de-risk capacity investment in the regional manufacturers and add regional logistics supports.

Metrics:
- Number of sites included in bundled procurements
- Factory production allocated to Atlantic projects
- Reduction in transport delays

Expected Timeline*:
Year 3

Prerequisite Initiatives:
-

Scope:
Regional

Owners:
- Provincial Government

Ease of implementation:
Medium

Impact (out of 10)
9

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM12

Procurement models and contracts

Location(s) Identified:
Atlantic

Barrier(s):
- Inconsistent contracting practices for MMC projects (Atlantic).
- Contracting practices for MMC projects are inconsistent across jurisdictions and clients.

Contributors:
Provincial Government, Academic and Training Institutions, Industry Association

Initiative:
Collaborate with CCDC and across the region to create contract templates for MMC to ensure consistency across the region.

Metrics:
- Contract templates created or modifed

Expected Timeline*:
Year 4

Prerequisite Initiatives:
-

Scope:
National, regional, provincial

Owners:
- Provincial Government, Industry Associations

Ease of implementation:
Medium

Impact (out of 10)
8

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM13

Procurement models and contracts

Location(s) Identified:
Atlantic

Barrier(s):
- Procurement is oriented toward traditional construction reducing acceptance for OSC approaches (Atlantic).

Contributors:
Manufacturers, Developers & General Contractors, Municipal Government

Initiative:
Encourage tenders to consider MMC categories 1 to 4 alternatives.

Metrics:
- Number of tenders allowing modular alternatives
- Number of modular alternative submissions

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:
- Add optional modular submission line to tender documents
- Provide evaluators guidance on comparing modular vs traditional approaches

Owners:
- Provincial Government, Municipal Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM14

Procurement models and contracts

Location(s) Identified:
NB

Barrier(s):
- New entrants to construction are not familiar with RFP processes (NB).

Contributors:
Manufacturers, Developers & General Contractors

Initiative:
After PM3, create consistent RFP processes across the four provinces and provide annual FAQs and training sessions.

Metrics:
- Reduction in incomplete modular submissions
- Increase in number of modular bidders
- Fewer administrative RFIs

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Easy

Impact (out of 10)
7

Prerequisite Initiatives:
- Identify common missing/incorrect items in past submissions

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM15

Procurement models and contracts

Location(s) Identified:
NB, PEI

Barrier(s):
- Lack of schedule regulations and enforcements (NB, PEI).

Contributors:
Manufacturers, Developers & General Contractors, Transportation & Logistics Providers

Initiative:
Include clear schedule requirements in contracts and link payments to project signing, factory-based project progress, delivery and installation milestones.

Metrics:
- Number of tenders including schedule enforcement
- Reduction in installation or delivery delays

Expected Timeline*:
Year 1

Scope:
Provincial, regional

Ease of implementation:
Easy

Impact (out of 10)
9

Prerequisite Initiatives:
- Identify modular-specific scheduling needs
- Update contract templates to include enforceable schedule milestones

Owners:
- Provincial Government, Municipal Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM16

Procurement models and contracts

Location(s) Identified:
Atlantic

Barrier(s):

- Pre-fabrication work is often missing from trade agreements and scopes, making coordination harder (Atlantic).
- Prefabrication work is often excluded from trade agreements and scopes of work, making coordination more difficult.

Contributors:
Manufacturers, Developers & General Contractors, Technical Professionals

Initiative:

Define OSC-specific responsibilities in trade scopes and use a standardized site-readiness checklist.

Metrics:

- Fewer installation delays due to unclear responsibilities

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
8

Prerequisite Initiatives:

- Review typical modular scope boundaries (factory vs. on-site)
- Identify common interface failures on past projects
- Update procurement templates with modular-specific scope language

Owners:

- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PM17

Procurement models and contracts

Location(s) Identified:
NB

Barrier(s):
- Lack of site access or information for bidders to accurately estimate on-site works (NB).

Contributors:
Provincial Government, Manufacturers, Developers & General Contractors

Initiative:
Where possible, include detailed site information in RFPs (geotechnical, laydown areas, overhead constraints, site images).

Metrics:
- Number of manufacturers using the directory
- Reduction in estimate variability between suppliers
- Fewer lender RFIs about project costing

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
8

Prerequisite Initiatives:
- Collect baseline cost data from Atlantic manufacturers (module production, transport, installation).
- Create standardized cost bands (Low/Medium/High) for modules, logistics, and site work.

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PR1

Policy and regulatory

Location(s) Identified:
NB

Barrier(s):
- Lack of alignment in terminology from funders. Ambiguity in terminology leading to confusion (NB).

Contributors:
Provincial Government, Manufacturers, Federal Government, Developers & General Contractors, Municipal Government

Initiative:
Adopt the MMC Definition Framework across government department and leverage the definitions in policies, procurement documents, and contracts.

Metrics:
- Number of municipalities adopting the terminology
- Reduction in terminology-related rejections
- Consistency in NB Housing program applications

Expected Timeline*:
Year 1

Scope:
Local, provincial

Ease of implementation:
Easy

Impact (out of 10)
7

Prerequisite Initiatives:
- Drafting of a concise modular terminology list based on CSA standards.
- Internal review by NB Housing, DLGLR, and municipal planners to confirm usability.
- Development of a short implementation memo instructing municipalities to adopt the terminology.

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PR2

Policy and regulatory

Location(s) Identified:
NB

Barrier(s):
- Lack of emphasis of the impact of housing on population health (NB).

Contributors:
Provincial Government, Municipal Government

Initiative:
Develop an NB Healthy Housing Planning Note linking housing and year-round safe employment to population health.

Metrics:
- Number of planning decisions referencing the Note.

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Easy

Impact (out of 10)
6

Prerequisite Initiatives:
- Drafting of the Healthy Housing Planning Note by NB Public Health with input from planning staff.
- Review and approval by DLGLR for integration into municipal planning processes.
- Distribution and short briefing session for development officers and planning commissions.

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PR3

Policy and regulatory

Location(s) Identified:
Atlantic

Barrier(s):

- There is a gap between the promotion of OSC and the acceptance of it. Specifically, politicians have been promoting OSC however their departments do not prefer it. A gap was also noted in CMHC promoting OSC despite the funding mechanisms not being friendly to OSC (Atlantic).
- Misalignment between the promotion and institutional acceptance of OSC, including political support not reflected in departmental preferences and funding mechanisms that are not aligned with OSC delivery.

Contributors:
Manufacturers, Federal Government, Municipal Government

Initiative:

Support public and private sector education and create a regional MMC approval pathway supported by awareness programs.

Metrics:

- Number of projects approved
- Approval time
- Number of departments using pathway

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:

- Development of clear eligibility criteria for selecting modular demonstration projects.
- Creation of a standardized modular submission package for applicants.
- Preparation of a modular review checklist for inspectors and permitting staff.

Owners:

- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PR4

Policy and regulatory

Location(s) Identified:
Atlantic

Barrier(s):
- Complexity of codes: mention of challenges navigating national, provincial, and local codes (including NBC, NECB) (Atlantic).
- The regulatory environment is complex and fragmented, as national, provincial, and local codes are difficult to navigate.

Contributors:
Manufacturers, Technical Professionals

Initiative:
Work with NRC and the necessary codes, committees and commissions to establish a technical committee to update codes for MMC and educate planners and officials.

Metrics:
- Change in average permit review times for modular projects (before vs after guide)
- Number of municipalities that formally adopt or reference the AM-CNG in procedures
- Number of RFIs or code-related clarifications requested on modular submissions (aim: decrease)
- Number of building officials / plan reviewers trained using the guide

Expected Timeline*:
Year 4

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
8

Prerequisite Initiatives:
- Inventory of existing modular-related code interpretations and issues
- Inventory of existing modular-related code interpretations and issues
- Draft modular-specific code navigation guide for review
- Pilot the guide with a small set of municipalities / projects

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PR5

Policy and regulatory

Location(s) Identified:
Atlantic

Barrier(s):
- Lack of communication across government agencies (Atlantic).
- Limited communication and coordination across government agencies.

Contributors:
Manufacturers, Federal Government, Municipal Government

Initiative:
Establish the Atlantic Off-site Housing Innovation Network with a clear mandate including monthly (or quarterly inter-provincial meetings) with up to two points-of-contact reporting back to provincial committees.

Metrics:
- Number of coordination meetings held
- Number of cross-department issues resolved
- Feedback from departments on clarity of roles

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:
- Identify representatives from Housing, Planning, Code, and Procurement in each province.
- Agree on basic Terms of Reference (purpose: modular-related coordination only).
- Create a shared information template for departments to submit updates/issues.
- Schedule quarterly virtual meetings (Atlantic-wide).

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PR6

Policy and regulatory

Location(s) Identified:
NL

Barrier(s):
- Outdated policies needing to be updated (NL).
- Certain existing policies are outdated and require updating.

Contributors:
Provincial Government, Municipal Government, Technical Professionals

Initiative:
Designate a MMC Liaison Officer in NL. This individual should ideally have expertise in conventional, panelized (category 2) and volumetric modular (category 1) construction.

Metrics:
- Number of modular projects supported by the liaison
- Reduction in RFI volume related to outdated policies
- Faster issue resolution times (before vs after designation)
- Reduction in approval delays

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Easy

Impact (out of 10)
7

Prerequisite Initiatives:
- Assign an existing staff member in Service NL as Modular Liaison Officer (no new hiring needed).
- Establish mandate: resolve outdated-policy conflicts, coordinate with NL Housing, guide modular projects.
- Set up an intake channel like email or form for modular-related questions.
- Hold initial coordination meetings with NL Housing and priority municipalities.
- Start tracking outdated policies to inform future modernization efforts.

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PR7

Policy and regulatory

Location(s) Identified:
Atlantic

Barrier(s):
- Concerns about duplicate inspections resulting in inefficiencies (Atlantic)
- Duplicate inspection requirements create inefficiencies in the approval and construction process.

Contributors:
Manufacturers, Developers & General Contractors

Initiative:
Standardize and promote CSA A277 adoption across municipalities through aligned policy, inspection practices, and inspector training.

Metrics:
- Reduction in duplicated inspection steps
- % of Atlantic municipalities using the acceptance framework
- Shortened inspection timelines for modular projects
- Fewer RFI (Requests for Information) from inspectors
- Improved manufacturer feedback on municipal acceptance

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Map which inspections are already covered under CSA A277 (factory QA, structural, plumbing rough-ins, electrical pre-wiring, firestopping inside modules).
- List which inspections MUST remain on-site (foundation, hookups, sealing, fire separations, assembly).
- Review differences in inspection practices across Atlantic municipalities.
- Draft the shared Framework

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PR8

Policy and regulatory

Location(s) Identified:
NB

Barrier(s):
- Heritage Conservation Act identifies heritage places in unincorporated areas, providing a barrier for housing (NB).

Contributors:
Provincial Government, Developers & General Contractors, Technical Professionals

Initiative:
Encourage MMC solutions (e.g., categories 2-4, 6 and 7) that meet Heritage Conservation Act requirements.

Metrics:
- Reduction in unplanned heritage-related delays
- Fewer RFIs to the Heritage Branch

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Easy

Impact (out of 10)
7

Prerequisite Initiatives:
- Confirm which heritage triggers apply in unincorporated areas
- Summarize permit types (site alteration, impact assessment)
- Draft short guidance text for Navigation Guide
- Validate with NB Heritage Branch

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

PR9

Policy and regulatory

Location(s) Identified:
Atlantic

Barrier(s):
- Slow and costly approval processes (Atlantic).
- Approval and permitting processes are slow, complex, and costly.

Contributors:
Developers & General Contractors, Municipal Government, Technical Professionals

Initiative:
Review permitting, by-laws, zoning and pre-construction workflows to remove barriers (e.g., costs, redundant processes, complex approvals, etc.) to all forms of housing supply. This may be done through removal of pre-construction costs, digitizing workflows, educating industry, etc.

Metrics:
- Average modular permitting time before vs. after track
- Number of repeatable modular designs pre-verified
- Increase in modular applications submitted

Expected Timeline*:
Year 4

Scope:
Local, provincial

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Identify which modular designs can be pre-verified.
- Provide municipalities with CSA certification details.
- Update municipal workflows to skip factory-completed checks.

Owners:
- Provincial Government, Municipal Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

TL1

Transportation and Logistics

Location(s) Identified:
Atlantic

Barrier(s):
- Responsibility/liability for damage is unclear between manufacturer, hauler, GC (Atlantic).
- Responsibility and liability for damage during manufacturing, transportation, and installation are unclear among manufacturers, haulers, and general contractors.

Contributors:
Manufacturers, Developers & General Contractors, Transportation & Logistics Providers, Industry Associations

Initiative:
Ensure conflict resolution for OSC component damages is included in contracts.

Metrics:
-
- Reduction in disputes

Expected Timeline*:
Year 1

Scope:
Local

Ease of implementation:
Easy

Impact (out of 10)
7

Prerequisite Initiatives:
- Development of formal insurance and liability agreements
- Stakeholder alignment

Owners:
- Industry Associations, Finance & Insurance/Business Services

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

TL2

Transportation and Logistics

Location(s) Identified:
Atlantic

Barrier(s):

- Denting, corner damage, and structural movement during loading/unloading (Atlantic).
- Modules are susceptible to denting, corner damage, and structural movement during loading and unloading.
- Inconsistent moisture barriers and wrapping practices (Atlantic).
- Moisture protection practices, including barriers and wrapping, are inconsistent.

Contributors:
Manufacturers, Developers & General Contractors, Transportation & Logistics Providers, Industry Associations, Academic/Training Institutions

Initiative:

Collaborate with the R&D based organizations to better understand and minimize damages from transportation and erection. Produce a document top help mitigate these risks.

Metrics:

- Number of training sessions delivered
- Reports of damage to modules during transportation

Expected Timeline*:
Year 1

Scope:
National

Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:

- Transport best-practice guidelines finalized
- Training content developed

Owners:

- Academic/Training Institutions

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

TL3

Transportation and Logistics

Location(s) Identified:
Atlantic

Barrier(s):
- Escort and permit rules for oversized modules (often >12 ft wide) vary across jurisdictions (Atlantic).

Contributors:
Provincial Government, Developers & General Contractors, Municipal Government, Transportation & Logistics Providers

Initiative:
Collaborate regionally to document overload escort and permit requirements in a single reference.

Metrics:
- Number of agreements signed
- Reduced delays due to permit harmonization
- Number of municipalities participating

Expected Timeline*:
Year 4

Scope:
Local, provincial, regional

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Regulatory coordination between provinces
- Legal framework for transport agreements

Owners:
- Provincial Government, Municipal Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

TL4

Transportation and Logistics

Location(s) Identified:
Atlantic, NL

Barrier(s):
- Module width/height is constrained by bridge clearances, turning radii, and road widths (Atlantic).
- Modules must be designed to match available island transport equipment (NL).

Contributors:
Provincial Government, Technical Professionals, Manufacturers

Initiative:
Using resources created from TL5, consider developing design guidelines that account for manufacturing, transportation, and assembly by province based on transportation and logistics constraints.

Metrics:
- Data collected on road restrictions
- Number of transportation-friendly designs used

Expected Timeline*:
Year 4

Scope:
Provincial, local

Ease of implementation:
Medium

Impact (out of 10)
7

Prerequisite Initiatives:
- Data collection on bridges, roads, turning radii
- Mapping infrastructure conflicts
- Design catalogue development
- Coordination between designers, manufacturers, transport providers

Owners:
- Provincial Government, Manufacturers

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

TL5

Transportation and Logistics

Location(s) Identified:
NL

Barrier(s):
- Ferry costs add major expense for panelized construction (NL).

Contributors:
Provincial Government, Transportation & Logistics Providers

Initiative:
Develop a regional logistics framework and database map for oversized loads in collaboration with provincial and municipal transportation authorities, ferry operators, energy authorities and other groups who maintain infrastructure in the right-of-way. (TL5)

Metrics:
- Number of ferry trips using discounted/off-peak rates
- Cost savings
- On-time deliveries

Expected Timeline*:
Year 1

Scope:
Provincial

Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:
- Agreements with ferry operators
- Approval of subsidy program

Owners:
- Provincial Government, Transportation & Logistics Providers

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

TL6

Transportation and Logistics

Location(s) Identified:
Atlantic, NS

Barrier(s):
- Limited staging and storage space near construction sites (Atlantic).
- Seasonal weight restrictions affecting transportation timelines (Atlantic).
- Seasonal road weight restrictions affect transportation timelines.
- Difficult access in dense urban areas (tight roads, overhead utilities) (NS).

Contributors:
Provincial Government, Municipal Government, Transportation & Logistics Providers

Initiative:
In parallel to TL5, identify designated transportation routes with temporary staging yards for critical projects.

Metrics:
- Number of staging yards designated
- Reduction in delivery delays
- Improvement in on-time module deliveries

Expected Timeline*:
Year 1

Scope:
Local, provincial

Ease of implementation:
Difficult

Impact (out of 10)
8

Prerequisite Initiatives:
- Database of land potentiall available for staging near sites

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD1

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Workforce resistance to OSC exists due to lack of familiarity, fear of job loss, or cultural hesitation toward new methods (Atlantic).

Contributors:
Industry Associations

Initiative:
Host OSC industry events (tours, seminars) targeting skilled trades.

Metrics:
- Attendance at OSC events
- Surveys on workforce perception of OSC
- Increased modular adoption

Expected Timeline*:
Year 1

Scope:
Regional, provincial

Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:
- Identification of industry professionals to host events
- Event planning

Owners:
- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD2

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Low awareness and misconceptions about OSC quality, aesthetics, and durability (Atlantic).

Contributors:
Provincial Government, Manufacturers, Federal Government, Industry Associations

Initiative:
Launch OSC awareness campaigns, docuseries, and industry-wide marketing.

Metrics:
- Public awareness metrics (survey data)
- Number of facility open houses
- Participation in outreach

Expected Timeline*:
Year 1

Scope:
National, regional, provincial

Ease of implementation:
Easy

Impact (out of 10)
9

Prerequisite Initiatives:
- Marketing strategy developed
- Local case studies collected
- Cooperation from manufacturers

Owners:
- Provincial Government, Manufacturers, Federal Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD3

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Limited promotion of modular construction within the industry and workforce (Atlantic).

Contributors:
Manufacturers, Industry Associations, Academic/Training Institutions

Initiative:
Promote OSC careers through coordinated awareness campaigns and industry events.

Metrics:
- Number of OSC events held
- Number of sponsorships awarded and recipient career paths
- Training integration into programs

Expected Timeline*:
Year 1

Scope:
Regional, provincial, national

Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:
- Event planning and secured funding for sponsorships

Owners:
- Provincial Government, Manufacturers, Academic/Training Institutions

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD4

Skilled workforce and skills development

Location(s) Identified:
NS

Barrier(s):
- NSCC programs closing due to low enrollment (NS).
- Low enrollment has resulted in the closure of OSC-related training programs, such as those at NSCC.
- Few contractors have OSC experience, limiting participation (NS).

Contributors:
Academic/Training Institutions

Initiative:
Collaborate across Atlantic post-secondary institutions to integrate MMC training and micro-credentials.

Metrics:
- Enrollment numbers in NSCC modular courses
- Campaign reach (social media, schools)
- Number of applications received

Expected Timeline*:
Year 1

Scope:
Local. provincial

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Marketing campaign materials
- Coordination with NSCC and provincial education authorities

Owners:
- Provincial Government, Academic/Training Institutions

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD5

Skilled workforce and skills development

Location(s) Identified:
NS

Barrier(s):

- Barriers for foreign-trained workers to gain equivalency; limited culturally appropriate programs for Indigenous communities (NS).
- Foreign-trained workers face barriers to credential recognition, and culturally appropriate training programs for Indigenous communities are limited.

Contributors:
Industry Associations, Academic/Training Institutions, Indigenous & Community Organizations

Initiative:

Create streamlined credential recognition for internationally trained workers and engage and work with Indigenous communities.

Metrics:

- Number of foreign-trained workers completing recognition process
- Number of culturally appropriate programs delivered
- Participation by Indigenous students

Expected Timeline*:
Year 1

Scope:
Provincial, regional

Ease of implementation:
Medium

Impact (out of 10)
8

Prerequisite Initiatives:

- Agreements with credentialing bodies
- Partnerships with Indigenous organizations
- Development of training content

Owners:

- Provincial Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD6

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Limited access to specialized equipment operators (e.g., cranes, certified operators) (Atlantic).

Contributors:
Federal Government, Transportation & Logistics Providers, Industry Associations

Initiative:
Collaborate across trade associations to offer heavy equipment and crane operations in workforce outreach.

Metrics:
- Counts of shared resources
- Project delays due to lack of resources

Expected Timeline*:
Year 1

Scope:
Regional

Ease of implementation:
Difficult

Impact (out of 10)
8

Prerequisite Initiatives:
- Coordination agreements between provinces
- Identification of regional capacity gaps

Owners:
- Provincial Government, Federal Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD7

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Limited capacity and in planning and building offices which can slow project delivery (Atlantic).

Contributors:
Academic/Training Institutions, Provincial Government

Initiative:
Work with post-secondary institutions to increase size and staffing in planning and building offices across the region.

Metrics:
- Increase in staffing

Expected Timeline*:
Year 1

Prerequisite Initiatives:
-

Scope:
Regional, provincial

Owners:
- Academic/Training Institutions, Provincial Government

Ease of implementation:
Medium

Impact (out of 10)
8

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD8

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Low overall workforce availability limits the ability to scale modular construction (Atlantic).
- Overall workforce availability is insufficient to support scaling of modular construction.

Contributors:
Provincial Government, Manufacturers, Federal Government, Industry Associations

Initiative:
Invest in factory optimization (i.e., digitized processes, automation, etc.) and training to increase capacity and recruitment.

Metrics:
- Efficiency KPIs folllowing implementation of automation
- Output per worker
- Reduced labour bottlenecks

Expected Timeline*:
Year 1

Scope:
Local, regional

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Investment in automation equipment
- Worker training on new technology

Owners:
- Provincial Government, Manufacturers, Federal Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD9

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Lack of clear, unified training pathways or standards for OSC across Canada (Atlantic).

Contributors:
Industry Associations, Academic/Training Institutions

Initiative:
Build on the AMC certificate to develop a national curriculum aligned with apprenticeships.

Metrics:
- Adoption rate of national curriculum by provinces
- Number of institutions offering courses
- Enrollment numbers

Expected Timeline*:
Year 4

Scope:
National, provincial

Ease of implementation:
Medium

Impact (out of 10)
8

Prerequisite Initiatives:
- Align provincial apprenticeship bodies to recognize modular-specific credentials
- Establish CHBA alignment
- Approval by national training authorities
- Funding for curriculum development

Owners:
- FALSE

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD10

Skilled workforce and skills development

Location(s) Identified:
NB

Barrier(s):
- Shortage of skilled trades needed for OSC construction (design, assembly, mass timber, mechanical/electrical, etc.) (NB).

Contributors:
Industry Associations, Academic/Training Institutions

Initiative:
Expand MMC-focused skilled workforce training, fast-track continuous education opportunities, and industry-supported apprenticeships.

Metrics:
- Number of apprenticeships created
- Program enrollment
- Industry placement rates

Expected Timeline*:
Year 3

Scope:
Regional

Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:
- College/unions agreement
- Curriculum development
- Employer sponsorship secured

Owners:
- Provincial Government, Industry Associations, Academic/Training Institutions

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD11

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Rural factory locations limit skilled workforce access and reduce available workforce pools (Atlantic).

Contributors:
Provincial Government, Manufacturers, Federal Government

Initiative:
Provide relocation incentives and additional workforce benefits (e.g., housing).

Metrics:
- Number of relocation/housing subsidies granted
- Change in labour availability at rural facilities

Expected Timeline*:
Year 3

Scope:
Regional, local

Ease of implementation:
Difficult

Impact (out of 10)
7

Prerequisite Initiatives:
- Provincial/federal funding approval
- Policy design for incentives

Owners:
- Provincial Government, Manufacturers, Federal Government

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD12

Skilled workforce and skills development

Location(s) Identified:
NB, NL

Barrier(s):
- Staff shortages in public offices (planning, permitting, fire inspection) delay projects (NB).
- New building inspectors are inexperienced (NL).

Contributors:
Provincial Government, Federal Government, Municipal Government

Initiative:
Identify training for provincial and municipal staff (including engineers, planners, inspectors, architects, project managers, trades, etc.) to educate on leveraging MMC in projects.

Metrics:
- Number of municipal staff hired
- Permitting turnaround times
- Number of inspectors trained
- Inspector certification rates
- Reduced inspection delays

Expected Timeline*:
Year 4

Scope:
Local, provincial

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Budget approval
- Digital permitting system development
- Curriculum development for inspector training

Owners:
- Provincial Government, Academic/Training Institutions

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD13

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Skill gaps among workforce(Atlantic).

Contributors:
Industry Associations, Manufacturers, Academic/Training Institutions

Initiative:
Collaborate with trade associations to offer training for conventional builders on installation, fit out and handover of category 1 and 2 MMC projects.

Metrics:
- Number of individuals trained

Expected Timeline*:
Year 1

Prerequisite Initiatives:
-

Scope:
Regional, provincial

Owners:
- Academic/Training Institutions

Ease of implementation:
Easy

Impact (out of 10)
7

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD14

Skilled workforce and skills development

Location(s) Identified:
Atlantic

Barrier(s):
- Difficulty attracting youth, women, diverse groups, and newcomers to construction trades (Atlantic).

Contributors:
Provincial Government, Manufacturers, Federal Government, Municipal Government, Academic/Training Institutions

Initiative:
Highlight MMC employment benefits and support bursaries, scholarships, mentorships, and DEI training.

Metrics:
- Scholarship uptake
- Mentorship participation
- Diversity metrics in workforce

Expected Timeline*:
Year 1

Scope:
Provincial, regional

Ease of implementation:
Medium

Impact (out of 10)
9

Prerequisite Initiatives:
- Funding approval for scholarships
- Mentorship program structure

Owners:
- Provincial Government, Indigenous & Community Organizations

*Following the establishment of the Atlantic Off-site Housing Innovation Network.

WD15

Skilled workforce and skills development

Location(s) Identified:
NB

Barrier(s):
- Culturally inappropriate or unwelcoming workplaces limit participation from Indigenous peoples and underrepresented groups (NB).
- Workplace cultures are not consistently inclusive or culturally appropriate, limiting participation from Indigenous peoples and other underrepresented groups.

Contributors:
Provincial Government, Federal Government, Academic/Training Institutions, Indigenous & Community Organizations

Initiative:
Consult Indigenous communities to identify workforce initiatives.

Metrics:
- Number of Indigenous-owned businesses supported
- DEI training completion
- Workforce participation rates

Expected Timeline*:
Year 1

Scope:
Provincial, regional

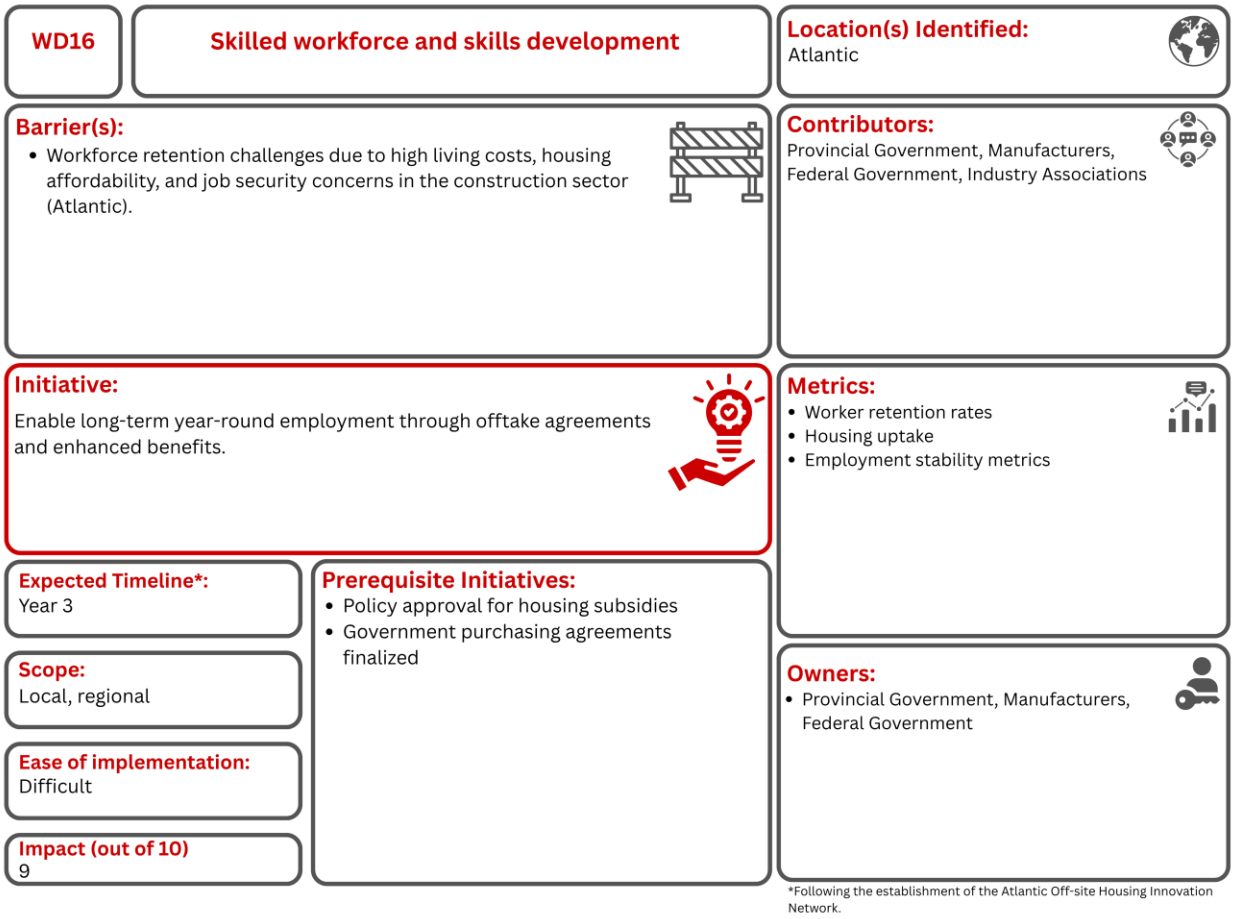
Ease of implementation:
Easy

Impact (out of 10)
8

Prerequisite Initiatives:
- Funding and program approval
- DEI curriculum developed

Owners:
- Provincial Government, Indigenous & Community Organizations

*Following the establishment of the Atlantic Off-site Housing Innovation Network.



Appendix J: Draft of Potential Terms of Reference

Atlantic MMC Steering Committee

Mandate and purpose: the Atlantic MMC steering committee provides strategic oversight, regional coordination, and system-level leadership to guide implementation of the Atlantic Off-site Housing Innovation Roadmap. The committee's purpose is to:

- Represent the collective interests of the network's membership.
- Each member is to participate in minimum one working day and, ideally, chair or co-chair a working group.
- Set priorities, monitor initiative progress and provide input on blue for all working groups.
- Maintain balanced representation across provinces and sectors.
- Engage CMHC, federal partners, and provincial authorities to advance aligned policies, programs, and funding that support MMC.

Scope and responsibilities

- Advise annual workplans to execute initiatives with each working group.
- Advise on major research, initiatives, interprovincial collaboration efforts.

- Coordinate interprovincial alignment on regulatory, procurement, and financing issues.
- Track roadmap implementation through monitoring dashboards and progress reviews.
- Convene an annual regional meeting of all working groups and committee members.

Membership and composition: membership will be appointed within the broader network and will integrate across provinces, housing and MMC groups. The committee may include:

- Minimum one representative from each of the Atlantic province's housing organizations. This person should coordinate across provincial government departments for their input and participation across working groups.
- Industry associations:
    - Minimum one of the Atlantic construction associations
    - Minimum one of the engineering associations
    - Minimum one of the architects' associations
    - One from the Atlantic Planners Institute
    - CHBA Modular Council
- Finance and insurance sector:
    - Canadian Mortgage Brokers Association (this is one example, but there may be a more prominent association in Atlantic Canada)
    - Canadian Lenders Association (this is one example, but there may be a more prominent association in Atlantic Canada)
    - Insurance Bureau of Canada
- Industry representation
    - There is discussion of the MMC industry in Atlantic Canada coming together to form MMC Atlantic. If this happens, the chair of MMC Atlantic should sit on this committee.
    - An association representing market housing developers.
    - An association representing non-market housing developers
- Minimum one Indigenous housing and community representative
- Minimum one representative from trade or community colleges to communicate with peer colleges across the region.
- Administrative support, project management and coordination to be provided by the UNB Off-site Construction Research Centre. The OCRC Executive Director will also serve on the committee.

Duration: Duration may be dependent on funding availability and timeline. However, committee members will serve a term of three years, renewable.

Meeting frequency

- Monthly virtual meetings with minimum 75% (nine meetings) participation. One in-person meeting to be held annually at the Atlantic MMC Summit involved all working groups.
- Additional meetings as required to execute initiatives.

Potential initiatives (for discussion)

The committee may be responsible to oversee:

- Interprovincial standards alignment initiatives (e.g., CSA A277, permitting harmonization, etc.).

- Regional procurement templates and financing model development.
- Workforce planning and cross-provincial mobility strategies.
- Manufacturing capacity expansion assessments.
- Public and industry outreach campaigns.
- Transportation and logistics coordination efforts with provincial agencies.
- Create MMC contract templates (e.g., adopting CCDC and amending for MMC and/or Atlantic region specifics)
- Coordinate with CMHC, BCH and other federal departments as a unified voice in the region.

Working group 1 – Financing and Procurement

Scope

- Collaborate to develop integrated financing models for OSC / MMC in Atlantic Canada.
- Create procurement frameworks, templates, and contract structures aligned with factory-based delivery.
- Address payment schedules, insurance requirements, bonding structures, and cost certainty needs.
- Explore public, private, and blended capital models.

Duration: Standing working group with deliverables reviewed annually. *Duration and timelines may be impacted by funding received.*

Membership: membership is not fixed to a certain minimum or maximum but should include minimum one representative from the following groups.

- Lenders, insurers, mortgage brokers and cost consultants.
- Provincial housing agencies, procurement offices and treasury officials.
- Private developers, planners, designers, general contractors and MMC manufacturers.
- Provincial construction, architectural, engineering and planning associations.
- Legal and risk specialists.
- A representative from the UNB OCRC any other educational or training institutions (particularly legal, commerce, engineering, planning and architecture departments).

The working group should include a chair and co- or vice-chair who sits on the Atlantic MMC Steering Committee.

Potential initiatives – see **Figure 23:** Draft working groups and *potential* initiatives **for the potential initiatives** and **Figure 18:** Atlantic Housing Innovation Roadmap initiative tracking view for guidance on initiative prioritization. These are all summarized in the dashboards.

Working group 2 – Regulatory Framework, Approvals and Transportation Solutions

Scope

- Harmonize interpretation of CSA A277 and modular-related codes.
- Identify opportunities to streamline permitting and approvals across all jurisdictions.
- Develop guidance for municipalities, local government and Indigenous communities to build OSC familiarity.

- Assess transportation logistics: routing, ferry constraints, oversized load permitting, infrastructure readiness.

Duration: Standing working group with deliverables reviewed annually. *Duration and timelines may be impacted by funding received.*

Membership: membership is not fixed to a certain minimum or maximum but should include minimum one representative from the following groups.

- Building officials, code experts and engineers (including Alliance of Canadian Building Officials Associations (ACBOA) or relevant Atlantic associations).
- Provincial code authorities (including but not limited to the Office of the Fire Marshal).
- Municipal policy, zoning and permitting representatives (e.g., planning offices).
- Provincial and municipal transportation departments, private public partnerships who operate and maintain key provincial and federal transportation corridors and other logistics specialists (e.g., logistics companies).
- MMC manufacturers, integrators and general contractors.
- Provincial construction, architectural, engineering, and planning associations.
- A representative from the UNB OCRC any other educational or training institutions (particularly legal, commerce, engineering, planning and architecture departments).

The working group should include a chair and co- or vice-chair who sits on the Atlantic MMC Steering Committee.

Potential initiatives – **Figure 23:** Draft working groups and *potential* initiatives **for the potential initiatives** and **Figure 18:** Atlantic Housing Innovation Roadmap initiative tracking view for guidance on initiative prioritization. These are all summarized in the dashboards.

Working group 3 – Market Capacity and Forecasting

Scope

- Assess regional manufacturing capacity and supply chain readiness.
- Collaborate with other organizations to develop market forecasting tools to project demand and investment needs.
- Identify gaps in skilled workforce for factory and site-based activities.
- Use an RFI to develop a detailed supply-chain database (similar to Build Canada Homes MMC RFI).

Duration: Standing working group with deliverables reviewed annually. *Duration and timelines may be impacted by funding received.*

Membership: membership is not fixed to a certain minimum or maximum but should include minimum one representative from the following groups.

- Provincial code authorities (including but not limited to the Office of the Fire Marshal).
- Economists, market analysts and provincial economic development departments.
- MMC manufacturers, integrators, general contractors and supply-chain firms.

- Provincial construction, sub-trade associations, architectural, engineering, and planning associations.
- Provincial education, training, labour and workforce departments.
- A representative from the UNB OCRC any other educational or training institutions (particularly legal, commerce, engineering, planning and architecture departments).

The working group should include a chair and co- or vice-chair who sits on the Atlantic MMC Steering Committee.

Potential initiatives – **Figure 23:** Draft working groups and *potential* initiatives **for the potential initiatives** and **Figure 18:** Atlantic Housing Innovation Roadmap initiative tracking view for guidance on initiative prioritization. These are all summarized in the dashboards.

Working group 4 – Skills, Training, and Workforce Growth

Scope

- Align industry workforce requirements with college, apprenticeship, and university training programs.
- Address credential recognition and cross-provincial mobility.
- Support long-term workforce growth for planning, architectural, engineering, on-site carpentry, on-site sub-trades, building officials, manufacturing, transportation, erection, and installation roles.

Duration: Standing working group with deliverables reviewed annually. *Duration and timelines may be impacted by funding received.*

Membership: membership is not fixed to a certain minimum or maximum but should include minimum one representative from the following groups.

- Provincial code authorities (including but not limited to the Office of the Fire Marshal).
- Economists, market analysts and provincial economic development departments.
- MMC manufacturers, integrators, general contractors and supply-chain firms.
- Provincial construction, sub-trade associations (e.g., provincial CHBA groups), architectural, engineering, and planning associations.
- Provincial education, training, labour and workforce departments.
- A representative from the UNB OCRC any other educational or training institutions (particularly legal, commerce, engineering, planning and architecture departments).

The working group should include a chair and co- or vice-chair who sits on the Atlantic MMC Steering Committee. The working group may create sub-groups focused on specific areas (e.g., curriculum development review for trade modernization).

Potential initiatives – **Figure 23:** Draft working groups and *potential* initiatives **for the potential initiatives** and **Figure 18:** Atlantic Housing Innovation Roadmap initiative tracking view for guidance on initiative prioritization. These are all summarized in the dashboards.

Working group 5 – Public and Industry Awareness

Scope

- Increase understanding of OSC/MMC across municipalities, industry, and the public.
- Capture best practices and disseminate lessons learned across project partners.
- Collaborate with educational institutions, traded associations, etc. to deliver communications, workshops, and events across Atlantic Canada.

Duration: Standing working group with deliverables reviewed annually. *Duration and timelines may be impacted by funding received.*

Membership: membership is not fixed to a certain minimum or maximum but should include minimum one representative from the following groups.

- Provincial housing agencies and communications teams.
- Private developers, planners, designers, general contractors and MMC manufacturers.
- Provincial construction, sub-trade associations (e.g., provincial CHBA groups), architectural, engineering, and planning associations.
- Local government and municipal communications teams.
- Market and non-market housing developers, owners and operators.
- Non-profit housing and community associations.
- A representative from the UNB OCRC any other educational or training institutions (particularly legal, commerce, engineering, planning and architecture departments).

The working group should include a chair and co- or vice-chair who sits on the Atlantic MMC Steering Committee.

Potential initiatives – **Figure 23:** Draft working groups and *potential* initiatives **for the potential initiatives** and **Figure 18:** Atlantic Housing Innovation Roadmap initiative tracking view for guidance on initiative prioritization. These are all summarized in the dashboards.