FEDERATION OF CANADIAN MUNICIPALITIES
FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

Building smarter:

off-site construction, prefabrication and modular development

A GUIDE FOR MUNICIPALITIES

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About this guide

This guide is designed to help Canadian municipalities understand and evaluate off-site construction, prefabrication and modular development for projects they deliver directly and for housing and infrastructure projects developed in their communities. It responds to growing pressures on municipalities from housing demand, labour shortages, rising costs and climate commitments by showing how off-site production can shorten project timelines, improve quality and support sustainability goals. The guide takes a technology-neutral lens: in some contexts, volumetric modular approaches may be advantageous, while in others, panelized, componentized or hybrid off-site options may be a better fit, depending on project type, site conditions, location and scale. Generally, the term "off-site" is used to encompass any type of project in the guide, however, in some cases, more specific references are used. The contents of the guide are tailored to the municipal context, drawing on research, case studies and policy examples from across Canada and internationally.

Summary for decision makers

Off-site construction can help municipalities support faster delivery of housing, facilities and infrastructure across their communities, while also improving delivery of their own capital projects. It is not a single technology but a range, including componentized, panelized, volumetric and hybrid systems. The most appropriate option depends on project type, site constraints, logistics, market capacity and municipal objectives.

For municipal leaders, the main question is not whether off-site is universally better than conventional construction, but when and how it can support faster delivery, affordability, sustainability and resilience goals. Zoning, permitting, procurement, financing, inspection processes and community understanding all shape whether projects realize their benefits. Success depends less on the technology itself than on municipal readiness to:

- Use off-site construction as a strategic tool where speed, repeatability and constrained labour markets are priorities.
- Take a technology-neutral approach and match the off-site method to the project, site and local market context.
- Focus municipal effort on the highest-impact levers: land use, permitting, procurement, financing, staff capacity and public communication.

The first sections of the guide provide concise context, while later sections offer more detailed background on approaches, benefits, limitations and implementation readiness. Readers looking for practical municipal actions to shape projects across their communities can move directly to Municipal levers: planning, permitting, zoning, procurement and incentives.

What this guide does and does not cover

This is a high-level guide for municipalities. It is intended to support policy, planning and project decisions by explaining key off-site construction concepts, outlining municipal actions and highlighting where these approaches fit well—or do not. It is not an engineering manual or a substitute for project-specific professional advice.

Why municipalities are looking at off-site construction now

Municipalities are responding to a perfect storm of pressures that extend well beyond their control: housing shortages, labour gaps, volatile construction costs, tight timelines and ambitious climate targets. These pressures are pushing all sectors—not just local governments—to rethink how housing and civic infrastructure are planned, financed, manufactured and delivered.

Across Canada, local governments operate within a much larger ecosystem of public agencies, private developers, manufacturers, financiers, utilities and community organizations. All these actors must adapt to effectively use off-site construction. Municipalities influence zoning, permitting and inspections, but they are neither the sole nor the primary cause of housing and infrastructure bottlenecks. Successful adoption of off-site methods requires cross-sector collaboration, shared learning and continuous improvement across the entire development and construction system.

The municipal challenge is determining where off-site methods fit and what policy, permitting, procurement and partnership changes are needed to make them work.

Current municipal pressures

Housing demand far outstrips supply

Canada needs about 3.5 million additional homes by 2030 to restore affordability, yet current construction averages around 200,000 units per year. Municipalities are under intense pressure to accelerate approvals and make more land available. Expanding off-site manufacturing capacity could help increase housing output, but the relevant scale and approach will vary by region, factory capacity and project type.

Modular factories can produce 1,000–2,000 homes annually; with 20 such factories, 20,000–40,000 extra homes could be delivered each year—an increase of 10 to 15 percent in the national housing supply. But this level of output requires coordinated action across governments, industry and the financial sector, not municipalities alone.

Steveston Highway Affordable Housing, Richmond, BC. A 33-module, 20,750 sq. ft. permanent affordable housing complex built by ROC Modular with affiliate Buttcon Limited.

There is also a need for projects to be delivered quickly to respond to urgent needs such as emergency housing or to meet funding deadlines. Traditional construction schedules can stretch from eight to 12 months for mid-sized projects, while well-planned off-site approaches can significantly compress onsite schedules. Volumetric modular buildings of similar size may in some cases be completed in three to six months, while panelized and hybrid systems can also accelerate delivery with different trade-offs in flexibility and logistics.

Persistent labour shortages

The construction workforce is aging and the sector is struggling to attract new entrants. BuildForce projections for 2025–2034 show that the western provinces alone will need to attract 47,400 workers, from other occupations, provinces or newly trained labour: 22,700 to British Columbia, 15,400 to Alberta, 1,400 to Saskatchewan and 7,900 to Manitoba. Experts warn that it is not the lack of money or projects that will hold back activity, but the lack of available workers. Workforce gaps slow down projects, inflate costs and expose municipalities to delays.

Volatile construction costs

Inflation and supply chain disruptions have driven up prices for lumber, steel, concrete and labour. Normac's *2025 Canadian Construction Cost Trends* report notes that construction costs remain elevated due to inflationary pressures on commodities, an ongoing skilled labour shortage and the lingering effects of natural catastrophes. This volatility makes budgeting unpredictable and exposes municipalities to significant financial risk.

Climate and sustainability commitments

Buildings are Canada's third-largest source of greenhouse gas emissions, and the federal government's *Canada Green Buildings Strategy* calls for new homes and buildings to be constructed with net-zero emissions in mind. Municipalities must align new construction with climate resilience and net-zero goals while adapting existing housing stock to withstand more extreme weather.

How this ties to the federal government's modern methods of construction agenda

Canada's new agency, Build Canada Homes (BCH), exemplifies a policy push toward modern methods of construction (MMC). Launched in September 2025, BCH is tasked with building affordable housing at scale by leveraging public land, flexible financing and partnerships with industry. BCH will focus on factory-built housing, modular, mass timber and other innovative methods to deliver homes faster.

These targets align with broader national commitments to double housing output and meet climate goals. Municipalities are key partners in advancing this agenda. By adopting off-site strategies, they can support proposals for BCH funding, accelerate project approvals and help build a domestic industry that creates jobs and reduces environmental impacts.

Understanding off-site construction in a municipal context

What do we mean by off-site construction

The terms off-site construction, prefabrication and modular are often used interchangeably, but they describe different levels of off-site production. Off-site construction is the broadest term and refers to any construction activity that takes place away from the building site. Prefabrication means that components, everything from wall panels to complete bathroom pods, are produced in a factory and then transported to the site for installation. Not all prefabricated components are "modules". Modular construction is a subset of prefabrication in which three-dimensional (3D) modules or "boxes", including their finishes and often services, are manufactured off-site and assembled onsite. Panelized systems—two-dimensional (2D) assemblies such as walls, floors and roof panels—lie between simple components and full volumetric modules.

To support consistent terminology and a shared understanding across sectors, municipalities may find it useful to reference the University of New Brunswick's *Canadian Modern Methods of Construction (MMC) Framework*. This framework provides a clear Canadian context for defining MMC categories—including componentized, panelized, volumetric and hybrid systems—and helps align municipal, industry and government partners around common definitions and expectations.

How prefabrication differs from traditional construction

The shift from traditional construction to off-site fundamentally changes when and how decisions are made. Conventional projects often leave "means and methods" to contractors during construction, leading to late-stage redesigns and schedule risk. In an off-site approach, manufacturing and assembly considerations are integrated from the outset. This paradigm shift makes components easier to produce, transport and assemble and enables shorter schedules, higher quality, greater safety, sustainability and cost predictability.

Because components are manufactured to standard designs off-site and then assembled onsite, more of the design effort is front-loaded. This requires early collaboration between architects, engineers, manufacturers, municipal building officials, departments and contractors, supported by digital tools such as Building Information Modelling. It also means that late design changes become costly, so municipal sponsors must commit earlier to key design decisions and align procurement and approvals accordingly.

The *Canadian MMC Framework* can also help municipal staff understand how this process shifts alignment with different levels of off-site production, and where municipal approvals, inspections and procurement practices may need to adapt.

How decisions, risk and effort shift earlier in the process

Some stakeholders worry that off-site shifts all responsibility for means and methods to the design team. In reality, off-site clarifies and strengthens roles. Contractors still own the means and methods of construction, while the design team focuses on creating assembly-based documents that clearly define how each sub-assembly contributes to the finished product. This clarity allows contractors and trades to plan their work more effectively, reducing misunderstandings. Early integration also facilitates mass customization: unique finishes and layouts can be pre-designed and pre-engineered so that factory-made parts come together smoothly onsite.

For municipalities, understanding these definitions is crucial. Prefabrication and off-site offer opportunities to build faster and more efficiently, but they also require different ways of working. Municipal leaders need to engage design teams, manufacturers and contractors early, ensure zoning and procurement processes accommodate off-site production and be prepared to make key decisions sooner.

Referencing the *Canadian MCC Framework* can help municipalities benchmark their current practices against emerging industry standards and identify where early decision-making, risk allocation and approval processes may need to evolve to support off-site delivery.

Subsequent sections of this guide explore the various prefabrication approaches (component, panelized, volumetric and hybrid), their benefits and limitations and how municipalities can enable successful off-site projects.

FUZE Woodstock, Woodstock, ON.
A 183-module, 92,000 sq. ft. multifamily project designed by Skyhook Modular with affiliates Z Modular Holding Inc, Melloul Blamey Construction, Entuitive and Quasar.

Approaches to off-site construction: components, systems, volumetric modules and hybrids

For municipalities, the key issue is not mastering technical terminology but understanding which off-site approaches best match different project types, delivery timelines, site constraints and risk profiles. This section explains the main categories and what they mean for municipal decision-making—both for their own projects or to better understand projects in their communities.

Unless otherwise noted, references in this guide to prefabrication or off-site construction apply broadly across componentized, panelized, volumetric and hybrid approaches. Where a consideration is more specific to volumetric modular construction—such as module transport constraints, stacked structural systems or fully-fitted 3D units—the text identifies that explicitly.

Prefabrication is not a single technology but a spectrum of approaches, ranging from simple pre-made parts to fully finished building volumes. Understanding these approaches helps municipalities choose the right fit for different project types and risks. The following categories are commonly used in the construction industry and align closely with the University of New Brunswick's *Canadian MCC Framework*, which defines componentized, panelized, volumetric and hybrid systems as distinct MMC types.

Lynn Fripps Two-Storey Permanent Modular Addition, Langley Twp, BC. An 18-module, 9,900 sq. ft. educational facility built by Fort Modular Inc.

Component-level prefabrication
(1D elements)

Component-level prefabrication refers to factory-made parts or sub-assemblies that are assembled onsite like conventional building materials. Examples include precast beams, columns, trusses, floor cassettes, wall panels, roof trusses and precast façade panels. A project might use prefabricated structural steel sections, concrete staircases or precast window assemblies. These components arrive ready for installation, but most of the building is still assembled onsite, with trades performing the final structural connections, building services and finishes.

This approach delivers some of the speed and quality benefits of off-site production while maintaining flexibility in design and onsite sequencing. It is often used for schools, housing and civic projects where traditional procurement and inspection processes are familiar.

Limitations and municipal considerations:

- Code requirements are generally the same as site-built structures, but inspection of concealed connections may require early coordination.
- Height limitations are minimal, since components integrate into conventional structural systems.
- Transport limitations are low, as most components fit standard trucking dimensions.
- Easiest entry point for municipalities, requiring minimal changes to permitting or inspection workflows.

System-level prefabrication
(2D panels and sub-assemblies)

System-level prefabrication goes beyond individual components by delivering 2D panels or packaged sub-systems that are manufactured off-site and assembled onsite. Also defined as non-volumetric or panelized construction, it involves the off-site prefabrication of 2D building elements, such as walls and frames, that are assembled onsite. These elements can include structural framing, insulation, sheathing, windows and even integrated services.

Common examples include wall and roof panels (often called panelized or flat-pack systems), floor cassettes, cross-laminated timber panels, prefabricated façade units and bathroom or kitchen pods. These elements reduce onsite construction time and improve quality because most of the work occurs in controlled conditions. However, trades still assemble panels onsite and complete some services and finishes, giving municipalities more flexibility for customization and changes during construction.

Limitations and municipal considerations:

- Height limits depend on materials (e.g., cross-laminated timber (CLT) mid-rise is permitted under the National Building Code (NBC); light-frame panelized systems are typically limited to low- to mid-rise).
- Transport width and length limits apply, especially for large CLT or sip panels.
- Fire and acoustic ratings must be verified early, as panelized systems may require specific detailing.
- Faster enclosure reduces inspection frequency and early design coordination reduces rework.

System-level prefabrication
(mechanical, electrical and plumbing sub-assemblies)

To reduce confusion, this guide treats prefabricated mechanical, electrical and plumbing (MEP) systems as a distinct sub-category, separate from panelized structural systems.

MEP systems include horizontal ceiling, vertical riser and plant modules. These integrate MEP systems into pre-assembled units that are installed onsite with minimal field labour.

Limitations and municipal considerations:

- Inspections must occur early, often at the factory or through third-party certification.
- Coordination with structural and architectural systems is critical, as MEP modules require precise tolerances.
- Significantly reduced onsite congestion and inspection load with clear protocols for off-site inspection acceptance.

Beaverton Heights is a 47-unit transitional housing residence that provides accommodation and access to wraparound services to help promote life stabilization in Beaverton, ON.

Volumetric prefabrication
(3D modules)

Volumetric prefabrication, or full modular construction, produces 3D “boxes” or modules that include structure, finishes and often services. Volumetric construction involves the off-site prefabrication of 3D, enclosed units that are assembled onsite to form a complete building. Modular units are the most complete off-site product, sometimes up to 95 percent finished in the factory. They can be permanent (such as apartments, hotels, schools, clinics and municipal offices) or relocatable (such as classrooms and temporary shelters).

Volumetric modules often arrive with interior finishes, windows, doors, MEP systems and fixtures installed. Site work is largely limited to foundations, exterior cladding, utility connections and finishing joint lines. Benefits include rapid assembly, predictable quality and minimal onsite disruption.

Limitations and municipal considerations:

- Height limits: volumetric modular is typically used up to six to eight storeys without hybridization; taller buildings require podium-plus-module systems.
- Transport limits: modules must meet road transport width and height restrictions; oversized loads require escorts and route planning.
- Structural duplication: floor and ceiling assemblies are duplicated, affecting cost and height efficiency.
- Late design changes are expensive, as modules are manufactured early.
- Requires earlier permit submissions and decisions, as well as clear processes for factory inspection acceptance.

Hybrid and scalable approaches

Many projects combine components, system and volumetric techniques. Many off-site outputs include componentized, panelized and modularized elements for structural, enclosure, service and interior systems. Hybrid projects might use modular bathroom pods within a traditional structure, panelized walls with prefabricated service risers or volumetric units combined with site-built podiums and penthouses. The right mix depends on project size, complexity, logistics and project objectives (e.g., speed, labour savings, quality, design flexibility).

Prefabrication is also expanding beyond building structures. Prefabricated façades, stair cores, elevator shafts, timber frame kits and even entire plant rooms can be delivered as ready-to-assemble units.

Limitations and municipal considerations:

- Hybrid systems require clear responsibility split between factory and site teams.
- Code compliance can be more complex, as different systems may fall under different sections of the NBC.
- Greatest flexibility requiring strong coordination and early engagement with manufacturers.

Key takeaways
for off-site approaches

- Component-level prefabrication offers incremental benefits and the greatest flexibility. It is a good starting point for municipalities unfamiliar with off-site methods.
- System-level prefabrication (panels and packaged MEP systems) requires more coordination but delivers greater reductions in site labour and schedule. Prefabricated horizontal ceiling, vertical riser and plant modules are proven ways to improve productivity.
- Volumetric modular construction provides the fastest onsite assembly and the highest quality control but demands the most extensive upfront design and logistical planning.
- Hybrid solutions allow municipalities to tailor prefabrication to local needs, combining methods for optimal performance.
- Understanding the terminology and these approaches and their implications helps municipal teams communicate with industry and select appropriate strategies for different building types, budgets, timelines and regulatory environments.

Benefits, misconceptions and practical limits

Municipal leaders likely hear broad claims about off-site, prefabrication and modular construction—both positive and negative. This section distills the main benefits, common misconceptions and practical cautions so municipalities can make balanced decisions based on fit, readiness and expected outcomes.

Why prefabrication and off-site make sense

Shorter project timelines

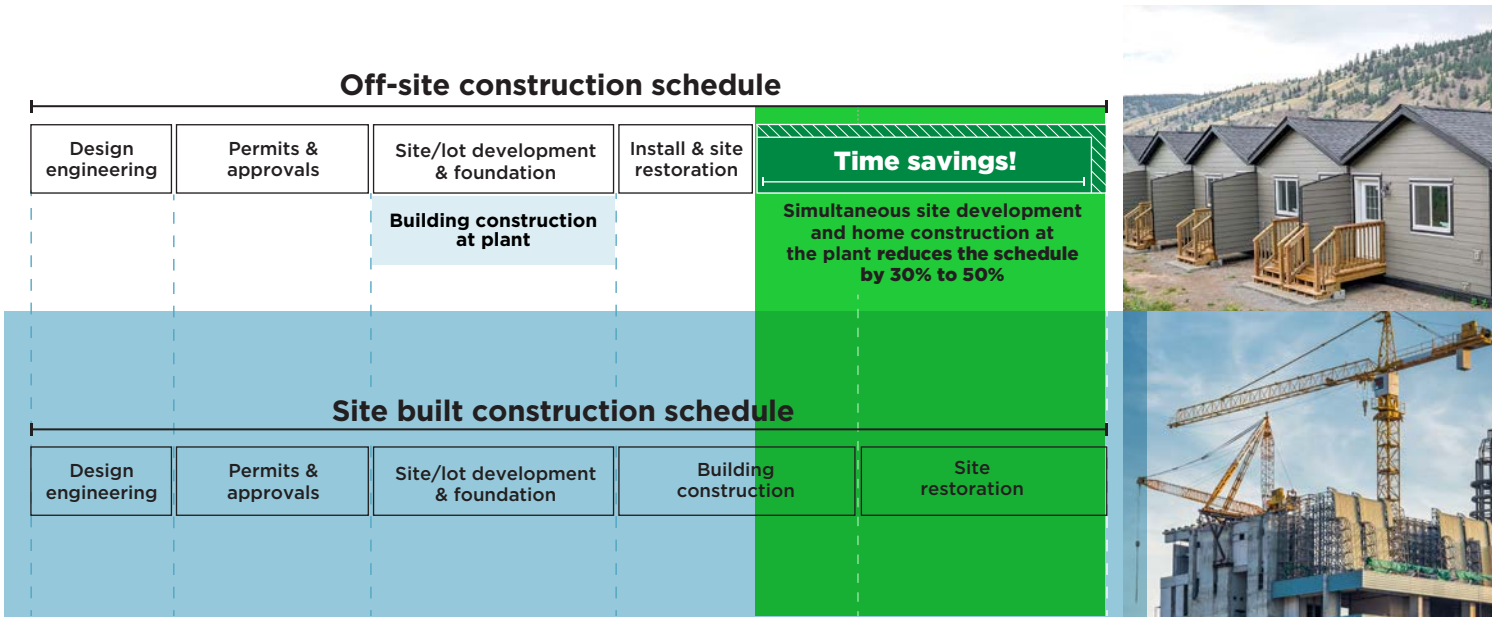
Because off-site fabrication and onsite work can happen in parallel, panelized, volumetric and hybrid projects are often completed 20 to 50 percent faster than conventional construction, depending on the system used and the degree of factory completion. Volumetric modular projects may achieve the greatest onsite schedule compression, while panelized and componentized systems can still deliver meaningful time savings with more design and site flexibility. Additionally, off-site construction reduces weather delays and enables year-round production, helping bring housing and community facilities online sooner, reducing pressure on staff managing long project timelines.

Cost certainty and potential savings

Off-site construction can improve cost certainty by shifting more work into controlled factory conditions. Factory production can reduce weather delays, labour shortages and onsite waste across many off-site systems. Cost outcomes vary by approach: panelized and componentized systems may offer incremental savings with fewer transport constraints, while volumetric modular can deliver stronger schedule gains but may introduce higher logistics and financing costs. In all cases, controlled environments can improve budget predictability by reducing rework, change orders and site inefficiencies.

It is worth noting that first-time off-site projects often cost more and take longer; however, cost and time savings generally increase over successive projects as municipalities, developers and manufacturers build experience. Modular construction can lower per-square-foot costs by up to 20 percent under the right conditions, with many experienced builders reporting 10 to 20 percent savings after multiple projects. These savings are not immediate. They emerge as the ecosystem matures and as municipal policy and permitting practices adapt to off-site methods.

Before scale is reached, off-site construction carries inherent cost premiums (e.g., factory overhead, robust quality assurance and quality control programs, transport-ready structures and duplicated floor and ceiling assemblies). Today, cost certainty, speed and quality offset some—but not all—of these costs. Currently, most savings are “soft cost” savings (financing, overhead, carrying costs) due to faster delivery. “Hard cost” savings become more likely as volume, standardization and economies of scale grow.



Timeline comparison of a off-site construction schedule and a site built construction schedule. Top image: Esk'etemc First Nation multiplex homes, Williams Lake, BC. An eight-module multifamily housing structure built by TASU Construction with affiliate Bridge Community Development. *Mention Modular Building Institute's 2026 Awards of Distinction — Permanent Multifamily Under 10,000 sq. ft.*

Higher quality and greater safety

Prefabricated building systems—whether panelized, componentized, volumetric or hybrid—must meet the same building code requirements as site-built construction. Factory quality control can improve consistency across all these approaches. Volumetric modular projects may benefit most from the high degree of factory completion, while panelized and componentized systems can also improve workmanship, coordination and worker safety by shifting complex tasks into controlled environments.

Labour efficiency

Off-site production requires fewer skilled trades per unit and enables repetitive tasks that can be performed by a broader workforce. It is easier to train new workers, partially easing labour shortages. It can also reduce pressure on municipalities facing their own labour shortages, including building officials, planners and engineers. Finally, onsite crews are smaller, reducing coordination challenges and safety risks.

Environmental benefits

Environmental benefits can arise across off-site systems through reduced material waste, better quality control and improved building performance. Panelized envelopes, prefabricated MEP assemblies and volumetric modules can all support tighter tolerances, lower rework and more efficient use of materials. The scale of emissions and waste reductions depends on the selected system, transport distances, materials and the amount of work completed in the factory.

Off-site methods, like traditional construction, facilitate the use of advanced materials and technologies, such as cross-laminated timber, passive-house standards and renewable energy systems, that enhance resilience against extreme weather. These approaches help municipalities advance their climate resilience and net-zero objectives.

King William Passive House is a three-storey, modular social and supportive housing project located in Hamilton, ON.

Reduced community impacts

With less onsite work, construction noise, traffic congestion and dust are minimized. Prefabricated projects can be completed with fewer site visits and a smaller staging area, which is particularly valuable in dense urban settings or rural locations.

Improved occupant comfort and health

Quality-controlled factory production allows builders to use low-emitting materials (such as low-volatile organic compound adhesives, sealants, paints and finishes) and ensure better thermal and acoustic performance. Tighter building envelopes reduce drafts and moisture penetration, improving indoor air quality.

Opportunity for repeatable, scalable solutions

Because modules and panels may be standardized, builders can replicate successful designs across multiple sites, reducing time to market. This is particularly relevant for standardized housing units, community facilities or replicable types like schools and recreation centres.

Standardized and repeatable designs can also significantly reduce municipal permitting timelines. By using consistent, pre-vetted design packages, municipal staff spend fewer hours on plan review, face fewer resubmissions and can process subsequent applications much faster. Many municipalities may also establish dedicated review teams or streamlined approval pathways for repeatable off-site designs, further reducing administrative burden and accelerating project delivery.

Reduced municipal staff time and administrative burden

Once municipalities adapt their permitting, inspection and procurement practices to accommodate off-site methods, prefabrication can significantly reduce staff time and administrative costs.

There is an initial "speed bump" as systems and processes are updated, but after this transition, municipal staff often experience fewer site visits, less change orders and more predictable scheduling with consistent submissions from developers.

Supports municipal productivity and capacity challenges

Local governments in many regions face severe staffing shortages, not just the construction industry. Prefabrication can help municipalities:

- reduce the number of inspections required on active sites
- streamline plan review through standardized designs
- reduce rework and resubmissions
- manage more projects with the same number of staff

This strengthens the local government productivity imperative without overburdening existing teams.

Efficiencies grow over time

It is important not to "snow" local governments or any sector. Prefabrication requires heavy lifting at the outset—new processes, new relationships and new expectations.

Once systems mature:

- permitting becomes faster
- inspections become more predictable
- developers submit more consistent packages
- manufacturers optimize production
- costs and timelines decrease

The greatest savings emerge only when the entire ecosystem—public, private and social sectors—improves together.

Hôpital Générale du Lakeshore Modular Complex (Lakeshore General Hospital), Pointe-Claire, QC. A 48-module, 32,000 sq. ft. addition to an existing hospital built by ATCO Structures & Logistics Ltd. with affiliate CIUSSS de L'Ouest-De-L'Île-De-Montréal.

Misconceptions and realities

Some misconceptions apply broadly to off-site construction and prefabrication, while others relate more specifically to volumetric modular construction. The table below distinguishes common myths about off-site systems generally from those most associated with fully modular buildings.

Myth	Reality
Modular buildings are low-quality or temporary. Some people still picture trailer-like structures when they hear modular.	Modern modular buildings use materials and performance standards that are generally comparable to site-built structures and are typically designed to meet either the applicable building code or a parallel standard, such as the CSA Z240 MH Series for manufactured homes. These frameworks are similar and address many of the same objectives for health, safety and energy efficiency, but they are not always identical, and service-level inspection requirements can also differ between factory-certified and site-built projects. Innovations and research have shown that modular construction produces durable, high-quality buildings. Some producers achieve defect-free rates above 95 percent.
Modular buildings don't last.	Modular buildings have lifespans comparable to stick-built structures, often 50 years or more. Manufacturers use durable materials and precision construction processes that make them safe, weather-resistant and long-lasting.
Modular buildings all look the same and lack design flexibility.	Modular designs can be highly flexible. Panels and modules can be customized in size and shape, joined in various configurations and combined with site-built elements. Hybrid projects mix modules with traditional construction to achieve bespoke layouts and aesthetics, while standardized modules can be arranged and clad to be indistinguishable from site-built product.
Prefabrication is only suitable for cheap or temporary housing.	Prefabrication is used across sectors, including schools, hospitals, hotels, civic facilities and high-rise apartments. Modular construction is being adopted in residential, commercial, hospitality, healthcare and education sectors because of its efficiency and sustainability benefits.
Prefabrication eliminates local jobs.	Off-site production changes job profiles but does not necessarily reduce employment. Factories need skilled and semi-skilled workers, and onsite crews still install foundations, assemble modules, connect services and finish exteriors. Prefabrication can attract a more diverse workforce by offering safer, year-round jobs.

Myth	Reality
Savings are automatic and guaranteed.	Cost and time savings depend on scale, repeatability and early planning. Transportation, factory overhead and the cost of robust quality-assurance programs can offset some gains. Upfront equity requirements are higher because materials must be purchased early. However, recent industry advancements mean that modular projects do not typically face a material increase in financing costs compared to conventional builds. At most, some additional insurance or administrative fees may apply. Without sufficient volume or early coordination, savings may be modest. Before scale and overall industry efficiency are reached, modular and volumetric construction carry some inherent cost increases relative to conventional methods. These include more robust safety, quality-control and quality-assurance programs that increase manufacturing overhead; the operation and maintenance of factory facilities and equipment; more rigorous structural requirements to allow modules to travel and be craned into place; and, in volumetric systems, the duplication of floor and ceiling assemblies. Cost certainty, speed and quality offset some—but not all—of these costs in today's prefabricated and volumetric industry.
Modular projects don't require architects.	Architects play a critical role in modular and prefabricated projects. They work with manufacturers and engineers to modularize designs, ensure regulatory compliance and integrate modules with site-built elements. Modern modular projects often involve high-end designs with significant architectural input.

By understanding both the benefits and the myths, municipalities can position prefabrication and off-site construction as tools, not magic bullets, in their toolbox.

When applied in the right context and at the right scale, these approaches can accelerate project delivery, improve quality and sustainability and help address housing and infrastructure challenges.

Practical limits: projects poorly suited to modular or off-site methods

Not every project is well suited to off-site delivery. This section helps municipalities identify which risks commonly undermine success, when prefabrication may be a poor fit and when conventional approaches may remain the better choice.

Prefabrication thrives on repetition, standardization and predictable logistics. Projects that lack these characteristics often face higher costs and greater risk.

Highly customized or non-repeatable designs

Modules are built to standard sizes and shapes to optimize factory production and transportation. Projects requiring complex geometry, curved facades or frequent floorplan changes may not fit within module dimensions. Strict adherence to module sizes limits design flexibility and may be unsuitable for projects needing unique or customized layouts. Once modules are manufactured, even minor changes, such as moving electrical outlets, can compromise structural integrity and are nearly impossible without expensive rework.

Small one-off projects without economies of scale

The efficiency of modular manufacturing depends on volume and repetition. One-off custom homes or small civic buildings may not justify the upfront investment required to set up production lines and may lose money when compared with conventional construction.

Large open spans of heavy industrial loads

Volumetric modules rely on module walls and frames for structural integrity. Buildings that require long column-free spans (e.g., sports arenas, heavy industrial facilities or large atriums) may not work with standard modules and hybrid systems and conventional construction may be better.

A good example of functional, repeatable design is Saint John Museum Staff Room, Saint John, NB. This is a 2-module, 1,740 sq. ft. staff gathering facility built by Kent Homes.

Extremely tall or slender buildings

High-rise modular construction is growing, but it poses challenges. Transport constraints limit the size of modules that can be used. Structural and fire requirements become more complex as height increases. A 2024 study notes that high-rise modular projects require extensive planning and engineering; they must integrate modules around a concrete or steel core and address fire separation, vertical services and lateral stability.

Current examples (e.g., 40-storey towers in Singapore and a 50-storey in the U.K.) show it can be done, but high-rise modular remains a niche with significant technical risk. Notably, certain prefabricated approaches, such as panelized facades, can be incorporated into high-rise buildings to boost productivity.

Sites with constrained access or long distances from factories, especially for volumetric modules

Modules are large and heavy; transporting them requires special permits, escorts and cranes. Delivery routes must accommodate oversized loads. Inner-city sites with narrow streets, tight turning radii or low bridges can make delivery impractical. The distance from factory to site affects transportation costs and can negate modular savings. However, for remote communities, challenges to access labour and materials may offset transportation costs.

Projects that need flexibility for late design changes

Modular construction front-loads design decisions. Delays in approvals or late design changes can cause expensive rework or scrap, because modules cannot be altered once built. Traditional construction may be more forgiving of late changes.

Projects requiring strict local labour quotas

Off-site construction reduces onsite labour demand; jurisdictions with union agreements or local hire requirements may resist modular imports. Engaging local labour in factory production or on-site assembly can help, but some projects may still face pushback.

Beaverton Heights represents a successful and scalable design, a 47-unit transitional housing residence that provides accommodation and access to wraparound services to help promote life stabilization in Beaverton, ON.

Common pitfalls and cautionary experiences

Even suitable projects can go wrong if risks are not managed.

Transportation constraints limit module size

Modules or panels must fit on trucks, railcars and on and under bridges. Oversized loads require permits and escorts, adding cost and complexity. Differing regulations between jurisdictions and provinces can lead to increased transportation costs, making the distance of a site to a manufacturing facility an important consideration. Weather or route closures can delay delivery and damage modules. Even panelized systems require careful planning for crane placement and staging. Transportation limits the maximum module size and adds costs that may outweigh savings.

Upfront capital and financing risk

Progress-based funding models used for traditional builds disadvantage off-site manufacturers. They must finance the entire module or panels before receiving payment and so their invoicing cadence does not meet that of conventional builders. Off-site factories demand large deposits, often 50 percent or more, because materials and labour are expended before units are delivered. A large amount of capital is often needed to set up manufacturing plants. Limited financing options and immature lender familiarity can stall projects.

However, the financing landscape has improved, and several lenders (e.g., ATB Financial) now offer modular-friendly structures. Financing is no longer a systemic barrier, though some institutions still lack experience with modular workflows. The main challenge remains securitizing off-site assets. Working with lenders and legal advisors familiar with off-site projects is essential.

Mica Dam Studio Dorms, Mica Creek, BC. A 12-module workforce housing project designed and manufactured by ATCO Structures & Logistics Ltd.

Shortage of experienced designers and engineers

Off-site projects require specialized expertise. The lack of knowledgeable designers and engineers with off-site experience is a limitation. Without this expertise, designs may not be optimized for factory production or may encounter code issues.

Difficult or expensive to modify after production

Once panels or modules leave the factory, changes are costly and may compromise structural integrity. Thorough design coordination and early decisions are essential; municipal approvals must align with factory timelines to avoid rework and take full advantage of the time savings associated with off-site construction.

Complex regulations and code compliance

Off-site construction buildings must meet the same codes as site-built structures, but local codes may not have specific guidelines for modular projects. Some building codes lack specific guidance, leading to delays in permits and approvals. Municipalities should adopt standards like CSA A277 and CSA Z250 to provide clear compliance pathways. Where the applicable building code does not directly accept CSA A277 or the CSA Z240 MH series, municipalities can establish local policies formally recognizing these standards as sufficient evidence of compliance with the building code for factory-constructed work.

Municipalities should also publish clear written policies describing the service level for planning, examination and inspection of factory-constructed buildings when certified to A277 or Z240 MH. These policies should explicitly distinguish between factory-certified work that may be accepted based on certification and site-regulated work that remains subject to local plan review and inspection.

Establishing these policies reduces duplication, provides predictability for project teams and ensures that off-site buildings are reviewed consistently and fairly, even when local codes do not yet address off-site construction directly.

Site work and foundations are still required

Off-site construction does not eliminate site preparation. Excavation, grading and foundations still need to be completed, approved by the building department and inspected. Notably, some prefabricated or productivity-enhanced foundation systems can be leveraged onsite, such as screw piles, insulated concrete forms or permanent wood panel foundations. Poor site coordination can erode schedule gains.

Factory or supplier insolvency

Off-site projects can fail if the manufacturer goes bankrupt or cannot complete components. Contractors and owners should require payment and performance bonds and vet manufacturers thoroughly.

Misconceptions and community resistance

Public perception of modular and prefabricated housing as low quality persists. Without proactive communication, community opposition can delay projects. Early engagement and demonstration projects are essential to build trust.

By recognizing these limitations and managing the risks, municipalities and builders can make informed decisions about when to deploy off-site methods and when to stick with conventional construction. Off-site construction is a powerful tool, but like any tool, it must be applied in the right context.

Municipal levers: planning, permitting, zoning, procurement and incentives

Municipal governments hold powerful levers to accelerate the adoption of prefabrication and off-site construction, both in the projects they deliver directly and in housing and infrastructure projects developed across their communities. While off-site construction can shorten timelines and reduce costs, these benefits often evaporate when projects encounter zoning rules, permit processes or procurement systems designed for traditional construction rather than off-site buildings. This section outlines the key areas where municipalities can intervene.

Integrate prefabrication into planning and land use

Update zoning to allow more prefabricated and modular housing

Many jurisdictions still restrict off-site-built housing to low-density or single-family zones. Adjusting zoning policies to allow prefabricated, panelized and volumetric modular housing in mixed-use and infill areas increases land availability and supports higher densities. For example, Minneapolis, Minnesota, rezoned 16 scattered sites to permit modular four- and six-plex buildings and issued setback and yard variances to align projects with its comprehensive plan.

Consider height and density limits

Because stacked volumetric modular buildings can require thicker floor assemblies, height limits can unintentionally reduce unit counts. Oakland, California, addressed this by passing the Construction Innovation and Expanded Housing Options Act to increase height limits for modular buildings. Other municipalities can enact similar changes when volumetric systems are being considered.

Adopt near-permit-ready or approval-ready plan catalogues

Pre-approved plans simplify the design review process by providing building designs that comply with local codes and design guidelines. However, "pre-approved" is often not accurate in practice, and municipalities are generally not comfortable issuing permits based on fully pre-approved, off-the-shelf designs. It is more appropriate to refer to "near-permit-ready" or "approval-ready" designs that reduce, but do not eliminate, review requirements.

British Columbia's *Digitally Accelerated Standardized Housing (DASH)* platform illustrates how this can work. BC Housing created DASH to speed up affordable housing delivery by combining standard building designs with prefabricated components and digital tools. Users can select from a library of three- to six-storey building designs and adapt them to specific sites using a rules-based generator that incorporates municipal zoning, setbacks and neighbouring massing.

The platform's kit-of-parts includes non-proprietary, standardized components—prefabricated wall assemblies, floor cassettes, mass-timber systems, roof panels, drop-in mechanical systems, balconies and millwork.

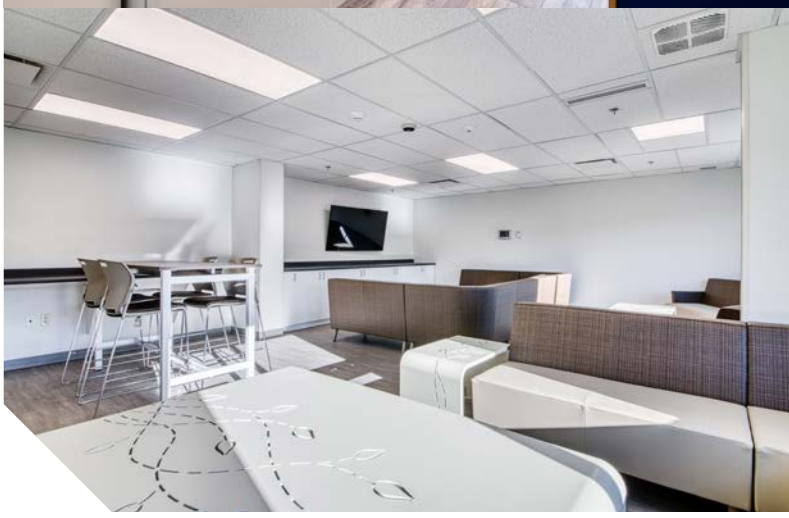
All components comply with the BC Building Code and Energy Step Code. DASH also offers model zoning language and a library of pre-qualified components to streamline approvals.

However, DASH is still evolving, and experienced manufacturers and developers may be able to deliver lower-cost, faster projects using their own standardized systems. DASH should be recognized as a visionary, long-term direction for the sector, not a turnkey solution that municipalities should adopt without careful evaluation.

A key, immediately actionable element of the DASH ecosystem is Metro Vancouver's creation of a shared regulation and zoning bylaw across multiple municipalities—a significant achievement in regional alignment that can reduce costs and timelines regardless of whether municipalities use DASH itself.

Other emerging resources include the *CMHC Housing Design Catalogue* and the province of BC's *Standardized Design Catalogue*. These initiatives have immense long-term potential but currently have limited uptake and require further development before they can deliver consistent cost or time savings. Municipalities should view them as promising tools rather than guaranteed solutions.

Integrating approval-ready catalogues into municipal permitting systems can reduce back-and-forth with planners and speed up approvals, but municipalities should be cautious about relying on any catalogue as a primary delivery tool until the models are proven in practice.



The Thompson Rivers University (TRU) student housing project is the newest addition to the university's East Village, located in Kamloops, BC. Comprised of 52 modules, the building consists of 80 rooms and accommodates 148 student-beds.

Streamline permitting, codes and inspections

Adopt and reference CSA modular construction standards

Prefabricated modules and off-site components frequently encounter duplicative reviews. This happens because factory-certified work is sometimes re-reviewed or re-inspected by local authorities when the scope of factory versus site responsibilities is not clearly defined. This duplication erodes off-site efficiencies.

CSA Group is a leading standards development organization that collaborates with industry, government and experts to create consensus-based standards guiding the design, manufacturing and regulatory compliance of construction systems, including off-site and modular building. In off-site construction specifically, CSA develops standards (e.g., for modular and prefabricated buildings) that define processes, quality assurance and certification requirements to ensure safety, consistency and efficient approvals across jurisdictions. Several CSA standards provide a framework for harmonized approvals:

CSA A277:16 (R2021) Procedure for certification of prefabricated building, modules and panels: This standard prescribes how prefabricated buildings and modules are certified during factory construction. Certification is performed by the Standards Council of Canada-accredited certification bodies, including third-party inspection and provincial agencies. These bodies review designs, conduct in-factory inspections and certify that modules meet structural, MEP requirements. Certified modules carry a label indicating the building codes they meet, which may reduce the need to open walls or ceilings for inspection onsite when accepted by the local authority having jurisdiction (AHJ), for example, building officials. CSA A277 is incorporated by reference in the building codes of Alberta, Ontario and Quebec; municipalities elsewhere can adopt it to reduce redundant inspections. CSA A277 certification does not eliminate all site inspections. It may reduce the need to re-inspect certified factory work, especially concealed assemblies, but building officials still review and inspect site work, installation, connections and final occupancy.

CSA Z250:21 Process for delivery of volumetric modular buildings: Developed to complement CSA A277, this standard covers the entire delivery process—from design and quality control through logistics, transportation, sitework, installation and finishing. Z250 does not replace AHJ review or site inspections; rather, it provides a consistent framework for coordinating work before and after factory certification, clarifying roles, responsibilities, documentation and interfaces between factory-certified and site-completed work.

CSA Z240 MH series: This series governs manufactured homes and provides another pathway for factory-built housing that municipalities may encounter.

Clarify scopes of review and inspection

Project teams should prepare separate plans for factory and site scopes, so inspectors know which elements each jurisdiction reviews. Under CSA A277, modules certified through an approved factory inspection program do not require reinspection onsite. Municipal inspections should instead focus on the building as a whole, its foundations, interconnections, site-installed systems and final assembly.

Municipalities can support consistency and efficiency by:

- publishing clear guidance that distinguishes factory-certified work from site-regulated work
- encouraging early engagement with qualified third-party inspectors
- providing training for building officials on factory-built systems
- identifying when third-party support may be appropriate, while recognizing that municipal building officials remain the primary inspectors for site work and occupancy

Effective use of CSA A277 requires strong coordination across the ecosystem—manufacturers, developers, certification bodies, CSA and local governments. When building officials perform thorough inspections of site work and interfaces, they can catch issues early and avoid costly delays.

Service sites early

Off-site projects must engage parties involved in utility and service connections very early, and municipalities must consider a streamlined approval or construction process to ensure connections are available before building construction is completed. This often means a 30 to 50 percent increase in connection timelines is required.

Introduce fast-track permitting pathways

Jurisdictions can establish expedited approval processes for modular and prefabricated projects. Several Canadian municipalities have already implemented fast-track models, including Toronto's Certified Plans program and Kelowna's Infill Fast-Track program.

Fast-track pathways are most effective when paired with standardized or "approval-ready" designs, allowing municipalities to reduce review timelines for repeatable building types. These can include either combined development and building permit streams or a building permit with a site-servicing plan, when a full development permit is not required.

Municipalities can publish clear checklists for off-site project applications and align review timelines with factory production schedules.

Pomeroy Lodging Employee Housing, Kananaskis, AB. A 36-module employee housing complex built by ROC Modular with affiliate Steenhof Building Services.

Provide municipal officials with tools and training

CSA Group offers free training and compliance tools, such as the Z252:23 guide to compliance and approval processes, interactive infographics on modular site access and safety, final inspection checklists and logistics-planning templates. Making these resources available to planning and building staff supports consistent, informed decision-making. Dedicated, trained teams to review and inspect modular projects, especially during early adoption, can help municipalities realize the full timeline benefits of off-site construction.

Rethink procurement and financing

Use collaborative procurement models

Off-site projects benefit from early integration of architects, contractors, engineers, building officials and manufacturers. Two-stage or design-build procurement allows teams to develop off-site concepts collaboratively before final selection, aligning designs with factory capabilities.

Support demand aggregation and pre-purchasing

Off-site manufacturers require predictable demand. Municipalities can form regional consortia to pre-purchase units or pool orders, helping secure production slots and encourage factory investment. BC Housing's DASH framework connects projects with a roster of manufacturers and pre-approved contractors to reduce procurement delays.

Tailor financing to off-site construction

Off-site production often concentrates costs earlier in the project timeline, as factories and suppliers may require large deposits before installation. Revolving loan funds or bridge financing can provide early-stage capital. Off-site-specific contract templates can help address risk allocation, payment schedules and delivery conditions.

Provide incentives and support

Encourage local manufacturing

Identifying facilities close to projects reduces transportation costs and emissions. Municipalities can offer tax abatements, grants or low-cost land to attract prefabrication manufacturers, but only where such incentives do not create a financial loss for the municipality. Municipalities can also prioritize non-financial incentives such as accelerated servicing, expedited permitting or clearer approval pathways, rather than offering land or subsidies that reduce municipal revenues. Given local government responsibilities for infrastructure, as well as existing infrastructure deficits, incentives must be used cautiously and only where demand is sufficient to sustain operations.

Consider cost-reducing measures to enable non-market project affordability

Municipalities have several levers that can reduce the cost of projects and improve their financial feasibility. This is true for both off-site construction and traditional building methods.

These levers are particularly relevant to enable non-market, affordable housing, where lower costs result in deeper affordability over the long-term. To support non-market off-site projects, municipal land can be donated, sold or leased at low cost to community housing providers. Reducing connection fees, offering expedited utility hookups and removing or reducing parking requirements can also lower costs and make off-site projects more feasible. For market housing, improved permitting timelines and clear acceptance of CSA A277/ Z240 MH often provide greater value to developers than fee reductions.

Invest in workforce development

Off-site construction creates new roles in digital design and manufacturing. Municipalities can partner with unions and colleges to develop training programs, apprenticeship pathways and continuing education courses. These workforce investments support local economic development without creating structural revenue losses for municipalities.

Engage communities and build capacity

Educate stakeholders and address misconceptions

Residents may associate modular housing with low-quality or temporary structures, even though modern modular buildings meet or exceed building codes. Municipalities should showcase successful projects, emphasize quality and sustainability and involve residents in design decisions. BC Housing's Resident Design Advisory Panels provide a useful model.

Coordinate across jurisdictions

Off-site projects cross provincial, territorial and municipal boundaries. Interdepartmental teams should engage regulators and certification bodies to align approvals and share lessons.

The CSA Z252 and Z250 standards offer guidance on coordination and quality management.

Collect and share data

Monitor metrics such as cost, timeline, energy performance and occupant satisfaction. CSA standards encourage thorough documentation and quality control, which municipalities can use to capture data, refine policies and build the case for broader adoption.

By modernizing land-use rules, integrating digital plan catalogues like DASH, adopting CSA and International Code Council standards, streamlining permits, using collaborative procurement and financing models, offering targeted incentives and engaging communities, municipalities can unlock the full potential of prefabrication and off-site construction. These levers accelerate delivery, improve quality and sustainability and support broader goals of affordability and economic development.

The Thompson Rivers University (TRU) student housing project is the newest addition to the university's East Village, located in Kamloops, BC. Comprised of 52 modules, the building consists of 80 rooms and accommodates 148 student-beds.

Readiness to adopt off-site construction: a municipal scorecard

Before committing to a prefabricated solution, municipal leaders should assess whether project conditions and internal systems are conducive to the selected off-site approach, whether panelized, componentized, volumetric modular or hybrid. The following readiness scorecard synthesizes best practices from industry guides and research and provides a structured way to evaluate preparedness. This tool can help a municipality assess readiness for adoption of off-site construction for its own development projects or off-site projects that may come to a municipality for approval.

Regulatory and inspection readiness

☑ Are code requirements understood?

Off-site projects must meet the same building codes as site-built construction but may require separate provincial/territorial, municipal or third-party inspections depending on the system used. Identify which agencies will inspect factory-built elements and which will inspect site work and final assembly.

☑ Are CSA standards adopted locally?

Confirm whether CSA A277 certification will be accepted by local building officials and whether the project needs to follow the CSA Z250 delivery process.

☑ Is there a fast-track or alternative permitting process?

Investigate whether local bylaws allow modular projects to benefit from expedited review or pre-approved plan catalogues.

Project suitability

☑ Is the project repetitive or scalable?

Prefabrication yields the greatest benefits when designs are repeatable and volumes are high. One-off, highly bespoke buildings or those requiring large open spans may not justify off-site methods.

☑ Is the selected prefabrication category appropriate for the project?

Consider whether component-level prefabrication (e.g., precast walls or MEP skids), system-level panelization (e.g., wall and roof panels or bathroom pods), volumetric modules or a hybrid approach best suits the building's size, complexity, design flexibility and site constraints. For example, panelized systems allow more flexibility for unique layouts but require more onsite assembly, while volumetric modules offer faster onsite installation but demand repetitive layouts and careful transport planning.

☑ Can the design be frozen early?

Off-site manufacturing moves quickly. Late changes are costly or impossible once fabrication begins. Evaluate whether stakeholders can commit to key decisions before production starts.

☑ Is there an opportunity to standardize units?

Standard room layouts, building modules or kit-of-parts components facilitate off-site production and reduce cost per unit.

Team and collaboration

☑ Is there an integrated project team?

Modular projects succeed when the developer, architect, engineer, general contractor, building department and manufacturer work together from the outset. Determine whether procurement and contracting processes support early collaboration and design integration.

☑ Have roles and responsibilities been clearly defined?

Define which team member is responsible for design coordination, manufacturing, transportation, site assembly, inspection, warranty and insurance.

☑ Is there sufficient off-site experience?

Assess the team's familiarity with off-site construction. If experience is limited, plan to engage specialists or provide training.

Manufacturer and supply chain readiness

☑ Has the manufacturer been pre-qualified or vetted, or is a supply arrangement or Memorandum of Understanding in place?

Due diligence is critical. This guide recommends reviewing a manufacturer's portfolio, touring the factory, visiting completed projects and checking references before signing contracts.

☑ Is the factory capacity aligned with your schedule?

Confirm that the manufacturer has production slots, labour and supply chain to meet your timeline.

☑ Do the factory processes comply with CSA A277 and other relevant standards?

Certification under CSA A277 ensures modules meet building code requirements for the installation and simplifies onsite inspection.

☑ Are there contingency plans for manufacturer failure?

Contractual terms should address what happens if the manufacturer cannot deliver.

Financing and budgeting

☑ Is the finance structure adapted to off-site cash flow?

Many off-site suppliers require earlier payments than conventional projects because manufacturing starts before onsite installation. This is especially true for volumetric modular systems with higher levels of factory completion, but panelized and MEP-prefabricated packages may also require deposits or milestone payments tied to factory production.

☑ Has budgeted cost savings been validated?

Don't assume automatic savings. Consider transportation costs, crane rental, factory overhead and permit fees. Include contingencies for changes or delays.

☑ Are there mechanisms for demand aggregation or pre-purchasing?

If multiple municipal projects are planned, consider pooled purchasing or agreements with manufacturers to secure production slots.

King William Passive House is a three-storey, modular social and supportive housing project located in Hamilton, ON.

Site and logistics readiness

☑ Is the site accessible for off-site deliveries, including modules when applicable?

Site access matters for all off-site systems, but it is most critical for volumetric modules because of their size and weight. Panelized, componentized and MEP-prefabricated systems generally offer more flexibility in constrained urban or remote sites, although they still require staging, craning and delivery planning.

☑ Are utilities and foundations prepared?

Prefabrication does not eliminate site work. Excavation, grading, foundations and utility connections must be completed and passed inspections before modules are installed.

Stakeholder engagement

☑ Has the community been informed?

Early engagement reduces misconceptions about prefabricated and modular housing. Provide clear information about design quality, sustainability and local benefits.

☑ Are elected officials and administrators aligned?

Political support is crucial for planning approvals, zoning changes and funding. Regular updates and briefings help maintain alignment.

Risk management and contingency planning

☑ Have risks been identified and mitigated?

Map out potential risks, such as manufacturer insolvency, transportation disruptions, regulatory delays and design changes and develop mitigation plans (e.g., performance bonds, alternate suppliers, buffer time).

☑ Is there insurance coverage for all phases?

Ensure the developer or municipality has adequate insurance that covers modules during manufacturing, transportation and onsite installation.

☑ Is there a schedule contingency?

Even with modular construction, unexpected delays occur. Include contingency allowances for weather, labour disruptions and permit issues.

Prince Rupert Five-Storey multifamily, Prince Rupert, BC. A 40-module, 28,500 sq. ft. multifamily project designed by Steenhof Building Services Group.

Training and capacity building

☑ Are staff trained in off-site construction and inspection?

Building officials, planners and inspectors require a solid understanding of prefabrication processes. CSA Group supports this by offering free access to training and compliance resources, including approvals guidance, interactive site-access infographics and safety and inspection checklists.

Municipalities should ensure that building departments have the resources to train staff specifically on factory-constructed buildings, modules and panels. This includes ensuring staff have access to the relevant CSA publications—either through partnerships with building official associations and CSA or through direct purchase of the standards.

☑ Is there a plan to develop a skilled workforce?

Off-site construction requires workers skilled in digital design, manufacturing and modular assembly. Partner with unions, colleges and training institutes to build local capacity. Workforce development supports both municipal capacity and local economic development and helps ensure that the region can support growth in prefabrication and off-site construction.

This readiness scorecard is not a pass-fail test but a diagnostic tool. By systematically assessing these areas, municipalities can identify gaps, adjust project plans or policies and increase the likelihood that prefabrication projects will deliver their promised benefits.

Additional resources and support

Municipalities embarking on off-site construction do not need to start from scratch. Numerous standards bodies, industry associations and programs offer guidance, training and funding support. Below are key resources to explore.

National standards and guidance

CSA Group resources and training

CSA Group's construction and infrastructure program curates a suite of standards (e.g., CSA A277 and CSA Z250), research reports, policy briefs, case studies and infographics to build confidence in off-site construction. The same page links to no-fee training modules on certification, approvals processes and delivery of modular and other prefabricated projects. Municipal officials can join the CSA Construction and Infrastructure Community to access discussion forums and stay up to date with standards development and research.

CSA A277 and Z250 standards

As discussed, CSA A277:16 (R2021) specifies certification procedures for prefabricated buildings and ensures modules are inspected and labelled in the factory. CSA Z250:21 outlines the process for delivering volumetric modular buildings from design through installation. Municipalities should encourage suppliers to follow these standards and familiarize building inspectors with their provisions.

Research reports and high-rise guidelines

CSA's modular resources page includes research on high-rise modular construction, regulatory frameworks and policy recommendations. These documents can help planners and engineers understand advanced applications and regulatory landscapes.

Municipal and funding programs

FCM Green Municipal Fund (GMF) and Sustainable Affordable Housing (SAH) initiative

FCM's GMF manages approximately $2.4 billion in programs funded by the Government of Canada. The SAH initiative, launched in 2020, is a six-year, $300 million program that has supported more than 3,700 affordable housing units across Canada. Although capital funding is now fully allocated, the program continues to offer no-cost supports, regional energy coaches, toolkits and guides (e.g., *Navigating Energy-efficient Affordable Housing Projects Toolkit* and *Understanding Energy Efficiency*), a funders list and various learning and training opportunities. These resources provide general planning assistance and can be applied to modular and prefabricated developments.

FCM webinar series

The Modular Momentum: Accelerating New Home Construction webinar features CSA Group experts, municipal leaders and industry representatives discussing how to unlock off-site potential, address common hurdles and learn from real-world projects. FCM's website also links to the *Canadian Permanent Modular Construction Industry Report* and CSA's *Seizing the Modular Construction Opportunity* policy brief.

Build Canada Homes (BCH)

Launched in 2025, BCH is a new federal agency (and as of publication, a proposed Crown corporation) that will invest billions in modular and mass-timber housing projects.

BCH identifies MMC—including modular, panelized, prefabricated and mass-timber systems—as a core strategy for scaling housing supply, improving quality and reducing carbon emissions. The BCH *Investment Policy Framework* emphasizes repeatable, standardized and manufacturable building solutions that can be deployed quickly across multiple communities.

Municipalities can align with BCH by:

- updating zoning, permitting and inspection practices to support MMC and off-site construction
- adopting or formally recognizing standards such as CSA A277, CSA Z250 and CSA Z240 MH to provide clear compliance pathways
- supporting standardized or "approval-ready" building designs that enable repeatable, scalable delivery
- building local capacity in digital design, manufacturing and modular assembly

The BCH *Framework* encourages municipalities to demonstrate readiness for MMC by streamlining approvals, reducing regulatory friction and supporting the conditions necessary for manufacturers to scale. While details are still emerging, municipalities can follow BCH announcements and participate in requests for information to position themselves for future funding and partnerships.

BC Housing Digitally Accelerated Standardized Housing (DASH)

BC Housing's DASH platform provides free standard designs and a kit-of-parts for mid-rise housing, along with model zoning language and pre-qualified prefabricated components. The platform illustrates how provinces and territories can support municipalities through digital design tools and pre-approved components.

Training and knowledge networks

Canadian Housing & Renewal Association (CHRA) / Chartered Institute of Housing Canada (CIH Canada)

In partnership with BCH, CHRA and CIH Canada host the More than Modular: MMC for Non-Market Housing training series. The four-session program provides community housing professionals with foundations in modular, panelized, volumetric and mass-timber construction. It covers core concepts, procurement guidance, design integration, site planning, financing and supply-chain realities. The curriculum is informed by advisors from Cahdco and the University of New Brunswick Off-site Construction Research Centre and awards a micro-credential to participants.

University of New Brunswick Off-site Construction Research Centre (OCRC)

The University of New Brunswick's OCRC conducts research on modular and off-site technologies, offers training sessions and disseminates best practices. Its partnership with CHRA ensures that course content reflects emerging Canadian research and cold-climate experience.

Modular Building Institute (MBI)

MBI is the international trade association for commercial modular construction. Its annual *Canadian Permanent Modular Construction Industry Report* provides market data, case studies and analyses of adoption barriers. MBI also offers webinars, conferences and advocacy resources.

National Institute of Building Sciences (NIBS) Off-Site Construction Council (OSCC)

NIBS OSCC publishes guides, conducts research and hosts webinars on off-site construction. While some resources focus on U.S. codes, many principles are transferable to Canadian contexts.

Fannie Mae Modular Construction Toolkit

Although U.S.-focused, the toolkit offers detailed guidance on planning, manufacturer selection, financing structures and best practices for modular development. It is a useful reference for developers and lenders seeking to understand off-site processes.

Tools and technology platforms

Digital plan catalogues

Tools like BC's DASH provide a template for integrating pre-approved designs and kit-of-parts components into municipal approval processes. Municipalities can encourage development of similar platforms or adapt DASH components to accelerate design and permitting.

Certification and compliance tools

CSA Group offers free compliance guides (e.g., Z252:23), interactive infographics on site access and safety, final inspection checklists and logistics-planning templates. These tools help streamline inspections and clarify roles for modular projects.

Further reading and case studies

Policy briefs and research reports

CSA's *Exploring the Existing Regulatory Framework for Modular Construction in Canada* and *Seizing the Modular Construction Opportunity* provide policy recommendations to harmonize codes and expand modular adoption. Reports from academic institutions (e.g., Concordia University, University of New Brunswick) and think tanks (e.g., C.D. Howe Institute) examine economic impacts, workforce implications and regional barriers.

International resources

The U.K. government's MMC Guidance Note and the U.S. National Renewable Energy Laboratory's off-site construction guides offer insights into different regulatory and market contexts. The World Bank Group's International Finance Corporation publishes guidelines for modular schools and health facilities in developing countries.

By exploring these resources and connecting with the networks described above, municipalities can expand their knowledge, build capacity and access funding to support off-site construction projects, whether in dense urban cores or in remote, rural and northern communities.