

Is Modular Construction Right for Your Housing Project?

A DECISION MAKING TOOL FOR HOUSING PROVIDERS

PURPOSE OF THE TOOL

This tool helps housing providers understand the difference between modular and conventional construction in the early stages of project planning. By understanding these differences, housing providers will be better able to determine if modular construction is a good fit for their project and to navigate a path forward.

Although the tool was developed with housing providers in mind, it may also be helpful to other groups such as developers and builders, building officials, and planners.

HOW TO USE THE TOOL

The tool is organized as a flow chart divided into three categories:


- DESIGN & CONSTRUCTION
- SITE, LOCATION & TRANSPORTATION
- TIMELINE & BUDGET

ABOUT THE TOOL

This tool draws on information collected through existing research and informational interviews with a variety of modular industry members.

DESIGN & CONSTRUCTION


1 Temporary or Permanent



Modular construction can offer some advantages over conventional site construction for temporary structures. It can be more quickly delivered (taking full advantage of the temporary timeframe) and disassembled for reuse elsewhere at a later date. Successful disassembly and reassembly will present various logistical challenges that should be planned for in detail early-on.

Is the project site **temporary or permanent**?


2 Repeating Modules



Simple designs with the least number of unique modules allows the project to be more cost-effective (i.e. having repeating room layouts, stacking bathrooms and mechanical/electrical rooms, etc.). Many unique modules will increase the cost of using modular construction, even if the building is replicated.

Does the design allow for **repeating modules**?


3 Replicability



Modular construction may allow for scalability and easier replication, which in turn may allow for economies of scale and for cost-efficiencies to be realized if project and site conditions permit.

Will the design be **replicated** for other projects?


4 Simple Form



While modular construction lends itself to simple forms (surface to volume ratio), it is possible to use it for more complicated forms and to add architectural features such as cladding. As with conventional construction, more custom work either in the factory or on-site will result in higher costs. It is therefore important to understand the specific design requirements for the Authorities Having Jurisdiction to avoid on-site corrective work that would add cost to a modular project.

Does the design incorporate a **simple form**?


5 Height Restrictions



As modular construction necessitates double floors/ceilings, a modular build can be higher than a conventional build with the same number of floors. For example, depending on the framing technique of the modules, each floor could add an additional 25.4 cm (10 inches) to the building height compared to a conventional building. However, it may be possible to reduce ceiling height to avoid or reduce additional building height. It is therefore important to be aware of height restrictions and how use of modular construction can impact building and/or ceiling height.

Will modular construction be a limiting factor for the project due to the **additional height**?


6 High Ceilings or Long Spans



Large open spans or high ceilings are not easily achievable with modular construction due to structural limitations and transportation restrictions.

Will the design incorporate **high ceilings or long spans**?

7 Hybrid Construction



A hybrid approach, using both conventional and modular construction techniques, is a way for modular construction to be more flexible and more creative architecturally. However, a hybrid approach may negate some of the time saving advantages of fully modular construction. An example would be using modules for living units in an apartment building, and using conventional construction for more open spaces such as a lobby.


Can the project be **fully built with modular units**?



SITE LOCATION & TRANSPORTATION

SITE LOCATION & TRANSPORTATION


8 Routing Issues



If there are road restrictions (low-height overpasses or powerlines, narrow streets, etc.), transporting the modules may be prohibitively costly or impossible. Ensure transportation of the modules is feasible with respect to height, width, and weight. Additionally, weather and potential water crossings, such as barging, should be considered to avoid moisture issues during transportation. The distance to the site from the plant should also be considered with regards to transportation costs and adequacy of temporary protection.

Will there be any **routing issues** during transportation?

9 Site Space



If the project location is in a very tight space (e.g. an urban infill site), staging and craning may be prohibitively costly or impossible. Sufficient space is required to lift the modules from the transportation to the building site. It is ideal if the site itself has space to stage and crane the modules. The space must also be shaped appropriately to accommodate modular designs. In addition, consideration should be paid to site obstructions, such as trees, overhead power lines, and neighbouring buildings, as they may limit on site access.

Is there adequate **site space** for staging and craning on site or nearby?

10 Local Labour and Materials



Modular construction may be helpful if there is a lack of locally available labour or materials, particularly if the modules can include furnishing. However, use of modular construction could be seen negatively by the community if it limits the local economic impact of the project.

Is there a lack of **local labour or materials**?

11 Short Building Season



A shorter building season in northern Canada can make conventional construction challenging since some aspects of construction might need to stop during the off-season. The manufacturing of modules can continue indoors during the off-season, with project assembly occurring once conditions allow.

Does the project location have a **short building season**?


12 Community Disruption



Where conventional construction requires the accommodation of outside workers for a long period of time, modular construction may be preferable because it reduces the demand for outside workers and/or their duration in the community. For example, a community reliant on tourism may not want local accommodations occupied by trades workers during their high-season.

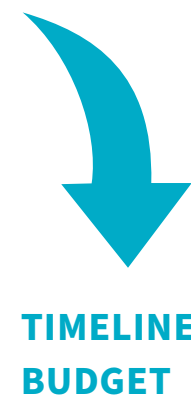
Is there a desire for limited **community disruption**?

13 Moisture



Moisture management is crucial for both modular and conventional construction. Modular construction presents unique circumstances such as transportation, open spaces between modules, and having completed finishes potentially exposed to moisture sooner than conventional builds. Due to these circumstances, a moisture management plan is important for modular construction. Particular consideration is required if the modules will be traveling through differing climates, in inclement weather, or over water.


Is there the potential that **moisture** can be an issue during transportation, staging or assembly?



TIMELINE & BUDGET

TIMELINE & BUDGET


14 Jurisdiction



In order to avoid potential costly design changes, it is important to fully understand the design requirements of the Authority Having Jurisdiction for issuing construction and occupancy permits. Design requirements may also limit opportunities to re-use building designs. Other regulatory requirements for different locations may also limit opportunities to re-use building designs.

Is the Authority Having **Jurisdiction** familiar with modular construction?


15 Late-Stage Design Changes



Late-stage design changes can be more costly to incorporate with modular construction and diminish some of the efficiencies that make modular construction advantageous.

Is the team willing to commit to no **late-stage design changes**?


16 Financing



Due to different financing considerations/requirements between conventional and modular construction, financing from lenders unfamiliar with modular construction may be more difficult to obtain. However, there are a number of options available to navigate the differences which should be discussed with your financing partners.

Does the lender providing **financing** have familiarity with modular construction?


17 Timeline Hurdles



Project approvals from financiers and the Authority Having Jurisdiction may take additional time if there is a lack of familiarity with modular construction.

Are there **timeline hurdles** such as permitting or other approvals that could delay the project?


18 Rapid Delivery



Both conventional and modular construction can complete projects in a quick timeline if organized appropriately. For modular construction, projects can achieve a rapid project delivery if the construction process is modified to align itself with modular. This is because the modules can be built concurrently with the sitework. However, this requires more coordination up front in the planning and design phase in order to accomplish. Project teams must consider what method of construction will be more suitable for the project.

Does the project need **rapid delivery**?

19 Warranty



In B.C., modular construction is exempt from the *Homeowner Protection Act* if it is certified under the CAN/CSA-A277 "Procedure for certification of prefabricated buildings, modules, and panels". Many modular manufacturers, however, will provide third party warranties. Refer to BC Housing Regulatory Bulletin No. 29 for further clarification of the *Homeowner Protection Act* and modular construction. Outside of B.C., each province will have its own legislation with respect to new home warranty and it is important to understand how this is impacted when using modular construction.

Does the project require a **warranty**?



PROJECT IMPLEMENTATION

By completing the decision making tool, readers should have a better understanding of the potential benefits and challenges of modular construction. Readers should reflect on the answers given to each of the questions above and determine if modular construction is a good option for their housing projects.