MASS TIMBER SCISSOR STAIR DEVELOPMENT COULD SET A PRECEDENT FOR SUSTAINABLE AND FAST HOUSING SOLUTIONS

STARTING AT THE CORE



Matt Durnan

An innovative mixed-use mid-rise development planned for a site in Etobicoke is nearing completion and the development team is optimistic about the project's potential to stand as an example of how new housing opportunities might be created on constrained sites through creative thinking and the use of modern methods of construction. The developer believes that its approach to this project, and the lessons it learned in bringing it to life could open the door to scalability and replicability of its model.

Construction of **Windmill Developments**' nine-storey mass timber residential building at 230 Royal York Road is expected to be completed in the coming months, with occupancy expected by late summer. The project will bring 58 new residential units to the site along with a small commercial unit at grade.

Once completed, the development will be the tallest multi-residential mass timber building in Ontario, at least for a short while. And some creative design played a significant role in ensuring the project's feasibility.

"It's a pretty tight site, so to get efficient with the floor plates, needing two means of egress [stairways facilitating exit from the building], and having to go through some alternative solutions … a single stair wasn't really an option here," Windmill partner in charge of innovation and development **Stephen Savell** told *NRU*.

"So with the scissor stair, it's really a space saving feature. It's like an interlocking staircase with a single fire-rated shaft. There is a divider shaft going up the middle that also kind of compartmentalizes the two staircases as well, so they basically zig-zag back and forth down the building and it provides two means of egress in a pretty space-efficient way."

While a single means of egress would not have been an option for this residential project due to *Ontario Building Code* (OBC) regulations, installing a scissor stair within a single shaft was the next best option to save space within the building and allow more floor space to be used for residential units.

In recent years, stakeholders in the architecture, planning, and development industries have been pushing for some loosening of restrictions within the *Building Code* to allow more buildings to permit a single means of egress from multi-storey, multi-unit residential buildings over three storeys high. Currently, the OBC requires such buildings to provide two means of egress to ensure tenant safety in the event of a fire or other emergency that requires fast and accessible ways to evacuate the building.

Many housing industry stakeholders would prefer providing a single-stair solution to means of egress for mid-rise housing developments as the installation of two staircases in a mid-rise reduces the amount of floor area that can be used for residential units, and in doing so, can make a mid-rise project substantially more costly.

Some industry experts are actively exploring solutions

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Map showing the location of the site (shaded grey) at 230 Royal York Road in Etobicoke where Windmill Developments is constructing a nine-storey mixed-use mass timber building.

SOURCE: CITY OF TORONTO

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that would permit single-stair solutions in multi-unit residential developments between four to six storeys, in an effort to make more of these missing middle housing projects pencil and to increase housing supply (*See: "Making the Case for Single Stair", Novae Res Urbis GTHA, July 3, 2024*).

In the meantime, a single shaft with a scissor stair is the most viable solution for providing two means of egress within mid-rise developments without sacrificing too much floor space that could otherwise be used for housing.

Over the course of troubleshooting the best solution for this particular residential project, the developer has learned some lessons around how a mid-rise mass-timber project like this on a constrained site might maximize efficiency of floor space, fire safety, and speed of delivery. Some of this emerged from finding solutions to logistical challenges and from looking to access more local supply of pre-fabricated building materials.

This mass timber residential project uses panelized wood framing that was manufactured by **Intelligent City**, a Vancouver-based manufacturer.

An element of concrete construction was used to form the stair and elevator shafts within the building. However, the developer is looking to a more efficient way of forming those structures in future projects.

This project's stair shaft was created using the traditional method of pouring and forming the concrete, but there are more efficient and cleaner methods for forming a staircase out there that Windmill is exploring.

"For future projects, we're looking at a pre-cast concrete solution instead of cast-in-place, where we'd be able to set a floor a day, so you can go much quicker and assemble the mass timber structure around it [the stairwell]," said Savell.

"If you're looking at pre-cast concrete [where the concrete shaft is formed off-site and delivered to the site], if you have a 10-storey building, you can do a floor a day, instead of a floor every three to four days. So, you're really saving quite a bit more time on the core [of the building] and then on the pre-fab mass timber and envelope erection. We did a study on a 12-storey project in Ottawa that we have plotted for 2027, and assuming there is an Ontario factory [that produces mass timber panels] that can keep up, we really see an overall schedule savings of about three months, which is a lot when you're trying to deliver housing quickly."

Another significant element to delivering innovative projects like this one is the need to undertake considerable planning on the front end in order to ensure that the project is effective. This is more the case than ever for mass timber projects, as with pre-fabricated materials, there is little-to-no wiggle room to adjust the project on the fly.

"The key thing with technology like this, specifically the pre-fabrication element, is early engagement with the supplier to really inform the design and even the budgeting. I think in order to make the pre-fabrication as effective as possible is shifting both the decision-making to be very early, as well as the cash flows to be able to pay for the product earlier," Windmill partner for communications and impact **Jenny McMinn** told *NRU*.

"The product needs to be

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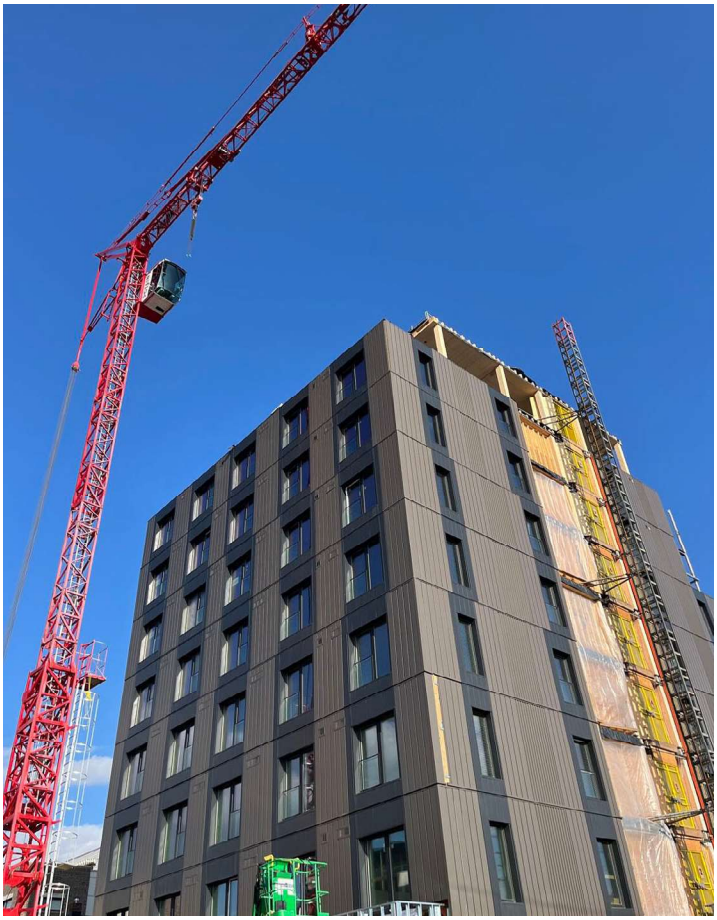


Photo of Windmill Developments' currently under construction nine-storey mixed-use building at 230 Royal York Road in Etobicoke. The development will bring 58 new residential units to the site along with a commercial unit at grade. The developer is using pre-fabricated mass timber panels to construct the building.

SOURCE: WINDMILL DEVELOPMENTS

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manufactured and ready to go so that logistically you're able to leverage the opportunity towards reduced project schedule, and ultimately, overall cost. In terms of planning, there is a lot of early decision-making and you can't choose pre-fab timber once you're already in the design development stage. This is such a strategic shift. And I think those are some of the key lessons that we're learning … about making a decision and sticking to it. And really figuring out how to optimize the solution and not waffling later on in a project, but really owning our commitment and vision and then working with the best consultants and suppliers to figure out the best and most cost-effective way to do that."

While this under-construction residential project will be nine storeys in height, Savell says that if this development were in the application stages today, Windmill would have further pushed the envelope to align with the most recent *Ontario Building Code* permissions that allow for encapsulated mass timber construction (EMTC) for buildings of up to 12 storeys.

In any case, the project is one that Windmill hopes will set a precedent for what can be accomplished through some creative planning and innovative construction methods, and that ultimately will lead to the construction of more of these types of buildings in the future, projects that deliver housing more quickly and in an economically and environmentally sustainable manner.

"I can't tell you how many tours I've given of the 230 Royal York site. We have had hundreds of people come through, from municipalities to government entities to **Build Canada Homes**, to the CMCH [**Canada Mortgage and Housing Corporation**], to other developers and architects and engineers and consultants," Savell said.

"Build Canada Homes is a new entity. And they're all about modern methods of construction, like off-site construction, scalability, and replicability. So, this fits all of those things in a sustainable way. We're really looking at sites and looking to the future to try to scale this up with mass timber and pre-fabricated concrete cores. That's really what we're looking to deliver, housing in a quick and sustainable way."

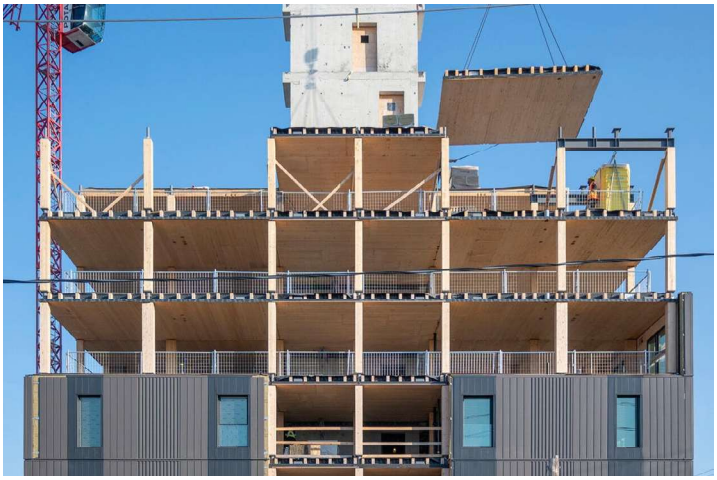




Photo of Windmill Developments' currently under construction nine-storey mixed-use building at 230 Royal York Road. The development will bring 58 new residential units to the site along with a commercial unit at grade. The developer is using pre-fabricated mass timber panels to construct the building. This image shows the single concrete shaft (centre) that will contain a scissor stair, which the developer opted for as a means of maximizing floor space for housing units.

SOURCE: WINDMILL DEVELOPMENTS

Photo inside the single shaft containing the scissor stair of Windmill Developments' mass timber mixed-use building at 230 Royal York Road. This scissor stair has been included in the project as a means of saving floor space to maximize the number of residential units the building can accommodate. By using a scissor stair rather than installing traditional two separate stairwells at opposite ends of the building, the developer has space to include 58 residential units in the building on a very constrained site.

SOURCE: WINDMILL DEVELOPMENTS