

Guide to Mid-Rise Wood Construction in the Ontario Building Code

Second Edition

Applicable as of January 1, 2025



Federal Economic Development
Agency for Northern Ontario

Agence fédérale de développement
économique pour le Nord de l'Ontario



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Cover Image

Blackstone Condominiums, Waterloo, ON – four 6-storey buildings, 323 market-rate rental units total
Completed July 2021 by VanMar Constructors Inc. for Urban Legend Developments

Acknowledgements

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Table of Contents

1	Introduction	1
1.1	Introduction	1
1.2	Scope and Methodology	1
1.3	Limitations	1
2	Background	2
3	Ontario Building Code	3
3.1	Background	3
3.2	Code Changes	3
3.3	Code Content	4
4	Mid-rise Combustible Construction in the 2024 OBC	5
4.1	General	5
4.2	Residential Buildings Construction Requirements	5
4.3	Office Buildings Construction Requirements	9
4.4	Provisions Common to Residential and Office Buildings	11
4.4.1	Combustible materials	11
4.4.2	Sprinkler Design Features	12
4.4.3	Fire Blocking	12
4.4.4	Building Facing Streets	13
4.4.5	Fire Department Access	13
4.4.6	Emergency Power	14
4.4.7	Exit Compartments	15
4.4.8	Structural	15
4.4.9	Occupancy Permit	15
4.5	Mixed Use Buildings	16
4.5.1	Permitted Major Occupancies	16
4.5.2	Other Major Occupancies	17
4.5.3	Separation of Major Occupancies	17
4.5.4	Subsidiary Occupancies	17

5	Other Applicable Code Requirements	18
5.1	Structural design using Wood (Part 4)	18
5.2	Use of Wood in Environmental Separations (Part 5)	19
5.3	Combustible materials – Other Provisions.	20
5.4	Other Fire and Life Safety Provisions.	20
6	Conclusion.	21
6.1	Additional Resources.	21
6.1.1	Organizations and Online Resources.	21
6.1.2	Guides and Technical Publications	21

List of Figures

Figure 1	Maximum permitted building areas by storey count for Group C residential wood buildings	<u>6</u>
Figure 2	Measurement of maximum building height, including mezzanines.	<u>7</u>
Figure 3	Maximum permitted building areas by storey count for Group D business and personal services wood buildings	<u>10</u>
Figure 4	Maximum permitted height between the fire department access route and the uppermost floor level, including mezzanine storeys.	<u>14</u>

List of Tables

Table 1	Permitted major occupancies	<u>16</u>
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1 Introduction

1.1 | Introduction

WoodWorks Ontario has developed this *Guide to Mid-Rise Wood Construction in the Ontario Building Code* to support the application of Ontario Building Code (OBC) provisions permitting the use of wood in mid-rise construction, with particular focus on 5- and 6-storey buildings. This second edition builds on the first edition, *Reference Guide: Mid-Rise Wood Construction in the OBC* prepared in 2015 by Morrison Hershfield Limited (now Stantec) and has been updated to reflect current code requirements and industry practice.

The report identifies key requirements, conditions and limitations associated with mid-rise wood construction under the OBC and is intended to support designers, builders, regulators, and other industry professionals. It is to be read in conjunction with the Ontario Building Code.

1.2 | Scope and Methodology

This report presents relevant provisions of the OBC governing the use of wood in mid-rise construction, with primary reference to the 2024 OBC (O. Reg. 163/24), including amendments carried forward from earlier editions. The report identifies features required to be provided for 5- and 6-storey light wood-frame buildings and outlines conditions and limitations associated with the use of wood under the Code.

The content is based on a review of applicable OBC provisions, published regulatory amendments and industry experience related to the interpretation and application of the Code.

This report focuses on buildings of new construction and does not address detailed design or construction best practices. Guidance on mid-rise wood building design and construction best practices is provided in *The Canadian Guide to Mid-Rise Wood Construction*.

1.3 | Limitations

Comments and conclusions within this report represent the opinions of Morrison Hershfield Limited (now Stantec) and the Canadian Wood Council, which is based on an examination of the applicable Codes, background documentation, our Code analysis and our past experience. In issuing this report, the Canadian Wood Council does not assume any of the duties or liabilities of the designers, builders, owners or operators who may use the information herein for the design or construction of a building. Persons who use or rely on the contents of this report do so with the understanding of the limitations of the documents examined. Such persons understand that the Canadian Wood Council cannot be held liable for damages they may suffer in respect of the design, construction, purchase, ownership, use or operation of a subject property.

2 Background

On September 23, 2014, after many years of research, development, stakeholder feedback and discussion, the Ontario Ministry of Municipal Affairs and Housing announced amendments to the 2012 Ontario Building Code (OBC) that permit 5- and 6-storey combustibile construction for Group C and D occupancies. The amendments to the OBC increase opportunities for designers and builders to create versatile and affordable new buildings. The changes recognize the advancements in wood products and systems, as well as in fire detection, suppression and containment systems, and establish additional features required to achieve an equivalent level of performance for business and personal services (office) buildings up to 6 storeys in building height.

Since then, the 2012 OBC was amended by O. Reg. 89/23 (May 12, 2023) to allow limited combustibile cladding and combustibile exits in mid-rise wood construction to harmonize with the National Model Construction Codes applicable at the time. These amendments have also been carried forward to the 2024 edition of the OBC issued under O. Reg. 163/24, with some minor editorial changes. The 2024 OBC came into effect on January 1, 2025, and applies to projects with permit applications submitted on or after April 1, 2025.

These regulatory changes provide the current framework governing the design and construction of 5- and 6-storey light wood-frame buildings in Ontario. Understanding the intent, scope, and application of these provisions is important for designers, builders and regulators involved in mid-rise projects.

Densification is mandated in almost all municipal growth plans in the province. Mixed-use mid-rise buildings are seen as an important solution that will help create higher density and attract businesses and families to urban centres. Previous code restrictions on combustibile construction made noncombustibile solutions the only option for mid-rise development and many potential developments were stalled as they were deemed cost prohibitive. Developers now have a new, cost-effective option to provide mid-rise solutions.

Decisions about how and where we build our communities have significant impacts on the natural environment and on human health. Wood is a natural, sustainable material and the processing of raw material into building materials has a lower environmental impact when compared to other major building components. The use of sustainable materials and components reduces the negative impact our buildings have on the environment and assists in mitigating climate change.

While amendments to the OBC have expanded opportunities for the use of wood in mid-rise construction, they have also introduced new design, detailing and construction considerations that must be carefully addressed to achieve code compliance and intended performance. This background provides context for the technical and regulatory discussions presented in subsequent chapters.

3

Ontario Building Code

3.1 | Background

The Ontario Building Code (OBC) (O.Reg. 163/24 as amended) is a set of regulations made under the Building Code Act (1992) (Ontario) and sets out the technical requirements for construction of buildings. The Ontario Building Code is a set of minimum requirements for buildings that address objectives of safety, health, accessibility, property protection, resource conservation, environmental integrity and conservation of buildings.

The Code references and paraphrases in this report are for convenience only. For the authoritative text of the Building Code regulations, the official version of O. Reg. 163/24, as amended, should be referenced. Official copies of Ontario's regulations are published in the Ontario Gazette and a consolidated version can be found on the Government of Ontario e-laws website.

The 2024 OBC came into effect January 1, 2025. All references to the OBC in this Guide are to the 2024 edition including all amendments to the date of this Guide. Unless otherwise stated, Code references in this Guide are with respect to Division B, "Acceptable Solutions" of the 2024 OBC.

3.2 | Code Changes

As of January 1, 2015, the OBC permits wood construction for buildings of residential and business and personal services (office) occupancies with a maximum height of 6 storeys. The change to the OBC has expanded the application of the Code, which previously restricted the maximum height of buildings of wood construction to 4 storeys.

The Code was updated to allow the new and innovative use of wood in buildings up to 6 storeys based on the balancing of two primary objectives of the Ontario government:

- » To help increase opportunities for designers and builders to create innovative, flexible and affordable new buildings.
- » To maintain Ontario's high fire safety standards for both the public and fire service personnel.

Since then, the 2012 OBC was amended by O. Reg. 89/23 (May 12, 2023) to allow limited combustible cladding and combustible exits in mid-rise wood construction to harmonize with the National Model Construction Codes applicable at the time. These amendments have also been carried forward to the latest 2024 edition of the OBC issued under O. Reg. 163/24, with some minor editorial changes. The 2024 OBC came into effect on January 1, 2025, and applies to projects with permit applications submitted on or after April 1, 2025.

3.3 | Code Content

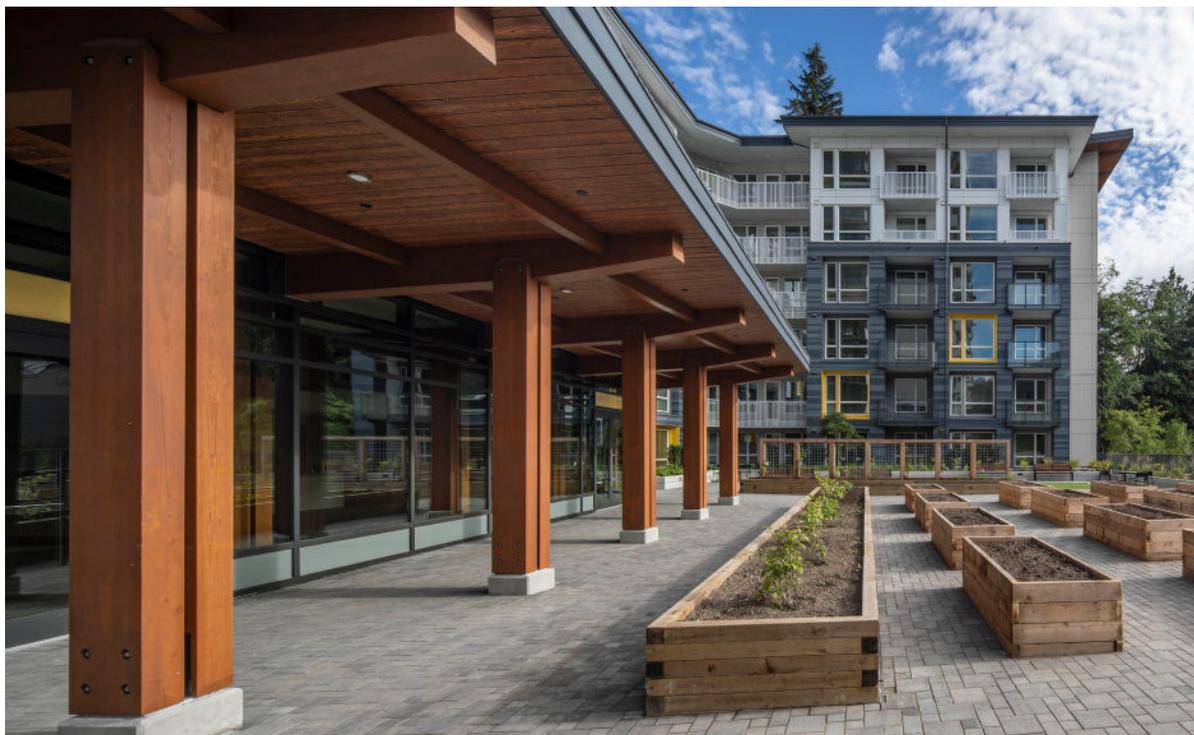
The OBC prescribes the minimum technical requirements for the design and construction of new buildings in Ontario. The high-level objectives of the OBC are safety, health, accessibility, fire/structural/water/sewage protection of buildings, resource conservation, environmental integrity and conservation of buildings. The use of wood in the construction of buildings is related to many of these objectives.

Division B “Acceptable Solutions” contains prescriptive (and some performance) requirements that establish the minimum performance level of the Code. Building Code provisions that influence the use of wood in buildings are in Division B in the following Parts:

- » Part 3 Fire Protection, Occupant Safety and Accessibility
- » Part 4 Structural Design
- » Part 5 Environmental Separation
- » Part 9 Housing and Small Buildings
- » Part 12 Resource Conservation and Environmental Integrity

Provisions that permit or prohibit wood as a construction material are contained in Parts 3 and 9. Part 9 is applicable to “small” buildings up to 3 storeys in building height and up to 600 m² in building area (footprint) with restrictions on occupancy type. Part 3 is applicable to any building larger than this, and a building of any size that contains assembly, care or high hazard industrial occupancies.

Parts 4, 5 and 12 generally do not explicitly require or prohibit wood as a construction material but rather set out the required performance standards for structural, envelope and energy elements that every building must meet.



[Kiwanis Lynn Woods, North Vancouver, BC – 6-storey building, 106 affordable rental units Completed April 2022 by VanMar Constructors Inc. for Kiwanis North Shore Housing Society](#)
Photo courtesy of VanMar Constructors ON Inc.

4

Mid-rise Combustible Construction in the 2024 OBC

4.1 | General

On September 23, 2014 Ontario Regulation 191/14 was filed to amend the 2012 edition of the Ontario Building Code (OBC) to permit mid-rise buildings of wood construction for both residential and business and personal services (office) occupancies, effective January 1, 2015. The amendment included the creation of new Articles 3.2.2.43A. and 3.2.2.50A. to prescribe the construction requirements and area limitations for mid-rise buildings of combustible construction.

The first edition of this Guide presented these novel changes to the 2012 OBC that enabled the use of wood construction for mid-rise residential and business and personal services (office) buildings up to 6 storeys in building height, and outlined the new features that were required to be provided in such buildings. Subsequent amendments to the 2012 OBC expanded these permissions and were later consolidated into the 2024 edition of the OBC. The current Code framework reflects these developments and applies to projects subject to the 2024 OBC.

The 2024 OBC includes specific provisions governing the design and construction of mid-rise combustible buildings, as set out in Articles 3.2.2.51. for Group C occupancies (previously 3.2.2.43A) and 3.2.2.60. for Group D major occupancies (previously 3.2.2.50A). These provisions permit the use of wood construction for buildings up to 6 storeys in height, subject to additional conditions and limitations as described in Sections 3.2-3.5 of this Guide.

4.2 | Residential Buildings Construction Requirements

The provisions of the Code contained in Article 3.2.2.51. permit residential buildings (Group C major occupancy) of combustible construction to be up to 6 storeys in building height. Prior to the 2015 amendments to the Code, the maximum height of a building of wood construction was 4 storeys. The advantage of applying these new Code requirements to shorter buildings (less than 5 storeys) is that Article 3.2.2.51. permits larger building areas (refer to Figure 1). However, when considering all Code requirements holistically, there are additional features that are mandated in these provisions and it may be more advantageous to apply other requirements (e.g., Article 3.2.2.52., which permits a building of wood construction be 4 storeys in building height) if the current area limitations are not a factor in the design of the building.

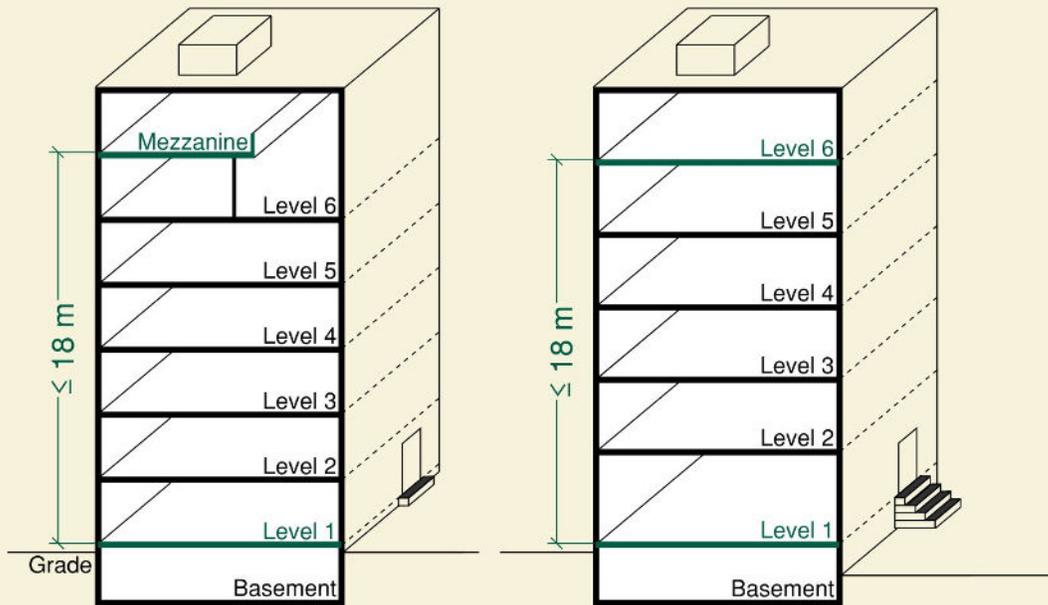


Figure 1
Maximum permitted building areas by storey count for Group C residential wood buildings

It is noted that when the construction requirements of Article 3.2.2.51. are applied and firewalls are used to separate a building into two or more buildings, if the required fire-resistance rating of the firewall is 2 hours (based on occupancies of the buildings), the firewall is not required to be constructed of masonry or concrete provided the buildings on each side of the firewall are sprinklered.

The construction requirements of Article 3.2.2.51., applicable to residential mid-rise buildings, are as follows:

- » A building is required to be sprinklered, as were most 4-storey residential buildings of wood construction prior to 2015.
- » A maximum height of 18 m measured between the floor level of the first storey¹ and the floor level of the uppermost storey or mezzanine is applicable (see Figure 2). The floor level of a rooftop enclosure (for building services), service room, elevator machine room or stairway does not have to be considered. Prior to the 2015 amendments, there was no physical height associated with fire department access.

¹ *First storey* means the *storey* that has its floor closest to *grade* and its ceiling more than 1.8 m above *grade*. *Grade* means the average level of proposed or finished ground adjoining a building at all exterior walls.

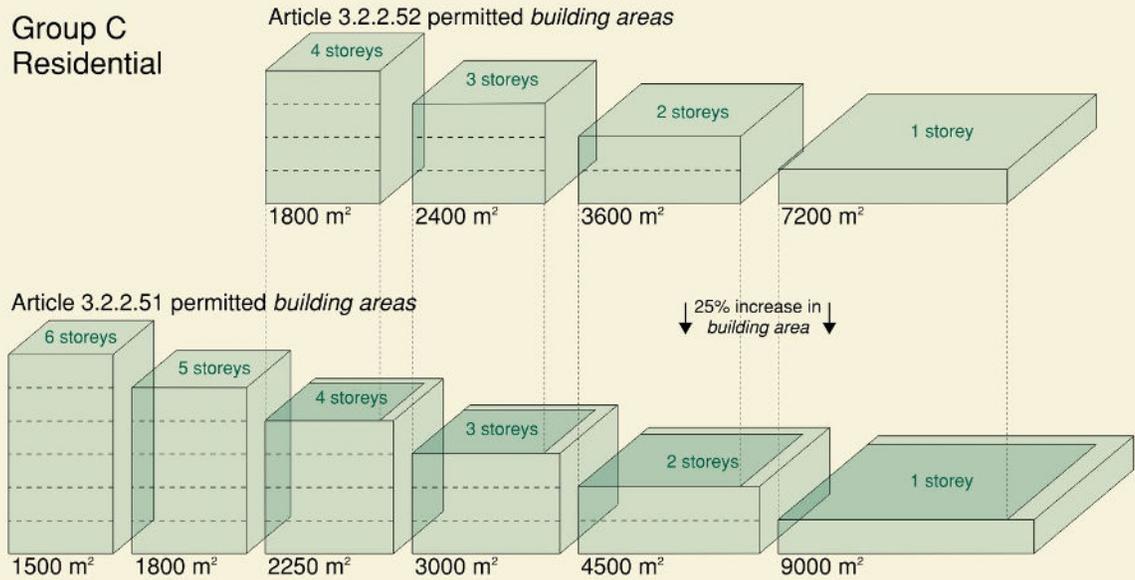


Figure 2
Measurement of maximum building height, including mezzanines

- » For a 5-storey building, maximum building area of 1800 m² is permitted and 1500 m² for a 6-storey building.
- » For a 4-storey building, a maximum building area of 2250 m² is permitted. Prior to the 2015 amendments, a 4-storey building of wood construction would be limited to a building area of 1800 m². Similarly, maximum area limits have been increased for 1- to 3-storey buildings (see Figure 1 for a full comparison).
- » Floor assemblies constructed as fire separations require a 1-hour fire-resistance rating. This requirement is consistent with mid-rise buildings of any construction which are within the corresponding maximum building area limits of the Code for buildings up to 6 storeys in building height.
- » Floor assemblies completely within an individual dwelling unit greater than 1 storey in height are required to have a fire-resistance rating of 1 hour but these assemblies are not required to be constructed as fire separations. This is consistent with residential buildings of any height. However, for some other residential buildings that are 4 storeys or less, the fire resistance rating for floor assemblies entirely within a dwelling unit is waived if there are no dwelling units above another dwelling unit.
- » Mezzanines are required to be constructed with a 1-hour fire-resistance rating. This requirement applies to all mezzanines whether located within a residential suite or not.

- » Roof assemblies require a 1-hour fire resistance rating. Prior to the 2015 amendments, the Code exempted a roof rating for all buildings if the building was sprinklered. This exemption is not applicable to mid-rise buildings of wood construction. Other provisions include the following:
 - » If the roof assembly has a height greater than 25 m from the floor level of the first storey to the highest point of the roof assembly, the roof assembly is required to be of noncombustible construction or be constructed of fire-retardant treated wood. This is a new requirement that was introduced to facilitate firefighting. Prior to the 2015 amendments there were no height limitations for buildings beyond the limitation on the number of storeys.
 - » The noncombustible roof applicable for mid-rise wood construction is permitted to be supported by combustible structural elements (Sentence 3.1.7.5.(3)). Prior to the 2015 amendments, an assembly that was required to be noncombustible would be required to be supported by noncombustible construction. This new provision does not conflict with the remainder of the building being wood construction.
 - » A building can have several roofs that are at different elevations. The construction of non-contiguous roof assemblies at different elevations is permitted to be evaluated separately with respect to the requirements for noncombustible construction for roofs more than 25 m above the floor level of the first storey. Depending on the configuration, the roof assemblies may be of mixed construction.
 - » Combustible roof coverings are required to have a Class A classification if the roof height exceeds 25 m measured from the floor level of the first storey to the highest point of the roof assembly (Sentence 3.1.15.2.(3)). Previously, there was no explicit correlation between the roof covering classification and the measured physical height for buildings conforming to Article 3.2.2.51. Similar to the construction of non-contiguous roof assemblies at different elevations, Sentence 3.1.15.2.(5) permits combustible roof coverings on each roof to be evaluated separately to determine the applicable classification (Class A, B or C).
- » Loadbearing assemblies are required to have a fire-resistance rating not less than that required for the supported assembly. This is not a new requirement and is consistent with the remainder of the Code for the protection of supporting assemblies.

Note that the sprinkler requirements of NFPA 13, “Standard for the Installation of Sprinkler Systems”, are required to be applied to 5- and 6-storey buildings instead of NFPA 13R, “Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies”. NFPA 13R is permitted to be applied to maximum 4-storey residential buildings (as per Sentence 3.2.5.12.(2)). The application of NFPA 13 is more onerous as NFPA 13R has provisions to exempt sprinklers in specific locations such as attics, closets and bathrooms and provisions for less water demand, which could lead to smaller pipe sizes.

For combustible residential buildings, NFPA 13 exempts sprinkler coverage from certain areas within dwelling units such as:

- » Bathrooms with a maximum area of 5.1 m², provided the walls and ceiling are protected by a minimum 15-minute thermal barrier (e.g. 12.5 mm fire rated gypsum board)
- » Closets with a maximum area of 2.2 m², with dimensional limitations

4.3 | Office Buildings Construction Requirements

The provisions of the Code contained in Article 3.2.2.60. permit business and personal services (office) buildings (Group D major occupancy) of combustible construction to be up to 6 storeys in building height. Prior to the 2015 amendments to the Code, the maximum height of an office building of wood construction was 4 storeys.

The advantage of applying Article 3.2.2.60. to shorter buildings (less than 5 storeys) is that this Article permits larger building areas (see Figure 3). However, when considering all Code requirements holistically, there are additional features that are mandated in the new provisions and it may be more advantageous to apply the current requirements (e.g., Article 3.2.2.61., which permits a building of wood construction to be 4 storeys in building height) if the current area limitations are not a factor in the design of the building.

It is noted that when the construction requirements of Article 3.2.2.60. are applied and firewalls are used to separate a building into two or more buildings, if the required fire-resistance rating of the firewall is 2 hours (based on occupancies of the buildings), the firewall is not required to be constructed of masonry or concrete provided the buildings on each side of the firewall are sprinklered.

The construction requirements of Article 3.2.2.60., applicable to mid-rise office buildings, are as follows:

- » A building is required to be sprinklered to NFPA 13, as were 4-storey office buildings of wood construction prior to 2015.
- » A maximum height of 18 m measured between the floor level of the first storey and the floor level of the uppermost storey or mezzanine is applicable (see Figure 2). The floor level of a rooftop enclosure (for building services), service room, elevator machine room or stairway does not have to be considered. Prior to the 2015 amendments, there was no maximum physical height associated with fire department access.
- » For a 5-storey building, a maximum building area of 3600 m² is permitted and 3000 m² for a 6-storey building.
- » For a 4-storey building, a maximum building area of 4500 m² is permitted. Prior to the 2015 amendments, a 4-storey building of wood construction would be limited to a building area of 3600 m². Similarly, maximum area limits have been increased for 1- to 3-storey buildings.

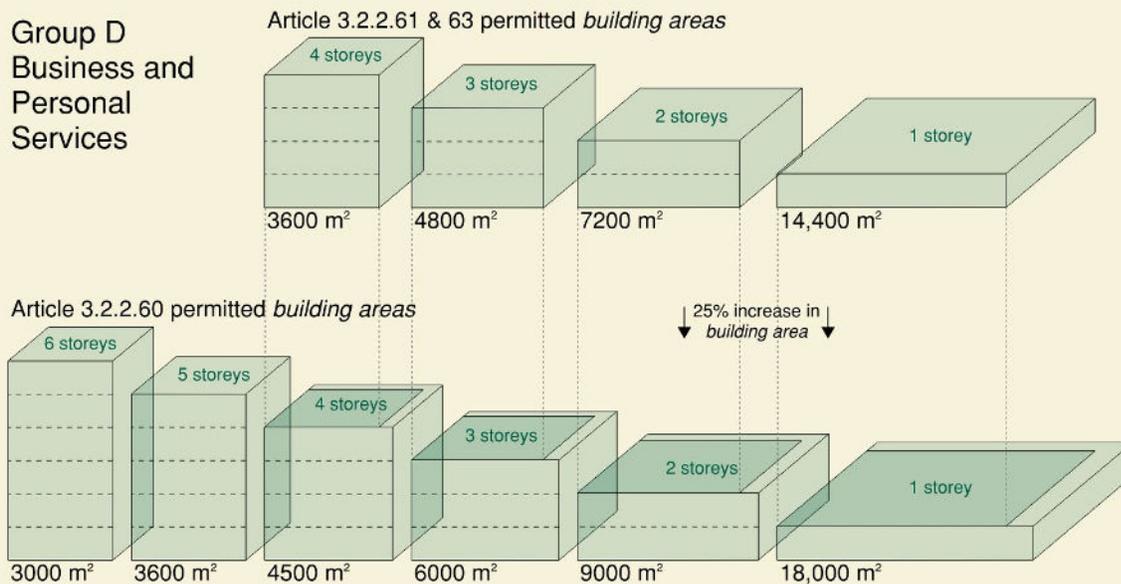


Figure 3

Maximum permitted building areas by storey count for Group D business and personal services wood buildings

- » Floor assemblies constructed as fire separations require a 1-hour fire-resistance rating. This requirement is consistent with mid-rise buildings of any construction which are within the corresponding maximum building area limits of the Code for buildings up to 6 storeys in building height.
- » Mezzanines are required to be constructed with a 1-hour fire-resistance rating. This requirement is not new and is consistent with buildings of similar height and occupancy.
- » Roof assemblies are required to be constructed with a 1-hour fire resistance rating. Prior to the 2015 amendments, the Code exempted a roof rating for all buildings if the building was sprinklered. This exemption is not applicable to mid-rise buildings of wood construction. Other provisions include the following:
 - » If the roof assembly has a height greater than 25 m from the floor level of the first storey to the highest point of the roof assembly, the roof assembly is required to be of noncombustible construction or be constructed of fire-retardant treated wood. This is a new requirement that was introduced to facilitate firefighting. Prior to the 2015 amendments there were no height limitations for buildings beyond the limitation on the number of storeys.
 - » The noncombustible roof is permitted to be supported by combustible construction (Sentence 3.1.7.5.(3)). Prior to the 2015 amendments, an assembly that was required to be noncombustible would be required to be supported by noncombustible construction. This new provision does not conflict with the remainder of the building being wood construction.

- » A building can have several roofs that are at different elevations. The construction of non-contiguous roof assemblies at different elevations is permitted to be evaluated separately and depending on the configuration, the roof assemblies may be of mixed construction.
- » Combustible roof coverings are required to have a Class A classification, if the roof height exceeds 25 m measured from the floor level of the first storey to the highest point of the roof assembly (Sentence 3.1.15.2.(3)). Previously, there was no explicit correlation between the roof covering classification and the measured physical height for buildings conforming to Article 3.2.2.60. Similar to the construction of non-contiguous roof assemblies at different elevations, Sentence 3.1.15.2.(5) permits combustible roof coverings on each roof to be evaluated separately to determine the applicable classification (Class A, B or C).
- » Loadbearing assemblies are required to have a fire-resistance rating not less than that required for the supported assembly. This is not a new requirement and is consistent with the remainder of the Code for the protection of supporting assemblies.

4.4 | Provisions Common to Residential and Office Buildings

4.4.1 Combustible materials

The Code has two Subsections (i.e., Subsection 3.1.4. and 3.1.5.) that explicitly state the additional combustible elements and prescriptive requirements that are applicable in buildings permitted to be of combustible construction or required to be of noncombustible construction. The provisions of Subsection 3.1.4. are applicable to buildings that are permitted to be of combustible construction. Prior to the 2015 amendments, a building permitted to be of combustible construction did not have limitations on the type of cladding (combustible versus noncombustible) or the amount of combustible cladding, unless there was an exposure condition driven by spatial separation and exposure protection requirements contained in Subsection 3.2.3.

For a building designed under Article 3.2.2.51. or 3.2.2.60. in the 2024 OBC, where Table 3.2.3.7. permits the use of combustible cladding on the exposing building face, Article 3.1.4.8. allows combustible cladding to account for only a maximum of 10% of the exterior cladding on each exterior wall. A greater design flexibility beyond the “10% restriction” can be explored, if combustible cladding forms part of a wall assembly that either:

- » satisfies the criteria of Clause 3.1.5.5.(1)(b) when tested in accordance with CAN/ULC-S134, “Standard Method of Fire Test of Exterior Wall Assemblies”, or
- » is constructed in conformance with Section 6 of MMAH Supplementary Standard SB-2 “Fire Performance Ratings”.

Where a CAN/ULC-S134 tested wall assembly includes combustible cladding of fire-retardant-treated wood, the standard fire test is required to be conducted after the cladding has been conditioned in conformance with ASTM D2898, “Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing” as per Sentence 3.1.4.8.(3).

4.4.2 Sprinkler Design Features

Mid-rise combustible buildings are required to conform to National Fire Protection Association Standard NFPA 13 “Standard for the Installation of Sprinkler Systems”. In addition, the Code specifies additional requirements that amend the NFPA 13 provisions. NFPA 13 includes a number of provisions that allow for combustible concealed spaces within roofs and floor assemblies to not be protected by sprinklers depending on the type of framing elements and finishes, for example (but not limited to):

- » Assemblies where the supporting joist elements are solid with no openings and the ceiling is attached no more than 150 mm from the bottom of the framing member.
- » Assemblies where the concealed space is entirely filled with noncombustible insulation, with a maximum 50 mm air gap at the top of the space.
- » Assemblies where the exposed materials are constructed entirely of fire-retardant-treated wood.

Several other unique areas where sprinkler coverage is not required for combustible construction per NFPA 13 include:

- » Combustible eave projections up to 1.2 m, provided the eaves meet additional prescribed rules or provisions with respect to fire stopping
- » Under decks that do not project more than 610 mm from the exterior wall

Notwithstanding NFPA 13 requirements, balconies greater than 610 mm in depth measured perpendicular to the exterior wall of the building are required to be sprinklered (as per Sentence 3.2.5.12.(7)).

4.4.3 Fire Blocking

Fire blocking is a material or system that is installed in a concealed space to mitigate fire spread within a concealed space or from the concealed space to an adjacent space. Fire blocks in concealed spaces are required to be provided as per Subsection 3.1.11. Additional new fire blocking requirements are applicable for a building designed under Article 3.2.2.51. or Article 3.2.2.60.

Concealed spaces created by wood construction, within a floor assembly or roof assembly (does not apply where there is a noncombustible roof) are required to be separated into compartments with the following features (Sentence 3.1.11.5.(3)):

- » Maximum area of 600 m² with no dimension more than 60 m if the exposed construction materials within the space have a maximum flame spread rating of 25
- » Maximum area of 300 m² with no dimension more than 20 m if the exposed construction materials within the space have a flame spread rating greater than 25

However, the above fire blocking requirements do not apply if the concealed space is filled with noncombustible insulation (e.g., mineral wool) such that any air gap between the insulation and the underside of the floor or roof deck is a maximum of 50 mm.

4.4.4 Building Facing Streets

In general, depending on the size, occupancy and protection of the building (sprinklered versus not sprinklered), a building may be required to face one to three streets. As a minimum, every building is required to face at least one street.

Typically, sprinklered buildings are not required to have a minimum percentage of the building perimeter facing a street, except that the principal entrance must be within 3–15 m of a street. A building designed per Article 3.2.2.51. or 3.2.2.60. has additional requirements to be considered to face one street (the minimum). As per 3.2.2.10.(3), the building must be situated such that not less than:

- » 25% of the building perimeter is located within 15 m of a street or streets, or
- » 10% of the building perimeter is located within 15 m of a street or streets, provided the exterior cladding conforms to Sentence 3.1.4.8.(2) – that is, where the exterior cladding is either:
 - » noncombustible,
 - » forms part of a wall assembly that satisfies the criteria of Clause 3.1.5.5.(1)(b) when tested in accordance with CAN/ULC-S134, “Standard Method of Fire Test of Exterior Wall Assemblies”, or
 - » forms part of a wall assembly constructed in conformance with Section 6 of MMAH Supplementary Standard SB-2 “Fire Performance Ratings”.

4.4.5 Fire Department Access

Each building is required to be served by a fire department access route, which can be a street, highway, road, boulevard, square or other improved thoroughfare that is 6 m or more in width (Clause 3.2.5.6.(1)(a)), designed for public use and accessible to Fire Department vehicles and equipment.

Prior to the 2015 amendments, there were no provisions related to the relationship between the fire department access route and the height of a building. For a building designed in accordance with Article 3.2.2.51. or 3.2.2.60., no portion of the required fire department access route is to be located more than 20 m below the uppermost floor level as per Sentence 3.2.5.6.(2) (see Figure 4).



[Tenth Line Rd, Kanata, ON – four 6-storey buildings, 251 units total](#)
[Completed March 2024 by Ironclad Developments Inc.](#)

Photo credits: Maksim Apelfeld, Ground Floor Photography (courtesy of Ironclad)

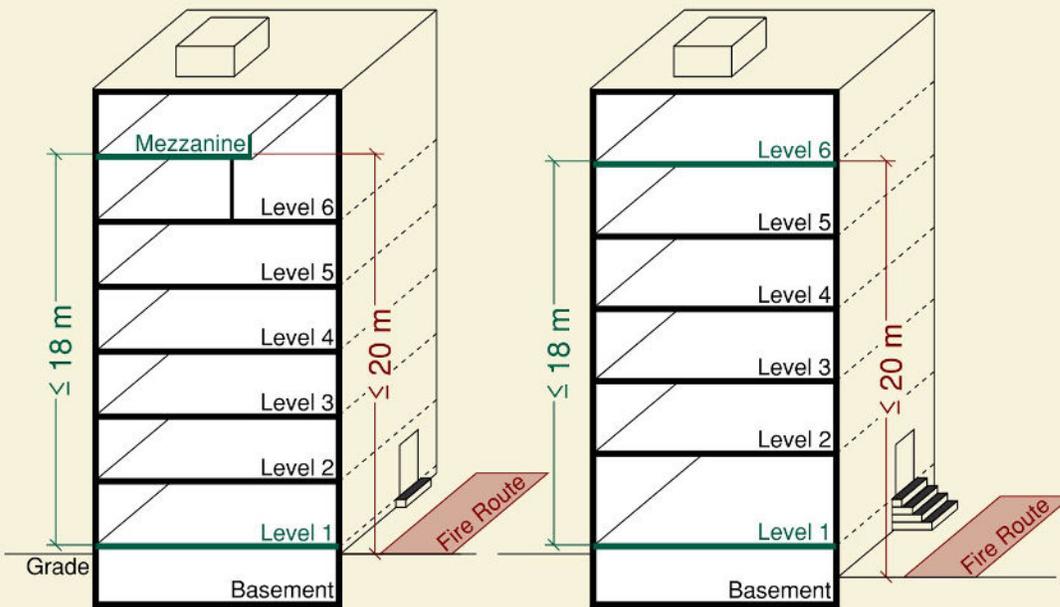


Figure 4

Maximum permitted height between the fire department access route and the uppermost floor level, including mezzanine storeys

4.4.6 Emergency Power

All buildings have basic emergency power requirements for emergency lighting, exit signs (where required) and the fire alarm system (where required). The emergency power requirements for a building designed as per Article 3.2.2.51. or Article 3.2.2.60. are enhanced compared to a similar sized building with the same occupancy, where other construction provisions of Subsection 3.2.2. are applied.

With respect to emergency power for emergency lighting, an emergency power supply is required for a period of 1 hour (Subclause 3.2.7.4.(1)(b)(iii)) as opposed to 30 minutes, which would be applicable to a similar sized building with the same occupancy.

With respect to emergency power for the fire alarm system, emergency power for the fire alarm system must be capable of providing supervisory power for a minimum of 24 hours followed by 1 hour under full load (Sentence 3.2.7.8.(3)). Typically, the emergency power under full load would be 30 minutes for residential and office buildings not more than 6 storeys in building height.

4.4.7 Exit Compartments

When the novel prescriptive Code provisions that enabled the design and construction of mid-rise buildings of light-wood frame construction came into effect on January 1, 2015, the 2012 edition of the OBC required that the construction of the fire separation between exits and the remainder of the building be noncombustible, and exit stairs to have a minimum fire resistance rating of 1½ hours. These requirements have since been removed from the OBC by O. Reg. 89/23 (May 12, 2023) to harmonize with the National Model Construction Codes (applicable at the time) and have also been carried forward to the latest 2024 edition of the OBC issued under O. Reg. 163/24. As such, mid-rise combustible buildings designed and constructed within the scope of Articles 3.2.2.51. and 3.2.2.60. of the 2024 OBC can now feature combustible exits and a reduced 1-hour fire-resistance rating for the exit fire separation.

4.4.8 Structural

For a building designed under Article 3.2.2.51. or Article 3.2.2.60., there are additional requirements to consider for a mid-rise building when performing the seismic design. These additional requirements include, but are not limited to, limitations on the maximum building height (Table 4.1.8.9), restrictions on certain types of structural irregularities (Sentence 4.1.8.10.(5)), and conditions that require increased seismic loading for buildings with more than 4 storeys (Sentences 4.1.8.11.(12) and 4.1.8.12.(12)), among other provisions. The seismic design requirements can be found in Subsection 4.1.8 of the OBC 2024. See additional information with respect to structural performance requirements in Section 5.1 of this report.

4.4.9 Occupancy Permit

Division C, Article 1.3.3.1. contains conditions for occupying a portion of an unfinished building. These requirements ensure that there is an adequate and appropriate level of safety in place for occupancy prior to completion of the building. However, where Division B, Article 3.2.2.51. or Article 3.2.2.60. is applied, there are more specific conditions for an occupancy permit as per Division C, Article 1.3.3.5.

An occupancy permit will be issued if:

- » the structure of the building is completed to the roof,
- » the building envelope, including, but not limited to, cladding, roofing, windows, doors, assemblies requiring fire-resistance ratings, closures, insulation, vapour barriers and air barriers, is complete,
- » the walls enclosing the space to be occupied are completed, including balcony guards,
- » all required fire separations and closures are completed,
- » all required exits are completed, including all fire separations, doors, door hardware, self-closing devices, guards and handrails,
- » all shafts including closures are completed,
- » measures have been taken to prevent access to parts of the building and site that are incomplete or still under construction,
- » floors, halls, lobbies and required means of egress are free of loose materials and other hazards,
- » if service rooms should be in operation, required fire separations and closures are completed,
- » all building drains, building sewers, water systems, drainage systems and venting systems are completed and tested as operational for the storeys to be occupied,

- » required lighting, heating and electrical supply are provided for the suites, rooms and common areas to be occupied,
- » required lighting in corridors, stairways and exits is completed and operational,
- » required standpipe, sprinkler and fire alarm systems are completed and operational, together with required pumper connections for such standpipes and sprinklers,
- » required smoke alarms and carbon monoxide alarms are completed and operational,
- » required fire extinguishers have been installed,
- » main garbage rooms, chutes and ancillary services are completed to all storeys to be occupied,
- » required firefighting access routes have been provided and are accessible, and
- » the sewage system has been completed and is operational.

Except where specifically noted, the conditions for an occupancy permit apply to the entire building.

4.5 | Mixed Use Buildings

The major occupancy classification of mid-rise combustible buildings is not limited to only residential or business and personal services (office) major occupancies. The Code permits such buildings to include other major occupancies to be constructed in accordance with the provisions of Article 3.2.2.51. or 3.2.2.60.; however, the Code also prescribes limitations. For example, a building designed and constructed in accordance with Article 3.2.2.51. or 3.2.2.60. is restricted from containing a retirement home per Sentence 3.1.3.2.(5).

4.5.1 Permitted Major Occupancies

A building within the scope of Articles 3.2.2.51. (Group C) or 3.2.2.60. (Group D) is permitted to contain the following major occupancies as summarized in Table 1. For buildings featuring these permitted occupancies, the construction requirements of Articles 3.2.2.51. or 3.2.2.60. may be applied to the entire building.

Table 1

Permitted major occupancies

Other Permitted Major Occupancy	Principal Major Occupancy	
	Group C	Group D
Storage Garage	below the fourth storey	below the fourth storey
Group A, Division 2	below the third storey	below the third storey
Group E	below the third storey	below the third storey
Group F, Division 2	not permitted	below the third storey
Group F, Division 3	not permitted	below the third storey

4.5.2 Other Major Occupancies

Other major occupancies can be incorporated into a building using the concept of multiple major occupancies as described in Articles 3.2.2.6. to 3.2.2.8.

For typical buildings that include multiple major occupancies, the construction requirements for the building are based on the most restrictive major occupancy and are required to be applied as if the whole building is of that major occupancy (subject to the exception of superimposed major occupancies) (Sentence 3.2.2.6.(1)).

For typical buildings that include superimposed major occupancies where one major occupancy is located above another major occupancy, the construction provisions of Articles 3.2.2.20. to 3.2.2.93. for each portion of the building containing the relevant major occupancy are applicable to that portion as if the entire building was of that major occupancy (Sentence 3.2.2.7.(1)). This provides for design flexibility to incorporate podiums for other major occupancies using the applicable construction provisions for those major occupancies, and construction in accordance with Articles 3.2.2.51. or 3.2.2.60. for the Group C or Group D occupancy above.

4.5.3 Separation of Major Occupancies

Adjacent major occupancies in a building are required to be fire separated from each other as outlined in Article 3.1.3.1. A fire separation with a 2-hour fire resistance rating is required between Group C (residential) or Group D (business and personal services) and Group A, Division 2 (assembly) major occupancies (Table 3.1.3.1.).

4.5.4 Subsidiary Occupancies

Buildings typically include several occupancies; however, these occupancies generally do not impact the core construction requirements (in some cases there are specific occupancy requirements).

The Code permits subsidiary occupancies that are in direct support and are an integral part of the principal occupancy.

For example, residential buildings typically include amenity spaces that are used only by the building occupants (e.g., pool or fitness area). Although these assembly spaces have a different occupancy than the remainder of the building (i.e., residential) these spaces are an integral part of the principal occupancy and do not constitute a separate major occupancy.

The new limitations for major occupancies does not apply to subsidiary occupancies (with the exception of a parking garage) such that these occupancies are permitted on all floors of the building.

5

Other Applicable Code Requirements

This section includes key provisions of the OBC that are required to be applied to mid-rise buildings of wood construction and that were already included in the Code prior to the changes permitting mid-rise buildings of wood construction and remain applicable.

5.1 | Structural design using Wood (Part 4)

The Code generally permits the use of wood as a structural material. The application and use of wood in the Code is subject to limitations based on the building size and occupancy as defined by Division A, Subsection 1.1.2. and using Part 3 (Fire Protection, Occupant Safety and Accessibility), Part 4 (Structural Design) or Part 9 (Small Buildings) as applicable. With respect to using wood as a structural material, in the case of buildings more than 3 storeys or otherwise not within the scope of Part 9, the use of wood as a structural material is governed by Part 4.

Part 4 of the Code provides a framework of procedures and requirements for determining the minimum structural loads and design standards to be applied so that buildings and their structural members have sufficient structural capacity and structural integrity to safely and effectively resist all loads and effects. Parameters to be considered include structural strength, serviceability and reliability. The minimum loads specified in the Code are primarily based on the use and occupancy of the building, as well as the building's geographic location and exposure (e.g., climatic and seismic influences). Part 4 of the Code does not provide use and occupancy structural loads based on the type of materials to be used. However, the Code does require that the design be completed in accordance with the corresponding material design standard. The design of the structural members will be governed by the applicable design standard, such as CSA O86 in the case of wood design. This essentially provides the designer with the freedom to select and utilize the material(s) of their choice, subject to the physical properties and limitations inherent with that material.

Part 4 of the Code does not prescribe the choice of structural material; rather, it outlines the minimum design requirements, procedures and restrictions that must be satisfied, which may limit the use of certain structural materials as part of the seismic force resisting system (SFRS). The SFRS is the part of the structural system that is designed to provide the required resistance to earthquake forces and effects. Wood can be used in the SFRS, but can be subject to height restrictions that are imposed in certain cases based on the Seismic Category assigned to the building and the type of SFRS utilized.

Table 4.1.8.9 of the Code displays design values for accepted types of SFRS using wood, such as shear walls and moment resisting frames. It also displays imposed height restrictions varying from “not limited” to values ranging from 15 to 30 m, where the maximum height is defined as the vertical distance from above grade to the roof diaphragm. Similar types of restrictions exist for the other common structural materials (i.e., steel, concrete and masonry). See Section 4.4.8. of this report for additional information regarding the additional seismic loads applicable to buildings constructed under Articles 3.2.2.51. or 3.2.2.60.

Since NBC 2015, all buildings are required to meet the seismic design provisions outlined in Subsection 4.1.8, and this Guide focuses on seismic provisions for lateral load-resisting systems (LLRS). However, note that LLRS must also be analyzed and designed in accordance with Subsection 4.1.7 to account for wind loads, which may still govern the lateral design.

Part 4 of the Code contains a provision for the use of wood in foundations or structures supporting soil and rock. This provision is outlined in Article 4.2.3.1., which permits wood as a material used in foundations provided that it conforms to the requirements of applicable CSA standards. Article 4.2.3.1. provides requirements for the preservation treatment of wood used in foundations, generally stating that it must be treated with preservative in conformance with CSA O80 Series, “Wood Preservation.”

Composite lumber and panel products are permitted for use as structural members, provided that they are designed and fabricated in accordance with the requirements of CSA O86. This Standard specifically deals with two types of composite building products; glued panel web beams (box or I-section) and stress skin panels (for floor or roof constructions), provided that they are not manufactured by a proprietary process. However, a proprietary process can be used and compliance with CSA O86 can be demonstrated via testing and/or certification.

5.2 | Use of Wood in Environmental Separations (Part 5)

Part 5 “Environmental Separation” of the OBC applies to all buildings except those within the scope of Part 9 or the scope of the National Farm Building Code of Canada. Under this context, Part 5 applies to building elements (e.g., walls, floors, roofs, windows, doors) that separate dissimilar environments. This includes both the separation between the indoor environment (i.e., conditioned space) and the outdoor environment (including the ground), as well as between interior spaces that have significantly different environments (e.g., between an indoor pool and classroom space).

In general terms, Part 5 deals primarily with the control of heat, air and moisture, where moisture includes the control of vapour, precipitation, surface water and ground water. Part 5 of the Code generally does not restrict the use of wood (or other materials) provided that the materials or assemblies fulfill the prescriptive requirements for their intended function within the building envelope (i.e., control of heat, air and/or moisture), and that any of the applicable reference standards are satisfied. The ability of a material or assembly to achieve the required performance related to the transfer of heat, air and moisture must be determined based on sound engineering principles and practices.

The Part 5 requirements have not been modified in the latest Code. However, a designer may not be able to use the same methods and approaches as were applied for 4-storey buildings of wood construction. Careful design and analysis will be required to meet Part 5 requirements of the 2024 OBC.

5.3 | Combustible materials – Other Provisions

For all buildings permitted to be of combustible construction, additional combustible materials that are permitted to be used in the building are specified in Subsection 3.1.4. This Subsection includes provisions to address the protection of foamed plastics, wire and cables that are permitted to be used, required features of fire-retardant treated wood and required features of heavy timber construction.

5.4 | Other Fire and Life Safety Provisions

For mid-rise buildings of wood construction, the designer is to undertake an analysis of all the traditionally required fire and life safety features of a building. A mid-rise building will require a fire alarm system, standpipe system, etc.

Other provisions will also have to be considered in design and will be similar to any mid-rise building, and will include the continuity of fire separations, firestopping penetrations through fire rated assemblies, interior finishes, occupancy-based fire separations (e.g., separation of dwelling units), etc.



[150 Wissler, Waterloo, ON – 6-storey building, 128 market-rate rental units](#)
[Under construction by VanMar Constructors Inc. for Killam Apartment REIT](#)
Photo courtesy of VanMar Constructors ON Inc.

6

Conclusion

This second edition of the Guide introduces readers to the existing and new provisions governing the design and construction of up to 6-storey combustible residential and office buildings in Ontario, so that they become familiar with the requirements, intent and application of the new prescriptive Code provisions found in the 2024 OBC.

6.1 | Additional Resources

Increasing amounts of information are available on wood as a construction material for use by designers, contractors and owners. The providers of this information intend to facilitate the use of wood on construction projects and aim for consideration of wood as a construction material by owners and designers early in the design process.

There are many websites, brochures, design guides, etc. that document the benefits of wood, and assist designers in applying the Building Codes for wood construction.

6.1.1 Organizations and Online Resources

These organizations provide research, technical guidance, policy information and educational resources related to wood construction:

- » Ontario Building Code O. Reg. 163/24 as amended by 447/24 (<http://www.e-laws.gov.on.ca/>)
- » WoodWorks at wood-works.ca
- » Canadian Wood Council at cwc.ca
- » FPInnovations at <https://web.fpinnovations.ca/wood-products/>
- » Natural Resources Canada at nrcan.gc.ca
- » Ontario Ministry of Natural Resources at <https://www.ontario.ca/page/forestry>
- » Online compilation of wood information resources at www.naturallywood.com

6.1.2 Guides and Technical Publications

The following documents provide detailed guidance on the design and construction of wood buildings:

- » Offsite Wood Construction Handbook ([FPInnovations](#))
- » The Canadian Guide to Mid-Rise Wood Construction ([Canadian Wood Council](#))
- » Low-Rise Commercial Construction in Wood ([Canadian Wood Council](#))
- » Guide to Encapsulated Mass Timber Construction in the Ontario Building Code, Second Edition ([WoodWorks Ontario](#))

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Natural Resources
Canada

Ressources naturelles
Canada