FIRE PROTECTION ENGINEERING SOLUTIONS TO UPGRADING EXISTING BUILDINGS

CROSS CANADA CHAPTERS TECHNICAL SESSION

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Alteration of Existing Buildings : Fire Safety for Historic and Heritage Buildings

By ***Pascal Caron, P. Eng.***
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Pascal Caron, P. Eng.

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Presentation Content

- **Applicable regulations in Québec**
- **Part 10 of the Québec Construction Code**
- **Some of the issues concerning firefighting**
- **Case study of a building in Old-Montréal**

Applicable regulations

Municipal regulations

In Montréal, for exempted buildings the ***Règlement sur la construction et la transformation de bâtiments*** (Municipal By-law 11-018) is applied.

chapter B-1.1, r. 2

Construction Code

Building Act
(chapter B-1.1, ss. 173, 176, 176.1, 178, 179, 185 and 192).

CHAPTER I
BUILDING

DIVISION I
SCOPE

1.04. The following buildings, other than private seniors' residences, are exempted from the application of this Chapter if used solely for one of the major occupancies provided for in the Code:

(1) an assembly occupancy not covered by subparagraph 6 that accommodates not more than 9 persons;

(2) a care or detention occupancy that constitutes

(*a*) a prison;

(*b*) a supervised education centre with or without detention facilities used to shelter or accommodate not more than 9 persons; or

(*c*) a convalescent home, a care occupancy or assistance occupancy or a rehabilitation centre used to shelter or accommodate not more than 9 persons;

(3) a residential occupancy that constitutes

(*a*) a rooming house or an outfitter offering no lodgings that has not more than 9 rooms;

(*b*) a single-family dwelling in which a bed and breakfast is operated by a natural person, which is also used as the person's residence, having not more than 5 bedrooms offered for rent;

(*c*) a single-family dwelling in which a school that accommodates less than 15 students at a time is operated by a natural person, which is also used as the person's residence;

(*d*) a monastery, a convent or a novitiate whose owner is a religious corporation incorporated under a special Act of Québec or the Religious Corporations Act (chapter C-71), where that building or part of the building divided by a firewall is occupied by not more than 30 persons and has not more than 3 storeys in building height;

(*e*) a shelter used to shelter or accommodate not more than 9 persons; or

(*f*) a building used as a dwelling unit having

i. not more than 2 storeys in building height; or

ii. not more than 8 dwelling units;

(4) a business and personal services occupancy having not more than 2 storeys in building height;

(5) a mercantile occupancy having a total floor area of not more than 300 m^2;

(6) a day care centre used to shelter or accommodate not more than 9 persons;

(7) a subway station;

(8) an agricultural facility; and

(9) an industrial occupancy.

Code national du bâtiment – Canada 2015 (intégrant les modifications du Québec) [CCQ (2022)]

VILLE DE MONTRÉAL
BY-LAW
11-018

BY-LAW CONCERNING THE CONSTRUCTION AND CONVERSION OF BUILDINGS

In view of sections 118, 118.1, 119, 120 and 120.0.1 of the Act respecting land use planning and development (R.S.Q., c. A-19.1);

In view of sections 4, 6, 19, 55 and 62 of the Municipal Powers Act (R.S.Q., c. C-47.1);

In view of sections 369 and 411 of the Cities and Towns Act (R.S.Q., c. C-19);

In view of sections 47, 50, 51 and 80 of schedule C to the Charter of Ville de Montréal (R.S.Q., c. C-14.1);

At its meeting of October 24, 2011, city council enacts:

CHAPTER I
INTERPRETATION

1. In this by-law, the following words or expressions mean:

"authority having jurisdiction": as defined in the Code and in this by-law, the director of the *Service du développement et des opérations*. In the Code, a reference to the "*Régie du bâtiment*" or the "*Régie*" is deemed to be a reference to the authority having jurisdiction in matters concerning requirements under city jurisdiction;

"Code": The "National Building Code – Canada 2005" (NRCC 47666) published by the Canadian Commission on Building and Fire Codes of the National Research Council Canada (CNRC), as adopted and amended by orders in council 953-2000 and 293-2008 (R.S.Q., c. B-1.1, r. 0.01.01), also known as the Construction Code of Québec - Chapter 1, Building, and the National Building Code – Canada 2005 (amended);

"construction": orderly assembly of materials whose use requires a location on the ground, or that is connected with an item requiring a location on the ground;

"dwelling unit": a suite of rooms used or intended to be used as a domicile by one or more persons and containing sanitary facilities, and space for cooking, eating and sleeping;

"exempt building": building exempt from the application of Chapter I-Building of the Construction Code of Québec by the Regulation respecting the application of the Building Act (R.S.Q., c. B-1.1, r. 0.01);

Source: Ville de Montréal

Provincial regulation (CNESST) - (*Provincial Agency for Worker Health and Safety*)

In Québec, we have also to consider CNESST requirements when applicable.

chapter S-2.1, r. 0.1

Building Code — 1985 Regulation

Act respecting occupational health and safety
(chapter S-2.1, s. 223).

This Regulation is applied by the Commission des normes, de l'équité, de la santé et de la sécurité du travail and concerns constructions begun after 24 January 1987 and alterations or additions made after that date. It has not been replaced or revoked and therefore continues to be applied by the CNESST.

1. In this Regulation, unless the context indicates otherwise,

"building" means any structure used or intended for supporting or sheltering any use or occupancy;

"Code": the National Building Code of Canada 1985, including the errata of October 1985 and January 1986, the revisions of January 1986, except the revisions relative to Subsection 9 of article 3.1.4.5, and the revisions of July and November 1986, January 1987 and January 1988, issued by the National Research Council of Canada.

O.C. 1958-86, s. 1; O.C. 996-91, s. 1.

DIVISION II
SCOPE

2. A building the construction of which began after 24 January 1987 shall conform to the Code as amended by this Regulation.

The first paragraph of this section also applies to an alteration as defined in the Code or to an addition made after the 24 January 1987 to a building built before that date.

The Regulation respecting the application of a Building Code (O.C. 912-84, 84-04-11) may apply to such a building, to its alteration or addition where work begins before 24 January 1988.

O.C. 1958-86, s. 2.

3. If, in the case of an alteration as defined in the Code or of an addition to a building already built, some provisions of the Code are difficult to enforce because of their effect, the owner, to ensure safety in his building, may submit alternative measures to a person designated by the Minister of Labour, which may be accepted by that person.

O.C. 1958-86, s. 3.

Source: *LégisQuébec* Publications Québec

The CNESST applies and monitors requirements that make employers as well as employees responsible for safety and health in the workplace.

Source: Répertoire du patrimoine culturel du Québec

Provincial regulation administered by the Régie du bâtiment du Québec (RBQ)

In order to ensure the quality of construction work in Québec, the ***Provincial Building Act*** provides for the adoption of a Construction Code covering buildings and equipment for public use.

The ***Code de construction du Québec***, chapitre Bâtiment (CNB 2015 modifié – Québec) consists of the National Building Code of Canada 2015, with amendments for Québec and is in effect since January 8th, 2022.

The document is published by the National Research Council of Canada in collaboration with the Régie du bâtiment du Québec. It contains the new edition of Chapter I, Building, of the Québec Construction Code (an amended version of the National Building Code of Canada 2015) that clearly indicates the changes adopted by Québec.

https://nrc-publications.canada.ca/eng/view/object/?id=a410dde0-2bce-4f8c-8adb-5c210235babf

Source: Régie du bâtiment du Québec

source: https://www.rbq.gouv.qc.ca/lois-reglements-et-codes/code-de-construction-et-code-de-securite/code-de-construction/

Provincial regulation (Prescriptive and Performance-Based)

The Québec Construction Code sets out technical requirements for all design and construction work of new buildings. It applies also to alteration of buildings, changes in occupancy and demolition of existing buildings.

Its requirements represent the minimum level of performance that the competent authority considers acceptable to achieve the objectives set, including those of safety and protection of the building and its occupants against fire and structural damage.

1.2.1.1. Compliance with this Code

1) Compliance with this Code shall be achieved by

a) complying with the applicable acceptable solutions in Division B (see Note A-1.2.1.1.(1)(a)), or

b) using alternative solutions that will achieve at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the applicable acceptable solutions approved by the Régie du bâtiment du Québec or, in the case of *buildings* or facilities over which the Régie du bâtiment du Québec does not have jurisdiction, by the *authority having jurisdiction* (see Note A-1.2.1.1.(1)(b)).

2) For the purposes of compliance with this Code as required in Clause 1.2.1.1.(1)(b), the objectives and functional statements attributed to the acceptable solutions in Division B shall be the objectives and functional statements referred to in Subsection 1.1.2. of Division B.

Acceptables Solutions

Alternative Solutions

Code national du bâtiment – Canada 2015 (intégrant les modifications du Québec) Volume 1 Division A Partie 1 Conformité

Provincial regulation (Equivalent and Different Measures)

chapter B-1.1

BUILDING ACT

Equivalent Measure

Equivalency Solution (article 127.)

127. The Board may approve a design, building method or the use of material and equipment different from that prescribed by a code or regulation made under this Act, on conditions it sets, where it finds the quality equivalent to what is sought by the standards of the code or regulation.

The same applies where it considers that public safety is equally protected.

1985, c. 34, s. 127; 1991, c. 74, s. 168.

Source: *LégisQuébec* Publications Québec

Different Measure

Different Solution (article 128.)

128. In the case of a building, facility intended for use by the public, installation independent of a building or petroleum equipment installation, the Board may allow the application of measures different from those prescribed by a code or regulation made under this Act, according to conditions it sets, where the provisions of the code or regulation are shown not to be reasonably applicable.

1985, c. 34, s. 128; 1991, c. 74, s. 168; 2005, c. 10, s. 56.

Source: *LégisQuébec* Publications Québec

Involvement of the Fire Department (Equivalent Measure, Different Measure or Alternate Solution)

By-law RCG 12-003 allows the fire department to give notice to city departments, reconstituted municipalities, or third parties, in regard of fire safety, civil protection or any other topic under its expertise such as prior to the implementation of an equivalent measure, a different measure, or an alternate solution concerning requirements with respect to objects having an impact on fire safety or fire prevention.

CHAPTER II
DIRECTOR'S JURISDICTION

3. The director has jurisdiction to give notice to city departments, reconstituted municipalities, or third parties, in regard of fire safety, civil protection or any other topic under their expertise:

(1) access routes for emergency vehicles and rescue delivery;

(2) access to firefighting equipment, facilities and buildings;

(3) the maximum permissible occupant load;

(4) fire safety plans, emergency procedures and other documents necessary to coordinate interventions;

(5) water supply for firefighting;

(6) fire protection and rescue systems;

(7) special fire risk protection;

(8) storage and handling of dangerous materials;

(9) fire safety and public safety measures as well as those for the protection of built heritage, those prior to the filming of a movie, special events or public meetings that present a risk of fire;

(10) prior to the implementation of an equivalent measure, a different measure, or an alternate solution concerning requirements with respect to objects having an impact on fire safety or prevention;

(11) civil protection elements in regard of territory development;

(12) civil protection risk analysis and communication;

(13) all other prevention, preparedness, intervention and restoration in case of a fire.

Source: Ville de Montréal

Source: Rapport des activités 2022 Service de sécurité incendie de Montréal (SIM)

Part 10 of the Québec Construction Code

Part 10 of the Québec Construction Code (Existing buildings)

Alteration of existing buildings → **Part 10 of the Québec Construction Code applies**

The application of the specific requirements of Part 10 of the Code is intended to facilitate the use and renovation of existing buildings and structures. These specific requirements make it possible to maintain or improve existing safety conditions even when they are different from the requirements for new construction.

Part 10 Existing Building under Alteration, Maintenance or Repair

Part 10 of the Québec Construction Code applies to every building under alteration, maintenance or repair that has been built for not less than 5 years.

Extrait de l'article 1.3.3.1. Domaine d'application des parties 1, 7, 8, 10 et 11 Division A Partie 1

- **Change of occupancy (*with or without alteration work*)**
- **Alteration (*addition, restoration, rehabilitation, renovation or remodeling*)**
    - increase in building height
    - increase in building area
    - increase in floor area
    - creation of an interconnected floor space
    - installation of a barrier-free access
    - modification of the provision for firefighting
    - addition affecting the safety and health conditions

Alteration does not include the types of intervention such as the work required to bring the building into compliance with the regulations in force (bringing it up to standard) as well as maintenance and repair that do not alter the characteristics or functions of the elements concerned. An alteration is any change to a building or occupancy that is the subject of the Code.

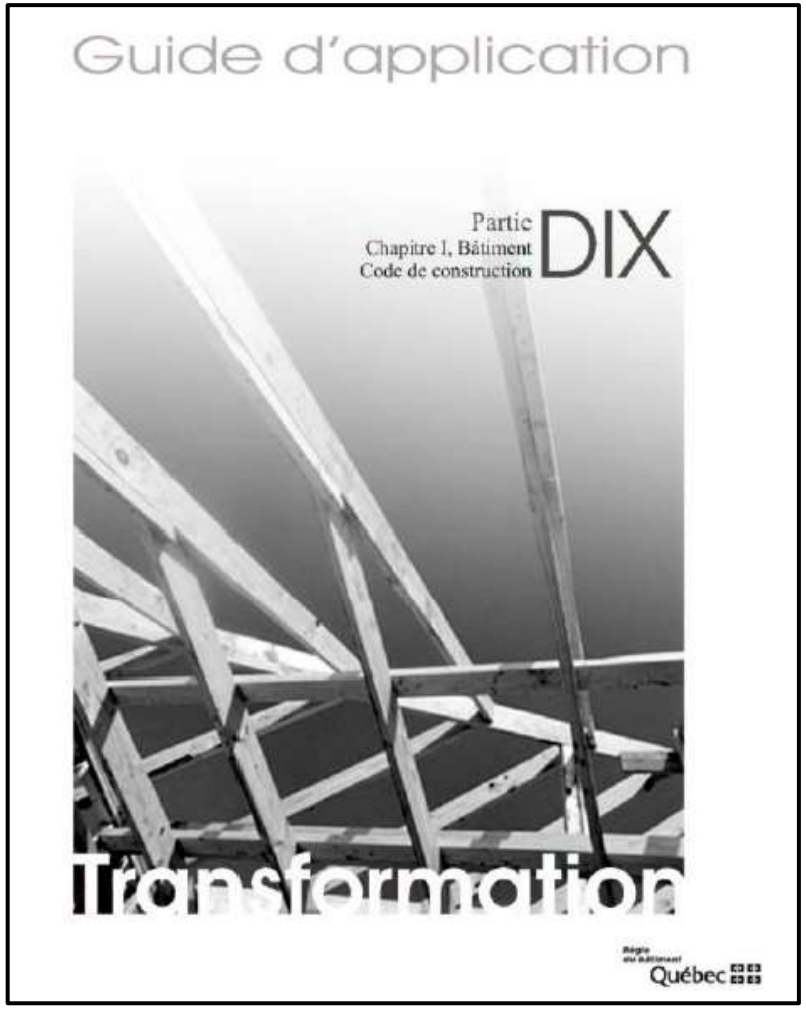
Part 10 Existing Building under Alteration, Maintenance or Repair (next)

TERMS OF APPLICATION

Maintenance or repair work performed on a building shall be **to maintain or restored it in good condition** without altering its characteristics or functions.

The remodeling of a floor area or part of, is considered a **major alteration** when it consists of the modification of the elements and components of walls, ceilings and floors, if not, it is considered a **minor alteration**.

Part 10 does not apply when there is a change in occupancy towards an occupancy prohibited in the building, an occupancy not permitted on the storey on which the alteration is carried out, the increase of the building height or in addition to the building area or floor area for combustible building up to 6 storey height occupancy C or D and building constructed of structural glued laminated timber elements (CLT) for which several occupancies are not permitted because of the risks they represent; **the requirements of the Code apply to them instead of those of Part 10**.



Source: Régie du bâtiment du Québec

Part 10 Existing Building under Alteration, Maintenance or Repair (next)

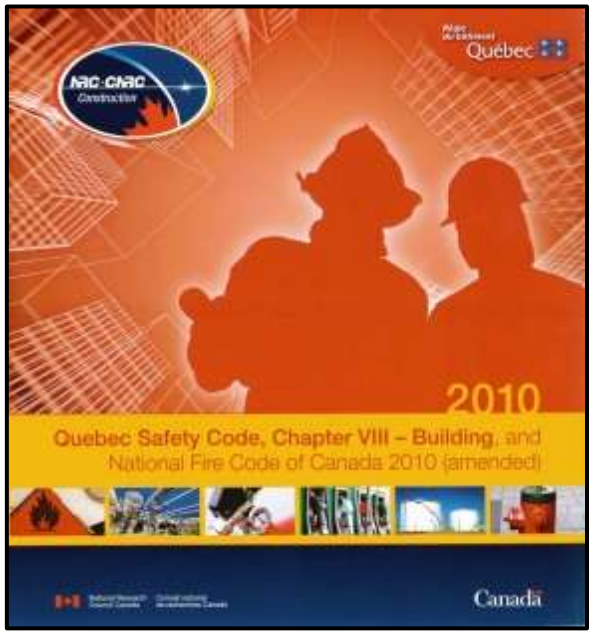
FIRE PROTECTION, OCCUPANT SAFETY AND ACESSIBILITY

Example: 10.3.1.1. Separation of Major Occupancies

The fire-resistance rating, measured on the unaltered side, is permitted to be less than the required fire-resistance rating, without being less than 45 min, when the fire separation between the two occupancies must have a fire-resistance rating **more than 1 h**;

Less than the required fire-resistance rating, without being less than the more stringent provisions of the **Safety Code (chapter B-1.1, r. 3), Chapter VIII, Buildings**, if the fire separation must have a fire-resistance rating **not more than 1 h** or in the case of a minor alteration.

361. In a building constructed or altered prior to 1 December 1976, the floors must constitute fire separations with a fire resistance rating of at least 30 minutes or meet the requirements of NBC 1980 am. Québec. The elements supporting the floors must also have a fire resistance rating of at least 30 minutes or meet the requirements of NBC 1980.



Safety Code (chapter B-1.1, r. 3), Chapter VIII, Buildings

FIRE PROTECTION, OCCUPANT SAFETY AND ACESSIBILITY

Example: 10.3.2.2. Construction and Protection of Buildings

The provision concerning the installation of a sprinkler system under Subsection **3.2.2. Building Size and Construction Relative to Occupancy** do not apply to the alteration of a building or part of a building not equipped with such system, in the following cases:

- the increase in floor area is not more than 10% or not more than 150 m^2;
- is a minor alteration;
- other criteria.

Source: Pascal Caron, P. Eng.

4) During the installation of a partial sprinkler system in a *building*, a standpipe must be sized to serve all the *building*, even if the system currently installed serves only part of the *building*.

Code national du bâtiment – Canada 2015 (intégrant les modifications du Québec) Volume 2 Division B Partie 10

FIRE PROTECTION, OCCUPANT SAFETY AND ACESSIBILITY

Example: 10.3.2.3. Spatial Separation and Exposure Protection

When a building or part of a building is under alteration, **a party wall that is not built as a firewall**, if the height of the party wall has been increased, shall have a fire-resistance rating of not less than 2 h on the altered side and ensure smoke-tightness from the floor of the altered part to the underface of the floor or roof located above the alteration.

Source: Pascal Caron, P. Eng.

Source: Pascal Caron, P. Eng.

FIRE PROTECTION, OCCUPANT SAFETY AND ACESSIBILITY

Example: 10.3.2.4. Fire Alarm and Detection Systems

For an alteration, Subsection **3.2.4. Fire Alarm and Detection Systems** applies **to the altered and unaltered part** of the system to the extent that those requirements are necessary to ensure system operation in the altered part and regarding required audibility (sound pressure level).

Source: Bruno Verville, P. Eng.

Part 10 Existing Building under Alteration, Maintenance or Repair (next)

FIRE PROTECTION, OCCUPANT SAFETY AND ACESSIBILITY

Example: 10.3.2.5. Provision for Firefighting

Where the alteration of a building or part of a building **increases the building height or the floor area by more than 10% of the building area or more than 150 m^2**, the provisions of the Code (Articles 3.2.5.7. to 3.2.5.18.) apply to the unaltered part of a sprinkler system or standpipe system except if there is a fire department connection, a wet pipe system for the heated parts of the building and a fire pump.

Part 10 allows for the residual water pressure at the topmost hose connection of a standpipe system to be only 30 psi (207 kPa) because firefighters can increase the pressure through their pumper and fire department connection.

10.3.2.5. Provisions for Firefighting

1) The provisions of Articles 3.2.5.7. to 3.2.5.18. apply to the unaltered part of a sprinkler system or standpipe system, where the *alteration* of a *building* or part of a *building* increases the *building height* or the *floor area* by more than 10% of the *building area* or more than 150 m^2, except if the system

a) has a fire department connection,
b) is of the wet pipe type in the heated parts of the *building*, and
c) has an approved booster pump capable of providing the pressure required by NFPA 13, "Installation of Sprinkler Systems," or NFPA 14, "Installation of Standpipe and Hose Systems," where the water pressure in the system is lower than that pressure, except as provided in Sentence (2).

2) The residual water pressure at the topmost hose connection of a standpipe system of a *building* referred to in Clause (1)(c) is permitted to be less than the pressure required by NFPA 14, "Installation of Standpipe and Hose Systems," but not lower than 207 kPa if the requirement in Clause 3.2.5.9.(5)(c) is met.

Code national du bâtiment – Canada 2015 (intégrant les modifications du Québec) Volume 2 Division B Partie 10

Part 10 Existing Building under Alteration, Maintenance or Repair (next)

FIRE PROTECTION, OCCUPANT SAFETY AND ACESSIBILITY

Example: 10.3.2.6. Additional Requirements for High Buildings

The requirements of Subsection **3.2.6. Additional Requirements for High Buildings** when applicable, do not include expansion of the surface area of the firefighters' elevator car.

Source: Service de sécurité incendie de Montréal (SIM)

10.3.2.6. Additional Requirements for High Buildings

1) Except as provided in Sentence (2), Subsection 3.2.6. covering additional requirements for high *buildings* applies to a high *building* in accordance with Part 3 that is under an *alteration* that results in

a) a change of *occupancy* so that it becomes a Group B or C *building*,
b) an increase in *building height*, or
c) a modification of more than 50% of the *floor areas* for a reconstruction.

2) This Subsection also applies to the entire *building* that becomes a high *building* following an *alteration* resulting in

a) a change of *occupancy* of the *building*, or
b) an increase in *building height*, except if the increase is not more than 4 m and its *floor area* is not more than 10% of the area of the *storey* located immediately below, without exceeding 150 m².

3) The size of the usable platform referred to in Sentence 3.2.6.5.(2) does not apply to an elevator modified to become an elevator for use by firefighters.

3.2.6.5. **2)** The passenger elevator referred to in Sentence (1) shall have a useable platform area not less than 2.2 m² and shall be capable of carrying a load of 900 kg to the top floor that it serves from a landing on the *storey* containing the entrance for firefighter access referred to in Articles 3.2.5.4. and 3.2.5.5. within 1 min.

Code national du bâtiment – Canada 2015 (intégrant les modifications du Québec)

Part 10 Existing Building under Alteration, Maintenance or Repair (next)

FIRE PROTECTION, OCCUPANT SAFETY AND ACESSIBILITY

Example: 10.3.2.7. Emergency Power for Firefighting

An emergency power supply capable of operating under full load for not less than 2 h, for emergency power to an existing fire pump, if an alteration results in an increase in building height or a change in occupancy of the building to a Group B, Division 2 or Division 3 or Group F, Division 1 or an ambulatory clinic occupancy, shall be provided.

Ambulatory clinic occupancy means a Group B, Division 2 *treatment occupancy*, other than a hospital, that provides *treatment* for a period not exceeding one day and does not provide overnight accommodation.

Code national du bâtiment – Canada 2015 (intégrant les modifications du Québec) [CCQ (2022)]

A-1.4.1.2. 1) Ambulatory Clinic Occupancy

The occupancies covered are care units where surgical or medical procedures are performed and may result in limitations making it impossible for a person to move or direct himself or herself unassisted in case of evacuation. Such procedures include a local or general anesthesia, administration of a sedative through a catheter or by other means, or treatment that requires a special procedure to terminate it. Dialysis, medical examinations and medical imaging may take place in ambulatory clinic occupancies. Any pre-existing conditions a person who enters a building may have do not affect the building's designation as an ambulatory clinic occupancy.

Occupancies covered by this definition are variously called

- day clinics,
- outpatient clinics,
- day surgery clinics,
- ambulatory surgery clinics,
- kidney dialysis clinics,
- oncology clinics,
- specialized medical centres (SMCs) (surgery).

To be eligible under the provisions relating to ambulatory clinic occupancies, an occupancy must not offer accommodation. If it does, it is subject to the requirements applicable to a treatment occupancy classified as Group B, Division 2.

Code national du bâtiment – Canada 2015 (intégrant les modifications du Québec) [CCQ (2022)]

FIRE PROTECTION, OCCUPANT SAFETY AND ACESSIBILITY

Example: 10.3.4.4. Exit Signs

When only one sign (or no more than 5% of the existing ones) must be relocated, added or replaced on the floor area, it is possible to use exit signs consisting of the letters ‘’SORTIE’’ or ‘’EXIT’’ and not necessarily the type with a green background and a white pictogram.

All of the exit signs of the same floor area must be <u>of the same type</u>.

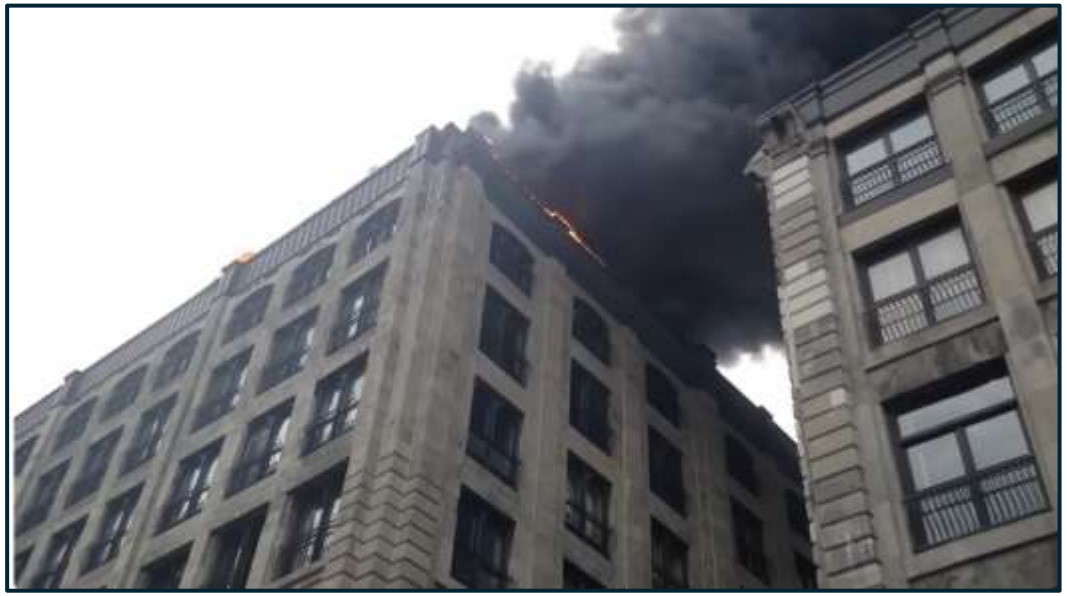
Source: Lumen.ca

Source: Lumen.ca

Some of the issues concerning firefighting

That of Accessibility…

fire (10-15) of September 20th , 2014 at 45 – 65 West Saint-Paul Street (Old-Montréal)



Source: Youtube

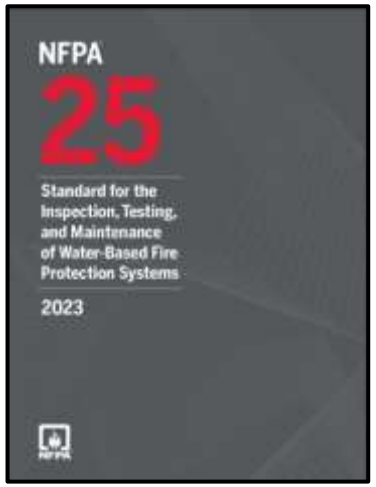
https://www.youtube.com/watch?v=2bqkDjVyu80

video to play

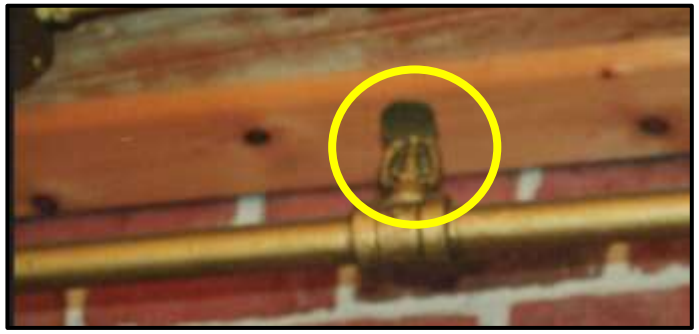
Some of the issues concerning firefighting (next)

That of Sprinkler…

Source: Pascal Caron, P. Eng.



Source: National Fire Protection Association (NFPA)



Source: Pascal Caron, P. Eng.

Montreal

Old Montreal fire that killed 7 was deliberately set, police say

Criminal investigation into deadly blaze being handled by major crimes unit

Matthew Lapierre, Verity Stevenson · CBC News ·
Posted: Aug 28, 2023 1:26 PM EDT | Last Updated: August 28, 2023

Police now believe that an Old Montreal fire that killed seven people last March was deliberately set and are now investigating the case as arson. Almost all the people who died were staying in illegal Airbnb units.

Source: CBC.ca/news

Tragic Fire of March 16th, 2023

Some of the issues concerning firefighting (next)

That of Fire Department Connection…

Source: NFPA *170 Standard for Fire Safety and Emergency Symbols*

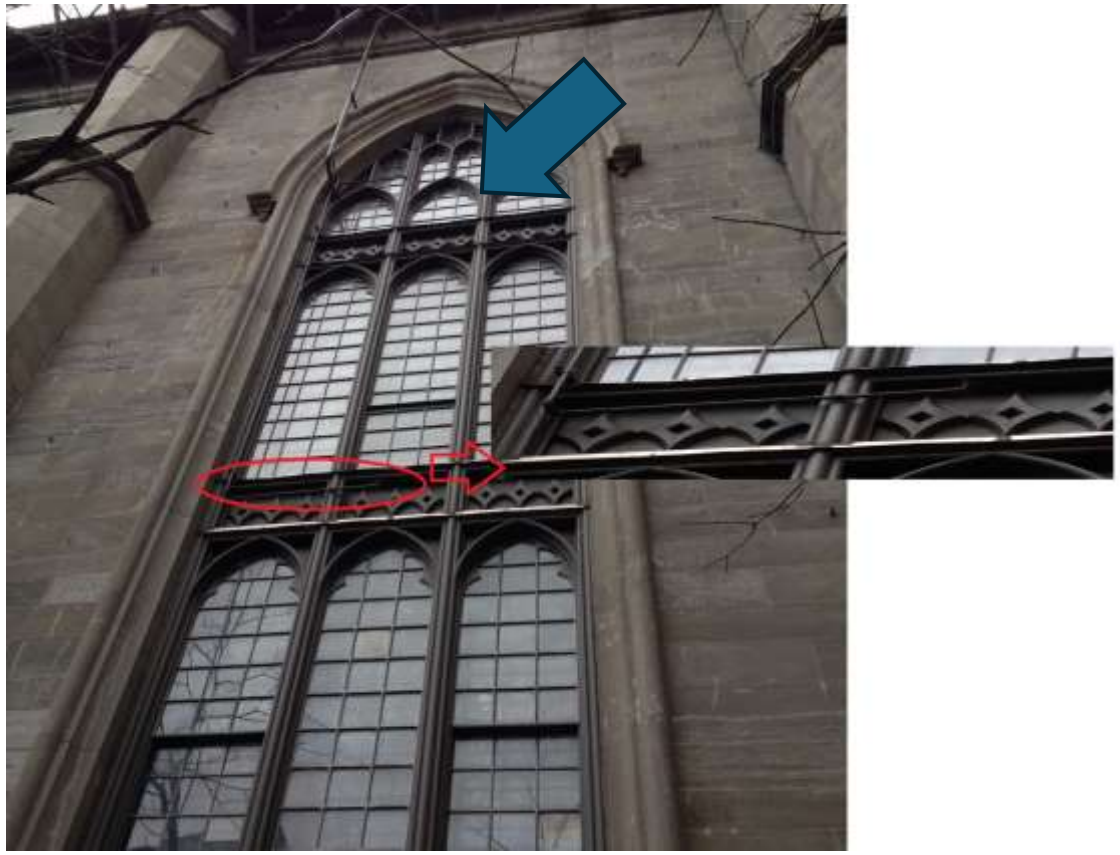
Source: Pascal Caron, P. Eng.

Source: Pascal Caron, P. Eng.

Source: Pascal Caron, P. Eng.

Some of the issues concerning firefighting (next)

That of Risk of Conflagration…



Source: Pascal Caron, P. Eng.

Fire at Notre-Dame Church in the Sacré-Coeur Chapel (1978)

Fire on De Brésoles Street in Old-Montréal (1992)

Source: Ian Stronach

INCENDIE MAJEUR - Un incendie majeur, qui a éclaté vers 3h30 dans la nuit de samedi à dimanche, a détruit tout un pâté de maisons dans le Vieux-Montréal, à proximité de la basilique Notre-Dame. Les pompiers, qui ont répondu à une alerte générale, ont réussi à contrôler le brasier vers 9h seulement. L'origine de l'incendie reste inconnue, mais on signale aucun blessé.

Source: Journal de Montréal

Source: Henri Rémillard

Source: Henri Rémillard

Some of the issues concerning firefighting (next)

That of Fire Hydrants…

Source: Pascal Caron, P. Eng.

Source: Pascal Caron, P. Eng.

Source: Pascal Caron, P. Eng.

Some of the issues concerning firefighting (next)

That of Required Fire Flow …

Examples:

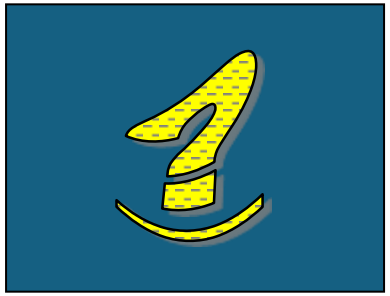
18 000 l/min
[4 800 USGPM]

4,000 l/min
[1 000 USGPM]

8,000 l/min
[2 000 USGPM]

12,000 l/min
[3 000 USGPM]

30,000 l/min
[8 000 USGPM]



new development

vacant building

outside risks

peculiar situations

Sources: Diverses

That of Fire Alarm System…

Source: Pascal Caron, P. Eng.

Source: Pascal Caron, P. Eng.

That of Fire Safety Plan…

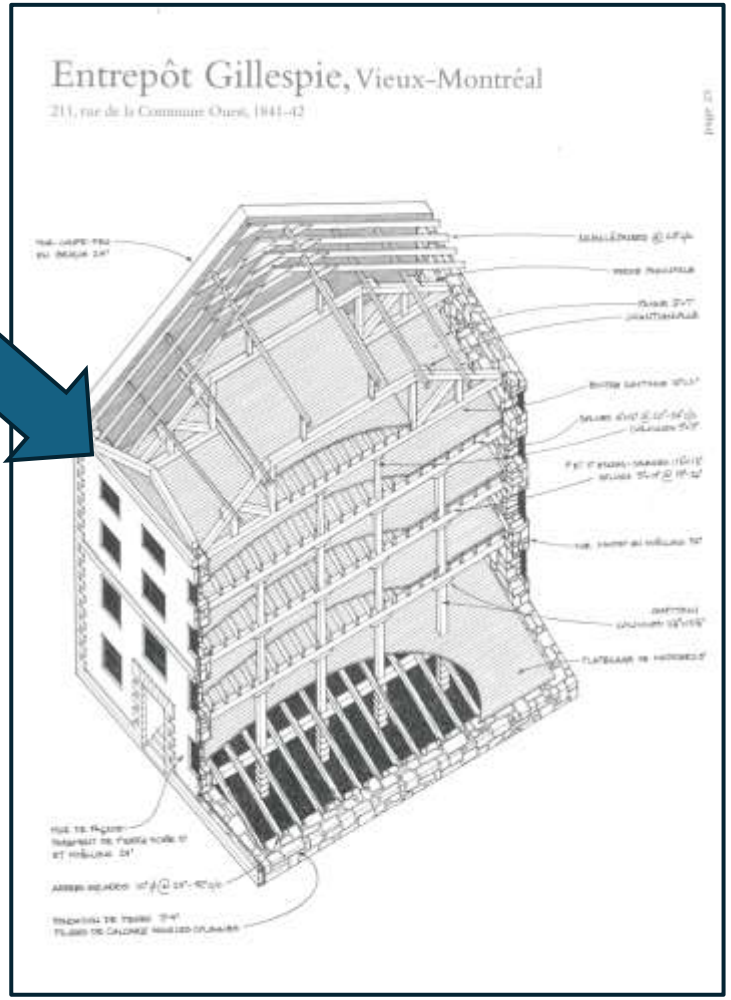
Source: Pascal Caron, P. Eng.

Some of the issues concerning firefighting (next)

That of Conditions to Be Evaluated During a Fire...

Source: Édition du Méridien

Source: Université McGill, Collection d'architecture canadienne



Source: Jules Auger, Professeur émérite à l'École d'architecture de l'Université de Montréal

The foregoing considerations are not exhaustive; several others exist...

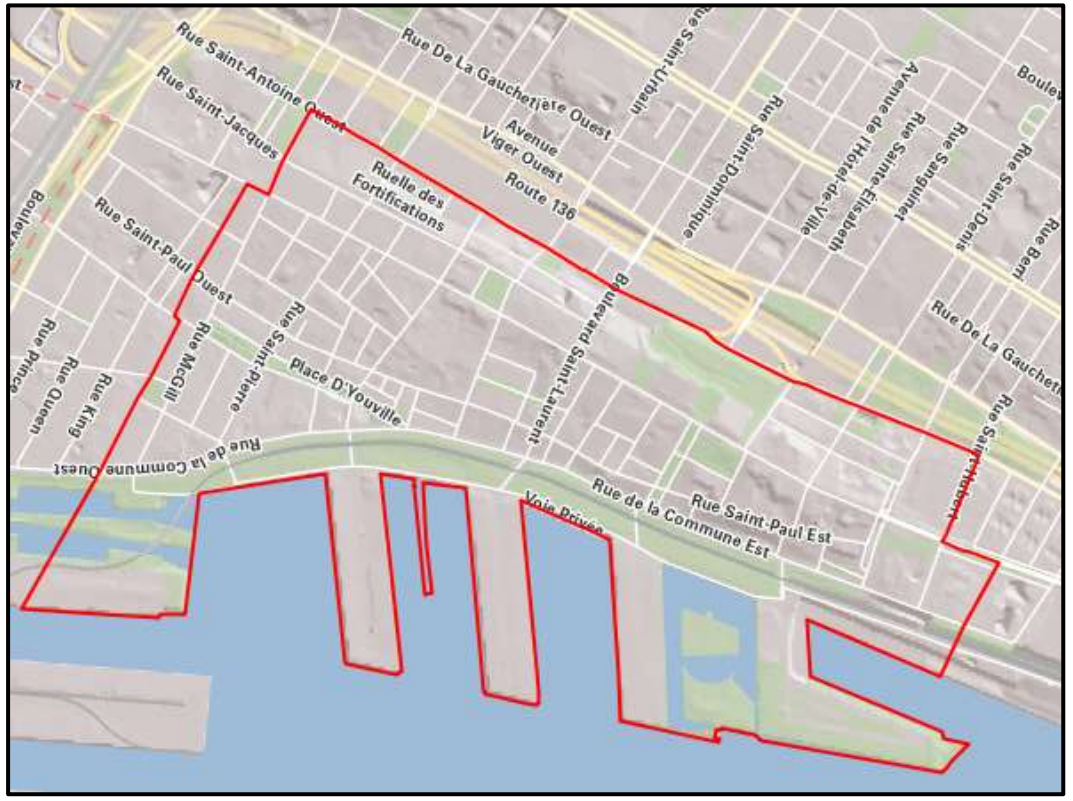
- **Smoke Control System**
- **Standpipe**
- **Fire Pump**
- **Pre-Incident Planning**
- **Etc.**

Source: Service de sécurité incendie de Montréal (SIM)

Case study of a building in Old-Montréal

Strong presence of historic and heritage buildings in Old-Montréal.

Source : www.vieux.montreal.qc.ca Denis Tremblay



Source: Ville de Montréal

VIEUX-MONTRÉAL
SITE PATRIMONIAL

An important tourist attraction!

Source : www.vieux.montreal.qc.ca Le photographe masqué

Source : www.vieux.montreal.qc.ca Denis Tremblay

Case Study

increase in building height
(by adding a floor in recessed)

Source: Adaptation for Example Solely Google Street View (2019)

Source: Adaptation for Example Solely
Courtesy of Henri C. Cleinge, Architect

Case Study (next)

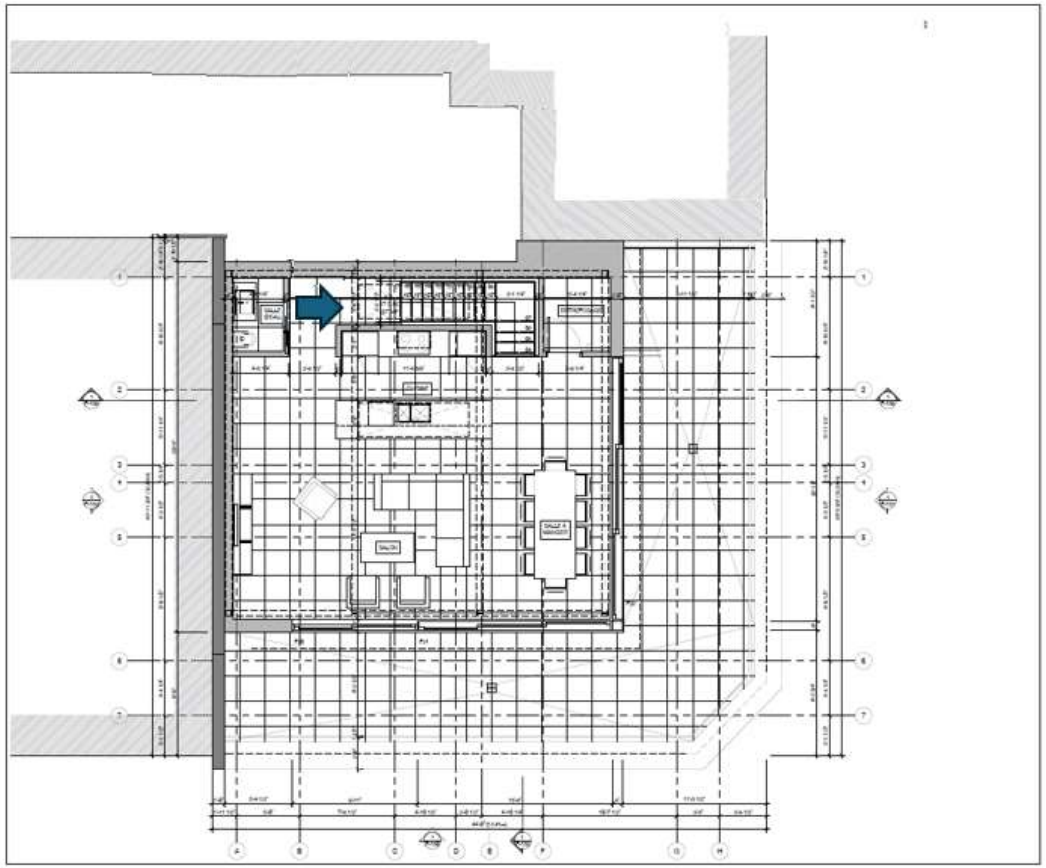
Alteration project (addition of a storey) :

Applicable Code	Québec Construction Code (NBC 2015 – amended Québec) [QCC (2022)]
Parts of Applicable Code	Parts 3 and 10 of the Québec Construction Code
Major Occupancies	Business and personal services occupancies – 1st floor Mercantile occupancies – 1st floor Residential occupancies (Dwelling Units) – 2nd, 3rd and 4th floor
Building Height	3 storeys (origin) 4 storeys (increase in building height)
Building Area	± 160 m^2
Number of Underground Storeys	1 storey
Number of Streets	2 streets
Construction Type	Combustible
Sprinkler system	Required
Fire Alarm and Detection System	Required

Case Study (next)

An exit is required → a different measure is necessary.

4th Floor layout
(modified for case study purpose)



Source: Adaptation for Example Solely
Courtesy of Henri C. Cleinge, Architect

Case Study (next)

Noncompliant of article 3.4.2.1. 1) [QCC (2022)] : number of exit on the 4th floor.

3.4.2. Number and Location of Exits from Floor Areas

3.4.2.1. Minimum Number of Exits

1) Except as permitted by Sentences (2) to (4), every *floor area* intended for *occupancy* shall be served by at least 2 *exits*.

3.4.2.1. Minimum Number of Exits	
(1)	[F10,F12,F05,F06-OS3.7]
	[F12,F06-OS1.2]
	[F12,F06-OP1.2]

Code national du bâtiment – Canada 2015 (intégrant les modifications du Québec) [CCQ (2022)]

The objective of the regulation is to ensure the safety of the occupants; they should be able to reach an exit and be able to evacuate the building within a reasonable time.

Problem: The existing location of the exit stairs could not be continued on the 4th floor without considerably modifying the heritage aspect of the building and preventing the added floor from being set back.

Considerations: The addition of a 4th floor to an existing building as part of an alteration project (increase in building height) visible from the street was previously proposed and refused by the Heritage Division of the City of Montreal.

However, a project to built it in recess from the street, away from the public view from the road below so as not to be seen or to be seen at least from the street, was deemed acceptable and accepted.

Case Study (next)

Objectives

OS Safety

An objective of this Code is to limit the probability that, as a result of the design, construction or demolition of the *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury.

OS1.2 – fire or explosion impacting areas beyond its point of origin

OS3.7 – persons being delayed in or impeded from moving to a safe place during an emergency

Functional Statements

F05 To retard the effects of fire on emergency egress facilities.

F06 To retard the effects of fire on facilities for notification, suppression and emergency response.

F10 To facilitate the timely movement of persons to a safe place in an emergency.

F12 To facilitate emergency response.

Code national du bâtiment – Canada 2015 (intégrant les modifications du Québec) [CCQ (2022)]

Case Study (next)

128. In the case of a building, facility intended for use by the public or installation independent of a building, the Board may allow the application of measures different from those prescribed by a code or regulation made under this Act, according to conditions it sets, where the provisions of the code or regulation are shown not to be reasonably applicable.

Excerpt : Building Act (chapiter B-1.1)

- Small building area (± 160 m^2)
- No sleeping room on the 4th floor
- Terrace accessible by hydraulic ladder of fire trucks
- Heritage constraints

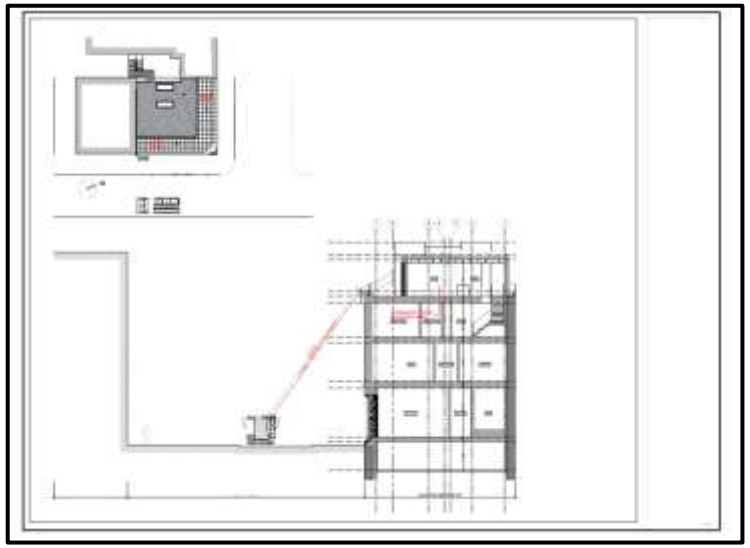
Source: Régie du bâtiment du Québec

Different measure proposal:

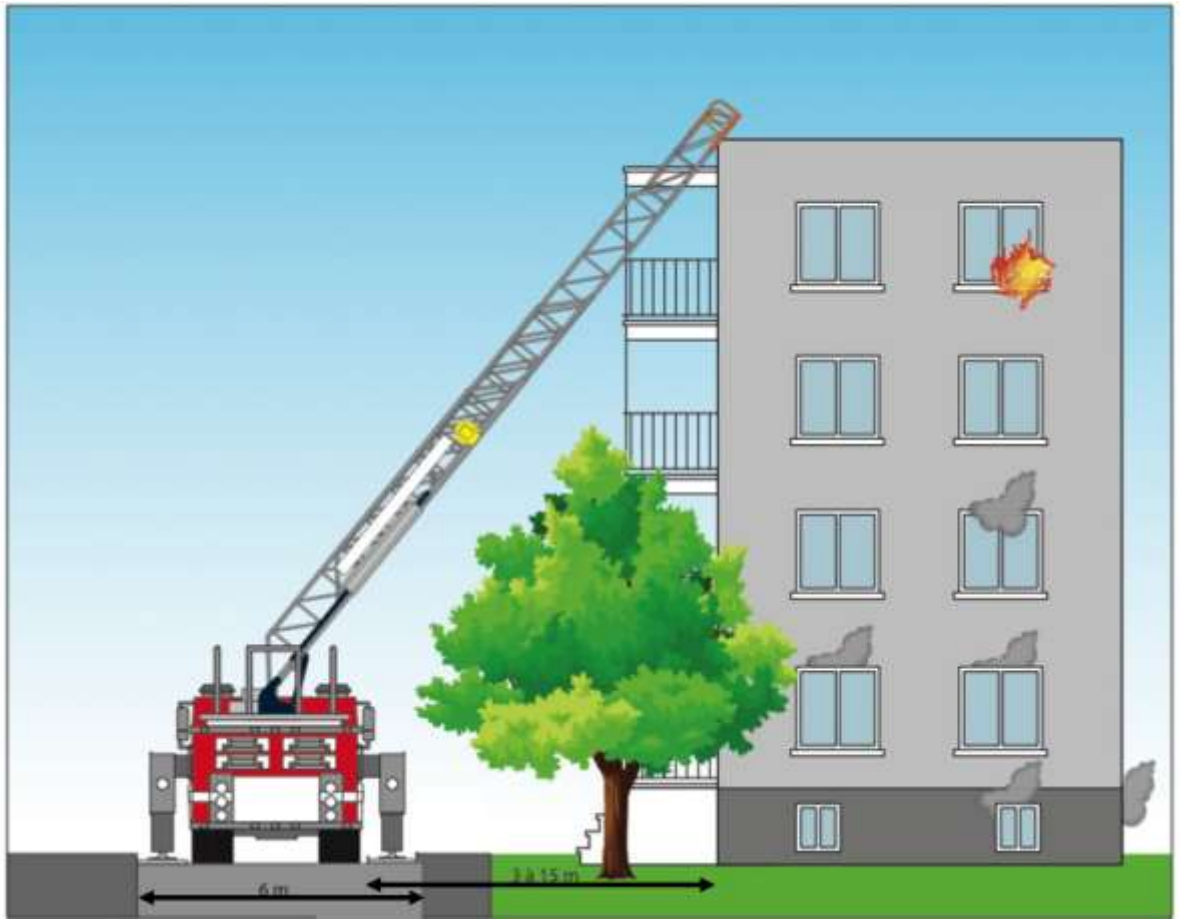
- Two dwelling units only [(2nd floor) and (3rd et 4th floor)]
- Consideration for the terrace as a ‘’refuge area’’
- Provide a portable fire extinguisher at each floor (not just one per dwelling unit)
- Increase fire resistance for floor/ceiling assembly between the 3rd and 4th floor (2 hours)

Case Study (next)

The sprinkler system should be able to control a fire and activate the fire alarm system to inform occupants of the need to evacuate the building. If smoke or other conditions prevent the occupants located on the fourth floor, to evacuate by the internal stair, they can take refuge on the terrace on the fourth floor (to take shelter) and if needed, be evacuated by the firefighters.

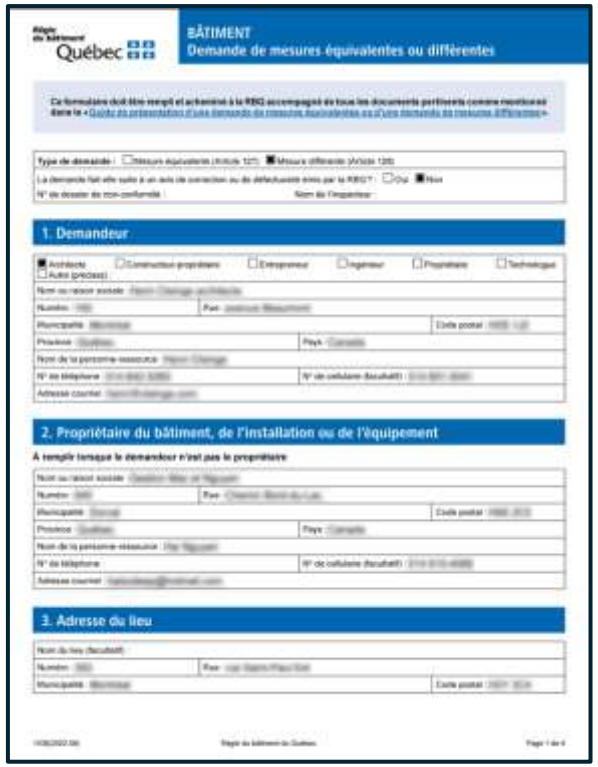


Source: Adaptation for Example Solely
Courtesy of Henri C. Cleinge, Architect



Source: Service de sécurité incendie de Montréal (SIM)

Case Study (next)


BÂTIMENT
Demande de mesures équivalentes ou différentes

1. Demandeur

2. Propriétaire du bâtiment, de l'installation ou de l'équipement

3. Adresse du lieu


4. Généralités

5. Description du bâtiment

6. Réglementation applicable


7. Contexte / Problématique

8. Mesures proposées


9. Documents annexés

10. Signature du demandeur

Source: Adaptation for Example Solely
Courtesy of Henri C. Cleinge, Architect

https://www.rbq.gouv.qc.ca/domaines-dintervention/batiment/les-mesures-equivalentes-et-les-mesures-differentes/demande-de-mesures-equivalentes-ou-de-mesures-differentes/

Case Study (next)

Example of a notice from the fire department using the By-Law RCG 12-003.

Montréal

Service de sécurité incendie de Montréal
Direction de la prévention et de la gestion intégrée des risques
8150, avenue Royalmount
Montréal (Québec) H4P 2R3
Téléphone : (514) 872-7182

PAR COURRIEL UNIQUEMENT

Le 10 septembre 2024

Notre priorité, votre sécurité !

[redacted]

Objet : [redacted]

Monsieur [redacted],

En vertu du règlement d'agglomération RCG 12-003 *Règlement sur le Service de sécurité incendie de Montréal* (SIM), le directeur du SIM ou tout employé autorisé à agir en son nom, a compétence pour donner tout avis à un autre service de la Ville de Montréal, à une municipalité reconstituée ou un autre tiers concernant la sécurité incendie, la sécurité civile et autre objet relevant de son expertise, notamment préalablement à l'établissement d'une mesure différente concernant des exigences relatives aux objets ayant une incidence sur la sécurité ou la prévention incendie.

Nous vous donnons par la présente, notre **avis favorable** concernant la demande de mesures différentes permettant qu'il n'y ait qu'une seule issue pour le 4e étage et que les paliers extérieurs existants soient maintenus dans leur configuration actuelle et ce, en considérant la nécessité de respecter les critères patrimoniaux applicables.

Cet avis concerne le [redacted] Montréal et ce, tel que présenté aux documents reçus par courriel le 1er août 2024 en lien avec cette demande.

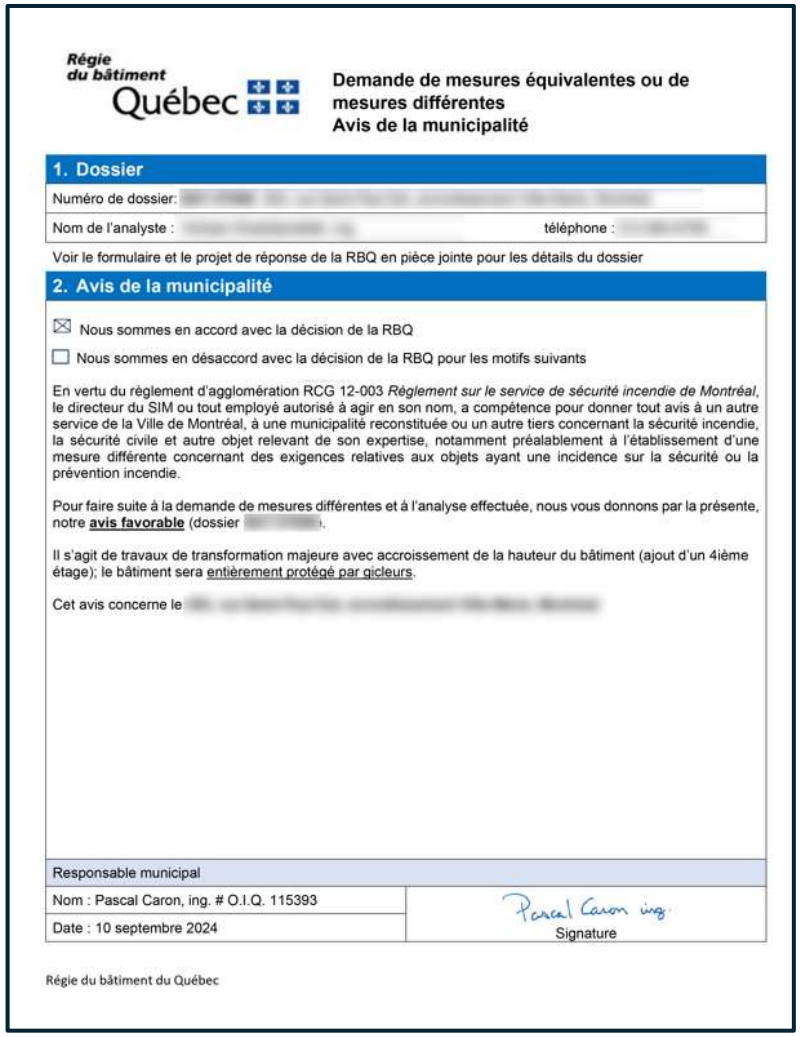
Le présent avis est spécifique ainsi qu'unique aux éléments du présent avis et ne soustrait pas le demandeur, le promoteur ou tout professionnel mandaté, à l'obligation d'obtenir tout autre permis, approbation ou autorisation ainsi que se conformer à la réglementation et aux règles de l'art applicables, le cas échéant.

Veuillez recevoir, [redacted] nos salutations distinguées.

Pascal Caron, ing. #115394 O.I.Q.

C.C. [redacted]

Source: Adaptation for Example Solely
Courtesy of Henri C. Cleinge, Architect



Régie du bâtiment Québec

Demande de mesures équivalentes ou de mesures différentes
Avis de la municipalité

1. Dossier

Numéro de dossier : [redacted]

Nom de l'analyste : [redacted] téléphone : [redacted]

Voir le formulaire et le projet de réponse de la RBQ en pièce jointe pour les détails du dossier

2. Avis de la municipalité

☒ Nous sommes en accord avec la décision de la RBQ

☐ Nous sommes en désaccord avec la décision de la RBQ pour les motifs suivants

En vertu du règlement d'agglomération RCG 12-003 *Règlement sur le service de sécurité incendie de Montréal*, le directeur du SIM ou tout employé autorisé à agir en son nom, a compétence pour donner tout avis à un autre service de la Ville de Montréal, à une municipalité reconstituée ou un autre tiers concernant la sécurité incendie, la sécurité civile et autre objet relevant de son expertise, notamment préalablement à l'établissement d'une mesure différente concernant des exigences relatives aux objets ayant une incidence sur la sécurité ou la prévention incendie.

Pour faire suite à la demande de mesures différentes et à l'analyse effectuée, nous vous donnons par la présente, notre **avis favorable** (dossier [redacted]).

Il s'agit de travaux de transformation majeure avec accroissement de la hauteur du bâtiment (ajout d'un 4ième étage); le bâtiment sera entièrement protégé par gicleurs.

Cet avis concerne le [redacted]

Responsable municipal	
Nom : Pascal Caron, ing. # O.I.Q. 115393	Pascal Caron ing. Signature
Date : 10 septembre 2024	

Régie du bâtiment du Québec

Source: Adaptation for Example Solely
Courtesy of Henri C. Cleinge, Architect

Resources available and conclusion

Resources available

Many resources available…

GESTION DES RISQUES D'INCENDIE DANS LES LIEUX PATRIMONIAUX

Dates :
Le jeudi 19 février et le vendredi 20 février 2009

Lieu :
La Citadelle de Québec
Québec, (Québec)

Commanditaire :
Agence Parcs Canada

Droits d'inscription :
Les droits sont de 125 $ et comprennent le cours, le manuel, un exemplaire de la norme NFPA 914, Codes for Fire Protection of Historic Structures (2001) et des rafraîchissements lors des pauses. L'atelier est gratuit pour les employés de Parcs Canada et pour les représentants des lieux historiques nationaux n'appartenant pas au gouvernement fédéral.

Description du cours :
Dans la dernière décennie, plusieurs constructions d'importance nationale ont été gravement endommagées ou détruites par des incendies. La perte de chacune de ces précieuses ressources culturelles illustre bien la nécessité d'adopter des stratégies de prévention et de protection pour garantir la sécurité des humains et des biens. La trousse de formation *Gestion des risques d'incendie dans les lieux patrimoniaux* vise à combler cette lacune. Le cours sera donné en français.

Objectifs d'apprentissage :
- Chaque participant acquerra une bonne connaissance des politiques et des pratiques techniques acceptables pour la gestion des risques d'incendie dans les lieux patrimoniaux, notamment les bâtiments et les ouvrages.
- Chaque participant se familiarisera avec les sources d'information où il pourra obtenir des conseils généraux et particuliers sur les aspects techniques de la gestion des risques d'incendie dans les lieux patrimoniaux, notamment les bâtiments et les ouvrages.

Moniteur : Pascal Caron, ing., membre de la SFPE

Monsieur Pascal Caron est ingénieur spécialisé en protection incendie. Il travaille pour un important service municipal d'incendie depuis 10 ans, au sein de la direction de la planification stratégique de ce service. Il agit également à titre d'ingénieur consultant pour divers projets et dossiers, dont plusieurs impliquent la mise aux normes de bâtiments historiques et patrimoniaux.

Il est membre de plusieurs comités techniques comme celui sur l'usage et l'évacuation de la Commission canadienne des codes du bâtiment et de prévention des incendies.

Il enseigne à l'École Polytechnique de Montréal où il donne plusieurs cours techniques en sécurité incendie.

Monsieur Caron est membre de la National Fire Protection Association. De plus il est président du chapitre Saint-Laurent de la Society of Fire Protection Engineers

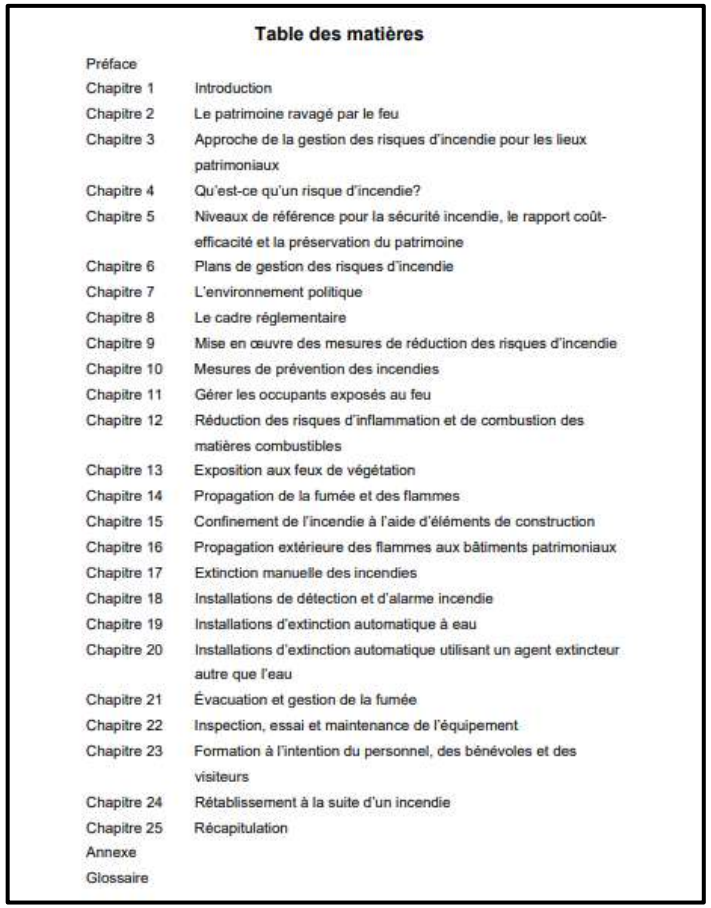
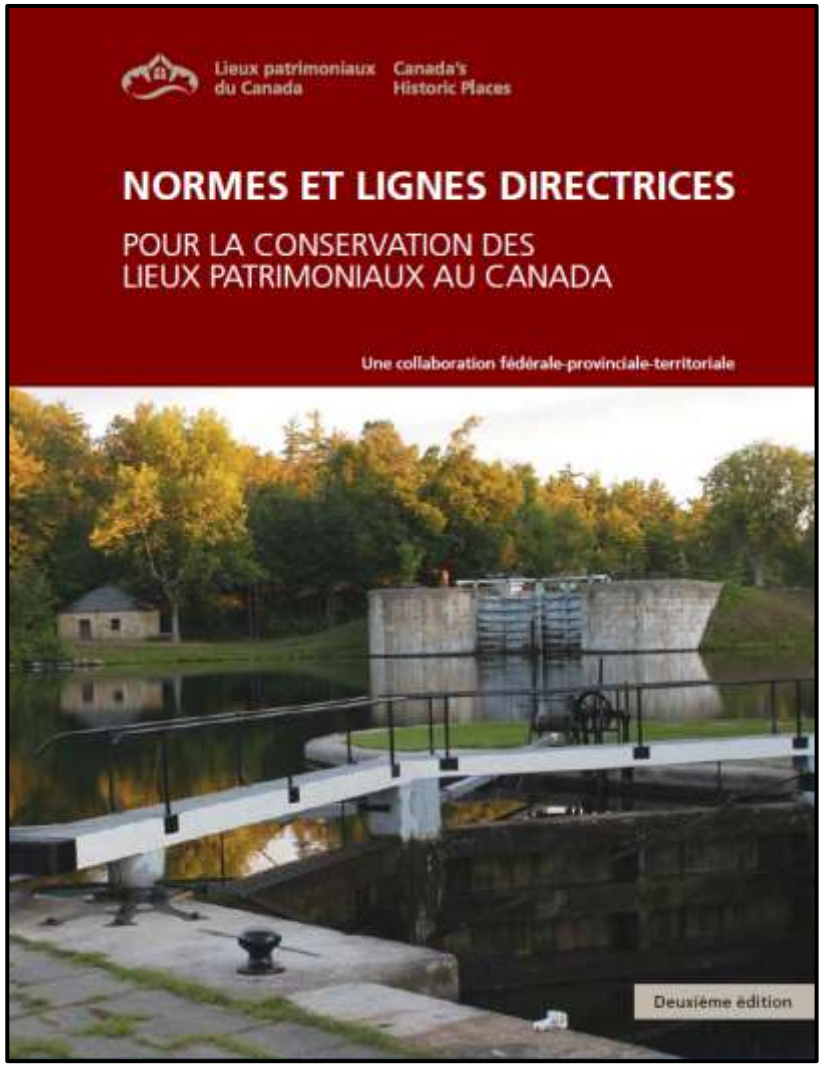


Table des matières

Source: Parcs Canada



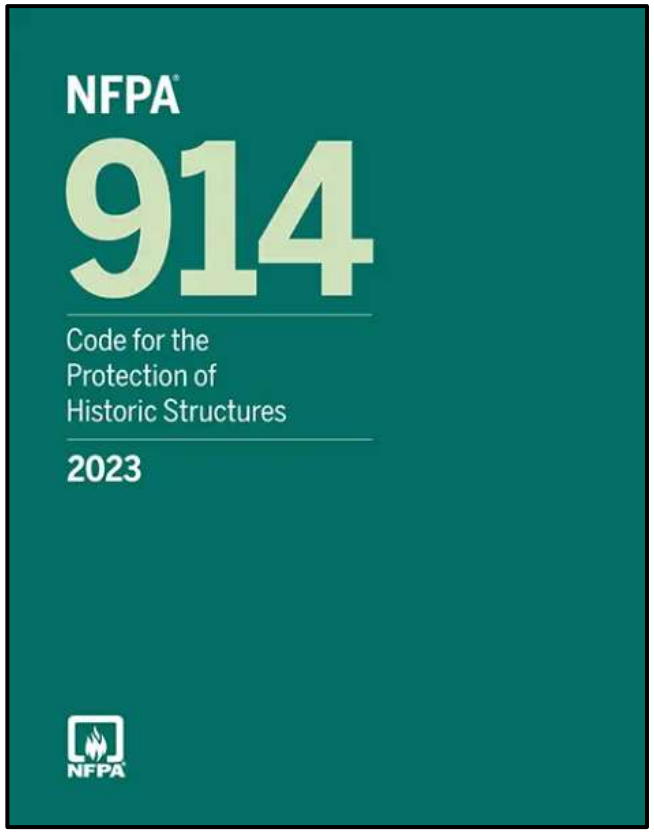
Source: Gouvernement du Canada

Parcs Canada

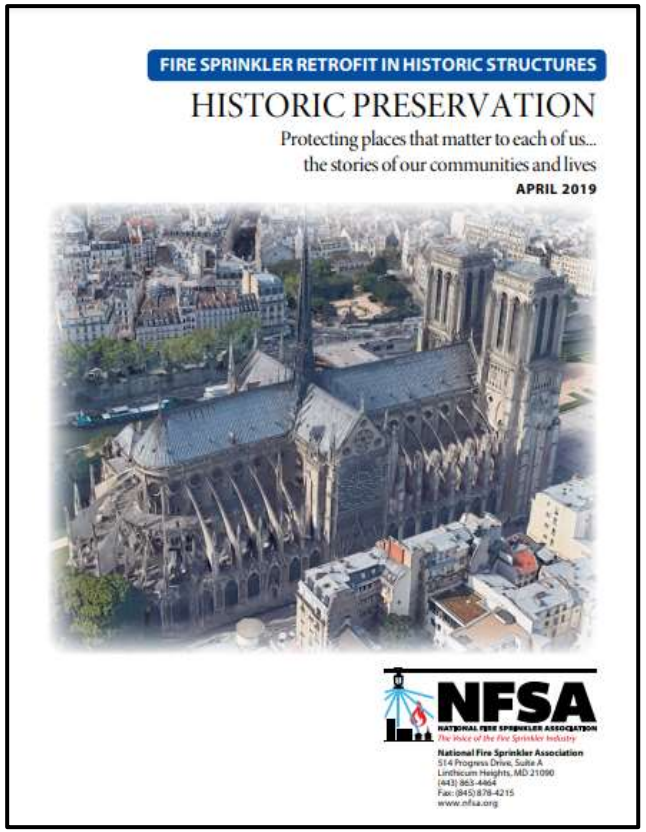
www.lieuxpatrimoniaux.ca

Resources available (next)

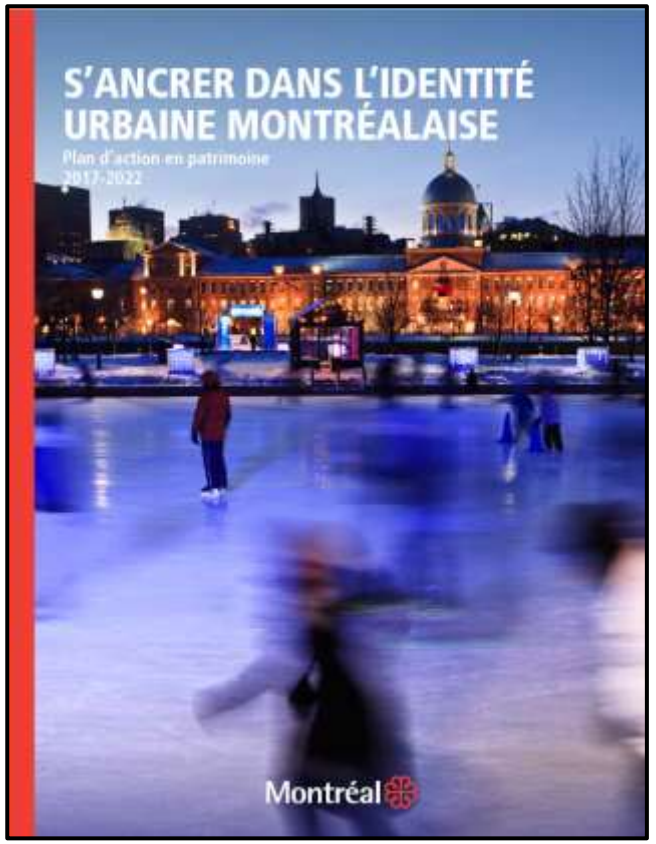
Many resources available…



Source: National Fire Protection Association (NFPA)



Source: National Fire Sprinkler Association (NFSA)



Source: Ville de Montréal

- **Acting as an exemplary owner and manager;**
- **Ensuring the enhancement of local heritage buildings;**
- **Supporting the requalification of similar ensembles;**
- **Disseminating knowledge and encouraging recognition.**

Merci !

Pascal Caron, P. Eng.
Fire Protection Engineer

terrapine@hotmail.com

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