Fire Code Retrofit Assessment and Water Supply Analysis for Larry Robinson Arena

Metcalfe, Ontario

Stantec

Prepared for:
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1 Introduction

1.1 Background

Stantec Consulting Ltd. (Stantec) has been retained by the City of Ottawa (Client) to conduct a study of the deficiencies of the existing building relative to the mandatory retrofit provisions of the Ontario Fire Code (OFC Section 9.2.) that would result in a Life Safety Study if the deficiencies were not readily rectified. The scope of work also includes analysis of water supply requirements of the OFC and Ontario Building Code (OBC), concluding with options and recommendations for an adequate water supply volume, to be discussed with the project team and Ottawa Fire Services.

This report was prepared to support the Site Plan Application prompted by the new addition, and specifically to support resolution of the question of an adequate water supply for the building, as required by the Ontario Building Code due to the addition.

1.2 Scope of Report and Methodology

This report is a presentation of findings relative to the retrofit requirements of the OFC for assembly buildings, and analysis supporting the determination of adequate water supply. This study is to support the response to the question “What is an adequate water supply for this building, considering the context of the existing arena with a new addition?”. The question is raised since Part 3 of the OBC (via Part 11) applies to the addition and includes compliance with Article 3.2.5.7.:

> **3.2.5.7. Water Supply** (See Appendix A.)
>
> **(1)** An adequate water supply for firefighting shall be provided for every *building*.

The report is structured in 3 sections:

- **Ontario Fire Code Analysis:** A review of how the building meets obligatory retrofit requirements applicable to the existing building, as requested by Ottawa Fire Services, to inform analysis of water supply requirements. Note that a sampling review was conducted to be able to assess overall conformance, and it was not a detailed audit to find every instance of a deficiency.
- **Ontario Building Code Analysis:** A high level summary of key fire and life safety requirements applicable to the addition, with a focus on factors impacting determination of water supply.
- **Water Supply Analysis:** A discussion of the factors that warrant consideration in the analysis of adequate water supply, and a summary of options for the project related to water supply.

This report is based on the site visit (visual observations) conducted on September 16, 2025, an online meeting with the Ottawa Fire Department on Oct 1, 2025, and background documentation on the existing building and proposed addition, provided by the City. Destructive testing and system performance testing were not undertaken and were outside the scope of this review.

1.3 Applicable Codes

The use and operation of the existing building is subject to the Ontario Fire Code (OFC, O.Reg. 213/07 as amended).

The OFC is applicable, including Section 9.2 which provides mandatory retrofit requirements for buildings with assembly occupancies. It is the building owner's responsibility to ensure that all requirements of the OFC are complied with and to undertake the necessary upgrades where required. The building is an "enclosed arena" and includes a "community hall" which are both uses in the Article 2.1.1.1. list of uses to which Section 9.2. applies. We understand the building has existed without major renovations since prior to February 11, 1987, which means that Section 9.2. is applicable to this existing building per OFC Article 9.2.1.3. Section 9.2. generally establishes the minimum fire and life safety requirements for existing buildings based on the 1986 Building Code (1986 OBC, O. Reg. 419/86).

The 2012 Ontario Building Code (OBC, O.Reg. 332/12, amended up to O.Reg. 163/24) is applicable to the addition of the arena as the design was substantially complete and a building permit application was submitted prior to March 31, 2025.

1.4 Building Description

The Larry Robinson Arena is 2-storeys with a building area (footprint) of approximately 2600 m^2. The proposed 1-storey addition on the north side is approximately 700 m^2 for a new building area of 3300 m^2. The 2-storey portion of the building is only on the east side of the building as the ice pad and seating takes up approximately three-quarters of the footprint of the existing building. Figure 1 below shows the overall configuration of the existing building with the planned addition (north is up).

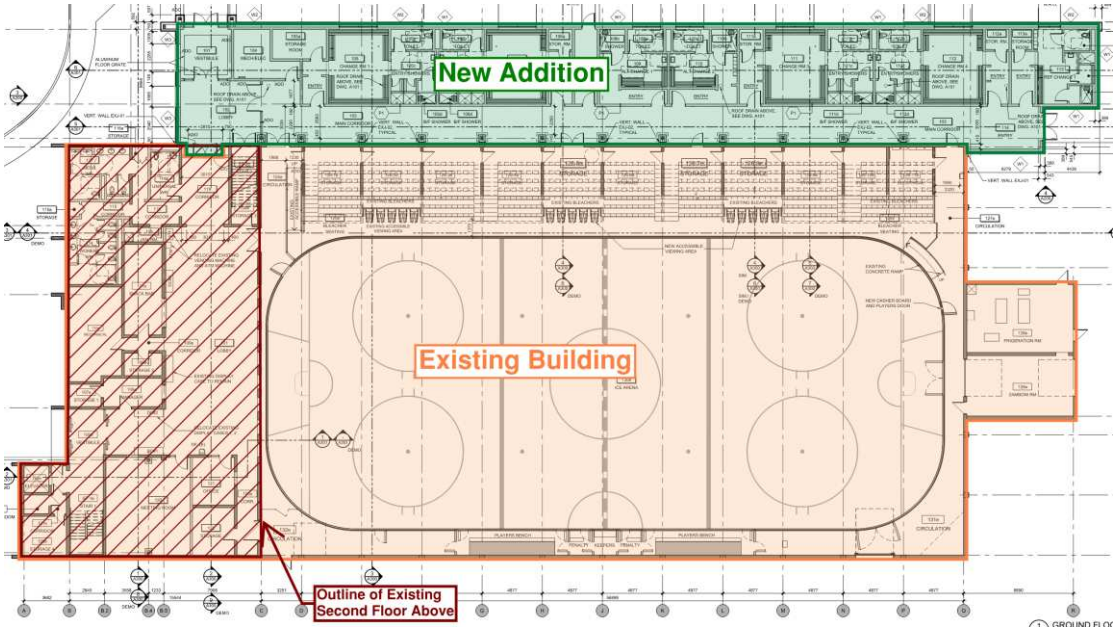


Figure 1: Ground Floor Plan

The building is a Group A, Division 3 major occupancy since it is the arena type with an ice pad used for ice sports and activities. The subsidiary occupancies are Group A, Division 2 (hall and meeting rooms), Group D (offices), and Group F, Division 3 (storage). Changerooms and washrooms are subsidiary spaces supporting the arena occupancy.

City of Ottawa staff have confirmed that the building is NOT used for trade shows and exhibitions. Periodically non-ice pad uses will take place inside the arena, such as livestock shows during the fall fair, concerts, and shelter use during emergencies. The analysis in this report considers these periodic other uses.

2 Ontario Fire Code Analysis

This section presents the findings of a review of the existing building (without addition) to the applicable provisions of the 2007 Ontario Fire Code, O.Reg. 213/07, as amended to date, Part 9 Retrofit, Section 9.2. Assembly, except where other Parts are noted. Observations and findings are noted with required actions to address deficiencies. All references are from the OFC unless otherwise indicated.

2.1 Fire Separations between Major Occupancies

Fire separations are required between assembly occupancies as listed in Sentence 9.2.1.1.(1) and other major occupancies in compliance with 1986 OBC Article 3.1.3.2. The building, including the addition, contains only one major occupancy, which is Group A, Division 3 – assembly occupancy of the arena type – so this provision is satisfied. The meeting rooms and 2nd Floor community hall are considered to be a Group A, Division 2 subsidiary occupancy, although the wall between the rink and the lobby and 2nd Floor contains windows with wired glass in steel frames, indicating that the original design may have intended a rated fire separation between occupancies.

2.2 Protection of Openings in Fire Separations

Closures that are in compliance with 1986 OBC Sentences 3.1.6.4.(2) and 3.1.6.7.(1) – fire protecting rating and maximum size of closure - are required to be provided in fire separations per Sentence 9.2.2.2.(1). Locations of required fire separations are identified in Section 2 of this report.

Doors located in a required fire separation are required to either be provided with at least the minimum required fire-protection rating or be constructed of hollow metal, with or without wired glass, as permitted by Clause 9.2.2.2.(2)(a).

The following observations were noted:

- Fire doors are a mix of labelled and not labelled, but all appear to be fire door construction and are in good condition for their age.
- Ground Floor Main Entrance Vestibule separates the Stair 1 Exit serving the 2nd Floor from the remainder of the Ground Floor and requires a 1 hour fire resistance rating, so the doors require a

45 minute fire protection rating. The vestibule sliding doors and panels appear to have been a more recent installation (not original) and are not rated.

- Rating of the Second Floor North Exit Stair doors could not be determined (label not provided); though they appear to be hollow metal, equipped with self-closing devices and in good condition. See comment in Section 2.6.3 for measurement of travel distance at this exit.

Rec 2.2-1: Replace entry vestibule sliding doors and panels with a 45 minute fire protection rating closure, that includes a breakaway function to swing on a vertical axis when pushed during an emergency – refer to 2.6.4). This recommendation is also mandatory to satisfy Fire Separation of Exits requirements in OFC Article 9.2.3.15 (refer to 2.6.9 of this report).

2.3 Fire Separations for Hazardous Areas

Fire separations that are in compliance with Subsection 3.5.2. of the 1986 Building Code are required to be provided between service rooms and assembly occupancies (9.2.2.3.(2)). A fire separation having a fire-resistance rating not less than 30 minutes is deemed to comply if a detection system is provided and connected to the building fire alarm system (9.2.2.3.(3)).

The walls and doors separating the Service Room 110e and Refrigeration Room 128e are concrete block construction and continuous from floor to underside of roof, providing the required fire separation. Several service penetrations are not firestopped through the wall and through the gypsum ceiling of the 2nd Floor assembly above the Service Room.

Figure 2: Service Room Ceiling and Service Penetrations Requiring Repair

Rec 2.23-1: Firestop service penetrations through Service Room walls (masonry) and gypsum ceiling with a firestop system that provides a 1 hour F Rating. Repairs of ceiling gypsum board may be necessary to provide adequate support for the firestopping.

2.4 Interior Finishes

Interior finishes are required to comply with the flame-spread rating requirements under Clauses 3.1.4.5.(3)(g) and (h) and Subsection 3.1.11. of the 1986 Building Code (9.2.2.4.(1)).

Thicknesses of interior finishes could not be determined since destructive testing was not conducted. Flame-spread ratings cannot be confirmed from visual observations and can only be fully confirmed with material specifications and fire test results. As a reference, the 1986 OBC governs interior combustible wall and ceiling finishes and flame spread ratings:

- Interior wall finishes other than foamed plastics that are not more than 25 mm in thickness, and have a flame-spread rating of not more than 150 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction, and
- Interior ceiling finishes other than foamed plastics that are not more than 25 mm in thickness… and consist of a material having a flame-spread rating of not more than 25 on any exposed surface or on any surface that would be exposed by cutting through the material in any direction or fire-retardant treated wood, except that not more than 10 per cent of the ceiling area within each fire compartment is permitted to have a flame-spread rating of not more than 150.
- Exits, exit lobbies and service rooms are limited to a maximum flame spread rating of 25 on all interior finish surfaces (walls, ceilings, floors) and a maximum smoke developed classification of 50.

The walls, ceilings and floors of exits and service rooms are generally concrete, masonry, gypsum and acoustic tile materials that are known or expected to provide a flame spread rating of 25 or less. The roof assembly over the ice pad and seating includes a ceiling finish of an insulation and covering material from original construction whose flame spread rating is not known. We understand this material exists at other arenas and is being removed over time as its condition deteriorates.

Rec 2.24-1: Investigate the ceiling interior finish material over the ice pad to confirm if the flame spread rating is 25 or less, or determine the basis for approval at similar buildings and confirm similar approval for this building.

2.5 Occupant Load Determination

The occupant load for calculation of number and width of exits is to be in accordance with OFC 2.7.1.4. (OFC 9.2.3.1.).

The following occupant loads were calculated using OFC Table 2.7.1.4.:

Ground Floor (Total: 927 persons, considering Method 2, and skating as the primary use of the arena)

- Bleachers and Player's Benches: 286 m^2 / 0.60 m^2/person = 476 persons (Method 1)

- Bleachers and Player's Bench, using a seat width factor of 450 mm per person: 307630 mm / 450 mm/person = 683 persons (Method 2)
- Arena
    - Used for skating: assumed design load of 100 persons
    - Used as exhibition hall (special use only): 1240 m^2 / 2.80 m^2/person = 442 persons
- Lobby: 137 m^2 / 1.85 m^2/person = 74 persons
- Team Rooms: 131 m^2 / 1.85 m^2/person = 70 persons

Second Floor (Total: 323 persons)

- Community Hall: 307 m^2 / 0.95 m^2/person = 323 persons

Where occupant loads are more than 60 persons, the occupant load is required to be posted in a conspicuous location such as at building and room entrances (OFC 2.7.1.5.(1)). Posted occupant load signs were not found during the site visit.

Rec 2.25-1: Confirm the calculated occupant load for each floor area and post occupant load signs for the Ground Floor and 2nd Floor at the building entrance and entrance to the 2nd Floor Hall.

2.6 Access to Exits

2.6.1 Number and Location

Two egress doorways are provided where the occupant load of a room exceeds 60 persons as required by OFC Sentence 9.2.3.2.(1).

In new construction, a maximum 30 m travel distance would apply. The 30 m travel distance is exceeded from the centre of the existing bleachers to the existing exterior exit doors on the north side of the building; however, this existing condition is not required to be addressed in Section 9.2. The addition does not worsen the existing conditions as the current exterior exit doors will open to a public corridor that will be protected from the existing building by a 1 hour rated fire separation. See discussion later in the report with a recommendation to further compartmentalize the corridor in the addition.

2.6.2 Access to Exits (dead-end corridors)

Access to exits is required to comply with OBC 1986 Article 3.3.2.7. (Sentence 9.2.3.3.(1)) that prohibits dead-end corridors in assembly occupancies unless there is a second and separate egress doorway not leading into the dead-end corridor.

The existing Men's W/R, Women's W/R, and Electrical / Janitors Room in the northwest corner of the building on the Ground Floor are served by a dead-end corridor, and the rooms do not have a second and separate egress doorway that does not lead into a dead-end corridor.

The interior renovations planned with the addition will rectify this situation since the new Rooms 115 – 117 will be a group of rooms clearly entered through a doorway from Corridor 119, so there will not be a dead-end corridor condition that has the potential to delay egress if people inadvertently go into a dead-end corridor.

2.6.3 Minimum Number of Exits

Each floor area is required to be served by at least two exits as required by OFC 9.2.3.4.(1) and 9.2.3.6.(1).

The Ground Floor is served by 5 exterior exit doors, plus exterior exit doors directly from the north side storage rooms and east side service rooms. The 2nd Floor is served by 2 exit stairs – Stair 1 and Stair 2.

Exit Stair 1 has a related deficiency since it does not have a 1 hour rated fire separation the remainder of the Ground Floor due to the non-rated sliding doors and panels, however Stair 1 still is considered an exit.

Exit Stair 2 is enclosed from the 2nd Floor Hall but the gypsum board on the partition does not extend to the underside of the roof. It is assumed that the design team designed Stair 2 to be an extension of the 2nd Floor area, and measured travel distance to the exterior door, which is permitted since the travel distance of maximum 30 m is still maintained.

2.6.4 Door Swing

Each door serving as an access to exit from a room serving more than 60 persons is required to open in the direction of exit travel and is required to swing on its vertical axis per OFC Article 9.2.3.5.

All rooms with an occupant load greater than 60 persons are provided with egress doors that open in the direction of exit travel and swing on a vertical axis, as required by OFC Article 9.2.3.5, except for the main entrance vestibule sliding doors, provided the sliding doors provide an emergency breakaway. The exterior doors at the main entrance, and the vestibule doors are sliding doors that do not appear to have a breakaway function in the direction of exit travel, and there is no signage to indicate it is a swinging door in an emergency as required by OBC 3.3.1.2.(1). See the photo in Figure 3 below.

Rec 2.6.4-1: Replace the exterior sliding doors of the main entrance with doors that swing on a vertical axis in the direction of exit travel.

2.6.5 Number of Exits and Total Exit Width

The building is provided with exits serving each floor as follows:

- The Ground Floor is provided with 5 exits (not including exits accessed through service rooms / storage rooms), which complies with OFC Clause 9.2.3.6.(1)(c) for an occupant load exceeding 1000 persons.
- The Second Floor is provided with 2 exits, which complies with OFC Clause 9.2.3.6.(1)(a) for an occupant load not exceeding 600 persons.

The aggregate width of exit capacity is to be determined by multiplying the occupant load by 6.1 mm per person for doorways and corridors per OFC Clause 9.2.3.7.(1)(a).

- Ground Floor: 927 occupants * 6.1 mm per person = 5655 mm
- Second Floor: 323 occupants * 6.1 mm per person = 1970 mm

The Ground Floor has a measured exit width of 5960 mm, which exceeds the minimum exit width required for the occupant load calculated above. Note that when the arena is used for trade shows and exhibition events, it is our understanding that there is involvement from the fire department based on discussions with facility staff. When anticipated occupant loads exceed those permitted based on the exit capacity of 5960 mm, the overhead door located at the southeast corner of the arena has been used as an additional exit, with approval from the fire department. In such cases, the exit width would increase to 8810 mm, which would permit a total occupant load of 1444 persons for the Ground Floor.

The Second Floor has a measured exit width of 3440 mm, which exceeds the minimum exit width required for the occupant load calculated above.

2.6.6 Exits through Lobbies

Exits through a lobby area shall comply with the requirements of Clauses 3.4.4.1.(7)(c) to (f) of the 1986 Building Code (9.2.3.16.(1)).

There are no exits through lobbies in the existing building. The addition to the arena will create an exit through lobby condition that will require a 1 hour rated fire separation to the remainder of the building (see further discussion in Section 3.1 of this report.

2.6.7 Fire Escapes

Articles 9.2.3.10. and 9.2.3.11. are not applicable as the building is not provided with a fire escape.

2.6.8 Emergency Lighting and Exit Signs

Emergency lighting is required to comply with 1986 OBC Article 3.2.7.3. per OFC Article 9.2.3.12. that requires emergency lighting to have average levels of 10 lx at floor or tread level in exits, corridors used by the public, principal routes providing access to exit in open floor areas, and in floor areas in Group A, Division 2 and 3 occupancies having an occupant load of 60 persons or more. A duration of at least 30 minutes is required.

Emergency lighting via unit lighting packs was observed to generally be present in corridors and at exits throughout the building as required by 1986 OBC Sentence 3.2.7.3.(1). Emergency lighting was not provided at the top of the east bleacher stairs.

Measurement of illumination levels of the emergency lighting was not in the scope and were not measured. The illumination levels may not be met on aisle steps serving the seating area, nor throughout the full paths

of travel from seating to the exit doors based on the locations of the emergency lighting units and distance to the path of travel.

Rec 2.6.8-1: Measure illumination levels of emergency lighting during the next test of the building's emergency power system and provide additional emergency lighting units where the illumination level does not meet minimum OFC requirements.

2.6.9 Fire Separations

An exit stairway is required to be separated from the remainder of the building in accordance with OBC 1986 Sentence 3.4.4.1.(1) per OFC Sentence 9.2.3.15.(1). The original construction was required to provide 1 hour rated floor assemblies and the new addition requires 2 hour rated floor assemblies. The rating of exit fire separations corresponds to the required rating for floor assemblies. Therefore, in the existing building, the 2nd Floor exits are required to have a 1 hour fire resistance rating. The sliding doors and panels between the front entrance vestibule and the remainder of the Ground Floor do not provide the required 1 hour rated fire separation.

The Stair 1 Exit doors from the 2nd Floor are equipped with self-closing devices but do not have a positive latching device that would keep the doors closed when not in use. It is not mandatory to install a positive latching device, but it is recommended as a voluntary measure.

Figure 3: Front entrance vestibule doors

Rec 2.6.9-1: Replace entry vestibule sliding doors and panels with a 45 minute fire protection rating closure, that includes a breakaway function to swing on a vertical axis when pushed during an emergency – refer to 2.6.4). This is the same as recommendation 2.2.-1.

2.6.10 Ancillary Rooms

Ancillary rooms such as service rooms and garbage rooms do not open directly into an exit stairway, complying with Article 9.2.3.17. .

2.7 Fire Alarm Systems

Fire alarm and detection systems are required to be installed in compliance with 1986 OBC Subsection 3.2.4. excluding Article 3.2.4.7. per OFC Sentence 9.2.4.1.(1). Key requirements are that an annunciator is provided where fire fighters will enter the building, the fire alarm system has emergency power for 24 hours supervisory function followed by 30 minutes power under full load, and manual stations are installed at exits.

1986 OBC Article 3.2.4.7. is exempted which would otherwise require that the system notifies the fire department that an alarm signal has been initiated. The Fire Safety Plan indicates that the fire department is automatically notified that an alarm signal has been initiated.

The building has a fire alarm system with fire alarm initiating devices (manual stations, heat and smoke detectors) generally where required the 1986 OBC, and notification devices (bells and horns/strobes) through the floor area. The annunciator is in the main entrance vestibule. An audibility test was not conducted.

2.8 Access for Fire Fighting

Access routes for fire fighting are required to comply with Sentence 3.2.5.2.(1) of the 1986 OBC. As the building exceeds 600 m^2 in building area, the building is required to be provided with access routes for fire department vehicles to the building face having a principal entrance, and each building face having access openings for fire fighting as required in Article 3.2.5.1. of the 1986 OBC.

The building is surrounded by paved parking on the north and south sides, and 8th Line Road is on the west side. Vehicles are able to travel around the east side of the building as well, although it is not paved. At least 50% of the building perimeter is within 15 m of an access route.

2.9 Sprinkler Systems

Article 9.2.5.2. does not apply as the building is not sprinklered. There is no requirement to retrofit a sprinkler system into this building.

2.10 Part 2 Fire Safety

This section includes key requirements for OFC Part 2 that applies to the ongoing use and maintenance of all buildings, regardless of date of construction.

2.10.1 Fire Separations

OFC requires that the integrity of fire separations be maintained where originally intended and constructed as per OFC Section 2.2 (separate from Section 9.2).

The 2nd Floor assembly was originally intended to be constructed as a 1 hour rated assembly based on original drawings, see Figure 4B below. A 2 hour rated assembly was specified over the service room since the OBC required 2 hours at that time, but this has since been reduced to 1 hour. From visual observation and lifting ceiling tiles in the Lobby, it appears that the original rated ceiling over the Ground Floor Lobby was removed at some point, and that a non-rated acoustic suspended rated ceiling was installed, since there was no evidence of rated tiles or clips to hold them down (see photos in Figure 4A).

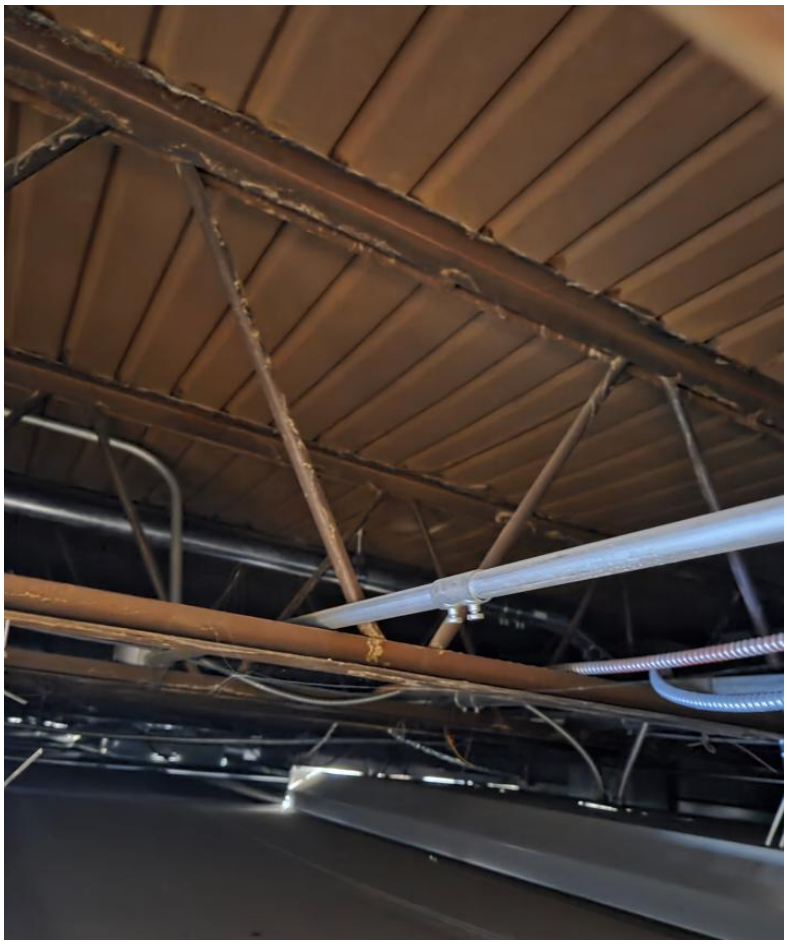


Figure 4A: Above the Lobby Suspended Ceiling/Underside of 2nd Floor Assembly

Rec 2.10.1-1: Remove existing unrated acoustic suspended ceiling on the Ground Floor and provide a ceiling that will achieve a 1 hour fire resistance rating for the floor assembly, based on a listed floor assembly design, such as from UL or Intertek.

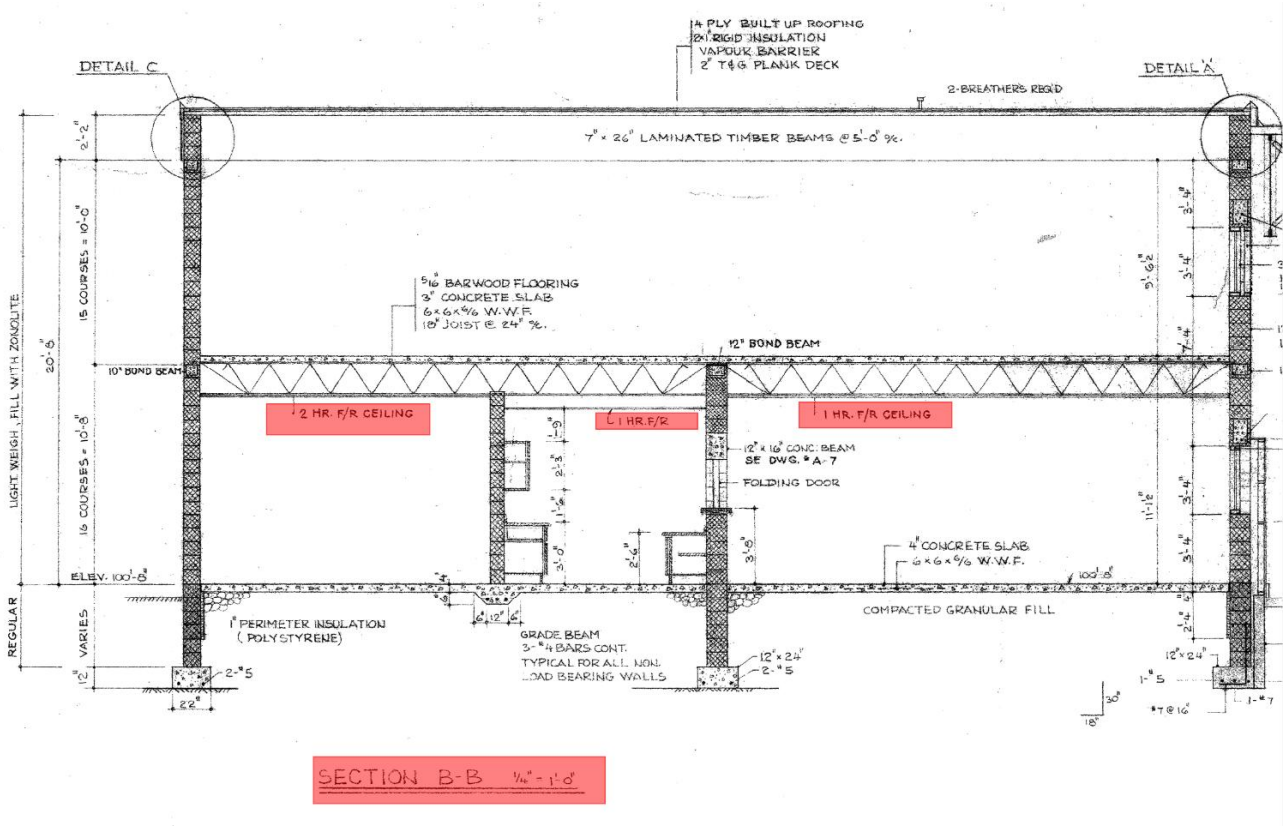


Figure 4B: Cross-section from original drawings showing 1 hour rated 2nd Floor assembly

2.10.2 Provisions for Firefighting

OFC Parts 2 and 6 require that:

- Fire access routes remain unobstructed and maintained ready for use,
- Sprinkler and standpipe connections be clearly identified and maintained free of obstructions for use at all times, and
- Fire protection systems and equipment be maintained in working order (or appropriate procedures are in place for temporary shutdowns), and that inspecting, testing and maintenance be undertaken as prescribed by the OFC.

There is no OFC requirement to retrofit a fire alarm system, sprinkler system or standpipe system in an existing building that has not changed use or hazard. There is no requirement to assess adequacy of a water supply of an existing building except as directed by the Ontario Building Code during renovations or change of use or extension.

2.11 Part 6 Fire Protection Equipment

The OFC requires that regular checks, inspection and testing be undertaken for fire protection equipment, which includes the fire alarm system, emergency lighting and exit signs, kitchen suppression system, and portable fire extinguishers. The study did not include an audit of records, but evidence of inspection and testing was observed on stickers and tags for the fire alarm system and the fire extinguishers. It is recommended to confirm that all required inspection and testing activities are being completed.

Rec 2.11-1: Confirm that inspection and testing activities required by OFC Part 6 are being undertaken and that records are being retained.

2.12 Summary of Findings

A summary of Section 9.2 deficiencies and actions to address is in the table below. See Section 4.3 for a discussion of how these items inform the determination of adequate water supply.

Table 1: Summary of Findings of OBC Section 9.2. Review

Item	Feature	OFC Reference	Action to Address
Mandatory			
2.2-1 and 2.6.9.-1	Protection of Openings in Fire Separations (main entrance vestibule doors)	Sentence 9.2.2.2.(2)	Replace entry vestibule sliding doors and panels with a 45 minute fire protection rating closure, that includes a breakaway function to swing on a vertical axis when pushed during an emergency – refer to 2.6.4). This recommendation is also mandatory to satisfy Fire Separation of Exits requirements in OFC Article 9.2.3.15 (refer to 2.6.9 of this report).
2.23-1	Firestopping of Service Penetrations	Sentence 9.2.2.3.(2)	Firestop service penetrations through Service Room walls (masonry) and gypsum ceiling with a firestop system that provides a 1 hour F Rating. Repairs of ceiling gypsum board may be necessary to provide adequate support for the firestopping.
2.24-1	Interior Finish – Ceiling over Ice Pad and Seating	Sentence 9.2.2.4.(1)	Investigate the ceiling interior finish material over the ice pad to confirm if the flame spread rating is 25 or less, or determine the basis for approval at similar buildings and confirm similar approval for this building.
2.25-1	Posted Occupant Load Signs	Sentence 2.7.1.5.(1)	Confirm the calculated occupant load for each floor area and post occupant load signs for the Ground Floor and 2nd Floor at the building entrance and entrance to the 2nd Floor Hall.

Item	Feature	OFC Reference	Action to Address
2.6.4-1	Door Swing (main entrance doors)	Article 9.2.3.5	Replace the exterior sliding doors of the main entrance with doors that swing on a vertical axis in the direction of exit travel.
2.6.8-1	Emergency Lighting	Article 9.2.3.12.	Measure illumination levels of emergency lighting during the next test of the building's emergency power system and provide additional emergency lighting units where the illumination level does not meet minimum OFC requirements.
2.10.1-1	2nd Floor Assembly Fire Resistance Rating	Section 2.2	Remove existing unrated acoustic suspended ceiling on the Ground Floor and provide a ceiling that will achieve a 1 hour fire resistance rating for the floor assembly, based on a listed floor assembly design, such as from UL or Intertek.
Voluntary			
2.11-1	Inspection and Testing of Fire Protection Equipment	Part 6	Confirm that inspection and testing activities required by OFC Part 6 are being undertaken and that records are being retained. This was not observed to be a deficiency, but a full check is recommended to confirm compliance for all systems.

If the above deficiencies can be readily addressed, and the actions are fully implemented, then the building will comply with OFC Section 9.2. and a Life Safety Study will not be required.

If there are feasibility or other challenges with taking the above actions, then it is possible to comply with Section 9.2. with the preparation of a Life Safety Study per Articles 9.1.4.1. to 9.1.4.5. Currently a Life Safety Study does not appear to be necessary.

3 Ontario Building Code Analysis

The project is required to comply with the 2012 Ontario Building Code as it is our understanding that substantially complete drawings were submitted for permit prior to March 31, 2025. The Ontario Building Code is applicable to the design and construction of the extension and those parts of the building that are subject to material alterations or repairs (2012 OBC, 1.1.2.7.(1)). Part 11 applies to the existing portion of the building, and the extended portion of the building is required to comply with Part 3 of the OBC.

This section presents key fire and life safety features required by the 2012 OBC focussing on key provisions related to determination of water supply.

3.1 2012 OBC Requirements

The 1-storey addition of approximately 700 m^2 means the new building area is approximately 3300 m^2, moving the building from Article 3.2.2.30. (that would apply to a building area up to 3000 m^2 and facing 3 streets), to Article 3.2.2.29. Group A, Division 3, Any Height, Any Area.

Article 3.2.2.29. requires noncombustible construction, 2 hour rated floor assemblies, roof assemblies with a 1 hour fire resistance rating, and loadbearing construction with the same rating as the supported assembly.

The building is only required to be sprinklered if it is a high building, or if the building is over 1500 m^2 in building area and intended for occasional use for trade shows and similar exhibition purposes. Since the building has neither condition the addition is not required to be sprinklered.

Three key fire separations for the addition are below, see the Figure 5 below:

1. **Public Corridor:** As an unsprinklered building, a maximum 30 metres travel distance applies to the addition. To avoid an adverse impact to the existing travel distances inside the arena, the corridor is to be constructed as a public corridor since the travel distance can then be measured in the arena to the corridor, then again in the corridor per Article 3.4.2.4.(2). The public corridor therefore requires at least a 45 minute rated fire separation per Article 3.3.1.4., to the remainder of the building. The design drawings show a 1 hour rated fire separation and that existing exterior doors in this wall are to be replaced with doors having a minimum 45 minute fire protection rating.

2. **Exit Lobby:** To avoid an adverse impact on the continuity of the exit path for Exit Stair 2 serving the 2nd Floor, the area through which the exit will discharge is required to be constructed as an exit lobby meeting Article 3.4.4.2., including a rated fire separation between the exit and the building. By strict application of the 2012 OBC, the exits require a 2 hour rated fire separation to the remainder of the building since the floor assemblies require a 2 hour rated fire separation under Article 3.2.2.30. However, since the expanded building is nominally over the criteria for the 1 hour rated floors, and the original building and exits required only a 1 hour rated fire separation, a 1 hour rating for the exit lobby is proposed to be sufficient. The exit lobby is in green shading in the figure below.

3. **Proposed New Cross-Corridor 1h Rated Partition**: A 1 hour rated fire separation across the corridor is proposed with opposite-swinging doors that could normally be on hold-open devices connected to fire alarm system and local smoke detectors on each side. The purpose is to separate the east and west travel paths, as a measure to support reduced water supply since it helps safe evacuation prior to Fire Department arrival. This fire separation also reflects the principles of the exemption for water supply for a small addition, discussed later in report.

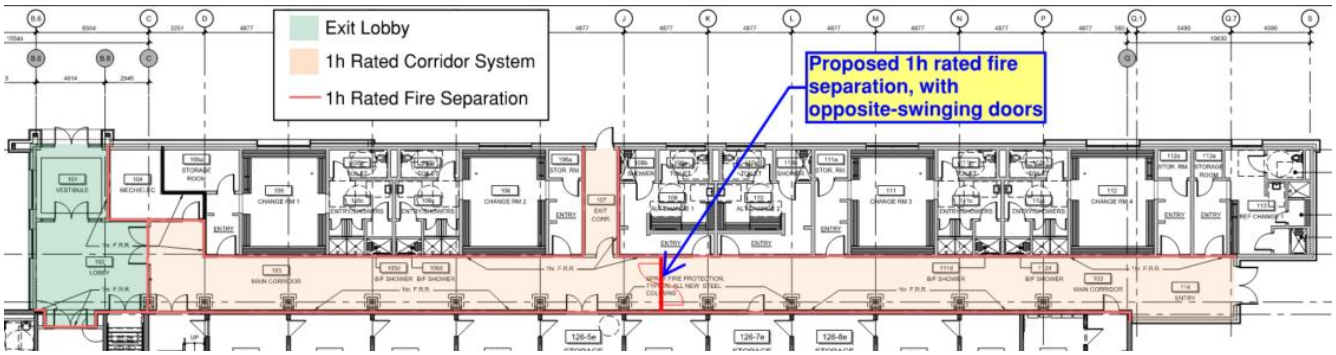


Figure 5: Proposed New Cross-Corridor Rated Partition

Note on Application of the 2024 OBC for Context Only

The 2024 OBC is not applicable to this project. However, if the project was initiated today, then the key change would be in the construction requirements. Under the 2024 OBC, a Group A, Division 3 major occupancy over 3000 m^2 building area requires a sprinkler system. Under Part 11, this means that the addition would require a sprinkler system, with a 1 hour rated fire separation to the existing unsprinklered building. The existing building would not require a sprinkler system to be retrofit.

The water supply needed for the new sprinkler system, as determined by NFPA 13 “Standard for the Installation of Sprinkler Systems”, 2019 edition, would be a means to satisfy OBC Article 3.2.5.7., however the question of adequacy for the overall building would still need to be addressed as recommended by the appendix notes to A-3.2.5.7.

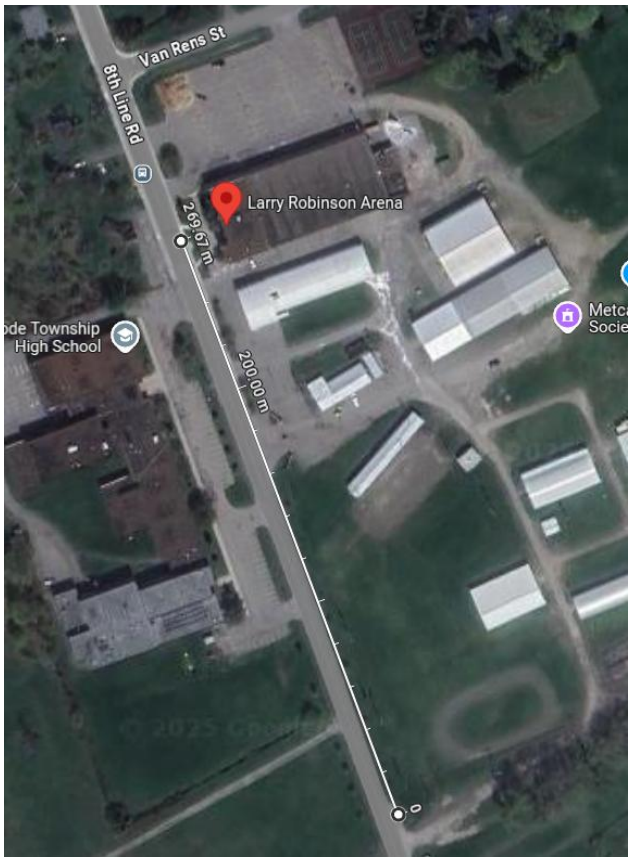
4 Water Supply Analysis

4.1 Existing Water Supply

There is currently no on-site water supply at the building. The closest water supply is a 40,000 gallon (~150,000 Litres) underground tank approximately 300 metres south of the building on 8th Line Road. It is understood that this water supply was constructed in the last 20 years as part of a water supply upgrade project for various rural arenas, and this tank may have been installed to also serve the adjacent fairground buildings. The tank is a similar size to other tanks installed to serve rural arenas such as in Cumberland, Navan and Osgoode.

Water Supply Fire Department Connection at 8th Line Road

Tank Address and Volume



Location of Existing Underground Water Tank for Fire Department Use

Figure 6: Existing Water Supply on 8th Line Road

4.2 OBC Water Supply Requirements for Addition

Under the 2012 OBC Article 3.2.5.7. Water Supply requires that *every building shall be provided with an adequate water supply for firefighting*, and Article 3.2.5.16. states that hydrants shall be located within 90 m horizontally of any portion of a building perimeter that is required to face a street in Subsection 3.2.2.

The appendix note A-3.2.5.7. elaborates on what is considered to be “adequate”, with the following key points:

- For new construction the water supply can be determined by Q=KSV, where Q is the minimum supply of water in Litres, K is the water supply coefficient from Table 1 (based on occupancy and type of construction), and S is a spatial separation coefficient.
    - It is noted that the K factors are generic by occupancy type and there is no direct correlation to fuel load density of the uses. For example, a Group A Div 3 major occupancy is the middle of 5 categories for determining the K factor, where each end of the range represents high and low fire hazards and the K factors are correspondingly high and low. However, the K factor for Group C and Group A Division 2 major occupancies are in the lowest category, yet the fuel loads in those occupancies can be much higher due to furnishings and building contents that exceed those found in a Group A Division 3 like an arena. This high-level blanket approach to K factors contributes to the large water supply volume when the calculation is applied to the overall building.
- The water supply is to provide the minimum flow rate (corresponding to the calculated Q) for a minimum duration of 30 minutes.
- Item 4 in A-3.2.5.7. recognizes that an addition governed by Part 11 only requires mandatory water supply to be based only on the volume of the addition, however it is recommended that the entire building volume of the expanded facility be used to ensure compete evacuation and safety of all occupants.
- New additions are exempted from providing an additional water supply for firefighting when they meet certain criteria. Exemption 4(iii) can be applied when an addition:
    - does not exceed 400 m^2 in building area,
    - contains only Group A, D, E or F, Division 3 occupancies,
    - is of noncombustible construction,
    - does not result in a significant increase in exposure to other existing buildings,
    - has no combustible storage or process, and
    - is separated from the existing building by a fire separation with a fire resistance rating of at least 1 hour.

While the appendix note does not form part of the regulations, and is ultimately voluntary, the A-3.2.5.7. recommendation to consider the overall building volume and construction when assessing the adequacy of water supply for the addition is recommended to be followed, and consideration made for the criteria for exemption, the extent of deficiencies relative to OFC Section 9.2., and the overall fire and life safety characteristics of the building and its occupants.

4.3 Factors Influencing Required Fire Flow

The deficiencies relative to OFC Section 9.2. are not mandatory to consider under the OBC determination of adequate water supply, however, it is reasonable to consider the fire safety context of the existing building:

- **Construction:** The building structure is primarily noncombustible construction (masonry, concrete, open web steel joist 2nd Floor assembly, 60" deep long span joists over rink) with the exception that the roof assembly over the 2nd Floor Hall is heavy timber based on the original drawings: 7" x 26" laminated timber beams @ 5'-0" o/cm, with a 2" T&G plank roof deck.
- **Uses and Fire Hazards:**
    - Normal use of the building is as a hockey and skating rink with spectators, with events in the upstairs Hall. Concerts and events beyond sporting events on the rink surface are reported to be infrequent and would involve Ottawa Fire Services if they are planned. The building does not host trade shows or exhibitions.
    - The building has storage under the bleachers, and some hazardous materials in the workshop and refrigeration room, however overall amounts are not unusual for an arena building. There are relatively few furnishings and contents in the arena and egress paths are expected to remain unobstructed.
- **Occupant Load:** Occupant load numbers are not posted, but based on calculations including the addition, when occupied at full capacity the building could have approximately: 300 persons on the 2nd Floor, 500 persons in the bleacher seating, and approximately 250 persons on the ice or in changerooms or in the lobby, for a total occupant load of approximately 1050 persons at maximum capacity.
- **Evacuation:**
    - The building has a single stage fire alarm system, so occupants will be directed to evacuate on the first fire alarm signal. The majority of the building is a large open area so additional cues of a fire emergency in these areas should be apparent.
    - There are at least 2 choices of egress direction for all occupants. Travel distances are less than 30 metres with the exception of up to ~ 45 m from the top central bleacher seats.
    - Persons with mobility impairments who may need assistance to evacuate could be located on the 2nd Floor since it has elevator access. Stair 1 is adjacent to the elevator and provides a direct connection from the main entrance to the 2nd Floor, so is expected to be used to provide assistance in evacuation.

- **Fire Department Access to the Site and Building:**
    - The Fire Safety Plan indicates that the Fire Department will automatically be notified of a fire alarm signal in this building (which exceeds OFC 9.2. requirements but reflects what would be required for a new arena of this size).
    - Fire Station 91 in Metcalfe is 1.8 km away which is ~2 minutes travel by road.
    - A fire access route is provided around more than 50% of the building perimeter, and there are exterior doors on all sides of the building for fire department access.
    - There are no nearby buildings on the north, east and west of the arena. The Metcalfe Curling Club is approximately 13 m away from south wall, and both walls are generally concrete block with up to 2 doors each.

If the OFC Section 9.2. deficiency items in Table 1 will be addressed in conjunction with the addition/renovation project, or in the near future, then the existing building will meet the Section 9.2. Retrofit requirements of the Ontario Fire Code. It is expected that through the plans review and inspection process of the building permit that the building will also reflect the requirements of the Ontario Building Code.

4.4 Options for Water Supply for Firefighting

The new addition requires conformance with Article 3.2.5.7. to provide an adequate water supply for firefighting. While Part 11 only applies to the addition, and not retroactively to the building, the appendix note A-3.2.5.7. and good practice recommend evaluating the adequacy of the water supply for the overall building.

The intent statements (from NBC) confirm that adequate water supply is to limit the probability that firefighting operations will be ineffective, which could lead to a fire not being suppressed or controlled, which could lead to the spread of fire, which could lead to harm to persons, or damage to the building, or damage to adjacent buildings.

The appendix note A-3.2.5.7. confirms that the intent for having a volume of water supply available at the building is to provide arriving firefighters the ability to charge hoses to enter the building to support evacuation, to conduct search and rescue operations and to provide limited property protection.

The various water supply calculations and options in concept are summarized in Table 2 below.

Table 2: Water Supply Options

Option and Concept		Water Supply	Comments
0	**Status Quo:** Existing water supply located ~300 m down 8th Line Rd.	Existing = 150,000 L (40,000 gallons) underground tank	Original building likely relied fully on shuttled water supply. Recent upgrade installed water tank nearby but much farther than the 90 m hydrant requirement.

Option and Concept		Water Supply	Comments
1	**Overall Building**: Calculate water supply for overall building, using A-3.2.5.7. Q = KVS using full volume of expanded building, 3315 m^2 area. K = 22 (heavy timber roof, ratings not considered).	EVB Calculation Q = 1,080,000 L, see Appendix A Adjusted height 9 m to 7m from drawings Q = 510,510 L	Even if adjusted for building height, this is 3x more than existing water supply located down 8th Line Rd. Based on Fire Department comments in meetings this is a very high volume for an arena building.
2	**Addition Only:** Water supply for ONLY the addition. Q=KVS for addition volume of 700m^2*5m = 3500 m^3 K = 14 since rated roof	Q = 49,000 L (~13,000 gallons)	This can be considered as the minimum water supply if following strict requirements of the OBC and A-3.2.5.7. guidance, and calculating water supply for only the addition volume and construction.
4	**Exemption plus add basic on-site water supply:** Extend the exemption for up to a 400 m^2 area addition that is 1-hour fire separated from the existing building plus other conditions. See discussion below on the basis to extend the exemption. Also add a basic water supply on the site to provide immediate water supply to arriving firefighters.	An additional water supply is not mandatory for an addition that meets the exemption. ***But recommended to provide some on-site water supply. ~38,000 L (10,000 gallons) tank discussed with OFS.***	This option reflects the permitted exemption for water supply, using judgment to extend its application, on the basis that all conditions are satisfied. This option also recommends additional on-site water supply to reduce the probability of delays to firefighters' actions when they arrive on site. ***This option is recommended, see discussion below.***

4.5 Recommended Water Supply Option

Option 4 from Table 2 is recommended. It is based on exemption 4(iii) in OBC appendix note A-3.2.5.7. for additions up to 400 m^2 in area. If this addition is divided roughly in half by a 1 hour rated fire separation (see figure below), then the addition will reflect the intent of the exemption (applied twice) and will result in very little "extra" water supply needed at this building. The addition will meet conditions for the exemption:

- Each compartment in the addition does not exceed 400 m^2 in building area by construction of a 1-hour rated fire separation across the corridor roughly halfway, opposite-swinging doors are permitted to be held open and released on local smoke detection or fire alarm activation,
- Contains only Group A and Group F, Division 3 occupancies,
- Noncombustible construction,
- Does not result in a significant increase in exposure to other existing buildings,
- Has nominal combustible storage rooms, and
- Separated from the existing building by a fire separation with a fire resistance rating of 1 hour.

Since the location of the nearest water supply ~300 m down 8th Line Road has the potential to cause delays while firefighters connect hoses or shuttle water to the building, it is also recommended that an on-site underground water tank be installed in conjunction with the addition.

The volume of 10,000 gallons (~38,000 L) was discussed with the Ottawa Fire Services during an meeting on October 1, 2025, as a reasonable volume for initial firefighting activities where life safety and evacuation of occupants is the priority. Referencing OBC A-3.2.5.7. Table 2, this storage volume would have a corresponding flow rate of 2,700 L/minute, so the duration of a 38,000 L on-site water supply would be 14 minutes. This water supply would complement the 8th Line Road tank and shuttle capabilities.

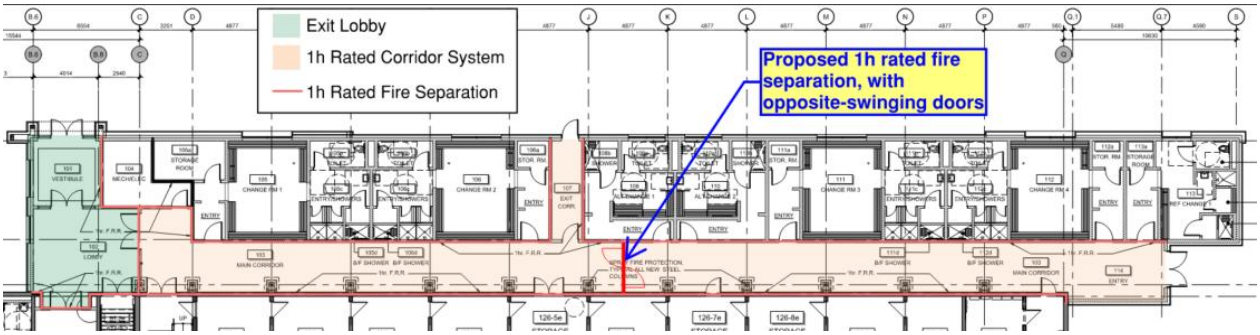


Figure 7: Proposed New Cross-Corridor Rated Partition

This suggested water supply is in the same range as the calculated water supply for only the new addition, so may be considered to be compliant with the strict application of the OBC Part 11, with consideration for the generic nature of the K factors and the relatively low fuel load in the addition that contains primarily changerooms, washrooms and a corridor.

4.6 Summary

The deficiencies identified relative to the Ontario Fire Code Part 2 and Section 9.2. are possible to address and are recommended to be addressed in conjunction with the addition project or separately in the near future. The building does not contain unusual fire hazards or fuel loads. The building may contain a high number of people (~1050 persons at maximum capacity) that may need support to evacuate if a fire emergency occurred during maximum occupant load. The building has no exposures on 3 sides, and the Metcalfe Curling Rink is located 13 metres to the south with an access route provided between the buildings.

The OBC A-3.2.5.7. would exempt water supply for an addition up to 400 m^2 in area and meeting other conditions that establish a low fire risk. The exemption is proposed to be applied to this addition since it is readily divided into two fire compartments less than 400 m^2 in area.

The existing water supply of ~150,000L located ~300 m down 8th Line Road may be used for this building, but the distance may cause delays for arriving firefighters. As such it is recommended to provide additional on-site water supply in conjunction with the addition project to support early firefighting efforts. A ~38,000 L (10,000 gallon) tank was discussed with Ottawa Fire Services as appropriate for this building and its context. The tank outlet would need to be installed within 90 m of the front entrance doors to meet OBC Article 3.2.5.5. The final decision on the volume of the on-site water supply is recommended to be confirmed with Ottawa Fire Services.
END OF REPORT

Appendix A Water Supply Calculation

A.1 OBC 3.2.5.7.

Water supply calculation by EVB Engineering dated 2025-03-03. Calculation was prepared for the proposed addition but considering the full volume of the existing building as recommended by A-3.2.5.7.4.(a), and using a Water Supply Coefficient (K) of 22.

OBC Fire Flow Calculations

Per OBC Div. B A-3.2.5.7.

Project Name: Larry Robinson Arena
Project No: 23211
Client: The City of Ottawa

Designed By: Adam Poapst, P. Eng.
Reviewed By: Francois Lafleur, P.Eng
Date: 2025-03-03

Building Description: Arena

Step		Input	Multiplier	Value Used	Fire Flow (L/min)
A	**Water Supply Cofficient (K)**				
	Type of construction:	Yes		22	
	Non-combustible or heavy timber, no fire-resistance rating				
	OBC Group or Division				
	A-1, A-3<				
B	**Building Volume (V)**				
	Building Footprint (m2)	3315			
	Average height (m)	9			
	Total volume (V) (m3)			29835	
C	**Spatial Coefficient Values (S)**				
	S North (m)	30	0.00		
	S South (m)	10	0.00		
	S East (m)	30	0.00		
	S West (m)	30	0.00		
	S Total = 1+[North+South+East+ West] (m)			1.00	
D	**Water Supply Calculation**				
	Q = KVS_{Total} (L)			656,370	
E	**Required Fire Flow (L/min) (from Table 2)**				9000
	Required Fire Flow (L/s)				150

Minimum Storage Required for 2 hr period (L)	**1,080,000**

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