

PROTECTION OF ADJACENT BUILDINGS DURING CONSTRUCTION AND DEMOLITION

PURPOSE

The purpose of this interpretation is to further clarify the requirements for protection of adjacent buildings, water supply and access for firefighting as per the National Fire Code – 2019 Alberta Edition (NFC(AE)). This clarification was requested during the public review of recommendations for High Intensity Residential Fires (HIRF) that was held in 2007.

DISCUSSION

The National Building Code–2019 Alberta Edition (NBC(AE)) has specific provisions for firefighting under Subsection 3.2.5 such as fire access routes and water supply requirements. Additionally, Part 8 addresses safety measures at construction and demolition sites and references the National Fire Code–2019 Alberta Edition (NFC(AE)).

In the NFC(AE), Section 5.6 and Section 2.8 specifies that fire safety plans are mandatory requirements to be submitted to the Fire Safety Codes Officer (SCO)/*authority having jurisdiction* (AHJ) for approval for all construction, alteration, or demolition operations. Articles 5.6.1.2 Protection of Adjacent Buildings and 5.6.1.4 Access for Firefighting should be prepared and referenced in conjunction to address the intended requirements of the Fire Safety Plan.

Prior to the construction, alteration, or demolition, the owner, developer or contractor who is responsible for a construction or demolition site is required to submit the mandatory fire safety plan to a SCO/AHJ. The measures outlined in the fire safety plan should provide a reasonable reassurance that ignitable circumstances are removed and/or controlled on the site so that fires that originate in a building or facility undergoing construction or demolition will not quickly spread to exposed adjacent buildings or facilities. These measures must take into account the size, type and configuration of the project, the methods of construction or demolition to be utilized and the distance to, and stage of completion of, adjacent exposures. Solutions may be active, passive or a combination of both to achieve the desired protection. As such there is no “one solution” that will be appropriate for all projects.

Further, the owner, developer or contractor responsible for the site is required to ensure that the fire department has unobstructed access to the site and that water supply for firefighting operations is available and sufficient to control fire situations.

Unless stated otherwise, all Code references in this STANDATA are to Division B of the National Fire Code-2019 Alberta Edition

Issue of this STANDATA is authorized by
the Provincial Fire and Building Administrators

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CODE REFERENCES

NBC(AE), Division B, Article 3.2.5.6. states:

3.2.5.6. Access Route Design

- 1) A portion of a roadway or yard provided as a required access route for fire department use shall
 - a) have a clear width not less than 6 m, unless it can be shown that lesser widths are satisfactory,
 - b) have a centre-line radius not less than 12 m,
 - c) have an overhead clearance not less than 5 m,
 - d) have a change of gradient not more than 1 in 12.5 over a minimum distance of 15 m,
 - e) be designed to support the expected loads imposed by firefighting equipment and be surfaced with concrete, asphalt or other material designed to permit accessibility under all climatic conditions,
 - f) have turnaround facilities for any dead-end portion of the access route more than 90 m long, and
 - g) be connected with a public thoroughfare.
(See Note A-3.2.5.6.(1).)
- 2) For *buildings* conforming to Article 3.2.2.50. or 3.2.2.58., no portion of the access route described in Sentence 3.2.2.10.(3) shall be more than 20 m below the uppermost floor level.

A-3.2.5.6.(1) Fire Department Access Route. The design and construction of fire department access routes involves the consideration of many variables, some of which are specified in the requirements in the Code. All these variables should be considered in relation to the type and size of fire department vehicles available in the municipality or area where the building will be constructed. It is appropriate, therefore, that the local fire department be consulted prior to the design and construction of access routes.

NBC(AE), Division B, Article 8.1.1.1. states:

8.1.1.1. Scope

- 2) This Part applies to fire safety and the protection of the public during the construction, *alteration* or demolition of every *building*, including any incompleted or abandoned *building*.
- 3) Fire safety at construction and demolition sites shall conform to Section 5.6. of Division B of the NFC(AE).

Article 5.6.1.2. states:

5.6.1.2. Protection of Adjacent Buildings

- 1) Protection shall be provided for adjacent *buildings* and facilities that would be exposed to fire originating from *buildings*, parts of *buildings*, facilities and associated areas undergoing construction, alteration or demolition operations. (See Note A-5.6.1.2.(1).)

A-5.6.1.2.(1) Methods and materials used to protect adjacent buildings and facilities can range from active to passive systems such as spatial separation, installing water curtains, using construction methods and materials that include gypsum sheathing, or erecting a temporary fire barrier such as a fire tarpaulin.

Article 5.6.1.3. states:

5.6.1.3. Fire Safety Plan

- 1) Except as required in Sentence (2), prior to the commencement of construction, alteration or demolition operations, a fire safety plan, accepted in writing by the fire department and the *authority having jurisdiction*, shall be prepared for the site and shall include
 - a) the designation and organization of site personnel to carry out fire safety duties, including a fire watch service if applicable,
 - b) the emergency procedures to be followed in the event of a fire, including
 - i) initiating a fire warning,
 - ii) notifying the fire department,
 - iii) instructing site personnel on the procedures to be followed once the warning has been initiated, and
 - iv) confining, controlling and extinguishing the fire,
 - c) measures for controlling fire hazards in and around the *building* (see Note A-5.6.1.3.(1)(c)), and
 - d) a maintenance procedure for firefighting measures required in Section 5.6.
- 2) Where construction, alteration or demolition operations occur in an existing *building* that is required to have a fire safety plan conforming to Section 2.8., the fire safety plan shall take into account the changes occurring to the *building*.

A-5.6.1.3.(1)(c) The control of fire hazards in and around buildings being constructed, renovated or demolished includes fire protection for combustible construction materials and combustible refuse on the site. The sizes of piles of materials and refuse and the location of such piles in relation to adjacent buildings are factors that should be taken into consideration in determining which fire protection measures to implement. The selection of fire protection measures for demolition operations will also depend on the demolition procedure being used, the specific conditions existing on the site and the firefighting capabilities of the responding fire department.

It is the intent of this Code that requirements regarding the outdoor storage of materials stated in Section 3.3. be referred to and applied at construction and demolition sites.

Article 5.6.1.4. states:

5.6.1.4. Access for Firefighting

- 1) Unobstructed access to fire hydrants, portable extinguishers and to fire department connections for standpipe and sprinkler systems shall be maintained.
- 2) A means shall be provided to allow firefighters to perform their duties on all levels of the *building*.
- 3) Provision shall be made for the use of existing elevators, hoists or lifts to assist firefighting personnel in reaching all levels of the *building*.
- 4) Access routes for fire department vehicles shall be provided and maintained to construction and demolition sites. (See Note A-5.6.1.4.(4).)
- 5) Where a construction or demolition site is fenced so as to prevent general entry, provision shall be made for access by fire department equipment and personnel.

A-5.6.1.4.(4) The fire safety plan for the construction or demolition site of buildings conforming to Article 3.2.2.50. or 3.2.2.58. of Division B of the NBC(AE) should take into consideration the design of the access route to the building under construction as well as the elevation of the access route relative to the uppermost floor level to facilitate firefighter access to the roof. (See Sentence 3.2.5.6.(2) of Division B of the NBC(AE).)

APPLICATION

This interpretation applies to all construction and demolition sites that range from multi-storey buildings to single-storey residences. Extra considerations should be provided for buildings with irregular configurations or special uses.

INTERPRETATION

For explanatory purposes, this Interpretation provides recommendations for both active and passive systems to the protection of adjacent properties.

Protection of Adjacent Properties

Most of these suggested solutions are adaptable or scalable and could be used in multiple applications. The degree of application should be determined in advance in conjunction with the SCO/AHJ. Firefighting capabilities that are available to a municipality in an emergency should also be taken into account when considering protection solutions.

NFC(AE) Appendix reference A-5.6.1.2. provides a non-exhaustive, non-exclusive list of suggestions which notes the following items:

- spatial separation,
- water curtains,
- fire resistive construction methods, or
- temporary fire barriers such as a fire tarpaulin.

Methods that building owners and/or contractors could utilize to provide some of the required protection include, but is not limited to, the following:

- ensure adequate water supply for firefighting operations is provided as soon as combustible construction materials arrive on the site,
- application of an acceptable intumescent or flame-retardant coating in accordance with the manufacturer's directions and the criteria utilized in any performance tests,
- install an acceptable temporary flame/heat resistant membrane affixed to the exterior sheathing of exposed walls prior to closure and cladding in accordance with the manufacturer's directions and the criteria utilized in any performance tests,
- complete all fire separations, including installation of fire-rated doors, as each floor is completed,
- cover exposed combustible materials as soon as possible,
- provide temporary sprinkler piping with open sprinkler heads that is connected to the standpipe installed on each floor,
- temporarily fence and secure a building site,
- provide on-site security personnel tasked with regular fire watch duties,
- install security lights around the construction area,
- designate certain outdoor areas for smoking,
- limit the amount of combustible and flammable materials stored on site,
- ensure that combustible and flammable materials are properly separated when stored on site,
- ensure that daily clean up and disposal of combustible waste are in secured non-combustible containers,

- provide a fire watch at the beginning of every break period on site in addition to a comprehensive site inspection at the end of each day,
- install temporary electronic intrusion and thermal detection systems, or
- plan and coordinate non-sequential construction, in new residential subdivisions

These methods are only some of the possible solutions to mitigate fire spread. Some may only be required for a specific duration when on site conditions or activities create increased vulnerability.

There are other provisions in Section 5.6 that should be considered if applicable to the construction site. These include procedures and permits required for Hot Works, when and how to properly refuel and use fuel-fired appliances and equipment, and how to properly use temporary heating during construction.

The NBC(AE) provides required limiting distances, spatial separations and the maximum permitted unprotected openings for exposed walls as a completed assembly at the conclusion of construction. When two adjacent structures are expected to be at the framing or sheathing stage at the same time is when these structures are most vulnerable to flame spread and owners and/or contractors should consult with SCO/AHJ to determine the appropriate measures to be taken.

Innovation, collaboration and discussion between contractors, owners, developers, local Safety Codes Officers (Building and Fire) and Workplace Health & Safety Officers should result in additional solutions that meet the need for protection and determining when the use of each of the identified solutions, singly or in sets, would be the most effective for the owner and acceptable to the SCO/AHJ.

Water Supplies and Access for Firefighting

The owner, developer or contractor responsible for a construction or demolition site is required to incorporate the following measures:

- a) Provide the fire department with unobstructed access to roads, routes, stairways and lifts (where applicable) that accommodates firefighting personnel, apparatus and equipment;
- b) Ensure that unobstructed access is always provided to fire hydrants (or other water supplies and connections serving the site that is acceptable to the SCO/AHJ) portable extinguishers and fire department connections for standpipe and sprinkler systems on the site; and
- c) Verify that water supply systems, where required by the NBC(AE), the NFC(AE), municipal infrastructure standards, development permit conditions and/or subdivision approval, are operational and sufficient for firefighting operations.

It is critical that regular communication between the owner(s), developer(s), municipality and the building and fire authorities occur to ensure that these measures and equipment are maintained and continue to operate to an acceptable level throughout the duration of construction, demolition, or alteration where applicable.

Given the potential complexity that may be involved in undertaking these measures on any particular site or sites, the following should be taken into consideration for water supply and access for firefighting:

- weather,

- location,
- road surfaces,
- geography,
- topography,
- security provisions,
- shared access to infrastructure,
- impacts of other related activities,
- material storage,
- parking of vehicles and equipment
- multiple employees and/or employers,
- multiple owners of multiple sites, and
- other issues that may arise during construction or demolition,

All of the matters noted above are required to be taken under consideration and addressed where applicable in the required fire safety plan as per Article 5.6.1.3. of the NFC(AE).

NOTE: All other applicable requirements in the NFC(AE) and the NBC(AE) shall be followed.

Please also refer to 19-FCV-018 Construction Site Fire Safety Plans and 19-FCI-004 Fire Safety Plan – Construction and Demolition Sites.

This Standata replaces FCI-09-01 Water Supplies and Access for Fire Fighting and FCI-09-02 Protection of Adjacent Building.

This INTERPRETATION is applicable throughout the province of Alberta.