

Mount Pleasant Library Report

APPENDIX: 7

International Fire Code (IFC 2006 Edition)

The IFC has been adopted by the DC Fire Department to be recognized as local governing code, except for Appendix D. Appendix D is being considered for adoption. Excerpts are attached with this report.

Excerpts included.

[[Appendix 7 over next several pages]]

INTERNATIONAL FIRE CODE[®]

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CODE AND COMMENTARY

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2006



Chapter 5: Fire Service Features

General Comments

The requirements of this chapter apply to all occupancies and pertain to access roads; access to building openings and roofs; premises identification; key boxes; hazards to fire fighters; fire protection water supplies; fire command centers and fire department access to equipment.

Purpose

This chapter contains the requirements for fire service access to the property that is to be protected, including access roads, security devices and access through openings in the building.

The chapter also addresses fire-fighter hazards, the requirements for a fire department command center and fire-fighter access to equipment, such as fire suppression equipment, air-handling equipment, emergency power equipment and access to the roof. In addition this chapter addresses the fire protection water supply.

SECTION 501 GENERAL

501.1 Scope. Fire service features for buildings, structures and premises shall comply with this chapter.

❖ This chapter contains requirements that will enable the fire service to respond to an emergency on the premises of a building or structure.

501.2 Permits. A permit shall be required as set forth in Sections 105.6 and 105.7.

❖ Permits must be obtained from the fire code official. Permit fees, if any, must be paid prior to the issuance of the permit. There are two types of permits: operational and construction. The operational permits required by this section are for the use or operation of fire protection valves and fire hydrants (see Section 105.6.16) or the use or removal from service of a private fire hydrant (see Section 105.6.36). The construction permit (see Section 105.7.9) allows the applicant to install or modify private fire hydrants. See Section 105 for additional information on permits.

501.3 Construction documents. Construction documents for proposed fire apparatus access, location of fire lanes and construction documents and hydraulic calculations for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

❖ Construction documents must be drawn to scale to clearly show the details that address the requirements of the code. The jurisdiction adopting the code may require a registered design professional to prepare the construction documents. Each jurisdiction will define the qualifications of a design professional.

501.4 Timing of installation. When fire apparatus access roads or a water supply for fire protection is required to be installed, such protection shall be installed and made service-

able prior to and during the time of construction except when approved alternative methods of protection are provided. Temporary street signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles in accordance with Section 505.2.

❖ Buildings under construction are quite vulnerable to fire and other types of construction incidents, such as injuries from falling objects. Access roads and water for fire protection are essential for fire-fighting purposes. Temporary street signs are also valuable to emergency responders because the streets in new developments will most likely not be familiar to them nor be on their maps.

Marked access roads and an emergency water supply should be in place before any large amount of combustible building materials is placed on site and before any construction is initiated.

SECTION 502 DEFINITIONS

502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

❖ The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

Definitions of terms can help in the understanding and application of the code requirements. The purpose for including those definitions that are associated with the subject matter of this chapter is to provide more convenient access to them without having to refer back to Chapter 2. It is important to emphasize that these terms are not exclusively related to this chapter but are applicable everywhere the term is used in the

code. For convenience, these terms are also listed in Chapter 2 with a cross reference to this section. The use and application of all defined terms, including those defined in this section, are set forth in Section 201.

FIRE APPARATUS ACCESS ROAD. A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as fire lane, public street, private street, parking lot lane and access roadway.

- ❖ Fire access roads are required to be all-weather surfaced roadways that are designed for the weight and type of emergency vehicle that may use the road. No specific surface material is required for a fire access roadway. It is up to the fire code official to decide whether the surface will support the load of the anticipated emergency vehicles.

FIRE COMMAND CENTER. The principal attended or unattended location where the status of the detection, alarm communications and control systems is displayed, and from which the system(s) can be manually controlled.

- ❖ Fire command centers are communication centers where dedicated manual and automatic facilities are located for the origination, control and transmission of information and instruction pertaining to a fire emergency to the occupants (including fire department personnel) of the building. Fire command centers must provide facilities for the control and display of the status of all fire protection (detection, signaling, etc.) systems. These stations must be located in secure areas as approved by the fire code official. Often, this is a location near the primary building entrance. Fire command centers also may be combined with other building operations and security facilities when allowed by the fire code official; however, operating controls for use by the fire department must be clearly marked and not subject to tampering by unauthorized persons (see the commentary to Section 509.1 for further discussion).

FIRE DEPARTMENT MASTER KEY. A limited issue key of special or controlled design to be carried by fire department officials in command which will open key boxes on specified properties.

- ❖ Several companies market emergency entry systems that use master keys. These keys are used to open key boxes and entry gates and turn on/off electronic switches that control electric gates and certain building functions such as smoke control systems, fans and special processes.

FIRE LANE. A road or other passageway developed to allow the passage of fire apparatus. A fire lane is not necessarily intended for vehicular traffic other than fire apparatus.

- ❖ The term "fire lane" is synonymous with "fire apparatus access road"; however, the driving surface may not be the same as for a public road.

KEY BOX. A secure device with a lock operable only by a fire department master key, and containing building entry keys and other keys that may be required for access in an emergency.

- ❖ The key box is part of an emergency entry system. The building owner/manager places a key box or key vault on the exterior of the building or at the entrance to the facility, placing keys, access cards or security codes inside the box. The emergency responders can use their special fire department master key to enter the box and gain access to the building or facility.

SECTION 503 FIRE APPARATUS ACCESS ROADS

503.1 Where required. Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.1.3.

- ❖ This section introduces the requirements for dedicated fire apparatus access roads serving new and relocated buildings in the jurisdiction. The requirements are to be established in coordination with the local fire service to accommodate the jurisdiction's fire apparatus and equipment. The intent of the requirements is to provide the fire department with sufficient access to buildings to enable efficient fire suppression and rescue operations.

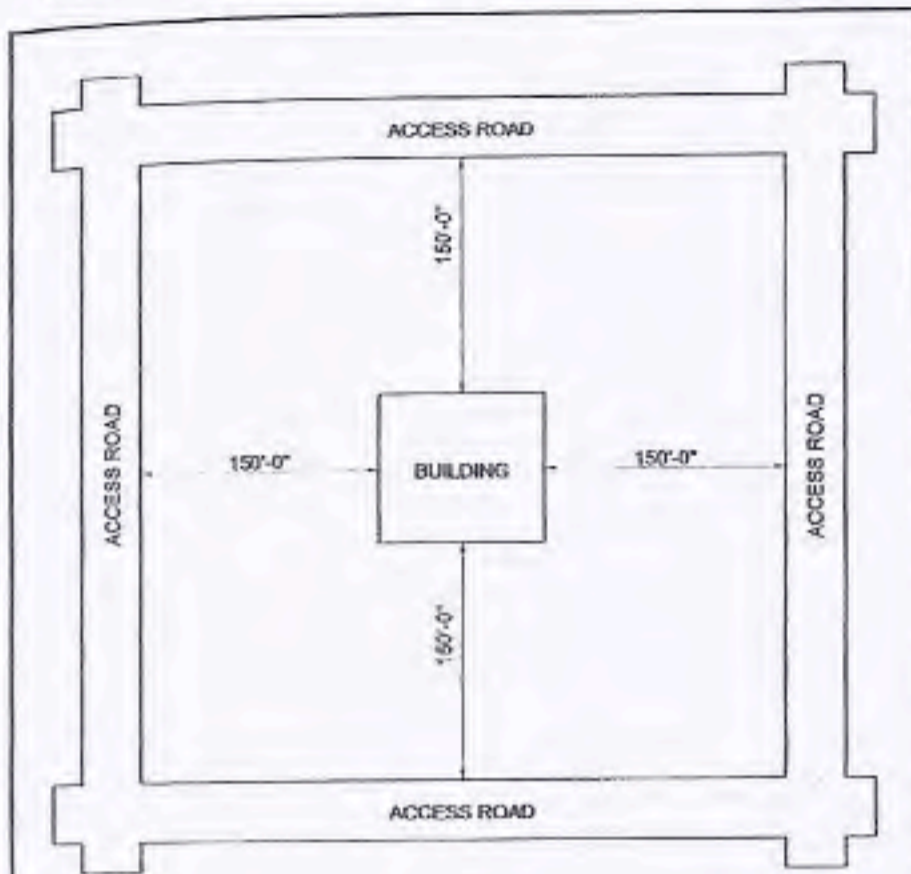
503.1.1 Buildings and facilities. Approved fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an approved route around the exterior of the building or facility.

Exception: The fire code official is authorized to increase the dimension of 150 feet (45 720 mm) where:

1. The building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an approved alternative means of fire protection is provided.
3. There are not more than two Group R-3 or Group U occupancies.

- ❖ This section establishes the maximum distance from buildings or facilities to fire apparatus access roads. The provisions intend to limit the maximum length of hose needed to reach any point along the exterior of a building or facility from a fire department vehicle. Large area buildings may require a fire apparatus access road on all four sides. An access road is required to extend to within 150 feet (45 720 mm) of all portions of the grade level floor of each new or relocated build-

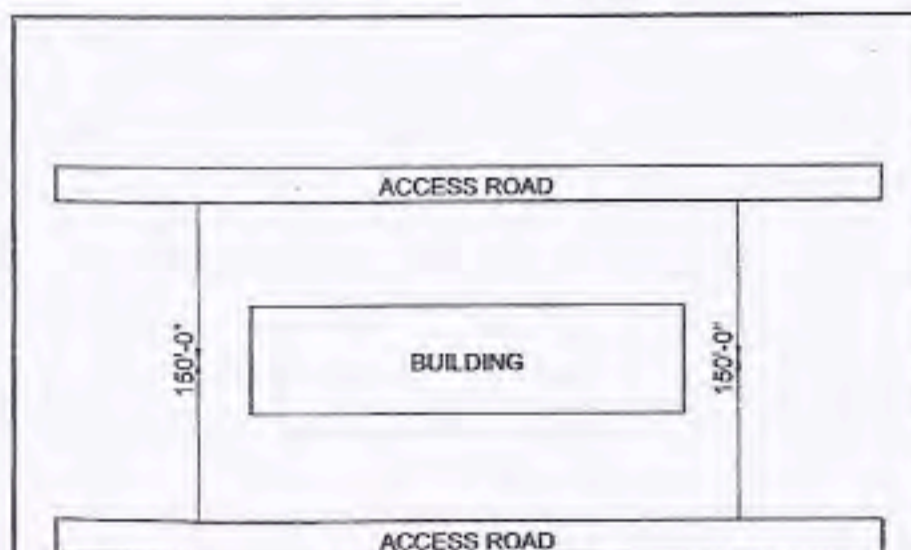
ing [see Figure 503.1.1(1)]. The 150-foot (45 720 mm) distance is based on the standard length of preconnected hoses carried on fire apparatus.



For SI: 1 foot = 304.8 mm.

Figure 503.1.1(1)
FIRE DEPARTMENT ACCESS—LARGE BUILDING

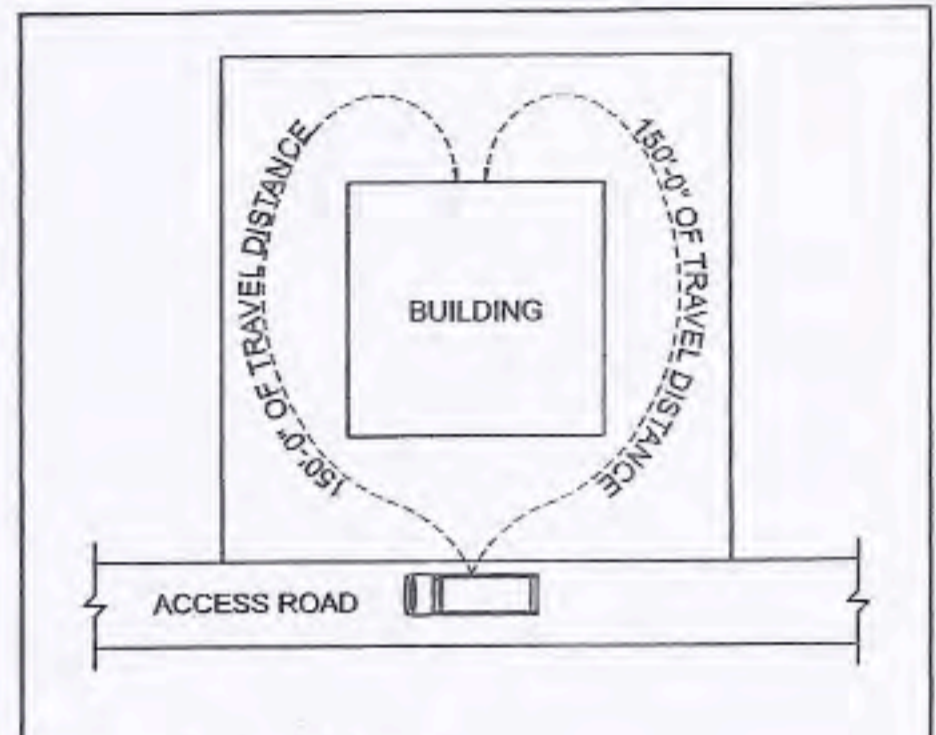
A long narrow building may require fire department access roads on two sides only, if all portions of the grade level floor are within 150 feet (45 720 mm) of the access road [see Figure 503.1.1(2)].



For SI: 1 foot = 304.8 mm.

Figure 503.1.1(2)
FIRE DEPARTMENT ACCESS ON TWO SIDES

Small buildings may require an access road on one side only, if the access road is within 150 feet (45 720 mm) of all portions of the grade level floor [see Figure 503.1.1(3)].



For SI: 1 foot = 304.8 mm.

Figure 503.1.1(3)
SMALL BUILDING ACCESS

Item 1 of the exception states that the 150-foot (45 720 mm) distance may be increased, with the approval of the fire code official, when the building is equipped throughout with an NFPA 13, 13R or 13D automatic sprinkler system, as applicable. The code does not give the fire code official guidance on how much of an increase over 150 feet (45 720 mm) is reasonable. The fire code official must make the determination based on the response capabilities of his or her emergency response units and the anticipated magnitude of the incident.

The "alternative means" in Item 2 of the exception may include standpipes, automatic sprinklers, remote fire department connections or additional fire hydrants.

The Group R-3 facilities noted in Item 3 of the exception include one- and two-family dwellings and townhouses not falling within the scope of the *International Residential Code*® (IRC®); adult and child care facilities that accommodate five or less people for less than 24 hours per day and congregate living facilities with 16 or fewer persons. Group U occupancies are utility and miscellaneous accessory buildings or structures. See the definitions for "Residential Group R" and "Miscellaneous Group U" in Section 202; the IRC commentary, Section R101.2; and the *International Building Code*® (IBC®) commentary, Section 310.1.

A question that often arises is if it is the intent of the code's regulations pertaining to fire apparatus access roads to be applicable to residential development sites upon which buildings are constructed under the provi-

sions of the IRC. The IRC is intended to be a stand-alone code for the construction of detached one- and two-family dwellings and townhouses not more than three stories in height. As such, all of the provisions for the construction of buildings of those descriptions are to be regulated exclusively by the IRC and not by another *International Code*[®]. Note, however, that the IRC applies only to the construction of the structures of those buildings and not to the development of the site upon which such structures are built. Accordingly, where the code is adopted, its fire apparatus access road provisions, including specifically adopted Appendix D, would apply because they are dealing only with land development requirements providing fire protection and emergency access to such residential sites on the same basis as to the rest of the community. It is important to note that the appendices are not considered as part of the code unless specifically adopted (see Section 1 of the sample adopting ordinance on page v of the code). See also the commentary to Sections 101.3 and 508.1 and Appendix D.

Another question that arises is whether it is the intent of this section to preclude locating a new building directly on a lot line, often referred to as a "zero lot line building." While it is true that some very large area buildings may require a fire apparatus access road on all four sides, this section does not specifically deal with exterior walls that may be located on the lot line in such buildings where the distance to a portion of that wall exceeds 150 feet (45 720 mm) from a fire apparatus access road. As such, the fire code official must determine the code's application in accordance with Section 102.8 and in consideration of the exception to this section.

In determining the application, however, it should be considered that, in order for the fire department access contemplated by this section to be effective, an exterior wall would need to have openings in it through which access to the interior of the building could be achieved by hose streams or personnel. In the case of an exterior wall constructed on a property line with a zero-foot fire separation distance, Table 602 of the IBC requires that such walls have a fire-resistance rating of between 1 and 3 hours (depending on the occupancy group assigned to the building) and Section and Table 704.8 require that such walls be without any openings. As such, access to the first (or any) floor level of that exterior wall would appear to provide little or no tactical usefulness to the fire department, especially if code-complying access is provided to other sides of the building.

503.1.2 Additional access. The fire code official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

❖ Additional access roads may be required by the fire code official based on his or her knowledge of traffic

patterns, local weather conditions, terrain or anticipated magnitude of a potential incident.

503.1.3 High-piled storage. Fire department vehicle access to buildings used for high-piled combustible storage shall comply with the applicable provisions of Chapter 23.

❖ Chapter 23 has special requirements for building access in occupancies with high-piled storage, but the requirements for fire apparatus access roads are the same as those required in this chapter.

503.2 Specifications. Fire apparatus access roads shall be installed and arranged in accordance with Sections 503.2.1 through 503.2.7.

❖ The dimensions of fire department access roads are based on the size and height of emergency vehicles, their turning radius and the fact that emergency vehicles may be required to pass each other on the access road.

503.2.1 Dimensions. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

❖ The dimensions in this section are established to give fire apparatus continuous and unobstructed access to buildings and facilities.

This section requires that the unobstructed width of a fire apparatus access road must not be less than 20 feet (6096 mm). The intent of the minimum 20-foot (6096 mm) width is to provide space for fire apparatus to pass one another during fire-ground operations. The need to pass may occur when engines are parked for hydrant hook-up, laying hose or when trucks are performing aerial ladder operations. When an engine company is connected to a fire hydrant parallel to the curb using a front suction connection and using a side-discharge port on the pump, the horizontal distance that is needed to make a no-kink bend in the discharge fire hose can be considerable, especially when a large-diameter hose (LDH) is being used. The roadway width needed to accommodate such a common operational scenario would be the width of the apparatus plus the no-kink bending radius of the discharge hose, leaving minimal roadway width for other apparatus to squeeze by, if needed.

The minimum vertical clearance of 13 feet 6 inches (4115 mm) is the standard clearance used for highway bridges and underpasses. The vertical clearance requirement would apply in cases where a building or portion of a building, such as a canopy or porte-cochere, projects over all or a portion of the required width of the fire apparatus access road. Conversely, if the full required width of the fire apparatus access road is provided outside of the footprint of the projecting building element, the vertical clearance requirement would not apply. It is not the intent of this section that all projecting elements be constructed with a 13-foot 6-inch

three stories in height shall have at least two means of fire apparatus access for each structure.

- ❖ This section addresses commercial and industrial buildings that, because of their height, have the potential of creating a large challenge to a fire department. This section, along with Sections D105, D106 and D107, contains requirements for fire apparatus access roads for specific kinds of buildings or developments. Section 503 gives the fire code official the authority to require more access roads but does not specify when the additional roads are required. The need for additional access roads will depend on so many factors that each situation must be judged individually.

Because of the height of these buildings, various types of vehicles may be needed, and having two or more means of approaching the site may be necessary to manage and manipulate the vehicles.

D104.2 Buildings exceeding 62,000 square feet in area. Buildings or facilities having a gross building area of more than 62,000 square feet (5760 m²) shall be provided with two separate and approved fire apparatus access roads.

Exception: Projects having a gross building area of up to 124,000 square feet (11 520 m²) that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems.

- ❖ When buildings are very large in area, two separate fire apparatus access roads are required because a large building may be difficult to access quickly, and if one of the access roads is blocked there is a large potential for loss. The exception acknowledges the ability of sprinklers to prevent most fires from growing quickly.

D104.3 Remoteness. Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

- ❖ This concept is similar to the one dealing with the remoteness of exits. One of the primary reasons for multiple access roads is to ensure that if one access road is blocked or otherwise unavailable, another will allow access to the fire department. Therefore, when more than one access road is required, they need to be separated by enough distance to avoid a situation where both would be blocked or unavailable simply because they are too close to one another.

SECTION D105

AERIAL FIRE APPARATUS ACCESS ROADS

D105.1 Where required. Buildings or portions of buildings or facilities exceeding 30 feet (9144 mm) in height above the lowest level of fire department vehicle access shall be provided with approved fire apparatus access roads capable of accom-

modating fire department aerial apparatus. Overhead utility and power lines shall not be located within the aerial fire apparatus access roadway.

- ❖ When building height exceeds 30 feet (9144 mm) above the lowest level of fire department vehicle access, the use of aerial fire apparatus becomes more necessary. This section states in general terms that the access roads must be capable of handling the larger aerial equipment and its need for wider road widths. The requirement for clear overhead space prevents interference with the aerial apparatus and avoids the possibility of personnel injury and equipment damage from electrical shock. These factors must be included in site design to make certain the fire department has the needed access to the buildings.

D105.2 Width. Fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm) in the immediate vicinity of any building or portion of building more than 30 feet (9144 mm) in height.

- ❖ This section specifies the minimum road width needed for aerial vehicles. This width allows the aerial apparatus outriggers to be set solidly on the road surface for safe operation of the aerial equipment.

D105.3 Proximity to building. At least one of the required access routes meeting this condition shall be located within a minimum of 15 feet (4572 mm) and a maximum of 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building.

- ❖ This section requires that the access road be specifically located where aerial equipment will have maximum access to the building. The fire code official, in consultation with the fire chief, must approve the final location of the road required by this section. Although not stated in this section, fireground operation protocols often place a truck company on the front side of the building so that the entire front can be reached by the ladder or tower basket. The road that will meet the requirements of this section will often be the public street upon which the building fronts. The distance from the building to the road must be reviewed and approved to match the capabilities of the fire department aerial equipment versus the buildings height.

SECTION D106

MULTIPLE-FAMILY RESIDENTIAL DEVELOPMENTS

D106.1 Projects having more than 100 dwelling units. Multiple-family residential projects having more than 100 dwelling units shall be equipped throughout with two separate and approved fire apparatus access roads.

Exception: Projects having up to 200 dwelling units may have a single approved fire apparatus access road when all buildings, including nonresidential occupancies, are equipped throughout with approved automatic sprinkler