

Fire Service Features – Chapter 5



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Learning Objectives

- After completing this session, the student will be able to:
 - **Review the requirements of the state fire code's fire service features**
 - **Assess the local policies related to fire service features**
 - **Identify features for fire department access and water supply**
 - **Apply fire department access and water supply requirements to a planned building**

Fire Service Features – MSFC Chapter 5

- Many of these features are best addressed during:
 - **Development review**
 - **Early site plan review**
- Provisions are really about time:
 - **Assist with rapid and efficient fire department operations**
- This is the FD's opportunity to have input

MSFC Chapter 5 – Format & Sections

- 501 – General
- 502 – Definitions
- 503 – Fire Apparatus Access Roads
- 504 – Access to Building Openings and Roofs
- 505 – Premise Identification
- 506 – Key Boxes

MSFC Chapter 5 – Format & Sections

- 507 – Fire Protection Water Supplies
- 508 – Fire Command Center
- 509 – Fire Protection and Utility Equipment Identification and Access
- 510 – Emergency Responder Radio Coverage (not adopted and moved to optional Appendix P)

Fire Apparatus Access to Buildings

Definitions

Fire Apparatus Access Road

- Provides access to a facility or building
- Includes streets, fire lanes, parking lots and access roadways



Fire Lane

- Allows passage of fire apparatus
- Not necessarily intended for other vehicles



F.D. Access Requirements

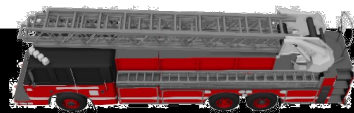
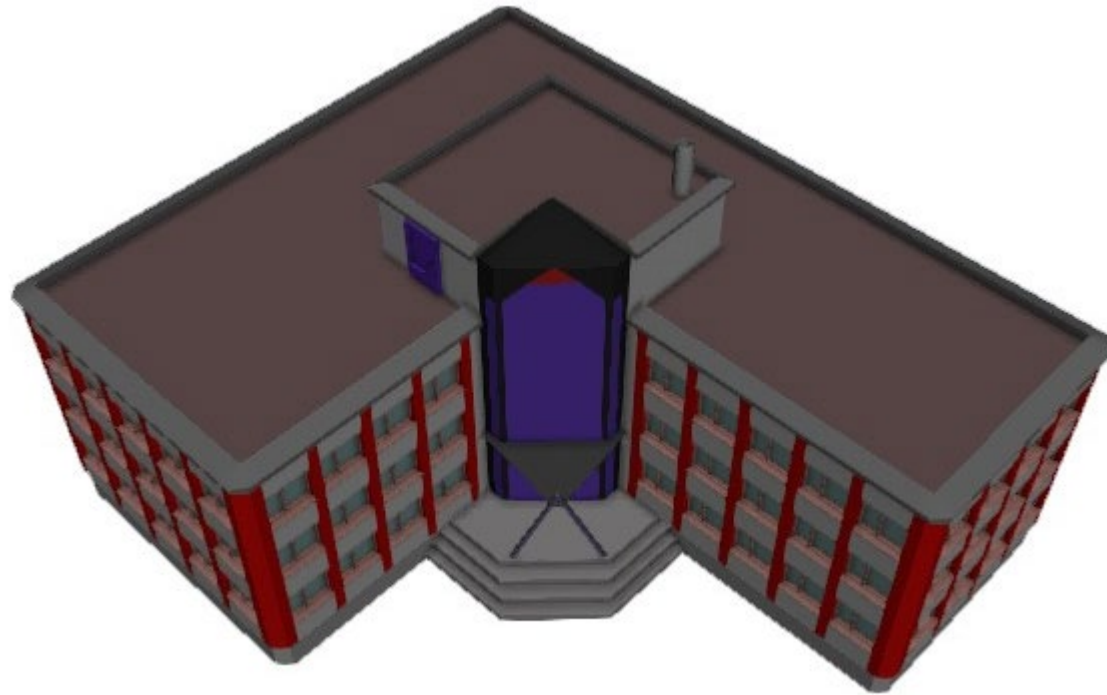
MSFC 503

F.D. Access – MSFC 503.1.1

- Required for new facilities, buildings and additions
- Must be able to get apparatus within 150 ft. of all portions of the building
- How far away from building?:
 - **No minimums specified**
 - **Aerial apparatus considerations**

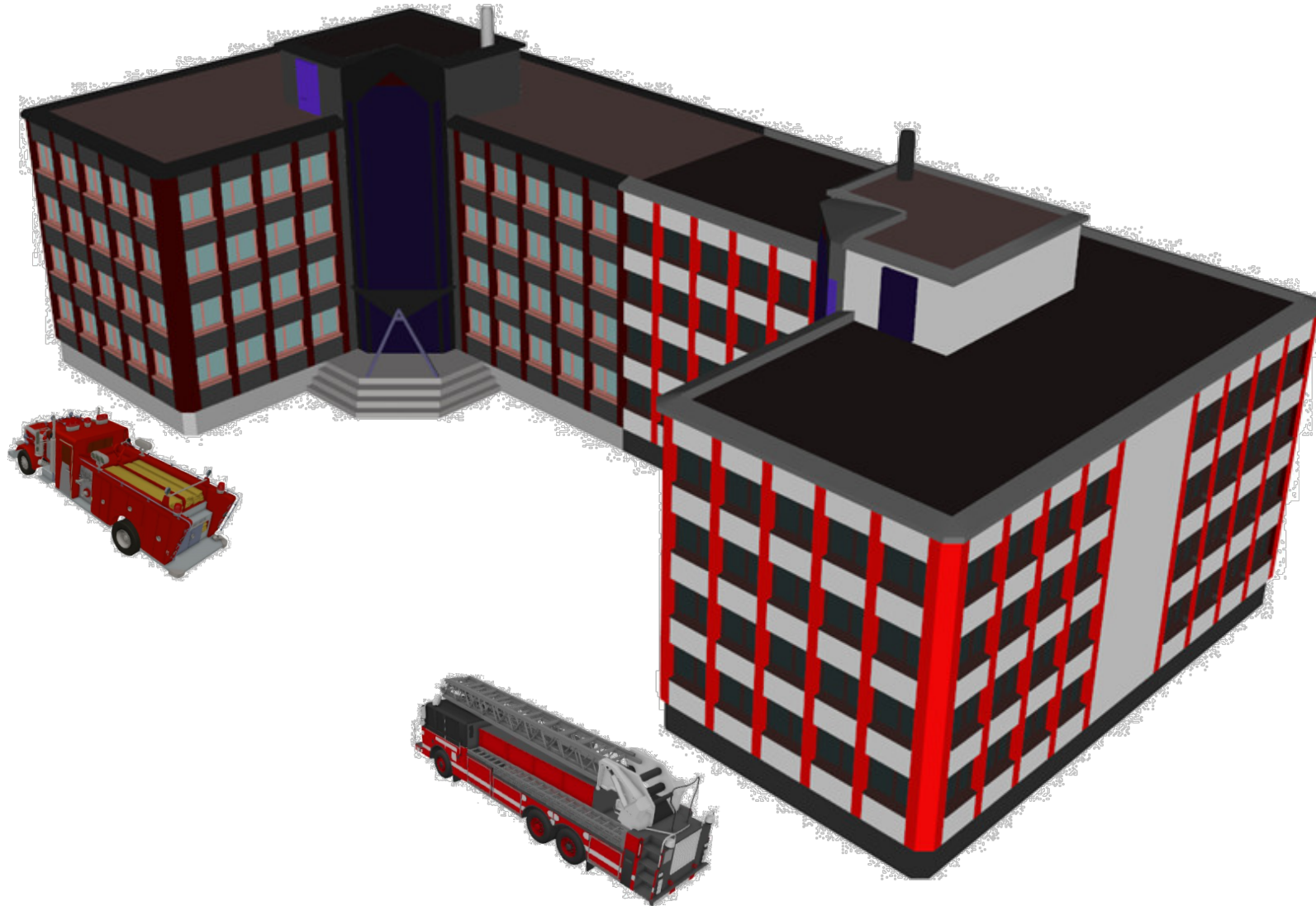
F.D. Access – MSFC 503.1.1

Alley or fire access road



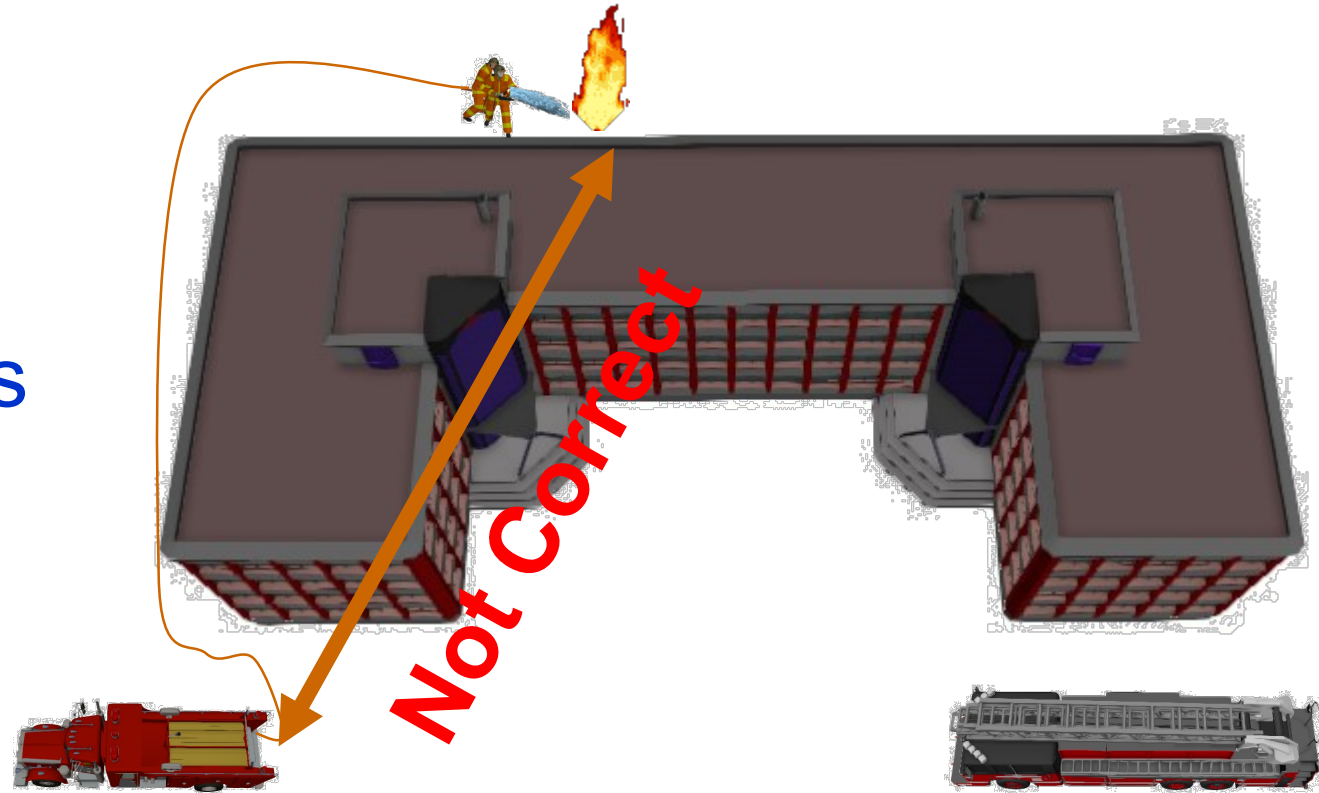
Road

F.D. Access – MSFC 503.1.1

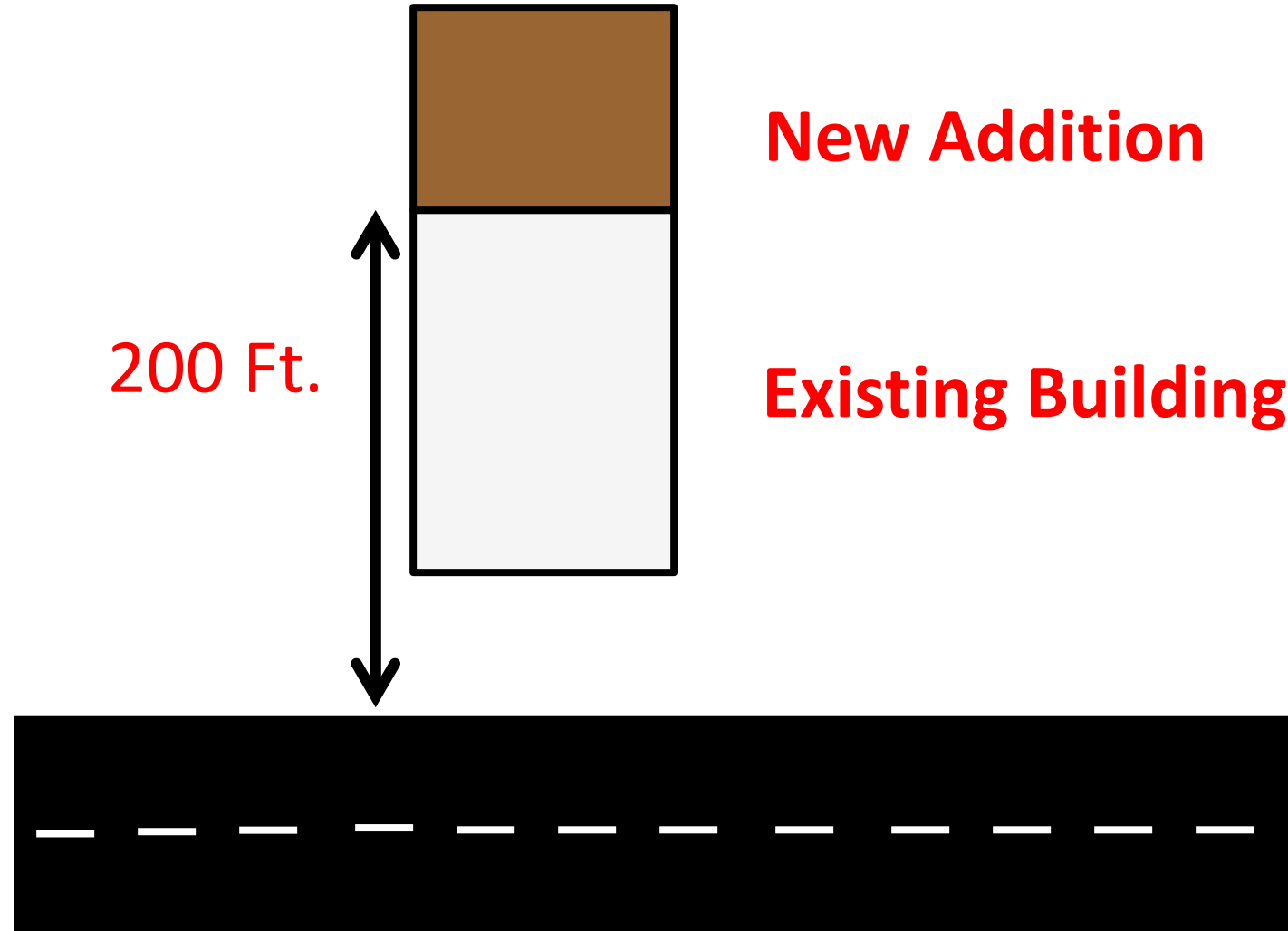


F.D. Access – MSFC 503.1.1

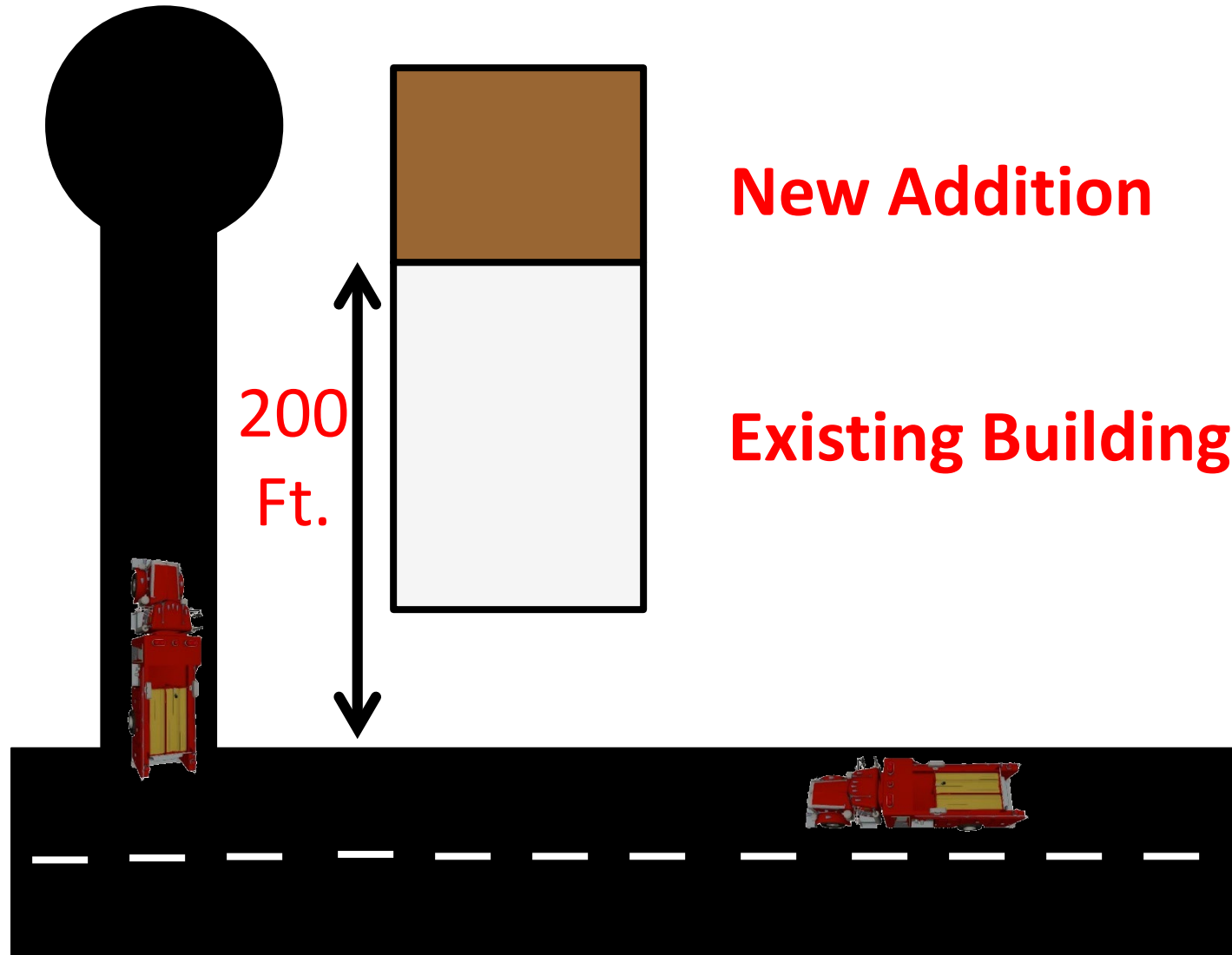
How the
150 foot
maximum
distance is
measured



F.D. Access – Building Addition

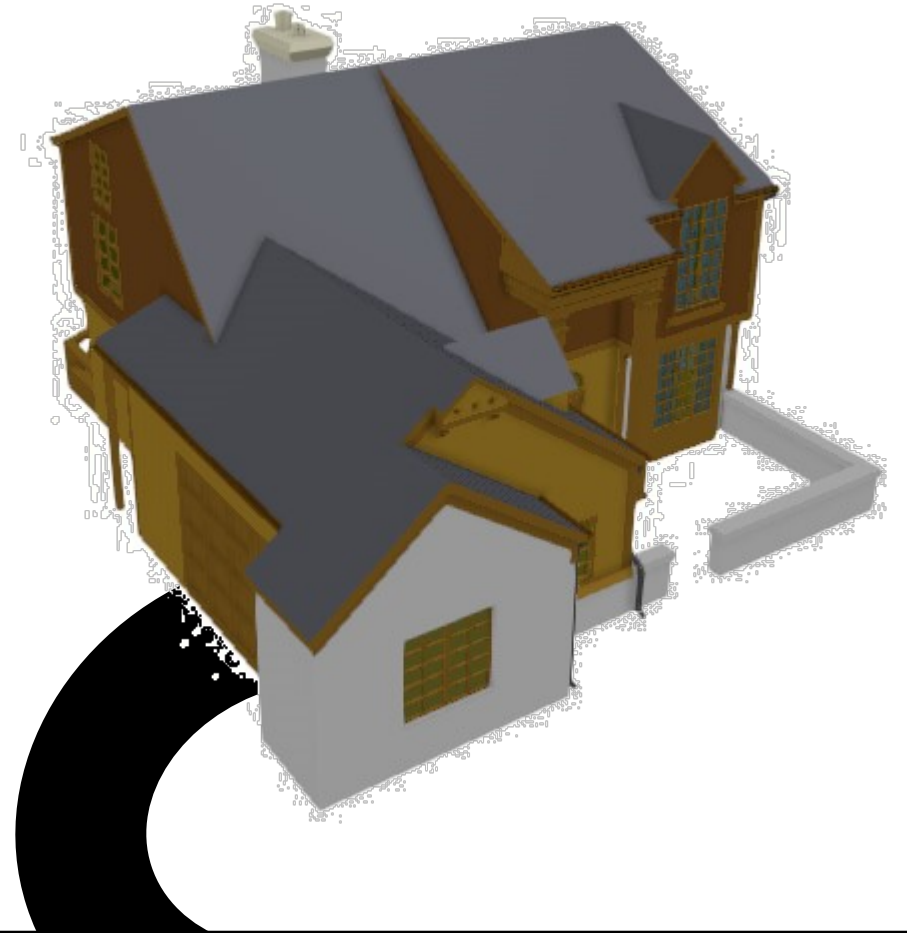


F.D. Access – Building Addition



F.D. Access – MSFC 503.1.1

- Exception: FD access roads are not required when the road serves two or fewer:
 - **Group R-3 (single family homes)**
 - **Group U (garages, barns, sheds, etc.)**

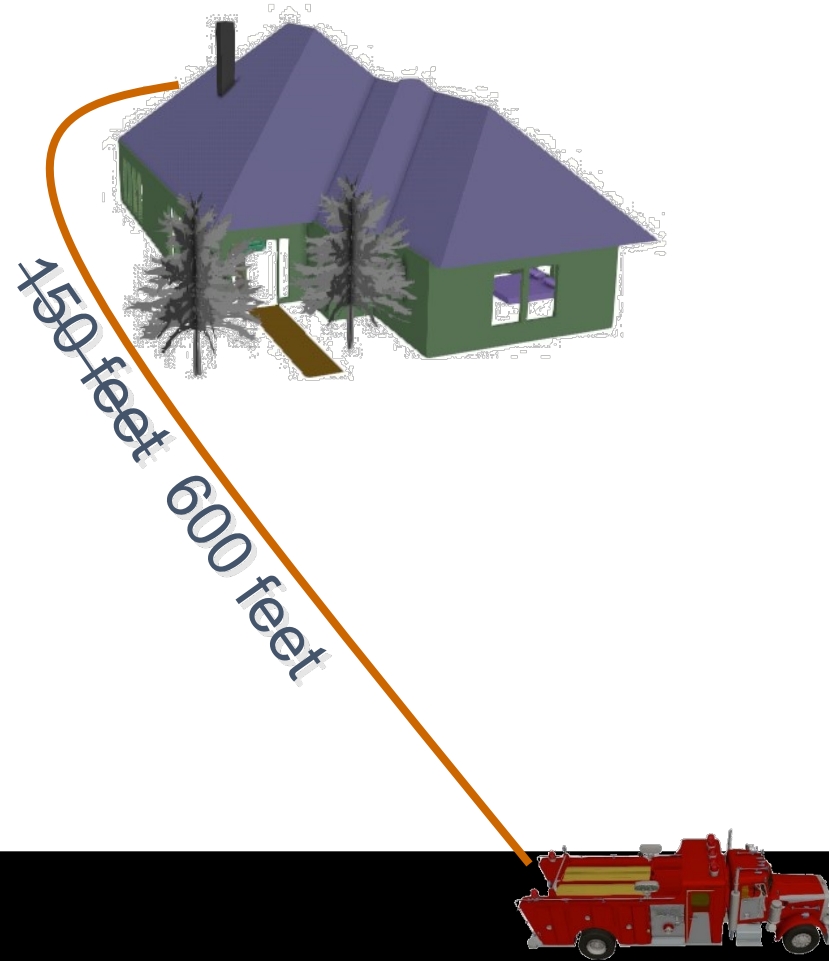


F.D. Access – MSFC 503.1.1.1

- Distance increases allowed (can increase the 150 ft. distance):
 - **Is sprinklered commercial: no maximum distance**
 - **Group R sprinkler-protected buildings (up to 600 feet)**
 - **Difficult location/topography and alternative means of fire protection provided (up to 300 feet)**

F.D. Access Roads – Houses

Fire apparatus roads can terminate further from the house when sprinkler-protected



Specifications for Access Roads

MSFC 503.2

F.D. Access Road Width – MSFC 503.2.1

- 20 foot minimum width
- Exception added for sprinkler-protected residences – 16 ft. width



F.D. Access Road Width – MSFC 503.2.1



F.D. apparatus access roads can be narrower if
sprinkler-protected buildings

Access Road Specifications

- MSFC 503.2.2 – Fire code official can require additional width if inadequate for fire or rescue operations
- MSFC 503.2.3 – Capable of supporting the loads of apparatus in all weather conditions
- MSFC 503.2.4 – Turning radius of fire apparatus must be met
- MSFC 503.2.5 – Dead-end turn-around provisions required

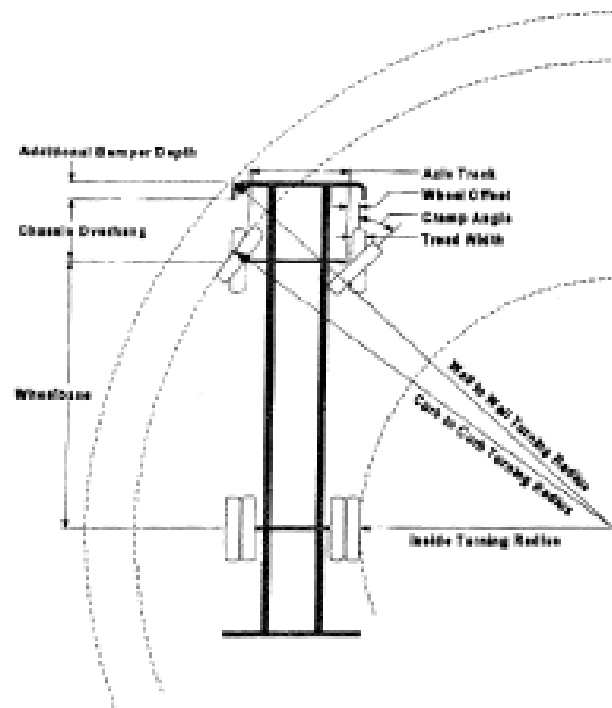
Access Road Specifications

- MSFC 503.2.6 – Bridges and elevated surfaces to be designed to handle the live load of the apparatus
- MSFC 503.2.7 – Road grade to be determined by local fire apparatus specifications
- MSFC 503.2.8 – Approach and departure angles based on local fire apparatus specifications

Increase Width for Certain Conditions



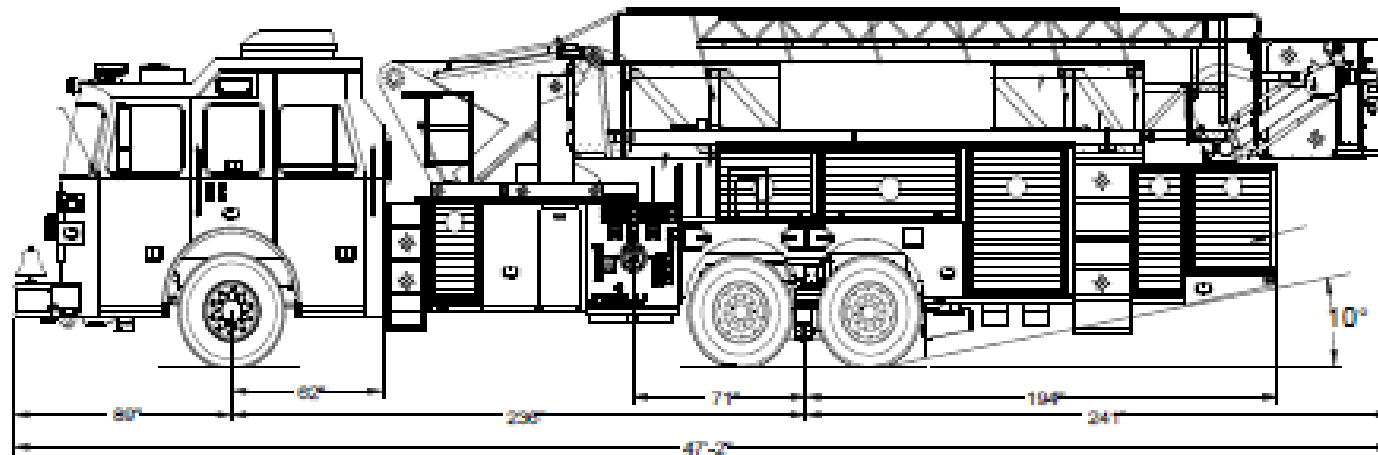
Apparatus Turning Radius – MSFC 503.2.4



Longest Vehicle:
Truck 101

Specifications:

Inside to Inside = 29' 10"
Curb to Curb = 4' 10 1/2"
Wall to Wall = 39' 3 1/2"



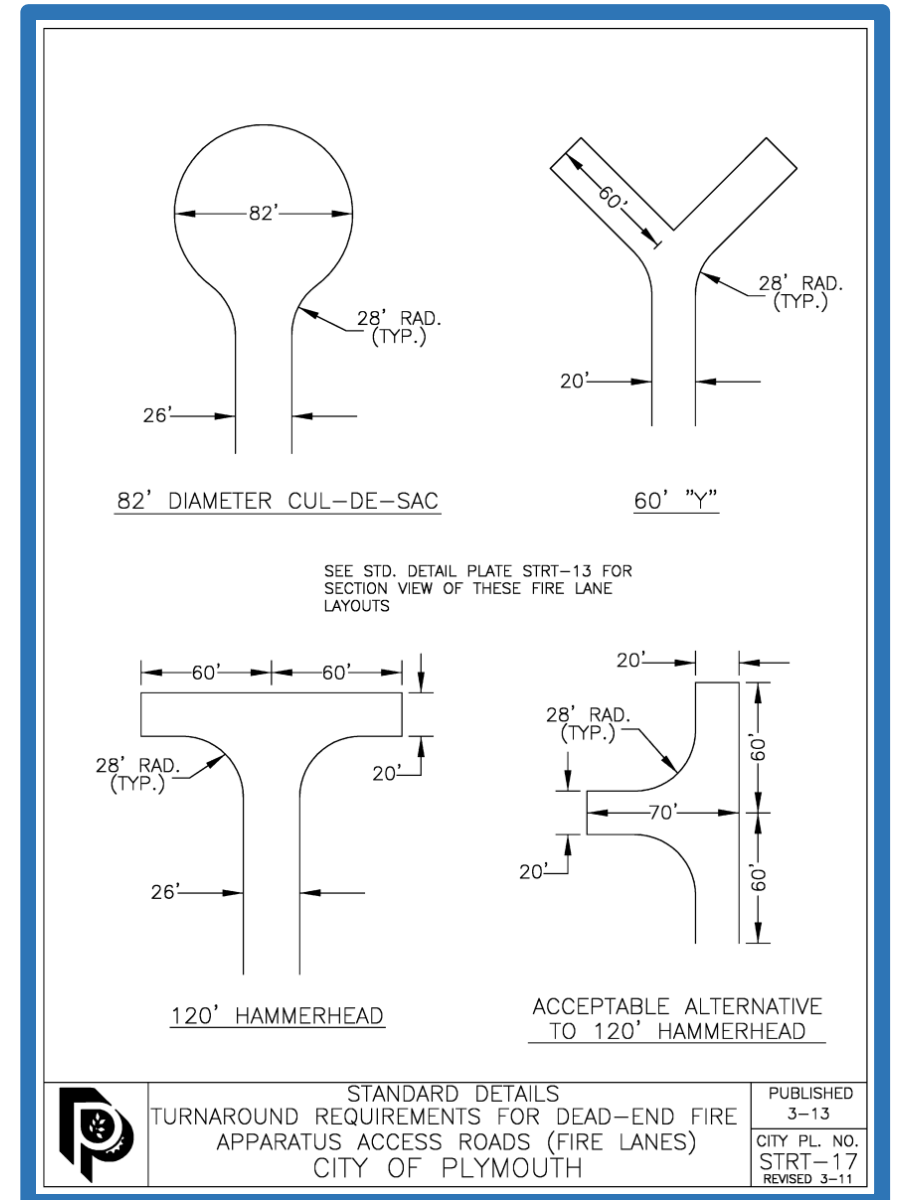
Access Road Turn-Around – MSFC 503.2.5

- Turn-around provisions if FD access road is over 150 ft. in length

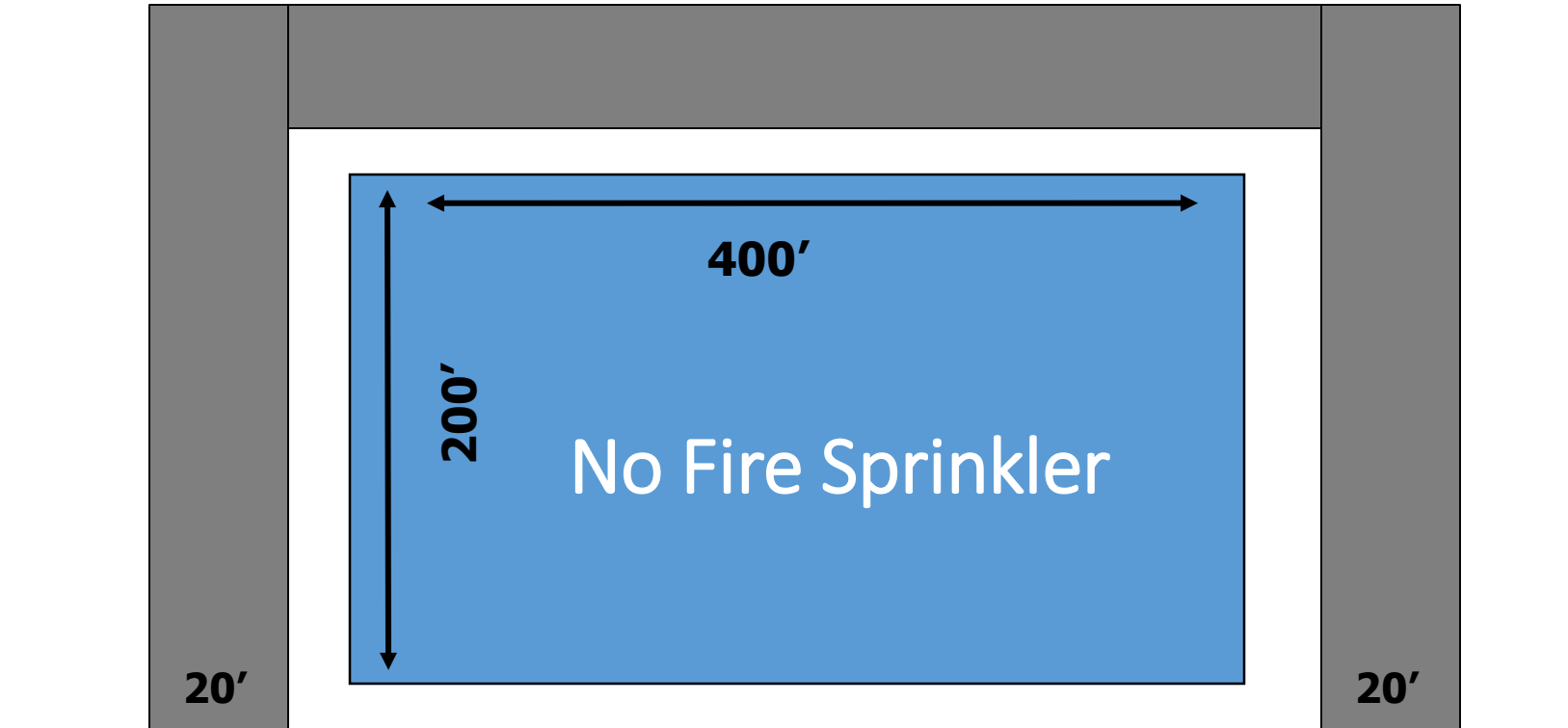


Access Road Turn-Around – MSFC 503.2.5

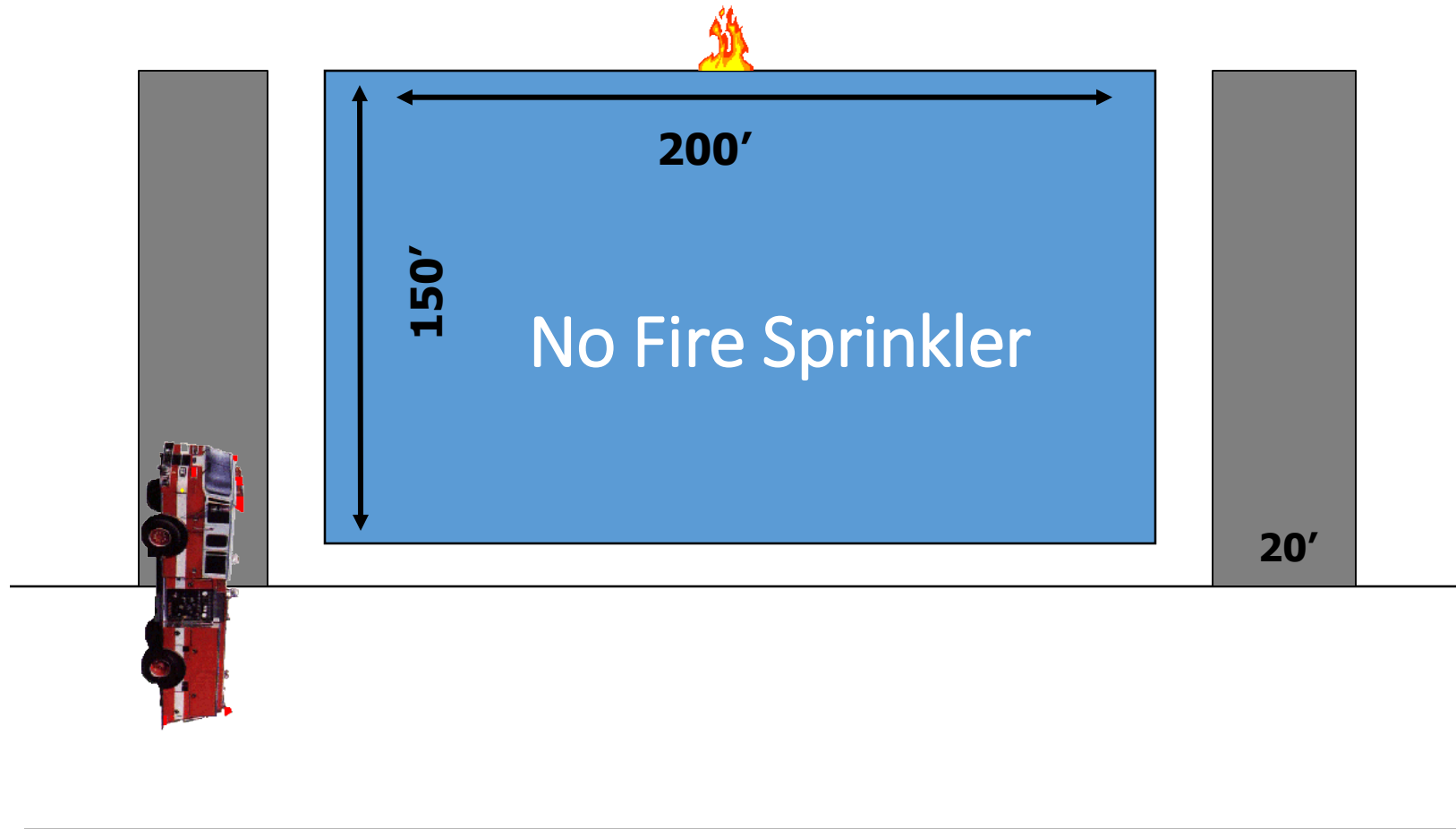
- Turn-around provisions will vary depending on local FD needs or equipment
- Exception allows 300 ft. dead-end road for sprinkler-protected Group R buildings



Fire Department Access – MSFC 503



Fire Department Access – MSFC 503



Fire Lane Marking and Signage – MSFC 503.3

- Fire code official can require the posting and marking of fire lanes
- Develop local ordinance for sign specifications
- Appendix D has guidance (D103.6)



Fire Lane Marking and Signage

- Curb painting is common in other areas of the country
- Not common in Minnesota due to snow cover



Premise Identification

MSFC Section 505

Premise Identification – MSFC 505.1

- Approved address numbers or building identification
- Plainly legible and visible from street
- Can require at additional locations
- Numbers to be at least 4” height and ½” stroke
- Address numbers to be maintained

Fire Department Key Boxes

MSFC 506

Key Boxes – MSFC 506

- Code official can require key boxes:
 - **To provide access to or within structure**
- Approved location
- Approved type of key box
- Containing keys to gain access as required
- Must be maintained (new keys, etc.)



F.D. Key Boxes – MSFC 506

- 506.1 Where required. Where access to or within a structure or an area is unduly difficult because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, the fire code official is authorized to require a key box to be installed in an approved location. The key box shall be of an approved type and shall contain keys to gain necessary access as required by the fire code official.
 - **Exception: One and two family dwellings need not be provided with lock boxes.**

When to Require Key Boxes?

- Sprinkler systems
- Fire alarm systems
- Apartment buildings
 - **Medical emergencies**
- Hotels
 - **But they are always open**
- Elevators with communication
- No fire protection systems?
- Convenience stores?
- Security concerns:
 - **Banks**
 - **Jewelry stores**
 - **Data centers**

Convenience Store

Open 24 Hours



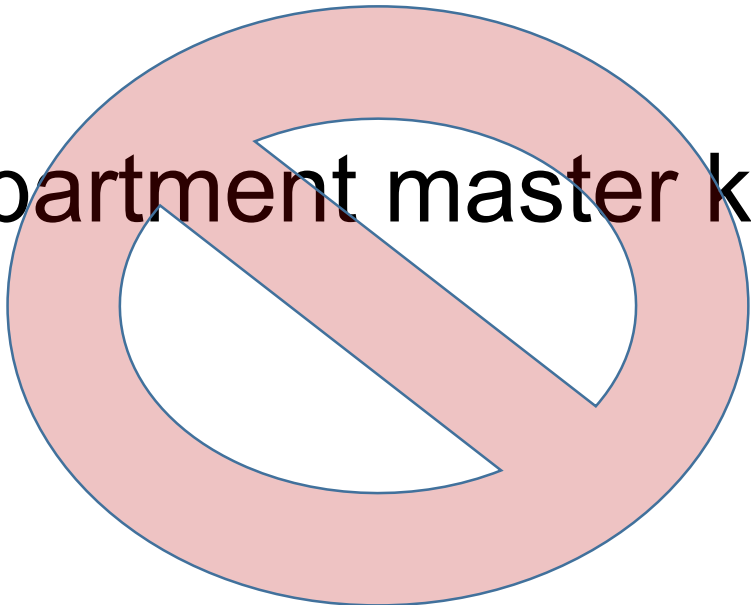
Bank

No alarms and no sprinklers
Security concerns



Type of Keys in Key Box

- Building access
- Sprinkler control room
- Mechanical & electrical
- Fire alarm panel / pull station key
- Apartment master key?



Department Policy or Directive

- Written policy highly recommended
- Specify type of key boxes (manufacturer)
- Who oversees the key box program
- Instructions for installing key boxes:
 - **Location, height, etc.**
- Distribution and security of keys
- When key boxes can be accessed

Key Box & Key Security

- You're the fire code official
- Fire officer walks into your office
 - **“Can we talk?”**
 - **“I can't find my key box key”**
- Key security
 - **Regular audits**
 - **Daily vehicle check**
 - **Security in vehicles**



Key Box Headline

- Phoenix Fire Department can't account for 850 keys
- April 14, 2014
- More than half of the keys gone missing, officials said
- City paying about \$50,000 to re-key all 9,000 boxes in 12 weeks
- Originally had 1,350 keys issued

Key Box Headline

- Seattle spending \$500,000 to re-key lock boxes after burglaries
- October, 2013
- Burglars were accessing key boxes, taking keys and entering the buildings

What if Owner Refuses the Key Box?

- Key box required as part of your site plan review
- They've read the headlines across the country
 - **Missing or stolen keys or misused**
- Right to appeal your requirements
- Better solution to indemnify the fire department and hold harmless any damage at an incident?

Firefighting Water Supplies

MSFC 507

Firefighting Water Supplies – MSFC 507

- Approved water supply to be provided:
 - **Applies to new buildings & additions to existing buildings**
- Capable of supplying minimum flows
- Types:
 - **Reservoirs, tanks**
 - **Water mains**
 - **Other fixed systems**



Fire Flows – Table 507.3

Hazard Classification	Unsprinklered or partially sprinklered building	Duration (minutes)
Light Hazard	250 gpm available for FD use	30
Ordinary Hazard	500 gpm available for FD use	60
Extra Hazard	750 gpm available for FD use	90
High Piled Combustible Storage	1000 gpm available for FD use	120
Other Group H Occupancies	1000 gpm available for FD use	120

Fire Flows – Table 507.3

Hazard Classification	Sprinklered Building	Duration (minutes)
Light Hazard	100 gpm available for FD use	30
Ordinary Hazard	250 gpm available for FD use	60
Extra Hazard	500 gpm available for FD use	90
High Piled Combustible Storage	Hose stream demand from NFPA 13 or 500 gpm, whichever is larger.	120
Other Group H Occupancies	Hose stream demand from NFPA 13, MSFC Chapters, or 500 gpm, whichever is larger.	120

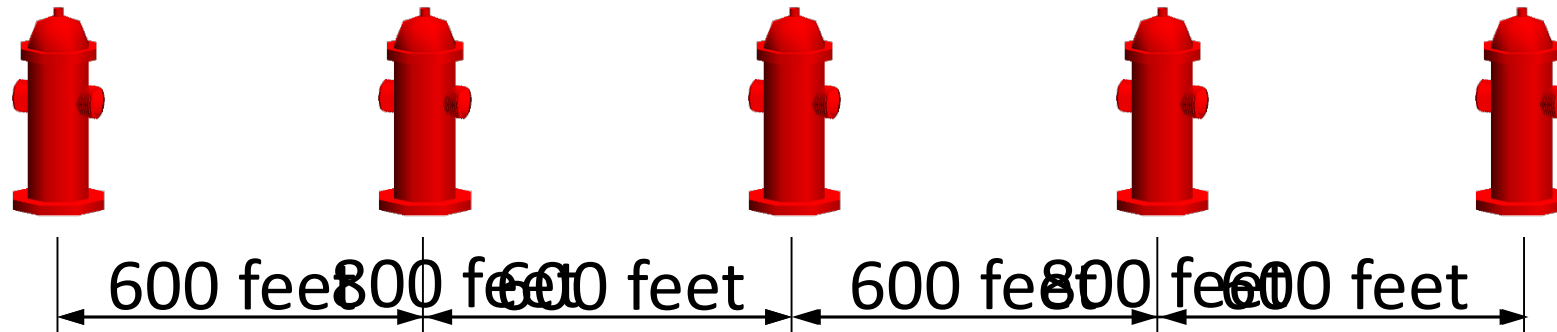
The Age-Old Question

- The owner is building outside the city where there is no water so they cannot provide:
 - **Water for firefighting**
 - **Sprinkler protection**
- Sorry – wrong answer
- No municipal water supply shifts the responsibility to property owner

Fire Protection Water Supplies – MSFC 507.5.1

- Requires any portion of a building to be within 300 ft. of a hydrant
- Can increase distance to 400 ft. if the building is sprinkler-protected
- Can increase distance to 600 ft. if Group R-3 occupancy and sprinkler-protected

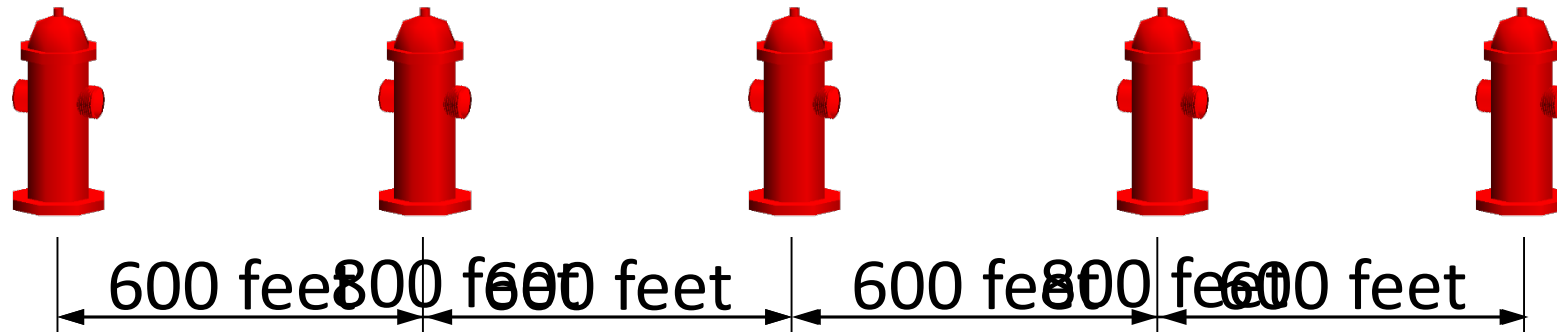
Hydrant Spacing – Most Occupancies



Increased hydrant spacing:

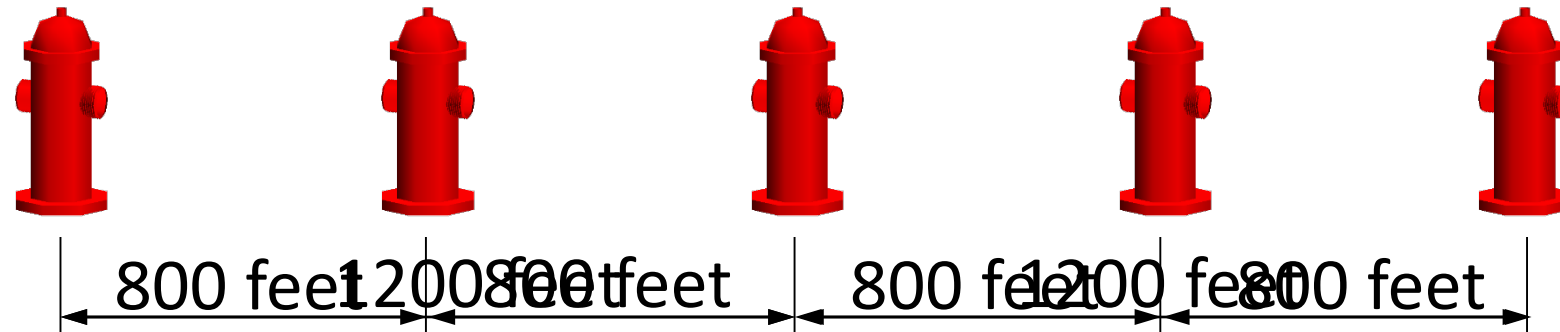
- 1 & 2 family dwellings
- Miscellaneous (Group U) occupancies

Hydrant Spacing – Commercial



Increased hydrant spacing if sprinkler-protected commercial building

Hydrant Spacing – Residential (R-3)

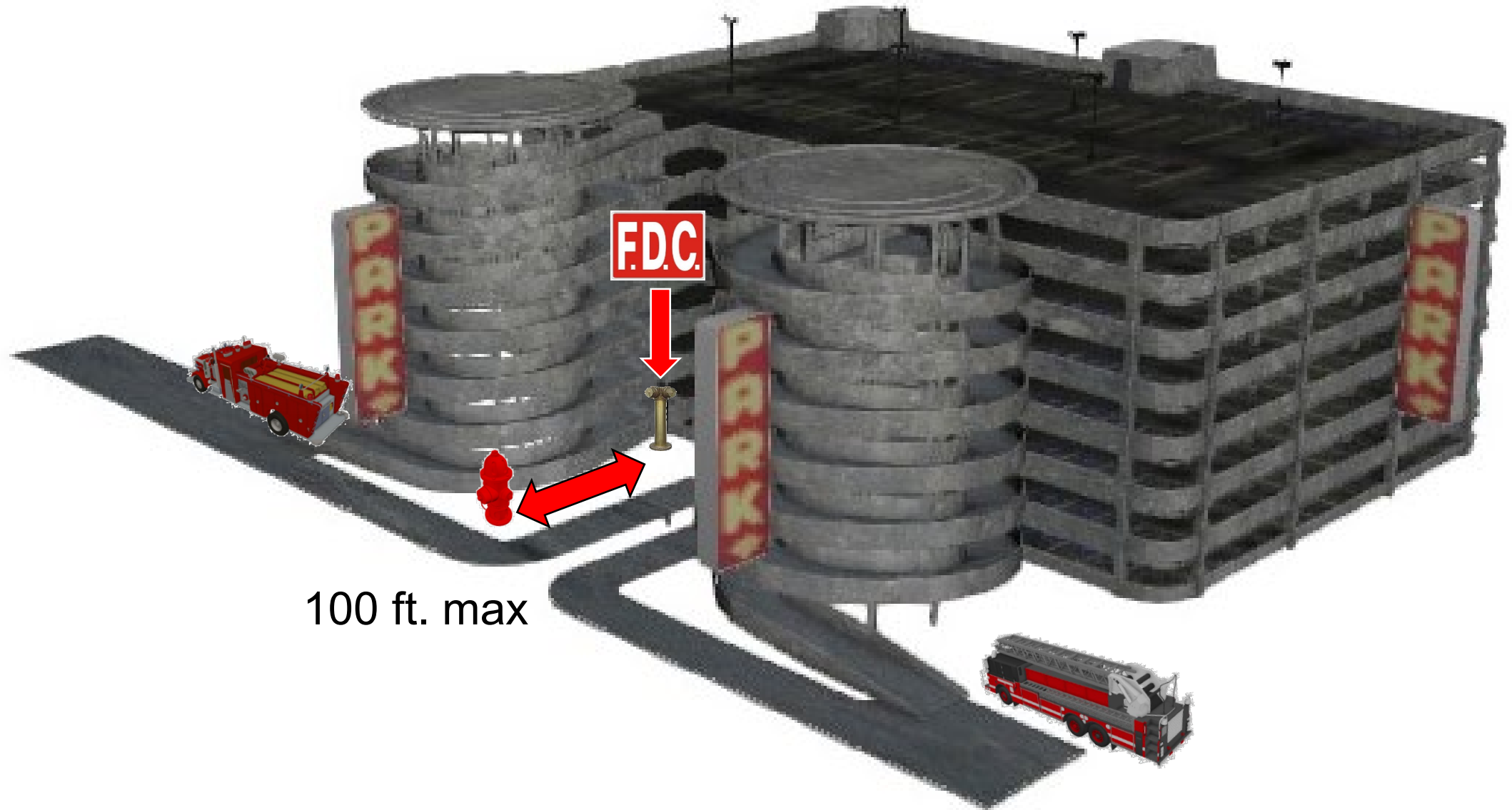


Increased hydrant spacing if sprinkler-protected
Group R-3 buildings

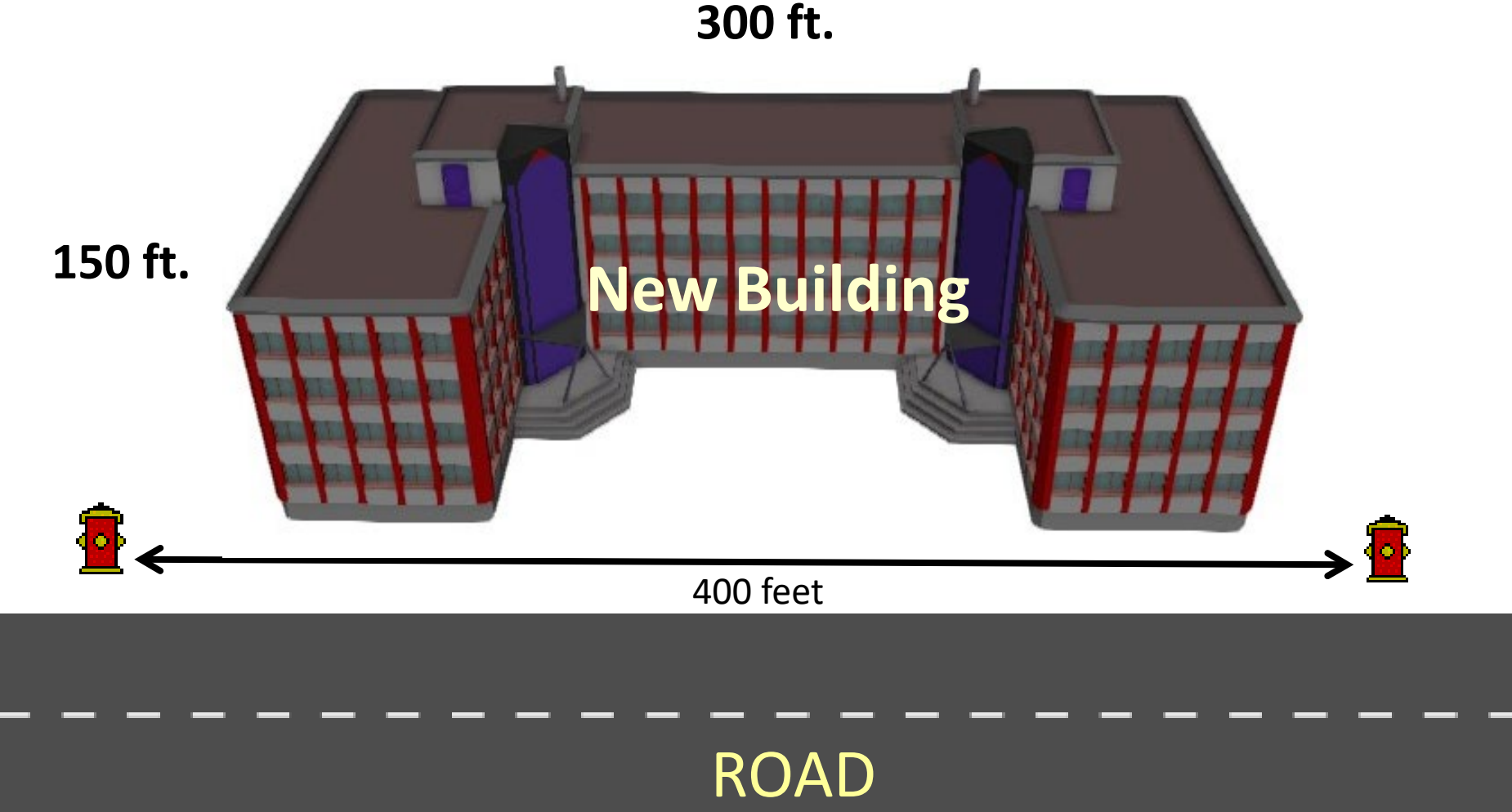
Hydrant for Standpipes – MSFC 507.5.1.1

- Fire hydrant to be located within 100 ft. of standpipe fire department connection (FDC)
- Does not apply to sprinkler system FDCs
- Exception allows an increase where acceptable to fire code official

Hydrant for Standpipes – MSFC 507.5.1.1



Access & Water Supplies – MSFC 503 & 507



Access Roads & Water Supplies

- MSFC allows a great deal of flexibility for sprinklered buildings
- FD access and water supply requirements are closely related:
 - **A hydrant is of little value if you cannot drive a fire truck to it**
 - **They use 150 ft. as a basis (length of typical pre-connected hose line)**

Access Roads & Water Supplies



More Does Not Always Mean Better



Hydrant Obstructions – MSFC 507.5.4

- Cannot obstruct hydrants or other fire protection system controls



Fire Hydrant Protection – MSFC 507.5

- Must maintain 3 ft. clear space around hydrants – MSFC 507.5.5
- Can require posts if hydrant is subject to vehicle impact – MSFC 507.5.6



Fire Command Centers

MSFC 508

Fire Command Center – MSFC 508.1.1 & 508.1.2

- Location to be approved by fire code official
- One-hour fire separated from the remainder of building



Fire Command Center – MSFC 508.1.3

- Size and dimensions of room:
 - **200 sq. ft. or 0.015% of building size (whichever is greater)**
 - **Previous codes allowed 96 sq. ft.**
 - **Minimum dimension of:**
 - 0.7 times $\sqrt{\text{of room}}$ – or –
 - 10 ft. (whichever is greater)

Fire Command Center Features – MSFC 508.1.6

- Extensive list of features that are required in fire command centers:
 - **Voice/alarm communication system**
 - **Fire alarm and detection annunciator**
 - **Elevator location annunciator**
 - **Controls for smoke management systems**
 - **Controls for unlocking interior stairway doors**
 - **Sprinkler and fire pump status indicators**
 - **See MSFC 508.1.6 for additional provisions**

Fire Protection & Utility Identification & Access

MSFC Section 509

Signage & Identification – MSFC 509.1

- Fire protection equipment to be identified
- Rooms containing the following to be identified:
 - **Sprinkler risers and valves**
 - **Fire alarm, detection or suppression controls**
 - **Air conditioning systems**

Signage & Identification – MSFC 509.1

**FACP & SPRINKLER/
FIRE PUMP
CONTROL ROOM**

**SPRINKLER
CONTROL
ROOM**

**SPRINKLER
CONTROL
VALVE**

Utility Identification – MSFC 509.1.1

- Certain utility equipment to be identified:
 - **Gas shut-off valves**
 - **Electric meters**
 - **Switches**
 - **Other utility equipment**
- Identifies space or unit that it serves

Utility Identification – MSFC 509.1.1

NOTICE

**ELEVATOR
MACHINE ROOM
ACCESS THROUGH THIS DOOR**

SmartSign.com • 800-952-1457 • S-4858

**ELECTRICAL
ROOM**

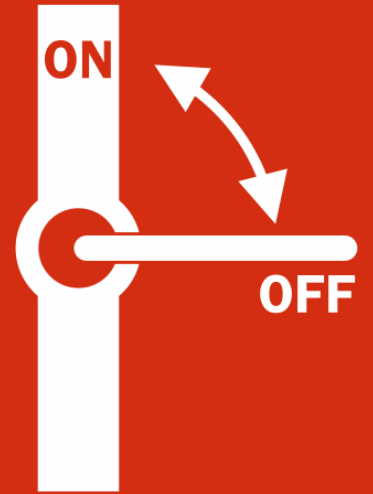
**AUTHORIZED
PERSONNEL ONLY**

SmartSign.com • 800-952-1457

**ELECTRIC
HVAC**



**GAS
SHUT-OFF
VALVE**

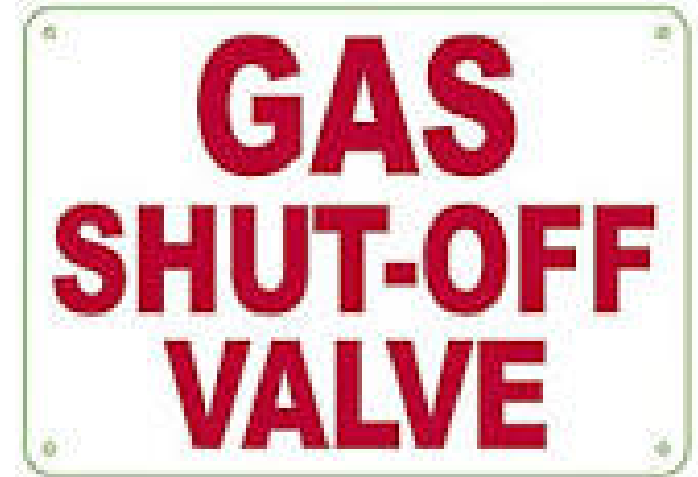


CAUTION

**MAIN
ELECTRIC
SHUT-OFF**

SmartSign.com • 800-952-1457 • S-1171

Utility Shut-offs Labeled – MSFC 509.1.1



Access to Equipment – MSFC 509.2

- Access to be provided for fire protection equipment
- When needed for immediate operation and maintenance
- No storage, trash or materials to prevent access to equipment



Access to Equipment – MSFC 509.2



Access to Equipment – MSFC 509.2



Emergency Responder Radio Coverage

MSFC 510

Emergency Responder Radio Coverage

- Section 510 was added to the 2012 IFC requiring emergency responder radio coverage for all new buildings
- MSFC moved this to an optional appendix chapter (Appendix P)

Resources for Fire Code Officials

Site Plan Review Checklist

State Fire Marshal Website

The screenshot shows the website's navigation and content. At the top, there are links for Home, Divisions, Media Center, Contact DPS, and Translate. The Minnesota Department of Public Safety logo is on the right. The main header includes the State Fire Marshal logo and a search bar. A secondary navigation bar contains links for SFM Home, About, Fire Code, Services, Training, Reporting, Fire Departments, Prevent Fires & Fire Deaths, Response Teams, and Contact. The left sidebar lists various services, with 'Fire Reporting' highlighted and indicated by a red arrow. The main content area features a 'WHAT'S NEW?' section with news items about fire department support and firefighter recruitment grants. On the right, there are two promotional banners: one for SEOC Activation (State Emergency Operations Center) regarding COVID-19, and another featuring State Fire Marshal Jim Smith.

Home Divisions Media Center Contact DPS Translate

MINNESOTA Department of Public Safety

State Fire Marshal
A Division of the Minnesota Department of Public Safety

Search...

SFM Home About **Fire Code** Services Training Reporting Fire Departments Prevent Fires & Fire Deaths Response Teams Contact

- Course Register
- Document Library
- Firefighter Recruitment
- Fire Death Information
- Fire in Minnesota Reports
- Fire Reporting**
- Prevent Fires and Fire Deaths**
- Service Planning Grant Program
- State Response Teams**
- Subscribe to Email Updates

Expand All Collapse All

WHAT'S NEW?

Plans in place to help fire departments keep their communities safe

We are working closely with Twin Cities fire departments and others across the state to ensure have the resources they need to keep people and property in their communities safe during the trial for former Minneapolis police officer Derek Chauvin.

We can work with the Minnesota State Fire Chiefs Association to activate the statewide mutual aid plan quickly to send help anywhere in the state.

Firefighter Recruitment Grant Information

The Minnesota State Fire Department Association (MSFDA) is holding informational sessions every other week on Tuesday and Thursday at 7 p.m. to discuss their Firefighter Recruitment Grant. Each one-hour meeting will go over the recruitment grant and provide details on new resources to improve your department's firefighter recruitment efforts.

The grant period began Dec. 10, 2020, and will run for four years.

[Click here](#) to learn more and to sign up.

SEOC ACTIVATION


STATE EMERGENCY OPERATIONS CENTER


MINNESOTA'S COORDINATED RESPONSE TO COVID-19 OUTBREAK.

A message from State Fire Marshal
Jim Smith

Website Fire Code Tab

Home Divisions Media Center Contact DPS Translate

 MINNESOTA Department of Public Safety

 State Fire Marshal
A Division of the Minnesota Department of Public Safety

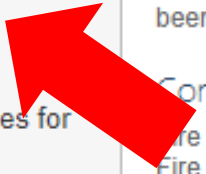
Search...

SFM Home About Fire Code Services Training Reporting Fire Departments Prevent Fires & Fire Deaths Response Teams Contact

Fire Code

- Fire Code Information Sheets
- Interpretations
- Policies
- Presentations
- Sample Inspection Checklists
- State Fire Code
- COVID-19 Resources for Businesses

Expand All Collapse All



FIRE CODE

General information

The links to the left take you to our information sheets, interpretations, policies, sample inspection checklists, the Minnesota State Fire Code and a new link to fire code training presentations.

The majority of the information sheets, policies and interpretations have not been updated to the 2020 Minnesota State Fire Code. The process to update will take some time to complete. When an information sheet, policy or interpretation has been updated, it will be noted with *2020 MSFC.


Contact us


Fire code questions may be submitted by emailing the [Fire Code Team](#).
Fire sprinkler questions may be submitted directly to the [Fire Protection Team](#).

Code staff monitor this email address on a daily basis and will respond to your question, usually within 24 hours, but always within three working days.

Sample Inspection Checklists

Home Divisions Media Center Contact DPS Translate

 MINNESOTA
Department of Public Safety

 State Fire Marshal
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Search...

SFM Home About Fire Code Services Training Reporting Fire Departments Prevent Fires & Fire Deaths Response Teams Contact

Fire Code

- o Fire Code Information Sheets
- o Interpretations
- o Policies
- o Presentations
- o **Sample Inspection Checklists**
- o State Fire Code
- o COVID-19 Resources for Businesses

Expand All Collapse All

SAMPLE INSPECTION CHECKLISTS

Sample Inspection Checklists

These documents are intended as a resource for inspection staff that perform inspections in accordance with the 2015 Minnesota State Fire Code (MSFC). They can be used as-is or as a guide to develop customized forms for a particular jurisdiction.

When a sample inspection checklist has been updated, it will be noted with *2020 MSFC.

[Apartment buildings](#) sample inspection checklist. *2020 MSFC

[Assembly occupancies](#) sample inspection checklist.

[Business occupancies](#) sample inspection checklist. *2020 MSFC

[College classroom](#) and lecture buildings sample inspection checklist. *2020 MSFC

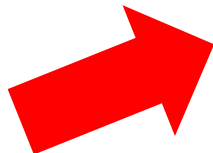
[Educational occupancies](#) sample inspection checklist. *2020 MSFC

[Fire department site plan review](#) sample inspection checklist.

[Home daycare and foster care](#) inspection checklist.

[Mobile food preparation vehicle](#) inspection checklist. *2020 MSFC

[Public fireworks](#) display sample inspection checklist.



Site Plan Review Checklist (Word Form-Fill)

Fire Department Site Plan Review Checklist Minnesota State Fire Code		
Project / Point of Contact Information		
Project Name: Click here to enter text.		
Address: Click here to enter text.		
Contact Name: Click here to enter text.	Contact Phone: Click here to enter text.	
Contact Address: Click here to enter text.		
Contact Email: Click here to enter text.		
Designer / Engineer Information		
Company Name: Click here to enter text.		
Address: Click here to enter text.		
Contact Name: Click here to enter text.	Contact Phone: Click here to enter text.	
Contact Email: Click here to enter text.		
Project Type (if multi-use development, check all that apply)		
<input type="checkbox"/> Assembly	<input type="checkbox"/> Hazardous	<input type="checkbox"/> Residential – Multi-unit
<input type="checkbox"/> Business	<input type="checkbox"/> Institutional	<input type="checkbox"/> Storage/Warehouse
<input type="checkbox"/> Educational	<input type="checkbox"/> Mercantile/Retail	<input type="checkbox"/> Utility/Miscellaneous
<input type="checkbox"/> Factory/Industrial	<input type="checkbox"/> Residential – 1&2 Family	<input type="checkbox"/> Other: Click here to enter text.
Description/Comments: Click here to enter text.		
Construction Type (if multiple types, check all that apply)		
<input type="checkbox"/> Type I-A (Noncombustible Fire Resistive)	<input type="checkbox"/> Type III-B (Unprotected Combustible)	
<input type="checkbox"/> Type I-B (Noncombustible Fire Resistive-Modified)	<input type="checkbox"/> Type IV (Heavy Timber)	
<input type="checkbox"/> Type II-A (Protected Noncombustible)	<input type="checkbox"/> Type V-A (Protected Wood Frame)	
<input type="checkbox"/> Type II-B (Unprotected Noncombustible)	<input type="checkbox"/> Type V-B (Unprotected Wood Frame)	
<input type="checkbox"/> Type III-A (Protected Combustible)		



Questions

Website: <https://sfm.dps.mn.gov>



Thank you

MINNESOTA STATE FIRE MARSHAL DIVISION

445 Minnesota Street; Suite 145 Saint Paul, MN 55101

Website: <https://sfm.dps.mn.gov>

Phone: (651) 201-7200