Travis County ESD No. 12

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NEW CONSTRUCTION GUIDELINE FOR COMMERCIAL AND MULTI-FAMILY DEVELOPMENTS

ACCESS FOR FIREFIGHTING DURING CONSTRUCTION AND DEMOLITION

Approved vehicle access for emergency response situations shall be provided to all construction or demolition sites. When fire apparatus access roads or a water supply for fire protection is required to be installed for any structure or development, they shall be installed, tested, and approved prior to the time of which construction has progressed beyond completion of the foundation of any structure.

Vehicle access shall be provided to within 100 feet of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads, capable of supporting 85,000 pounds under all weather conditions. If not asphalt or concrete, the road base material shall be over soil compacted to at least 90% and be mixed or topped with a suitable binding material to provide all-weather characteristics; road base alone does not satisfy this requirement. The final road section, less the final lift of asphalt topping, may be acceptable if certified by the engineer. Vehicle access shall be maintained until permanent fire apparatus access roads are available. Temporary address signage shall also be provided during construction. (IFC 3311.1)

REQUIRED WATER SUPPLY FOR STORAGE OF COMBUSTIBLE MATERIALS ON SITE PRIOR TO CONSTRUCTION

An approved water supply for fire protection shall be made available as soon as combustible building materials arrive on the site, on commencement of vertical combustible construction and on installation of a standpipe system in buildings under construction. (IFC 3313.2)

When combustible building materials of the building under construction are delivered to a site, a minimum fire flow of 500 gallons per minute shall be provided. The fire hydrant used to provide this fire-flow supply shall be within 500 feet of the combustible building materials, as measured along an approved fire apparatus access road. (IFC 3313)

REQUIRED FIRE FLOW

The minimum fire flow and flow duration shall be determined in accordance with IFC Sections B105 and Reference Table B105.1(2). Fire flow reductions are based on the occupancy type and construction type. The required fire flow for a building shall not exceed the available GPM in the water delivery system at 20 psi. Minimum required fire flow for all buildings shall be 1500 GPM.

ALLOWABLE FIRE FLOW REDUCTIONS

SYSTEM TYPE	OCCUPANCY	CONSTRUCTION TYPE	MAX REDUCTION ALLOWED
Full NFPA 13	Any except H-2, H-3, & H-5	Any	75%
Full NFPA 13	H-2, H-3, & H-5	Any	50%
NFPA 13R	R occupancies	Type I or II	75%
NFPA 13R	R occupancies	Other than Type I or II	50%
NFPA 13D	Townhouses/Townhomes (As defined in 2015 IFC)	Any	Amounts listed in Table B105.1(1)

FIRE FLOW WATER AVAILABILITY

Applicants shall provide documentation of a fire hydrant flow test or a letter from the local water purveyor confirming the required amount of water will be available for the project. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests shall be dated within 6 months. Water availability information may not be required to be submitted for every project.

The fire flow test shall include at a minimum:

- Map clearly showing the locations of hydrants used for the test
- The name of the water purveyor/water company
- Approximate location, type and size of supply lines for the project
- Flow hydrant – static pressure, flow (pitot) pressure, opening size, coefficient used

- Residual hydrant – static pressure, residual pressure while flow hydrant is fully open
- Observed flow in GPM from the flow/test hydrant
- Anticipated flow available from main at 20 psi

TABLE B105.1(2)
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.
a. Types of construction are based on the *International Building Code*.
b. Measured at 20 psi residual pressure.

The fire-flow calculation area shall be the total floor area of all floor levels within the exterior walls, and under the horizontal projections of the roof of a building, unless a building is of Type IA or Type IB construction. (IFC B104.1)

Portions of buildings that are separated by fire walls without openings, constructed in accordance with the IBC, are allowed to be considered as separate fire flow calculation areas. (IFC B104.2)

WHEN ARE LOOPED WATER LINES NEEDED

Looped water lines are fed from two directions in such a way that a line break at any point along the looped line does not result in shutting off the water supply. Looped lines are important in a fire situation because a water main break could result in loss of a building or group of buildings if a second source of supply is not available.

Hydrants shall be on a looped (receiving water from more than one direction) water supply line of at least six inches (6") in diameter.

Exceptions:

- One or two-family residential developments may have hydrants supplied by a dead-end water line where there are 30 or fewer dwelling units. Up to 60 dwelling units may have hydrants supplied by a dead-end water line when all units are protected by an approved residential fire sprinkler system. In any case, the fire chief may require such developments provide

for water line connections to adjacent properties to ensure the overall water distribution system meets recognized standards.

- Multiple-family residential developments having up to 100 dwelling units may be protected by fire hydrants supplied by a dead-end water line. Up to 200 dwelling units may be protected by fire hydrants supplied by a dead-end water line when all units are protected by an approved residential fire sprinkler system. In no case shall such developments be supplied by a dead-end line exceeding 1000 feet in length. The fire chief may require such developments provide for water line connections to adjacent properties to ensure the overall water distribution system meets recognized standards.

- For commercial and industrial developments, any building not exceeding three stories or 30 feet in height may be protected by fire hydrants supplied by a dead-end water line.

For commercial and industrial developments, buildings or facilities having a gross building area up to 62,000 square feet may be protected by fire hydrants supplied by a dead-end water line. The gross building area may be increased to 124,000 square feet without a looped water line when all buildings are equipped with an approved automatic fire sprinkler system. In no case shall such developments be supplied by a dead-end line exceeding 1000 feet in length. The fire chief may require such developments to provide for water line connections to adjacent properties to ensure the overall water distribution system meets recognized standards.

- The fire chief may allow a new development that would otherwise be required to provide a looped water line for required fire hydrants, to have a dead-end line as long as the development provides a means to connect to a looped system as future development occurs. The time period and conditions under which this exception is allowed shall be as determined by the fire chief.

- The fire chief may allow fire hydrants to be supplied by other than a looped water line when the applicant can demonstrate, to the satisfaction of the fire chief, that a looped system is not practicable. In such event, the fire chief shall make his findings in writing and shall copy such findings to the Public Works Director and the City of Manor Director of Community Development as needed. In such cases, additional fire protection may be required as determined by the fire chief.

Travis County ESD No. 12 recognizes that, for many new development projects, it is not always practical to immediately provide looped water lines. For example, if the new project is surrounded by undeveloped land or by areas that are already developed with no means of connecting to existing lines, dead-end lines might be allowed according to two basic rules:

- If the required fire flows can be provided with dead-end lines, the looping can be delayed until either a later phase of the project is completed or until adjacent properties are developed, so that water-line extensions result in completion of the loop.

- If the required fire flows can be provided with dead-end lines and looping the water lines is demonstrated to be impracticable, then the fire chief may allow the project to develop.

In all cases, if looping the water lines is the only way to provide the required fire flows, then the project will not be approved without the looping.

FIRE APPARATUS ACCESS ROADS

Access roads shall be provided for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction. (IFC 503.1.1) Fire apparatus access roads shall have an unobstructed vertical clearance of 14 feet as amended.

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

A fire lane is 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.

FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE

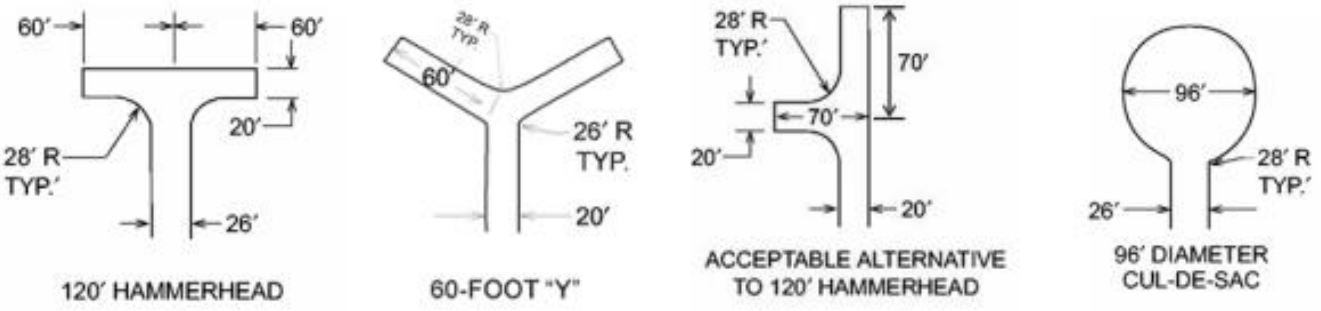
Fire apparatus access roads shall have an unobstructed driving surface width of not less than 25 feet if no fire hydrant is present and 26 feet if a fire hydrant is present and an unobstructed vertical clearance of not less than 14 feet. (IFC 503.2.1 as amended) The 26-foot dimension shall extend 20 feet before and after the point of the hydrant.

FIRE APPARATUS ACCESS ROAD GRADE

Fire apparatus access roads shall not exceed 10 percent in grade. (IFC 503.2.7/D103.2)

FIRE APPARATUS ACCESS ROADS IN EXCESS OF 150 FEET AND DEAD-END FIRE APPARATUS ACCESS ROADS

Fire apparatus access roads in excess of 150 feet in length AND dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved area for turning around fire apparatus. Parking, median islands, landscaping or other obstruction within the required turnarounds is prohibited.

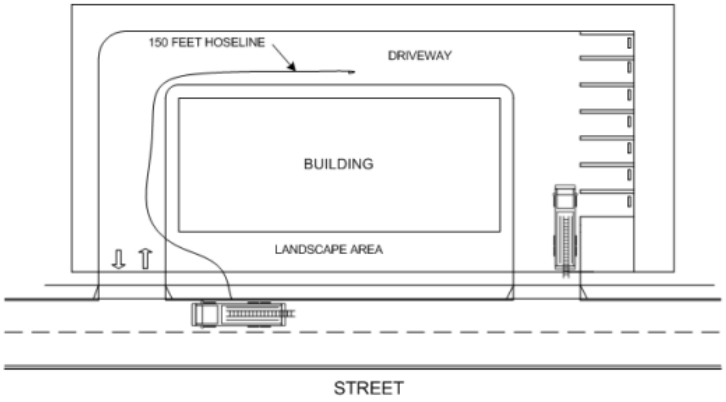


NOTE: If the fire apparatus access road is more than 150 feet, it shall not be permitted to have a "red line" painted across the fire lane at 150 feet. If such a situation exists, the fire apparatus access road shall have an approved turnaround or be continuous around the building or project.

FIRE APPARATUS ACCESS ROAD - DISTANCE FROM BUILDINGS

The fire apparatus access road shall extend to within 150 feet 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. (IFC 503.1.1 as amended)

Note: The measurement shall be by a fire department *approved route*.



APPROVED ROUTE

An approved route shall be defined as one in which the buildings are in proximity to a street or fire apparatus access road which is accessible by firefighting apparatus and from which the furthermost part of all buildings may be reached at ground level by a fire hose which is attached to the apparatus and is not in excess of 150 feet.

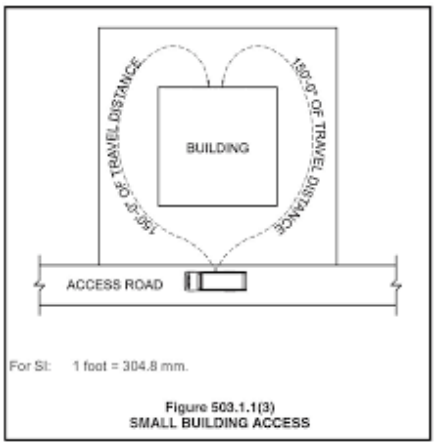
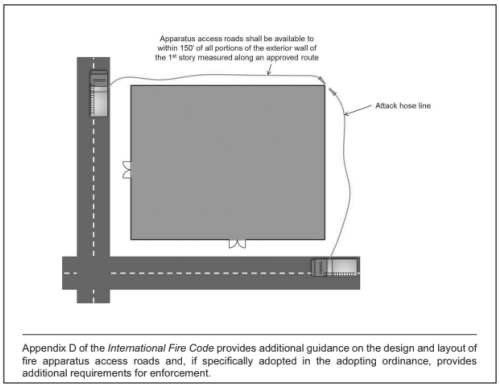


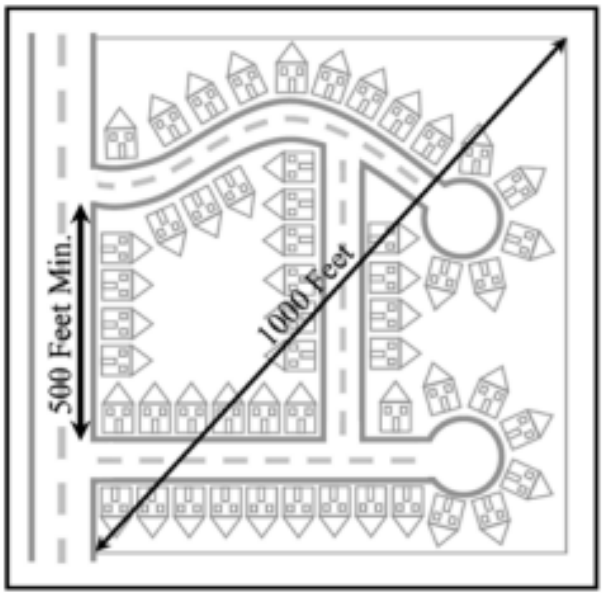
Figure 503.1.1(3)
SMALL BUILDING ACCESS



Appendix D of the *International Fire Code* provides additional guidance on the design and layout of fire apparatus access roads and, if specifically adopted in the adopting ordinance, provides additional requirements for enforcement.

MULTIPLE ACCESS ROADS SEPARATION/REMOTENESS

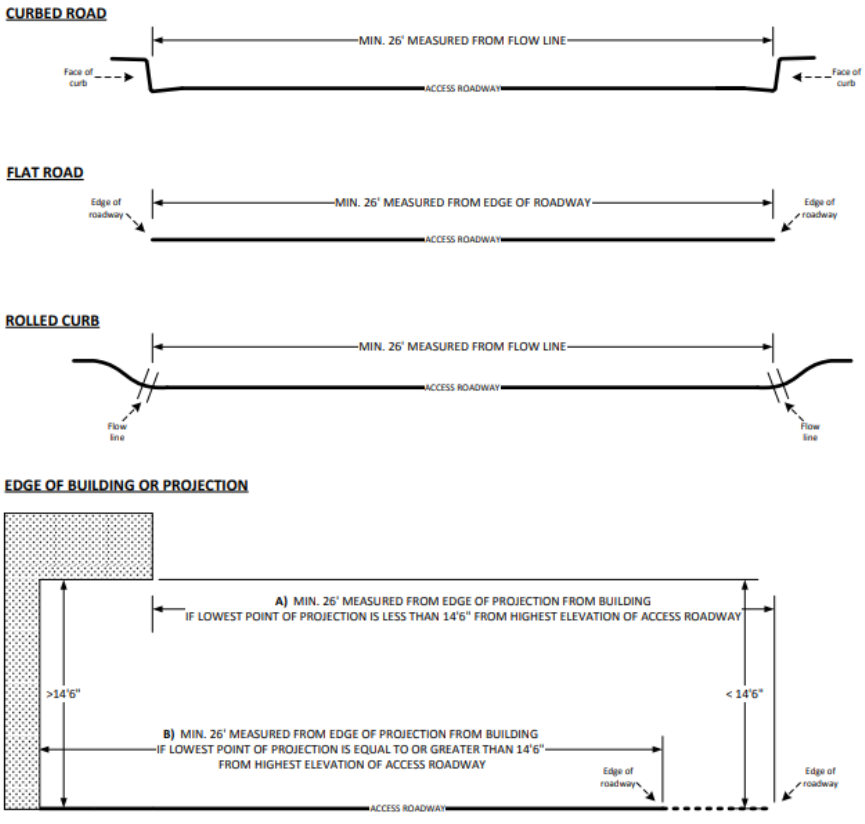
Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses. (IFC D104.3, D106.3) Any exceptions shall be approved in writing by the fire chief.



TURNING RADIUS

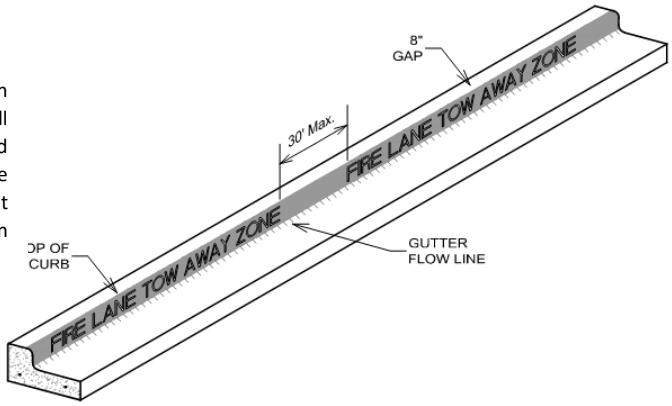
Fire apparatus access roads shall be designed with a minimum 25-foot inside turning radius and a minimum 50-foot outside turning radius, measured from the same center point. (IFC D103.3 as amended)

FIRE APPARATUS ACCESS ROAD DESIGN



FIRE APPARATUS ACCESS ROAD MARKINGS

NOTE:
Fire lane striping to be 6" wide red paint with "FIRE LANE TOW AWAY ZONE" in 4" tall white letters. Wording may not be spaced greater than 30' apart. Striping to be painted on the face of curb when present and painted flat on the parking surface when it is not.



Where required by the fire code official, fire apparatus access roads shall be marked as follows: Where curb and guttering exist, all of the fire apparatus access roads shall be painted red and be conspicuously and legible marked with the warning "FIRE LANE – TOW AWAY ZONE" in white letters and at least four inches tall, at intervals not exceeding 35 feet.

Where no curb and guttering exist, fire apparatus access roads shall be marked with permanent "FIRE LANE – TOW AWAY ZONE" signs at intervals not exceeding 50 feet. Signs shall have a minimum dimension of 12 inches wide by 18 inches high and have red letters on a white reflective background. Signs shall be posted on one side or both sides of the fire apparatus road. (IFC D103.6 as amended)

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.

ADDDITIONAL FIRE APPARATUS ACCESS ROADS – COMMERCIAL/INDUSTRIAL HEIGHT

Buildings exceeding 30 feet or 3 stories in height shall have at least two means of fire apparatus access for each structure. (IFC D104.1)

ADDITIONAL FIRE APPARATUS ACCESS ROADS – MULTIPLE-FAMILY RESIDENTIAL DEVELOPMENTS

Multiple family residential projects having more than 100 dwelling units shall be provided 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 an approved automatic sprinkler system in accordance with section 903.3.1.1, 903.3.1.2. (IFC D 106.1)

Projects having more than 200 dwelling units shall be provided with two separate and approved fire apparatus roads, regardless of whether they are equipped with an approved automatic sprinkler system. (IFC D106.2)

ANGLE OF APPROACH/GRADE FOR TURNAROUNDS AND INTERSECTIONS

Turnarounds shall be as flat as possible and have a maximum of 5% grade with the exception of crowning for water run-off. Intersections shall be level (maximum 5%) with the exception of crowning for water run-off. (IFC 503.2.8)

ANGLE OF APPROACH/GRADE FOR INTERSECTIONS

Intersections shall be level (maximum 5%) with the exception of crowning for water run-off. (IFC 503.2.8)

SURFACE AND LOAD BEARING CAPACITY OF FIRE APPARATUS ACCESS ROAD

Fire apparatus access roads shall be of an all-weather surface such as concrete, asphalt, or other approved driving surface capable of supporting the imposed load of fire apparatus weighing at least 85,000 pounds or the weight of the heaviest fire response apparatus, whichever is greater. (IFC D102.1)

AERIAL APPARATUS OPERATING GRADES

Portions of aerial apparatus roads that will be used for aerial operations shall be as flat as possible. Front to rear and side to side maximum slope shall not exceed 10%. (IFC D103.2)

AERIAL FIRE APPARATUS ACCESS ROADS

Buildings with a vertical distance between the grade plane and the highest roof surface that exceeds 30 feet in height shall be provided with a fire apparatus access road constructed for use by aerial apparatus with an unobstructed driving surface width of not less than 26 feet. For the purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of the parapet walls, whichever is greater. Any portion of the building may be used for this measurement, if it is accessible to firefighters and is capable of supporting ground ladder placement. (IFC D105.1).

AERIAL FIRE APPARATUS OPERATIONS

At least one of the required aerial access routes shall be located within a minimum of 15 feet and a maximum of 30 feet from the building and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial access road is positioned shall be the long side of a building. Overhead utility and power lines shall not be located over the aerial access road or between the aerial access road and the building. (IFC D105.3, D105.4)

HOSE PULL (DISTANCE FROM ENGINE TO BUILDING)

The dimension of 150 feet when used in relation to fire department access is commonly referred to as “hose pull distance.” Hose pull represents the amount of fire hose that firefighters must pull from the engine to reach the structure. This is the maximum distance that firefighters can effectively pull a fire hose or carry other equipment to combat a fire.

Hose pull may not exceed 150 feet from the apparatus to the most remote point of the perimeter of the structure. The hose pull distance is set at 150 feet due to a variety of factors, including standard hose lengths, weight of equipment, hydraulic properties, and accepted operational procedures. Hose pull is measured along the firefighter path of travel, avoiding obstacles, not “as the crow flies.”

HOSE LAY (DISTANCE FROM HYDRANT TO ENGINE)

Hose lay represents the amount of hose that must be laid out of the engine to supply water to the engine from the hydrant. Gates across fire lanes, topography, and other obstructions to firefighting and emergency operations affect hose lay requirements. No point along the portion of the fire lane serving the structure may be farther from a hydrant than the distance specified in IFC Table C102.1. (IFC C102.1, C103.1 as amended)

HYDRANT SPACING

Where required by Section 507.5.1, a minimum of one (1) hydrant within 300 feet of all portions of exterior walls (lowest point of fire department access). This measurement is taken around the perimeter of the building and down the access road to the hydrant (measurement not taken as a radius). Exception: The fire chief is authorized to accept an increase of up to 10 percent where existing fire hydrants provide all or a portion of the required fire hydrant service. (IFC C103.1 as amended)

TABLE C102.1
REQUIRED NUMBER AND SPACING OF FIRE HYDRANTS[h]

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c, f, g] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d, f, g]
1,750 or less	1	500	250
1,751–2,250	2	450	225
2,251–2,750	3	450	225
2,751–3,250	3	400	225
3,251–4,000	4	350	210
4,001–5,000	5	300	180
5,001–5,500	6	300	180
5,501–6,000	6	250	150
6,001–7,000	7	250	150
7,001 or more	8 or more[e]	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers that cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.

f. A 50-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Fire Code*.

g. A 25-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*.

h. The fire code official is authorized to modify the location, number and distribution of fire hydrants based on site-specific constraints and hazards.

GATES

The gate(s) shall be an electronic operating gate. Gate(s) shall be of the swinging or sliding type. A single gate serving two-way traffic shall be a minimum unobstructed width of 25 feet. When two gates are installed and each only serves one direction of travel, they shall have 15 feet of clear open width each. The gate control shall be operable with a Knox Gate Key Switch keyed for Travis County ESD No. 12 and identified with a KNOX sign. A manual override shall require that gates open fully until normal power is restored.

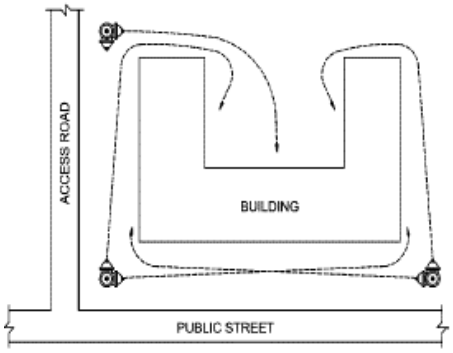
HYDRANT INSTALLATION

Fire hydrants must be installed with the center of the 4.5-inch steamer opening at least 18 inches above finished grade. The 4.5-inch opening must face the driveway or street and must be totally unobstructed to the street. Set back from the face of the hydrant to the back of the curb shall be in accordance with all applicable codes and standards. Note that on private property, set back shall be three (3) to six (6) feet to avoid vehicular damage, unless specifically approved by the fire chief. (IFC 102.2 as amended)

NUMBER OF FIRE HYDRANTS AND DISTRIBUTION

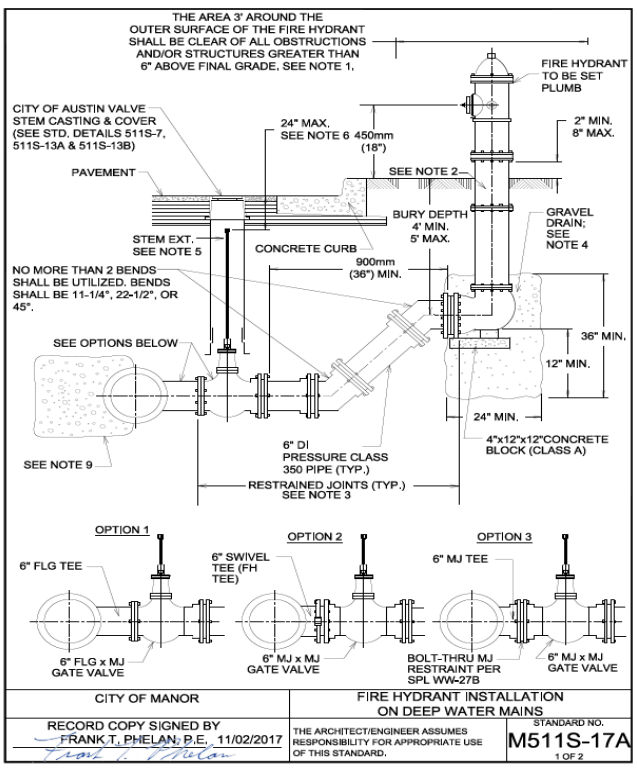
The minimum number and distribution of fire hydrants available to a building shall not be less than that listed in Table C 102.1. (IFC C102.1)

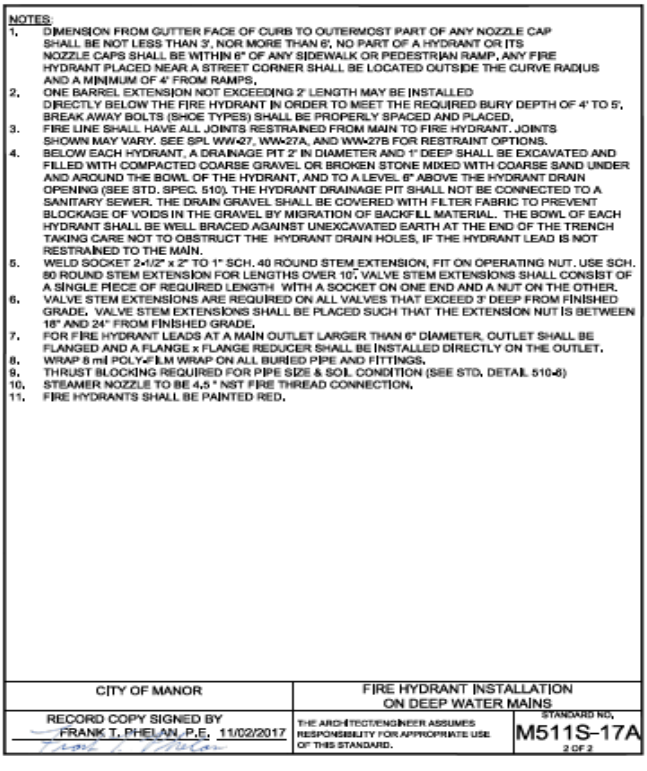
ALL PORTIONS OF EXTERIOR GROUND FLOOR SHALL BE WITHIN 300' OF A FIRE HYDRANT.



PRIVATE FIRE HYDRANTS

Private fire hydrants in the jurisdiction of Travis County ESD No. 12 shall conform with the City of Manor Standard No. M511S-17A. They shall be painted red in color.





REFLECTIVE FIRE HYDRANT MARKERS

Fire hydrant locations shall be identified by the installation of blue reflective markers. They shall be located adjacent and to the side of the center line of the access roadway that the fire hydrant is located on. In the case that there is no center line, then assume a center line and place the reflectors accordingly.

PHYSICAL PROTECTION OF FIRE HYDRANTS

Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (IFC 312, 507.5.6)

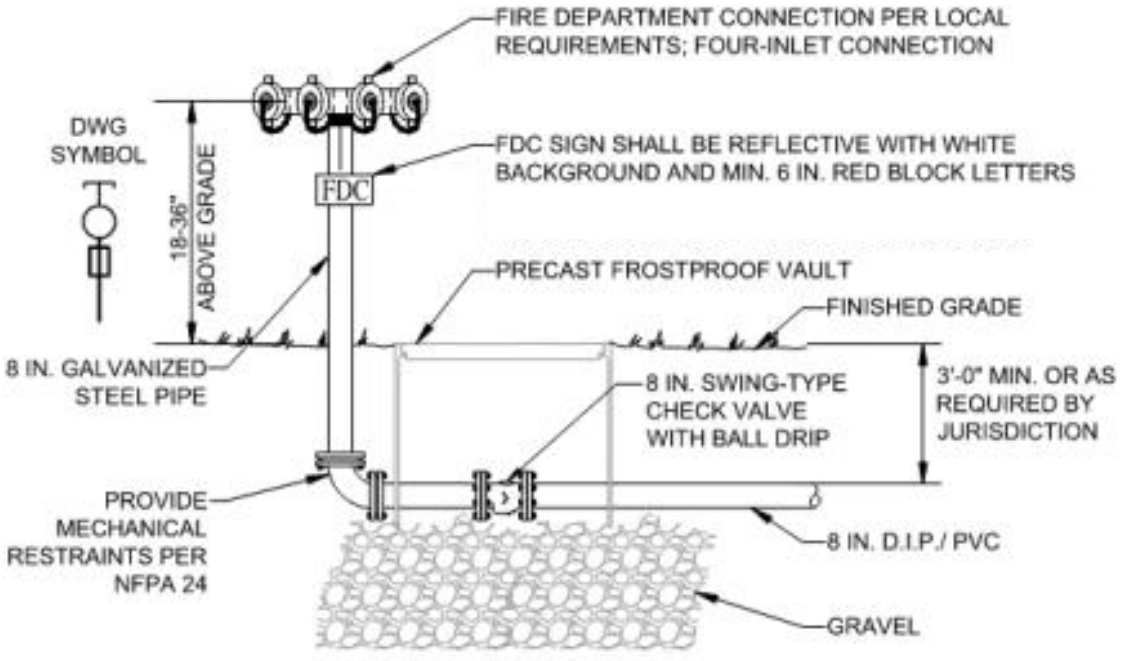
CLEAR SPACE AROUND FIRE HYDRANTS

A 3-foot clear space shall be maintained around the circumference of fire hydrants. (IFC 507.5.5)

FIRE DEPARTMENT CONNECTIONS (FDC)

FDC's shall be in accordance with the following:

- The FDC(s) shall be located so that when in-use, the fire apparatus and hose connections to the FDC and to the supply hydrant will not obstruct access to the building for other fire apparatus. (IFC 912.2)
- FDC(s) shall be located on street side of building or facing approved apparatus access roads. (IFC 912.2.1)
- The FDC(s) shall be within 100 feet of a fire hydrant as required locally. (IFC 912.2)
- The FDC(s) shall be wall-mounted on the building it serves or be remotely located (IFC 912.2)
- FDC(s) shall be installed at a height between 24 inches and 48 above grade (IFC 912.2.1)
- The FDC(s) shall be fully visible, and recognizable from the street or nearest point of the fire department vehicle access or as otherwise approved (IFC 912.2.1)
- Where the FDC(s) is/are subject to impact by a motor vehicle, bollards or other vehicle impact protection must be provided in accordance with IFC 312. (IFC 912.4.3)
- The FDC(s) shall be provided with Knox Locking Caps as required locally. (IFC 912.4.1)
- For concrete tilt wall buildings, a remote FDC shall be required.
- All signage for remote FDC shall comply with Travis County ESD No. 12 requirements.
- It is preferred that the remote FDC be located at a distance away from the building of at least 1.5x the building height and the preferred location is one of the corners of the building.
- System demand of 500 GPM more or less: Minimum pipe size of 4 inches, two-inlet connection required
- System demand of 501 to 750 GPM: Minimum pipe size of 6 inches, three-inlet connection required
- System demand greater than 750 GPM: Minimum pipe size of 8 inches, four-inlet connection required
- Installation of remote FDC shall follow the schematic below:



TOWNHOUSE/TOWNHOMES

A townhouse (townhome) is defined as a single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from the foundation to the roof. A townhouse (townhome) development does not permit for a common attic space.

The fire-resistance rated wall or assembly separating townhouse units shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly.

The common wall between townhouses shall be constructed in accordance with Section R302.2(2) if an automatic residential fire sprinkler system is not installed. The fire-rating of the common wall may be reduced in accordance with Section R302.2(1) if an automatic residential fire sprinkler system is installed in townhouses.

3 or more townhouse units under the same roof shall require at a minimum a NFPA 13D fire sprinkler system to be installed.

TABLE B105.1(1) REQUIRED FIRE FLOW FOR ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

FIRE-FLOW CALCULATION AREA (square feet)	AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
0–3,600	No automatic sprinkler system	1,000	1
3,601 and greater	No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2) at the required fire-flow rate
0–3,600	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	500	1/2
3,601 and greater	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	1/2 value in Table B105.1(2)	1

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m.

TRAFFIC CALMING DEVICES

These guidelines apply to private streets within the jurisdiction of Travis County ESD No. 12 to which emergency response my be necessary. The information pertaining to traffic calming devices is intended to assist the applicant in attaining compliance and to ensure that privately owned roadways necessary for emergency response purposes will be always available for use and will not be obstructed in a way that increases the response times beyond 5 minutes.

The following definitions are provided to facilitate the consistent application of this guideline, and to provide alternative ideas when applying for traffic calming measurements.

Fire Department Access Roads - The means for emergency apparatus to access a facility or structure for emergency purposes. Roadways must extend to within 150 feet of all portions of the exterior of the first floor of any structure and must meet specified criteria for width, pavement characteristics, roadway gradient, turning radius, etc. Fire apparatus access roads are also referred to as fire lanes.

Speed Humps – Raised traffic calming devices that are constructed to a height of 3 inches plus or minus ¼ inch at the midpoint. They are parabolic in shape and are placed across the road to slow traffic. Speed humps are the most popular calming measure in the United States. Speed humps are constructed of asphalt and are 12 feet in length to provide a gradual lift to the highest point.

Speed Cushions – These devices are designed as small, raised traffic calming devices 6 feet in width. The first speed cushion is constructed/installed along the center of the street with a few speed cushions constructed/installed adjacent from curb to curb, with a minimum of 2 feet between the cushions so that a fire engine can straddle them (fire engines will primarily straddle the center speed cushion to allow for maximum clearance on either side). By straddling the cushion, the fire engine is minimally impacted by the cushion and can maintain speed while traveling to the emergency. The speed cushions can be purchased as a ready-made rubber product or constructed out of asphalt (or any material that can support the imposed loads of Travis County ESD No. 12 fire apparatus with a total weight of 85,000 pounds. They are 7 feet in length to provide a less gradual lift making it necessary for residential vehicles to reduce their speed while traversing them.

Gates and Barriers - Devices that restrict pedestrian and vehicle ingress and egress to and from a facility.

Radar Speed Signs - A permanent sign adjacent to the roadway that displays the speed of oncoming vehicles using highly visible LED's to make motorists aware when they are driving at unsafe speeds.