BEND FIRE & RESCUE

FIRE CODE APPLICATION GUIDE

Prevention Division

This guide is intended to aid in the application of the fire code in all areas served by Bend Fire & Rescue.

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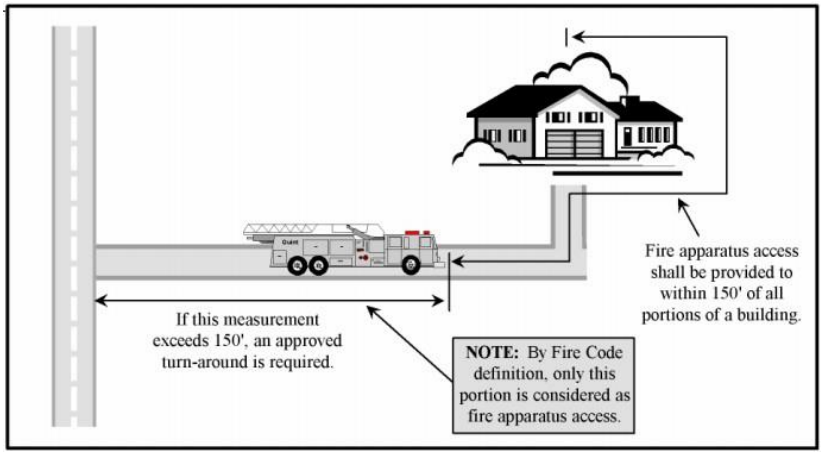
NEW CONSTRUCTION FIRE CODE APPLICATION GUIDE

FIRE APPARATUS ACCESS

Fire Apparatus Access Road Distance From Building And Turnarounds:

Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building (OFC 503.1.1).

An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet (OFC 503.2.5).



Fire Apparatus Access Road Exceptions:

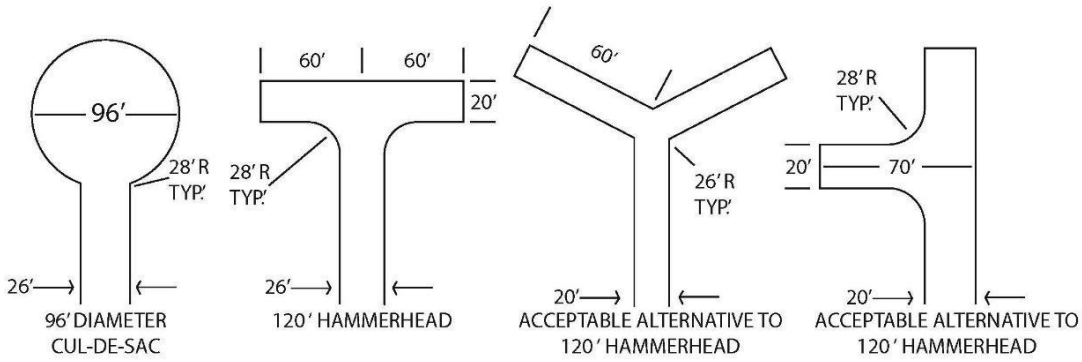
The requirements for fire apparatus access may be modified as approved by the Fire Marshal where any of the following apply (OFC 503.1.1 Exception):

1) Buildings are equipped throughout with an approved automatic fire sprinkler system (the approval of this alternate method of construction shall be accomplished in accordance with the provisions of ORS 455.610(5)).
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.
   NOTE: Under this condition, a deed restriction will be recorded for the parcel in question to indicate that emergency vehicle access does not conform to the requirements of the Oregon Fire Code and as such, this condition makes the delivery of fire and life safety emergency services by the local fire department not possible within a timeframe that allows for efficient emergency scene mitigation.
3) There are not more than two Group R-3 or Group U occupancies.

Dead End Roads:

Dead-end fire apparatus roads in excess of 150 feet in length shall be provided with an approved area for turning around fire apparatus. Dead-end fire apparatus roads in excess of 500 or 750 feet in length are subject to the requirements of OFC Appendix D Table D103.4. Diagrams of approved turnarounds are shown below (OFC 503.2.5 Appendix D):

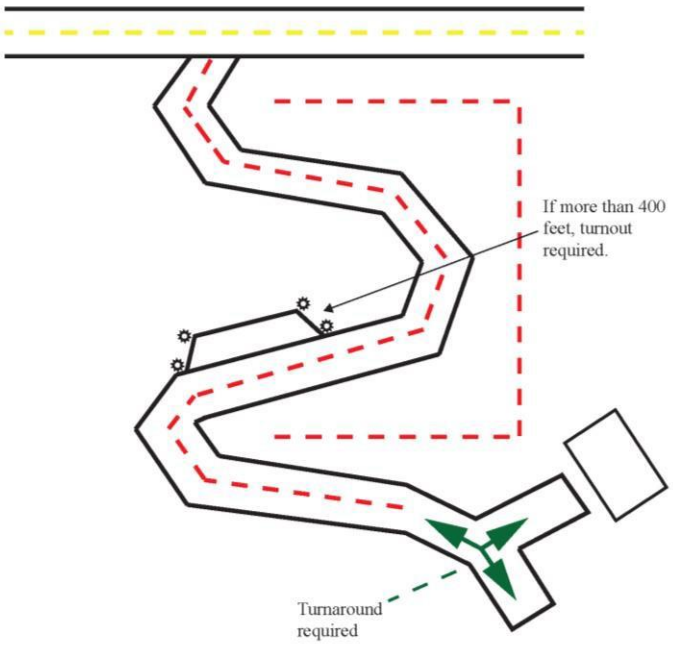
DEAD END TURNAROUNDS



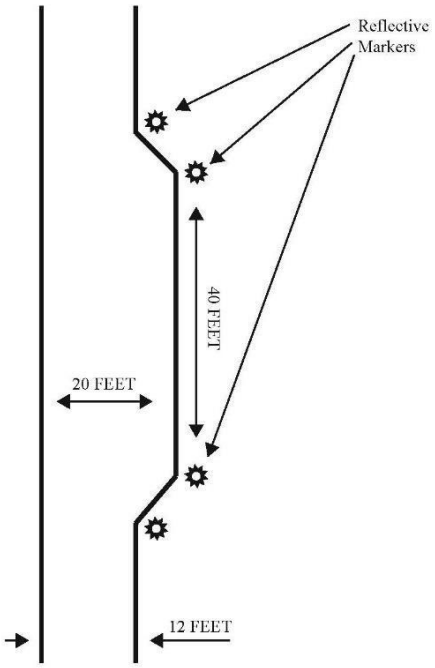
Turnouts:

When a fire apparatus access road exceeds 400 feet in length, turnouts 20 feet wide and 40 feet long shall be provided in addition to the required road width and shall be placed no more than 400 feet apart, unless otherwise approved by the Fire Marshal. These distances may be adjusted based on visibility and sight distances. Fire access roads in excess of 500 feet but not more than 750 feet shall be 26 feet in width and shall have approved turnarounds per table D103.4 of the Oregon Fire Code. Fire access roads in excess of 750 feet require Fire Marshal approval.

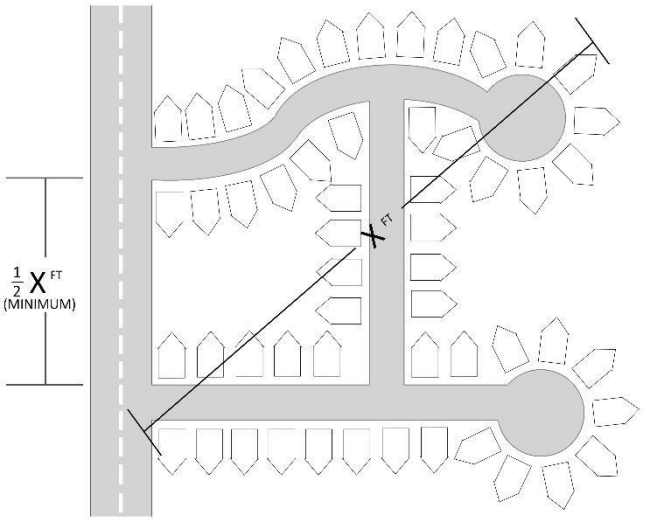
EXAMPLE:



Multiple Access Roads:



Developments of one- and two-family dwellings where the number of dwelling units exceeds 30, multiple-family residential projects having more than 100 dwelling units and where vehicle congestion, adverse terrain conditions or other factors that could limit access, as determined by the Fire Marshal, shall be provided with not less than two approved means of access. Exceptions may be allowed for approved automatic sprinkler systems. The approval of fire sprinklers as an alternative shall be accomplished in accordance with the provisions of ORS 455.610(6) (OFC D106 & D107).

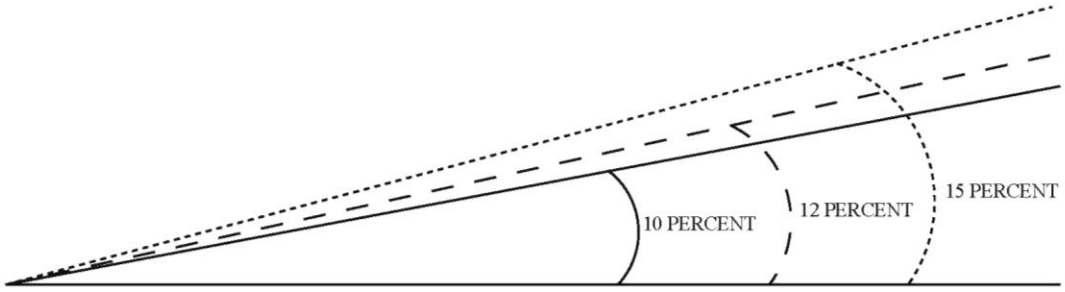


Multiple Access Roads Separation:

Where two access roads are required, they shall be placed a distance apart equal to not less than one half the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses (OFC D104.3 & D107.1).

Grade:

Fire apparatus access roads shall not exceed 10 percent in grade with fire marshal approval.



Drainage:

When subject to run-off damage, access roads shall be provided with approved drainage (OFC D103.2.1).

Fire Apparatus Access Road Width And Vertical Clearance:

Fire apparatus access roads shall have an unobstructed width of not less than 20 feet, exclusive of shoulders, except for approved security gates in accordance with OFC Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches. When serving two or fewer single-family dwellings and accessory buildings the driving surface may be reduced to 12 feet in width, although the 20 feet unobstructed width shall remain.

Aerial Fire Apparatus Road Widths:

Buildings more than 30 feet in height shall have fire apparatus access roads constructed for use by aerial apparatus with an unobstructed driving surface width of not less than 26 feet (OFC 105.2).

Surface And Load Capacities:

Fire apparatus access roads shall be of an all-weather surface, asphalt, concrete or other approved driving surface capable of supporting the imposed load of fire apparatus weighing up to 75,000 pounds, that is easily distinguishable from the surrounding area. Documentation from a registered engineer that the final construction is in accordance with approved plans or the requirements of the Fire Code may be requested (OFC D102.1).

Turning Radius:

The inside turning radius and outside turning radius shall not be fewer than 28 feet and 48 feet respectively, measured from the same center point (OFC 503.2.4 & Appendix D103.3).

Gates:

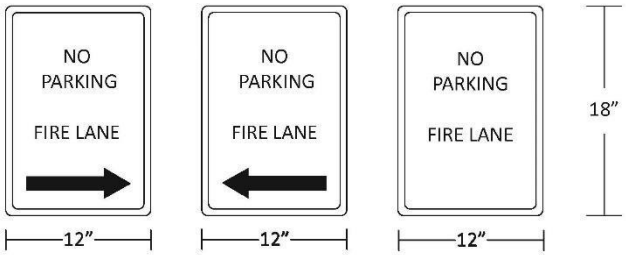
Gates securing fire apparatus roads shall comply with all of the following (OFC D103.5):

- Minimum unobstructed width shall be 20 feet.
- Gates serving one- or two-family dwellings shall be a minimum of 12 feet in width.
- Gates shall be set back at a minimum of 30 feet from the intersecting roadway.
- Gates shall be of the swinging or sliding type.
- Manual operation shall be capable by one person.
- Electric gates shall be equipped with a means for operation by fire department personnel for emergency access.
- Locking devices shall be approved and shall incorporate the Knox Box Rapid Entry System.

An approved lock shall be installed on all commercial AND residential locking gates or similar barriers. Electric gates shall be equipped with a red fire access box equipped with a micro switch. The access box shall be secured using a model 3782 Knox exterior padlock with a 2” shackle. Orders can be made directly from Knox Box at their website, www.knoxbox.com. Please reference the appropriate Bend zip code for all orders (OFC 506.1).

No Parking Signs:

Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, “No Parking” signs shall be installed at 50-foot intervals on one or both sides of the roadway and in turnarounds. Roads 26 feet wide or less shall have signs posted on both sides at 50-foot intervals as a fire lane. Roads 26 feet to 32 feet wide shall have signs posted at 50-foot intervals on one side as a fire lane.



Signs shall read “NO PARKING – FIRE LANE” and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white, reflective background (OFC D103.6).

Markings:

Where required by the Fire Marshal, approved signs or other approved notices or markings that include the words “NO PARKING – FIRE LANE” shall be provided for fire apparatus access roadways to identify such roads or prohibit the obstruction thereof. The means by which fire lanes are designated shall be maintained in a clean and legible condition at all times and be replaced or repaired when necessary to provide adequate visibility.

FIREFIGHTING WATER SUPPLIES

Commercial Buildings – Fire Flow:

The required fire flow for the building shall not exceed 3,000 gallons per minute (GPM) or the available GPM in the water delivery system at 20 psi, whichever is less (OFC 507.3 & Appendix B).

NOTE: In a municipal system, available GPM in the water delivery system at 20 psi shall be determined by the City Engineer of the municipality.

Single Family Dwellings – Required Fire Flow:

The minimum available fire flow for one- and two-family dwellings served by a municipal water supply shall be 1,000 gallons per minute. If the structure(s) is(are) 3,600 square feet or larger, the required fire flow shall be determined according to OFC Appendix B (OFC B105.1 & B105.2).

Rural Buildings – Required Fire Flow:

Required fire flow for rural and suburban areas in which adequate and reliable water supply systems do not exist shall be calculated in accordance with National Fire Protection Association Standard 1142. Please contact the Fire Marshal’s office for special assistance and other requirements that may apply (OFC B107.1).

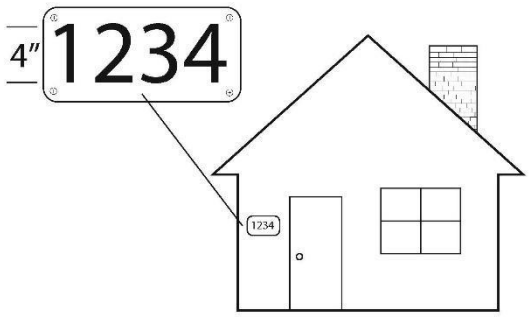
Access And Fire Fighting Water Supply During Construction:

Approved fire apparatus access roadways and firefighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site (OFC 501.4).

PREMISE IDENTIFICATION

Premise Identification:

Buildings shall have address numbers or approved identification placed in a position that is plainly legible and visible from the access road fronting the property. Numbers shall contrast with their background and shall be a minimum of 4 inches high with a minimum stroke width of ½ inch (OFC 505.1). Size of the numbers shall be relative to the size of the building.



Premise Identification For Multi-Family Complexes:

Sites containing multi-family complexes shall have one street address per building. Buildings shall be addressed so that they are identifiable from any point within the complex.

The following table shall be utilized to address each dwelling unit within a multi-family complex:

1st Floor	101 - 199
2nd Floor	201 - 299
3rd Floor	301 - 399
4th Floor	401 - 499, etc.

Each successive floor and building will follow the above pattern. For complexes that exceed 100 dwelling units on a single floor level, the dwelling unit numbers shall increase from three digits to four digits and expand on the above pattern for identification. The first digit represents the floor level of the unit.

Each entrance to the complex shall be provided with a graphical map representing the layout of the buildings within the complex. Any graphical map shall represent the orientation of the complex as viewed from its vantage point. Each building on the map shall contain its address designation and the range of dwelling units on each floor in each building.

FIRE HYDRANTS

Fire Hydrants – Commercial Buildings:

Where a portion of the building is more than 400 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the building, on-site fire hydrants and mains shall be provided (OFC 507.5.1).

Note: The distance may be increased to 600 feet for buildings equipped throughout with an approved automatic sprinkler system.

Fire Hydrants – One- And Two- Family Dwellings & Accessory Structures:
Where a portion of a structure is more than 600 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), on-site fire hydrants and mains shall be provided (OFC 507.5.1).

Fire Hydrant Number And Distribution:
The minimum number and distribution of fire hydrants available to a building shall not be fewer than that listed in Table C 102.1 of the Oregon Fire Code (OFC Appendix C).

Fire Hydrant Locations:
When evaluating the placement of hydrants at an apartment, commercial, or industrial complexes, the first hydrant(s) to be placed shall be at the main entrance and any secondary access to the site. After these hydrants have been placed, the other hydrants shall be sited to meet the requirements for spacing and minimum number of hydrants.

Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway.

Fire Hydrant/Fire Department Connection:
Fire Department Connections (FDCs) shall be installed in accordance with the NPFA standard applicable to the system design and shall comply with Sections 912.2 through 912.7.

FDCs shall be remote from the protected structure when possible and shall be located within 50 feet of a fire hydrant. Fire hydrants required for an FDC shall be located on the same side of the street as the FDC.

Each building shall be provided with its fire department connection unless approved by the Fire Marshal.

FDC locations shall be approved by the Fire Marshal.

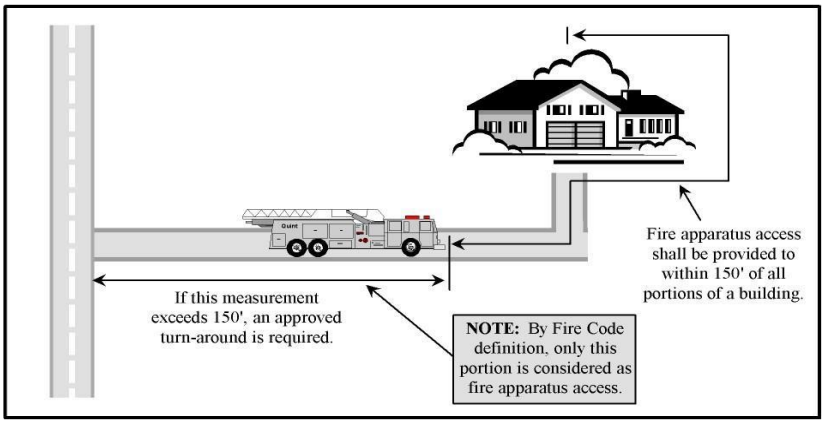
Fire Hydrant/Fire Department Connection Clearance:
A 3-foot clear space shall be maintained around the circumference except as otherwise required or approved. No parking within 10 feet and no closer than 4 feet from any supporting structure for electrical equipment such as transformers and poles (OFC 507.5.5 & 912.4).

Fire Code Application Guide for Commercial and Multi-Family Development

FIRE APPARATUS ACCESS

Fire Apparatus Access Road Distance From Buildings And Facilities:

Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility. An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet. (OFC 503.1.1)



Access Road Exceptions:

The requirements for fire apparatus access may be modified as approved by the fire code official where any of the following apply: (OFC 503.1.1 Exception)

1. Buildings are equipped throughout with an approved automatic fire sprinkler system (the approval of this alternate method of construction shall be accomplished in accordance with the provisions of ORS 455.610(5).
2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, non-negotiable grades, or other similar conditions, and an approved alternative means of fire protection is provided.

Premises Identification:

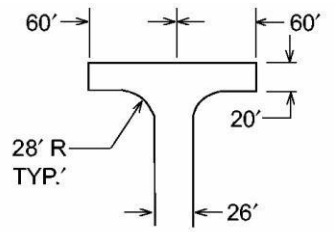
New and existing buildings shall have approved address numbers; building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property, including monument signs. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 1/2 inch. (OFC 505.1)

Access During Construction:

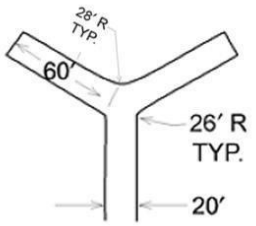
Approved fire apparatus access roadways shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. Temporary address signage shall also be provided during construction. (OFC 3309 and 3310.1)

Dead End Roads And Turnarounds

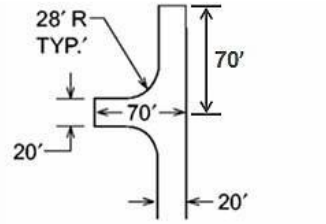
Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround. Diagrams of approved turnarounds are shown below: (OFC 503.2.5 & D103.1)



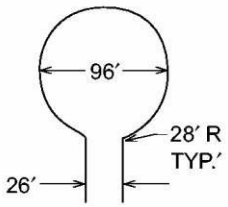
120′ HAMMERHEAD



60-FOOT "Y"



ACCEPTABLE ALTERNATIVE
TO 120′ HAMMERHEAD



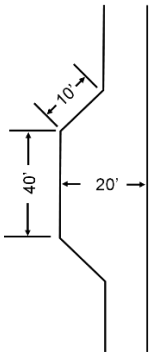
96′ DIAMETER
CUL-DE-SAC

Turning Radius:

The inside turning radius and outside turning radius shall not be less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & D103.3)

Turnouts:

Where access roads are less than 20 feet and exceed 400 feet in length, turnouts 20 feet wide and 40 feet long are required. (OFC 503.2.2)



TURNOUT

Additional Access Roads – Commercial/Industrial Height:

Buildings exceeding 30 feet in height or three stories in height shall have at least two separate means of fire apparatus access. (D104.1)

Additional Access Roads – Commercial/Industrial Square Footage:

Buildings or facilities having a gross building area of more than 62,000 square feet shall have at least two approved separate means of fire apparatus access. Exception: Projects having a gross building area of up to 124,000 square feet that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems. (OFC D104.2)

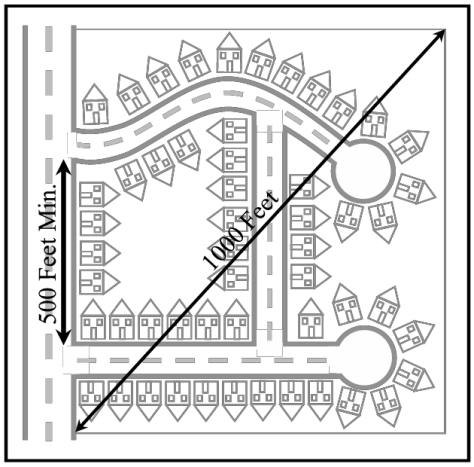
Additional Access Roads – Multi-Family Residential Developments:

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. 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. (OFC D106)

Multiple Access Roads Separation:

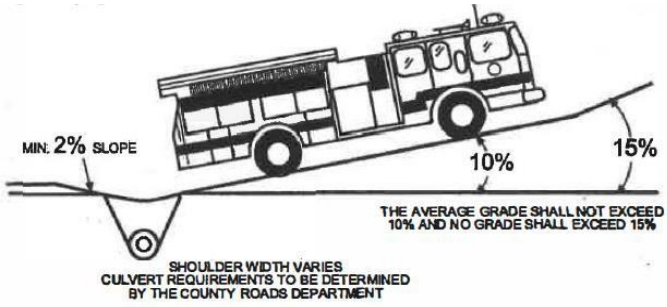
Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the area to be served (as identified by the Fire Code Official), measured in a straight line between accesses. (OFC D104.3)



Exception: Buildings equipped throughout with an approved automatic fire sprinkler system (the approval of this alternate method of construction shall be accomplished in accordance with the provisions of ORS 455.610(5).

Access Road Grade:

Fire apparatus access roadway grades shall not exceed 10%. Alternate methods and materials may be available at the discretion of the Fire Marshal (for grade exceeding 10%).



Angle Of Approach/Grade For Turnarounds:

Turnarounds shall be as flat as possible and have a maximum of 5% grade with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)

Angle Of Approach/Grade For Intersections:

Intersections shall be level (maximum 5%) with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)

Aerial Apparatus Operating Grades:

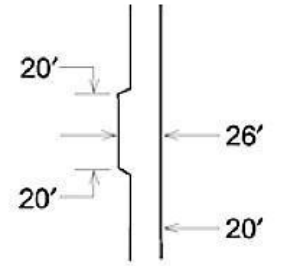
Portions of aerial apparatus roads that will be used for aerial operations shall be as flat as possible. Front to rear and side to side maximum slope shall not exceed 10%.

Fire Apparatus Access Road Width And Vertical Clearance:

Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants) and an unobstructed vertical clearance of not less than 13 feet 6 inches. (OFC 503.2.1 & D103.1)

Fire Apparatus Access Roads With Fire Hydrants:

Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet and shall extend 20 feet before and after the point of the hydrant. (OFC D103.1)



MINIMUM CLEARANCE AROUND A FIRE HYDRANT

Aerial Fire Apparatus 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, provided that it is accessible to firefighters and is capable of supporting ground ladder placement. (OFC D105.1, D105.2)

Aerial 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 approved by the fire code official. Overhead utility and power lines shall not be located over the aerial access road or between the aerial access road and the building. (D105.3, D105.4)

Surface And Load Capacities:

Fire apparatus access roads shall be of an all-weather surface that is easily distinguishable from the surrounding area and is capable of supporting not less than 75,000 pounds live load (gross vehicle weight). Documentation from a registered engineer that the final construction is in accordance with approved plans or the requirements of the Fire Code may be requested. (OFC 503.2.3)

Bridges:

Private bridges shall be designed and constructed in accordance with the State of Oregon Department of Transportation and American Association of State Highway and Transportation Officials Standards *Standard Specification for Highway Bridges.* A building permit shall be obtained for the construction of the bridge if required by the building official of the jurisdiction where the bridge is to be built. The design engineer shall prepare a special inspection and structural observation program for approval by the building official. The design engineer shall give, in writing; final approval of the bridge to the fire district after construction is completed. Maintenance of the bridge shall be the responsibility of the party or parties that use the bridge for access to their property. The fire district may at any time, for due cause, ask that a registered

engineer inspect the bridge for structural stability and soundness at the expense of the property owner(s) the bridge serves. Vehicle load limits shall be posted at both entrances to bridges when required by the fire code official. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces which are not designed for such use, approved barriers, approved signs or both shall be installed and maintained when required by the fire code official. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces which are not designed for such use, approved barriers, approved signs or both shall be installed and maintained when required by the fire code official. (OFC 503.2.6)

Gates:

Gates securing fire apparatus roads shall comply with all of the following (OFC D103.5, and 503.6): 1. Minimum unobstructed width shall be not less than 20 feet (or the required roadway surface width)

1. Gates serving three or less single-family dwellings shall be a minimum of 12 feet in width.
2. Gates shall be set back at minimum of 30 feet from the intersecting roadway or as approved.
3. Electric gates shall be equipped with a means for operation by fire department personnel
4. Electric automatic gates shall comply with ASTM F 2200 and UL 325.

Electric gates shall be equipped with a red fire access box equipped with a micro switch. The access box shall be secured using a model 3782 Knox exterior padlock with a 2" shackle. Orders can be made directly from Knox Box at their website, www.knoxbox.com. Please reference the appropriate Bend zip code for all orders (OFC 506.1).

Bollards:

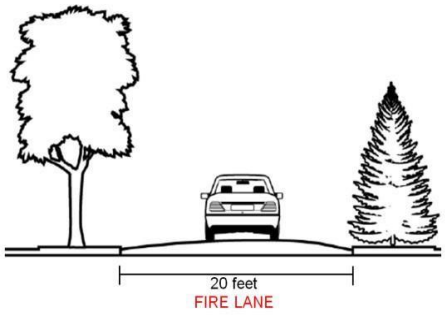
Where secondary fire access roads are required, they shall be secured utilizing a removable bollard. The *fire code official* is authorized to require the installation and maintenance of gates or other *approved* barricades across fire apparatus access roads, trails or other accessways, not including public streets, alleys or highways. The MaxiForce Removable Bollard MRRW-RS1-R, MRRW-RS2-R, MRSW-SS1-R, MRSW-SS2-R and MRSW-SS3-R are approved for use. maxiforcebollards.com (OFC 503.5)

No Parking:

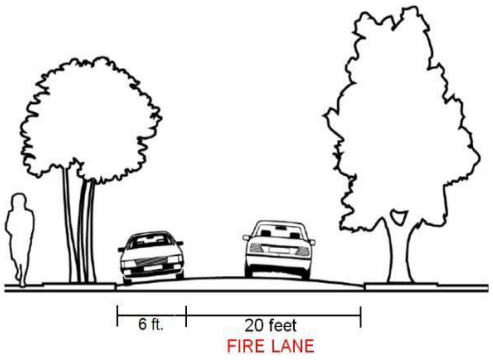
Parking on fire access roads shall be as follows (OFC D103.6.1-2):

1. 20-26 feet road width – no parking on either side of roadway
2. 26-32 feet road width – parking is allowed on one side
3. Greater than 32 feet road width – parking is not restricted

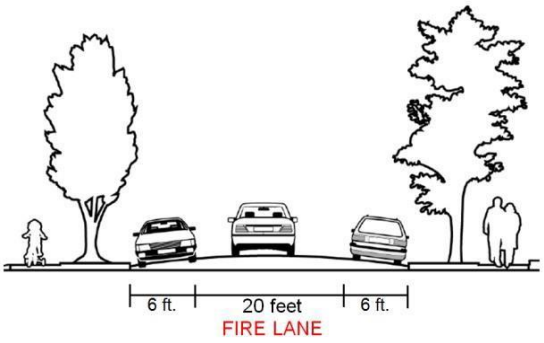
Parking prohibited on either side



Parking prohibited on one side only



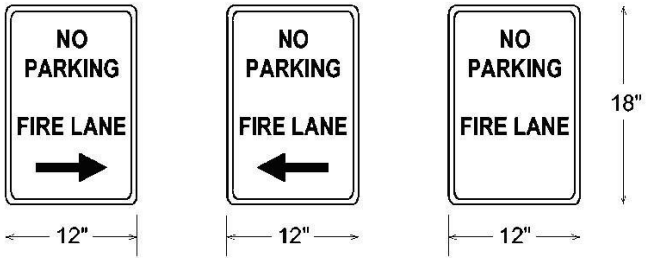
Parking permitted on both sides



No Parking Signs:

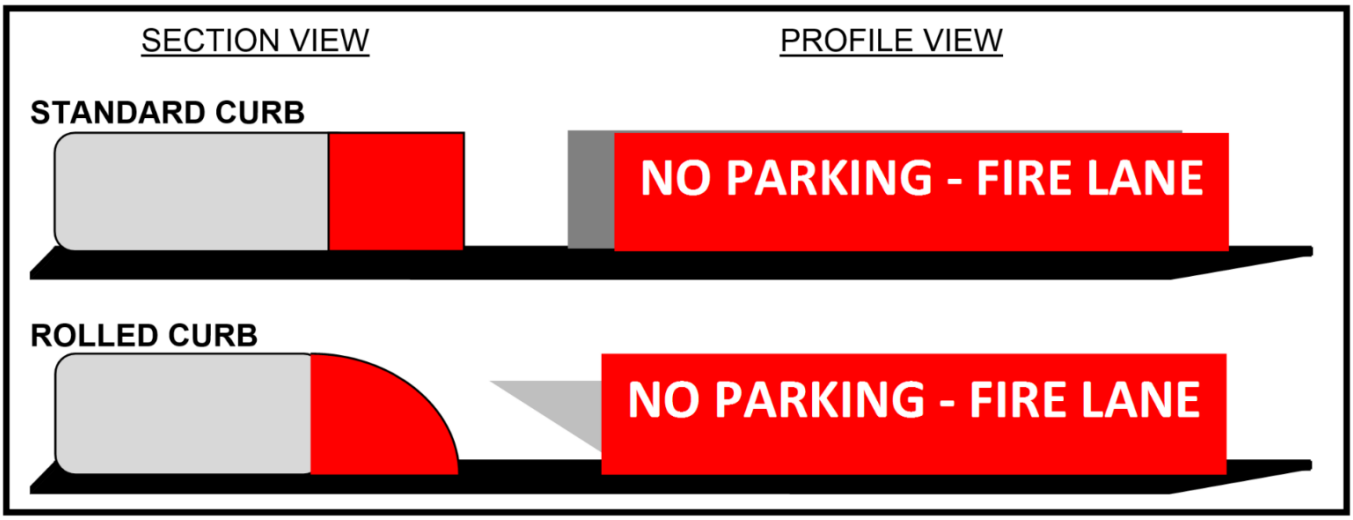
Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, “No Parking” signs shall be installed on one or both sides of the roadway and in turnarounds as needed.

Signs shall read “NO PARKING - FIRE LANE” and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)



Painted Curbs:

Where required, fire apparatus access roadway curbs shall be painted red (or as approved) and marked “NO PARKING FIRE LANE” at 25 foot intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background (or as approved). (OFC 503.3)



BUILDING ACCESS AND FIRE SERVICE FEATURES

Key Box:

A Knox Box for building access may be required for structures and gates. See Appendix C for further information and detail on required installations. Order via www.knoxbox.com or contact Bend Fire & Rescue for assistance and instructions regarding installation and placement. (OFC 506.1)

Utility Identification:

Rooms containing controls to fire suppression and detection equipment shall be identified as "Fire Control Room." Signage shall have letters with a minimum of 4 inches high with a minimum stroke width of 1/2 inch, and be plainly legible, and contrast with its background. (OFC 509.1)

Fire Extinguishers:

Portable fire extinguishers shall be selected, installed and maintained in accordance with (OFC 906.2) and NFPA 10.

FIREFIGHTING WATER SUPPLIES

Commercial Buildings – Required Fire Flow:

The minimum fire flow and flow duration for buildings other than one- and two-family dwellings shall be determined in accordance with residual pressure (OFC Table B105.2). The required fire flow for a building shall not exceed the available GPM in the water delivery system at 20 psi.

Note: OFC B106, Limiting Fire-Flow is also enforced, except for the following:

- In areas where the water system is already developed, the maximum needed fire flow shall be either 3,000 GPM or the available flow in the system at 20 psi, whichever is greater.
- In new developed areas, the maximum needed fire flow shall be 3,000 GPM at 20 psi.

Fire Flow Water Availability:

Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the

floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests will be accepted if they were performed within 5 years as long as no adverse modifications have been made to the supply system. Water availability information may not be required to be submitted for every project. (OFC Appendix B)

Rural Commercial Buildings - Required Fire Flow:

Commercial structures greater than 3600 ft^2 in rural and suburban areas where adequate and reliable water supply systems do not exist shall require fire flow to be calculated in accordance with National Fire Protection Association Standard 1142, 2017 Edition. (OFC B107)

- When a building is required to provide an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 (NFPA 13) & 903.3.1.2 (NFPA 13R), a credit of 75% shall be allowed on the volume of water supply required for firefighting.
    - Firefighting water supply reductions shall not reduce the minimum volume of water required for sprinkler system operation per NFPA 13.
    - When serving a fire sprinkler system, firefighting water supplies that are required to have, or voluntarily designed with, a standpipe, draft port, or hydrant(s) must include the hose stream demand (volume) for inside/outside allowances per NFPA 13.
- The calculated firefighting water supply will be waived when structures are voluntarily protected by an approved automatic fire sprinkler system when otherwise not required by the Oregon Structural Specialty Code.
    - Voluntarily installed fire protection sprinkler systems will not require a drafting port. The system's demand will solely delineate the volume of water required per NFPA 13.

Note: See Application Guide Appendix A for further information and detail.

Water Supply During Construction:

Approved firefighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 3312.1)

FIRE HYDRANTS

Fire Hydrants – Commercial Buildings:

Where a portion of the building is more than 400 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the building, on-site fire hydrants and mains shall be provided. (OFC 507.5.1)

- This distance may be increased to 600 feet for buildings equipped throughout with an approved automatic sprinkler system.
- The number and distribution of fire hydrants required for commercial structure(s) is based on Table C105.1, following any fire-flow reductions allowed by section B105.3.1. Additional fire hydrants may be required due to spacing and/or section 507.5.1 of the Oregon Fire Code.

Fire Hydrant Number And Distribution:

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

TABLE C102.1
NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a,b,c] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d]
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 which can be crossed by firefighters 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 up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.

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.

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

Fire Hydrant(S) Placement: (OFC C104)

- Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants. (OFC 507.5.1)
- Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the fire code official.
- Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets may be considered when approved by the fire code official.
- Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the fire code official.

Fire Hydrant Distance From An Access Road:

Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the fire code official. (OFC C102.1)

Dead End Fire Lines:

Private fire service lines serving onsite fire hydrants that exceed 300 feet in length shall be looped. (NFPA 24)

Private Fire Hydrant Identification:

Private fire hydrants shall be painted red in color and shall have the port chains removed. (OFC 507)

Physical Protection:

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

Clear Space Around Fire Hydrants:

A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)

Fire Department Connection (Fdc) Locations:

FDCs shall be located within 50 feet of a fire hydrant (or as approved). Hydrants and FDC's shall be located on the same side of the fire apparatus access roadway or drive aisle, fully visible, and recognizable from the street or nearest point of the fire department vehicle access or as otherwise approved. (OFC 912.2.1 & NFPA 13)

- Fire department connections (FDCs) shall normally be located remotely and outside of the fall-line of the building when required. FDCs may be mounted on the building they serve, when approved.
- FDCs shall be plumbed on the system side of the check valve when sprinklers are served by underground lines also serving private fire hydrants (as diagramed below).
- FDC shall be a minimum height of 18" to a maximum height of 48".
- The fire service vault shall be heated and monitored and equipped with a sump pump.

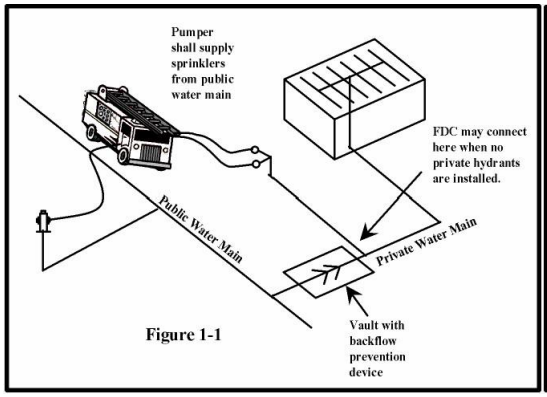


Figure 1-1

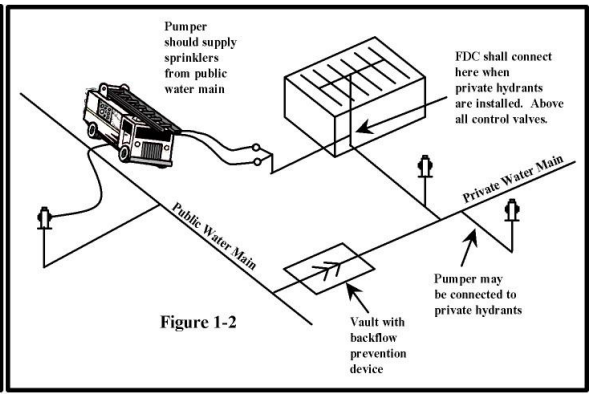


Figure 1-2

APPENDIX

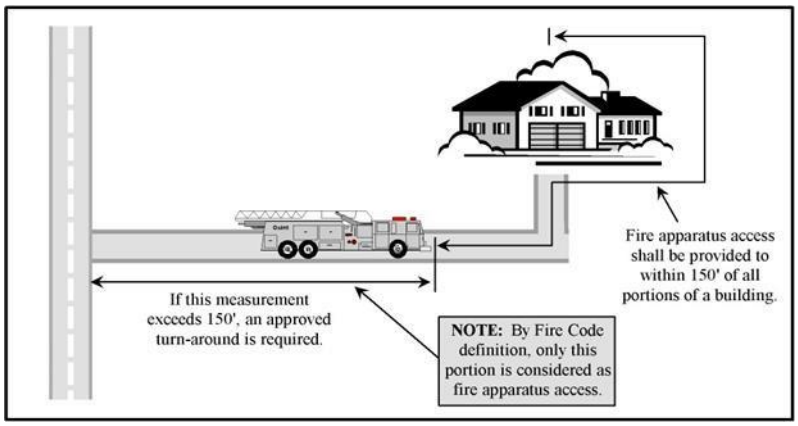
A) Key Boxes - Policy
B) Agricultural Building and Equine Facility Exemption - Policy

Fire Code Application Guide for One- and Two-Family Residential Developments

FIRE APPARATUS ACCESS

Fire Apparatus Access Road Distance From Buildings And Facilities:

Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility. An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet. (OFC 503.1.1)



Fire Apparatus Access Road Width And Vertical Clearance:

Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants (OFC D103.1)) and an unobstructed vertical clearance of not less than 13 feet 6 inches. (OFC 503.2.1 & D103.1)

Fire Apparatus Access Roads For Individual One- And Two-Family Dwellings And Accessory Structures:

The Fire Marshal will approve access roads of 12 feet for up to three dwelling units (Group R-3) and accessory (Group U) buildings. (OFC 503.1.1 Exception 3)

Fire Apparatus Access Roads For Agricultural/Equine Exempt Structures:

Agricultural buildings and equine facilities, as defined in ORS 455.315, shall meet the requirements for fire access roads contained in Bend Fire & Rescue's adopted fire prevention ordinance. (See Appendix B)

Fire Apparatus Access Roads For Forest Dwellings:

Approved Forest Dwellings (in which the structure meets all County forest dwelling fire siting, fire retardant roof, and spark arrestor requirements) are allowed up to 20% maximum grade. Access roads greater than 20% shall be considered on a case-by-case basis. Forest Dwelling access roads shall be an all-weather surface capable of supporting imposed loads of not less than 75,000 pounds gross vehicle weight and be no less than 12 feet minimum width.

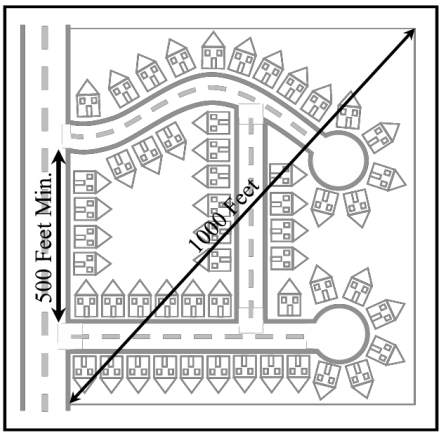
Additional Access Roads – One- And Two-Family Residential Developments:

Developments of one- and two-family dwellings, where the number of dwelling units exceeds 30, shall be provided with separate and approved fire apparatus access roads and shall meet

the requirements of Section D104.3. Exception: Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with section 903.3.1.1, 903.3.1.2, or 903.3.1.3 of the International Fire Code, access from two directions shall not be required. (OFC D107)

Multiple Access Roads Separation:

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 area to be served (as identified by the Fire Code Official), measured in a straight line between accesses. (OFC D104.3)



Premises Identification:

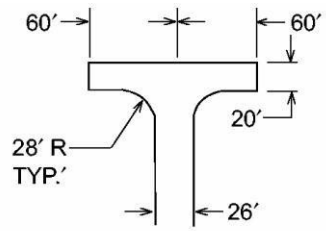
New and existing buildings shall have approved address numbers; building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property, including monument signs. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 1/2 inch. (OFC 505.1)

Access During Construction:

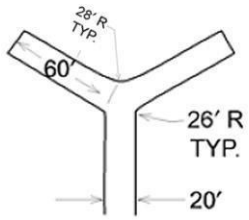
Approved fire apparatus access roadways shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. Temporary address signage shall also be provided during construction. (OFC 3309 and 3310.1)

Dead End Roads And Turnarounds:

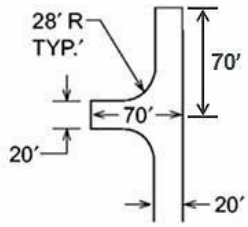
Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround. Diagrams of approved turnarounds are shown below: (OFC 503.2.5 & D103.1)



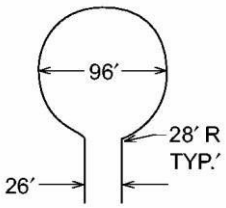
120′ HAMMERHEAD



60-FOOT "Y"



ACCEPTABLE ALTERNATIVE TO 120′ HAMMERHEAD



96′ DIAMETER CUL-DE-SAC

Turning Radius:

The inside turning radius and outside turning radius shall not be less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & D103.3)

Turnouts:

Where access roads are less than 20 feet and exceed 400 feet in length, turnouts 20 feet wide and 40 feet long may be required and will be determined on a case by case basis. (OFC 503.2.2)

Access Road Grade:

Fire apparatus access roadway grades shall not exceed 10%*. Alternate methods and materials may be available at the discretion of the Fire Marshal for grades exceeding 10%. *See Fire Apparatus Access for Forest Dwellings section for exceptions.

Angle Of Approach/Grade For Turnarounds:

Turnarounds shall be as flat as possible and have a maximum of 5% grade. (OFC 503.2.7 & D103.2)

Angle Of Approach/Grade For Intersections:

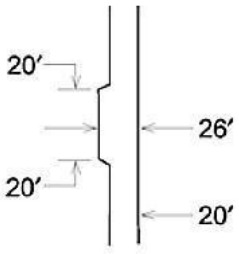
Intersections shall be level (maximum 5%). (OFC 503.2.7 & D103.2)

Fire Apparatus Access Roads With Fire Hydrants:

Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet and shall extend 20 feet before and after the point of the hydrant. (OFC D103.1)

Surface And Load Capacities:

Fire apparatus access roads shall be of an all-weather surface that is easily distinguishable from the surrounding area and is capable of supporting not less than 75,000 pounds live load (gross vehicle weight). Documentation from a registered engineer that the final construction is in accordance with approved plans or the requirements of the Fire Code may be requested. (OFC 503.2.3)



MINIMUM CLEARANCE AROUND A FIRE HYDRANT

Bridges:

Private bridges shall be designed and constructed in accordance with the State of Oregon Department of Transportation and American Association of State Highway and Transportation Officials Standards Standard Specification for Highway Bridges. A building permit shall be obtained for the construction of the bridge if required by the building official of the jurisdiction where the bridge is to be built. The design engineer shall prepare a special inspection and structural observation program for approval by the building official. The design engineer shall give, in writing; final approval of the bridge to the fire district after construction is completed. Maintenance of the bridge shall be the responsibility of the party or parties that use the bridge for access to their property. The fire district may at any time, for due cause, ask that a registered engineer inspect the bridge for structural stability and soundness at the expense of the property owner(s) the bridge serves. Vehicle load limits shall be posted at both entrances to bridges when required by the fire code official. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces which are not designed for such use, approved barriers, approved signs or both shall be installed and maintained when required by the fire code official. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces which are not designed for such use, approved barriers, approved signs or both shall be installed and maintained when required by the fire code official. (OFC 503.2.6)

Gates:

Gates securing fire apparatus roads shall comply with all of the following (OFC D103.5, and 503.6):

1. Minimum unobstructed width shall be not less than 20 feet (or the required roadway surface width)
2. Gates serving three or less single-family dwellings shall be a minimum of 12 feet in width.
3. Gates shall be set back at minimum of 30 feet from the intersecting roadway or as approved.
4. Electric gates shall be equipped with approved means for operation by fire department personnel
5. Electric automatic gates shall comply with ASTM F 2200 and UL 325.

Electric gates shall be equipped with a red fire access box equipped with a micro switch. The access box shall be secured using a model 3782 Knox exterior padlock with a 2” shackle. Orders can be made directly from Knox Box at their website, www.knoxbox.com. Please reference the appropriate Bend zip code for all orders (OFC 506.1).

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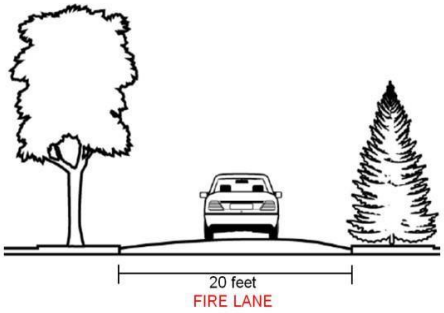
Bollards:
Where secondary fire access roads are required, they shall be secured utilizing a removable bollard. The fire code official is authorized to require the installation and maintenance of gates or other approved barricades across fire apparatus access roads, trails or other accessways, not including public streets, alleys or highways. The MaxiForce Removable Bollard MRRW-RS1-R, MRRW-RS2-R, MRSW-SS1-R, MRSW-SS2-R and MRSW-SS3-R are approved for use. maxiforcebollards.com (OFC 503.5)

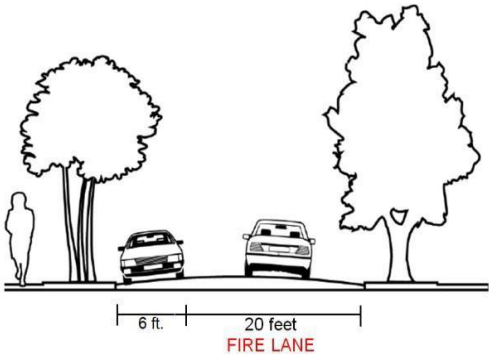
No Parking:
Parking on emergency access roads shall be as follows (OFC D103.6.1-2):

1. 20-26 feet road width – no parking on either side of roadway
2. 26-32 feet road width – parking is allowed on one side
3. Greater than 32 feet road width – parking is not restricted

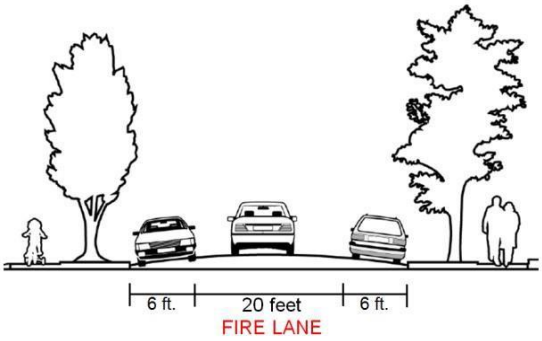
Parking prohibited on either side



Parking prohibited on one side only

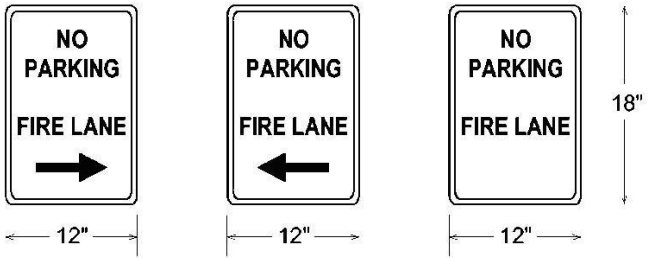


Parking permitted on both sides



No Parking Signs:
Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, “No Parking” signs shall be installed on one or both sides of the roadway and in turnarounds as needed.

Signs shall read “NO PARKING - FIRE LANE” and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)



Painted Curbs:
Where required, fire apparatus access roadway curbs shall be painted red (or as approved) and marked “NO PARKING FIRE LANE” at 25 foot intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background (or as approved). (OFC 503.3)

BUILDING ACCESS AND FIRE SERVICE FEATURES

Key Box:
A Knox Box, padlock, or access box for gate access may be required See Appendix A for further information and detail on required installations. Order via www.knoxbox.com or contact Bend Fire & Rescue for assistance and instructions regarding installation and placement. (OFC 506.1)

FIREFIGHTING WATER SUPPLIES

Firefighting Water Supply For Individual One- And Two-Family Dwellings:
The minimum available fire flow for one and two-family dwellings served by a fixed and reliable (municipal) water supply shall be 1,000 gallons per minute. If the structure(s) is (are) 3,600 square feet or larger, the required fire flow shall be determined according to OFC Appendix B. (OFC B105.2)

Firefighting Water Supply For Rural One- And Two- Family Dwellings:
Rural one- or two-family dwellings, where there is no fixed and reliable water supply and where there is approved access shall not be required to provide a firefighting water supply.

Firefighting Water Supply For Agricultural/Equine Exempt Structures:
(See Appendix B) Agricultural buildings and equine facilities, as defined in ORS 455.315, shall be exempt from the firefighting water supply requirements.

Firefighting Water Supply For Accessory Structures:
Detached U occupancies, that are in excess of 3,600 square feet, are not required to have a water supply when they are accessory to a single family dwelling and have approved fire department access and no exposures within 20 feet of all sides of the structure, or in accordance with ORSC, whichever is greater.

Fire Flow Water Availability:

Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests will be accepted if they were performed within 5 years as long as no adverse modifications have been made to the supply system. Water availability information may not be required to be submitted for every project. (OFC Appendix B)

Water Supply During Construction In Municipal Areas:

In areas with fixed and reliable water supply, approved firefighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 3312.1)

FIRE HYDRANTS

Fire Hydrant Number And Distribution:

The minimum number and distribution of fire hydrants available to a building shall not be less than that listed in Table C 105.1. (OFC Appendix C)

TABLE C105.1
NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d]
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180
5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 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 which can be crossed by firefighters 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 up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.
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.

Fire Hydrant(S) Placement:
(OFC C104)

- Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants. (OFC 507.5.1)
- Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the fire code official.
- Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets may be considered when approved by the fire code official.
- Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the fire code official.

Fire Hydrant Distance From An Access Road:
Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the fire code official. (OFC C102.1)

Fire Hydrants – One- And Two-Family Dwellings & Accessory Structures:
Where a portion of a structure is more than 600 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), on-site fire hydrants and mains shall be provided. (OFC 507.5.1)

Private Fire Hydrant Identification:
Private fire hydrants shall be painted red in color. (OFC 507)

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

Clear Space Around Fire Hydrants:
A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)

Appendix

A. Key Boxes - Policy
B. Agricultural Building and Equine Facility Exemption – Policy

New Construction Fire Code Application Guide

APPENDIX A: KEY BOXES

DATE: January 14, 2022 (Reviewed: 1/2022)

PURPOSE: To define the requirements for installation of key boxes.

SCOPE: This policy shall apply to all areas served by Bend Fire & Rescue.

CODE REFERENCES: 2019 OFC Section 506

POLICY: Key Boxes

Bend Fire & Rescue requires key boxes on buildings that meet certain parameters. When key boxes are required by this policy, Knox brand key boxes shall be used.

Required Installation - Key boxes shall be installed on buildings and structures when:

□ An elevator is installed. □ Equipped with an automatic fire extinguishing system.

□ Equipped with a fire alarm system. □ Access is restricted due to security arrangements.

EXCEPTION: Buildings and structures open and supervised twenty-four hours a day, seven days a week or constantly attended.

Installation Details - Key boxes shall be installed in an approved location; normally adjacent to primary entrance. The bottom of the key box shall not be more than six feet (5') above the walking surface unless approved by the Chief or authorized representative. See exception below.

EXCEPTION: In multi-tenant buildings (each with their own outside entrance) the key box shall be located at the door that will best and most easily gain access to automatic sprinkler system controls alarm system controls, etc.

Contents - Key boxes typically may contain the following keys and critical information necessary to gain access:

- Building or structure keys
- Alarm systems keys and instructions
- Elevator recall key
- Emergency personnel contact numbers
- Multiple sets of keys when required
- Gate key
- Elevator door key
- Automatic fire extinguishing system control valve keys
- Hazardous materials safety data sheets

Required Labeling - All keys shall be labeled as to their use, i.e., main entrance, alarm control panel, sprinkler room door, etc.

Key Box Size - The size of the key box shall be sufficient to contain all necessary keys and/or equipment.

APPENDIX B: AGRICULTURAL BUILDING AND EQUINE FACILITY

DATE: January 14, 2022 (Reviewed: 1/2022)

PURPOSE: To define the requirements for access and firefighting water supplies for agricultural buildings and equine facilities.

SCOPE: This policy shall apply to all areas served by Bend Fire & Rescue.

CODE REFERENCES: Oregon Revised Statute 455.315

POLICY: Agricultural Building and Equine Facility

For the purposes of this policy, fire apparatus access and firefighting water supplies for agricultural buildings and equine facilities, as defined in ORS 455.315, shall be as follows:

1. Agricultural buildings and equine facilities, as defined in ORS 455.315, shall be provided with adequate fire apparatus access roads.
2. It shall be the policy of Bend Fire & Rescue to encourage the installation of fire sprinkler systems in agricultural buildings and equine facilities.
3. It shall be the policy of Bend Fire & Rescue to encourage the installation of fire apparatus access roadways and firefighting water supplies.