

# Oregon Fire Code Applications Guide

Based on the 2022 Oregon Fire Code



**CLACKAMAS FIRE DISTRICT #1**

Revised 6/21/23

# Notes to users

## Local Development Codes

Check the local city or county development code to determine the applicability of roadway standards as it relates to conflicts with this guide and/or the adopted fire code.

## ORS 368.039 Road standards adopted by local government supersede standards in fire codes: Consultation with fire agencies.

(1) When the governing body of a county or city adopts specifications and standards, including standards for width, for roads and streets under the jurisdiction of the governing body, such specifications and standards shall supersede and prevail over any specifications and standards for roads and streets that are set forth in a uniform fire code adopted by the State Fire Marshal, a municipal fire department or a county firefighting agency.

(2) This section applies to specifications and standards for roads and streets adopted by the governing body of a county or city in a charter, acknowledged comprehensive plan or ordinance adopted pursuant to ORS chapter 92, 203, 221 or 368.

(3) Before adopting or amending any comprehensive plan, land use regulation or ordinance that establishes specifications and standards for roads and streets, a governing body of a county or city shall consult with the municipal fire department or other local firefighting agency concerning the proposed specifications and standards. The county or city governing body shall consider the needs of the fire department or firefighting agency when adopting the final specifications and standards.

## Dispute Resolution Process

The Office of State Fire Marshal's (OSFM), Dispute Resolution Process allows an aggrieved party to dispute inspection findings of the local fire marshal. This process allows the aggrieved party to ask for a "second opinion" but does not supersede the local or State Fire Marshal's appeal process. The local fire marshal, through the OSFM, arranges a conference call with the aggrieved party and on-call code experts from other jurisdictions and industry. The on-call group discusses the case, and the local fire marshal takes the group's second opinion into consideration when rendering a decision in writing to the aggrieved party. The goal of the OSFM is to conduct the conference call within 48 hours (two business days) for new construction and no more than seven business days for maintenance issues of the notice of dispute. Aggrieved parties who are not satisfied with the findings can appeal the decision to a local appeals board, if available, otherwise to the OSFM.

## Preamble/Authority and Scope

Clackamas Fire District #1 administers and enforces the Oregon Fire Code under the authority granted to them by ORS 476.030 or ORS 476.060. The 2022 Oregon Fire Code is the International Fire Code, 2021 Edition, as published and copyrighted by the International Code Council, which has been amended and adopted by the Oregon State Fire Marshal's Office.

This Applications Guide was created to provide good faith guidance to building officials, contractors, business owners, the public, and fire marshals on local interpretations and practices that are considered to be in compliance with the Oregon Fire Code. The intent is to clarify aspects of the code that are vague or non-specific by addressing selected issues under normal conditions. This Applications Guide does not create or replace code provisions and is not an adopted policy of Clackamas Fire District #1. The reader is cautioned that the guidance detailed in this Applications Guide may or may not apply to their specific situation, and that the designated authority for each jurisdiction retains final authority to determine compliance.

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## **Fire Department Access and Water Supply Submittal Requirements**

Fire access and water supply site plans are required to be uploaded through Clackamas Fire District's online plan submittal process. Go to [Fire Access and Water Supply Plan Submittal - Clackamas Fire District](#)

Follow the directions to choose the correct type of plan submittal. After filling out the form and answering all questions, you will need to click on the map link that designates the correct plan reviewer. You will then choose that plan reviewer on the drop-down box. Upload your site plan pdf, enter your payment information, and enter contact information, then hit submit.

### **Fire Access and Water Supply Site Plan shall contain the following:**

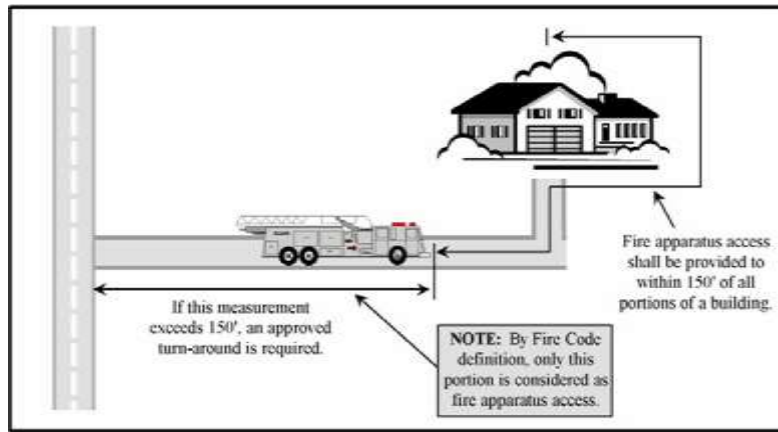
The plan shall show fire apparatus access – length, width and slope, fire lanes, fire hydrant locations within 600' of new building(s) back furthest part by way of access and around footprints, available fire flow, FDC location if applicable, building square footage, height, and type of construction.

### **Available Fire Flow: If you are in an area with fire hydrants, you must provide this.**

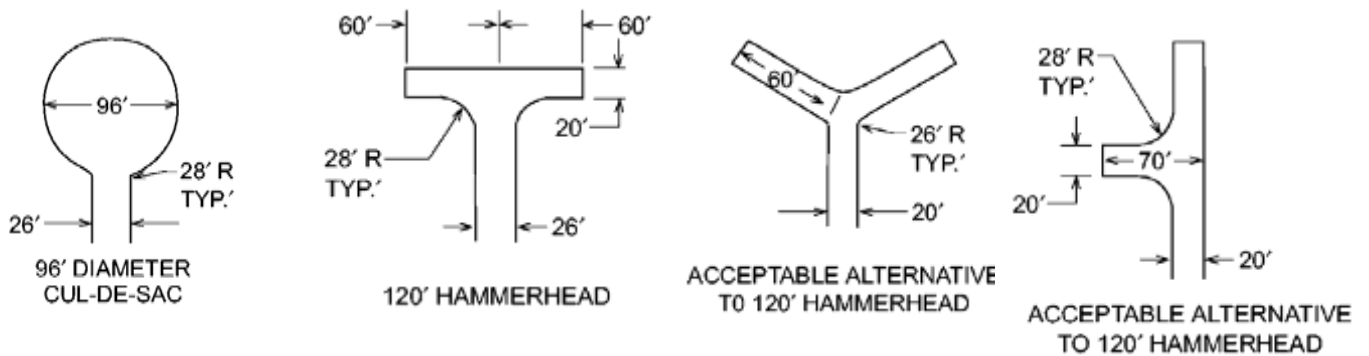
The applicant shall provide fire flow tests per NFPA 291 and shall be no older than 12 months. For review purposes, the available fire flow at 20 psi is required. Work to be completed by experienced and responsible persons and coordinated with the local water authority. \*Hydraulic models may be available, contact water authority to verify.

# FIRE APPARATUS ACCESS

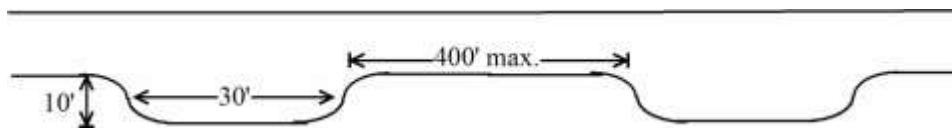
**FIRE APPARATUS ACCESS ROAD DISTANCE FROM BUILDING AND TURNAROUNDS:** Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building. An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet. (OFC 503.1.1)



**DEAD END ROADS:** Dead end fire apparatus access roads more than 150 feet in length shall be provided with an approved turnaround. Dead end fire apparatus access roads more than 500 in length shall have a driving surface width of not less than 26 feet. Diagrams of approved turnarounds are shown below: (OFC 503.2.5)



**TURNOUTS:** When any fire apparatus access road exceeds 400 feet in length, turnouts 10 feet wide and 30 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 code official. These distances may be adjusted based on visibility and light distances.

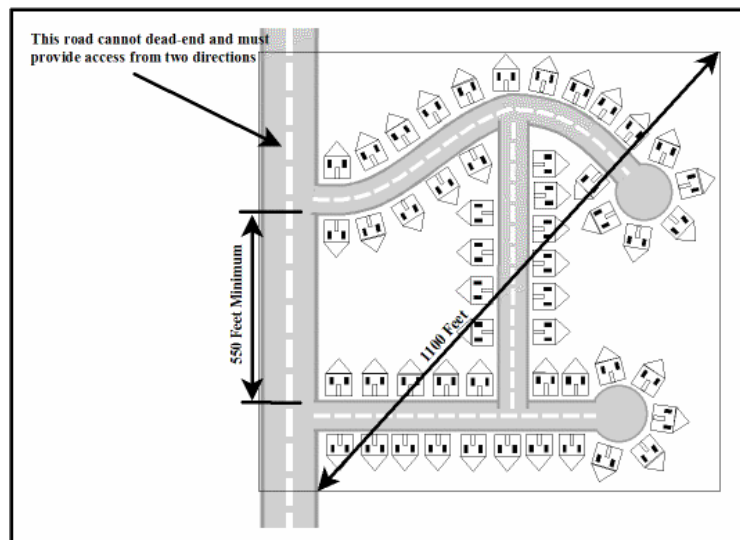


**FIRE APPARATUS ACCESS ROAD EXCEPTION FOR AUTOMATIC SPRINKLER PROTECTION:** When buildings are completely protected with an approved automatic fire sprinkler system, the requirements for fire apparatus access may be modified as approved by the fire code official. The approval of this alternate method of construction shall be accomplished in accordance with the provisions of OFC 503.1.1 Exception 1.

**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 code official, shall be provided with not less than two approved means of access. Exceptions may be allowed for an approved automatic sprinkler system. The approval of fire sprinklers as an alternate shall be accomplished in accordance with the provisions of OFC D106 & D107.

**GRADE:** Fire apparatus access roadway grades shall not exceed 12 percent. Intersections and turnarounds shall be level (maximum 5%) with the exception of crowning for water run-off. When fire sprinklers are installed, a maximum grade of 15% may be allowed. Grades over 15% will not be approved. The approval of fire sprinklers as an alternate shall be accomplished in accordance with the provisions of OFC 503.1.1 Exception 1 (1.2).

**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 property or area to be served, measured in a straight line between accesses. (OFC D104.3 & D107.2)



**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)

Note: When serving three or less dwelling units and accessory buildings, the driving surface may be reduced to 12 feet, although the unobstructed width shall be 20 feet. Turning radii for curves and turnarounds on 12' wide roads shall be not less than 44 feet and 56 feet respectively, measured from the same center point. (D103.1)

**AERIAL FIRE APPARATUS ROAD WIDTH:** 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 and comply with OFC D105.1. Overhead powerlines must be shown on the site plan.

**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 13,500 pounds point load (wheel load) and 75,000 pounds live load (gross vehicle weight). Documentation from a registered engineer that the finished construction is in accordance with the approved plans, or the requirements of the Fire Code may be requested. (D102.1)

**BRIDGES:** Private bridges shall be designed and constructed in accordance with AASHTO HB-17. Bridges and elevated surfaces shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. Vehicle load limits shall be posted at both entrances to bridges where required by the fire code official. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces that are not designed for such use, approved barriers, approved signs, or both shall be installed and maintained where required by the fire code official. 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(ies) that use(s) the bridge for access to their property(ies). 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. (OFC 503.2.6)

**TURNING RADIUS:** The inside turning radius and outside turning radius for a 20' wide road shall be not less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & D103.3)

**GATES:** Gates securing fire apparatus roads shall comply with all the following: (OFC 503.5, 503.6 & D103.5)

- Commercial - Minimum unobstructed width shall be 20 feet, or two 12-foot sections with a center post or island.
- Residential - Gates serving one- or two-family dwellings shall be a minimum of 16 feet clear width.
- Gates shall be set back at 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 Knox box key switch for operation by fire department personnel.
- Electric gate operators, where provided, shall be listed in accordance with UL 325.
- Gates intended for automatic operation shall be designed, constructed, and installed to comply with the requirements of ASTM F2200.
- Locking devices shall be submitted for approval.

**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. Roads 26 feet wide or less shall be posted on both sides as a fire lane. Roads more than 26 feet wide to 32 feet wide shall be posted 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)



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

## **FIREFIGHTING WATER SUPPLIES**

**COMMERCIAL BUILDINGS - FIRE FLOW:** The minimum fire-flow and flow duration for commercial buildings shall be as specified in OFC 2022 Tables B105.1(2) and B105.2.

**RURAL COMMERCIAL BUILDINGS - REQUIRED FIRE FLOW:** Required fire flow for rural and suburban areas in which adequate and reliable water supply systems do not exist may be calculated in accordance with ISO "Guide for Determination of Needed Fire Flow," when approved by the fire code official. Please contact the Fire Marshal's Office for special assistance and other requirements that may apply.

**SINGLE FAMILY DWELLINGS - REQUIRED FIRE FLOW:** The minimum available fire flow for one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses, up to 3600 square feet, served by a municipal water supply shall be 1,000 gallons per minute. (OFC Table 105.1 (1) If the structure is 3,601 square feet or larger, the required fire flow shall be determined according to OFC Appendix B. (OFC Table B105.1(2)

**RURAL ONE- AND TWO-FAMILY DWELLINGS-REQUIRED FLOW:** Required fire flow for detached one- and two-family dwellings in areas in which adequate and reliable water supply systems do not exist shall be calculated in accordance with National Fire Protection Association Standard 1142, 2017 Edition. (OFC 102.8)

- Exception 1: One- and two-family dwelling structures where the total area of all floor levels within exterior walls are less than 3,601 square feet.
- Exception 2: When an Alternate Method and Material is approved, which provides a separation in accordance with one of the following methods, the square footage of the garage shall not count towards the 3,600 square foot exception above.
  - The garage/dwelling separation shall be per ORSC, except that construction material in Table R302.6 shall be two (2) layers of 5/8" Type X gypsum board in all design options. All other separation and penetration protection shall be per ORSC 302.5; or
  - A listed 1-hour fire rated assembly. All other separation and penetration protection shall be per ORSC 302.5
- Exception 3: One- and two-family dwellings protected by an approved NFPA 13D automatic sprinkler system are not required to have a water supply other than that required to supply the fire sprinkler system.

**ACCESS AND FIRE FIGHTING WATER SUPPLY DURING CONSTRUCTION:** Approved fire apparatus access roadways and fire-fighting water supplies shall be installed and operational prior to any vertical combustible construction or storage of combustible materials on the site. (OFC 501.4) Temporary Street signs shall be installed at each street intersection where construction of new roadways allows passage by vehicles. (OFC 505.2)



## **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 where required by the fire code official. (OFC 507.5.1)

Note: This distance may be increased to 600 feet for buildings equipped throughout with an approved automatic sprinkler system. (507.5.1 Exception 2)

**FIRE HYDRANTS – RESIDENTIAL 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 Exception 1)

**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 102.1. See page 9 for hydrant proximity to FDC. (OFC Appendix C)

**TABLE C105.1  
NUMBER AND DISTRIBUTION OF FIRE  
HYDRANTS**

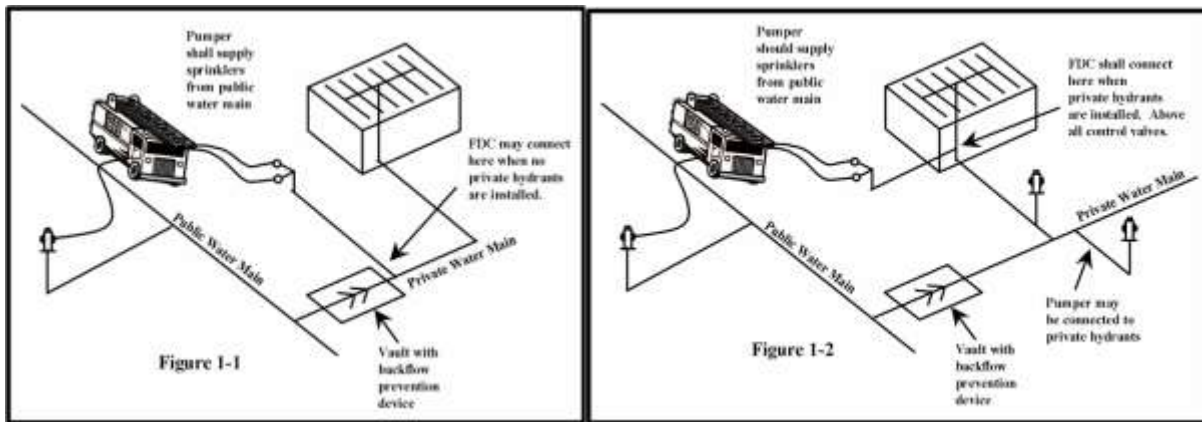
<b>FIRE-FLOW REQUIREMENT (gpm)</b>	<b>MINIMUM NUMBER OF HYDRANTS</b>	<b>AVERAGE SPACING BETWEEN HYDRANTS<sup>abc</sup> (feet)</b>	<b>MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT<sup>d</sup></b>
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	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	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 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 up to a fire-flow requirements 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.
- 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 fire 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.

**CONSIDERATIONS FOR PLACING FIRE HYDRANTS MAY BE AS FOLLOWING:** (OFC C104)



- Existing hydrants on public streets 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 C104.1)
- 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 only as 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.
- 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.
- When evaluating the placement of hydrants at apartment or industrial complexes the first hydrant(s) to be placed shall be at the primary access and any secondary access to the site. After these hydrants have been placed other hydrants shall be sited to meet the above requirements for spacing and minimum number of hydrants.

**FIRE HYDRANT NON-THREADED QUICK CONNECTORS:** Non-threaded quick connectors shall NOT be installed on newly installed fire hydrants Clackamas Fire District #1.

**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.

**FIRE HYDRANT/FIRE DEPARTMENT CONNECTION:** A fire hydrant shall be located within 100 feet of a fire department connection (FDC). Fire hydrants and FDC's shall be located on the same side of the fire apparatus access roadway. (NFPA 14)

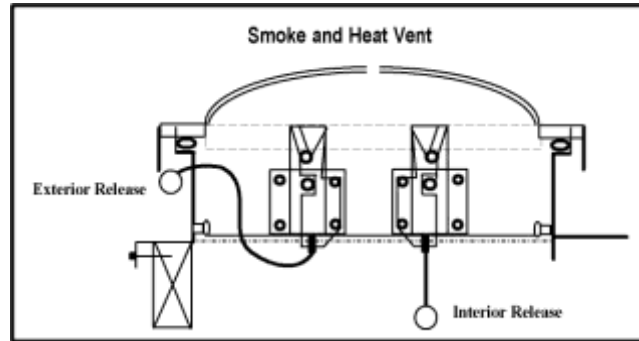
**FDCs shall be remote from building except when approved.**

## **KEY LOCK BOXES:**

To request a Knox Box for your building or gate click here. [Knox Box Information and Request Form - Clackamas Fire District](#)

## **SMOKE AND HEAT VENTS:**

**MANUAL RELEASE:** Manual releases shall be provided for use during fire suppression operations. Individual exterior release mechanisms shall be provided for each vent.



## **FIRE WATCH**

**FIRE WATCH:** Whenever a required fire alarm, detection or suppression system is out-of-service and a life hazard and or distinct fire hazard is present, the fire code official and/or the property owner or manager shall initiate a fire watch. A fire watch is defined as a temporary measure intended to ensure continuous and systematic surveillance of a building or portion thereof by one or more qualified individuals for the purposes of identifying and controlling fire hazards, detecting early signs of unwanted fire, raising an alarm of fire, and notifying the fire department. Each affected area or building must be patrolled hourly and documented in a written log. Individuals assigned to fire watch duty must be provided with a means of communication such as a cell phone or two-way radio and their only duties shall be to perform constant patrols. The watch must remain in effect until repairs are made and the system(s) are back in service. When in doubt if a system is required or if a fire watch is needed, contact the local Fire Marshal's Office for consultation and or response. (OFC 901.4.1 and Appendix T)

### **EXAMPLES:**

The automatic smoke detection system in the Family Birth Center at the local Hospital is taken off-line due to unwanted false alarms and an alarm technician has been dispatched to evaluate the system. This is a required detection system, and the patients occupy the floor. A fire watch is required and could be conducted by nursing and or security personnel.

The manual fire alarm system at a local elementary school is initiating false alarms and is taken offline by school district personnel; the automatic smoke detection and fire sprinkler system are operational. It's Saturday afternoon and the building is not occupied. Although this is a required system, a fire watch is not required as the building is vacant.

The water main that serves a local apartment complex is damaged in a construction accident rendering the fire hydrants and residential fire sprinkler systems out of service. It's Sunday night and nearly all the apartments are occupied. Both systems are required, and a continuous fire watch is needed.

## **EMERGENCY RESPONDER RADIO COVERAGE**

**Emergency responder radio coverage must be tested or provided due to the following:**

1. Any building with one or more basements or below grade building levels.
2. Any underground buildings.
3. Any building more than five stories in height.
4. Any building 50,000 square feet in size or larger.
5. Any building that, through performance testing, does not meet the requirement of OFC 510.

\*\* Approval of a wired communication system must be documented on OSSC Form 918 in accordance with Section 918 of the OSSC. Permit to be acquired from the appropriate building department.