SCOPE
This D.O.G establishes regulations affecting or relating to structures, processes, premises and safeguards regarding: 1) the hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices; 2) conditions hazardous to life, property or public welfare in the occupancy of structures or premises; 3) fire hazards in the structure or on the premises from occupancy or operation; 4) matters related to the construction, extension, repair, alteration or removal of fire suppression or alarm systems; and, 5) conditions affecting the safety of firefighters and emergency responders during emergency operations.

The fire code official shall enforce the provisions of the Oregon Fire Code (OFC) as directed in ORS 476.060 and OAR Chapter 837, Division 39. ORS 476.030(c) “defines the rules for maintenance and regulations of structural fire safety features in occupied structures and overseeing the safety and directing the means and adequacy of exits in case of fire except that structural changes shall not be required in buildings built, occupied and maintained in conformity with state building code regulations applicable at the time of construction”. OAR Chapter 837, Division 41 “defines the fire protection regulations relating to existing facilities”.

FIRE PLAN REVIEW PROCEDURES: CITY OF CORVALLIS
Fire plan reviews within the City of Corvallis shall be conducted using the adopted Corvallis Municipal Code (CMC) version of the OFC with local amendments found in CMC Sections 7.080.010 – 7.080.200. Local interpretations of the provisions within OFC with CFD amendments can be found in the CFD Fire Plan Review Guide; these interpretations are based on the resources and capabilities of the Corvallis Fire Department.

FIRE PLAN REVIEW PROCEDURES: CORVALLIS RURAL FIRE PROTECTION DISTRICT
Fire plan reviews within the Corvallis Rural Fire Protection District (CRFPD) shall be conducted using the Corvallis Rural Fire Protection Standards adopted by CFD. This standard is based on the current editions of the Oregon Fire Code and NFPA 1142: Standard on Water Supplies for Suburban and Rural Fire Fighting.
Executive Summary

By definition emergency response is reactive, albeit it is a pre-planned and coordinated effort to the maximum extent possible. As with anything a reactive response can be very costly. We have firefighters on duty 24/7 and equipment that can respond to any emergency at any time; a great deal of expense for what might happen. So how can an organization with a mission that is so fundamentally reactive become proactive? The premise of Fire Prevention is to stop the incidents before they occur, put mechanisms in place that automatically mitigate an incident at the earliest point, and to prepare those that might be involved to respond appropriately.

This Fire Plan Review Guide was written through analysis of the existing fire problem in the Corvallis Rural Fire Protection District, and it is intended to provide local interpretations of the 2014 Oregon Fire Code that are imperative to reduce the risk of injury, death, or property loss from fire in our community.

Pragmatically it is impossible to perfectly prepare the fire department for the next emergency; what is important is to make sure that we have not gotten the preparations so wrong that we cannot quickly adapt as the conditions evolve. To that end, the Corvallis Fire Department considers the most likely scenarios using historical data, national statistics, and validated research in the process of development review, issuing fire permits, conducting fire and life safety inspections, training staff, and allocating resources in the execution of its mission.

This guideline does not cover all the requirements or details of Fire Permits, Fire Plan Review, Fire Department Access, Fire Protection Water Supplies, or all of the requirements for Fire Suppression and Fire Alarm Systems. Nor is it an attempt to restate all of the requirements or details addressed by the Oregon Fire Code, NFPA, or other code referenced material. This Fire Plan Review Guide addresses only those items where the prescriptive code language must be clarified in order to coordinate the passive and active Fire Prevention features in building construction and community development with the Corvallis Fire Department’s emergency operations.
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11.1.2.1: Corvallis Fire Code

11.1.2.1.1 Adoption of State Fire Code (CFC 7.08.010)
The State of Oregon Fire Code (OFC) effective July 1, 2014 including the Table of Contents Appendices B, C, D, H, I, K, L, M, and N and the Index together which prescribe regulations safeguarding life health property and public welfare to a reasonable degree from the hazards of fire explosion and panic save and except such other portions thereof are herein after deleted herein modified or amended is hereby adopted and by this reference made apart here of with the same force and effect as though set forth herein in full. The foregoing is referred to as the “Fire Code” and is composed of the 2012 edition of the International Fire Code as published by the International Code Council and amended by the Oregon State Fire Marshal said Fire Code is on file and open to public inspection in the City Library. All referenced standards in OFC Chapter 80 are hereby adopted and are on file and open to public inspection at the Fire Prevention Office of the Fire Department.

Intent:
The Oregon State Fire Marshal mandates that local jurisdictions coordinate the minimum interpretation of state fire laws to assure uniformity in the application of the Oregon Fire Code. Jurisdictions are permitted to establish more restrictive interpretations of the provisions within the OFC based on the needs of the community.
11.1.2.1.2 Change of Use or Occupancy (CFC 7.08.020)  
OFC Section 102 adopted by this Chapter is amended, and Section 102.11.1 is added, to read in its entirety as follows:

102.1 Construction and design provisions. The construction and design provisions of this code shall apply to:

1. Structures, facilities and conditions arising after the adoption of this code.
2. Existing structures, facilities and conditions not legally in existence at the time of adoption of this code.
3. Existing structures, facilities and conditions when required in Chapter 11.
4. Existing structures, facilities and conditions which, in the opinion of the fire code official, constitute a distinct hazard to life or property.

102.2 Administrative, operational and maintenance provisions. The administrative, operational and maintenance provisions of this code shall apply to:

1. Conditions and operations arising after the adoption of this code.
2. Existing conditions and operations

ORS 476.030(c) is not a part of this code but is paraphrased here for the reader's convenience.

ORS 476.030(c) defines the rules for maintenance and regulations of structural fire safety features in occupied structures and overseeing the safety and directing the means and adequacy of exits in case of fire except that structural changes shall not be required in buildings built, occupied and maintained in conformity with the state building code regulations applicable at the time of construction.

OAR Chapter 837, Division 41 defines the fire protection regulations relating to existing facilities. Also see Section 110.1.1, ORS 476.030(c) and OAR Chapter 837, Division 41.

102.3 Change of use or occupancy. The provisions of the Building Codes as adopted by the City of Corvallis shall apply to all buildings undergoing a change of occupancy.

102.4 Application of building code. The design and construction of new structures shall comply with the building codes as adopted by the City of Corvallis. Repairs, alterations, and additions to existing structures shall comply with these building codes as adopted by the City of Corvallis.

102.5 Application of residential code. The design and construction of new residential structures shall comply with the residential building codes as adopted by the City of Corvallis. Repairs, alterations, and additions to existing structures shall comply with these residential building codes as adopted by the City of Corvallis.

102.6 Historic buildings. The construction, alteration, repair, enlargement, restoration, relocation, or movement of existing buildings or structures that are designated as historic buildings when such buildings or structures do not constitute a distinct hazard of life or property shall be in accordance with the provisions of the building codes as adopted by the City of Corvallis.

102.7 Referenced codes and standards. The codes and standards referenced in this code shall be those that are listed in OFC Chapter 80 and such codes and standards shall be considered part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between the provisions of this code and the
referenced standards, the provisions of this code shall apply.

102.8 Subjects not regulated by this code. Where no applicable standards or requirements are set forth in this code, or are contained within statutes or administrative rules adopted by the jurisdiction, compliance with applicable standards of the National Fire Protection Association or other nationally recognized fire safety standards, as approved, shall be deemed as prima facie evidence of compliance with the intent of this code. Nothing herein shall derogate from the authority of the fire code official to determine compliance with codes or standards for those activities or installations within the fire code official’s jurisdiction or responsibility.

102.9 Matters not provided for. Requirements that are essential for the public safety of an existing or proposed activity, building or structure, or for the safety of the occupants thereof, which are not specifically provided for by this code shall be determined by the fire code official.

102.10 Conflicting provisions. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where, in a specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

102.11 Other laws. The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

OFC 102.11.1 Local interpretation. Corvallis Fire Department Fire Prevention Operating Guidelines (DOG) have been developed with the intent to detail and clarify the city application of this Fire Code as adopted by the City of Corvallis these guidelines are available for public review at the administrative Offices of the Fire Department and on the city’s website.

102.12 Application of references. References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

**Intent:**

The purpose of the Oregon Fire Code is to establish the minimum requirements required to provide a reasonable level of life safety and property protection from hazards of fire, explosion, or dangerous conditions in new or existing buildings, structures, or premises, and to provide safety to firefighters and emergency responders during emergency operations.
11.1.2.1.3 Fire Code Permits (CMC Section 7.08.060)

OFC Section 105.6 and 105.7 are adopted by this Chapter in their entirety with the intent that the Corvallis Fire Department issue Fire Code Permits for all operations and installations listed in the Oregon Fire Code Sections 105.6.A through 105.7.16.

The fire permits and fees identified in this section are committed to fund the operations of the Fire Department. The fire permit fees shall be no less than the amount listed in this Chapter. The Fire Chief may increase fire permit fees through an annual adjustment of Departmental Operating Guideline 1.2.4 to reflect the actual costs of administration of the permitting and inspection process. The permits and fees applicable under Chapter 8.03 shall be:

<table>
<thead>
<tr>
<th>Service Description</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosol Products, Level 2 or 3 &gt; 500 lbs.</td>
<td>$80</td>
</tr>
<tr>
<td>Ambulance Fees for Transportation</td>
<td></td>
</tr>
<tr>
<td>Amusement Buildings</td>
<td>$80</td>
</tr>
<tr>
<td>Aviation Facilities, Group H or S used for repair or fuel-servicing</td>
<td>$80</td>
</tr>
<tr>
<td>Battery Systems, Stationary Lead-Acid &gt; 50 gal.</td>
<td>$80</td>
</tr>
<tr>
<td>Carnivals and Fairs</td>
<td>$80</td>
</tr>
<tr>
<td>Cellulose Nitrate Film, in Group A Occupancies</td>
<td>$80</td>
</tr>
<tr>
<td>Combustible Dust-Producing Operations</td>
<td>$80</td>
</tr>
<tr>
<td>Combustible Fiber Storage or Handling &gt; 100 cf</td>
<td>$80</td>
</tr>
<tr>
<td>Combustible Storage &gt; 2,500 cf</td>
<td>$80</td>
</tr>
<tr>
<td>Compressed Gas (CFC Table 105.6.9)</td>
<td>$80</td>
</tr>
<tr>
<td>Covered Mall Buildings, Use for Displays, Gas-fueled Equipment, Open Flame or Flame-Producing Equipment</td>
<td>$80</td>
</tr>
<tr>
<td>Cryogenic Fluids (CFC Table 105.6.11)</td>
<td>$80</td>
</tr>
<tr>
<td>Dry Cleaning Plants</td>
<td>$80</td>
</tr>
<tr>
<td>Exhibits/Trade Shows</td>
<td>$80</td>
</tr>
<tr>
<td>Explosives, Manufacture, Storage, Handling, Sale or Use</td>
<td>$80</td>
</tr>
<tr>
<td>Fire Hydrants and Valves</td>
<td>$80</td>
</tr>
<tr>
<td>Fireworks, agricultural</td>
<td>$80</td>
</tr>
<tr>
<td>a. Public display</td>
<td>$80</td>
</tr>
<tr>
<td>b. Sales</td>
<td>$40</td>
</tr>
<tr>
<td>Fireworks, wholesale</td>
<td>$80</td>
</tr>
<tr>
<td>Flammable/Combustible Liquids</td>
<td>$80</td>
</tr>
<tr>
<td>a. Storage or Use of Class I &gt; 5 gal inside or &gt; 10 gal outside</td>
<td>$80</td>
</tr>
<tr>
<td>b. Storage, Handling or Use of Class II or III-A &gt; 25 gal inside or 60 gal outside (except fuel oil)</td>
<td>$80</td>
</tr>
<tr>
<td>c. Removal of Class I or II liquids from underground tanks (other than approved, onsite pumps)</td>
<td>$80</td>
</tr>
<tr>
<td>d. Operation of tank vehicles, equipment, plants, fuel-dispensing stations, refineries, distilleries</td>
<td>$80</td>
</tr>
<tr>
<td>e. Place tanks (above- or below-ground) temporarily out of service</td>
<td>$80</td>
</tr>
<tr>
<td>f. Change of contents in tank</td>
<td>$80</td>
</tr>
<tr>
<td>g. Manufacture, process, blend or refine flammable/combustible liquids</td>
<td>$80</td>
</tr>
<tr>
<td>h. Fuel dispensing of any kind in any location</td>
<td>$80</td>
</tr>
<tr>
<td>Floor Finishing &gt; 350 sf using Class I or II Liquids</td>
<td>$80</td>
</tr>
<tr>
<td>Fruit/Crop Ripening</td>
<td>$80</td>
</tr>
<tr>
<td>Fumigation/Thermal Insecticidal Fogging (commercial)</td>
<td>$80</td>
</tr>
<tr>
<td>Hazardous materials (CFC Table 105.6.21)</td>
<td>$80</td>
</tr>
<tr>
<td>Hazardous Production Materials, use or handling</td>
<td>$80</td>
</tr>
<tr>
<td>High-Piled Combustible Storage, &gt; 500 sf</td>
<td>$80</td>
</tr>
<tr>
<td>Hot Work Operations (Chapter 26)</td>
<td>$80</td>
</tr>
<tr>
<td>Industrial Ovens (Chapter 21)</td>
<td>$80</td>
</tr>
<tr>
<td>Institutions</td>
<td>$80</td>
</tr>
<tr>
<td>a. Congregate Residences/Greek Housing</td>
<td>$100</td>
</tr>
</tbody>
</table>
31) Lumber Yards/Woodworking Plants > 100,000 bd ft - $80
32) Liquid- or Gas-Fueled Vehicles/Equipment in Assembly Buildings - $80
33) LPG Storage & Use - $80
34) Magnesium Working - $80
35) Open Burning (does not include recreational fires) - $80
36) Open Flames and Torches - $80
37) Open Flames and Candles in Assembly, Dining, or Drinking areas - $20 / $80
38) Organic Coatings, Manufacture > 1 gal per day - $80
39) Places of Assembly - $80
40) Private Fire Hydrants, Use or Removal – Notify
41) Pyrotechnic Special Effects Materials - $80
42) Pyroxylin Plastics, storage or handling > 25 lbs - $80
43) Refrigeration Equipment (Chapter 6) - $80
44) Repair Garages/Motor Fuel-Dispensing - $80
45) Rooftop Heliports - $80
46) Spraying/Dipping Operations (Chapter 15) - $80
47) Tire Storage (Scrap) > 2,500 cf - $80
48) Tents > 200 sf, Canopies > 400 sf, Temporary Membrane Structures - $80
49) Tire Rebuilding Plants - $80
50) Waste Handling Facilities - $80
51) Welding/Cutting Operation (in any occupancy) - $80
52) Wood Products > 200 cf - $80
53) Auto Fire Extinguishing System Installation or Modification - $80
   a. This permit is also issued for Underground Fire Protection Piping if the fire sprinkler plans are requested to be a deferred submittal. This Underground Fire Protection Piping permit allows the pre-approval of underground piping and facilitates inspection by DS staff prior to covering underground work and pouring concrete. See CFC 11.1.2.5.5
   b. A $75 Flow Test Fee will be assessed in addition to other fees associated with fire sprinkler permits where an adequate and reliable water source is present.
54) Compressed Gas System Installation, Repair, Removal or Modification (CFC Table 105.6.9) - $80
55) Fire Alarm Installation or Modification - $80
56) Fire Pump Installation or Modification - $80
57) Flammable/Combustible Liquids, Installation, Repair or Modification - $80
58) Haz. Materials Installation, Repair or Modification (CFC Table 105.6.21) - $80
59) Industrial Oven Installation - $80
60) LP Gas Installation or Modification - $80
61) Private Fire Hydrant Installation or Modification - $80
62) Spray Booth/Room, Dip Tank Installation or Modification - $80
63) Standpipe Installation, Modification or Removal - $80
64) Tents > 200 sf, Canopies > 400 sf, Temporary Membrane Structures - $80

* Base Fee. If processing/inspection(s) involve more than two hours of staff time or multiple field inspections, that time shall be added to the base fee and charged at an additional $75.00 per hour or fraction thereof.

Sample Corvallis Reinspection Notice

CORVALLIS FIRE DEPARTMENT
REINSPECTION NOTICE

Permit Number: ________________________________ Date of Inspection: _______________________

Project Name: ________________________________ Project Address: ____________________________

Contractor Name: ______________________________ Contractor Phone: ( __________ ) ___________

Contractor Address: ____________________________ City: ____________________________ State: ______ Zip: ________

Reason(s) for Failure:
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

Due to the failure of a customer requested inspection or acceptance test, a reinspection is required. Per CMC Section 803.500.010, reinspection fees may be charged in addition to the base permit fee. The rate per CMC 803.500.010 is $75/hr, or fraction thereof; this time includes administrative time, driving time, and inspection time.

A reinspection appointment will not be scheduled until the reinspection fee has been paid in full with the Corvallis Fire Department.

X Corvallis Fire Department Inspector X Building Inspector

The reinspection fees on this notice have been explained to me and I understand them.

X Contractor Date

White – CFD copy Yellow – Development Services copy Pink – Contractor copy Form # 173 08/12
11.1.2.1.4 Violations (CMC Section 7.08.080)
OFC Section 109 is adopted by his Chapter with Sections 109.3.3 and 109.4 are reinstated to read in their entirety as follows:

109.3.3 Prosecution of violations. If the notice of violation is not complied with promptly the fire code official is authorized to request the legal counsel of the jurisdiction to institute the appropriate legal proceedings at law or in equity to restrain correct or abate such violation or to require removal or termination of the unlawful occupancy of the structure in violation of the provisions of this code or of the order or direction made pursuant hereto.

109.4 Violation penalties. Persons who shall violate a provision of this code or shall fail to comply with any of the requirements thereof or who shall erect, install, alter repair or do work in violation of the approved construction documents or directive of the fire code official, or of a permit or certificate used under provisions of this code, shall be subject to the provisions of 109.4.1.1 - 109.4.1.8.12.

109.4.8.1 General. In addition to any other penalty provided by law the owner of any unsafe building or owner of property upon which a fire hazard exists may incur a civil penalty in an amount as specified in 109.4.8.2 plus any cost of service or recording costs

109.4.8.2 Authorized civil penalties and fees.

a) Unsafe or dangerous building, $1,000;
b) Blocking or obstructing an exit way, $1,000;
c) Overcrowding beyond the approved capacity for a building, $1,000;
d) Failure to immediately restore fire sprinkler standpipe alarm or other fire protective or extinguishing systems or appliances to operational condition, $900;
e) Failure to maintain exit signs or illumination, $900;
f) Possession or use of illegal fireworks, $900;
g) Tampering with fire equipment appliances, $900;
h) Failure to provide alarm supervision for an automatic sprinkler system with over 100 heads, $600;
i) Failure to provide cleaning of kitchen ventilating hood and duct systems, $600;
j) Failure to abate an electrical hazard, $600;
k) Storage use dispensing and/or mixing of flammable and combustible liquids not in accordance with OFC Chapter 57, $600;
l) Illegal storage of hazardous equipment in buildings, $600;
m) Failure to remove combustible decorative material from a public assembly, $600;
n) Failure to provide or maintain a fire extinguisher, $400;
o) Using a building or portion thereof rooms in an unsafe manner beyond the scope of its designed use and or occupancy classification, $1,000;
p) Open burning in violation of OFC Section 307, $400;
q) Failure to obtain a fire permit in accordance with OFC Section 105, $200;
r) Failure to provide premises identification, $200;
s) Permitting accumulation of waste material in violation of Corvallis Fire Code, $200;
t) Failure to perform required inspections and maintenance of fire protection systems in accordance with Corvallis Fire Code, $200;
u) Failure to perform required fire drills and or to mail in certification, $200;
v) Parking in a marked Fire Lane, $200;
w) Obstructing a fire hydrant, $200
11.1.2.1.5 LPG Storage Limits (CMC Section 7.08.160)

OFC Section 6104 as adopted by this Chapter is amended to add Section 6104.2.1 as follows:

6104.2.1 LPG Storage Limits. The limits as referenced in OFC Section 6104.2 apply to all properties in the city except for those sites in General Industrial and Intensive Industrial districts which will be reviewed for quantities in excess of 2000 gallons of liquefied petroleum gas. Upon completion of the Plan Compatibility Review procedures of the Land Development Code, approval for storage of such additional quantities may be granted by the fire chief.

11.1.2.1.6 Flammable and Combustible Liquids in Outside, Above Ground Tanks Prohibited

(CMC Section 7.08.170)

OFC Chapter 57 as adopted by this Chapter is amended to add Sections 5704.2.9.6.1.7 and 5706.2.4.4.1 as follows:

5704.2.9.6.1.7 Locations where above ground tanks are prohibited. Storage of Class I and II liquids in above ground tanks outside of buildings is prohibited within the limits established by law as the limits of districts in which such storage is prohibited. The limits referred to above, in which storage of Class I and II liquids in outside above ground tanks is prohibited, include all areas of the City except those sites in General Industrial and Intensive Industrial districts which may hereafter be given specific approval for such use by the fire chief after review through the Plan Compatibility Review procedure of the Land Development Code.

5706.2.4.4.1 General industrial and intensive industrial districts. The limits referred to in OFC Section 5706.2.4.4 in which storage of Class I and II liquids in outside above ground tanks is prohibited, include all areas of the City except those sites in General Industrial and Intensive Industrial districts which are hereafter given specific approval for such use by the fire chief after review through the Plan Compatibility Review procedure of the Land Development Code.

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11.1.2.1.7 Aerial Apparatus Access (CMC Section 7.08.200)

OFC Section D105 as adopted by this Chapter is amended to add Sections D105.1, D105.1.1, D105.4, D105.5, and D105.5.1 as follows: See also Plan Review Guide 11.1.2.3.9 Aerial Fire Apparatus Access Road Specifications

D105.1 Where required. Building or portions of buildings or facilities exceeding 30 feet in height above the lowest level of fire department vehicle access shall be provided with approved fire apparatus access roads capable of accommodating fire department aerial apparatus. Overhead utility and power lines shall not be located within the aerial fire apparatus access roadway.

D105.1.1 Building height definition. For the purposes of Section D105.1 building height is measured from the lowest level of approved fire department vehicle access to the highest peak on the roof line.

D105.2 Width. Aerial fire apparatus access roads shall have a minimum unobstructed width of 26 feet, exclusive of shoulders, in the immediate vicinity of the building or portion thereof.

D105.3 Proximity to Building. At least one of the required access routes meeting this condition shall be located within a minimum of 15 feet 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 fire apparatus access road is positioned shall be approved by the Fire Marshal.

D105.4 Obstructions. Overhead utility and power lines shall not be located over aerial fire apparatus access road or between the aerial fire apparatus road and the building. Other obstructions shall be permitted to be placed with the approval of the Fire Marshal.

D105.5 Modifications. For residential structures less than 40 feet in height as defined by Appendix D105.1.1, fire aerial apparatus access roads and specifications are allowed to be modified by the Fire Marshal where the following condition applies:

D105.5.1 Automatic fire sprinkler system. A building has been equipped with an automatic fire sprinkler system that was not prescriptively required by the 2014 OFC, OSSC, or ORSC. The system shall be installed in accordance with the provisions of NFPA 13, NFPA 13R, or NFPA 13D.

**Intent:**
The intent of this section is to ensure that minimum fire protection can be provided to new, or modified, structures exceeding 30 feet and less than 4 stories in height.

The D105.1 and D105.1.1 amendments are legacy codes from the 2010 OFC. CFD has used Appendix D in this capacity to ensure aerial access since the codes were adopted by the State in 2010. The amendments serve as a continuation of the locally adopted Departmental Operating Guidelines (DOG) that are crafted to match the capacity of the current Corvallis Fire Department resources with the rapidly changing needs of the community.

Historically the Land Development Codes have been in conflict with the Fire Department access provisions within Appendix D of the OFC; this CFC amendment offers an Alternative Method of compliance (AM&M) when the prescriptive requirements of the OFC cannot be met due to existing infrastructure or site design parameters.
11.1.2.2 Fire Plan Submittal

Standard
The fire code official is hereby authorized to enforce the provisions of this code as directed in ORS 476.060 and OAR Chapter 837, Division 39 and shall have the authority to adopt policies, procedures, rules and regulations in order to clarify the application of its provisions (OFC Section 104)

Specifications
1. Such policies, procedures, rules and regulations shall be in compliance with the intent and purpose of this code and shall not have the effect of waiving requirements specifically provided for in this code (OFC 104.1).

2. The fire code official is authorized to receive applications, review construction documents and issue permits for construction regulated by this code, issue permits for operations regulated by this code, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code (OFC 104.2).

3. Modifications to this code shall not be less stringent than the minimum fire code adopted by the State Fire Marshal (OFC 104.1).
   a. Whenever there are practical difficulties involved in carrying out the provisions of this code, the fire code official shall have the authority to grant modifications for individual cases, provided the fire code official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements.
   b. The details of action granting modifications shall be recorded and entered in the files of the department of fire prevention.
   c. The State Fire Marshal may make adjustments and variances to this code under ORS 476.035. (OFC 104.8)

4. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been approved.
   a. The fire code official is authorized to approve an alternative material or method of construction where the fire code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. (OFC 104.9)

5. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the fire code official shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction.
   a. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the fire code official shall approve the testing procedures. Tests shall be performed by an approved agency.
   b. Reports of such tests shall be retained by the fire code official for the period required for retention of public records. (OFC 104.9.2)
11.1.2.2.1 Fire Site Plan Submittal Checklist

Standard

*Construction documents* and supporting data shall be submitted in two or more sets with each application for a permit and in such form and detail as required by the *fire code official*. The *construction documents* shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

Specifications

1. The fire code official shall examine or cause to be examined the accompanying construction documents and shall ascertain by such examinations whether the work indicated and described is in accordance with the requirements of this code.

2. It shall be the responsibility of the applicant to ensure that the construction documents include all of the fire protection requirements and the shop drawings are complete and in compliance with the applicable codes and standards (OFC 105.4.3).

3. Construction documents shall be drawn to scale upon suitable material.
   a. Electronic media documents are an allowed method of submission.
   b. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations as determined by the fire code official (OFC 105.4.2).

4. Shop drawings for the fire protection system(s) shall be submitted to indicate compliance with this code and the construction documents, and shall be approved prior to the start of installation.
   a. Shop drawings shall contain all information as required by the referenced installation standards in OFC Chapter 9 (OFC 105.4.2.1)

5. All plans submitted for Corvallis Fire Department review must use the Fire Site Plan Submittal Checklist.
## Fire Site Plan Submittal Checklist
### New Construction/Additions

### GENERAL SUBMITTAL REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Yes</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan sheets labeled “FD-1, FD-2, FD-3, FD-n”, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan sheets with drawings properly scaled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic “AS BUILT” submittal of the FD Plan Sheets (.pdf)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic submittal of all AM &amp; M Agreements (.pdf)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PROJECT GENERAL FIRE INFORMATION (Sheet FD-1)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Yes</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Address/Tract/Tentative Tract/Parcel Map Number shown?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Corvallis Fire Department site plan notes are included?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Information Summary Table to include: building area; construction type; number of above or below grade levels; occupancy uses; and, fire sprinklers/alternate fire suppression systems provided?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Temporary Procedures During Construction (include notes on Sheet FD-1)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Yes</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of temporary addressing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access TO and THROUGH the project site DURING CONSTRUCTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary Fencing with KNOX PADLOCKS?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary Water Supply?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary Standpipe?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### FIRE SITE PLAN SHEET (Sheet FD-2)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Yes</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior walls, interior fire walls, interior enclosed/exterior stairways, elevator shafts and their fire-restive rating (if any)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of all roof projections/overhangs from exterior walls?</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Location of highest point on the roof &gt; 30 feet above the level of “Fire Department Vehicle Access”</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Location of building entry/egress points and loading doors/docks?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of building Knox Key Box?</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Location of Fire Alarm Panel?</td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

(Show only exterior wall locations of existing buildings)

N/A – No fire alarm or fire suppression system.
| Location of Fire Alarm Annunciator? | ☐ Yes | ☐ N/A – No fire alarm or fire suppression system. |
| Location of Fire Sprinkler Riser Room? | ☐ Yes | ☐ N/A – No fire alarm or fire suppression system. |
| Location of all external Horn/ strobes or Water Flow Alarm Bells | ☐ Yes | ☐ N/A – No fire alarm or fire suppression system. |
| Location of property lines and “North” directional arrow? | ☐ Yes | ☐ N/A – No fire alarm or fire suppression system. |
| Location of all exterior trash/ recycling enclosures/ collection sites? | ☐ Yes | ☐ N/A – Only interior collection room(s) provided. |
| Location of all exterior utility meters/shut- offs (Nat. gas, Electric) | ☐ Yes | ☐ N/A – All utility meters are located inside. |
| Premises address signage location identified? | ☐ Yes | ☐ No – Site monument sign provided |

### Water and Fire Hydrants

- All existing public/private fire hydrants on/within 600’ of the site?
  - ☐ Yes
  - ☐ N/A – Only roads adjacent to buildings (OFC Appendix C)
- New fire hydrants provided along required access roads?
  - ☐ Yes
  - ☐ N/A (Show Static psi and GPM at 20 psi)
- Most hydraulic remote private hydrant: Annotate with design flow?
  - ☐ Yes
  - ☐ N/A
- All new/existing private fire water service mains and control valves?
  - ☐ Yes
  - ☐ N/A – Not protected with a fire sprinkler system

### Access and Roadways

- Extent of fire access roadway(s) and any adjacent parking areas/width provided clearly shown?
  - ☐ Yes
  - ☐ N/A – Private fire access roads not required.
- Turning radii, including the associated center points and their arcs for each turn? *Auto-CAD using CFD apparatus preferred method.*
  - ☐ Yes
  - ☐ N/A – Private fire access roads not required.
- Road surface width and clearance height to overhead projections?
  - ☐ Yes
  - ☐ N/A
- Located within 150’ hose pull distance of exterior of all structures?
  - ☐ Yes
  - ☐ No (Mitigation proposed via AM&M)
- Walkable surfaces to required building openings shown?
  - ☐ Yes
  - ☐ N/A
- Location of vehicle loading/unloading zones?
  - ☐ Yes
  - ☐ N/A
- Is Aerial Access required per 2014 CFC Section 7.08.200? Note: *If the highest portion of the building is greater than 30 feet from the level of CFD vehicle access, aerial access is required.*
  - ☐ Yes
  - ☐ N/A

### Fire Lane Identification

- YELLOW curbs are used for Fire Lanes in PUBLIC right-of-
  - ☐ Yes
  - ☐ N/A (No curbs. Signs provided)
way?

RED curbs are used for Fire Lanes on PRIVATE property?  
☐ Yes  ☐ N/A (No curbs. Signs provided)

Contrasting STENCILING indentifying “FIRE LANE” for painted curbs?  
☐ Yes  ☐ N/A (No curbs. Signs provided)

Location of each “Fire Lane—No Parking” sign shown?  
☐ Yes  ☐ N/A (No curbs. Signs provided)

Fire Lane identification shown 30 feet on either side of any driveway entrance accessed from ≤ 28 foot wide street, with on-street parking?  
☐ Yes  ☐ N/A

Are the Aerial Access Fire Lanes indentified? Use 40% shading/gradient to identify Aerial Access road 26 feet width and 90 feet length.  
☐ Yes  ☐ N/A

Gates and other Obstructions

Location of all gates, fences, road bollards, and planters?  
☐ Yes  ☐ N/A – No gates proposed.

Vehicle gates identified as manual or electric?  
☐ Yes  ☐ N/A – No gates or manual gate provided.

Pedestrian gate provided adjacent to electric vehicle gate?  
☐ Yes  ☐ N/A – No manual gates proposed.

Emergency use-only vehicle gates have “No Parking” sign noted?  
☐ Yes  ☐ N/A – No gates proposed.

Knox key boxes/locks/switches are noted on plans?  
☐ Yes  ☐ N/A – No street trees proposed.

Location and mature height of Street Trees?  
☐ Yes  ☐ N/A – No street trees proposed.

Other Site Information

Premises ID/address monument location?  
☐ Yes  ☐ N/A (Address signage provided on buildings)

Buildings >75’ to highest occupiable floor called out?  
☐ Yes  ☐ N/A (No high-rise structures)

Location and identity of all exterior aboveground storage tanks, private utility equipment (e.g. cell phone towers), non-vehicle storage areas or process equipment locations?  
☐ Yes  ☐ N/A

Fire access/hydrant phasing plan provided?  
☐ Yes  ☐ N/A (No phasing of access/hydrant installation)

PROJECT FIRE DETAILS (Sheet FD-3 as needed)

CFD vehicle gate detail drawings included on plan?  
☐ Yes  ☐ N/A (No gates)

Road and walkway grades >10% shown on plan?  
☐ Yes  ☐ N/A (Grade <10%)

Detail drawings of Fire Lanes and “No Parking signs provided?  
☐ Yes  ☐ N/A – No onsite private fire access roads.

PROJECT SUPPORTING DOCUMENTS (Sheet FD-n as needed)

Alternate Materials and Methods request letter?  
☐ Yes  ☐ N/A (No alternate methods proposed)

Fire Flow Calculation Form, to include required fire hydrant spacing required and proof of adequate water availability?  
☐ Yes  ☐ See OFC Appendix B & C

Engineer’s certification letter that required new/improved roads are an all-weather surface that will accept 75,000 GVW?  
☐ Yes  ☐ N/A (No new road-existing road improvements)
CFD vehicle gate notes/specifications included on plan?  

- [ ] Yes  
- [ ] N/A (No gates)

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Corvallis Fire Code References

- **2014 Corvallis Fire Code**: Formal adoption of the 2014 Oregon Fire Code with some local interpretations

- **2014 Oregon Fire Code**
  [http://www.ecodes.biz/ecodes_support/Free_Resources/Oregon/Oregon_main.html](http://www.ecodes.biz/ecodes_support/Free_Resources/Oregon/Oregon_main.html)

- **2013 NFPA 13**: Standard for the Installation of Sprinkler Systems

- **2013 NFPA 13R**: Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies

- **2013 NFPA 13D**: Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

- **2013 NFPA 14**: Standard for the Installation of Standpipe and Hose Systems

- **2013 NFPA 72**: National Fire Alarm and Signaling Code


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11.1.2.2.2 Example: Request for Alternative Material & Method, NFPA 13D

to: Corvallis Fire Marshal
from: (Property Owner Name)
Address:
subject: AM&M request in lieu of Fire Department Access
date: [Click to Select Date]

Corvallis Fire Marshal,

Predevelopment consultations with the Corvallis Fire Department have established that prescriptive fire department access cannot be achieved per the 2014 Oregon Fire Code on our project site due to:

- Fire department access road grade exceeding 12 percent (OFC Chapter 5, 503.2.7; Appendix D103.2).
- Fire department access on a dead-end road exceeding 750 feet (OFC Chapter 5, 503.2.5; Appendix D103.4).
- Fire department access on a dead-end road exceeding 150 feet without turnarounds (OFC Chapter 5, 503.2.5; Appendix D103.4).
- A single family residential development exceeding 30 structures with a single means of egress (OFC Appendix D107.1).

In order to meet the prescriptive intent of the 2014 Oregon Fire Code for fire department access and water supply we would like to propose an equivalent alternative method of fire protection: the installation of a NFPA 13D automatic residential fire sprinkler system in all single family residential structures within the (proposed) subdivision. This condition will be attached as a deed restriction to all parcels within the development, and will be a condition of development of those parcels.

Sincerely,

[Signature]

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11.1.2.2.3 Example: Alternative Material & Method Acceptance Memo

to: (Property Owner Name)  
Address:  
from: Jeff Prechel, Fire Marshal  
subject: Approval of AM&M request in lieu of Fire Department Access  
date: [Click to Select Date]  

Dear (Property Owner),

During the Corvallis Fire Department plan review of your (Proposed) Development project it was determined that the site was not complaint with the access requirements in the 2014 edition of the Oregon Fire Code due to:

- Fire department access road grade exceeding 12 percent (OFC Chapter 5, 503.2.7; Appendix D103.2).
- Fire department access on a dead-end road exceeding 750 feet (OFC Chapter 5, 503.2.5; Appendix D103.4).
- Fire department access on a dead-end road exceeding 150 feet without turnarounds (OFC Chapter 5, 503.2.5; Appendix D103.4).
- A single family residential development exceeding 30 structures with a single means of egress (OFC Appendix D107.1).

The Corvallis Fire Prevention Division has evaluated your proposed Alternative Material and Method (AM&M) of fire protection, a NFPA 13D automatic residential fire sprinkler system, in lieu of prescriptive compliance with the access requirements within the Oregon Fire Code.

The proposed installation of a full NFPA 13D automatic residential fire sprinkler system in lieu of prescriptive fire department access as an AM&M will be accepted as a condition that applies to the development of each parcel within the (proposed) subdivision.

Very respectfully,

Jeffrey Prechel  
Division Chief – Fire Marshal  
Corvallis Fire Department

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11.1.2.3 Fire Department Apparatus Access

Standard
Approved fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within a jurisdiction.

Specifications
1. The fire apparatus access roads shall comply with the requirements of OFC Section 503 & Appendix D, and as defined by this Guide.

2. Construction documents for proposed fire apparatus access, location of fire lanes, security gates across fire apparatus access roads and construction documents and hydraulic calculations for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction (OFC 501.3).

3. When fire apparatus access roads or a water supply for fire protection is required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except when approved alternative methods of protection are provided (OFC 501.4).

4. Fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Section 503.2.1 shall be maintained at all times (OFC 503.4).

5. Traffic calming devices shall be prohibited unless approved by the fire code official. (OFC 503.4.1)

Alternative Method & Materials
1. Fire apparatus access roads and specifications are allowed to be modified by the Fire Marshal where any of the following conditions apply:
   a. A building has an automatic fire sprinkler system installed in accordance with the provisions of NFPA 13, NFPA 13R, or NFPA 13D that was not otherwise required by code (OFC 503.1.1, Exception 1).
   b. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, non-negotiable grades, or similar conditions. Under this condition, an approved alternate means of fire protection shall be provided as approved by the fire code official (OFC 503.1.1, Exception 2).
   c. Where there are no more than two dwellings (Group R-3) or utility (Group U) structures served by a fire apparatus access road (OFC 503.1.1, Exception 3), and all other fire department access provisions are met.
11.1.2.3.1 Proximity of Buildings to Fire Apparatus Access Roads

Standard:
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 (Oregon Fire Code 503.1.1).

Specifications:
An approved route generally follows the outline of a building and is not closer than 10 feet from the nearest edge of the building. This route follows a route where fire hoses may be deployed during fire operations.

![Diagram of building proximity to fire apparatus access roads]

Non-Conforming Driveway Example

Max. 300 Ft.

Building or Facility

Public Street
11.1.2.3.2 Multiple Fire Apparatus Access Roads & Road Separation

Standard:
More than one fire apparatus access road may be required, 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. Access roads shall be located as required by the fire code official (Oregon Fire Code Section 503.1.2).

Specifications: (OFC Appendix D)
1. Two access roads are required under the following conditions:
   a. One- and two-family dwellings (Group R-3) where there are more than 30 dwelling units, with an exception for installation of automatic fire sprinkler systems (OFC Appendix D107.1).
   b. Multiple-family residential developments (Group R-2) having more than 100 dwelling units, with an exception for installation of automatic fire sprinkler systems (OFC Appendix D106.1).
   c. Multiple-family residential developments (Group R-2) having more than 200 dwelling units regardless of whether they have an approved automatic fire sprinkler system installed within each structure (OFC Appendix D106.2).
   d. At commercial or industrial developments with buildings or facilities having a gross building area of more than 62,000 square feet (OFC Appendix D104.2).
   e. At commercial or industrial developments with buildings or facilities having a gross building area of more than 124,000 square feet where all buildings have an approved automatic fire sprinkler system installed within each structure (OFC Appendix D104.2, Exception).
   f. At commercial or industrial developments with buildings exceeding three stories or 30 feet in height (OFC Appendix D104.1).
2. Access roads 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 Appendix D104.3).
3. The access roads shall enter onto a road that has access from two different directions.
4. The number of dwelling units on a single fire apparatus access road shall not be increased unless fire apparatus access road will connect with future development unless approved by the fire code official.
11.1.2.3.3 Fire Apparatus Access Road Widths and Vertical Clearances

Standard:
All fire apparatus access roads must have a drivable surface for fire vehicle travel that is wide enough to allow their full, complete, and instant use during fire and other emergencies (OFC 503.2.1).

Specifications:
1. Fire lanes and private roads shall have an unobstructed width of not less than 20 feet.
2. All fire apparatus access roads must have an unobstructed height of not less than 13 feet, 6 inches.
11.1.2.3.4 Fire Apparatus Access Road Turning Radius

**Standard:**
All fire department apparatus access roads shall be constructed with respect for the anticipated fire apparatus vehicles that will provide emergency services to the specific location under consideration.

**Specifications:** OFC Appendix Section D103.3.

1. The turning radius for access roads shall be as determined by the fire code official (OFC 503.2.4).
   a. The minimum inside turning radius shall not be less than 28 feet.
   b. The minimum outside turning radius shall not be less than 48 feet (minimum 96 foot diameter).

2. Both the inside and outside turning radius shall be measured from the same center point.
11.1.2.3.5 Fire Apparatus Access Road Grades and Angles of Approach & Departure

Standard:
The maximum grade for all fire apparatus access roads shall be within the limits established by the fire code official (OFC 503.2.7 & 503.2.8).

Specifications:
Maximum grade on Fire Apparatus Access Roads shall not exceed 10 percent.

Exception: Maximum grade on Private Driveways and Private Roads shall not exceed 12 percent.
1. Where grades exceed 10% the fire code official is authorized to accept, under the provisions of ORS 455.610(5), an automatic fire sprinkler system meeting the provisions of NFPA 13D, 13R, or 13 to be installed within all habitable structures as an alternative to meeting these requirements.

2. Under no circumstances shall the maximum grade exceed 15 percent at any single point along the driving surface of any fire apparatus access road.

3. Intersections, turnarounds, and water bars shall be essentially level with crowning allowed for water run-off (maximum of 5 percent grade allowed).

4. Angles of approach, break-over (ramp-over), and departure at the interface to and from fire apparatus access roads, and where grades change, shall be not more than 8 degrees. The angle shall be measured from the adjacent road surface.
11.1.2.3.6 Fire Apparatus Access Road Surfaces and Load Capacities

Standard:
Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities (OFC 503.2.3 & Appendix D102.1).

Specifications:
1. Fire apparatus access roads shall be constructed of an all-weather surface (asphalt concrete, or other approved driving surface) that meets the following:
   a. Easily distinguishable from the surrounding area by markings acceptable to the fire code official. Markings may include plantings, signs, or other arrangements acceptable to delineate the limits of fire access driving surfaces.
   b. Capable of supporting not less than a **60,000 pound live load** (gross vehicle weight).
   c. The weight limit specified in section 1(b) above may be increased to 75,000 pound live load based upon the actual weight of fire apparatus serving the location.
   d. A **point load of 8,000psf** shall be considered when designing aerial apparatus access roads which require the use of specialized jacking pads and outriggers.

2. Private roads and driveways must be constructed and maintained as designed.

3. Private driveways shall be constructed of an approved design, meeting the weight limits established above.

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11.1.2.3.7 Fire Apparatus Access Road Dead-Ends and Turnarounds

**Standard:**
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 (Oregon Fire Code Section 503.2.4, 503.2.5).

**Specifications:** OFC Appendix Section D103.4, & Table D103.4
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.
11.1.2.3.8 Turnouts on Private Driveways

Standard:
When a driveway exceeds 400 feet in length, turnouts shall be provided unless otherwise approved by the fire code official (OFC 503.1.1).

Specifications:
1. Turnouts shall be 20 feet wide and 40 feet long at the widest part.
2. Turnouts shall be located no more than 400 feet apart unless approved by the fire code official.
3. The distances between turnouts, road intersections, and turnarounds may have the length modified based on visibility and line-of-sight distances.
4. Visual indicators such as reflective markers shall be located to delineate the location and extent of turnouts.
11.1.2.3.9 Aerial Fire Apparatus Access Road Specifications

Standard:
Building or portions of buildings or facilities exceeding 30 feet in height above the lowest level of fire department vehicle access shall be provided with approved fire apparatus access roads capable of accommodating fire department aerial apparatus. Overhead utility and power lines shall not be located within the aerial fire apparatus access roadway (Oregon Fire Code Section 503.1, CMC 7.08.200).

If fire department access cannot be achieved on the public roadway, adequate access into the site must be provided in a method approved by the Fire Marshal. This may necessitate the removal of on-street parking to accommodate the fire apparatus turning radius.

Specifications: (OFC Appendix D105).
1. Fire apparatus access roads shall have an unobstructed driving surface width of not less than 26 feet and shall be in the immediate vicinity of any building or portion of a building that is more than 30 feet in height.
2. At least one of the required fire apparatus access roads 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.
3. The aerial apparatus set-up zone must be at least 100 feet in length, and in a location approved by the Fire Marshal.
4. The aerial access road shall have a load bearing capacity of 75,000 pounds, and a point load in the set-up area of 8,000psf.
5. Overhead utility and power lines shall not be located over aerial fire apparatus access road or between the aerial fire apparatus road and the building. Other obstructions shall be permitted to be placed with the approval of the fire code official.
   a. For buildings 4 stories or less in height fire aerial apparatus access roads and specifications are allowed to be modified by the fire code official when the building has been equipped with an automatic fire sprinkler system installed in accordance with the provisions of NFPA 13, NFPA 13R, or NFPA 13D.
Example Dimensions:
Street Width: 32 Feet
Driveway Apron Width: 20 Feet
Parking Strip Width: 8 Feet
Ladder Truck Length: 47 Feet
Ladder Truck Width: 11-1/2 Feet
11.1.2.3.10 Gates on Fire Apparatus Access Roads

Standard:
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 access ways, not including public streets, alleys or highways.

Specifications: Refer to OFC Appendix Section D103.5 for specifications.
1. Gates shall be a minimum width of 20 feet wide for fire lanes and private roads. Gates shall be a minimum width of 16 feet for private driveways.

2. Gates shall be of either the swinging or sliding type and may be either a single or double section.

3. Gates shall not reduce the minimum required width of the access road width when in a fully open position.

4. Where security gates are installed, they shall have an approved means of emergency operation and shall be maintained operational at all times (OFC 503.6).
   a. Electric gate operators, where provided, shall be listed in accordance with UL 325.
   b. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200 (OFC 503.5).
   c. Gates that are power operated shall require the installation of a means to open the gate when there is a loss of power to the gate operating device (OFC 503.6).
   d. Gates shall be constructed to allow manual operation by a single person (OFC 503.6).

5. Gates and barricades shall be secured in accordance with the following:
   a. Gates secured with padlocks or chains and padlocks shall be capable of being opened by means of a Knox key, or with keys provided in a Knox Box installed at the gate location.
   b. All security devices shall allow opening without undue delay of fire apparatus during emergencies.

6. Gates shall be set back from roadways not less than 30 feet and shall swing into the roadway that is served.

7. Gates installed on private driveways, fire lanes, and other fire apparatus access roads shall not cause cross traffic to stop or create a hazardous traffic condition on the roadway when the access road is occupied by emergency apparatus or other large vehicles.

8. Gate components shall be maintained in an operative condition at all times and replaced or repaired when defective.

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11.1.2.3.11 No Parking Signs & Painted Curbs

Standard:
Approved signs shall be provided for fire apparatus access roads to identify such roads or to prohibit the obstruction thereof. Fire apparatus access roads shall be marked in an approved manner as specified by the fire code official and in accordance with this section (Oregon Fire Code Section 503.3).

Specifications:
Signs shall comply with the current Manual on Uniform Traffic Control Devices adopted by the State of Oregon. Below are examples of acceptable signage.

1. Signs shall meet the specifications for the R7 series and shall have red writing on a white reflective background.

2. Signs shall be a minimum size of not less than 12 inches by 18 inches.

3. Signs shall be constructed of 0.080 thickness aluminum.

4. Reflective sheething shall be high intensity prismatic or better.

5. Signs or markings shall be maintained in a clean and legible condition at all times and shall be replaced or repaired when necessary to provide adequate visibility.

6. In lieu of signs, other marking methods may be applied where approved by the Fire Marshal.

7. In lieu of signs, fire lanes curbs may be marked as follows:
   a. Curbs shall be painted a color approved by the Fire Marshal.
   b. Curbs shall have the words, “Fire Lane, No Parking” stenciled in paint
   c. Lettering shall be legible and shall contrast with the background color.
11.1.2.3.12 Premises Identification

Standard
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 (OFC Section 505).

1. Two sets of addressing plans shall be submitted to Community Development for approval by the Fire Department.

Specifications (OFC 505.2)
1. Streets and roads shall be identified with approved signs.
2. Address numbers shall be provided in additional approved locations to facilitate emergency response.
3. Address numbers shall be maintained

Temporary (OFC 505.2)
1. Temporary address signs shall be placed in a position that is plainly legible and visible from the street or road fronting the property.
2. Temporary signs shall be installed at each intersection when construction of new roadways allows passage of vehicles.
3. Temporary address signs shall be installed where there is undue difficulty with locating a given structure or facility during emergencies.
4. Temporary signs shall be of an approved size, weather resistant, and maintained until replaced by permanent signs.
5. Temporary address markings shall use Arabic numerals or alphabetic letters.
11.1.2.3.12.1 Addressing Signage

**Residential – Single Family, Duplex, Mobile**
1. Building addresses shall be a minimum of four inches (102 mm) in height, contrasting in color to the background, readily visible from the street, and located in an area with exterior lighting.

2. Where structures are set back more than 50' from the street, larger numbers shall be required.

3. In the event a structure is not visible from the street, the address numbers shall be posted adjacent to the driveway entrance as well as on the structure.

**Apartments, Condominiums, Hotels, Motels**
1. Building addresses shall be a minimum of six inches (152 mm) in height, with a stroke of not less than ¾ inch (19 mm), contrasting in color to the background, readily visible from the street, and illuminated during the hours of darkness. This may require addresses in more than one location on the building.

2. Where structures are set back more than 150' from the street, larger numbers shall be required.

3. Each individual unit number shall be above or adjacent to the entrance door. If displayed adjacent to the entry door, it shall be on the exterior wall side that will allow the digits to remain visible even when the door is in the fully open position.
   a. Unit numbers shall be a minimum of four inches (102 mm) in height, contrasting in color to the background and readily visible.

4. Individual unit numbers shall be 3 digits, with the first digit identifying floor level, the following two positions identifying sequential unit numbers located on that level. As viewed from side where the individual apartment entry doors are accessed and visible, the numbering shall start on the left and increase numerically as you read/view to the right.

<table>
<thead>
<tr>
<th>Building Level</th>
<th>Room/Space Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor 3</td>
<td>301 302 204 304</td>
</tr>
<tr>
<td>Floor 2</td>
<td>201 202 203 204</td>
</tr>
<tr>
<td>Mezzanine</td>
<td>M101 M102 M103 M104</td>
</tr>
<tr>
<td>Floor 1</td>
<td>101 102 103 104</td>
</tr>
<tr>
<td>Basement Floor 01</td>
<td>B101 B102 B103 B104</td>
</tr>
</tbody>
</table>
Commercial/Industrial

1. Building address shall be a minimum of six inches (152 mm) in height with a stroke of not less than ⅜ inch (19 mm), contrasting in color to the background, readily visible from the street, and illuminated during the hours of darkness.

2. Where structures are set back more than 150' from the street, larger numbers shall be required. In the event a structure is not visible from the street, the address numbers shall be posted adjacent to the driveway entrance as well as on the structure.

3. Suite numbers shall be above or adjacent to the entrance door.
   a. Suite numbers shall be a minimum of four inches (102 mm) in height, contrasting in color to the background and readily visible.

4. Multiple occupancies with rear doors shall also provide suite numbers above or adjacent to the rear door.
   a. Rear door numbers shall be a minimum of four inches (102 mm) in height, contrasting in color to the background and readily visible.

Directory Map

1. Address directory maps shall be provided at each entrance into a complex containing six or more buildings and 36 individual units.

2. Maps shall show all streets, driveways, building numbers, unit numbers, a notation “you are here,” and any additional information that would assist in locating individual units.

3. It is suggested that this directory map be island mounted so that it is on the driver’s side of an approaching vehicle and that the directory island or turnout is so designed that a vehicle stopped at the directory map does not block vehicle access to the complex.

Directory Map Dimensions

1. Set back two feet (0.6 m) from the curb, facing the driveway. Minimum size: 3’ X 2’ (0.91 m X 0.6 m).

2. Individual unit numbers: 1/4 inch (6.4 mm) in height. Building numbers: 3/8 inch (9.5 mm) in height.

3. Lettering: ½ inch (12.7 mm) in height.

4. During the hours of darkness, the map shall be illuminated or located in an illuminated area.

5. These numbers shall contrast with their background. Where required by the fire code official, Address numbers shall be Arabic numbers or alphabetical letters.

6. Numbers shall be a minimum of 4 inches (101.6 mm) high with a minimum stroke width of 0.5 inch (12.7 mm).

7. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure.
11.1.2.3.12.2 Reflective Rural Address Markers

1. For those residents who wish to identify their driveway entrances with a highly reflective address number, the following signage is available and recommended by the Corvallis Rural Fire Protection District. The cost will be borne by the homeowner. For ordering information, call (541)766-6961 or visit the CRFPD website at: http://www.corvallisrfpd.com/ruralsigns/ruralsigns.htm

2. An all-weather fiberglass white delineator post provided with a high intensity reflective tape background, 3 inches wide, with 4 inches in height and blue address numbers applied to both sides. The marker is to be installed adjacent to the entrance driveway outside of the public street right of way and visible to traffic from both directions. The post is 66 inches high and installed 18 inches into the ground.

3. Product information: Fiberglass delineator post = Carsonite CIB-390 with an anchor on the bottom, or equivalent. High intensity background tape: 3M 3870SIL-CL, 3 inch width or equivalent. Blue transparent tape: 3M Blue EC film 1175S or equivalent.
11.1.2.3.13 Key Boxes

Standard
Where access to or within a structure or an area is restricted because of secured openings, or where immediate access is necessary for life-saving or fire-fighting purposes, the fire code official is authorized to require a key box to be installed (OFC 506.1).

1. The approved CFD key box and related security devices (HazMat cabinets, pad locks, and key operated switches) are produced by the Knox Company: http://www.knoxbox.com/

2. The operator of the building shall immediately notify the fire code official and provide the new key when a lock is changed or rekeyed. The key to such lock shall be secured in the key box (OFC 506.2).

Knox Box Contents

1. When more than one (1) key is secured in the Knox Box, each key shall each be legibly identified as to its use, utilizing a round key tag a minimum of one (1) inch in diameter. Necessary keys provided by the building owner or business owner may include:
   a. Main Entrance Door
   b. Fire Alarm Control Panel,
   c. Alarm Codes
   d. Manual Pull Stations
   e. Fire Sprinkler Control Padlock/s
   f. Mechanical Rooms
   g. Elevator Control
   h. Attic or Roof Access
   i. Any Other Keys Necessary to Access Building Controls

All keys stored in the Knox Box should be hung on the key hooks supplied with the vault. Keys placed on the floor of the vault will rust and also may jam the locking mechanism.

Structure Specifications

1. A Knox Box is required on all new buildings that are protected by a fire sprinkler system (except single and duplex dwellings) and/or automatic fire alarm system (except for single and duplex dwellings) monitored by an approved fire alarm service.

2. The Knox Box shall be located at the main entrance into the structure. The Knox Box shall be located immediately adjacent to the main door/s, located to the right side (as viewed from the outside, facing the door/s), and mounted six (6) feet above finished floor level. Any deviation from these location parameters shall be reviewed by the Fire Department prior to installation of the Knox Box.

3. The two-inch square, red reflective, self-adhesive Knox decal shall be attached to the door located closest to the installed Knox Box. The decal shall be placed next to the door locking mechanism, in an area not subject to repainting if possible.

4. The Knox Box shall be secured to the structure with a minimum of five (5) 5/16 inch diameter Grade 8 carriage bolts per the Knox Company installation instructions or Fire Department approved equivalent fasteners. The bolts shall penetrate through a substantial structural element, and the securing lock nuts shall be located within the Knox Box. Tamper switches are optional but recommended in those
occupancies where the tamper switches can be integrated with a monitored sprinkler or fire alarm system.

5. Series 3200 Knox Box is designed to provide secure storage for up to ten (10) keys. Series 4400 Knox Box shall be used when storage of ten (10) or more keys is necessary. The recessed-mount style box is recommended as this style of installation is more resistant to vandalism. All series 3200 and 4400 Knox Boxes are fully tested and listed by UL as both an anti-theft device and burglar alarm system accessory unit (OFC 506.1).

Special Applications

Doors Provided with Electro-Magnetic Security Locks
1. When the main entrance to a structure is provided with an electro-magnetic security locking system and keypad or card reader, Fire Department emergency access can be accomplished by:
   a. Providing a Knox key switch wired to release the magnetic door lock. This Knox key switch shall be mounted at the keypad or card reader provided at the entrance door; or,
   b. Providing a security key card for door release. This key card shall be stored in a Knox box located at the door at which access is to be provided. Knox box mounting location shall be as designated above.

Vehicle Gates, Automatically Operated (Unattended)
1. Electrically operated gates that control vehicle access on drives utilized by Fire Department vehicles shall be provided with a Knox key switch.

2. If the gate provides access to a residential neighborhood or complex housing more than 18 units, emergency gate control shall be accomplished utilizing the Opticom system.

3. The Knox key switch shall be mounted adjacent to the key pad or card reader and face the vehicle access drive.

Vehicle Gates, Manually Operated
1. A Knox padlock is the preferred method of security. If the gate design will not accommodate more than a single padlock and access is required by other individuals or agencies, a single private padlock may be utilized and a Knox Box installed.

2. The Knox Box shall be located on the support fence post closest to the private padlock. If the gate has two panels, the Knox Box shall be installed on the right support fence post, located at a height of six (6) feet or at the top of the post for a fence less than six (6) feet in height.

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11.1.2.3.14 Fire Department Access to Equipment

**Standard**
Fire protection equipment shall be identified in an approved manner (OFC 509.1).

**Specification**
1. Identification. Rooms containing controls for air-conditioning systems, sprinkler risers and valves, or other fire detection, suppression or control elements shall be identified for the use of the fire department. Approved signs required to identify fire protection equipment and equipment location shall be constructed of durable materials, permanently installed and readily visible (OFC 509.1).

2. Equipment access. Approved access shall be provided and maintained for all fire protection equipment to permit immediate safe operation and maintenance of such equipment. Storage, trash and other materials or objects shall not be placed or kept in such a manner that would prevent such equipment from being readily accessible (OFC 509.2).

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11.1.2.3.15 Fire Apparatus Access during Construction Operations

Standard:
Approved vehicle access for firefighting shall be provided to all construction or demolition sites. Fire apparatus access roads shall be approved by the fire code official prior to beginning construction or demolition of buildings. Roads shall meet the requirements of this guide (OFC 3310.1).

Specifications:
1. Approved vehicle access for firefighting and emergency medical service shall be provided to, and through, all construction or demolition sites (OFC 3310.1).
2. Construction roads exceeding 150 feet shall be equipped with a fire department turnaround.
3. Vehicle access shall be provided to within 100 feet of temporary or permanent fire department connections (OFC 3310.1).
4. Vehicle access shall be provided by either temporary or permanent roads, with a load bearing capacity capable of supporting 60,000 pounds under all weather conditions.
5. Vehicle access shall be maintained until permanent fire apparatus access roads are available (OFC 3310.1).
6. All construction gates over roadways or obstructing water supplies shall have keyed Knox Padlock or other device approved by the fire department (OFC 3310.2).
11.1.2.3.16 First Responder Radio Coverage

Standard:
All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems (OFC 510.1).

Specifications - New Construction
Emergency responder radio coverage must be provided in the following new buildings and locations (OFC 510.1.1):
1. Any building with one or more basement or below grade building levels
2. Any underground building
3. Any building more than five stories in height
4. Any building 50,000 square feet (4645 m2) in size or larger
5. Any building that, through performance testing, does not meet the requirement of Section 510

Specifications - Existing Buildings
1. Existing buildings shall be provided with approved radio coverage for emergency responders (OFC 510.2)
2. Existing buildings that do not have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building, shall be equipped with such coverage according to one of the following (OFC 1103.2)
   a. Whenever an existing wired communication system cannot be repaired or is being replaced, or where not approved in accordance with Section 510.1, Exception 1.
   b. Within a time frame established by the adopting authority.
   c. Exception: Where it is determined by the fire code official that the radio coverage system is not needed.
11.1.2.4 Fire Protection Water Supplies

Standard
An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction (OFC 507.1).

11.1.2.4.1 Fire Flow Requirements for Buildings WITH Adequate and Reliable Water Systems

Specifications
1. Fire flow requirements for buildings or portions of buildings and facilities shall be determined by an approved method (OFC 507.3). See OFC Appendix B.

2. The fire flow rate of a water supply is measured at 20 pounds per square inch (psi) residual pressure that is available for firefighting (OFC Appendix B102.1).

3. The provisions of the OFC Appendix section B105 shall apply to those areas where fire hydrants and water supply systems are present and that are capable of meeting the minimum specified fire flows specified as follows:
   a. The minimum fire flow and flow duration requirements for one- and two-family dwellings having a fire-flow calculation area that does not exceed 3,600 square feet shall be 1,000 gallons per minute for 1 hour. Fire-flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet shall not be less than that specified in Table B105.2 as modified by Section B105.4 (OFC Appendix B105.2).
   b. The minimum fire-flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table B105.2 as modified by Sections B105.3 and B105.4 but shall be not less than 1,500 gallons per minute at not less than 20 pounds per square inch residual (OFC Appendix B105.3).

4. Based on the firefighting capabilities of the jurisdiction, the Corvallis Fire Department has limited the maximum required fire-flow.
   a. No building shall be constructed, altered, enlarged, moved, or repaired in a manner that by reason of size, type of construction, number of stories, occupancy, or any combination thereof creates a need for a fire-flow in excess of 3,000 gallons per minute at 20 pounds per square inch residual pressure as specified in OFC Appendix B Table 105.2, or exceeds the available fire flow at the site of the structure (OFC Appendix B106.2).

5. Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official (OFC 507.5.1).

Exceptions:
1. For Group R-3 and Group U occupancies, the distance requirement shall be 600 feet
2. For buildings equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 600 feet.
Subsequent to fire protection system design and plan submittal for review of a hydraulically calculated fire sprinkler system, the volume and pressure of the public water supply shall be determined from water flow test data.

b. Much of the City has been pre-tested and Fire Flow information can be found using: Google Chrome browser (only) at [http://50.112.128.65/hydrantinspection/Index.html](http://50.112.128.65/hydrantinspection/Index.html)
   i. Hydrants that have been Flow Tested within the previous 5 years will have a Gold or Green Icon on the Hydrant Inspection Map
   ii. Select the hydrant icon to view the Fire Flow information.
   iii. Pan the mouse to scroll down and view historical information

c. For areas that have not been tested, Fire Flow tests can be requested through the Fire Prevention Division.
   i. Call the Fire Prevention Division at 541-766-6961 to request a Fire Flow test.
   ii. Provide the hydrant number and hydrant address found on the Hydrant Inspection website that you wish to have tested in your request.
   iii. The turnaround time for CFD personnel to conduct a Fire Flow test and publish the test results is generally 10 working days.
   iv. This test is pre-paid through the fire sprinkler permitting process.
d. If no current Fire Flow data is available, a developer has the option to have the test conducted through a private entity under the following guidelines:
   i. Corvallis Public Works and the Fire Department shall be notified prior to performing any hydrant water flow tests.
   ii. The test shall be conducted by a fire sprinkler contractor, a fire protection engineer, or a NICET Level III sprinkler designer.
   iii. Approved independent testing shall utilize the flow test procedure identified in NFPA 13, Chapter 23.
   iv. At the conclusion of the flow test, documented results shall be submitted to representatives of Development Services, Corvallis Public Works, and the Fire Marshal’s office for review and entry into the permanent record.
### 11.1.2.4.1.1 Fire Flow Work Sheet

**Corvallis Fire Department**  
**Development Review**  
**Fire Flow Work Sheet**

<table>
<thead>
<tr>
<th>OSSC 602</th>
<th>OFC B104</th>
<th>OFC B105.3.1.2</th>
<th>OFC B105.3.1.2</th>
<th>OFC TABLE B105.4 NFPA 13 A5.3.2</th>
<th>OFC TABLE B105.1</th>
<th>OFC TABLE C105.1</th>
<th>OFC TABLE C105.1 (a, b, c)</th>
<th>OFC TABLE C105.2 (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONST TYPE</td>
<td>FIRE AREA (SQFT)</td>
<td>REQUIRED FIRE FLOW TABLE PER OFC APPENDIX B</td>
<td>FIRE ALARM 25% FF REDUCTION PER OFC APPENDIX B</td>
<td>FIRE SPRINKLER 75% FF REDUCTION PER OFC APPENDIX B</td>
<td>HAZARD MODIFIER OFC APPENDIX B</td>
<td>MODIFIED FF REQUIRED PER APPENDIX C</td>
<td>HYDRANTS REQUIRED PER APPENDIX C</td>
<td>Max spacing, and max distance of all hydrants from structure</td>
</tr>
<tr>
<td>Example</td>
<td>V-b</td>
<td>10,500</td>
<td>2,750</td>
<td>(687.5)</td>
<td>(0.00)</td>
<td>1.00</td>
<td>2,062.5</td>
<td>2</td>
</tr>
</tbody>
</table>

**Existing Structure**

**Proposed Structure**

**Existing Hydrants**

**Additional Hydrants Required**

- a) Reduce by 100 feet for dead-end streets or roads
- b) Where streets are provided with median dividers which 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 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.

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11.1.2.4.1.2 Fire Hydrants

Standard:
Fire hydrants shall comply with the Oregon Fire Code (OFC Section 507.5) and the City of Corvallis Engineering Division Standards Details. After March, 1995, the dry fire hydrant barrel specified by the City of Corvallis is provided with two 2½ inch outlets and a 4½ inch outlet. In conformance with the national standard NFPA 1963, all outlets are specified with National Standard Threads.

For installation requirements refer to the City of Corvallis Public Works fire hydrant specifications and Standard Detail 303 - Fire Hydrant Setting.

Specifications:
1. The installation of blue reflective markers on fire department access roads marking the location of all new or existing fire hydrants that are prescriptive for the fire protection of the site, is required and shall be installed at the time of building construction.

2. The installation of non-threaded quick connectors on fire hydrants and fire department connections shall be approved by the fire code official.

3. Unobstructed access to fire hydrants shall be maintained at all times. The fire department shall not be deterred or hindered from gaining immediate access to fire protection equipment or fire hydrants. (OFC 507.5.4)
   a. Remove security chains from 2 ½” port hydrant caps.

4. A clear space of not less than three feet shall be maintained around the circumference of fire hydrants (OFC 507.5.5).

5. Where fire hydrants are subject to impact by motor vehicles, guard posts or other approved means of physical protection shall be approved. Guard posts shall comply with the following requirements (OFC 505.5.6):
   a. Constructed of steel not less than 4 inches in diameter and concrete filled.
   b. Spaced not more than 4 feet between posts on center.
   c. Set not less than 3 feet deep in a concrete footing of not less than a 15 inch diameter.
   d. Set with the top of the posts not less than 3 feet above ground.
   e. Located no closer than 3 feet to the fire hydrant or FDC.

6. **STORZ Adapter.** To eliminate the need of carrying additional adapters on responding Corvallis Fire Department equipment, and to facilitate a quick connection, a 5-inch Storz adapter with National Standard Threads shall be installed on the 4½ inch outlet.
   a. The adapter shall be constructed of high-strength aluminum alloy, have a Teflon coating on the seat and threads, and use a rubber gasket and manufacturer provided set screws to secure the cap in place.
   b. The adapter shall be provided with an aluminum alloy pressure cap.
   c. The cap shall be attached to the hydrant barrel or Storz adapter with a cable to prevent loss or theft of the cap.

7. **Color Coding/STORZ Adapter Cap.** To provide additional visibility and to identify flow volume, the Storz adapter cap shall be identified by an adhesive-backed reflective circular trim.
   a. This reflective trim strip will encircle the cable anchor point located in the center of the pressure cap.
b. The reflective trim shall be attached by the contractor at the time new hydrants are accepted by the City Engineering Division.

c. On retrofitted hydrants, the reflective trim will be attached by the Fire Department after the inspection/flush is performed by the Fire Department.

d. The color of the adhesive trim shall indicate the available flow volume of the water supply system as identified in NFPA 291, “Fire Flow Testing and Marking of Fire Hydrants” (shown below):

<table>
<thead>
<tr>
<th>Trim Flow (GPM) @ 20 psi Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
</tr>
<tr>
<td>1,500 or greater</td>
</tr>
<tr>
<td>Green</td>
</tr>
<tr>
<td>1,000 - 1,499</td>
</tr>
<tr>
<td>Orange</td>
</tr>
<tr>
<td>500 – 999</td>
</tr>
<tr>
<td>Red</td>
</tr>
<tr>
<td>Less than 500</td>
</tr>
</tbody>
</table>

8. **Fitting Existing Hydrants with STORZ Adapters.** Beginning in 1996, the City has undertaken a long-range plan to fit existing hydrants with Storz adapters. Hydrants serving commercial districts and high life hazard occupancies will be given priority in the scheduling process. The City’s goal is to complete retrofit on all existing hydrants in the water system within ten years through a capital improvement project.

9. **Private Hydrants.** When on-site fire hydrants are required, City policy encourages the installation to be part of the public system. In those rare cases where the hydrants are private, they shall be identified by having the hydrant barrel/s painted red. Private hydrant systems shall be installed per NFPA 24.

10. **Private Hydrant – Maintenance.** The owners of developments provided with private water mains and hydrants are responsible for the maintenance and semi-annual testing of the hydrants in conformance with the NFPA 24, Section 14.1, and NFPA 25. The semi-annual test shall be documented on a tag and signed by the qualified individual performing the testing. This inspection tag shall be attached to one of the main shut-off valves on the double backflow preventer.

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11.1.2.4.1.3 Fire Hydrant Location and Distribution

Standard:
Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet from a hydrant on a fire apparatus access road, as measure by an approved vehicle driving route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided (OFC 507.5.1 & Appendix C).

Specifications:
1. Fire hydrants shall be provided along required fire apparatus access roads and public streets which are adjacent to buildings in accordance with the OFC Appendix C, Section C105.

2. Where dwellings (Group R-3) or utility (Group U) structures only are located, such as in residential subdivisions, the distance, as measure by an approved route around the exterior of the facility or building, from a hydrant shall be not more than 600 feet.

3. Where buildings are equipped throughout with an approved automatic fire sprinkler system installed to either NFPA 13, NFPA 13R, or NFPA 13D, the distance as measure by an approved route around the exterior of the facility or building, from a fire hydrant shall be not more than 600 feet.

4. The number of fire hydrants available, including consideration of existing fire hydrants, shall be in accordance with OFC Appendix sections C103 and C104.

5. The Fire Marshal shall approve the location and distribution of fire hydrants.
11.1.2.4.1.4 Water Supply during Construction or Demolition Operations

Standard:
An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material arrives on construction sites (OFC 3312.1).

Specifications:
1. Fire protection water supplies shall be operational prior to the beginning of combustible construction, and maintained during the demolition of buildings.

2. The Fire Marshal may allow an applicant to begin construction without on-site fire protection hydrants in place, provided the following conditions exist:
   a. The applicant submits a written request for permission to proceed with construction, using an alternate means of providing fire protection water supplies through use of existing fire hydrants.
   b. Any existing hydrant proposed for use shall be located within 400 feet of structure as measured along the road of fire department access.
   c. This request shall also state the applicant’s understanding that this alternate means of protection is for temporary use only and that all required fire hydrants will be installed, inspected, and approved prior to occupancy of any structures.
   d. In buildings where an automatic sprinkler system is required by this code or the International Building Code, it shall be unlawful to occupy any portion of a building or structure until the automatic sprinkler system installation has been tested and approved (OFC 3314.1).
   e. In buildings required to have standpipes, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed when the progress of construction is not more than 40 in height above the lowest level of fire department vehicle access. Such standpipe shall be provided with fire department hose connections at accessible locations adjacent to usable stairs. Such standpipes shall be extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring (OFC 3313.1)
11.1.2.4.2 Fire Flow Requirements for Buildings *WITHOUT* Adequate and Reliable Water Systems

**Standard:**
An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings, or portions of buildings are hereafter constructed or moved into or within the jurisdiction (OFC 507.1).

This guideline does not cover all the requirements or details, nor is it an attempt to restate all of the requirements or details for appurtenances installed on or for sprinkler systems addressed by NFPA 1142 but addresses only those items listed below, the specific details of which may not be adequately identified by existing code language.

**Specifications:** Refer to Oregon Fire Code Appendix B for specifications.
1. The provisions of OFC Appendix B, Section B107 are intended for use by the fire code official in protected areas in which adequate and reliable water supply systems do not exist or where water supply systems are incapable of meeting the provisions specified in this guide.
2. Residential (R-3) and Accessory Structures (U): If the structure is less than 3,600 square feet, including all floors, attached garage and basement, no water supply is required. If the structure is 3,600 square feet or greater, including all floors, attached garage and basement, a water supply calculated using NFPA 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting, 2012 Edition is required.
3. Commercial Structures: All commercial structures in excess of 3,600 square feet shall have a water supply calculated using NFPA 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting, 2012 Edition. Commercial structures less than 3,600 square feet will be re-evaluated on a case-by-case basis.
4. The minimum water supply for any structure without an exposure hazard shall not be less than 2,000 gallons (NFPA 1142, 4.2.2).
5. The minimum water supply for any structure with an exposure hazard shall not be less than 3,000 gallons (NFPA 1142, 4.3.2).

NOTE: Structures protected by an approved automatic fire sprinkler system are not required to have a water supply other than that required to supply the sprinkler system.
11.1.2.4.2.1 NFPA 1142 Calculation

1. The applicant will need to provide the following information to determine the volume of water supplied on site (NFPA 1142, 4.11):
   a. Occupancy Hazard
   b. Type of Construction
   c. Total Structure Volume including all covered porches, attics, crawl spaces, and garages
   d. Exposures located within 50 feet of the structure being evaluated

2. Example of NFPA 1142 calculation. **1.5 multiplier** used for structures with exposures located within 50 feet. Multiplier may be excluded from calculation with no exposure.

\[
\text{Water Supply}_{\text{min}} = \frac{\text{Volume of Structure}_{\text{tot}} \times \text{Occupancy Hazard Classification}}{\text{Construction Classification}} \times 1.5
\]

11.1.2.4.2.2 Private Water Supply Access

1. The water supply shall be maintained and accessible on a year-round basis (NFPA 1142, 7.1.2)
2. All non-pressurized water supply sources shall be accessible using dry hydrants (NFPA 1142, 7.1.4)
3. Example of dry hydrant detail, NFPA 1142. Figure A.8.3.2(b)

4. All water supply sources shall maintain the minimum capacity and delivery requirements on a year-round basis, based on the 50-year drought for the water service (NFPA 1142, 7.1.5)
5. Roads providing a means of access to any required water supply shall be constructed and maintained in accordance with the following (NFPA 1142, 7.5):
   a. Roadways shall have a minimum clear width of 16 feet for each lane of travel
   b. A fire department turnaround shall be provided
   c. Turns shall be constructed with a minimum radius of 100 feet to centerline
   d. The maximum sustained grade shall not exceed 10 percent
   e. The surface shall be treated as required for year-round travel.
11.1.2.5 Fire Suppression Systems

Standard
Automatic sprinklers and appurtenances shall meet the approval of the Fire Department as to installation and location, and shall be designed in accordance with NFPA 13, NFPA 13R or NFPA 13D, and NFPA 25, and subject to acceptance tests as required by the Fire Marshal.

Specifications
This guideline does not cover all the requirements or details, nor is it an attempt to restate all of the requirements or details for appurtenances installed on or for sprinkler systems addressed by NFPA 13 but addresses only those items listed below, the specific details of which may not be adequately identified by existing code language.

The intent is to establish guidelines which detail specific installation and testing requirements for appurtenances installed on or for automatic fire sprinkler (NFPA 13) systems, including:

11.1.2.5.1. Fire Department Connection (FDC)
   1. Design of installation
   2. FDC Location
   3. FDC design for a system with a Fire Flow requirement exceeding 2,100 gpm
   4. FDC Signage
   5. FDC Access
   6. Single FDC service for multiple buildings

11.1.2.5.2 Local Water Flow Alarm Bell

11.1.2.5.3 Signage/Marking of Maximum Commodity Height

11.1.2.5.4 Signage/Marking of Multiple Fire Protection System Division Lines

11.1.2.5.5 Underground Fire Sprinkler Permits

11.1.2.5.6 Acceptance Testing Requirements for Underground Piping

11.1.2.5.7 NFPA 13D Residential Fire Sprinkler System Acceptance Testing

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11.1.2.5.1 Fire Department Connection (FDC)

The location of the FDC shall be identified by the applicant and approved by the City prior to issuance of the site utilities permit.

1. Design of Installation
   a. FDC shall be visible, easily accessible, and installed in front of the building. The front of the building, as used here, is considered to be the address side, and that side that would normally front on a public or private street and would usually include the primary entrance to the building (OFC 912.2)

2. The FDC shall be located as specified in a) through d) below (OFC 912.2):
   a. Forty (40) feet from the protected structure;
   b. Two (2) feet behind the curb face or rear edge of the sidewalk; and
   c. Not less than 18 inches nor more than 4 feet above the level of the adjacent grade or access level; and,
   d. Within 150 feet of a hydrant but not closer than ten (10) feet.

   EXCEPTION: Where it is technically infeasible to meet the above dimensions, an alternate FDC location shall be proposed for Fire Department review that meets the intent of the above-stated parameters and shall be approved by the Fire Marshal prior to installation.

3. Systems designed for a total combined water demand of 2,100 gpm and over shall be equipped with an FDC having a minimum of four (4) 2 ½ inch N.S. clappered inlets Siamesed into a minimum six (6) inch pipe.

4. FDC Signage. A metal sign shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: AUTOMATIC SPRINKLERS or STANDPIPES or TEST CONNECTION or a combination thereof as applicable (OFC 912.4).
   a. Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.
      i. Example: An FDC for a basement shall indicate “basement only” (OFC 912.4).
   b. If the FDC serves more than one address, those address numbers shall be listed on the FDC (OFC 912.4).
   c. The signs required by Items "a" and "b" above shall be permanently attached to the FDC riser, constructed of metal, with reflective red, one (1) inch high lettering, 1/4 inch stroke, on a reflective white background. These signs shall be constructed on standard aluminum .080 stock (OFC 912.4).
   d. Signs shall be securely mounted to the FDC riser and located in a position so that it does not interfere with making the necessary hose connections (OFC 912.4).

5. FDC Access. Immediate access to fire department connections shall be maintained at all times and without obstruction by fences, bushes, trees, walls or any other fixed or moveable object (OFC 912.3).
   a. Clear space around connections. A working space of not less than 36 inches in width, 36 inches in depth and 78 inches in height shall be provided and maintained in front of and to the sides of wall-mounted fire department connections and around the circumference of free-standing fire department connections (OFC 912.3.2).
   b. Physical protection. Where fire department connections are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with OFC Section 312. (OFC 912.3.3)
6. Systems Providing Protection to Two or More Buildings.
   a. The building served and visual alarm notification on those buildings, shall be within direct site of the
      FDC serving that building
   b. Signage shall be as required in 11.1.2.5.1(4)

11.1.2.5.2 Local Water Flow Alarm Bell (Both electrical and water motor operated)

1. Exterior Alarm Bell Location:
   a. The water flow alarm bell for a single building shall be located on the face of the building closest to
      the FDC, and directly in line with, and behind the FDC.

2. If a single FDC serves more than one building, a water flow alarm bell shall be provided for each protected
   structure.
   a. These bells shall operate independently of each other and only when there is a water flow within the
      building to which each is attached.
   b. To avoid audible confusion, these units shall be bell/strobe assemblies and listed for exterior
      installation. The bell/strobe assemblies on each building served shall be visible from the FDC
      location.
   c. The location of the bell/strobe assemblies shall be specified by the applicant on the fire sprinkler plans
      and shall be approved by the Fire Marshal on these plans prior to issuance of the permit authorizing
      sprinkler system installation.

3. The alarm bell shall be installed at a height of at least eight (8) feet above prevailing grade, but no more than
   twelve (12) feet. Other installation locations may be approved by the Fire Marshal.

4. Alarm notification appliances shall be provided and shall be listed for their purpose (OFC 907.5.2).

5. Audible alarm notification appliances shall be provided and emit a distinctive sound that is not to be used for any
   purpose other than that of a fire alarm (OFC 907.5.2.1).

6. When a contiguous building (or buildings in the case where area separation walls exist) has multiple Fire
   Department Connections, the individual FDCs and water flow alarm bells shall be labeled in a manner to
   correlate each water flow alarm bell to the appropriate FDC, either by address (i.e., suite 1, 2, etc., or Suite A,
   B, etc.); sprinkler system number or letter (i.e., 1, 2, or A, B, etc.); or by direction (i.e., east system, west
   system, etc.).
11.1.2.5.3 Signage/Marking of Maximum Commodity Storage Height

1. In factories, industrial storage, and retail sales occupancies where commodity storage methods or pile heights can exceed the design parameters of the sprinkler system, permanent signage shall be provided identifying the maximum allowed storage height.

2. High-piled combustible storage is storage of combustible materials in closely packed piles or combustible materials on pallets, in racks, or on shelves where the top of storage is greater than twelve (12) feet in height.

3. When required by the Chief, high-piled combustible storage also includes certain high-hazard commodities, such as rubber tires, Group A plastics, flammable liquids, idle pallets, and similar commodities, where the top of storage is greater than six (6) feet in height.

4. All high piled storage areas shall be signed identifying the maximum storage height as follows:
   a. This sign must be posted prior to building being occupied.
   b. Signage shall be displayed fifty (50) feet on center, located on storage area walls starting twenty-five (25) feet from any exterior corner.
   c. Support columns shall be marked at the maximum storage height with a three (3) inch red band, paint or tape. Lettering on columns is not required.

Diagram 11.2.8D
11.1.2.5.4 Signage/Marking of Multiple Fire Protection System Division Lines

1. When a contiguous building (or buildings in the case where area separation walls exist) is protected by more than one sprinkler system, those sprinkler system divisional lines shall be permanently identified on the exterior of the structure.
   a. The sign shall be centered on the sprinkler system divisional line and mounted on the exterior of the building at the top of the wall or eave line.
   b. If the division line is at an inside corner created by exterior walls, the sign must be folded lengthwise at a 90 degree angle to fit the corner.

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11.1.2.5.5 Underground Fire Sprinkler Permits (Ref: CFC 11.1.2.1.3)

At times a builder may find it necessary to defer submittal of fire sprinkler plans. In order to request underground piping inspections prior to trench backfill and pouring concrete for slabs and foundations, the builder will need to obtain a fire sprinkler permit. **This Underground Fire Sprinkler Permit applies to system supply piping originating 5 feet outside of the building, and extending to the riser base inside of the building.**

**Option 1:**
1. For NFPA 13, 13R or 13D systems provide an approval from the system design professional indentifying the minimum supply size required for the underground piping supplying the pending overhead fire protection system.
2. All systems will be required to be successfully flushed and hydrostatically tested upon complete installation of entire underground system per CFC 11.1.2.5.6.
3. Use of joints and fittings shall not exceed 3, continuous connections are preferred.
4. Mega lug connections are required as well as thrust blocks.

**Option 2:** Development Services staff and the Corvallis Fire Prevention Division have created a process for rapid partial-system permit approval using standard criteria for fire sprinkler supply pipe sizing.

1. For residential NFPA 13D multipurpose systems (combined fire sprinkler and domestic plumbing):
   a. Provide a minimum water service two times larger than the minimum building plumbing fixture supply.
   b. For example, 1 inch required plumbing fixture building supply, install 1 ½ water service.
2. For residential NFPA 13D stand alone systems:
   a. For homes 2,000 sqft. or less, provide a minimum 1 ½ inch supply piping
   b. For homes larger than 2,000 sqft., provide a minimum 2 inch supply
3. For NFPA 13R systems:
   a. In buildings 4,000 sqft. or less, provide 2 inch supply piping
   b. In buildings greater than 4,000 sqft., provide a minimum 4 inch supply.
   c. All FDC connections for 13R systems shall be a minimum of 1 ½ inch.
4. For all NFPA 13 systems:
   a. Provide a minimum 6 inch supply
   b. All FDC connections for 13 systems shall be a minimum of 4 inch.
5. All systems will be required to be successfully flushed and hydrostatically tested upon complete installation of entire underground system per CFC 11.1.2.5.6.
6. Use of joints and fittings shall not exceed 3, continuous connections are preferred.
7. Mega lug connections are required as well as thrust blocks.

At risk / All partial installations are being installed with the understanding and agreement that upon complete review of total system design size modification could be required and it is the responsibility of the permit holder to make all necessary changes.
11.1.2.5.6 Acceptance Testing Requirements for Underground Piping

1. Prior to conducting hydrostatic tests for associated sprinkler piping, the private fire service mains and lead-in connections to system risers shall be thoroughly flushed before connection is made to sprinkler system piping.

2. The flushing procedure shall be conducted in accordance with NFPA 13, 10.10.2.1 & A10.10.2.1.
   a. Prior to conducting the underground piping flush procedure, an approved disposal area shall be determined by a representative of Development Services for the water issuing from the test outlets.
   b. Underground mains and lead-in connections to system risers should be flushed through hydrants at dead ends of the system or through accessible aboveground flushing outlets allowing the water to run until clear.
   c. If water is supplied from more than one source or from a looped system, divisional valves should be closed to produce a high-velocity flow through each single line. The flow should produce a velocity of at least 10 ft/sec, which is necessary for cleaning the pipe and for lifting foreign material to an aboveground flushing outlet (NFPA 13, Table 10.10.2.1.3).
   d. Hydrostatic tests should be made before the joints are covered, so that any leaks can be detected. Thrust blocks should be sufficiently hardened before hydrostatic testing is begun.
   e. If the joints are covered with backfill prior to testing, the contractor remains responsible for locating and correcting any leakage in excess of that permitted.

3. Upon completion of the underground piping work, inspection, flushing and testing, the Contractor’s Material and Test Certificate for Underground Piping NFPA 13, Fig 10.10.1 shall be completed and submitted to Development Services, for review and permanent record.
11.1.2.5.7 NFPA 13D Residential Fire Sprinkler System Acceptance Testing

OFC section 901.5. Fire-extinguishing and alarm systems, fire extinguishing systems, fire hydrant systems, fire standpipe systems, fire pump systems, private fire service mains, and all other fire protection systems and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as approved by the Fire Marshal.

1. Alternative materials and methods. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been approved.
   a. The fire code official is authorized to approve an alternative material or method of construction where the fire code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety (OFC 104.9)

2. Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the fire code official shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction.
   a. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the fire code official shall approve the testing procedures (OFC 104.9.2).
   b. Tests shall be performed by an approved agency (OFC 104.9.2).
   c. Reports of such tests shall be retained by the fire code official for the period required for retention of public records (OFC 104.9.2).

3. All structures with an NFPA 13D automatic fire sprinkler system installed shall be hydraulically designed to operate 2 sprinkler heads at the most remote location.
   a. The fire sprinkler system shall conform to the System Acceptance criteria outlined in NFPA 13D, Chapter 11.
   b. The Fire Sprinkler Flow must be demonstrated using a 2 sprinkler head “bucket test” at the most remote location. The two sprinkler heads tested must demonstrate the designed flow rate and maintain residual pressure for one minute as outlined in 11.1.2.5.6.1.
11.1.2.5.7.1 Standard Single Family Residential NFPA 13D Conditions

1. Fire Sprinkler System installation in one and two family dwellings shall be according to 2013 NFPA 13D and the 2014 Oregon Fire Code (OFC 903.3.1.3)

2. The layout, calculation, and installation of sprinkler systems installed in accordance with NFPA 13D shall only be performed by people knowledgeable and trained in such systems (NFPA 4.6)

3. **48hrs NOTICE** for Fire Department inspection request (NFPA 13D 11.1.2; OFC 901.5)

4. Approved NFPA 13D Residential Fire Sprinkler system **PLANS MUST BE ON SITE** for the inspection (NFPA 13D 4.5; OFC 104.2, 105.1-105.5, 901.2)

5. To avoid construction delays and additional contractor expense **PRE-TEST** all system components prior to requesting an inspection (NFPA 13D 11.1.1)

6. To avoid construction delays and additional contractor expense, a Fire Department inspection is STRONGLY SUGGESTED to verify proper head placement and piping configuration PRIOR TO COVERING the sprinkler system piping (OFC 106.2, 106.3)

7. A **REINSPECTION FEE of $75.00/hr**, or every part thereof, will be assessed upon inspection/test failure, and must be paid prior to requesting a follow-up Fire Department inspection (CMC 803.500.010)

8. System Pressure Test will be at normal system operating pressure with no leaks for 2 hours (NFPA 13D 11.2.1.1, 11.2.1)

9. **Protection from Freezing.**
   - Ensure proper insulation of piping to maintain temperature of system components >40°F (NFPA 13D 9.1.1, 12.3.4); or,
   - Provide an alternative method of protection from freezing (NFPA 13D 9.1.2, 9.2).

10. If installed, audible/visual alarms shall sound upon sprinkler system activation during the Flow Function Test (NFPA 11.2.3.1)

11. A warning sign with a minimum ¼ inch letters shall be affixed adjacent to the main shutoff valve in accordance with NFPA 13D (NFPA13D 6.3.4).
   - For **MULTIPLURPOSE SYSTEMS**, this signage shall be located in the water meter/valve box, or at the main valve from the tank supply.

12. The installer shall provide to the owner/occupant instructions on inspecting, testing, and maintaining the system (NFPA 13D 12.1)
   - The owner instructions shall include system information identified in NFPA 13D Appendix A (A.12.1, A.12.2, A.12.3.3.2, and A.12.3.4).

13. A **FLOW FUNCTION TEST** (Bucket Test) is required to validate that the system is installed and performs per design criteria (NFPA 13D 3.2.1, A.3.2.1, 11.1.1; OFC 104.1, 104.9.2, 901.5).
It is STRONGLY SUGGESTED that the Flow Function Test be conducted PRIOR TO COVERING the system piping.

**Test Preparation**
1. Locate the hydraulically most remote two sprinkler heads (as noted on plans)
2. Verify that the sprinkler control valve is closed
3. Drain the system piping
4. Remove the two most remote heads (as identified on the plan) from the system
5. Install a pipe with a ½- inch, ¼ turn ball valve, in place of each of the two most remote heads
6. Install “test heads” in the end of the pipes.
   - Identical to system heads with the thermal linkage removed
7. Replace the next upstream head with a pressure gauge
8. Open control valve and bleed air from the system through one of the ¼ turn ball valves
9. *Other test methods, such as a Flow Test Gauge, may be approved in advance by the Fire Marshal*

**Test Procedure**
1. Record the static pressure
2. Open both ¼ turn ball valves simultaneously and begin a timed, 30 second test
3. Record residual pressure while flowing
4. Verify audible flow alarm if installed *(not required)*
5. Measure the amount of water flowed into a calibrated container
6. Verify that the flow rate meets, or exceeds, design requirements per system plans
7. Place system back in service

**Test Data**

<table>
<thead>
<tr>
<th>Min. Static Psi Req. (per Plans)</th>
<th>Min. Flow Req. (GPM per Plans)</th>
<th>Static PSI (witnessed)</th>
<th>Residual PSI (witnessed)</th>
<th>Two Head Total Flow (witnessed)</th>
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**NOTE:** All test equipment; valves, test heads, containers, etc. shall be furnished by the installing contractor. If an accurate determination of container capacity cannot be obtained by container markings, the following formula may be used for cylindrical containers with vertical sides: $(\pi r^2 H)/231 = \text{volume}$, where $\pi = 3.14$, $r =$ radius in inches, $H =$ depth of water in inches.

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11.1.2.6 Fire Alarm Systems

Standard
The fire code official shall have the authority to require construction documents and calculations for all fire protection systems and to require permits be issued for the installation, rehabilitation or modification of any fire protection system (OFC 901.2, 977.1.1, 907.1.2).

1. Construction documents for fire protection systems shall be submitted for review and approval prior to system installation (OFC 901.2).

2. Before requesting final approval of the installation, the installing contractor shall furnish a written statement to the fire code official that the subject fire protection system has been installed in accordance with approved plans and has been tested in accordance with the manufacturer’s specifications and the appropriate installation standard (OFC 901.2.1).

3. Any deviations from the design standards shall be noted and copies of the approvals for such deviations shall be attached to the written statement (OFC 901.2.1).

Specifications
All fire alarm systems and components shall meet applicable requirements listed in the edition of the following codes in effect at time of installation or alteration: The Oregon Structural Specialties Code, the Oregon Electrical Code, the Oregon Fire Code Chapter 9, and NFPA 72.

1. Fire protection systems shall be maintained in accordance with the original installation standards for that system (OFC 901.4).

2. Required systems shall be extended, altered or augmented as necessary to maintain and continue protection whenever the building is altered, remodeled or added to. Alterations to fire protection systems shall be done in accordance with applicable standards (OFC 901.4).

This guideline does not cover all the requirements or details, nor is it an attempt to restate all the requirements or details for appurtenances installed on or for fire alarm systems addressed by NFPA 72 but addresses only those items listed below, the specific details of which may not be adequately identified by existing code language.

The intent is to establish guidelines which detail specific installation and testing requirements for appurtenances installed on or for automatic fire alarm (NFPA 72) systems, including:

11.1.2.6.1 Permit Procedures (Code and Non-Code Required Systems)
11.1.2.6.2 System Design Requirements (Code and Non-Code Required Systems)
11.1.2.6.3 Fire Alarm Final Inspection & Acceptance Testing
11.1.2.6.3.1 Fire Alarm Final Inspection & Acceptance Testing Criteria Worksheet

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11.1.2.6.1 Permit Procedures (Code and Non-Code Required Systems)

Plan Review and Permits
Applicant shall submit plans to Development Services and apply for permits prior to installation or alteration of a fire alarm system (OFC 907.1.2).

1. Plans and specifications for fire alarm systems shall include, but not be limited to:
   a. A floor plan indicating the use of each area or room
   b. Location of all alarm-initiating and alarm-signaling devices
   c. Alarm control- and trouble-signaling equipment
   d. Annunciation
   e. Power connection
   f. Battery calculations
   g. Conductor type and sizes
   h. Voltage drop calculations
   i. Manufacturer, model numbers and listing information for all equipment, devices, and materials.

2. Systems and components shall be listed and approved for the purpose for which they are installed (OFC 907.1.3).

3. All code-required system plans shall be stamped by a State of Oregon licensed design professional, and shall be designed and installed in accordance with applicable codes as noted above.

4. All non-code-required system plans shall be prepared by a fire alarm system design professional, in accordance with applicable codes as noted above.

5. Fire Alarm permit fees shall be paid prior to issuance of permit.

Procedures for Code-Required Fire Alarm Systems:

1. Fire protection systems required by the OFC, ORSC, or the OSSC shall be installed, repaired, operated, tested and maintained in accordance with this code (OFC 901.4.1).

2. The plan review process is coordinated by Development Services. Applicant submits plans and requests inspections through the Development Assistance Center (DAC).

3. In addition to the building and electrical permits required by Development Services, the applicant shall apply for a Fire Alarm permit from the Corvallis Fire Department, which is obtained in Development Services.

4. The Fire Prevention Office performs a plan review in conjunction with Development Services and submits all comments to the DAC Plans Examiner.

5. Development Services coordinates field inspections and final acceptance testing with the applicant and the Fire Prevention Office.

6. Records of the accepted plan, inspections, and acceptance testing will be maintained at Development Services.

Procedures for Non-Code-Required Fire Alarm Systems:

1. Any fire protection system or portion thereof not required by OFC, ORSC, or the OSSC shall be allowed to be furnished for partial or complete protection provided such installed system meets the applicable requirements of the OFC (OFC 901.4.2).

2. A plan review is performed by the Corvallis Fire Prevention Office. The applicant shall submit plans and request inspections through Development Services as with any other permitting process.

3. In addition to the Fire Alarm permit obtained through Development Services, the applicant shall obtain a low-voltage electrical permit from Development Services.

4. Development Services will conduct the low voltage inspections.

5. The Fire Prevention Office shall perform a plan review, final inspection, and observes the system acceptance test.

6. Records of the accepted plan, inspections, and acceptance testing will be maintained at the Fire Prevention Office.
11.1.2.6.2 System Design Requirements (Code and Non-Code Required Systems)

System Design Requirements:
1. Specific design and installation requirements are contained in NFPA 72.
2. A single fire alarm control unit receiving all fire alarm input for that structure shall be located in a supervised and/or secure area, where it will not be tampered with but can be heard if a trouble signal sounds.
   a. If installed in a secure, normally unstaffed area (i.e., the utility room), the door providing access to that room shall be identified with a sign.
   b. The sign shall have 1-inch (minimum) red lettering and shall read, “Fire Alarm Control Unit.”
3. Annunciator Panel. A remote annunciator panel shall be located near the most appropriate entrance as designated by the Fire Marshal based on the access which will be utilized by fire emergency vehicles.
   a. The location of the annunciator panel will be identified on the approved plans prior to issuance of the fire alarm permit.
      i. If possible, the annunciator panel shall be mounted on an interior wall where it is visible from the exterior (through a glass door or window).
   b. The Knox Box and Fire Department Connection (FDC) shall be co-located in proximity to the annunciator entry. Alternative locations may be approved by the Fire Marshal.
   c. In those occupancies where a voice annunciation system is required, the panel containing the microphone provided for fire department use shall be located adjacent to the remote annunciator panel.
   d. Audible alarm system notification device shall NOT be located in close proximity to the annunciator panel
   e. The Fire Marshal or designee shall have the authority to waive the requirement for a remote annunciator when the main Fire Alarm Control Panel is readily visible and accessible at an appropriate building entrance or lobby.
4. Zoning. When two or more alarm zones are required, fire protective signaling systems shall be divided into zones to assist in determining the fire location and type of device (OFC 907.6.3.1).
   a. The annunciation of all zones and device identification shall be on electrically supervised initiating circuits to the main fire alarm control unit and remote annunciator panels.
   b. Alarm, supervisory, and trouble signals shall be annunciated in the main control unit by means of an audible signal and a visual display.
   c. Such annunciation shall indicate the building, floor, zone, type of device activated, or other designated area from which the alarm or trouble signal originated.

For the purposes of annunciation, zoning shall be in accordance with the following:
   a. When the fire protective signaling system serves more than one building, each building shall be considered a separate zone.
   b. Each floor of a building shall be considered a separate zone.
   c. Each section of floor of a building that is separated by area separation walls or by horizontal exits shall be considered a separate zone.
   d. Identification of the type of alarm, initiating devices such as manual pull, smoke detector, heat detector, sprinkler water flow, sprinkler supervisory switches, hood suppression system, etc., shall be separately indicated on electrically supervised initiating circuits to the main fire alarm control unit and remote annunciator panels.

Example 1: 400 NW Harrison Blvd, Floor 1, room 101, smoke detection.
Example 2: 400 NW Harrison Blvd, water flow
5. On **non-addressable fire alarm systems** or addressable fire alarm systems connected to non-addressable initiating devices, a permanent zone identification map and labeling shall be provided at the fire alarm control panel and annunciator panel/s.
   a. The proposed map and labeling shall be submitted to the Plans Examiner for review and approval prior to installation.
   b. An acceptable method is to have the map mounted on the wall by the annunciator panel and fire alarm control unit, with a Plexiglas cover protecting the map.
   c. A properly installed and programmed, fully addressable fire alarm system, provided with initiating devices that are all individually addressable does not need to be provided with a zone map.
   d. Written operating, *testing and maintenance* instructions and *as-built drawings* shall be provided and stored at the fire alarm control unit.

6. **Alarm System Monitoring.** When fire alarm systems are required to be monitored, it shall be by an approved central, proprietary, or remote station service except where local monitoring is allowed by the Oregon Structural Specialty Code and/or the Oregon Fire Code.
   a. The method of providing systems monitoring may be any of the above as permitted by the Code and shall be identified on the plans submitted for permit application (OFC 907.6.5).

7. **Audible Alarm Signal.**
   a. Audible alarm notification appliances shall be provided and emit a distinctive sound that is not to be used for any purpose other than that of a fire alarm (OFC 907.5.2.1).
   b. The use of the distinctive three-pulse temporal pattern fire alarm evacuation signal is required. This pattern consists of an “on” phase lasting 0.5 seconds, followed by an “off” phase lasting 0.5 seconds for three successive “on” periods, which is then followed by an “off” phase lasting 1.5 seconds. The signal will be repeated for not less than 180 seconds.
   c. Alarm notification appliances shall be provided and shall be listed for their purpose (OFC 907.5.2).

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11.1.2.6.3 Fire Alarm Final Inspection & Acceptance Testing

1. Upon completion of the installation, the fire alarm system and all fire alarm components shall be tested in accordance with NFPA 72 (OFC 907.7).

2. **BEFORE REQUESTING FINAL APPROVAL** of the installation, the installing contractor shall furnish a written statement to the fire code official that the subject fire protection system has been installed in accordance with approved plans and has been PRE-TESTED in accordance with the manufacturer’s specifications and the appropriate installation standard (OFC 901.2.1).
   
   a. Written certification shall be submitted to either Development Services (for code-required systems) stating that the system has been installed in accordance with the approved plans, specifications and appropriate standards.
   
   b. Written certification shall be submitted to the Fire Department (for non-code-required systems) stating that the system has been installed in accordance with the approved plans, specifications and appropriate standards.

3. Upon completion of installations or any alterations, tests of the system shall be conducted in the presence of, and as directed by the Building Inspector and the Fire Prevention Officer, using the edition of NFPA 72 under which the permit was submitted, as the guide for the testing process.
   
   a. **Battery Test.** A battery stress test will be included in the final acceptance test.
      
      i. In order to facilitate this test, the system shall be put in battery back-up mode for the 24 hours preceding the test, and **signaling devices shall be activated for a minimum of 5 minutes** during the acceptance test.
   
   b. **ALL** functions of the Fire Protection Systems shall be tested, including:
      
      i. Operation of the systems in ALL alarm and trouble modes for which it is designed
      
      ii. If applicable, ALL alarms will be transmitted through the monitoring service and to fire dispatch, to ensure proper zoning and device identification.

4. A **Reinspection Fee** at the rate of **$75/hour, or portion thereof**, shall be applied per 11.1.2.1.3 to all projects that fail the Fire Protection System acceptance tests.
   
   a. Reinspection fees shall be paid prior to scheduling a follow-up inspection.
11.1.2.6.3.1 Fire Alarm Final Inspection & Acceptance Testing Criteria Worksheet

As a minimum, the following items shall be verified through a plan review, field inspection, and acceptance test. The installer shall phone the County Building Department to schedule the inspection and acceptance test 48 hours in advance of the desired appointment. The County Building Department will notify the Corvallis Fire Department of the inspection appointment. The approved alarm plans and building permit, with any attached conditions, shall be available at the job site for reference. Before requesting final approval of the installation, the installation contractor shall furnish the Record of Completion, verifying that the system has been installed as per the approved plans and tested in accordance with the manufacture's specifications and NFPA 72 standards. The following items will be verified; testing to be performed by installer and observed by the building and/or fire inspector(s).

<table>
<thead>
<tr>
<th>Pass</th>
<th>NA</th>
<th>General Criteria</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Received Record of Completion form from the installer.</td>
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<td>Approved alarm plans on-site</td>
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<td>Fire alarm panel and components match approved plans.</td>
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<td></td>
<td>FACP/Annunciator panel location same as plans, and a permanently installed zone/legend map is provided at the remote annunciator. Zone map not required on fully addressable system.</td>
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<td>Zones are properly identified on panel(s). Addressable verbiage or zone labeling.</td>
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<td>System has dedicated 120 AC branch circuit with lockout and labeling.</td>
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<td>Type and gauge of wire of cable(s) match plans.</td>
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<td>Device location and wiring are the same as the approved plans and as required by Code.</td>
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<td>Pull stations are proper height and location, 42&quot; to 54&quot;, 200' maximum travel distance.</td>
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<td>A completed Contractor decibel pretest list is provided for spot checking.</td>
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<table>
<thead>
<tr>
<th>Pass</th>
<th>NA</th>
<th>Operational</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Fire alarm warning devices are audible throughout the occupancy at least a minimum of 15 dBA's above ambient noise level or 5 dBA's above maximum noise level, sound level of not less than 75 dBA at 10 ft (3 m). For bedrooms with door closed, 70 dBA at the pillow. NFPA 72, Chapter 4-3.</td>
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<td>Fire alarm audibles are a three-pulse temporal pattern.</td>
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<td>Fire alarm accessibility devices (strobes) are proper candella, height, and location, 80&quot; to 96&quot; above finished floor.</td>
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<td>Fire alarm warning devices activate by the operation of the sprinkler flow.</td>
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<td>HVAC duct detectors are supervised by the fire alarm system and fans shutdown. Initiate a supervisory signal; not fire alarm signal. Where in-duct smoke detector’s alarm indicator is not visible or more than 10' high, remote indicators shall be installed in an accessible location and labeled.</td>
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<td>24-hour listed fire monitoring service received signals. Verify that the correct street address and signal are received: alarm, trouble, and supervisory alarms are to be distinctive signals.</td>
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<td>Monitoring company contacts 911 within 90 seconds of receiving the alarm.</td>
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<td>Two monitoring circuits are provided and both are tested for sending signals to monitoring company and verify line seize function.</td>
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<td>Verify proper operation of door-releasing hardware, smoke barriers, and/or ventilation shutdown.</td>
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<tr>
<td>Pass</td>
<td>NA</td>
<td>Operational (cont.)</td>
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<tr>
<td>20</td>
<td></td>
<td>Sprinkler valve tamper switches cause trouble light and buzzer indication at the annunciator panel and tamper signal at monitoring service.</td>
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<tr>
<td>21</td>
<td></td>
<td>Microphone/handset for voice evacuation system (if provided) is located at the annunciator panel for fire department use and is operative.</td>
</tr>
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<td>22</td>
<td></td>
<td>For air sampling and flame detectors, test device per the manufacturer’s instructions.</td>
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<td>23</td>
<td></td>
<td>Resettable heat and smoke detectors, and pull stations, are tested (sample of total).</td>
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<tr>
<td>24</td>
<td></td>
<td>Trouble condition is tested on each circuit. Alarm contractor to momentarily disconnect wire/remove initiation device.</td>
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<tr>
<td>25</td>
<td></td>
<td>Remote annunciator receives the correct point or zone identification information.</td>
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<tr>
<td>26</td>
<td></td>
<td>Battery stress test: system switched to battery operation 24 or 60 hours before the test. Then, activate audible circuit per code, 5 min. for voice communication systems.</td>
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<tr>
<td>27</td>
<td></td>
<td>Verify battery charger operation.</td>
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<td>28</td>
<td></td>
<td>Test ground fault monitoring circuit, if provided.</td>
</tr>
<tr>
<td>29</td>
<td></td>
<td>Under primary and secondary (standby) power, these tests are performed:</td>
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<tr>
<td></td>
<td></td>
<td>a. Power light on and in normal condition; trouble signal when on secondary power.</td>
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<td>b. Supervisory signals: fire pumps, water level/temp, pressure switches, control valves.</td>
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<td>c. Silence switches.</td>
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<td>d. A second initiating zone overrides silence switch.</td>
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<td></td>
<td>e. Trouble signals and panel light operate for each circuit tested; disconnect wires from devices and primary power supply.</td>
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<td>f. Verify secondary power in alarm mode.</td>
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<td>g. Trouble and alarm reset switches operate.</td>
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<td>h. Emergency voice alarms; message clear and distinct.</td>
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<td></td>
<td>i. Initiating devices tested; audibles and visuals operate - temporal tone and strobes synchronized.</td>
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<td>j. Panel lamp test switch operates, if provided.</td>
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<td></td>
<td>k. Zone/address signals correct.</td>
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<td>l. Elevator(s) recall to designated floor and alternate floor.</td>
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<td></td>
<td>m. Elevator shaft enclosure system operates.</td>
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<td>30</td>
<td></td>
<td>Other systems activate fire alarm: kitchen hood suppression system, clean agent.</td>
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<tr>
<td>31</td>
<td></td>
<td>Water flow alarm bell is mounted in direct line of sight behind the fire department connection.</td>
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<td></td>
<td></td>
<td>a. Water flow alarm bell operates only when there is a sprinkler flow.</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>As-builts are required when system installation is not the same as the submitted approved plans.</td>
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<tr>
<td>33</td>
<td></td>
<td>The fire alarm control unit (FACU) shall be placarded with the names and contact phone numbers of both the monitoring company and alarm maintenance service provider.</td>
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<tr>
<td>34</td>
<td></td>
<td>The door to the room containing the FACU shall be signed “Fire Alarm Control Unit” in 1” high red lettering.</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>A copy of the alarm plans and the owner’s manual shall be maintained at the FACU. It is suggested that the plans and manual be stored in a PVC capped pipe container mounted next to the FACU.</td>
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<td>Access keys for the FACU and pull stations shall be provided and labeled for placement in the Knox box.</td>
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* Note: additional testing criteria is found in NFPA 72 7-2.
11.1.2.7 Fire Escapes

**Standard**
Fire escape stairs shall comply with OFC Sections 1104.16.1 through 1104.16.7.

**Specifications**

1. Existing fire escape stairs shall be permitted in existing buildings but shall not constitute more than 50 percent of the required exit capacity (OFC 1104.16.1)

2. **Materials and strength** (OFC 1104.16.5)
   a. Components of fire escape stairs shall be constructed of noncombustible materials.
   b. Fire escape stairs and balconies shall support the dead load plus a live load of not less than 100 pounds per square foot.
   c. Fire escape stairs and balconies shall be provided with a top and intermediate handrail on each side.

3. **Examination.** Fire escape stairs, balconies, rails and ladders shall be examined for structural adequacy and safety in accordance with Section 1104.16.5 and the Oregon Structural Specialty Code by a registered design professional or others acceptable to the fire code official every five years, or as required by the fire code official. An inspection report shall be submitted to the fire code official after such examination (OFC 1104.16.5.1).
   
   **Exception:** The testing interval for fire escapes that have all connections replaced, re-enforced, and/or duplicated may be extended as specified by the design professional if approved by the fire code official.

4. **Unsafe/imminent hazard condition.** When a fire escape component is determined to be in an unsafe/imminent hazard condition, the fire code official and building official shall be notified immediately. Where required, the building shall either be evacuated or an approved fire watch shall be provided until the fire escape has been repaired and approved for use by the building official (OFC 1104.16.5.2).

5. **Posting of fire escape conditions.** Each fire escape shall have signage indicating current conditions posted at the lowest balcony or as directed by the fire code official (OFC 1104.16.5.3). Signage shall be clearly visible, legible, and weather resistant and indicate;
   a. Condition of fire escape.
   b. Date of posting.
   c. Site address.
   d. Other as directed by the fire code official.

6. **Maintenance.** Fire escapes stairs, balconies, rails and ladders shall be kept clear, unobstructed and in working order at all times. They shall be maintained free of corrosion (OFC 1104.16.7).

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11.1.2.8 Fire Watch

Standard
When, in the opinion of the fire code official, it is essential for the safety of the public and/or occupants, the owner or agent or lessee shall provide one or more fire watch personnel.

Specifications
When a fire watch is required in an existing structure(s) or portions thereof, or for a fire protection system that is out of service, or other fire hazard situation, it shall be in accordance with this Guide (OFC Appendix N). A fire watch shall have ALL of the elements listed in this section.

1. At least one dedicated person is required to conduct patrols (OFC N103.2).
   a. Additional personnel shall be added as necessary to meet the interval requirements.

2. All personnel shall meet the following criteria and be:
   a. At least 18 years of age.
   b. Competent to identify fire hazards.
   c. Capable of effectively communicating the need for a fire department response.
   d. Physically capable to perform patrols and self-preservation.
   e. Familiar with the structure and the emergency plan for the structure.

3. The structure or portions thereof shall be checked for fire hazards every 15 minutes or as required by the fire code official.

4. At least one method of communication to initiate a fire department response is required.
   a. Fire watch personnel shall have a cellular phone or other means of communication acceptable to the fire code official.
   b. In the event of a fire, fire watch personnel shall alert occupants and take appropriate action.

5. An activity log sheet is required to document the activities of the fire watch. The log shall list the name of the person(s) who conducted the fire watch, time of each activity, and description of activity performed.

6. A fire watch shall continue until the initiating circumstances have been abated and the fire code official has been notified.
11.1.2.9 CFC Appendices