

# State of Oregon Model Flood Hazard Management Ordinance

**Current Version Effective:** October 23, 2020

*(Minor typo and reference corrections effective: Nov. 27, 2019)*

*(Last version effective: Aug. 9, 2019)*

## **Introduction**

The model flood hazard ordinance has been prepared by the State of Oregon Department of Land Conservation and Development (DLCD) and has been reviewed and approved by FEMA Region X. Adoption of the ordinance language provided will ensure compliance with the minimum standards for participation in the National Flood Insurance Program (NFIP).

The model flood hazard ordinance includes standards and provisions that encourage sound floodplain management. The language is based on the minimum requirements of the NFIP found in the [Code of Federal Regulations](#) (CFRs), [Oregon’s statewide land use planning Goal 7](#), and the [Oregon specialty codes](#).

## **Instructions for How to Use this Document**

This 2019 version of the model ordinance includes a Table of Contents and a Regulatory Crosswalk that identifies the federal and state standards that align to and are reflected in each section.

### **Ordinance Language Legend:**

- Black: Represents the NFIP and state minimum requirements and must be included in your community’s ordinance to ensure compliance.
- Red: Represents language that must be replaced with community specific information. Only include the appropriate language for your community.
- Purple: Represents language required for communities with Coastal High Hazard Areas mapped by FEMA (V Zones or Coastal A Zones).  
*(DELETE ALL PURPLE LANGUAGE IF NOT A COASTAL COMMUNITY).*
- [Hyperlinks](#): Link to other sections of the document; including the Appendices, which contain optional and highly recommended language.

## Note Regarding the Appendices:

Each community should review the optional language provided in Appendices A and B whenever a hyperlink is provided, and identify what language to include based on their community floodplain management goals. Adopting higher standards is recommended and can provide benefits to your community, including financial savings on individual flood insurance policies.

## Summary of Changes from the 2014 version to the 2019 Version of the Oregon Model Flood Hazard Ordinance:

The 2019 version of the Oregon Model Flood Hazard Ordinance (to be referred to herein as the “2019 model ordinance”), varies from the previous version in its reorganization of some sections and subsections, as well as the modification of content to include new sections and revisions to existing sections.

In general, the content was revised to more closely match (verbatim) the language in the sections of Code of Federal Regulations (CFR), which contain the minimum requirements for the National Flood Insurance Program (NFIP). The content was also revised to incorporate relevant standards in the State of Oregon’s Specialty Codes, and updates to those standards that have changed in the last 5 – 10 years. A breakdown of the primary changes found in the 2019 model ordinance is provided below:

1. Some definitions have been added, removed, or reworded to match the CFR definitions verbatim, as required by FEMA. There are additional optional and recommended definitions provided in [Appendix A](#).
2. The 2019 model ordinance notes the requirement for coordination with State of Oregon Specialty Codes (section **3.3**) and incorporates relevant requirements (higher standards) from the Specialty Codes to ensure alignment between the model flood ordinance language and the building code language. For example, the 2019 model ordinance:
  - a. Directly addresses “Garages” (section **5.2.2**) and “Tanks” (section **5.1.5**) by incorporating the relevant NFIP and State of Oregon Specialty Code requirements into the ordinance language.
  - b. Incorporates the Specialty Codes additional standards for flood openings in residential structures that require a building permit (section **5.2.1**).
3. The floodplain development permit and permit review requirements have been expanded in the 2019 model ordinance (sections **4.3.2** and **4.2.1**) to more accurately capture all of the information a community Floodplain Administrator is required to

obtain and review to ensure a floodplain development proposal complies with the standards of the 2019 model ordinance (minimum NFIP and state standards).

4. The 2019 model ordinance expands the requirements for “Information to be Obtained and Maintained” (section **4.2.2**). To reflect the NFIP minimum requirements and Oregon Specialty Code Requirements.
5. The 2019 model ordinance also has a new section, **4.2.3.1**, “Community Boundary Alterations”, that reflects the NFIP minimum requirement for communities to notify FEMA when their boundaries change (i.e. when annexations occur).
6. The 2019 model ordinance clearly indicates that floodplain managers have a duty to conduct Substantial Improvement (SI) assessments and Substantial Damage (SD) determinations in a new section **4.2.4**. Both SI and SD are defined in section **2.0**. SI review is required for all structural development proposals and other development activities associated with or attached to a structure. This section is designed to help ensure that each floodplain development file includes SI calculations whenever appropriate, as well as the floodplain administrator’s determination of whether the proposed development activity qualifies as SI. SD review is required whenever structures have been damaged due to natural or other events (i.e. house fire). Please refer FEMA Publication 758: *Substantial Improvement/Substantial Damage Desk Reference*, available for download at: <https://www.fema.gov/media-library/assets/documents/18562> for additional details regarding SI and SD.
7. There is a change to the “Variance Conditions” section in the 2019 model ordinance. Per FEMA guidance, the variance condition related to historic structures has been removed. For more details, including an explanation of the reasons for this change, please see the note in [Appendix B, for section 4.4.1](#).
8. In the 2019 model ordinance, subdivisions and other development proposals (including manufactured dwelling parks and subdivisions) have been addressed directly in the new section **5.1.6**, and the language reflects the requirements minimum NFIP requirements in 44 CFR 60.3(a)(4), and 60.3(b)(3).
9. Section **5.1.7**, “Use of Other Base Flood Data” has been moved out of the administration section and the language has been updated to reflect the minimum state and NFIP standards.
10. Section **5.1.8**, “Structures Located in Multiple or Partial Flood Zones”, has been added to reflect how the NFIP and State of Oregon Specialty Codes address structures that fall within multiple flood zones or are partially within one or more flood zones.

11. Section **5.2**, which addresses the specific standards for riverine flood zones has been re-organized slightly, but it is still broken down by the type of FEMA Flood Insurance Rate Map (FIRM) flood zone and the level of detail or information available. It has also been amended to add the following sections at the beginning:
  - a. Section **5.2.1**, “Flood Openings,” which covers the NFIP minimum requirements and additional Oregon Specialty Code requirements for residential structures requiring a building permit.
  - b. Section **5.2.2**, “Garages,” addresses the specific requirements for attached and detached garages under the NFIP minimum standards and Oregon Specialty Code requirements.

**Summary of Changes Made Under October 2020 Revisions to the Model Ordinance Language:**

1. Removal of optional language from Appendix B that reflected the FEMA Region X Fish Enhancement Policy that was rescinded in 2020.
2. Addition of the word “and” after the first bullet in Section **5.2.3.5**, the standards for recreational vehicles based on FEMA interpretation of the regulatory language for this standard in 44 CFR 60.3 as having an implied “and”.
3. Addition of the words “conversion to” into the residential and non-residential development standards Sections **5.2.3.2** and **5.2.3.3**. This language was added to ensure that structures that are converted to different uses within the Special Flood Hazard Area are brought into compliance with residential standards for life, safety, and property damage prevention purposes.
4. Addition of “replacement” to the language in Section **5.2.3.4** standards for manufactured dwellings to ensure that the standards in this section are applied to replacement manufactured homes as well as new and substantially improved manufactured dwellings.

# TABLE OF CONTENTS

- 1.0 STATUTORY AUTHORITY, FINDINGS OF FACT, PURPOSE, AND METHODS ..... 11
  - 1.1 STATUTORY AUTHORIZATION ..... 11
  - 1.2 FINDINGS OF FACT ..... 11
  - 1.3 STATEMENT OF PURPOSE ..... 11
  - 1.4 METHODS OF REDUCING FLOOD LOSSES ..... 12
- 2.0 DEFINITIONS..... 12
- 3.0 GENERAL PROVISIONS ..... 17
  - 3.1 LANDS TO WHICH THIS ORDINANCE APPLIES ..... 17
  - 3.2 BASIS FOR ESTABLISHING THE SPECIAL FLOOD HAZARD AREAS ..... 17
  - 3.3 COORDINATION WITH STATE OF OREGON SPECIALTY CODES ..... 17
  - 3.4 COMPLIANCE AND PENALTIES FOR NONCOMPLIANCE ..... 18
    - 3.4.1 COMPLIANCE..... 18
    - 3.4.2 PENALTIES FOR NONCOMPLIANCE ..... 18
  - 3.5 ABROGATION AND SEVERABILITY ..... 18
    - 3.5.1 ABROGATION ..... 18
    - 3.5.2 SEVERABILITY ..... 18
  - 3.6 INTERPRETATION ..... 19
  - 3.7 WARNING AND DISCLAIMER OF LIABILITY..... 19
    - 3.7.1 WARNING..... 19
    - 3.7.2 DISCLAIMER OF LIABILITY..... 19
- 4.0 ADMINISTRATION ..... 19
  - 4.1 DESIGNATION OF THE FLOODPLAIN ADMINISTRATOR..... 19
  - 4.2 DUTIES AND RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR..... 20
    - 4.2.1 PERMIT REVIEW ..... 20
    - 4.2.2 INFORMATION TO BE OBTAINED AND MAINTAINED ..... 20
    - 4.2.3 REQUIREMENT TO NOTIFY OTHER ENTITIES AND SUBMIT NEW TECHNICAL DATA..... 21
      - 4.2.3.1 COMMUNITY BOUNDARY ALTERATIONS ..... 21
      - 4.2.3.2 WATERCOURSE ALTERATIONS ..... 22
      - 4.2.3.3 REQUIREMENT TO SUBMIT NEW TECHNICAL DATA ..... 22
    - 4.2.4 SUBSTANTIAL IMPROVEMENT AND SUBSTANTIAL DAMAGE ASSESSMENTS AND DETERMINATIONS..... 23

4.3	ESTABLISHMENT OF DEVELOPMENT PERMIT .....	23
4.3.1	FLOODPLAIN DEVELOPMENT PERMIT REQUIRED.....	23
4.3.2	APPLICATION FOR DEVELOPMENT PERMIT .....	23
4.4	VARIANCE PROCEDURE.....	24
4.4.1	CONDITIONS FOR VARIANCES.....	24
4.4.2	VARIANCE NOTIFICATION .....	25
5.0	PROVISIONS FOR FLOOD HAZARD REDUCTION .....	25
5.1	GENERAL STANDARDS.....	25
5.1.1	ALTERATION OF WATERCOURSES.....	25
5.1.2	ANCHORING .....	25
5.1.3	CONSTRUCTION MATERIALS AND METHODS .....	25
5.1.4	UTILITIES AND EQUIPMENT .....	26
5.1.4.1	WATER SUPPLY, SANITARY SEWER, AND ON-SITE WASTE DISPOSAL SYSTEMS .....	26
5.1.4.2	ELECTRICAL, MECHANICAL, PLUMBING, AND OTHER EQUIPMENT.....	26
5.1.5	TANKS.....	26
5.1.6	SUBDIVISION PROPOSALS & OTHER PROPOSED DEVELOPMENTS .....	27
5.1.7	USE OF OTHER BASE FLOOD DATA.....	27
5.1.8	STRUCTURES LOCATED IN MULTIPLE OR PARTIAL FLOOD ZONES.....	28
5.2	SPECIFIC STANDARDS FOR RIVERINE (INCLUDING ALL NON-COASTAL) FLOOD ZONES .....	28
5.2.1	FLOOD OPENINGS .....	28
5.2.2	GARAGES.....	29
5.2.3	FOR RIVERINE (NON-COASTAL) SPECIAL FLOOD HAZARD AREAS WITH BASE FLOOD ELEVATIONS .....	29
5.2.3.1	BEFORE REGULATORY FLOODWAY .....	29
5.2.3.2	RESIDENTIAL CONSTRUCTION.....	30
5.2.3.3	NON-RESIDENTIAL CONSTRUCTION.....	30
5.2.3.4	MANUFACTURED DWELLINGS .....	31
5.2.3.5	RECREATIONAL VEHICLES.....	31
5.2.3.6	APPURTENANT (ACCESSORY) STRUCTURES.....	31
5.2.4	FLOODWAYS.....	32
5.2.5	STANDARDS FOR SHALLOW FLOODING AREAS .....	33
5.2.5.1	STANDARDS FOR AH ZONES.....	33
5.2.5.2	STANDARDS FOR AO ZONES.....	33

5.3 SPECIFIC STANDARDS FOR COASTAL HIGH HAZARD FLOOD ZONES..... 34

5.3.1 DEVELOPMENT STANDARDS..... 35

5.3.1.1 MANUFACTURED DWELLING STANDARDS FOR COASTAL HIGH HAZARD ZONES ..... 36

5.3.1.2 RECREATIONAL VEHICLE STANDARDS FOR COASTAL HIGH HAZARD ZONES..... 37

5.3.1.3 TANK STANDARDS FOR COASTAL HIGH HAZARD ZONES ..... 37

## Oregon Model Flood Ordinance Regulatory Crosswalk

Section	Code of Federal Regulations (CFR) and Technical Bulletin Citation(s)	State of Oregon Citation(s) (Goal 7, Specialty Codes*, ORS)
1.1 Statutory Authorization	59.22(a)(2)	Goal 7; ORS 203.035 (Counties), ORS 197.175 (Cities)
1.2 Findings of Fact	59.22(a)(1)	Goal 7
1.3 Statement of Purpose	59.2; 59.22(a)(1) and (8); 60.22	Goal 7
1.4 Methods of Reducing Flood Losses	60.22	Goal 7
2.0 Definitions	59.1	Goal 7
3.1 Lands to Which this Ordinance Applies	59.22(a)	Goal 7
3.2 Basis for Establishing the Special Flood Hazard Areas	59.22(a)(6); 60.2(h)	Goal 7
3.3 Coordination with Specialty Codes Adopted by the State of Oregon Building Codes Division		ORS 455
3.4.1 Compliance	60.1(b) – (d)	Goal 7
3.4.2 Penalties for Noncompliance	60.1(b) – (d)	Goal 7
3.5.1 Abrogation	60.1(b) – (d)	Goal 7
3.5.2 Severability		
3.6 Interpretation	60.1(b) – (d)	Goal 7
3.7.1 Warning		
3.7.2 Disclaimer of Liability		
4.1 Designation of the Floodplain Administrator	59.22(b)(1)	Goal 7
4.2.1 Permit Review	60.3(a)(1) – (3); 60.3(c)(10)	Goal 7
4.2.2 Information to be Obtained and Maintained	59.22(a)(9)(iii); 60.3(b)(5)(i) and (iii); 60.3(c)(4); 60.3(b)(3); 60.6(a)(6)	Goal 7; 105.9; 110.33; R106.1.4; R109.1.3; R109.1.6.1; R322.1.10; R322.3.6
4.2.3.1 Community Boundary Alterations	59.22(a)(9)(v)	Goal 7
4.2.3.2 Watercourse Alterations	60.3(b)(6) – (7), 65.6(12 - 13)	Goal 7
4.2.3.3 Requirement to Submit New Technical Data	65.3, 65.6, 65.7, 65.12	Goal 7

4.2.4 Substantial Improvement and Substantial Damage Assessments and Determinations	59.1;60.3(a)(3); 60.3(b)(2); 60.3(b)(5)(i); 60.3(c)(1),(2),(3),(5) – (8),(10), (12); 60.3(d)(3); 60.3(e)(4),(5),(8)	Goal 7
4.3.1 Floodplain Development Permit Required	60.3(a)(1)	Goal 7
4.3.2 Application for Development Permit	60.3(a)(1); 60.3(b)(3); 60.3(c)(4)	Goal 7; R106.1.4; R322.3.6
4.4 Variance Procedure	60.6(a)	Goal 7
4.4.1 Conditions for Variances	60.6(a)	Goal 7
4.4.2 Variance Notification	60.6(a)(5)	Goal 7
5.1.1 Alteration of Watercourses	60.3(b)(6) and (7)	Goal 7
5.1.2 Anchoring	60.3(a)(3); 60.3(b)(1),(2), and (8)	Goal 7; R322.1.2
5.1.3 Construction Materials and Methods	60.3(a)(3), TB 2; TB 11	Goal 7; R322.1.3; R322.1.3
5.1.4.1 Water Supply, Sanitary Sewer, and On-Site Waste Disposal Systems	60.3(a)(5) and (6)	Goal 7; R322.1.7
5.1.4.2 Electrical, Mechanical, Plumbing, and Other Equipment	60.3(a)(3)	Goal 7; R322.1.6;
5.1.5 Tanks		R322.2.4; R322.3.7
5.1.6 Subdivision Proposals	60.3(a)(4)(i) – (iii); 60.3(b)(3)	Goal 7
5.1.7 Use of Other Base Flood Data	60.3(a)(3); 60.3(b)(4); 60.3(b)(3); TB 10-01	Goal 7; R322.3.2
5.1.8 Structures Located in Multiple or Partial Flood Zones		R322.1
5.2.1 Flood Openings	60.3(c)(5); TB 1; TB 11	Goal 7; R322.2.2; R322.2.2.1
5.2.2 Garages	TB 7-93	R309
5.2.3.1 Before Regulatory Floodway	60.3(c)(10)	Goal 7
5.2.3.2 Residential Construction	60.3(c)(2)	Goal 7
5.2.3.3 Non-residential Construction	60.3(c)(3) – (5); TB 3	Goal 7; R322.2.2; R322.2.2.1
5.2.3.4 Manufactured Dwellings	60.3(b)(8); 60.3(c)(6)(iv); 60.3(c)(12)(ii)	Goal 7; State of OR Manufactured Dwelling Installation Specialty Code (MDISC) and associated statewide Code Interpretation dated 1/1/2011
5.2.3.5 Recreational Vehicles	60.3(c)(14)(i) – (iii)	Goal 7

5.2.3.6 Appurtenant (Accessory) Structures	60.3(c)(5); TB 1; TB 7-93	S105.2; R105.2
5.2.4 Floodways	60.3(d); FEMA Region X Fish Enhancement Memo (Mark Riebau)	Goal 7
5.2.5 Standards for Shallow Flooding Areas	60.3(c)(7),(8),(11), and (14)	Goal 7
5.3 Specific Standards for Coastal High Hazard Flood Zones, and 5.3.1 Development Standards	60.3(e); TB 5; TB 8; TB 9	Goal 7; R322.3.1; R322.3.2; R322.3.3; R322.3.4; R322.3.5
5.3.1.1 Manufactured Dwelling Standards for Coastal High Hazard Zones	60.3(e)(8)(i) – (iii)	Goal 7; RR322.3.2; State of OR Manufactured Dwelling Installation Specialty Code (MDISC) and associated statewide Code Interpretation dated 1/1/2011
5.3.1.2 Recreational Vehicle Standards for Coastal High Hazard Zones	60.3(e)(9)(i)- (iii)	Goal 7
5.3.1.3 Tank Standards for Coastal High Hazard Zones		R322.2.4; R322.3.7

\*[Link to Oregon Specialty Codes](#)

## **1.0 STATUTORY AUTHORITY, FINDINGS OF FACT, PURPOSE, AND METHODS**

### **1.1 STATUTORY AUTHORIZATION**

The State of Oregon has in **ORS 203.035 (COUNTIES) OR ORS 197.175 (CITIES)** delegated the responsibility to local governmental units to adopt floodplain management regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the **COMMUNITY NAME** does ordain as follows:

### **1.2 FINDINGS OF FACT**

- A. The flood hazard areas of **COMMUNITY NAME** are subject to periodic inundation which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.
- B. These flood losses may be caused by the cumulative effect of obstructions in special flood hazard areas which increase flood heights and velocities, and when inadequately anchored, cause damage in other areas. Uses that are inadequately floodproofed, elevated, or otherwise protected from flood damage also contribute to flood loss.

### **1.3 STATEMENT OF PURPOSE**

It is the purpose of this ordinance to promote public health, safety, and general welfare, and to minimize public and private losses due to flooding in flood hazard areas by provisions designed to:

- A. Protect human life and health;
- B. Minimize expenditure of public money for costly flood control projects;
- C. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. Minimize prolonged business interruptions;
- E. Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in special flood hazard areas;

- F. Help maintain a stable tax base by providing for the sound use and development of flood hazard areas so as to minimize blight areas caused by flooding;
- G. Notify potential buyers that the property is in a special flood hazard area
- H. Notify those who occupy special flood hazard areas that they assume responsibility for their actions
- I. Participate in and maintain eligibility for flood insurance and disaster relief.

## **1.4 METHODS OF REDUCING FLOOD LOSSES**

In order to accomplish its purposes, this ordinance includes methods and provisions for:

- A. Restricting or prohibiting development which is dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- B. Requiring that development vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- C. Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- D. Controlling filling, grading, dredging, and other development which may increase flood damage;
- E. Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas.

## **2.0 DEFINITIONS**

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage.

**Appeal:** A request for a review of the interpretation of any provision of this ordinance or a request for a variance.

**Area of shallow flooding:** A designated Zone AO, AH, AR/AO or AR/AH on a community’s Flood Insurance Rate Map (FIRM) with a one percent or greater annual chance of flooding to an average depth of one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

**Area of special flood hazard:** The land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. It is shown on the Flood Insurance Rate Map (FIRM) as Zone A, AO, AH, A1-30, AE, A99, AR (V, V1-30, VE). “Special flood hazard area” is synonymous in meaning and definition with the phrase “area of special flood hazard”.

**Base flood:** The flood having a one percent chance of being equaled or exceeded in any given year.

**Base flood elevation (BFE):** The elevation to which floodwater is anticipated to rise during the base flood.

**Basement:** Any area of the building having its floor subgrade (below ground level) on all sides.

**Breakaway wall:** A wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

**Coastal high hazard area:** An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources.

**Development:** Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

**Flood or Flooding:**

- (a) A general and temporary condition of partial or complete inundation of normally dry land areas from:
  - (1) The overflow of inland or tidal waters.
  - (2) The unusual and rapid accumulation or runoff of surface waters from any source.
  - (3) Mudslides (i.e., mudflows) which are proximately caused by flooding as defined in paragraph (a)(2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.

(b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (a)(1) of this definition.

**Flood elevation study:** See “Flood Insurance Study”.

**Flood Insurance Rate Map (FIRM):** The official map of a community, on which the Federal Insurance Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community. A FIRM that has been made available digitally is called a Digital Flood Insurance Rate Map (DFIRM).

**Flood Insurance Study (FIS):** An examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudslide (i.e., mudflow) and/or flood-related erosion hazards.

**Flood proofing:** Any combination of structural and nonstructural additions, changes, or adjustments to structures which reduce or eliminate risk of flood damage to real estate or improved real property, water and sanitary facilities, structures, and their contents.

**Floodway:** The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Also referred to as "Regulatory Floodway."

**Functionally dependent use:** A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, and does not include long term storage or related manufacturing facilities.

**Highest adjacent grade:** The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

**Historic structure:** Any structure that is:

1. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
2. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
3. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior; or
4. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
  - a. By an approved state program as determined by the Secretary of the Interior or
  - b. Directly by the Secretary of the Interior in states without approved programs.

**Lowest floor:** The lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.

**Manufactured dwelling:** A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured dwelling" does not include a "recreational vehicle" and is synonymous with "manufactured home".

**Manufactured dwelling park or subdivision:** A parcel (or contiguous parcels) of land divided into two or more manufactured dwelling lots for rent or sale.

**Mean sea level:** For purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which Base Flood Elevations shown on a community's Flood Insurance Rate Map are referenced.

**New construction:** For floodplain management purposes, "new construction" means structures for which the "start of construction" commenced on or after the effective date of a floodplain management regulation adopted by **COMMUNITY NAME** and includes any subsequent improvements to such structures.

**Recreational vehicle:** A vehicle which is:

1. Built on a single chassis;
2. 400 square feet or less when measured at the largest horizontal projection;
3. Designed to be self-propelled or permanently towable by a light duty truck; and
4. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

**Special flood hazard area:** See “Area of special flood hazard” for this definition.

**Start of construction:** Includes substantial improvement and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within 180 days from the date of the permit. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured dwelling on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

**Structure:** For floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured dwelling.

**Substantial damage:** Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

**Substantial improvement:** Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

1. Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or
2. Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure."

**Variance:** A grant of relief by **COMMUNITY NAME** from the terms of a flood plain management regulation.

**Violation:** The failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in this ordinance is presumed to be in violation until such time as that documentation is provided.

[Additional Optional Language Provided in Appendix A](#)

### **3.0 GENERAL PROVISIONS**

#### **3.1 LANDS TO WHICH THIS ORDINANCE APPLIES**

This ordinance shall apply to all special flood hazard areas within the jurisdiction of **COMMUNITY NAME**.

#### **3.2 BASIS FOR ESTABLISHING THE SPECIAL FLOOD HAZARD AREAS**

The special flood hazard areas identified by the Federal Insurance Administrator in a scientific and engineering report entitled "The Flood Insurance Study (FIS) for **EXACT TITLE OF FLOOD INSURANCE STUDY FOR COMMUNITY**", dated **DATE (MONTH DAY, FOUR DIGIT YEAR)**, with accompanying Flood Insurance Rate Maps (FIRMs) **LIST ALL EFFECTIVE FIRM PANELS HERE (UNLESS ALL PANELS ARE BEING REPLACED THROUGH A NEW COUNTY\_WIDE MAP THAT INCORPORATES ALL PREVIOUS PANELS/VERSIONS, IN THAT SITUATION PANELS DO NOT NEED TO BE INDIVIDUALLY LISTED)** are hereby adopted by reference and declared to be a part of this ordinance. The FIS and FIRM panels are on file at **INSERT THE LOCATION (I.E. COMMUNITY PLANNING DEPARTMENT LOCATED IN THE COMMUNITY ADMINISTRATIVE BUILDING)**.

#### **3.3 COORDINATION WITH STATE OF OREGON SPECIALTY CODES**

Pursuant to the requirement established in ORS 455 that the **INSERT COMMUNITY NAME** administers and enforces the State of Oregon Specialty Codes, the **INSERT COMMUNITY NAME** does hereby acknowledge that the Oregon Specialty Codes contain certain provisions that apply to the design and construction of buildings and structures located in special flood hazard areas. Therefore, this ordinance is intended to be administered and enforced in conjunction with the Oregon Specialty Codes.

### **3.4 COMPLIANCE AND PENALTIES FOR NONCOMPLIANCE**

#### **3.4.1 COMPLIANCE**

All development within special flood hazard areas is subject to the terms of this ordinance and required to comply with its provisions and all other applicable regulations.

#### **3.4.2 PENALTIES FOR NONCOMPLIANCE**

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations. Violations of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a **(INSERT INFRACTION TYPE (I.E. MISDEMEANOR). INSERT PENALTIES PER STATE/LOCAL LAW ASSOCIATED WITH SPECIFIED INFRACTION TYPE (I.E. ANY PERSON WHO VIOLATES THE REQUIREMENTS OF THIS ORDINANCE SHALL UPON CONVICTION THEREOF BE FINED NOT MORE THAN A SPECIFIED AMOUNT OF MONEY...)** Nothing contained herein shall prevent the **COMMUNITY NAME** from taking such other lawful action as is necessary to prevent or remedy any violation.

### **3.5 ABROGATION AND SEVERABILITY**

#### **3.5.1 ABROGATION**

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

#### **3.5.2 SEVERABILITY**

This ordinance and the various parts thereof are hereby declared to be severable. If any section clause, sentence, or phrase of the Ordinance is held to be invalid or

unconstitutional by any court of competent jurisdiction, then said holding shall in no way effect the validity of the remaining portions of this Ordinance.

### **3.6 INTERPRETATION**

In the interpretation and application of this ordinance, all provisions shall be:

- A. Considered as minimum requirements;
- B. Liberally construed in favor of the governing body; and
- C. Deemed neither to limit nor repeal any other powers granted under state statutes.

### **3.7 WARNING AND DISCLAIMER OF LIABILITY**

#### **3.7.1 WARNING**

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages.

#### **3.7.2 DISCLAIMER OF LIABILITY**

This ordinance shall not create liability on the part of the **COMMUNITY NAME**, any officer or employee thereof, or the Federal Insurance Administrator for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

### **4.0 ADMINISTRATION**

#### **4.1 DESIGNATION OF THE FLOODPLAIN ADMINISTRATOR**

The **INSERT INDIVIDUAL JOB TITLE** is hereby appointed to administer, implement, and enforce this ordinance by granting or denying development permits in accordance with its provisions. The Floodplain Administrator may delegate authority to implement these provisions.

[Additional Recommended Language Provided in Appendix B](#)

## 4.2 DUTIES AND RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR

Duties of the floodplain administrator, or their designee, shall include, but not be limited to:

### 4.2.1 PERMIT REVIEW

Review all development permits to determine that:

- A. The permit requirements of this ordinance have been satisfied;
- B. All other required local, state, and federal permits have been obtained and approved.
- C. Review all development permits to determine if the proposed development is located in a floodway. If located in the floodway assure that the floodway provisions of this ordinance in section **5.2.4** are met; and
- D. Review all development permits to determine if the proposed development is located in an area where Base Flood Elevation (BFE) data is available either through the Flood Insurance Study (FIS) or from another authoritative source. If BFE data is not available then ensure compliance with the provisions of sections **5.1.7**; and
- E. Provide to building officials the Base Flood Elevation (BFE) (**ADD FREEBOARD IF COMMUNITY HAS HIGHER ELEVATION STANDARDS**) applicable to any building requiring a development permit.
- F. Review all development permit applications to determine if the proposed development qualifies as a substantial improvement as defined in section **2.0**.
- G. Review all development permits to determine if the proposed development activity is a watercourse alteration. If a watercourse alteration is proposed, ensure compliance with the provisions in section **5.1.1**.
- H. Review all development permits to determine if the proposed development activity includes the placement of fill or excavation.

### 4.2.2 INFORMATION TO BE OBTAINED AND MAINTAINED

The following information shall be obtained and maintained and shall be made available for public inspection as needed:

- A. Obtain, record, and maintain the actual elevation (in relation to mean sea level) of the lowest floor (including basements) and all attendant utilities of all new or substantially improved structures where Base Flood Elevation (BFE) data is provided through the Flood Insurance Study (FIS), Flood Insurance Rate Map (FIRM), or obtained in accordance with section **5.1.7**.
- B. Obtain and record the elevation (in relation to mean sea level) of the natural grade of the building site for a structure prior to the start of construction and

the placement of any fill and ensure that the requirements of sections **5.2.4**, **5.3.1(F)**, **4.2.1(B)** are adhered to.

- C. Upon placement of the lowest floor of a structure (including basement) but prior to further vertical construction, obtain documentation, prepared and sealed by a professional licensed surveyor or engineer, certifying the elevation (in relation to mean sea level) of the lowest floor (including basement).
- D. Where base flood elevation data are utilized, obtain As-built certification of the elevation (in relation to mean sea level) of the lowest floor (including basement) prepared and sealed by a professional licensed surveyor or engineer, prior to the final inspection.
- E. Maintain all Elevation Certificates (EC) submitted to the community;
- F. Obtain, record, and maintain the elevation (in relation to mean sea level) to which the structure and all attendant utilities were floodproofed for all new or substantially improved floodproofed structures where allowed under this ordinance and where Base Flood Elevation (BFE) data is provided through the FIS, FIRM, or obtained in accordance with section **5.1.7**.
- G. Maintain all floodproofing certificates required under this ordinance;
- H. Record and maintain all variance actions, including justification for their issuance;
- I. Obtain and maintain all hydrologic and hydraulic analyses performed as required under section **5.2.4**.
- J. Record and maintain all Substantial Improvement and Substantial Damage calculations and determinations as required under section **4.2.4**.
- K. Maintain for public inspection all records pertaining to the provisions of this ordinance.

#### **4.2.3 REQUIREMENT TO NOTIFY OTHER ENTITIES AND SUBMIT NEW TECHNICAL DATA**

##### **4.2.3.1 COMMUNITY BOUNDARY ALTERATIONS**

The Floodplain Administrator shall notify the Federal Insurance Administrator in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed authority or no longer has authority to adopt and enforce floodplain management regulations for a particular area, to ensure that all Flood Hazard Boundary Maps (FHBM) and Flood Insurance Rate Maps (FIRM) accurately represent the community's boundaries. Include within such notification a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished floodplain management regulatory authority.

#### **4.2.3.2 WATERCOURSE ALTERATIONS**

Notify adjacent communities, the Department of Land Conservation and Development, and other appropriate state and federal agencies, prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration. This notification shall be provided by the applicant to the Federal Insurance Administration as a Letter of Map Revision (LOMR) along with either:

- A. A proposed maintenance plan to assure the flood carrying capacity within the altered or relocated portion of the watercourse is maintained; or
- B. Certification by a registered professional engineer that the project has been designed to retain its flood carrying capacity without periodic maintenance.

The applicant shall be required to submit a Conditional Letter of Map Revision (CLOMR) when required under section **4.2.3.3**. Ensure compliance with all applicable requirements in sections **4.2.3.3** and **5.1.1**.

#### **4.2.3.3 REQUIREMENT TO SUBMIT NEW TECHNICAL DATA**

A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Federal Insurance Administrator of the changes by submitting technical or scientific data in accordance with Title 44 of the Code of Federal Regulations (CFR), Section 65.3. The community may require the applicant to submit such data and review fees required for compliance with this section through the applicable FEMA Letter of Map Change (LOMC) process.

The Floodplain Administrator shall require a Conditional Letter of Map Revision prior to the issuance of a floodplain development permit for:

- A. Proposed floodway encroachments that increase the base flood elevation; and
- B. Proposed development which increases the base flood elevation by more than one foot in areas where FEMA has provided base flood elevations but no floodway.

An applicant shall notify FEMA within six (6) months of project completion when an applicant has obtained a Conditional Letter of Map Revision (CLOMR) from FEMA. This notification to FEMA shall be provided as a Letter of Map Revision (LOMR).

#### **4.2.4 SUBSTANTIAL IMPROVEMENT AND SUBSTANTIAL DAMAGE ASSESSMENTS AND DETERMINATIONS**

Conduct Substantial Improvement (SI) (as defined in section 2.0) reviews for all structural development proposal applications and maintain a record of SI calculations within permit files in accordance with section **4.2.2**. Conduct Substantial Damage (SD) (as defined in section 2.0) assessments when structures are damaged due to a natural hazard event or other causes. Make SD determinations whenever structures within the special flood hazard area (as established in section **3.2**) are damaged to the extent that the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

#### **4.3 ESTABLISHMENT OF DEVELOPMENT PERMIT**

##### **4.3.1 FLOODPLAIN DEVELOPMENT PERMIT REQUIRED**

A development permit shall be obtained before construction or development begins within any area horizontally within the special flood hazard area established in section **3.2**. The development permit shall be required for all structures, including manufactured dwellings, and for all other development, as defined in section **2.0**, including fill and other development activities.

##### **4.3.2 APPLICATION FOR DEVELOPMENT PERMIT**

Application for a development permit may be made on forms furnished by the Floodplain Administrator and may include, but not be limited to, plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically the following information is required:

- A. In riverine flood zones, the proposed elevation (in relation to mean sea level), of the lowest floor (including basement) and all attendant utilities of all new and substantially improved structures; in accordance with the requirements of section **4.2.2**.
- B. In coastal flood zones (V zones and coastal A zones), the proposed elevation in relation to mean sea level of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all structures, and whether such structures contain a basement;

- C. Proposed elevation in relation to mean sea level to which any non-residential structure will be floodproofed.
- D. Certification by a registered professional engineer or architect licensed in the State of Oregon that the floodproofing methods proposed for any non-residential structure meet the floodproofing criteria for non-residential structures in section **5.2.3.3**.
- E. Description of the extent to which any watercourse will be altered or relocated.
- F. Base Flood Elevation data for subdivision proposals or other development when required per sections **4.2.1 and 5.1.6**.
- G. Substantial improvement calculation for any improvement, addition, reconstruction, renovation, or rehabilitation of an existing structure.
- H. The amount and location of any fill or excavation activities proposed.

#### **4.4 VARIANCE PROCEDURE**

The issuance of a variance is for floodplain management purposes only. Flood insurance premium rates are determined by federal statute according to actuarial risk and will not be modified by the granting of a variance.

##### **4.4.1 CONDITIONS FOR VARIANCES**

- A. Generally, variances may be issued for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, in conformance with the provisions of sections **4.4.1 (C) and (E), and 4.4.2**. As the lot size increases beyond one-half acre, the technical justification required for issuing a variance increases.
- B. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
- C. Variances shall not be issued within any floodway if any increase in flood levels during the base flood discharge would result.
- D. Variances shall only be issued upon:
  1. A showing of good and sufficient cause;
  2. A determination that failure to grant the variance would result in exceptional hardship to the applicant;
  3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
- E. Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that the criteria of section **4.4.1 (B) – (D)**

are met, and the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

[Additional Optional Language Provided in Appendix B](#)

#### **4.4.2 VARIANCE NOTIFICATION**

Any applicant to whom a variance is granted shall be given written notice that the issuance of a variance to construct a structure below the Base Flood Elevation will result in increased premium rates for flood insurance and that such construction below the base flood elevation increases risks to life and property. Such notification and a record of all variance actions, including justification for their issuance shall be maintained in accordance with section **4.2.2**.

### **5.0 PROVISIONS FOR FLOOD HAZARD REDUCTION**

#### **5.1 GENERAL STANDARDS**

In all special flood hazard areas, the following standards shall be adhered to:

##### **5.1.1 ALTERATION OF WATERCOURSES**

Require that the flood carrying capacity within the altered or relocated portion of said watercourse is maintained. Require that maintenance is provided within the altered or relocated portion of said watercourse to ensure that the flood carrying capacity is not diminished. Require compliance with sections **4.2.3.2** and **4.2.3.3**.

##### **5.1.2 ANCHORING**

- A. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
- B. All manufactured dwellings shall be anchored per section **5.2.3.4**.

##### **5.1.3 CONSTRUCTION MATERIALS AND METHODS**

- A. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

- B. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

#### **5.1.4 UTILITIES AND EQUIPMENT**

##### **5.1.4.1 WATER SUPPLY, SANITARY SEWER, AND ON-SITE WASTE DISPOSAL SYSTEMS**

- A. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.
- B. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters.
- C. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding consistent with the Oregon Department of Environmental Quality.

##### **5.1.4.2 ELECTRICAL, MECHANICAL, PLUMBING, AND OTHER EQUIPMENT**

Electrical, heating, ventilating, air-conditioning, plumbing, duct systems, and other equipment and service facilities shall be elevated at or above the base flood level (INSERT ANY COMMUNITY FREEBOARD REQUIREMENT HERE) or shall be designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during conditions of flooding. In addition, electrical, heating, ventilating, air-conditioning, plumbing, duct systems, and other equipment and service facilities shall:

- A. If replaced as part of a substantial improvement shall meet all the requirements of this section.
- B. Not be mounted on or penetrate through breakaway walls.

#### **5.1.5 TANKS**

- A. Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood.
- B. Above-ground tanks shall be installed at or above the base flood level (INSERT COMMUNITY FREEBOARD REQUIREMENT HERE) or shall be anchored to prevent flotation, collapse, and lateral movement under conditions of the base flood.

- C. In coastal flood zones (V Zones or coastal A Zones) when elevated on platforms, the platforms shall be cantilevered from or knee braced to the building or shall be supported on foundations that conform to the requirements of the State of Oregon Specialty Code.

#### **5.1.6 SUBDIVISION PROPOSALS & OTHER PROPOSED DEVELOPMENTS**

- A. All new subdivision proposals and other proposed new developments (including proposals for manufactured dwelling parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, shall include within such proposals, Base Flood Elevation data.
- B. All new subdivision proposals and other proposed new developments (including proposals for manufactured dwelling parks and subdivisions) shall:
  - 1. Be consistent with the need to minimize flood damage.
  - 2. Have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize or eliminate flood damage.
  - 3. Have adequate drainage provided to reduce exposure to flood hazards.

#### **5.1.7 USE OF OTHER BASE FLOOD ELEVATION DATA**

When Base Flood Elevation data has not been provided in accordance with section **3.2** the local floodplain administrator shall obtain, review, and reasonably utilize any Base Flood Elevation data available from a federal, state, or other source, in order to administer section **5.0**. All new subdivision proposals and other proposed new developments (including proposals for manufactured dwelling parks and subdivisions) must meet the requirements of section **5.1.6**.

Base Flood Elevations shall be determined for development proposals that are 5 acres or more in size or are 50 lots or more, whichever is lesser in any A zone that does not have an established base flood elevation. Development proposals located within a riverine unnumbered A Zone shall be reasonably safe from flooding; the test of reasonableness includes use of historical data, high water marks, FEMA provided Base Level Engineering data, and photographs of past flooding, etc... where available. **(INSERT REFERENCE TO ANY OF THIS TYPE OF INFORMATION TO BE USED FOR REGULATORY PURPOSES BY YOUR COMMUNITY, I.E. BASE LEVEL ENGINEERING DATA, HIGH WATER MARKS, HISTORICAL OR OTHER DATA THAT WILL BE REGULATED TO. THIS MAY BE NECESSARY TO ENSURE THAT THE STANDARDS APPLIED TO RESIDENTIAL STRUCTURES ARE CLEAR AND OBJECTIVE. IF UNCERTAIN SEEK LEGAL ADVICE, AT A MINIMUM REQUIRE THE ELEVATION OF RESIDENTIAL STRUCTURES AND NON-RESIDENTIAL STRUCTURES THAT ARE NOT DRY FLOODPROOFED TO BE**

**2FEET ABOVE HIGHEST ADJACENT GRADE).** Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

### **5.1.8 STRUCTURES LOCATED IN MULTIPLE OR PARTIAL FLOOD ZONES**

In coordination with the State of Oregon Specialty Codes:

- A. When a structure is located in multiple flood zones on the community's Flood Insurance Rate Maps (FIRM) the provisions for the more restrictive flood zone shall apply.
- B. When a structure is partially located in a special flood hazard area, the entire structure shall meet the requirements for new construction and substantial improvements.

[Additional Recommended Language Provided in Appendix B](#)

## **5.2 SPECIFIC STANDARDS FOR RIVERINE (INCLUDING ALL NON-COASTAL) FLOOD ZONES**

These specific standards shall apply to all new construction and substantial improvements in addition to the General Standards contained in section 5.1 of this ordinance.

### **5.2.1 FLOOD OPENINGS**

All new construction and substantial improvements with fully enclosed areas below the lowest floor (excluding basements) are subject to the following requirements.

Enclosed areas below the Base Flood Elevation, including crawl spaces shall:

- A. Be designed to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters;
- B. Be used solely for parking, storage, or building access;
- C. Be certified by a registered professional engineer or architect or meet or exceed all of the following minimum criteria:
  - 1. A minimum of two openings,
  - 2. The total net area of non-engineered openings shall be not less than one (1) square inch for each square foot of enclosed area, where the enclosed area is measured on the exterior of the enclosure walls,
  - 3. The bottom of all openings shall be no higher than one foot above grade.
  - 4. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they shall allow the automatic flow of floodwater into and out of the enclosed areas and shall be accounted for in the determination of the net open area.

5. All additional higher standards for flood openings in the State of Oregon Residential Specialty Codes Section R322.2.2 shall be complied with when applicable.

## **5.2.2 GARAGES**

- A. Attached garages may be constructed with the garage floor slab below the Base Flood Elevation (BFE) in riverine flood zones, if the following requirements are met:
  1. If located within a floodway the proposed garage must comply with the requirements of section **5.2.4**.
  2. The floors are at or above grade on not less than one side;
  3. The garage is used solely for parking, building access, and/or storage;
  4. The garage is constructed with flood openings in compliance with section **5.2.1** to equalize hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwater.
  5. The portions of the garage constructed below the BFE are constructed with materials resistant to flood damage;
  6. The garage is constructed in compliance with the standards in section **5.1**; and
  7. The garage is constructed with electrical, and other service facilities located and installed so as to prevent water from entering or accumulating within the components during conditions of the base flood.
- B. Detached garages must be constructed in compliance with the standards for appurtenant structures in section **5.2.3.6** or non-residential structures in section **5.2.3.3** depending on the square footage of the garage.

## **5.2.3 FOR RIVERINE (NON-COASTAL) SPECIAL FLOOD HAZARD AREAS WITH BASE FLOOD ELEVATIONS**

In addition to the general standards listed in section **5.1** the following specific standards shall apply in Riverine (non-coastal) special flood hazard areas with Base Flood Elevations (BFE): Zones A1-A30, AH, and AE.

### **5.2.3.1 BEFORE REGULATORY FLOODWAY**

In areas where a regulatory floodway has not been designated, no new construction, substantial improvement, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's Flood Insurance Rate Map (FIRM), unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing

and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

### **5.2.3.2 RESIDENTIAL CONSTRUCTION**

- A. New construction, conversion to, and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated at or above the Base Flood Elevation (BFE) (INSERT ADDITIONAL FREEBOARD FOR YOUR COMMUNITY – RECOMMEND MINIMUM OF 1FT ABOVE BFE).
- B. Enclosed areas below the lowest floor shall comply with the flood opening requirements in section **5.2.1**.

[Additional Recommended Language Provided in Appendix B](#)

### **5.2.3.3 NON-RESIDENTIAL CONSTRUCTION**

- A. New construction, conversion to, and substantial improvement of any commercial, industrial, or other non-residential structure shall:
  - 1. Have the lowest floor, including basement elevated at or above the Base Flood Elevation (BFE) (INSERT ANY ADDITIONAL FREEBOARD REQUIREMENTS FOR YOUR COMMUNITY);  
Or, together with attendant utility and sanitary facilities:

[Additional Recommended Language Provided in Appendix B](#)

- i. Be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water;
- ii. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.
- iii. Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this section based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the Floodplain Administrator as set forth section **4.2.2**.

- B. Non-residential structures that are elevated, not floodproofed, shall comply with the standards for enclosed areas below the lowest floor in section **5.2.1**.
- C. Applicants floodproofing non-residential buildings shall be notified that flood insurance premiums will be based on rates that are one (1) foot below the floodproofed level (e.g. a building floodproofed to the base flood level will be rated as one (1) foot below).

[Additional Recommended Language Provided in Appendix B](#)

**5.2.3.4 MANUFACTURED DWELLINGS**

- A. Manufactured dwellings to be placed (new or replacement) or substantially improved that are supported on solid foundation walls shall be constructed with flood openings that comply with section **5.2.1**;
- B. The bottom of the longitudinal chassis frame beam shall be at or above Base Flood Elevation;
- C. Manufactured dwellings to be placed (new or replacement) or substantially improved shall be anchored to prevent flotation, collapse, and lateral movement during the base flood. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Reference FEMA’s “Manufactured Home Installation in Flood Hazard Areas” guidebook for additional techniques), and;
- D. Electrical crossover connections shall be a minimum of twelve (12) inches above Base Flood Elevation (BFE).

**5.2.3.5 RECREATIONAL VEHICLES**

Recreational vehicles placed on sites are required to:

- A. Be on the site for fewer than 180 consecutive days, and
- B. Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or
- C. Meet the requirements of section **5.2.3.4**, including the anchoring and elevation requirements for manufactured dwellings.

**5.2.3.6 APPURTENANT (ACCESSORY) STRUCTURES**

Relief from elevation or floodproofing requirements for residential and non-residential structures in Riverine (Non-Coastal) flood zones may be granted for appurtenant structures that meet the following requirements:

- A. Appurtenant structures located partially or entirely within the floodway must comply with requirements for development within a floodway found in section **5.2.4**.
- B. Appurtenant structures must only be used for parking, access, and/or storage and shall not be used for human habitation;
- C. In compliance with State of Oregon Specialty Codes, appurtenant structures on properties that are zoned residential are limited to one-story structures less than 200 square feet, or 400 square feet if the property is greater than two (2) acres in area and the proposed appurtenant structure will be located a minimum of 20 feet from all property lines. Appurtenant structures on properties that are zoned as non-residential are limited in size to 120 square feet.
- D. The portions of the appurtenant structure located below the Base Flood Elevation must be built using flood resistant materials;
- E. The appurtenant structure must be adequately anchored to prevent flotation, collapse, and lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the base flood.
- F. The appurtenant structure must be designed and constructed to equalize hydrostatic flood forces on exterior walls and comply with the requirements for flood openings in section **5.2.1**;
- G. Appurtenant structures shall be located and constructed to have low damage potential;
- H. Appurtenant structures shall not be used to store toxic material, oil, or gasoline, or any priority persistent pollutant identified by the Oregon Department of Environmental Quality unless confined in a tank installed in compliance with section **5.1.5**.
- I. Appurtenant structures shall be constructed with electrical, mechanical, and other service facilities located and installed so as to prevent water from entering or accumulating within the components during conditions of the base flood.

[Additional Optional Language Provided in Appendix B](#)

## **5.2.4 FLOODWAYS**

Located within the special flood hazard areas established in section **3.2** are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of the floodwaters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

- A. Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless:
  - 1. Certification by a registered professional civil engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment shall not result in any increase in flood levels within the community during the occurrence of the base flood discharge;
  - Or,
  - 2. A community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that a Conditional Letter of Map Revision (CLOMR) is applied for and approved by the Federal Insurance Administrator, and the requirements for such revision as established under Volume 44 of the Code of Federal Regulations, section 65.12 are fulfilled.
  
- B. If the requirements of section **5.2.4 (A)** are satisfied, all new construction, substantial improvements, and other development shall comply with all other applicable flood hazard reduction provisions of section **5.0**.

## **5.2.5 STANDARDS FOR SHALLOW FLOODING AREAS**

Shallow flooding areas appear on FIRMs as AO zones with depth designations or as AH zones with Base Flood Elevations. For AO zones the base flood depths range from one (1) to three (3) feet above ground where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. For both AO and AH zones, adequate drainage paths are required around structures on slopes to guide floodwaters around and away from proposed structures.

### **5.2.5.1 STANDARDS FOR AH ZONES**

Development within AH Zones must comply with the standards in sections **5.1, 5.2, and 5.2.5**.

### **5.2.5.2 STANDARDS FOR AO ZONES**

In AO zones, the following provisions apply in addition to the requirements in sections **5.1** and **5.2.5**:

- A. New construction, conversion to, and substantial improvement of residential structures and manufactured dwellings within AO zones shall have the lowest floor, including basement, elevated above the highest grade adjacent to the building, at minimum to or above the depth number specified on the Flood Insurance Rate Maps (FIRM) **(INSERT COMMUNITY FREEBOARD REQUIREMENT HERE)** (at least two (2) feet if no depth number is specified). For manufactured dwellings the lowest floor is considered to be the bottom of the longitudinal chassis frame beam.
- B. New construction, conversion to, and substantial improvements of non-residential structures within AO zones shall either:
  - 1. Have the lowest floor (including basement) elevated above the highest adjacent grade of the building site, at minimum to or above the depth number specified on the Flood Insurance Rate Maps (FIRMS) **(INSERT COMMUNITY FREE BOARD REQUIREMENT HERE)** (at least two (2) feet if no depth number is specified); or
  - 2. Together with attendant utility and sanitary facilities, be completely floodproofed to or above the depth number specified on the FIRM **(INSERT COMMUNITY FREEBOARD REQUIREMENT HERE)** or a minimum of two (2) feet above the highest adjacent grade if no depth number is specified, so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy. If this method is used, compliance shall be certified by a registered professional engineer or architect as stated in section **5.2.3.3(A)(4)**.
- C. Recreational vehicles placed on sites within AO Zones on the community's Flood Insurance Rate Maps (FIRM) shall either:
  - 1. Be on the site for fewer than 180 consecutive days, and
  - 2. Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or
  - 3. Meet the elevation requirements of section **5.2.5.2(A)**, and the anchoring and other requirements for manufactured dwellings of section **5.2.3.4**.
- D. In AO zones, new and substantially improved appurtenant structures must comply with the standards in section **5.2.3.6**.
- E. In AO zones, enclosed areas beneath elevated structures shall comply with the requirements in section **5.2.1**.

### **5.3 SPECIFIC STANDARDS FOR COASTAL HIGH HAZARD FLOOD ZONES**

Located within special flood hazard areas established in section **3.2** are Coastal High Hazard Areas, designated as Zones V1-V30, VE, V, or coastal A zones as identified on the FIRMs as the area between the Limit of Moderate Wave Action (LiMWA) and the Zone V boundary. These areas have special flood hazards associated with high velocity waters from surges and, therefore, in addition to meeting all provisions of this ordinance and the State of Oregon Specialty Codes, the following provisions shall apply in addition to the general standards provisions in section **5.1**.

### **5.3.1 DEVELOPMENT STANDARDS**

- A. All new construction and substantial improvements in Zones V1-V30 and VE, V, and coastal A zones (where base flood elevation data is available) shall be elevated on pilings and columns such that:
  - 1. The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated a minimum of one foot above the base flood level; and
  - 2. The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those specified by the State of Oregon Specialty Codes;
- B. A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of this section.
- C. Obtain the elevation (in relation to mean sea level) of the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures and whether or not such structures contain a basement. The floodplain administrator shall maintain a record of all such information in accordance with section **4.2.2**.
- D. Provide that all new construction and substantial improvements have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system.

For the purpose of this section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or state codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:

1. Breakaway wall collapse shall result from water load less than that which would occur during the base flood; and
  2. If breakaway walls are utilized, such enclosed space shall be useable solely for parking of vehicles, building access, or storage. Such space shall not be used for human habitation.
  3. Walls intended to break away under flood loads shall have flood openings that meet or exceed the criteria for flood openings in section **5.2.1**.
- E. The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and nonstructural). Maximum water loading values to be used in this determination shall be those associated with the base flood. Maximum wind loading values used shall be those specified by the State of Oregon Specialty Codes.
- F. Prohibit the use of fill for structural support of buildings.
- G. All new construction shall be located landward of the reach of mean high tide.
- H. Prohibit man-made alteration of sand dunes which would increase potential flood damage.
- I. All structures, including but not limited to residential structures, non-residential structures, appurtenant structures, and attached garages shall comply with all the requirements of section **5.3.1** Floodproofing of non-residential structures is prohibited.

#### **5.3.1.1 MANUFACTURED DWELLING STANDARDS FOR COASTAL HIGH HAZARD ZONES**

All manufactured dwellings to be placed (new or replacement) or substantially improved within Coastal High Hazard Areas (Zones V, V1-30, VE, or Coastal A) shall meet the following requirements:

- A. Comply with all of the standards within section **5.3**;
- B. The bottom of the longitudinal chassis frame beam shall be elevated to a minimum of one foot above the Base Flood Elevation (BFE); and
- C. Electrical crossover connections shall be a minimum of 12 inches above the BFE.

#### **5.3.1.2 RECREATIONAL VEHICLE STANDARDS FOR COASTAL HIGH HAZARD ZONES**

Recreational Vehicles within Coastal High Hazard Areas (Zones V, V1-30, VE, or Coastal A) shall either:

- A. Be on the site for fewer than 180 consecutive days, and
- B. Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or
- C. Meet the permit requirements of section **4.0** and the requirements for manufactured dwellings in section **5.3.1.1**.

#### **5.3.1.3 TANK STANDARDS FOR COASTAL HIGH HAZARD ZONES**

Tanks shall meet the requirements of section **5.1.5**.

## Appendix A – Optional Definitions

**Building:** See "Structure."

**Below-grade crawl space:** Means an enclosed area below the base flood elevation in which the interior grade is not more than two feet below the lowest adjacent exterior grade and the height, measured from the interior grade of the crawlspace to the top of the crawlspace foundation, does not exceed 4 feet at any point. *[Must add both this definition and the language in Appendix B, Section 5.2.3.7 to have a below-grade crawlspace foundation option in your community's ordinance.]*

**Critical facility:** Means a facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to schools, nursing homes, hospitals, police, fire and emergency response installations, installations which produce, use, or store hazardous materials or hazardous waste.

**Elevated building:** Means for insurance purposes, a non-basement building which has its lowest elevated floor raised above ground level by foundation walls, shear walls, post, piers, pilings, or columns.

**Floodplain or flood prone area:** Any land area susceptible to being inundated by water from any source. See "Flood or flooding."

**Floodplain administrator:** The community official designated by title to administer and enforce the floodplain management regulations.

**Floodplain management:** The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works, and floodplain management regulations.

**Floodplain management regulations:** Zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as floodplain ordinance, grading ordinance and erosion control ordinance) and other application of police power. The term describes such state or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

**Hazardous material:** The Oregon Department of Environmental Quality defines hazardous materials to include any of the following:

- (a) Hazardous waste as defined in ORS 466.005;
- (b) Radioactive waste as defined in ORS 469.300, radioactive material identified by the Energy Facility Siting Council under ORS 469.605 and radioactive substances defined in ORS 453.005
- (c) Communicable disease agents as regulated by the Health Division under ORS Chapter 431 and 433.010 to 433.045 and 433.106 to 433.990;

- (d) Hazardous substances designated by the United States Environmental Protection Agency (EPA) under section 311 of the Federal Water Pollution Control Act, P.L. 92-500, as amended;
- (e) Substances listed by the United States EPA in section 40 of the Code of Federal Regulations, Part 302 – Table 302.4 (list of Hazardous Substances and Reportable Quantities) and amendments;
- (f) Material regulated as a Chemical Agent under ORS 465.550;
- (g) Material used as a weapon of mass destruction, or biological weapon;
- (h) Pesticide residue;
- (i) Dry cleaning solvent as defined by ORS 465.200(9).

**Letter of Map Change (LOMC)**: Means an official FEMA determination, by letter, to amend or revise effective Flood Insurance Rate Maps and Flood Insurance Studies. The following are categories of LOMCs:

- (a) **Conditional Letter of Map Amendment (CLOMA)**: A CLOMA is FEMA’s comment on a proposed structure or group of structures that would, upon construction, be located on existing natural ground above the base (1-percent-annual-chance) flood elevation on a portion of a legally defined parcel of land that is partially inundated by the base flood.
- (b) **Conditional Letter of Map Revision (CLOMR)**: A CLOMR is FEMA’s comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective base flood elevations, or the special flood hazard area.
- (c) **Conditional Letter of Map Revision based on Fill (CLOMR-F)**: A CLOMR-F is FEMA’s comment on a proposed project that would, upon construction, result in a modification of the special flood hazard area through the placement of fill outside the existing regulatory floodway.
- (d) **Letter of Map Amendment (LOMA)**: An official amendment, by letter, to the Flood Insurance Rate Maps (FIRMs) based on technical data showing that an existing structure, parcel of land or portion of a parcel of land that is naturally high ground, (i.e., has not been elevated by fill) above the base flood, that was inadvertently included in the special flood hazard area.
- (e) **Letter of Map Revision (LOMR)**: A LOMR is FEMA’s modification to an effective Flood Insurance Rate Map (FIRM), or Flood Boundary and Floodway Map (FBFM), or both. LOMRs are generally based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the

modification of the existing regulatory floodway, the effective base flood elevations, or the SFHA. The LMOR officially revises the FIRM or FBFM, and sometimes the Flood Insurance Study (FIS) report, and, when appropriate, includes a description of the modifications. The LOMR is generally accompanied by an annotated copy of the affected portions of the FIRM, FBFM, or FIS report.

- (f) **Letter of Map Revision based on Fill (LOMR-F):** A LOMR-F is FEMA’s modification of the special flood hazard area shown on the Flood Insurance Rate Map (FIRM) based on the placement of fill outside the existing regulatory floodway.
- (g) **PMR:** A PMR is FEMA’s physical revision and republication of an effective Flood Insurance Rate Map (FIRM) or Flood Insurance Study (FIS) report. PMRs are generally based on physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective base flood elevations, or the special flood hazard area.

**Regulatory floodway:** See “Floodway”.

**Sheet flow area:** See "Area of shallow flooding".

**Water dependent:** Means a structure for commerce or industry which cannot exist in any other location and is dependent on the water by reason of intrinsic nature of its operations.

**Water surface elevation:** The height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, or other datum, of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

## Appendix B – Recommended and Optional Higher Standards

Section	Optional Higher Standard	Explanation	Highly Recommended
<a href="#">4.1</a>	Add the following after the Job Title: “and their designee”	If a community designates a single position as the Floodplain Administrator (i.e. the Planning Director) this allows that position to designate others within the agency that can act as the Floodplain Administrator in case of vacation or other reasons. For example, the Planning Director can make the Senior Planner the designee, which will allow them to act as the Floodplain Administrator in their absence.	<b>YES</b>
<a href="#">4.2.3.3</a>	<p>The applicant shall be responsible for preparing all technical data to support CLOMR/LOMR applications and paying any processing or application fees associated with the CLOMR/LOMR.</p> <p>The Floodplain Administrator shall be under no obligation to sign the Community Acknowledgement Form, which is part of the CLOMR/LOMR application, until the applicant demonstrates that the project will or has met the requirements of this code and all applicable state and federal permits.</p>	This additional language is not required under the NFIP but it makes it clear that applicants are required to develop the technical information and cover the costs associated with LOMR applications, and specifying this helps to manage community members’ expectations. The second paragraph assists in conveying that a community does not have to sign-off on a CLOMR/LOMR if they find that the project does not meet the requirements of their local code, or any state or federal laws.	<b>YES</b>
<a href="#">4.4.1</a>	Variances may be issued for the repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure’s continued designation as a	Communities have the option of using either this language or the Substantial Improvement definition exemption to regulate historic structures.	

	<p>historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.</p>	<p>Per FEMA P-467-2 (May 2008) <i>Floodplain Management Bulletin Historic Structures</i>, and FEMA P-993 (July 2014) <i>Floodplain Management Bulletin: Variances and the National Flood Insurance Program</i>.</p> <p>FEMA Region X advocates for the use of the Substantial Improvement Definition historic structure exclusion. The Region believes it may represent a less rigorous process for exclusion than the variance process.</p> <p>[Must current bullet E down to be bullet F and add this text as new bullet E, update citation in Bullet F to read (B – E) instead of default citation. Delete bullet 2 of the Substantial Improvement definition in section 2.0. Merge bullet 1 back into the definition by changing the last sentence of the SI definition to read:  “The term does not, however, include: Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specification which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions.”]</p>	
<p><a href="#">5.1.9</a></p>	<p><b>CRITICAL FACILITIES</b>  Construction of new critical facilities shall be, to the extent possible, located outside the limits of the special flood hazard area.</p>	<p>Regulatory language to prevent the location of critical facilities within high risk flood hazard areas.</p>	<p><b>YES</b></p>

	<p>Construction of new critical facilities shall be permissible within the SFHA only if no feasible alternative site is available. Critical facilities constructed within the SFHA shall have the lowest floor elevated three (3) feet above the Base Flood Elevation (BFE) or to the height of the 500-year flood, whichever is higher. Access to and from the critical facility shall also be protected to the height utilized above. Floodproofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into floodwaters.</p>	<p>Critical facilities when damaged by flooding cause significant impacts to a community, risk to lives, and/or risks to critical infrastructure. Critical facilities like schools, hospitals, and fire stations often act as shelters and are required to provide aid during flood events, and should not be placed in special flood hazard area.</p> <p>[Must also adopt the definition of “critical facilities” in Appendix A, if this language is inserted into the ordinance.]</p>	
<a href="#">5.2.3.2 (A)</a>	<p>Replace the default model ordinance language with the following: A. New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated to one (1) foot <b>(CAN INCREASE TO UP TO 3 FEET)</b> above the Base Flood Elevation (BFE).</p>	<p>For many years the State of Oregon Residential Specialty Code required that residential construction within riverine flood hazard areas had the lowest floor elevated to one (1) foot above the Base Flood Elevation (BFE). This was changed to allow for communities to go above one (1) foot or to just adopt the National Flood Insurance Program Minimum: “at or above the BFE”. The insurance savings and protection from flood events is significant for homes that are elevated one (1) foot or more above the BFE.</p>	<b>YES</b>
<a href="#">5.2.3.3 (A)(1)</a>	<p>Replace the default model ordinance language with the following: 1. Have the lowest floor, including basement elevated to one (1) foot <b>(CAN</b></p>	<p>The State of Oregon Residential Specialty Code leaves it up to the community to determine if</p>	<b>YES</b>

	<p><b>INCREASE UP TO 3 FEET</b>) above the Base Flood Elevation (BFE).</p>	<p>they wish to go above the NFIP minimum standard for elevating non-residential structures to be above the Base Flood Elevation. The more elevated a structure is the more it is protected from flood hazards. ASCE 24 provides recommended levels of elevation for different types of non-residential structures and these can provide guidance on the appropriate amount of freeboard (additional elevation) to be used for this section.</p>	
<p><a href="#">5.2.3.3 (D) &amp; (E)</a></p>	<p>D. Applicants shall supply a maintenance plan for the entire structure to include but not limited to: exterior envelop of structure; all penetrations to the exterior of the structure; all shields, gates, barriers, or components designed to provide floodproofing protection to the structure; all seals or gaskets for shields, gates, barriers, or components; and, the location of all shields, gates, barriers, and components, as well as all associated hardware, and any materials or specialized tools necessary to seal the structure</p> <p>E. Applicants shall supply an Emergency Action Plan (EAP) for the installation and sealing of the structure prior to a flooding event that clearly identifies what triggers the EAP and who is responsible for enacting the EAP.</p>	<p>The Flood Insurance Manual indicates that flood insurance companies are requiring both a Maintenance Plan and an Emergency Action Plan (EAP) for flood insurance policies to be rated based on floodproofing providing protection to the structure during the base flood event.</p>	<p><b>YES</b></p>
<p><a href="#">5.2.3.7</a></p>	<p><b>BELOW-GRADE CRAWL SPACES</b></p> <p>A. The building must be designed and adequately anchored to resist flotation, collapse, and lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy. Hydrostatic loads and the</p>	<p>Below-grade crawlspaces are allowed subject to the standards in the optional language, as found, in FEMA Technical Bulletin 11-01, Crawlspaces Construction for Buildings Located in special</p>	

	<p>effects of buoyancy can usually be addressed through the required flood openings stated in (INSERT CITATION FOR SECTION ADDRESSING FLOOD OPENING STANDARDS). Because of hydrodynamic loads, crawlspace construction is not allowed in areas with flood velocities greater than five (5) feet per second unless the design is reviewed by a qualified design professional, such as a registered architect or professional engineer. Other types of foundations are recommended for these areas.</p> <p>B. The crawlspace is an enclosed area below the Base Flood Elevation (BFE) and, as such, must have openings that equalize hydrostatic pressures by allowing the automatic entry and exit of floodwaters. The bottom of each flood vent opening can be no more than one (1) foot above the lowest adjacent exterior grade.</p> <p>C. Portions of the building below the BFE must be constructed with materials resistant to flood damage. This includes not only the foundation walls of the crawlspace used to elevate the building, but also any joists, insulation, or other materials that extend below the BFE. The recommended construction practice is to elevate the bottom of joists and all insulation above BFE.</p> <p>D. Any building utility systems within the crawlspace must be elevated above BFE or designed so that floodwaters cannot enter or accumulate within the system components during flood conditions. Ductwork, in particular, must either be placed above the BFE or sealed from floodwaters.</p>	<p>flood hazard areas. These type of crawlspaces are common within Oregon. ASCE 24 also addresses this type of construction.</p> <p>[Your community must also add the definition for “Below-grade crawlspaces” in Appendix A to have a below grade crawlspace foundation option in your community’s ordinance.]</p>	
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	<p>E. The interior grade of a crawlspace below the BFE must not be more than two (2) feet below the lowest adjacent exterior grade.</p> <p>F. The height of the below-grade crawlspace, measured from the interior grade of the crawlspace to the top of the crawlspace foundation wall must not exceed four (4) feet at any point. The height limitation is the maximum allowable unsupported wall height according to the engineering analyses and building code requirements for flood hazard areas.</p> <p>G. There must be an adequate drainage system that removes floodwaters from the interior area of the crawlspace. The enclosed area should be drained within a reasonable time after a flood event. The type of drainage system will vary because of the site gradient and other drainage characteristics, such as soil types. Possible options include natural drainage through porous, well-drained soils and drainage systems such as perforated pipes, drainage tiles or gravel or crushed stone drainage by gravity or mechanical means.</p> <p>H. The velocity of floodwaters at the site shall not exceed five (5) feet per second for any crawlspace. For velocities in excess of five (5) feet per second, other foundation types should be used.</p>		
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