

Oregon Model Companion Flood Damage Prevention Ordinance

All Zones, Optional Provisions

Last Modified: September 29, 2011

This Oregon Model Companion Flood Damage Prevention Ordinance was developed by the State of Oregon in cooperation with the Federal Emergency Management Agency (FEMA). This model companion ordinance incorporates by reference the Oregon Specialty Codes as adopted and administered by the Oregon Building Code Division. Oregon Specialty Codes are based upon International Building Codes (I-Codes). Oregon Specialty Codes, and the I-Codes, apply only to buildings over 200 square feet; however, Title 44 of the Code of Federal Regulations Part 60 (the National Flood Insurance Program) does not differentiate construction requirements based on square footage. As a result, NFIP construction standards must be included in local ordinances. Additional administrative provisions also must be included in the local ordinance.

Not all sections of this model companion ordinance are required to be adopted: these recommended or optional sections are shaded. Bracketed *[i]* notations in italic are explanatory or cite a source of authority. There is no need to retain or adopt the phrases that are shown in bracketed italics. Items in red italic braces *{n}* are to be filled in by the community.

User Notes

Base Flood Elevation = Design Flood Elevation: The NFIP uses the term Base Flood Elevation (BFE) for the vertical elevation of the 1% annual flood. Oregon Specialty Codes use the term Design Flood Elevation (DFE). The terms are equivalent. The Oregon Specialty Code-required one foot of freeboard is added to Design Flood Elevation to establish the elevation of the lowest floor or minimum elevation of floodproofing of non-residential structures.

Manufactured Dwellings:

The Oregon Manufactured Dwelling Installation Specialty Code requires the bottom of the chassis to be elevated to or above Base Flood Elevation. This is a higher standard than that required by the NFIP and it exceeds the Oregon Residential Specialty Code requirement that the lowest floor be elevated one foot above the BFE. In most cases elevating the bottom of the chassis to BFE will result in the living floor being elevated 18” to 20” above Base Flood Elevation. NFIP regulations exempt the placement/replacement of manufactured dwellings in manufactured home parks that were in existence prior to the first Flood Insurance Rate Maps (FIRMs) from the requirement to elevate above Base Flood Elevation if the Base Flood Elevation is 36” or more above the highest adjacent grade. The Oregon Manufactured Dwelling Specialty Code also requires that all electrical crossover connections shall be a minimum of 12 inches above the Base Flood Elevation. The electrical cross connection requirement may be the more restrictive than the chassis elevation requirement. If so, it takes precedence

Oregon Manufactured Dwelling Installation Specialty Code makes no distinction between new, existing, or pre-FIRM manufactured dwelling parks. All new or substantially damaged/improved manufactured dwellings must comply with Oregon Manufactured Dwelling Installation Specialty Code requirement to elevate manufactured dwellings above the Base Flood Elevation. Please see *Statewide Code Interpretation: 2010 Oregon Manufactured Dwelling Installation Specialty Code (MDISC)* for more information. .

Agricultural Buildings:

ORS 455.315 exempts certain agricultural buildings from application of the Oregon Structural Specialty Code, however, the exemption does not apply to:

- (A) A dwelling;
- (B) A structure used for a purpose other than growing plants in which 10 or more persons are present at any one time;
- (C) A structure regulated by the State Fire Marshal pursuant to ORS chapter 476;
- (D) A structure used by the public; or
- (E) **A structure subject to sections 4001 to 4127, title 42, United States Code (the National Flood Insurance Act of 1968) as amended, and regulations promulgated thereunder.**

How to Include Oregon Specialty Codes in Local Regulations:

Appendix A contains the construction provisions required by the NFIP and included in Oregon Specialty Codes. Adoption of Appendix A is optional because the Oregon Specialty Codes are adopted by reference in Chapter V Section E of this companion model ordinance. If your city or county decides to include the construction standards set forth in Appendix A, they should be placed into Chapter V Section.E of this companion model ordinance. If your city or county decides to adopt more stringent standards than found in the Oregon Specialty Codes, these standards also should be placed into Chapter V Section.E.

{Red italicized phrases need to be modified by the local community}

 The dark vertical line is meant to highlight major additions to the model flood hazard ordinance as compared to the 2009 version.

I. STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE, AND OBJECTIVES

A. Statutory Authority

The State of Oregon has delegated¹ the responsibility to local governmental units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the *{city/ county/tribe}*, does ordain as follows:

B. Findings of Fact

- (1) The flood hazard areas of *{city/ county/tribe}* are subject to periodic inundation that results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood relief and protection, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.
- (2) These flood losses are caused by structures in flood hazard areas, which are inadequately elevated, flood-proofed, or otherwise unprotected from flood damages, and by the cumulative effect of obstructions in flood hazard area causing increases in flood heights and velocities.
- (3) The *{city/ county/tribe}* has the primary responsibility for planning, adoption and enforcement of land use regulations to accomplish proper management of special flood hazard areas. [44 CFR Part 59.22]

C. Statement of Purpose

The objectives of this ordinance are to

- (1) Protect human life, health and property;
- (2) Minimize damage to public facilities and utilities, such as water purification and sewage treatment plants, water and gas mains, electric, telephone and sewer lines, streets and bridges, that are located in areas of special flood hazard;
- (3) Help maintain a stable tax base by providing for the sound use and development of flood prone areas;
- (4) Minimize expenditure of public money for costly flood control projects;
- (5) Minimize the need for rescue, emergency services, and relief associated with flooding and generally undertaken at the expense of the general public;
- (6) Minimize prolonged business interruptions, unnecessary disruption of commerce, access and public service during times of flood;
- (7) Ensure that potential buyers are notified that property is in an area of special flood hazard;
- (8) Ensure that those who occupy within the areas of special flood hazard assume responsibility for their actions, and;

¹ Almost all Oregon cities and some Oregon counties will derive their authority to adopt a flood damage prevention ordinance from the home rule provisions of the Oregon Constitution. See Article XI, Section 2 of the Oregon Constitution and your local government charter, if applicable. All counties, including those without home rule charters, have been granted authority to enact ordinances under Oregon Revised Statute 203.035.

- (9) Manage the alteration of areas of special flood hazard, stream channels and shorelines to minimize the impact of development on the natural and beneficial functions.

D. Methods of Reducing Flood Losses

In order to accomplish its purpose, this ordinance includes methods and provisions to

- (1) Require development that is vulnerable to floods, including structures and facilities necessary for the general health, safety and welfare of citizens, to be protected against flood damage at the time of initial construction;
- (2) Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which increase flood heights, velocities, or erosion;
- (3) Control filling, grading, dredging and other development which may increase flood damage or erosion;
- (4) Prevent or regulate the construction of flood barriers that will unnaturally divert flood waters or that may increase flood hazards to other lands;
- (5) Preserve and restore natural floodplains, stream channels, and natural protective barriers which carry and store flood waters, and;
- (6) Coordinate with and supplement provisions of State of Oregon Specialty Codes enforced by the State of Oregon Building Codes Division.

II. DEFINITIONS

Chapter II contains an extensive list of definitions; definitions with an asterisk "" are required to be incorporated in this ordinance. The remaining definitions should be included for clarification but may not be applicable to your community. All definitions should be reviewed and coordinated with definitions contained in other parts of your ordinances. Additional NFIP definitions may be found in 44 CFR Part 59.1.*

Unless specifically defined in Chapter II, words or phrases used in this ordinance shall be interpreted according to the meaning they have in common usage.

"Accessory Structure" means a structure on the same parcel of property as a principal structure, the use of which is incidental the use of the principal structure.

"Appeal" means a request for review of the interpretation of any provision of this ordinance.

***"Area of Shallow Flooding"** means a designated Zone AO or Zone AH on a community's Flood Insurance Rate Map (FIRM) with a 1 percent (1%) or greater annual chance of flooding in any given year. Zone AO has an average base flood depth of 1 to 3 feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate, and where velocity flow may be evident. Zone AO is characterized as sheet flow; Zone AH indicates ponding and is shown with Base Flood Elevations.[44 CFR Part 59.1, simplified]

***"Area of Special Flood Hazard"** means the land in the flood plain within a community subject to a 1 percent or greater chance of flooding in any given year. The Area of Special Flood Hazard is synonymous with Special Flood Hazard Area (SFHA). The SFHA is shown on Flood Insurance Rate Maps and includes the letters A and V.

*“**Base Flood**” means the flood having a one percent (1%) chance of being equaled or exceeded in any given year. [44 CFR Part 59.1]

*“**Base Flood Elevation (BFE)**” means the water surface elevation during the base flood in relation to a specified datum. The Base Flood Elevation (BFE) is depicted on the FIRM to the nearest foot and in the FIS to the nearest 0.1 foot. BFE includes base flood depth as used for Zone AO.

*“**Basement**” means any area of a building having its floor subgrade (below ground level) on all sides. [44 CFR Part 59.1]

*“**Below-grade Crawlspace**” means an enclosed area below the Base Flood Elevation in which the interior grade does not exceed 2 feet below the lowest adjacent exterior grade and the height, measured from the interior grade of the crawlspace to the bottom of the lowest horizontal structural member of the lowest floor does not exceed 4 feet at any point.

Note: this definition and appropriate crawlspace code must be included in the flood hazard development ordinance if below grade crawlspaces are allowed, otherwise below grade crawlspaces will be considered to be basements. Structures built with below grade crawlspaces will have higher insurance premiums.

*“**Breakaway Wall**” means 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**” means 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. The area is designated on the FIRM always includes the letter “V”. [44 CFR Part 59.1]

“**Community**” means any area or political subdivision thereof which has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction. [44 CFR Part 59.1] For Indian tribes delete “area or political subdivision” and substitute “Indian tribe or authorized tribal organization”

“**Conditional Letter of Map Revision (CLOMR)**” is a letter from FEMA commenting on whether a proposed project, if built as proposed, would meet the minimum NFIP standards or proposed hydrology changes. If the project, built as proposed, revises the Flood Insurance Rate Map and/or Flood Insurance Study, a LOMR is required to be submitted no later than 6 months after project completion.

“**Critical Facility**” See “Essential Facility”.

“**Datum**” means the vertical control datum from which all vertical elevations are determined. Historically, Flood Insurance Rate Maps have used the National Geodetic Vertical Datum of 1929 (NGVD29). The vertical datum currently adopted by the federal government as a basis for measuring heights is the North American Vertical Datum of 1988 (NAVD88).

*“**Development**” means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, fencing, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials located within the area of special flood hazard. [44 CFR Part 59.1]

“Digital FIRM (DFIRM),” means Digital Flood Insurance Rate Map. It depicts flood risk and zones and flood risk information. The DFIRM presents the flood risk information in a format suitable for electronic mapping applications.

“Encroachment” means the activities or construction within the Floodway including, fill, excavation, grading, new construction, substantial improvements and other development.

“Elevated Building” means, a non-basement building which has its lowest elevated floor raised above ground level by foundation walls, shear walls, post, piers, pilings, or columns.

“Essential Facility” or **“Critical Facility”** means:

- (a) hospitals and other medical facilities having surgery and emergency treatment areas;
- (b) fire and police stations;
- (c) tanks or other structures containing, housing or supporting water or fire-suppression materials or equipment required for the protection of essential or hazardous facilities or special occupancy structures;
- (d) emergency vehicle shelters and garages;
- (e) structures and equipment in emergency-preparedness centers;
- (f) standby power generating equipment for essential facilities; and
- (g) structures and equipment in government communication centers and other facilities required for emergency response. *[ORS 455.447 and Table 1-1 of ASCE 24]*

***“Flood” or “flooding”** means a general and temporary condition of partial or complete inundation of normally dry land areas from:

- (a) overflow of inland or tidal waters; and/or
- (b) unusual and rapid accumulation or runoff of surface waters from any source. *[44 CFR Part 59.1]*

***“Flood Insurance Rate Map (FIRM)”** means an official map of a community, issued by the Federal Insurance Administration, delineating the Special Flood Hazard Areas and/or risk premium zones applicable to the community. *[44 CFR Part 59.1]*

***“Flood Insurance Study (FIS)”** means the official report by the Federal Insurance Administration evaluating flood hazards and containing flood profiles, regulatory Floodway boundaries and water surface elevations of the base flood. *[44 CFR Part 59.1, modified]*

***“Floodway (regulatory Floodway)”** means the channel of a river or other watercourse and those portions of the land areas adjacent to the channel that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height (usually the designated height is one foot, however, some communities may be more restrictive.) *[44 CFR Part 59.1]*

“Highest Adjacent Grade (HAG)” means the highest natural elevation of the ground surface prior to construction, adjacent to the proposed walls of a structure. Refer to the Elevation Certificate and instructions, FEMA Form 81-31, Section C, for additional information.

*“**Historic Structure**” means a structure that is:

- (a) Listed individually in the National Register of Historic Places (a listing maintained by the U.S. Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- (b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or to a district preliminarily determined by the Secretary to qualify as a registered historic district;
- (c) Individually listed on a state inventory of historic places which have been approved by the Secretary of the Interior, or;
- (d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
 - i. by an approved state program as determined by the Secretary of the Interior, or;
 - ii. directly by the Secretary of the Interior in states without approved programs.
[44 CFR Part 59.1 Note: Oregon has an approved state program]

“**Letter of Map Change (LOMC)**” means an official FEMA determination, by letter, to amend or revise effective Flood Insurance Rate Maps and/or Flood Insurance Studies. LOMCs are issued in the following categories:

(a) Letter of Map Amendment (LOMA)

An amendment to the Flood Insurance Rate Maps based on technical data showing that an existing structure or parcel of land that has not been elevated by fill (natural grade) was inadvertently included in the special flood hazard area because of an area of naturally high ground above the base flood.

(b) Letter of Map Revision (LOMR)

- 1) **LOMR-F (Letter of Map Revision based on Fill)** is a letter from FEMA stating that an existing structure or parcel of land that has been elevated by fill would not be inundated by the base flood.
- 2) A LOMR revises the current Flood Insurance Rate Map and/or Flood Insurance Study to show changes to the floodplains, Floodways or flood elevations. LOMRs are generally based on manmade alterations that affected the hydrologic or hydraulic characteristics of a flooding source and thus result in modification to the existing regulatory Floodway, the effective Base Flood Elevation, or the Special Flood Hazard Area. It is recommended a Conditional Letter of Map Revision be approved by FEMA prior to issuing a permit to start a project if the project has a potential to affect the special flood hazard area. (See Conditional Letter of Map Revision)

* “**Lowest Floor**” is the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure used solely for parking of vehicles, building access, or storage, in an area other than a basement, is not considered a structure’s lowest floor provided that the enclosed area is built and maintained in accordance with the applicable design requirements of the Oregon Specialty Codes and this ordinance. The lowest floor of a structure in a V-zone is measured from the bottom of the lowest horizontal structural member supporting the structure.*[44 CFR Part 59.1, modified for clarity]*

*“**Manufactured Dwelling**” means a structure, transportable in one or more sections, built on a permanent chassis and designed to be used with or without a permanent foundation when connected

to the required utilities. The term “Manufactured Dwelling” does not include a “Recreational Vehicle.” [44 CFR Part 59.1]

“**Manufactured Home**” see “Manufactured Dwelling”

“**Mean Sea Level**” means for purposes of the National Flood Insurance Program, the *{select the one that matches effective FIRM: National Geodetic Vertical Datum (NGVD) of 1929 or North American Vertical Datum (NAVD) of 1988}* or other datum, to which Base Flood Elevations shown on a community’s FIRM are referenced. [44 CFR Part 59.1, modified to add new datum]

*“**New Construction**” means a structure for which the “start of construction” commenced on or after *{insert adoption date of this ordinance}*, and includes any subsequent substantial improvements to the structure. [44 CFR 59.1, modified for clarity]

*“**Oregon Specialty Codes**” means the combined specialty codes adopted under ORS 446.062, 446.185, 447.020 (2), 455.020 (2), 455.496, 455.610, 455.680, 460.085, 460.360, 479.730 (1) or 480.545, but does not include regulations adopted by the State Fire Marshal pursuant to ORS chapter 476 or ORS 479.015 to 479.200 and 479.210 to 479.220. The combined specialty codes are often referred to as building codes. *{Tribes substitute International Building Code}*

*“**Recreational Vehicle**” means a vehicle that is

- (a) built on a single chassis;
- (b) 400 square feet or less when measured at the largest horizontal projection;
- (c) designed to be self-propelled or permanently towed by a light duty truck, and;
- (d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use. [44 CFR Part 59.1]

*“**Special Flood Hazard Area**” means zones on Flood Insurance Rate Maps that depict the land in the floodplain within a community subject to a one percent or greater chance of flooding in any given year. “Special Flood Hazard Area” is synonymous with “Area of Special Flood Hazard.” Special Flood Hazard Areas on Flood Insurance Rate Maps always include the letters A or V. [44 CFR Part 59.1, simplified]

*“**Start of construction**” includes substantial improvement and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, or other improvement was within 180 days of the permit date². 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 home 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 the alteration affects the external dimensions of a building. [44 CFR Part 59.1]

² Building permits in Oregon expire if work isn't started within 180 days from the date of issue. Once work has begun, permits expire if work is suspended or abandoned for 180 days or more. Building permits may be extended for an additional 180-day period upon written request.

*“**Structure**” means a walled and roofed building, a manufactured dwelling, a modular or temporary building, or a gas or liquid storage tank that is principally above ground. [44 CFR Part 59.1, modified for clarity]

*“**Substantial Damage**” means 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 its market value before the damage occurred³. [44 CFR Part 59.1]

*“**Substantial Improvement**” means 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 market value of the structure is :

(a) the real market value of the structure prior to the start of the initial repair or improvement, or

(b) in the case of damage, the real market value of the structure prior to the damage occurring, or

Substantial Improvement does not include either:

(a) 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;

(b) any alteration of a “historic structure”, provided that the alteration will not preclude the structure’s continued designation as a “historic structure.” [44 CFR Part 59.1]

“**Variance**” means a grant of relief by a community from any requirement of this ordinance. [44 CFR Part 59.1]

“**Violation**” means the failure of a structure or other development to be fully compliant with the community’s flood plain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance of this ordinance is presumed to be in violation until such time as that documentation is provided.

“**Watercourse**” means the channel and banks of an identifiable channel, and not the adjoining floodplain areas. The flood carrying capacity of a watercourse refers to the flood carrying capacity of the channel (except in the case of alluvial fans, where a channel is not typically defined).

“**Water Dependent Use**” means a facility that cannot be used for its intended purpose unless it is located or carried out in close proximity to water, such as a docking or port facility necessary for the loading and unloading of cargo or passengers, shipbuilding, or ship repair facilities. The term does not include long-term storage, manufacture, sales, or service facilities.

“**Water Surface Elevation**” means the height, in relation to a specific datum, of floods of various magnitudes and frequencies in the flood plains of coastal or riverine areas. [44 CFR Part 59.1]

³ Communities may define substantial improvement and substantial damage as less than 50% of the market value of the structure. Substantial improvement and substantial damage also may be accumulated over time.

III. GENERAL PROVISIONS

A. Lands to Which This Ordinance Applies

This ordinance shall apply to all Special Flood Hazard Areas within the jurisdiction of *{city/county/tribe}*. Nothing in this Ordinance is intended to allow uses or structures that are otherwise prohibited by the zoning ordinance or State of Oregon Specialty Codes. .

B. Basis for Areas of Special Flood Hazard

Jurisdictions may regulate a larger area than that depicted on the FIRM. Any larger area (such as an historic inundation area) must be identified in this ordinance. Add the expanded area description to this section.

The Area of Special Flood Hazard identified by the Federal Emergency Management Agency in its Flood Insurance Study (FIS) for *{insert title of effective FIS}*, dated *{insert the date of effective FIS}*, with accompanying Flood Insurance Rate Maps (FIRM) or Digital Flood Insurance Rate Maps (DFIRM) are adopted by reference and declared a part of this ordinance. The FIS and the FIRM are on file at the office of the *{city/county/tribe}* clerk *{insert address}*. [44 CFR Part 60.3(b)(1), (c)(1) and (d(2))]

Areas of Special Flood Hazard are depicted on FIRMs and DFIRMs as Special Flood Hazard Areas (SFHA). When the Base Flood Elevation has not been identified, the best available information for flood hazard area identified as outline in Chapter V Section D shall be the basis for regulation.

C. Coordination with Specialty Codes Adopted by the State of Oregon Building Codes Division

Pursuant to the requirement established in ORS 455 that the *{city/county}* administers and enforces the State of Oregon Specialty Codes, the *{jurisdiction's governing body}* of *{city/county}* 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. [Tribes substitute implementing statute]

D. Establishment of a Development Permit

A development permit shall be required prior to initiating development activities in any Special Flood Hazard Area established in Chapter III Section B. The permit shall be for all proposed development as set forth in Section II Definitions, including the placement of manufactured dwellings. [44 CFR Part 60.3(a)]

E. Interpretation

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

- (1) Considered as minimum requirements;
- (2) Liberally construed in favor of the governing body, and;
- (3) Deemed neither to limit nor repeal any other powers granted under state statutes, including Oregon State Specialty Codes.

F. Warning and Disclaimer of Liability

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. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the Special Flood Hazard Areas or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of *{city/county/tribe}* or any officer or employee thereof, or the Federal Insurance Administration, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

IV. ADMINISTRATION

A. Designation of Floodplain Administrator

The *{insert title}* is hereby appointed as the Floodplain Administrator who is responsible for administering and implementing the provisions of this ordinance. *[44 CFR Part 59.22(b)]*

B. Duties and Responsibilities of the Floodplain Administrator

Duties of the Floodplain Administrator shall include, but not be limited to

- (1) Review all proposed construction and other development, including the placement of manufactured dwellings, to determine whether such construction or other development will be located in Special Flood Hazard Areas or other flood-prone areas; *[44 CFR Part 60.3(a)(1)]*
- (2) Review permit applications for new development or modifications of any existing development in Special Flood Hazard Areas for compliance with the requirements of this ordinance; *[44 CFR Part 60.3(a)(1)]*
- (3) Review proposed development to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal, State, or local government. Copies of such permits shall be maintained on file. *[44 CFR Part 60.3(a)(2)]*
- (4) Review all development permit applications to determine if proposed development is located in the regulatory Floodway, and if so, ensure that the encroachment standards of Chapter V, Section B are met; *[44 CFR Part 60.3(d)(1)]*
- (5) When Base Flood Elevation data or data have not been provided in Chapter III, Section B, the Floodplain Administrator shall obtain, review and reasonably utilize any Base Flood Elevation

and floodway data available from a Federal, state or other authoritative source in order to administer the provisions of this ordinance; [44 CFR Part 60.3(b)(4)]

- (6) When Base Flood Elevations are not available:
 - (a) review proposed development to determine whether development proposals are reasonably safe from flooding [44 CFR Part 60.3(a)(4)]⁴.
 - (b) review all development permits for all new subdivision proposals and other proposed development (including proposals for manufactured home parks and subdivisions) greater than 5 acres or 50 lots, whichever is the lesser, to ensure a base flood elevation has been established (44 CFR Part 60.3 (b)(3));
- (7) Where a determination is needed of the exact location of boundaries of the Special Flood Hazard Areas including (for example, where there appears to be a conflict between a mapped boundary and actual field conditions) the Floodplain Administrator shall make a determination. Any person contesting the location of the boundary shall be given a reasonable opportunity to appeal the determination as provided in Section {*add appeal section number*}.
- (8) Issue development permits when the provisions of this ordinance have been met, or deny the same in the event of noncompliance; [44 CFR Part 59.24]
- (9) Coordinate with the Building Official to ensure that applications for building permits comply with the requirements of this ordinance; [Good practice]
- (10) Obtain, verify and record the actual elevation in relation to the vertical datum used on the effective FIRM, or in relation to the highest adjacent grade where no Base Flood Elevation is available, of the lowest floor level, including basement, of all new construction or substantially improved structures, including manufactured dwellings, that are located in non-coastal special flood hazard areas; [44 CFR Part 60.3(b)(5)(i), amended to address no BFE and manufactured dwellings]
- (11) Obtain, verify and record the actual elevation of finished construction, in relation to the vertical datum used on the effective FIRM, or highest adjacent grade where no Base Flood Elevation is available, to which a new or substantially improved non-residential structure located in a non-coastal special flood hazard area has been flood-proofed. When floodproofing is utilized for a non-residential structure, the Floodplain Administrator shall obtain a Floodproofing Certificate (FEMA Form 81-65) which has been signed and sealed by a registered professional engineer or architect; [44 CFR Part 60.3(b)(5), amended to address no BFE]
- (12) Obtain, verify and record the actual elevation in relation to the vertical datum used on the effective FIRM, or in relation to the highest adjacent grade where no Base Flood Elevation is available, of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new construction or substantially improved structures, including manufactured dwellings that are located in coastal special flood hazard areas (all V Zones); [44 CFR Part 60(e)(2)(i)]
- (13) Ensure that all records and certifications pertaining to the provisions of this ordinance are permanently maintained in {*specify official or office*} and available for public inspection; [44 CFR Parts 60.3(b)(5)(iii) and 60.3(e)(2)(ii)]

⁴ 44 CFR Part 65.2 defines “reasonably safe from flooding” as base flood waters will not inundate the land or damage structures ... and that any subsurface waters related to the base flood will not damage existing or proposed buildings.

- (14) Make periodic inspections of Special Flood Hazard Areas to establish that development activities are being performed in compliance with this ordinance, and to verify that existing buildings and structures maintain compliance with this ordinance; *[Good practice]*
- (15) Coordinate with the Building Official to inspect areas where buildings and structures in Special Flood Hazard Areas have been damaged, regardless of the cause of damage, and notify owners that permits may be required to repair, rehabilitate, demolish, relocate, or reconstruct structures; *[Good practice]*
- (16) Make substantial improvement and/or substantial damage determinations for all structures located in Special Flood Hazard Areas. *[44 CFR Part 60.3(b)(4)]*

C. Development Permit

The State of Oregon recommends that applicants be required to submit an Elevation Certificate (FEMA Form 81-31) for proposed structures (based on construction drawings) at the time of application for a floodplain development permit, for buildings under construction at the time of the inspection required by the Oregon Residential Specialty Code, Section R109, and upon building completion (the elevation certificate states "finished construction") prior to issuance of a Certificate of Occupancy.

- (1) A Development Permit shall be obtained prior to start of all proposed construction and other development including the placement of manufactured homes within any Special Flood Hazard Area. *[44 CFR Part 60.3(b)(1)]*
- (2) Application for a Development Permit shall be made to the Floodplain Administrator or designee on forms furnished by the Floodplain Administrator or designee prior to starting development activities. Specifically, the following information is required
 - (a) plans in duplicate drawn to scale with elevations of the project area and the nature, location, dimensions of existing and proposed structures, earthen fill placement, storage of materials or equipment and drainage facilities; *[Oregon Residential Specialty Code R106.5 requires one set to be retained and the second to be returned to the applicant]*
 - (b) delineation of Special Flood Hazard Areas, regulatory Floodway boundaries including Base Flood Elevations, or flood depth in AO zones, where available; *[Oregon Residential Specialty Code R106.1.3]*
 - (c) for all proposed structures, elevation in relation to the highest adjacent grade and the Base Flood Elevation, or flood depth in AO zones, of the:
 - (i) lowest enclosed area including crawlspace or basement floor; *[Oregon Residential Specialty Code R106.1.3]*
 - (ii) bottom of the lowest horizontal structural member in coastal high hazard areas (V Zones); *[Oregon Residential Specialty Code R106.1.3]*
 - (iii) top of the proposed garage slab, if any, and; *[Good Practice]*
 - (iv) next highest floor *[Good Practice]*
 - (d) locations and sizes of all flood openings, if required, in any proposed structure; *[Good Practice]*
 - (e) the proposed elevation to which a non-residential structure will be flood-proofed or elevated; *[44 CFR Part 60.3(b)(5)]*

(f) specifications for any proposed flood-proofing of nonresidential structures and an indication that the proposed flood-proofing will be certified by a professional engineer or architect prior to issuance of the development permit;

(g) description of the extent to which any watercourse will be altered or relocated as a result of a proposed development (see Chapter IV Section D(3)).; [44 CFR Part 60.3(b)(6)]

(h) evidence that all necessary permits can be obtained from those governmental agencies from which approval is required by Federal or State law. [44 CFR Part 60.3 (a)(2)]

(3) No Development Permit shall be issued until compliance with this ordinance and other applicable codes and regulations has been demonstrated. Specifically, the following documentation is required prior to issuance of a floodplain Development Permit

(a) evidence that all necessary permits have been obtained from those governmental agencies from which approval is required by Federal or State law; [44 CFR Part 60.3 (a)(2)]

(b) a FEMA-approved CLOMR if the project will cause a watercourse alteration, modify Base Flood Elevation, or change the boundaries of the floodway or special flood hazard area; [44 CFR Parts 65.3 and 65.5]

(c) a completed pre-construction Elevation Certificate signed and sealed by a registered professional surveyor;

(d) certification from a registered professional engineer or architect that any proposed non-residential flood-proofed structure will meet the flood-proofing criteria of the NFIP and Oregon Specialty Codes. [44 CFR Part 60.3 (c)(4) and Oregon Specialty Codes]

(4) During construction

(a) for all new construction and substantial improvements, the permit holder shall provide to the Floodplain Administrator an as-built certification of the floor elevation or flood-proofing level immediately after the lowest floor or flood-proofing is placed and prior to further vertical construction; [Oregon Residential Specialty Code R109]]

(b) any deficiencies identified by the Floodplain Administrator shall be corrected by the permit holder immediately and prior to work proceeding. Failure to submit certification or failure to make the corrections shall be cause for the Floodplain Administrator to issue a stop-work order for the project. [Good Practice based on 44 CFR Part 59.24]

(5) Finished Construction:

In addition to the requirements of the Oregon Specialty Codes pertaining to certificate of occupancy, and prior to the final inspection, the owner or authorized agent shall submit the following documentation for finished construction that has been signed and sealed by a registered surveyor or engineer

(a) for elevated buildings and structures in non-coastal Special Flood Hazard Areas (all A zones), the elevation of the lowest floor, including basement, or where no Base Flood Elevation is available, the height above highest adjacent grade of the lowest floor; [44 CFR Part 60.3(b)(5)]

(b) for buildings and structures in coastal Special Flood Hazard Areas (all V zones), the elevation 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, and; [44 CFR Part 60.3(e)(2)]

(c) for non-residential buildings and structures that have been floodproofed, the elevation to which the building or structure was floodproofed. [44 CFR Part 60.3(b)(5)]

Failure to submit certification or failure to correct violations shall be cause for the Floodplain Administrator to withhold a certificate of occupancy until such deficiencies are corrected. [Good Practice]

(6) Expiration of Development Permit

Development permits issued under this Chapter shall become invalid unless the work authorized by such permit is commenced within 180 days after issuance or the work is suspended or abandoned for a period of 180 days after the work commences. Extensions for periods of not more than 180 days each shall be requested in writing and shall be reviewed against the current FIRM and this ordinance. [Good practice based on the NFIP definition of 'start of construction' and Sections 105.3.2 of the ORSC and OSSC]

D. Watercourse Alterations

(1) Development shall not diminish the flood carrying capacity of a watercourse. If any watercourse will be altered or relocated as a result of the proposed development the applicant must submit certification by a registered professional engineer that the flood carrying capacity of the watercourse will not be diminished. [Good Practice]

(2) Applicant will be responsible for obtaining all necessary permits from governmental agencies from which approval is required by Federal, State, or local law, including but not limited to section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334; the Endangered Species Act of 1973, 16 U.S.C. 1531-1544; and State of Oregon Division of State Lands regulations.

(3) The Floodplain Administrator shall notify adjacent communities and Oregon Department of Land Conservation and Development prior to any alteration or relocation of the watercourse. Copies of such notification shall be submitted to the Federal Insurance Administrator [44 CFR Part 60.3(b)(6)] The applicant shall provide to the Floodplain Administrator the technical information necessary to prepare the notification [Good Practice].

(4) The Floodplain Administrator shall assure that maintenance for the altered or relocated portion of the water course is provided so that the flood carrying capacity will not be diminished. [44 CFR Part 60.3(b)(7)] It shall be the responsibility of the applicant to perform required maintenance [Good Practice]

(5) The applicant shall submit to the Floodplain Administrator technical data as set forth in Chapter IV Section E prior to any watercourse alteration that will result in the expansion, relocation or elimination of the special flood hazard area. [44 CFR Parts 65.3, 65.5, 65.6]

E. Requirement to Submit New Technical Data

(1) Within six months of project completion, an applicant who obtains a Conditional Letter of Map Revision (CLOMR) from FEMA, or whose development alters a watercourse, modifies floodplain boundaries, or Base Flood Elevations shall obtain from FEMA a Letter of Map Revision (LOMR) reflecting the as-built changes to the FIS and/or FIRM. [44 CFR Part 65.3]

- (2) It is the responsibility of the applicant to have technical data prepared in a format required for a CLOMR or LOMR and to submit such data to FEMA on the appropriate FEMA Form MT-2 application forms. Submittal and processing fees for these map revisions shall be the responsibility of the applicant. *[Good Practice]*
- (3) Applicants shall be responsible for all costs associated with obtaining a CLOMR or LOMR from FEMA. *[Good Practice]*
- (4) 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 all applicable requirements of this ordinance *[GoodPractice]*

F. Non-Conversion of Enclosed Areas below the Lowest Floor

To ensure that enclosed areas below the lowest floor continue to be used solely for parking vehicles, limited storage, or access to the building and not be finished for use as human habitation/recreation/bathrooms, etc., the Floodplain Administrator shall

- (1) Determine which applicants for new construction and/or substantial improvements have fully enclosed areas below the lowest floor that are 5 feet or higher; *[Good Practice]*
- (2). Enter into a “NON-CONVERSION DEED DECLARATION FOR CONSTRUCTION WITHIN FLOOD HAZARD AREAS” or equivalent with the *{city, county, tribe}*. The deed declaration shall be recorded with the *{name of entity}*. The deed declaration shall be in a form acceptable to the Floodplain Administrator and County Counsel; *[Good Practice]*

V. PROVISIONS FOR FLOOD HAZARD REDUCTION

A. Site Improvements and Subdivisions

- (1) Where Special Flood Hazard Areas have not been defined within the community or a Base Flood Elevation has not been provided, all plans and permits for proposed construction subdivisions, placement of manufactured homes, or other development shall be consistent with the need to ensure that building sites will be reasonably safe from flooding⁵. The test of reasonableness is a local judgment and includes historical data, high water marks, photographs of past flooding, etc. *[44 CFR Parts 60.3(a)(3) and (4)].*
- (2) Building lots shall have adequate buildable area outside of regulatory Floodways. *[Good Practice]*
- (3) Where Base Flood Elevation has not been provided, it shall be generated for subdivision proposals and other proposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres (whichever is the lesser). *[44 CFR Part 60.3(b)(3)]*

⁵ 44 CFR Part 65.2 defines “reasonably safe from flooding” as base flood waters will not inundate the land or damage structures ... and that any subsurface waters related to the base flood will not damage existing or proposed buildings.

- (4) Site improvements, subdivisions, and manufactured home parks shall have public utilities and facilities such as sewer, gas, electric and water systems located and constructed to minimize or eliminate flood damage and infiltration of floodwaters into the systems. Replacement public utilities and facilities such as sewer, gas, electric and water systems, likewise shall be sited and designed to minimize or eliminate damage and infiltration of floodwaters. [44 CFR Part 60.3(a)(4) and (5)]
- (5) New and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the systems. New and replacement sanitary sewerage systems shall be designed to minimize or eliminate infiltration of flood waters in the systems and discharges from the systems into flood waters. Onsite waste disposal systems shall be located to avoid functional impairment to them or contamination from them during flooding. [44 CFR Part 60.3(a)(5)]
- (6) Subdivisions proposals and other proposed new development, including manufactured home parks, shall have adequate drainage provided to reduce exposure to flood hazards. [44 CFR Part 60.3(a)(4)]. In AO and AH zones, drainage paths shall be provided to guide floodwater around and away from proposed structures. [44 CFR Part 60.3(c)(11)]
- (7) In coastal high hazard areas (V Zones), all new construction shall be located landward of the reach of mean high tide. [44 CFR Part 60.3(e)(3)]
- (8) In coastal high hazard areas (V Zones), alteration of sand dunes is prohibited unless it has been demonstrated by engineering analysis that the alteration will not increase potential flood damage. [44 CFR 60.3(e)(7)]
- (9) New essential facilities shall not be constructed in the Tsunami Inundation Zone. The Tsunami Inundation Zone may include V, A, and potentially other flood zones. If an exception is granted then the Coastal High Hazard Area construction standards in the model ordinance shall apply to the building of these new structures in the Tsunami Inundation Zone. [ORS 455.446 and 447]

B. Development in Regulatory Floodways

- (1) Except as provided in paragraph (4) and (5) below, encroachments, including fill, new construction, substantial improvements, fences or other development are prohibited in the regulatory Floodway unless certification by a registered professional civil engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that such encroachment will not result in any increase in flood levels during the occurrence of the base flood discharge. [44 CFR Part 60.3(d)(3)]
- (2) If B(1) is met, any fill permitted to be placed in the regulatory Floodway shall be designed to be stable under conditions of flooding, including rapid rise and rapid drawdown of floodwaters, prolonged inundation, and flood-related erosion and scour. [Good Practice]
- (3) Upon demonstration of no other alternative, applicants shall obtain a Conditional Letter of Map Revision (CLOMR) from FEMA before an encroachment, including fill, new construction, substantial improvement, fences, or other development, in the regulatory Floodway is permitted that will cause any increase in the Base Flood Elevation unless the development causes a temporary encroachment and the conditions in paragraph (4) below are satisfied. [44 CFR Part 60.3(d)(4)]. Upon completion of the project, but not later than six months after the project completion, a Letter of Map Revision shall be submitted to FEMA to reflect the changes on the FIRM and/or FIS. [44 CFR Part 65.3]

EXCEPTIONS:

- (4) Temporary encroachments in the regulatory Floodway for the purposes of capital improvement projects (including bridge construction/repair) ⁶ must have a development permit issued. This includes ensuring that all other required permits and permissions are obtained from federal, state and local agencies. If the temporary encroachment results in an increase in flood levels during the occurrence of the base flood discharge, a CLOMR⁷ is not required to be obtained when:
- (a) the project is limited as to duration with the days and dates that the structure or other development will be on site specified in the development permit. If a longer period is required, a new permit should be issued.
 - (b) all other accessory equipment and temporary structures (i.e. construction trailers) are restricted from the regulatory Floodway;
 - (c) the project limits placement of equipment and material in the regulatory Floodway to that which is absolutely necessary for the purposes of the project;
 - (d) structures shall be placed on site so the flood damages are minimized.
 - (e) the project includes a flood warning system sufficient to allow equipment to be evacuated from the regulatory Floodway and placed outside the area of special flood hazard in the event of imminent flood;
 - (f) the project applicant identifies insurable structures affected by any increase in Base Flood Elevation. The community should disclose to all owners of insurable structures and all

⁶ The permit should stipulate the days and dates the structure or other development will be on site. If a longer period is required, a new permit should be issued.

A flood warning system for the project should be in place to allow equipment to be evacuated from the site and placed outside the floodplain.

Placement of equipment in the Floodway should be restricted to only that equipment which is absolutely necessary for the purposes of the project. All other accessory equipment and temporary structures (i.e. construction trailers) should be restricted from the Floodway. Structures should be placed on site so that flood damages are minimized. The community may want to consider such things as anchoring construction trailers in case evacuation isn't practical.

The following conditions should be included in the permit:

- Identification of the temporary changes to the floodplain under a 1% chance flood event (100-year flood)
- Identification of all insurable structures affected by any increase in BFE during a 1% chance flood event (100-year flood)
- Written notification to the applicant that they may be liable for any flood damages resulting from the temporary structure
- The length of time the structure or encroachment will be allowed.

⁷

No CLOMR/LOMR will be required because there is no need to modify the FIRM due to the temporary condition of the encroachment, but the community should disclose to all owners of insurable structures and all applicants for permits in the affected area that there is an increased risk of flooding for the duration of the temporary encroachment.

applicants for permits in the affected area that there is an increased risk of flooding for the duration of the temporary encroachment;

(g) the project applicant is provided with written notification that they may be liable for any flood damages resulting from the temporary encroachment.

(5) Projects for stream habitat restoration may be allowed without certification by a registered professional civil engineer provided [*Oregon Solutions Regulatory Streamlining Project 2009*]

(a) a development permit is obtained prior to initiating development activities

(b) the project qualifies for a Department of the Army, Portland District Regional General Permit for Stream Habitat Restoration (NWP-2007-1023) and,

(c) a qualified professional (a Registered Professional Engineer; or staff of NRCS; the county; or fisheries, natural resources, or water resources agencies) has provided a feasibility analysis and certification that the project was designed to keep any rise in 100-year flood levels as close to zero as practically possible given the goals of the project; and,

(d) no structures would be impacted by a potential rise in flood elevation; and,

(e) an agreement to monitor the project, correct problems, and ensure that flood carrying capacity remains unchanged is included as part of the local approval.

COMMENT: Paragraph (5) is under review.

C. Zones with Base Flood Elevations but No Regulatory Floodway

(1) In areas within Zones A1-30 and AE on the community's FIRM with a Base Flood Elevation but where no regulatory Floodway has been designated, new construction, substantial improvements, or other development (including fill) shall be prohibited, 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. [*44 CFR Part 60.3(c)(10) & ORSC R324.1.3.2*]

(2) Applicants of proposed projects that increase the Base Flood Elevation more than one foot shall obtain from FEMA a Conditional Letter of Map Revision (CLOMR) before the project may be permitted. As soon as possible, but no later than 6 months after project completion, an application for a Letter of Map Revision (LOMR) shall be submitted by the applicant to FEMA. The applicant is responsible for paying any costs associated with the CLOMR and LOMR process. [*44 CFR Parts 60.3(c)(13), 65.3, and 65.12*]

D. Special Flood Hazard Areas Without Base Flood Elevations

(1) When Special Flood Hazard Areas have been provided by FEMA on Flood Insurance Rate Maps, but Base Flood Elevations have not been provided, the Floodplain Administrator shall

(a) require that a Base Flood Elevation be generated whenever development is proposed on greater than 50 lots or 5 acres (whichever is the lesser). [*44 CFR 60.3(b)(3)*], or;

(b) if 50 lots or less or 5 acres or less (whichever is the lesser), obtain, review, and reasonably utilize scientific or historic Base Flood Elevation and Floodway data available from a federal, state, or other source, in order to administer this ordinance. [*44 CFR Part 60.3(b)(4)*] If Base Flood Elevations are not available, and are not required to be generated subsection (3) below

shall apply.

(2) When the Floodplain Administrator has obtained Base Flood Elevations, Chapter V, Sections C and Sections E through M shall apply. [44 CFR Part 60.3(b)(4)]

(3) In Special Flood Hazard Areas without Base Flood Elevations,

(a) no encroachments, including structures or fill, shall be located in an Area of Special Flood Hazard within an area equal to the width of the stream or fifty feet, whichever is greater, measured from the ordinary high water mark, unless a Base Flood Elevation is developed by a licensed professional engineer, or;

(b) the lowest floor of any building or structure, including the bottom of the longitudinal chassis frame beam of the manufactured dwelling, shall be elevated a minimum of three (3) feet above highest adjacent grade. Below grade crawlspaces are prohibited.

E. Building Design and Construction

This Section links local ordinance to Oregon Specialty Codes. Communities may include specific building design and construction standards, such as those found in Appendix A, in this section. Specific construction standards must equal or exceed those published in 44 CFR Part 60.3 and Oregon Specialty Codes.

Buildings and structures, including manufactured dwellings, within the scope of the Oregon Specialty Codes, including repair of substantial damage and substantial improvement of existing buildings and structures, shall be designed and constructed in accordance with the flood-resistant construction provisions of these codes, including but not limited to the Residential Specialty Code, the Manufactured Dwelling Installation Specialty Code, the Structural Specialty Code.

F. Below Grade Crawlspaces

*Below grade crawlspaces in the SFHA is not the recommended construction method because of the increased likelihood of problems with water accumulation, moisture, and drainage. Buildings that have below grade crawlspaces will have higher flood insurance premiums than buildings that have the preferred crawlspace construction, with the interior elevation at or above the lowest adjacent exterior grade. **Communities that allow below-grade crawlspaces are required to adopt a below-grade crawlspace provision in their ordinance that are outlined in FEMA Technical Bulletin 11-01, Crawlspace Construction for Buildings Located in Special Flood Hazard Areas .***

(1) 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 effects of buoyancy can usually be addressed through the required openings stated in Section (2) below. Because of hydrodynamic loads, crawlspace construction is not recommended 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.

(2) The crawlspace is an enclosed area below the Base Flood Elevation 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.

- (3) 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.
- (4) 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.
- (5) The interior grade of a crawlspace below the BFE must not be more than two (2) feet below the lowest adjacent exterior grade.
- (6) The height of the below-grade crawlspace, measured from the interior grade of the crawlspace to the bottom of the structural support of the next higher floor must not exceed four (4) feet at any point.
- (7) 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.
- (8) The velocity of floodwaters at the site should 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.

For more detailed information refer to FEMA Technical Bulletin 11-01.

ADDITIONAL OPTIONS

Include the diagrams from the Technical Bulletin in the ordinance to illustrate the 2 ft./4 ft. rules but revise to correctly reference the Oregon Specialty Code requirements to elevate 1 ft. above BFE for residential structures.

Include language advising citizens about the increased insurance cost associated with below-grade crawlspaces. There is a charge added to the basic policy premium for a below-grade crawlspace.

G. Recreational Vehicles

In all Special Flood Hazard Areas, Recreational Vehicles that are an allowed use or structure under the zoning ordinance must either: [44 CFR Part 60.3(e)(9) and 44 CFR Part 60.3(c)(14)] *Note: 44 CFR Part 60.3(c)(14) does not include AO zones. Application of this section in AO Zones is considered a good practice.*

- (1) Be placed on the site for fewer than 180 consecutive days,

- (2) Be fully licensed and ready for highway use, on its wheels or jacking system, attached to the site only by quick disconnect type utilities and security devices, and have no permanently attached additions, or
- (3) Shall:
 - (a) meet the development permit requirements of Chapter IV Section C and Chapter V of this ordinance and the manufactured home requirement in the Oregon Manufactured Dwelling Installation Specialty Code and be elevated on a permanent foundation such that the bottom of the vehicle chassis is elevated to or above Base Flood Elevation
 - (b) be securely anchored to an adequately anchored foundation system to resist flotation, collapse and lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. Permanently placed Recreational Vehicles shall, in addition, meet the requirements of paragraphs L(1) or M(1), as appropriate.

H. Temporary Structures and Temporary Storage in A1-A30 and AE Zones with a Floodway

- (1) Temporary structures placed in the floodway: Relief from no-rise evaluation, elevation or dry flood-proofing standards may be granted for a non-residential structure placed during the dry season (June – October) and for a period of less than 90 days. A plan for the removal of the temporary structure after the dry season or when a flood event threatens shall be provided. The plan shall include disconnecting and protecting from water infiltration and damage all utilities servicing the temporary structure.
- (2) Temporary storage (temporary storage does not include hazardous materials) in the floodway: Temporary storage of goods and materials is allowed in the floodway for a period of less than 90 days within the dry season (June – October).

COMMENT: Paragraph H is under review

I. Essential Facilities

- (1) Construction of new essential facilities shall be, to the extent possible, located outside the limits of the Special Flood Hazard Area. Construction of new essential facilities shall be permissible within the Special Flood Hazard Area if no feasible alternative site is available. Floodproofing and sealing measures must be taken to ensure that toxic substances or priority organic pollutants as defined by the Oregon Department of Environmental Quality will not be displaced by or released into floodwaters. The lowest floor shall be elevated three feet above the Base Flood Elevation or to the height of the 500-year flood, whichever is higher. Access routes elevated to or above the level of the Base Flood Elevation shall be provided to all essential facilities to the maximum extent possible. *[Good practice, Oregon Structural Specialty Code and ASCE24]*
- (2) New essential and new special occupancy structures may not be constructed in the Tsunami Inundation Zone. If an exception is granted then the Coastal High Hazard Area construction standards shall apply [OAR 632-005-0000].

J. Tanks

- (1) New and replacement tanks in flood hazard areas either shall be elevated above the Base Flood Elevation on a supporting structure designed to prevent flotation, collapse or lateral movement

during conditions of the base flood, or be anchored to prevent flotation, collapse or lateral movement resulting from hydrostatic loads, including the effects of buoyancy assuming the tank is empty, during conditions of the design flood. [From ASCE 24]

- (2) New and replacement tank inlets, fill openings, outlets and vents shall be placed a minimum of 2 feet above Base Flood Elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tank during conditions of the design flood. [From ASCE 24]

K. Fencing

New and replacement fencing shall be designed to collapse under conditions of the base flood or to allow the passage of water by having flaps or openings in the areas at or below the Base Flood Elevation sufficient to allow flood water and associated debris to pass freely. Fencing located in the regulatory Floodway shall meet the requirements of Section V.B Development in Regulatory Floodways. [See Appendix B: Oregon Guidance Concerning Fencing and Walls in Areas of Special Flood Hazard]

L. Development, including Accessory Structures, in Non-Coastal Special Flood Hazard Areas (all A zones)

This section is needed to address development that is not covered by Oregon Specialty codes. Paragraph (2) addressing accessory structures is optional, however if this paragraph is not included in your local ordinance, it will not be possible to permit non-elevated accessory structures in special flood hazard areas. Accessory structures less than 200 square feet that satisfy the criteria outlined below are not required to be elevated, and do not require an elevation certificate.

- (1) All development (including substantial improvements) in non-coastal high hazard areas (all A zones) for which provisions are not specified in this ordinance or Oregon Specialty Codes shall
 - (a) be located and constructed to have low damage potential; [44 CFR 60.3(a)(3)]
 - (b) be constructed with materials resistant to flood damage; [44 CFR 60.3(a)(3)]
 - (c) if located in a regulatory Floodway, meet the limitations of Chapter V, Section B Development in Regulatory Floodways of this ordinance; [44 CFR 60.3(d)(3)]
 - (d) be anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the base flood; [44 CFR 60.3(a)(3)]
 - (e) have all enclosures below the Base Flood Elevation designed to equalize hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwater. Designs for complying with this requirement must be certified by a licensed professional engineer or architect or
 - (i) provide a minimum of two openings with a total net area of not less than one square inch for every square foot of enclosed area subject to flooding;
 - (ii) the bottom of all openings shall be no higher than one foot above the higher of the exterior or interior grade or floor immediately below the opening;

(iii) openings may be equipped with screens, louvers, valves or other coverings or devices provided they permit the automatic flow of floodwater in both directions without manual intervention.

(f) have 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. [44 CFR 60.3(a)(3)];

(2) Walled and roofed accessory structures, including substantial improvement to existing accessory structures, shall meet the requirements of paragraph (1) above and shall:

(a) be less than 200 square feet and not exceed one story;

(b) have unfinished interiors and not be temperature controlled;

(c) not be used for human habitation and may be used solely for parking of vehicles or storage of items having low damage potential when submerged;

(d) not be used to store toxic material, oil or gasoline, or any priority persistent pollutant identified by the Oregon Department of Environmental Quality shall unless confined in a tank installed in compliance with this ordinance or stored at least one foot above Base Flood Elevation.

M. Development, including Accessory Structures, in Coastal Special Flood Hazard Areas (all V Zones)

This section is needed to address development that is not covered by Oregon Specialty codes. Paragraph (2) addressing accessory structures is optional, however if this paragraph is not included in your local ordinance, it will not be possible to permit accessory structures in coastal special flood hazard areas. Accessory structures that satisfy the criteria outlined below are not required to be elevated, and do not require an elevation certificate.

(1) All development in coastal high hazard areas (all V Zones) for which specific provisions are not specified in this ordinance or Oregon Specialty Codes, shall:

(a) be located outside the footprint of, and not structurally attached to, buildings and structures, and be permitted only if analysis by a registered design professional demonstrates no harmful diversion of floodwaters or wave runup and wave reflection onto adjacent buildings and structures. [Coastal Construction Manual, FEMA 55]

(b) be sited landward of the reach of the mean high tide and not alter sand dunes in such a way which would increase potential flood damage [44 CFR 60.3(e)(7)]

(c) be supported on piles or columns designed and installed to withstand drag, inertia, and other wave induced forces and to resist scour and erosion. The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated one foot or more above the base flood elevation. Structural fill shall not be permitted. 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 ordinance. [44 CFR 60.3(e)(4) & (6)]

(d) be anchored to prevent flotation, collapse, and lateral movement resulting from wind and water loads, including the effects of buoyancy, during conditions of the base flood. Water

loading values used shall be those associated with the base flood. Wind loading values used shall be those required by applicable Oregon Specialty Codes or local building standards; [44 CFR 60.3(e)(4)]

(e) 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 design proposed meet the following conditions:

(i) Breakaway wall collapse shall result from water load less than that which would occur during the base flood; and

(ii) The elevated portion of the structure 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 components (structural and non structural). Water loading values to be used in this determination shall have a one percent chance of being equaled or exceeded in any given year. [44 CFR 60.3(e)(5)]

(f) be constructed of flood damage- and corrosion-resistant materials; [44 CFR 60.3(a)(3), FEMA TB-5)]

(g) have 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. [44 CFR 60.3(a)(3)]

(2) Roofed accessory structures, including substantial improvement to existing accessory structures shall meet the requirements of paragraph (1) above and shall:

(a) be less than 100 square feet, not exceed one story and be enclosed by lattice or insect screening. Break away walls are prohibited.

(b) be used for parking or storage.

(c) not be temperature controlled;

(d) not be used to store toxic material, oil or gasoline, or any priority persistent pollutant identified by the Oregon Department of Environmental Quality shall unless confined in a tank installed in compliance with this ordinance or stored at least one foot above Base Flood Elevation.

VI. VARIANCE PROCEDURES AND CRITERIA

A. Variance

(1) An application for a variance must be submitted to the {city/ county/tribe} on the form provided by the {city/ county/tribe} and include at a minimum the same information required for a development permit and an explanation for the basis for the variance request.

(2) The burden to show that the variance is warranted and meets the criteria set out herein is on the applicant.

(3) Upon consideration of the criteria in Section B (Criteria for Variances) and the purposes of this ordinance, the {city/ county/tribe} may attach such conditions to the granting of variances as it deems necessary to further the purposes of this ordinance.

- (4) The Floodplain Administrator shall maintain a permanent record of all variances and report any variances to the Federal Emergency Management Agency upon request. [44 CFR 60.6(a)(6)]

B. Criteria for Variances

- (1) Variances shall not be issued within a designated regulatory Floodway if any increase in flood levels during the base flood discharge would result. [44 CFR 60.6(a)(1)]
- (2) Generally, the only condition under which a variance from the elevation standard may be issued is 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 items a-j in Section VI.A.8 have been fully considered. As the lot size increases the technical justification required for issuing the variance increases. [44 CFR 60.6(a)(2)]
- (3) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief. [44 CFR 60.6(a)(4)]
- (4) Variances shall only be issued upon a:
- (a) showing of good and sufficient cause;
 - (b) determination that failure to grant the variance would result in exceptional hardship to the applicant, and;
 - (c) 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 local laws or ordinances. [44 CFR 60.6(a)(3)]
- (5) Variances may be issued for a water dependent use provided that the
- (a) criteria of paragraphs (a)(1) through (a)(4) of this section are met, and;
 - (b) structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety. [44 CFR 60.6(a)(7)]
- (6) Variances may be issued for the reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or the Statewide Inventory of Historic Properties, without regard to the procedures set forth in this section. [44 CFR 60.6(a)]
- (7) Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece or property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely populated residential neighborhoods. As such, variances from the flood elevations should be quite rare. [44 CFR 60.6]
- (8) In passing upon such applications, the *{city/county/tribe}* shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and the:
- (a) danger that materials may be swept onto other lands to the injury of others;
 - (b) danger to life and property due to flooding or erosion damage;
 - (c) susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;

- (d) importance of the services provided by the proposed facility to the community;
- (e) necessity to the facility of a waterfront location, where applicable;
- (f) availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;
- (g) compatibility of the proposed use with existing and anticipated development;
- (h) The relationship of the proposed use to the comprehensive plan and flood plain management program for that area;
- (i) safety of access to the property in times of flood for ordinary and emergency vehicles;
- (j) expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and,
- (k) costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.

C. Variance Decision

If the variance is approved, the community shall notify the applicant in writing over the signature of a community official 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 shall be maintained with a record of all variance actions. [44 CFR 60.6(a)(5)]

VII. PENALTIES FOR VIOLATION

- (1) No structure or land shall hereafter be located, extended, converted or altered unless in full compliance with the terms of this ordinance and other applicable regulations.
- (2) Violation of the provisions of this ordinance or failure to comply with any of its requirements, including violation of conditions and safeguards established in connection with grants of variance or special exceptions, shall constitute a misdemeanor. Any person who violates this ordinance or fails to comply with any of its requirements shall, upon conviction thereof, be fined not more than *{ \$ amount }* or imprisoned for not more than *{ number }* days, or both for each violation. Each day the violation continues shall be considered a separate offense. Nothing herein contained shall prevent the *{ city/ county/tribe }* from taking such other lawful actions as is necessary to prevent or remedy any violation.

VIII. SEVERABILITY

The ordinance is hereby declared to be severable. Should any portion of this ordinance be declared invalid by a court of competent jurisdiction, the remaining provisions shall continue in full force and effect and shall be read to carry out the purpose(s) of the ordinance before the declaration of partial invalidity. [FEMA]

IX. ABROGATION AND GREATER RESTRICTIONS

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

Appendix A: Specific Building Design and Construction Standards

Substitute the relevant sections of Appendix A for Chapter V Section E of the model companion ordinance to add NFIP minimum construction standards to a local ordinance. This substitution is optional. All of the provisions in this Appendix also are found in Oregon Specialty Codes. This Appendix contains certain Sections pertaining to specific flood hazard zones. There is no need to adopt code for flood hazard zones that are not within your jurisdictional boundaries.

E. Building Design and Construction Standards

(1) In all Special Flood Hazard Areas

- (a) new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure; [44 CFR 60.3(a)(3)(i)]
- (b) new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage; [44 CFR 60.3(a)(3)(ii)]
- (c) New construction and substantial improvements shall be constructed using methods and practices that minimize flood damage, and; [44 CFR 60.3(a)(3)(iii)]
- (d) electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding. [44 CFR 60.3(a)(3)(iv)]

(2) Specific Building Design and Construction Standards for Non-coastal Residential Construction (all A Zones)

In addition to Paragraph (1) of this Section,

- (a) new construction and substantial improvement of residential structures located in non-coastal flood zones shall have the lowest floor, including basement, elevated a minimum of one foot above the Base Flood Elevation or three feet above highest adjacent grade where no BFE is defined, and; [44 CFR 60.3(c)(2) and Oregon Specialty Codes]
- (b) new construction and substantial improvement that have fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must be either be certified by a registered professional engineer or architect and must meet or exceed the following minimum criteria:
 - (i) a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided;
 - (ii) the bottom of all openings shall be no higher than one foot above grade, and;
 - (iii) openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters. [44 CFR 60.3(c)(5)]

(3) Specific Building Design and Construction Standards for Non-coastal, Nonresidential Construction

In addition to Paragraph (1) of this Section, new construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated according to Table 2-1 the American Society of Civil Engineers, Flood Resistant Design and Construction Standard (ASCE 24); or, together with attendant utility and sanitary facilities, shall,

- (a) be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water; [44 CFR 60.3(c)(3)]
- (b) have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; [44 CFR 60.3(c)(3)]
- (c) 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 subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the Floodplain Administrator; [44 CFR 60.3(c)(3) & (4)]
- (d) nonresidential structures that are elevated, not floodproofed, must meet residential standards described in Chapter V Section E, subsection (2);
- (e) applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g. a building floodproofed to the base flood level will be rated as one foot below.)

(4) Specific Building Design and Construction Standards for Manufactured Dwellings- Non-Coastal

In addition to Paragraphs (1) and (2)(b) of this Section, new, replacement, and substantially improved manufactured dwellings are subject to the following standards,

- (a) if the manufactured dwelling is supported on solid foundation walls, the ground area reserved for the placement of a manufactured dwelling shall be a minimum of one foot above BFE unless the foundation walls are designed to automatically equalize hydrostatic forces by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria:
 - (i) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided;
 - (ii) The bottom of all openings shall be no higher than one foot above grade, and;
 - (iii) Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters. [Manufactured Dwelling Installation Specialty Code, Definitions and Section 4-3.1(5) and NFIP 60.3(c)(5)]
- (b) the bottom of the longitudinal chassis frame beam in A zones, shall be at or above BFE [see Manufactured Dwelling Installation Specialty Code Interpretation dated January 1, 2011]
- (c) the manufactured dwelling 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; [44 CFR 60.3(c)(6)]

(d) electrical crossover connections shall be a minimum of 12 inches above BFE. [Manufactured Dwelling Installation Specialty Code 6-4.1(1)]

(5) Standards for Shallow Flooding Areas (AO Zones)

Shallow flooding areas appear on FIRMs as AO zones with depth designations that range from 1 to 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 often characterized as sheet flow. In these areas Paragraph (1) of this section and the following provisions shall apply:

(a) New construction and substantial improvements of residential structures and manufactured homes within AO zones shall have the lowest floor (including basement) elevated above the highest grade adjacent to the building, a minimum of one foot above the depth number specified on the FIRM (at least three feet above HAG if no depth number is specified). [Oregon Residential Specialty Code R324.2.1, 44 CFR Part 60.3(c)(7)]

(b) New construction and substantial improvements of nonresidential structures within AO zones shall either:

- (i) Have the lowest floor (including basement) elevated above the highest adjacent grade of the building site, one foot or more above the depth number specified on the FIRM (at least three feet above HAG if no depth number is specified); or [Oregon Residential Specialty Code R324.2.1 [44 CFR Part 60.3(c)(8)]
- (ii) Together with attendant utility and sanitary facilities, be completely flood proofed to or above that level 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 effects of buoyancy. If this method is used, compliance shall be certified by a registered professional engineer or architect. [44 CFR Part 60.3(c)(8)]

(6) Specific Building Design and Construction Standards for Coastal Special Flood Hazard Areas (all V Zones)

Located within Special Flood Hazard Areas established in Section III.B are Coastal High Hazard Areas, designated as Zones V1-V30, VE and/or V. These areas have special flood hazards associated with high velocity waters from surges and, therefore, in addition to meeting Paragraph (1) of this Section and all other provisions in this ordinance the following provisions shall also apply:

(a) all residential and non-residential new construction, substantial improvements, and installation of manufactured dwellings in Zones V1-V30 and VE (V if Base Flood Elevation data is available) shall be elevated on pilings and columns so that: [44 CFR Part 60.3(e)(4)]

- (i) 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 Elevation; and [44 CFR Part 60.3(e)(4)(i)]
- (ii) 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 shall have a one percent chance of being equaled or exceeded in any given year (base flood); Wind loading values used shall be those required by applicable state or local building standards. [44 CFR Part 60.3(e)(4)]

(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 Paragraph (a) of this Section. *[44 CFR 60.3(e)(4)]*

(c) 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:

- (i) breakaway wall collapse shall result from water load less than that which would occur during the base flood; and
- (ii) 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). Water loading values to be used in this determination shall have a one percent chance of being equaled or exceeded in any given year (base flood). Wind loading values shall be those required by applicable state or local building standards. *[44 CFR Part 60.3(e)(5)]*

(d) 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. *[44 CFR 60.3(e)(5)]*⁸

(e) prohibit the use of fill for structural support of buildings. *[44 CFR Part 60.3(e)(6)]*

⁸ *The State of Oregon strongly recommends that communities limit the size of areas enclosed by break away walls to less than 300 square feet.*

Appendix B: Guidance Concerning Fencing and Walls in Special Flood Hazard Areas

Fencing and walls located in the special flood hazard area require floodplain development permits, unless they are small enough to be considered *de minimis* development as defined by local ordinance.

Fence or Wall Type	Fencing and Walls Allowed?			
	Floodway Fringe (Riverine)	Regulatory Floodway (Riverine)	Shallow/Sheetflow/Ponding Zones	Coastal Velocity Zones
A	Yes			
B	Yes	Yes, with limited cross channel fencing	Yes	Yes
C	Design Review Required ⁱ			
D	Yes, if open at base to BFE	No ⁱⁱ	Yes, if open at base to BFE	Yes, if installed parallel to shore, otherwise Design Review required.
E	Yes, if open at base to BFE	No ⁱⁱ	Yes, if open at base to BFE	Yes, if installed parallel to shore, otherwise Design Review required.
F	Yes, if adequate openings at base to BFE	No ⁱⁱ	Yes, if adequate openings at base to BFE	Design Review required ⁱⁱⁱ
G	Yes, if adequate openings at base to BFE	No ⁱⁱ	Yes, if adequate openings at base to BFE	Design Review required ⁱⁱⁱ
H	Yes, if adequate openings at base to BFE	No ⁱⁱ	Yes, if adequate openings at base to BFE	No

Fence/Wall Types:

- A Open barb or barbless wire. Open means no more than one horizontal strand per foot of height
- B Open pipe or rail fencing (e.g. corrals). Open means rails occupy less than 10% of the fence area and posts are spaced no closer that 8 feet apart.
- C Collapsible fencing
- D Other wire, pipe, or rail fencing (e.g. field fence, chicken wire, etc.) which does not meet open requirements above.
- E Chain link fencing
- F Continuous wood fencing
- G Masonry walls
- H Retaining walls, bulkheads

ⁱ Ensure fence will collapse under anticipated base flood conditions. Debris impact must be considered.

ⁱⁱ Unless shown, using FEMA-approved engineering/modeling standards, to cause no-rise in BFE

ⁱⁱⁱ Fences and walls in V zone must be analyzed for their effects on flood conditions, including ramping effects on adjacent buildings and effects of debris during flood events (TB 5)