

## **4.4 Design Standards**

### **4.4.1 Water Quality Design/Performance Standards**

#### *Problem*

Many communities have not given the same consideration to water quality standards as they have to street standards, building design standards or even vehicle parking standards. While all of these standards are important to a community, and are in many ways linked to protecting and enhancing water quality and aquatic habitat, they do not get to the heart of what determines a community's water quality. To protect and enhance water quality and aquatic habitat, a community must have standards to measure the success of their regulations and programs.

Each community may have a different motivation for addressing water quality through their design standards. The need for water quality standards may be determined by the Oregon Department of Environmental Quality (DEQ) load allocations given to local jurisdictions following a total maximum daily load allocation. The federal Endangered Species Act (ESA), Goal 5, Goal 6 or other regulations also influence a community's standards (See Chapter 2 for more information on these programs).

#### *Objective*

Develop water quality performance and design standards for site development. Standards provide a means to evaluate potential new development, redevelopment, or improvements. Standards require any new development to meet the expectations of the community and the regulations imposed by state and federal agencies.

#### *Strategy*

Work with the appropriate state and federal agencies to determine and adopt specific design and performance standards that adequately protect water quality. This may take the form of a management plan required by DEQ to address specific pollutant identified in a 303(d) list, or may be part of a Drinking Water Protection Plan, or both. In addition, federal ESA requirements may necessitate an emphasis on particular standards for habitat protection and stormwater management.

#### *Discussion*

The sample standards that follow are meant to provide an idea of the type of standards a community could adopt. These standards are considered "performance standards" as they leave much discretion. A community may decide to create more specific standards based on its assessment of their water quality issues.

### Sample Water Quality Performance Standards

#### A. Purpose

To protect and enhance water quality, to support the designated beneficial water uses and to protect the functions and values of water quality resources (streams, wetlands, open space, etc.), which include, but are not limited to:

1. Provide a vegetated corridor to protect Protected Water Features from development;
2. Maintain or reduce stream temperatures;
3. Maintain and rehabilitate natural stream corridors and other protected water features;
4. Minimize sediment, nutrient and pollutant loading into water;
5. Provide filtration, infiltration and natural water purification;
6. Stabilize slopes to prevent landslides contributing to sedimentation of water features;
7. Maintain the existing tree canopy where possible;
8. Minimize impervious surfaces while providing for compact growth;

#### 4.4.2 Vehicular Access and Circulation (Model Code Section 3.1.2)

##### *Problem*

Streets, parking lots, driveways and other automobile infrastructure accounts for a significant portion of the impervious surface in most urban areas. Most communities require vehicular access and circulation designs to accommodate rapid, smooth traffic flow and do not consider the potential impacts to water quality and aquatic habitat. Street and driveway length and the design of fire lanes can be prescribed in local codes to reduce impervious cover, but most jurisdictions have not addressed these issues.

##### *Objective*

Reduce the total area of street pavement by allowing alternative street layouts that result in the greatest number of homes per length of street, while maintaining the necessary connectivity to meet other transportation goals. Encourage and provide incentives for shared driveways and alternative paving surfaces to reduce the amount of impervious surface.

*Strategy*

Implement the *Model Development Code and User's Guide for Small Cities* section 3.1.2 (which includes provisions for shared driveways and alternative street networks) with the changes and/or additions below.

*Discussion*

The street network is an important part of any community and must be managed in a manner that meets many community goals, including mobility, accessibility, safety, as well as the protection and enhancement of water quality and aquatic habitat. This section is not meant to preclude the use of a grid pattern, which has many community benefits. A grid pattern is usually able to accommodate more houses per unit of length, and the additional length can be offset by allowing skinnier streets where appropriate, thus reducing impervious surfaces in some instances. A community should consider a modified grid pattern where topography, natural water features, and other site conditions pose barriers to street connectivity.

Changes to Model Development Code

3.1.2 (A) Intent and Purpose

Add: The roadway system will be designed in a manner that limits impervious surfaces to the extent possible by requiring street patterns that reduce the total area of needed street pavement while meeting all requirements of this Section.

3.1.2(L) Fire Access and Parking Area Turnarounds

Add: Fire equipment access drives and parking area turnarounds may be constructed with porous paving material per [jurisdiction] specifications.

4.4.3 Pedestrian Access and Circulation (Model Code Section 3.1.3)

*Problem*

Local codes may not require safe, direct and convenient pedestrian circulation. Lack of pedestrian and bicycle options limits residents' ability to make trips via modes other than the automobile, leading to more automobile trips. Increasing the number of automobile trips leads to a demand for more roads (or wider roads), and thus a greater amount of impervious surfaces. In addition, a significant amount of water pollutants originate from motor vehicle use.

*Objective*

Require pedestrian and bicycle access and circulation as part of certain new developments, to provide opportunities for residents to make trips other than by automobile.

*Strategy*

Implement the *Model Development Code and User's Guide for Small Cities* Section 3.1.3 with the change below.

*Discussion*

Although swales require significant amounts of land and ongoing maintenance, they do provide moderate to high water quality benefits.

Changes to Model Development Code

3.1.3 – Pedestrian Access and Circulation

B. Design and Construction

Vehicle/Pathway Separation. Where pathways are parallel and adjacent to a driveway or street (public or private), they shall be separated from the driveway/street by a vegetated swale or other similar Best Management Practice (BMP) to treat the stormwater runoff from the pathway and/or driveway/street where possible. The swale or other BMP shall be designed to [jurisdiction] standards. If a vegetated swale or similar BMP is not possible to construct, the applicant shall make a finding describing why stormwater treatment is not possible and the following standards shall apply (Model Code provisions 3.1.3 (B)(1)

4.4.4 Landscaping (Model Code Section 3.2)

*Problem*

Landscaping is often required to meet community standards for greenery and to provide buffers between different uses. This landscaping, if designed correctly, also can reduce impacts to water quality and aid in infiltration, storage and treatment of surface water runoff. Excessive clearing of native vegetation can lead to increased erosion and sedimentation (see 4.4.9 for erosion control standards). Non-native vegetation can have higher irrigation demands in the summer than native species adapted to seasonal dry periods. Non-native plants also can be more susceptible to insects, which may result in increased application of pesticides which impacts water quality.

*Objective*

Minimize clearing of development sites, preserve natural vegetation to the extent possible and replace lost vegetation with native species that are pest resistant and adapted to the local climate conditions. Utilize required landscaping for the purpose of protecting and enhancing water quality.

*Strategy*

Implement the *Model Development Code and User's Guide for Small Cities* Section 3.2.2 without changes, or use the alternative provided below that provides incentives to maintain existing landscaping.

Implement Section 3.2.3 of the *Model Development Code* with the changes described below to add water quality elements to new landscaping requirements.

*Discussion*

Landscaping standards should support the protection and enhancement of water quality, but may not be the most effective method of meeting the goal of increasing infiltration on site (i.e., decreasing the amount of surface water runoff from the site). For example, requirements found throughout Section 4.3 of this guidebook are better suited to address water quality through infiltration, but must be supported by provisions in the design standards section of the code.

**Model Code Language to Minimize Clearing of Existing Vegetation Using Incentives  
(Alternative to Model Development Code Section 3.2.2)**

Encourage the preservation and integration of existing native vegetation into the design of the development.

1. Credit shall be given for preservation of native vegetation as follows:
  - a. For each tree with a trunk diameter of [4-8] inches or greater, as measured 4 feet above the ground (DBH), preserved on the development site, the development will be relieved from planting requirements for [two] trees as specified in section X.X.X.
  - b. When the 100 percent of the area defined by the dripline of the tree is preserved, the development will be relieved from providing [ten] square feet of planting area as specified in section X.X.X.
  - c. Areas containing mature native vegetation shall require to provision irrigation except where the [City Official] finds that the subject area needs irrigation due to altered soil, slope, drainage or other conditions related to development. (Note the following section only applies if the community has a Heritage Tree or similar program).
  - d. Variable credit shall be allowed for preservation of Heritage Trees, as defined in the adopted Urban Forest Plan. The urban forester shall determine the value of the Heritage Tree, according to formulas established in Valuation of Landscape Trees, Shrubs and Other Plants (International Society of Arboriculture) and shall relieve the contractor/ developer from planting a number of trees equal to the value of the Heritage Tree preserved.
2. Contractors/developers who choose to preserve native vegetation on the site, (including Heritage Trees), shall be required to:
  - a. Submit a detailed planting plan to the [city official] who shall confirm that vegetation to be preserved conforms to the definition for native vegetation (or Heritage Tree);

- b. Follow the [city/county official] recommendations to insure that no cutting, filling or compaction of soil takes place within the root zone protection area, which consists of 75% of the area defined by the dripline of the tree. Alteration of the soil within the root zone protection area shall require submittal, to the [city official], of a plan for mitigative actions to preserve the tree. The mitigation plan shall address drainage, compaction, feeding, and pruning measures that will be taken to insure the continued health of the tree before and after the root zone protection area is disturbed.
- c. Execute an agreement with the city to replace any significant tree (or Heritage Tree), shrub or other native vegetation that dies within five years of the date the agreement is signed. For trees determined to be significant, replacement trees shall be provided at the rate of two new trees for each tree lost. (The replacement ratio for Heritage Trees is variable; the number of Heritage replacement trees shall be equal to the number credited, as provided in section X.X.X above. The location of replacement trees shall be determined prior to execution of the agreement.)

1. Yard Setback Landscaping. Landscaping shall satisfy the following criteria:  
**Add:** Use the appropriate [native] landscaping and the appropriate design to increase infiltration and reduce the amount of surface water runoff from the site. Treatments might include swales, filter strips, ponds and wetlands. Landscaping for water quality will count towards total percentage of landscaping required on site.
2. Parking Areas.  
**Require 10 percent of combined parking areas to be landscaped.**  
**Add:** Where parking areas are required and/or selected to provide water quality treatment on site, the resulting best management practice (e.g. bioretention areas, filter strips, etc.) will count towards the total required landscaping. Provision of water quality treatment facilities will not replace the requirements for trees or shrubs.

#### 4.4.5 Vehicle Parking

##### *Problem*

Vehicle parking in commercial and industrial districts often represents the largest amount of impervious surface in the district. Stormwater pollutant removal and volume control are not usually considered when parking lots are designed. Many communities have codes that require excessive parking to be constructed. Revising these provisions, and allowing for alternative parking scenarios, can serve to reduce the amount of parking, and thus reduce the amount of impervious surface found in commercial and industrial districts.

Parking lots will continue to be necessary in all districts, but fitting various stormwater treatment and/or infiltration techniques, into landscaped areas can mitigate the impact of the impervious surface created by parking lots. Where appropriate, alternative paving surfaces can be used to reduce storm water runoff.

##### *Objective*

To decrease the amount of impervious surfaces by revising the amount of parking required for commercial and industrial uses. Require or provide the opportunity for the use of stormwater treatment and/or infiltration techniques within landscaped areas, and, where appropriate, allow alternative parking surfaces.

##### *Strategy*

Implement Chapter 3.3, Vehicle and Bicycle Parking, of the *Model Development Code and User's Guide for Small Cities*. Include the provision for the limitation on the total number of parking spaces to insure the appropriate amount of parking is provided for each use. Include the credit for on-street parking to decrease the amount of new parking required.

Add provisions requiring pollution reduction and flow control facilities be incorporated into parking lot design (See recommendations under section 4.4.4 *Landscaping* in this document, which would provide sufficient area for this requirement.) Allow alternative parking surfaces that increase infiltration in certain low use areas, such as residential off-street parking and overflow parking for incidental commercial and institutional uses.

##### *Discussion*

Parking areas are one of the largest contributors of impervious surfaces in urban and unincorporated communities. Local jurisdictions also have direct control over the size, design and maintenance requirements of parking areas. Appropriate regulations can significantly reduce the amount of impervious surface and untreated stormwater. Studies have shown that pollutant removal and flow control for parking lots can generally be accomplished within a 10% set-aside for landscaping (City of Portland, Bureau of Planning, August 2, 2000. *Stormwater Amendments to the Zoning Code, Recommended Draft*). Issues to be aware of when requiring onsite surface water management include the maintenance required to keep facilities effective, and the potential for added or reduced cost of construction. The effectiveness of each of the different BMPs depends on a number of factors including soil type, slope of the site and final design, construction, and maintenance of the facility. Simplified sizing and construction specifications for storm

water runoff treatment/infiltration facilities for parking lots and other impervious areas are referenced in the appendix. These standards were generated for the northern Willamette Valley and may need to be revised for areas with different climate and soil types.

#### Model Code Provisions

Implement Chapter 3.3 of the *Model Development Code and User's Guide for Small Cities*. Add sections G and H.

##### G. Off-Street Parking Design Standards for Water Quality

Parking lot construction must give consideration to the water quality and quantity, of stormwater created by new or expanded impervious surface. New parking lots greater than [X square feet], or parking lot expansions greater than [X square feet] will provide onsite surface water management. Vegetative treatment will be provided within area reserved for landscaping. Exceptions based on site restrictions, such as slope or impermeable soils, must be documented and approved by [city/county engineer].

Small, [less than X square feet], off-street parking areas, such as those provided in single family residential districts and necessary overflow parking in commercial and institutional districts, will be allowed to use alternative paving techniques to reduce the total impervious surface of the site. Suitable alternative paving materials, their installation and maintenance will be determined by the [city/county official].

Parking areas using pollution reduction and flow control facilities or alternative paving materials pursuant to this section will not be included in the calculation of the total impervious surface of the site when there is less than [0-10%] net increase in off-site runoff from the parking area.

##### H. Off Street Parking Surface Water Management Construction Specifications and Alternative Paving Specifications

The [city/county official] shall establish sizing and design criteria for treatment facilities consistent with the requirements of this Chapter and the application of engineering principles. Standards are incorporated in this code by reference and described in [name design manual] (or reference general stormwater management requirements if adopted).

#### 4.4.6 Public Facility Standards

##### *Problem*

The Western United States has a tradition of wide streets. In the early days of a city, many communities required that streets be wide enough to turn a team of horses around. This tradition often lives on zoning codes and Transportation System Plans. The impervious

surface created by unnecessarily wide streets leads to increased surface water runoff. The increase of impervious surface decreases the amount of infiltration available in the watershed, and leads to a runoff rate that increases erosion and downstream flooding. Runoff from streets typically contains pollutants deposited by motor vehicles. Many cities require sidewalks on both sides of the street. For some communities, this may not be appropriate or necessary. In some cases, reducing sidewalks to only one side of the street can further decrease the amount of impervious surface without sacrificing pedestrian mobility.

In many older communities and new “neo-traditional” development, rear alleys are often used to minimize the amount of curb cuts across sidewalks, locate utilities away from the street and provide for a more human-scale environment. Permitting alleys can help reduce the amount of impervious surface by reducing driveway lengths and the size of local streets. On the other hand, alleys that are larger than necessary may actually increase total impervious surface. In addition, alleys usually carry little traffic but are required to have paving types similar to regular streets, further increasing surface water runoff.

Cul-de-sacs are often a signature of many newer developments. Cul-de-sacs can have a radius that is larger than necessary or may have many square feet of unused space in the center, contributing to the amount of impervious surface found in a community.

#### *Objective*

Limit the amount of pavement to the smallest amount needed for the function of each specific street. Utilize the space remaining in the right-of-way for pedestrian and bicycle travel, and to promote infiltration and treatment of surface water runoff through the appropriate structural BMPs. Where appropriate, limit the sidewalk to only one side of the street and grade the pavement to drain to infiltration areas when available.

Allow rear alleys as a development alternative, and where appropriate, allow the alleys to be constructed with an alternative paving material to decrease impervious surface.

Discourage the use of cul-de-sacs, except where necessary due to topography or other constraints. Limit the cul-de-sac to the smallest radius necessary, or require the center of the cul-de-sac to be landscaped and/or serve as a surface water runoff treatment/storage facility.

#### *Strategy*

Implement Chapter 3.4 of the *Model Development Code and User’s Guide for Small Cities*. Utilize the “no curb and gutter” option for local streets (see footnote 4 on table 3.4.1). Where public right-of-way allows, use the seven-to-eight-foot planting strip as a vegetated swale on each side of the street, and grade the street for drainage to the swale. Where swales are used, access to the street from the sidewalk should be provided every 200 feet or less. Consider placing sidewalks on only one side of residential streets where vegetated swales are employed.

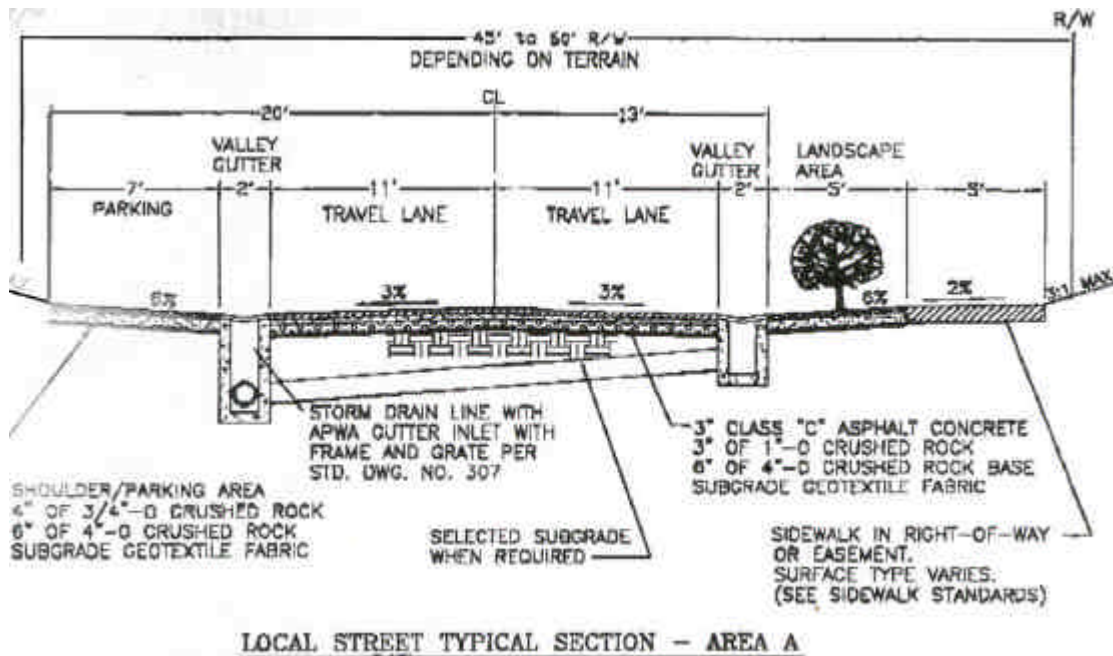
Allow alternative paving types for residential alleyways with a required covenant for maintenance.

*Discussion*

The implementation of the model code provisions found in the Model Development Code, and the additions suggested above, will likely take much discussion with the fire department and the public works department. In addition, the public works department will have to create standards to address the installation and maintenance of porous pavement, infiltration swales along roadways, and other water quality BMPs as necessary. (See available sources for BMP standards on page A.1 of the Appendix.)

Model Code Language

Implement Chapter 3.4 – Public Facilities Standards of the Model Development Code for Small Cities or include the following standard for local streets.



**Add to Table 3.4.1**

Footnote to Alleys – Porous paving materials may be used with approval from [City Engineer] and in accordance with [jurisdiction] standards. Private alleys using porous paving materials will not be counted as impervious surface on site when there is less than [0-10%] net increase in off-site runoff from the private alley.

#### 4.4.7 Stormwater Management

##### *Problem*

Many communities deal with stormwater created by development by channeling and diverting it off site into the storm sewer system as quickly as possible. Stormwater plans and zoning codes often deal only with the conveyance of stormwater, and not the retention, treatment and prevention of water quality impacts. Stormwater runoff can alter natural stream flows, cause increased erosion and lead to downstream flooding. Where stormwater comes into contact with pollutants, such as oil, pesticides, solvents and other materials used in the urban environment, pollutants can be carried into surface or groundwater. These issues must be adequately considered during the land use review process.

##### *Objective*

To reduce the amount of stormwater leaving a site to the greatest extent possible, and to treat and, when appropriate detain, the stormwater that cannot be infiltrated on-site.

##### *Strategy*

Implementing the zoning code changes suggested throughout this guidebook will lead to a significant reduction in the amount of stormwater flowing from a site. It is unlikely that all stormwater can be eliminated and therefore, a zoning code should contain adequate stormwater provisions to address both the quality and quantity of stormwater leaving a site. The *Model Development Code and User's Guide for Small Cities* includes some language for storm drainage, but does not adequately address both the quantity and quality of stormwater leaving a site. Implement the model code language that follows, requiring storm drainage plans to effectively address stormwater.

##### *Discussion*

Many of the model ordinances found in this guidebook are designed to minimize the amount of runoff generated by new development by increasing infiltration opportunities and decreasing impervious surfaces where possible. Where it is not feasible to eliminate runoff, it is important that local jurisdictions allow or require developers and to treat and/or store stormwater on-site and/or provide for regional treatment and storage. The best method to ensure such provisions is to prepare a local stormwater or surface water master plan that shows the jurisdiction's method for dealing with stormwater. Stormwater Master Plans specify BMPs to be used, to mitigate stormwater impacts on surface and ground water and the rationale (nexus) for requiring new development to manage stormwater. They can also describe regional and sub-regional treatment and storage facilities. Absent a stormwater plan, language in the comprehensive plan can help support a stormwater ordinance (See Chapter 3).

When developing a strategy for stormwater management it is important to select an appropriate size of storm for which to design your BMPs. Many jurisdictions require treatment facilities to be designed for large storms, such as a twenty-year storm. In western Oregon most of the rain falls in many small storms. While you may need to require conveyance facilities to handle large storms, designing infiltration and treatment facilities for smaller storms will allow many more options and may provide sufficient protection for

water quality and aquatic habitat. The objective is to allow rainwater to flow through a development in a manner that most closely mimics the pre-development condition, or in other words, preserve the natural hydrology of the site.

Much of this objective can be achieved by eliminating barriers that exist in local drainage ordinances. Many cities and counties require gutters, storm drains and storm sewers. Some have mandatory systems development charges for storm sewers that provide no incentive to reduce stormwater flow. If developers are given the freedom reduce the amount of stormwater generated on the site through landscaping techniques, the use of porous paving materials and/or improving infiltration on site, impacts to the natural hydrology and downstream water ways will be reduced. Code improvements to promote stormwater mitigation strategies can be made within a drainage ordinance and supported through education, technical assistance and incentive programs. Sections one through five of the following ordinance provide code language to facilitate this type of approach.

For a more aggressive approach to stormwater management a local jurisdictions can adopt specific requirements for treatment, infiltration, and possibly detention of stormwater. Such requirements may be necessary in high impact areas (i.e. downtown, or industrial parks), or when the jurisdiction has water quality or salmon protection obligations under state or federal law (See Chapter Two). Section six, “Pollution Reduction and Flow Control”, provides a framework for specific infiltration, treatment and detention requirements that could apply to high risk areas in the jurisdiction or for all development. It is important to remember, however, that the development of such standards is an engineering exercise that is difficult to generalize for a model code. Each jurisdiction needs to research appropriate standards for their local area.

## Model Code Requiring a Stormwater Management Plan for New Development and Redevelopment

### STORM AND SURFACE WATER MANAGEMENT STANDARDS

#### **I. Statement of Purpose**

This ordinance includes standards for conveyance of surface water in streams, creeks and channels that exist on a site at the time of development. It also addresses pollution reduction and flow control for stormwater generated from new and redevelopment. For the purpose of this ordinance, “new” and “redevelopment” refers to any man-made change to improved or unimproved real estate including, but not limited to the placement of buildings or other structures, dredging, filling, grading, or paving. The ordinance provides standards for addressing infiltration, treatment and detention of stormwater separately as well as an option for a combined approach to mitigating the water quality impacts of developments that fall below a certain size threshold.

#### **II. Applicability**

No permit for construction of new development or tenant improvements [greater than X square feet.] within the [jurisdiction] shall be issued until a stormwater management plan is approved. Separate applicability thresholds for Pollution Reduction and Flow Control Standards are listed in section IV. Development projects shall not be phased or segmented in such a manner to avoid the requirement of these Rules and Regulations.

#### **III. Stormwater Management Plan Submittal**

A. Preconstruction plans - shall include the following analyses and descriptions.

1. An analysis of stormwater mitigation strategies to increase infiltration and evapotranspiration (use of water by plants) and reduce the amount of stormwater runoff generated from the site. (*Note: rainwater can soak into the ground where it falls or it can accumulate on a non-pervious surface, flow to a pervious area and then infiltrate into the ground. The former scenario is stormwater mitigation, while the latter scenario requires stormwater management.*)
2. Calculations of the amount of impervious surface before development and the amount of impervious surface after development. Impervious surface refers only to strictly impervious surfaces including roofs of buildings, impervious asphalt and concrete pavements, and other specifically impervious pavement materials such as mortared masonry and gravel.
3. An analysis of vegetative and other treatment methods used to reduce pollutants.
4. An analysis of flow reduction methods including, infiltration, and detention and techniques.
5. Statement of consistency with [jurisdiction] stormwater management objectives stated in section 3.1 and, if applicable, the watershed management plan for the basin and/or requirements of a pollutant load reduction plan for a water quality limited stream.

- B. Post construction plans shall include the following information
  - 1. As-built plans, [stamped by a qualified professional] indicating all storm water mitigation and management strategies are installed per approved plans and approved changes.
  - 2. Maintenance plans for all stormwater facilities installed to comply with this ordinance. The maintenance program must be approved by the [Jurisdiction]. [Proof of maintenance shall be submitted [annually].]

#### **IV General Requirements**

- A. All development shall be planned, designed, constructed and maintained to:
  - 1. Provide a system by which storm/surface water within the development will be managed without causing damage or harm to the natural environment, or to property or persons.
  - 2. Protect property from flood hazards.

- B. Plan Review Standards

Plans shall be submitted to the jurisdiction for review. All plans and calculations must be stamped and signed by a [qualified professional]. Plan approval will be based on the following criteria:

- 1. Design, construction and maintenance of proposed stormwater management plan will result in post construction stormwater volumes flowing off site which are substantially the same as pre construction volumes for all storms less than or equal to the [2-year] design storm. *(Although water quality and aquatic habitat benefit from preservation of the natural hydrology, small jurisdictions that anticipate the cumulative impacts of development to be small over time might consider a less stringent criteria, which allows post development runoff volumes to be somewhat greater than pre development volumes.)*
- 2. All culvert installations must allow fish passage in accordance with Division of State Lands (DSL) and the US Army Corps of Engineering (COE) and any other authorized federal, state, or local agency.
- 3. Instillation of culverts, spans or stormwater outfalls along natural water features shall be designed to emphasize preservation of natural flow conditions, allow for natural obstructions and pursue stream enhancement opportunities.
- 4. Stormwater mitigation strategies, such as retention of existing trees, and use of porous paving surfaces, as well as stormwater treatment and flow control facilities used to meet the requirements of this code must be included in the plans.
- 5. Stormwater management plan shall be consistent with [state applicable basin or sub basin watershed management plan and/or pollutant load reduction plan].
- 6. In areas of high pollutant load, stormwater infiltration shall incorporate, or be preceded by treatment as necessary to prevent siltation of the infiltration facility, protect ground water, and prevent toxic accumulations of pollutants in the soil. (Note: it is preferable to eliminate pollutant contact with stormwater where possible.)

7. All vegetation used for the installation and landscaping of storm water facilities shall be selected from plants listed in [name of document, listing approved native plants] available from the [Jurisdiction or other source]. *[Optional - Trees which are preserved or planted on site for stormwater mitigation credit, no not need to meet this criteria.]* Planting schedule and maintenance of vegetation shall be approved by the [local official].

*(Note: The use of a plan review to determine compliance with general objectives is appropriate when a jurisdiction has not adopted specific construction standards for stormwater facilities, or mitigation credits for specific stormwater reduction strategies. Jurisdictions may prefer to adopt standards to provide clearer direction to developers. Design standards for simplified combined facilities and storm water mitigation credits from the City of Portland are included in the appendix. Many other large cities and counties have also developed such standards. Although examples from other jurisdictions are valuable reference, construction standards for stormwater facilities that incorporate infiltration and vegetative treatment must be tailored to local watershed conditions. If standards are adopted the following statements could be substituted for **B.1 through B. 7.***

*[All storm conveyance pipes, vaults and stormwater infiltration, treatment and detention facilities shall be built to specifications of the [Jurisdiction]. As described in [reference standards document].)*

9. See section V for Surface Water Conveyance Standards.

10. See section VI for Pollution Reduction and Flow Control standards.

C. The [jurisdiction] reserves the right to restrict the use of infiltration facilities in high risk areas including those with steep slopes, unstable soils, high water tables, or sites known to be contaminated by hazardous substances.

D. Infiltration facilities which fall under the jurisdiction of DEQ's Underground Injection Control (UIC) Program must be registered with the state and meet the requirements of the UIC Program.

E. Bonds

Applicants shall provide a performance bond or similar surety acceptable to the [Jurisdiction] to assure successful installation and initial maintenance of surface pollution reduction and flow control facilities. During construction and for a period of one year thereafter, the bond shall be in favor of the [Jurisdiction] and in an amount of the anticipated construction cost. *(Reference existing local practice for administering performance bonds.)*

F. Contingency for system failure

If the storm drainage system fails due to lack of maintenance or breakage, and there are impacts to downstream water quality or quantity as a result of the failure, the [Jurisdiction] may perform the maintenance or repair and charge the owner of the facility.

**V. Surface Water Conveyance Standards**

- A. Culverts in and spans of streams, creeks, gulches and other natural drainage channels shall maintain a single channel conveyance system.
- B. Culverts and/or spans are to be sized for the 24-hour post-developed tributary conditions of the [100 year storm].
- C. Conveyance calculations shall use [state method desired by jurisdiction, i.e. the Rational Method] for analysis. Exceptions must be documented and approved by the [Jurisdiction].
- D. In-stream and in-line detention is not allowed.
- E. It shall be the responsibility of the owner that the new drainage system shall not negatively impact any natural waters on or downstream from the site. The owner is responsible for providing a drainage system for all surface water, springs, and groundwater on site and for water entering the property as well as management of springs and groundwater that surface during construction.

**VI Pollution Reduction and Flow Control Standards**

- A. Applicability
  - 1. *(Applicability should be determined by the local jurisdiction. It could include just commercial and industrial, or commercial, industrial and high density residential, or all development. Alternatively, a size threshold could be set for new impervious surface areas. Parking lots could be addressed under this ordinance, or addressed separately – see section 4.4.5 of this guidance. Jurisdictions that are working to encourage in-fill and redevelopment in core areas should select applicability thresholds for redevelopment such that they do not impose a disincentive for redevelopment and in-fill efforts.)*
  - 2. Stormwater treatment and detention facilities receiving stormwater from impervious surface areas less than [15,000 square feet] may be designed in accordance with sizing and construction standards for combined facilities. More than one such facility can be installed on site as long as each facility receives stormwater from an area less than the stated threshold. (See subsection E of this section.)
- B. Infiltration, Treatment and Detention
  - 1. Infiltration
    - (a) Infiltration systems are to infiltrate a minimum of [one-half inch of rainfall in 24 hours].
    - (b) Stormwater treatment, in accordance with subsection B.2 of this section, shall occur prior to or concurrent with infiltration.
    - (c) Infiltration systems shall be designed to overflow to conveyance systems in accordance with subsection D of this section.
    - (d) Infiltration may be waived, or reduced, if it can be demonstrated by a registered professional engineer that infiltration will destabilize the soil, cause structural problems, or provide negative impacts to the environment, or due to site constraints such as high groundwater or soil contamination.

2. Treatment

(a) Water quality facilities shall be designed to capture and treat runoff for all flows up to [2/3 of a 2-year, post-developed, 24-hour storm].

(b) The water quality system shall use vegetation for treatment. Accepted types of vegetated treatment facilities and sizing criteria are described in [name document]. Alternative systems may be used with approval of [local official] and shall be designed to provide equivalent treatment as is provided with a vegetated system.

(c) Systems treating stormwater from over [15,000] square feet of impervious area and all systems that deviate from the sizing and design criteria in [name document] must be designed by a registered engineer and be approved by [local official].

3. Detention

Onsite storm quantity detention facilities shall be designed to capture and detain runoff as follows:

(a) [2-year, 24-hour post-developed runoff rate to a ½ of the 2 year, 24-hour pre-developed discharge rate;]

(b) Sites with infiltration systems designed to handle storms in excess of that specified by subsection (1) of this section will be permitted to reduce on-site detention requirements by a volume equal to [100%] of the excess infiltration capacity.

*(The following provisions, c and d, should be added when jurisdictions have areas of known flooding/conveyance problems. The standards contained in the brackets must be tailored to meet the specific needs and watershed conditions of your jurisdiction.)*

(c) In areas with limited downstream capacity, [reference map or other document specifying areas], detention shall be designed for a [25-year, 24 hour, post-developed runoff rate to a 2-year, 24-hour pre-developed discharge rate, and, from the 2 year, 24-hour, post developed rate, to ½ of the 2-year, 24-hour pre-developed discharge rate.]

(d) Downstream analysis shall be provided to assure sufficient capacity for new development. Downstream analysis shall occur to the distance downstream where the project site contributes less than 15% of the upstream drainage area OR a minimum of 1,500 feet downstream of the project.

*C. Combined stormwater infiltration, treatment and detention*

*Facilities receiving stormwater from impervious areas less than [15,000 square feet] and designed in accordance with the sizing and construction standards contained in [name document] are presumed to comply with the [Jurisdiction's] infiltration, treatment and detention requirements of this code. (See appendix of this document for example of sizing and construction standards from City of Portland.)*

*(An option for In-lieu-of fees for treatment and/or detention should be considered by the jurisdiction if regional treatment facilities are in place or are planned. The following criteria are recommended for determining the appropriateness of in-lieu-of fees.*

- *Subregional or regional treatment/detention downstream is available and has been identified.*
- *Downstream treatment/detention is constructed or an agreement has been approved by the [Jurisdiction] on implementation of downstream treatment/detention.*
- *Fees for “in lieu of” treatment/detention would be applied as a percentage of facility costs, including engineering and administration. Percentage of costs would be based on percentage of use of facility.*
- *Maintenance of facility is provided.)*

#### D. Conveyance

Infiltration, treatment and detention facilities shall be constructed to convey stormwater that exceeds their design capacity. Conveyance systems shall be sized to meet the following conditions:

1. Storm sewer drainpipes draining [less than 640 acres], [25-year 24-hour design storm].
2. Storm sewer drain pipes draining [greater than 640 acres], [50 year 24-hour design storm].

#### 4.4.8 Tree Preservation Ordinance

*Problem*

Development ordinances sometimes require the preservation of trees, to the extent possible ,during construction. Prior to and after construction, however, there often are no regulations that prohibit the cutting or destruction of trees. An intact tree canopy can aid significantly in reducing the amount of precipitation that results in runoff and stream flow, thus reducing the amount of stormwater that must be treated or stored. Tree destruction also causes erosion that can lead to a degradation of water quality.

*Objective*

Protect the existing tree canopy within the community to help protect and enhance water quality.

*Strategy*

Implement the following tree preservation model code to protect existing trees throughout the community before, during and after construction.

*Discussion*

The requirement for compliance with this code, regardless of whether a building permit is being sought, may be controversial. It may require the public to be educated in its benefits.

The penalty suggested in this ordinance (Section XIII) is set at a minimum of \$500. This amount may not be enough to deter a property owner from cutting a tree that might be worth three or four times that amount. A community could set the minimum penalty higher to reflect the economic worth of mature trees.

Implementation of this ordinance will require the local jurisdiction to administer the Forest Practices Act within their legal boundaries according to the Oregon Department of Forestry's interpretation of ORS 527.722 (The local government option to the Forest Practices Act). The model language provided meets the requirements of the Forest Practices Act.

## TREE CUTTING, DESTRUCTION AND REMOVAL

### **Sections:**

- I. Purpose.
- II. Definitions.
- III. Tree removal prohibited.
- IV. Exemptions.
- V. Permit fee.
- VI. Permits required with planned unit developments, subdivisions and site plans.
- VII. Procedure for filing tree removal plan.
- VIII. Tree removal standards.
- IX. Plan review.
- X. Conditions of approval.
- XI. Permit posting.
- XII. Appeal to [city council/county commission].
- XIII. Violation - Penalty.

### **I. Purpose.**

The purpose of this chapter is to establish a process and standards which will minimize the cutting or destruction of trees and wooded areas within [jurisdiction]. This chapter is intended to protect the scenic beauty of the [jurisdiction] to retain a livable environment through the filtering effect of trees on air pollution and sound. To protect soil, air, water, fish and wildlife resources, and to provide visual contrast to the built urban environment through the maintenance and protection of trees and wooded areas in the [jurisdiction]. The [jurisdiction] finds that timber harvesting is secondary to preservation of other natural resources and cultural values within the [jurisdiction] and its urban growth boundary. Therefore, pursuant to ORS 527.722, the [jurisdiction] has chosen to regulate the cutting, destruction, and removal of trees in place of the Oregon Forest Practices Act.

### **II. Definitions.**

As used in this chapter or in any conditions imposed by the [jurisdiction] pursuant to [Chapter VII of this ordinance], the following words and phrases, unless the context requires otherwise, shall mean:

**CUTTING** means falling or removing a tree, or any act by a person, above or below ground, which results in death or substantial destruction of a tree. Cutting does not in any context include measures which are in accordance with sound arboriculture practice such as trimming, pruning. If the tree dies within one year of such trimming, pruning or topping, the property owner or other responsible party bears the burden of proving compliance with sound arboriculture standards.

**HAZARD TREE** means any tree with any structural defect, disease, extreme size or combinations of these, making it subject to a high probability of failure which might cause damage to persons or property.

**HERITAGE TREE** means any tree of exceptional value to the [jurisdiction] based on its size (relative to species), history, location or species, or any combination of these criteria. The specific methodology for classifying a tree as a Heritage Tree shall be established by resolution of the [city council/county commission].

**NUISANCE TREE** means any tree which impedes pedestrian or vehicular traffic within public rights-of-way from its normal and reasonable use of such right-of-way. Any tree by its biological nature which has a negative impact on its surrounding environment.

**RIGHT-OF-WAY** means the area between the boundary lines of a street or public easement. This area includes the park strip or tree lawn area between the curb and sidewalk.

**REMOVE** or "removal" means the act of removing a tree by digging up, cutting down or any act which causes a tree to die within a period of three years. This includes but is not limited to damage inflicted on the root system by machinery, storage of materials or soil compaction, changing the ground level in the area of the tree's root system, damage inflicted on the tree permitting infections or infestation, excessive pruning, topping or any other action which is deemed harmful to the tree.

**TREE** means any woody, perennial, deciduous, evergreen or coniferous plant, characterized by having a main stem or trunk of six inches or more in diameter four and one-half feet above natural grade. In cases of multi-stemmed or multi-trunk trees, the diameter shall be the sum of diameters of all individual stems or trunks.

### **III. Tree removal prohibited.**

- (1) Except as provided in [Chapter XI of this ordinance] no person shall remove more than [two] trees per parcel within a single calendar year without first filing a tree removal plan and obtaining a tree removal permit.
- (2) Except as provided in [Chapter XI of this ordinance], no person shall remove a Heritage Tree from a parcel of property, without first applying for and obtaining a Heritage Tree removal permit.

### **IV. Exemptions.**

*The provisions of this chapter do not apply to the exemptions listed within this section nor is any fee required for their implementation.*

- (1) The action of any city official or of any public utility necessary to remove or alleviate an immediate danger to life or property, to restore utility service or to reopen a public street to traffic;
- (2) Any removal of trees necessary to install or maintain improvements such as streets and sewers within publicly owned and accepted rights-of-way or utility easements;
- (3) Removal of trees that are nuisances or hazardous trees, after being designated as such by the [jurisdiction] administrator. The [city official] may rely upon this chapter and [XX chapter] in making this determination.

**V. Permit fee.**

- (1) The permit fee for tree and Heritage Tree removal shall be submitted at the time of application. The fee shall be [\$150.00] if the parcel is one acre or less in size. If the parcel is larger than one acre the fee shall be [the lesser of \$300.00 or \$150.00 plus \$50.00 per tree for each tree in excess of [two] to be cut from the entire parcel]. In the event of unusual circumstances, the [city official] may adjust the fees to reflect the [jurisdiction]'s actual anticipated costs in processing the application, including staff time and administrative costs. The permit fee is nonrefundable.
- (2) Fees collected under the provisions of this chapter shall first be allocated to the costs of administering and enforcing the tree felling ordinance, including the payment of legal costs. The remainder of fees collected and not used in the administration of the tree felling ordinance shall be deposited in a special "tree project account," which shall be administered through an appropriate fund or funds as determined by the [city council/county commission], for the purpose of enhancing and furthering the integration of trees into the urban landscape of [jurisdiction].

**VI. Permits required with planned unit developments, subdivisions and site plans.**

- (1) Any application for any planned unit development (PUD), subdivision, site plan or other zoning permit or approval, the plans for which call for tree removal which would require a tree removal permit, pursuant to [Chapter III of this ordinance], shall be accompanied by an application for a tree removal permit, together with the required filing fee under [Chapter X of this ordinance].
- (2) Compliance with this chapter shall be a supplemental condition of approval for all site plans, PUDs, and subdivisions.

**VII. Procedure for filing tree removal plan.**

Application for a permit to remove a Heritage Tree or more than three trees shall include:

- (1) The name, address, and telephone number of the applicant, species or common name of the tree(s), the reason for removal, a plot plan showing the location of trees to be removed and their sizes, the method of tree removal and the hauling route to be used.
- (2) A description of any plan (vegetation and re-vegetation report) to replace, landscape, or otherwise reduce the effect of the removal that addresses the applicable standards in VMC 8.10.080.
- (3) The [city official] at their discretion may hire a professional forester, hydrologist, landscape architect, or arborist at the applicant's expense. Such a professional consultant may be hired for any or all of the following reasons:
  - (a) To ensure the standards in [Chapter XIII of this ordinance] are met;
  - (b) To ensure that standards promulgated within the Forest Practices Act are met, except where they are inconsistent with the provisions of this chapter;
  - (c) To provide consultation during the application review process; and
  - (d) If the permit is granted to provide continuing oversight through cutting, reforestation, and until the end of the fifth growing season after reforestation.

**VIII. Tree removal standards.**

- (1) The [city official], in consultation with the city engineer and the fire chief, shall approve, approve with conditions or deny the permit, as provided in [Chapter IX of this ordinance]. The [city official] may, at their discretion, refer the permit to the [jurisdiction] planning commission.
- (2) The [jurisdiction]'s consideration of the permit shall be based on the following standards:
  - (a) Whether the condition of the trees with respect to disease, hazardous or unsafe conditions, danger of falling, proximity to existing structures or proposed construction, or interference with utility services or pedestrian or vehicular traffic safety warrants the proposed removal;
  - (b) The impact the trees' removal has on the environmental quality of the area, including but not limited to the protection of nearby trees and windbreaks, air quality, fish and wildlife, erosion, soil retention and stability, volume of surface runoff and water quality of streams, scenic quality, and geological sites;
  - (c) Whether it is necessary to remove trees in order to construct proposed improvements, or to otherwise utilize the applicant's property in a reasonable manner;
  - (d) In the event that no plot plan has been approved by the [jurisdiction], removal of trees shall be permitted on a limited basis consistent with the following criteria:
    - (i) Wooded areas associated with natural drainageways and water areas shall be retained to preserve riparian habitat and to minimize erosion;
    - (ii) Wooded areas that will likely provide attractive on-site views to occupants of future developments shall be retained;
    - (iii) Wooded areas along ridge lines and hilltops shall be retained for their scenic and wildlife value;
    - (iv) Wooded areas shall be retained to serve as buffers along property lines, streets, roadways, railroad rights-of-way and other thoroughfares;
    - (v) Trees shall be retained in sufficiently large areas and dense stands so as to ensure against windthrow;
    - (vi) Any proposed replanting of new trees or vegetation must be an adequate substitute for the trees to be removed;
    - (vii) Removal must be compatible with generally accepted practices of horticulture, silviculture or landscape architecture. Such practices include erosion control to prevent stormwater runoff from damaging soil in the area of removal;
    - (viii) The removal must be consistent with the guidelines set forth in the Forest Practices Field Guide published by the Oregon Department of Forestry.

**IX. Plan review.**

- (1) Within 30 business days after a plan is filed with the [jurisdiction], unless a request for a time extension in writing is submitted by the applicant, the [jurisdiction] shall:

- (a) Accept the plan if it meets the requirements of [chapter VII of this ordinance]and [chapter VIII of this ordinance]; or
  - (b) Accept the plan, with conditions; or
  - (c) Deny the plan and provide the applicant with a written statement containing the basis for the denial. Denial shall be for a failure of the applicant to meet the requirements of [Chapter VII of this ordinance]and [Chapter VIII of this ordinance] only. The [jurisdiction] shall not be required to review any plans or check any information supplied for accuracy or completeness. The receipt or acceptance of a plan is not an indication that the [jurisdiction] has approved the plans or the information contained therein.
- (2) In accepting the plan, either conditionally or outright, the [jurisdiction] may waive street or land use development setback requirements or grant a conditional use or variance in order to preserve one or more Heritage Trees. The issue of whether to approve such a grant or waiver may be referred to the [jurisdiction] planning commission.

#### **X. Conditions of approval.**

The [jurisdiction] may place conditions on the applicant's plot plan in order to meet the standards in [chapter VIII of this ordinance].

- (1) If issuance of the tree removal permit is conditioned upon the applicant's proposed plan to replace the trees, landscape or otherwise reduce the effects of the tree removal, the time within which the plan is to be completed shall be set forth on the permit.
- (2) The [jurisdiction] may require the posting of a surety bond to guarantee that any conditions imposed on tree removal or replanting are met or to insure against damage to [jurisdiction] facilities.
- (3) Failure to comply with a condition of a tree removal permit within the designated time is a violation of this section.

#### **XI. Permit posting.**

In order to ensure compliance with this chapter, once a tree removal permit has been issued, the permittee shall:

- (1) Display the tree removal permit in a visible location on the parcel where tree removal is to occur; or
- (2) Once removal has begun, the tree removal permit may be kept in the possession of the operator, while the operator is on the parcel conducting the permitted tree removal.

#### **XII. Appeal to city council.**

- (1) An applicant may appeal the denial or conditioning of a permit to the city council by filing a written notice of appeal with the [jurisdiction] within 30 days from the date of the notice of [jurisdiction] action.
- (2) The city council shall hold a hearing within 30 days of filing of the appeal. Notice of the hearing shall be provided to the applicant.

- (3) The appellant shall carry the burden of proving that the requirements of [Chapter VII of this ordinance] and [Chapter VIII of this ordinance] have been met.
- (4) Notice of denial or conditioning of a permit, and notice of hearing, shall be deemed to be served upon the applicant upon the earlier of:
  - (a) Personal service upon the applicant:
  - (b) Deposit of such notice in the mail with first class postage, addressed to the applicant at the address listed in the application.

**XIII. Violation - Penalty.**

- (1) Any person found to have removed a tree in violation of this chapter shall incur a civil penalty of not more than [\$1,000] nor less than [\$500].
- (2) Failure to comply with any condition of the permit issued to the applicant shall constitute a violation of this chapter and shall, upon conviction, subject the applicant to a fine of not more than [\$1,000] nor less than [\$500].
- (3) Each tree removed in violation of this chapter or any permit issued pursuant to this chapter shall constitute a separate violation.
- (4) Each tree that the applicant fails to replant or replace as required by the terms of the permit, and each violation of any other condition of a permit, shall constitute a separate violation.
- (5) A court may impose less than the mandatory [\$500] per tree penalty only if the defendant establishes by clear and convincing evidence that:
  - (a) The minimum [\$500] per tree penalty would create a severe financial hardship; or
  - (b) A settlement agreement is reached prior to the hearing in which reclamation is offered as a substituted for part or all of the fine.

#### 4.4.9 Erosion and Sediment Control

*Problem*

Erosion control during construction is a primary means of decreasing the amount of sedimentation and associated pollutants in a water body. The EPA recently adopted rules to lower the threshold from five acres to one acre for construction and grading activity, requiring an NPDES erosion and sediment control permit (see Chapter 2 for more information). This requirement is imposed on the state, but could lead to additional requirements for local erosion and sediment control programs. Cities may decide that additional risk factors, or a more stringent land area threshold is needed to control impacts from development activity. Such a decision could be based on a 303(d) listing or ESA listing (see Chapter 2 for more information).

*Objective*

Develop erosion prevention and sediment control standards that match the needs of a community, and provide the necessary level of protection for potentially impacted water bodies.

### *Strategy*

Review the model ordinance below and the discussion that follows to determine the steps that must be taken to implement the model ordinance. The ordinance relies on an “erosion and sediment control manual” or some similar document that describes the “best management practices” applicable to the community given soil types, topography and location of water bodies and drainages. The model also calls for a manual that describes water quality treatment facilities. This manual need not be created for the community, instead a manual or handbook from another community or the Oregon Department of Transportation can be referenced in the code and kept on hand at the jurisdiction’s offices. See page A.1 of the Appendix for examples.

### *Discussion*

The implementation of an erosion prevention and control ordinance may require additional work on the part of the jurisdiction. In particular, techniques for preventing erosion must be determined and included in the “erosion and sediment control manual.” If a community does not have the resources to complete such a manual entirely from scratch there are a number of communities that probably have similar erosion control issues that have completed such a manual. Jurisdictions with completed manuals include, Eugene, City of Portland, Unified Sewerage Agency of Washington County. The ideas and techniques within these manuals can be easily “borrowed” and tailored for use with this model ordinance.

This model ordinance begins to address the “relative risk” of each land disturbing activity. The risk of damaging sediments traveling from a disturbed site to a water body depends on the following factors:

- Amount of soil disturbed
- Occurrence of rain
- Erosivity of the soil
- Slope
- Proximity to water body or storm drain

The relative risk factors found in the model ordinance include amount of soil disturbed, slope and proximity to water bodies. A community can choose to include the other relative risk factors, and create a matrix that rates each project according to its relative risk and places fewer requirements on projects that pose less risk to water quality through erosion. The appendix contains a full explanation of relative risk and a suggested matrix for inclusion in the zoning code.

This ordinance also includes a separate section in the Appendix that can be added to require larger developments to install water quality controls that protect specific water bodies. This additional section requires a manual or a referenced manual that describes water quality treatment facility standards.

## **I. Purpose**

The purpose of these standards is to reduce the amount of sediment and pollutants resulting from development, construction, grading, excavating, clearing, and any other activity which accelerates erosion or increases water pollution, from reaching the public storm and surface water system or from directly entering surface waters. The objective is to prevent and control erosion and pollution at its source in order to maintain and improve water quality and reduce downstream impacts.

## **II. Applicability**

An erosion prevention and sediment control plan shall be required and approved by the [planning director/city engineer] under any of the following circumstances:

A. Prior to final plat approval for any subdivision, in accordance with Chapter [X.X].

[B. Prior to Design Review, in accordance with Chapter [X.X].]

C. Prior to approval of any building or grading permit that results in:

1. Disturbance of [1,000] square feet or more of land surface area.
2. Land or native vegetation disturbance within [50] horizontal feet of top of bank of any wetland, stream, river or storm drain inlet.
3. Disturbance of land or vegetation affecting [500] square feet or more of land area on slopes of [25] percent or greater.

D. Farming activities are exempt from the provisions of this section, provided that the specific land area has been cultivated within the last three years.

E. Upon a finding that visible or measurable erosion has entered, or is likely to enter, the public storm and surface water system. As used in this section, "visible or measurable erosion" shall include the following:

1. Depositions of soil or sediment exceeding [one cubic foot] in volume on a public or private street, adjacent property, or into the surface water management system either by direct deposit, dropping, discharge or as a result of erosion.
2. Flows of water over bare soils, turbid or sediment laden flows, or evidence of on-site erosion such as rivulets or bare soil slopes, where the flow of water is not filtered or captured on the site.
3. Earth slides, mud flows, earth sloughing, or other earth movement which leaves the property of origin.

F. Single Family Lot Exemption - Standard Erosion Control Plan.

Standard Erosion Control Plan Option. In lieu of compliance with [section V of this ordinance] the developer may choose to follow the requirements of the [Standard Erosion Control Plan, approved by the Planning Commission] and on file in the [with the jurisdiction] in the following circumstances:

- a. The lot is [20,000 square feet or less.] and
- b. No portion of the lot exceeds [5%] slope.

Nothing in this section shall relieve any person from the obligation to comply with the regulations or permits of any federal, state, or local authority.

### **III. Approval Standards**

The Director shall make the following affirmative findings prior to approval of an erosion control plan:

- A. The project has been designed to minimize disturbance of natural topography, native vegetation and soils, consistent with applicable provisions of [section X.X of this development code] (Hillside Preservation) and [section X.X of this development code] (Flood Hazard).
- B. The site design maximizes the preservation of healthy trees, understory shrubs and ground cover.
- C. The plan complies with the applicable technical guidelines, as determined by the [Public Works Director/engineer]. In the case of erosion control and prevention standards, the [list adopted erosion control manual or another jurisdiction's manual] shall be the recognized authority. [In the case of water quality facilities, the [list adopted water quality manual or a manual from another jurisdiction] shall be the recognized authority.] (note: include only if including the Special Water Quality Treatment Facilities in section VII.)

### **IV. Erosion Prevention and Sediment Control Plan Submission Requirements**

The required erosion prevention and sediment control plan shall include a narrative description and scaled drawings which address:

- A. The physical characteristics of the site, including a map of existing topography at [2] foot contour intervals, the location of water areas, and a narrative description of soil characteristics. The requirement for a [2] foot contour map may be waived by the [planning official] where this information is not readily available, and erosion potential is minor.
- B. The nature of the proposed development, including any phasing plans, which may affect soils or create soil erosion. Areas of excavation, grubbing, clearing, stockpiling, or vegetation removal shall be specifically identified.
- C. Specific erosion control measures and practices to be used to demonstrate compliance with Section V of this ordinance.

[D. Submitted plans shall be stamped by a professional engineer registered in Oregon.]

**V. Erosion Control Plan Standards.**

[In addition to compliance with relevant portions of the Hillside Development (4.2.7(c) in this handbook) and Floodway and Floodplain (4.2.7(d) in this handbook) Overlay Districts,] the required Erosion Prevention and Sediment Control Plan shall comply with the following standards:

- A. Control Measures. Specific methods of soil erosion and sediment control shall be used during construction to minimize visible and measurable erosion. In no case shall soil erosion and sediment transport from the site exceed the rate of one ton per acre per year. These methods shall include all of the following:
1. The land area to be grubbed, stripped, used for temporary placement of soil, or to otherwise expose soil shall be confined to the immediate construction site only.
  2. The duration of exposure of soils shall be kept to a minimum during construction. Exposed soils shall be covered by mulch, sheeting, temporary seeding or other suitable material following grading or construction, until soils are stabilized. During the rainy season [(November through May)], soils shall not be exposed for more than [seven] consecutive days. All disturbed land areas which will remain unworked for [21] days or more during construction, shall be mulched and seeded.
  3. During construction, runoff from the site shall be controlled, and increased runoff and sediment resulting from soil disturbance shall be retained on-site. Temporary diversions, sediment basins, barriers, check dams, or other methods shall be provided as necessary to hold sediment and runoff.
  4. A stabilized pad of gravel shall be constructed and maintained at all entrances and exits to the construction site to prevent soil deposits on the roadway or in the drainageways. The stabilized gravel pad shall be the only allowable entrance or exit to the site.
  5. Topsoil removal for development shall be stockpiled and reused on-site to the degree necessary to restore disturbed areas to their original or enhanced condition, or to assure a minimum of six inches of stable topsoil for re-vegetation. Additional soil shall be provided if necessary to support re-vegetation.
  6. The removal of all sediments which are carried into the streets, or on to adjacent property, are the responsibility of the developer. The applicant shall be responsible for cleaning and repairing streets, catch basins, and adjacent properties, where such properties are affected by sediments or mud. In no case shall sediments be washed into storm drains, ditches, drainageways, streams, or wetlands.
  7. Any other relevant provision of the [list adopted erosion control manual or the manual referenced from another jurisdiction], required by the [planning official].

- B. Restoration of Vegetation. In addition to compliance with native vegetation removal and enhancement provisions of [chapters X.X and X.X] of this code, the developer shall be responsible for re-vegetating public and private open spaces, utility easements, and undeveloped rights-of-way in accordance with an approved Schedule of Installation.
1. If the vegetation existing prior to site development is non-native or invasive, it shall be replaced with native or non-invasive plant species.
  2. Temporary measures used for initial erosion control shall not be left in place permanently.
  3. Work areas on the immediate site shall be carefully identified and marked to reduce potential damage to trees and vegetation.
  4. Trees shall not be used as anchors for stabilizing working equipment.
  5. During clearing operations, trees and vegetation shall not be permitted to fall or be placed outside the work area.
  6. In areas designated for selective cutting or clearing, care in falling and removing trees and brush shall be taken to avoid injuring trees and shrubs to be left in place and the provisions for tree preservation in [Chapter X.X and X.X of this ordinance].
  7. Stockpiling of soil, or soil mixed with vegetation, shall be removed prior to completion of the project.
- C. Schedule of Installation. A schedule of planned erosion control and revegetation measures shall be provided, which sets forth the progress of construction activities, and mitigating erosion control measures.
- D. Responsible Person. The developer shall designate a specific person to be responsible for carrying out the Erosion Prevention and Sediment Control Plan.
- E. Reference Authority. The [list adopted erosion control manual or other jurisdiction's manual or the manual referenced from another jurisdiction] shall be the primary guide for [jurisdiction] in establishing and reviewing erosion control techniques, methods and requirements. The [planning official] and [Public Works Director] may also develop regulations and procedures in accordance with the Handbook to implement erosion control measures as needed.

## **VI. Plan Implementation Requirements.**

An approved Erosion Prevention and Sediment Control Plan shall be implemented and maintained as follows:

- A. Plan Approval Required Prior to Clearing or Grading. No grading, clearing or excavation of land requiring an Erosion Prevention and Sediment Control Plan shall be undertaken prior to approval of the Erosion Prevention and Sediment Control Plan.
  
- B. Implementation. The developer shall implement the measures and construct facilities contained in the approved Erosion Prevention and Sediment Control Plan in a timely manner.
  - 1. During active construction, the developer shall inspect erosion prevention and control measures daily during rainy periods. In all cases, the developer shall be responsible for maintenance, adjustment, repair and replacement of erosion control measures to ensure that they are functioning properly without interruption.
  - 2. Eroded sediment shall be removed immediately from pavement surfaces, off-site areas, and from the surface water management system, including storm drainage inlets, ditches and culverts. In the event that sediment is inadvertently deposited in a wetland or stream, the developer shall immediately contact the [planning official] and coordinate remedial actions with the [jurisdiction].
  - 3. Water containing sediment shall not be flushed into the surface water management system, wetlands or streams without first passing through an approved sediment filtering facility or device.
  - 4. When required by the [planning official], the developer shall maintain written records of all site inspections of erosion control measures which shall be provided to the [planning official] upon request.
  - 5. The developer shall call for [jurisdiction] inspection, prior to the foundation inspection for any building, to certify that erosion control measures are installed in accordance with the Erosion Prevention and Sediment Control Plan.
  
- [C. Dust Control. [jurisdiction] is especially susceptible to wind erosion. Therefore, the [planning official] may require that additional dust control measures be included in the Erosion Prevention and Sediment Control Plan. Such control measures may include, but are not limited to, the following:
  - 1. Sprinkling access and haul roads and other exposed dust producing areas with water.
  - 2. Applying dust palliatives to access and haul roads.
  - 3. Establishing temporary vegetative cover.
  - 4. Placing wood chips, gravel or other effective mulches on vehicle and pedestrian use areas.
  - 5. Maintaining the proper moisture condition on all fill surfaces.
  - 6. Pre-wetting cut and fill surface areas.
  - 7. Using covered haul equipment.]

- D. Correction of Ineffective Measures. If the facilities and techniques approved in the Erosion Prevention and Sediment Control Plan are not effective or sufficient to meet the purpose of this section, based on an on-site inspection, the [planning official] may require a revised plan.
1. The revised Erosion Prevention and Sediment Control Plan shall be provided within 5 working days of written notification by the [planning official].
  2. The developer shall implement fully the revised plan within 5 working days of approval by the [planning official].
  3. In cases where serious erosion is occurring, the [planning official] may require the developer to install interim control measures immediately, before submittal of the revised Erosion Prevention and Sediment Control Plan.
- E. Additional Standards. The following additional standards shall apply:
1. Construction between stream banks shall be prohibited, unless absolutely necessary to construct required public facilities. Any such activities must be performed in accordance with Oregon Department of Fish and Wildlife and other state regulations.
  2. Pollutants such as fuels, lubricants, raw sewage, and other harmful materials shall not be discharged into or near rivers, streams, or impoundments, and shall be properly stored and disposed.
  3. Discharge of water into a stream, wetland or impoundment shall not result in violation of the state temperature standard.
  4. All sediment-laden water from construction operations shall be routed through stilling basins, filtered, or otherwise treated to reduce the sediment load, and prevent violation of the state turbidity rule.
- F. Storage. All erodible or toxic materials delivered to the job site shall be covered and protected from the weather and stored according to appropriate health and safety guidelines.
1. Such materials shall not be exposed during storage.
  2. Waste material, rinsing fluids, and other such material shall be disposed of in such manner that pollution of groundwater, surface water, or air does not occur.
  3. In no case shall toxic materials be dumped into drainageways or onto land.
- G. Contaminated Soils. Where the construction process reveals soils contaminated with hazardous materials or chemicals, the Contractor shall stop work immediately; ensure that no contaminated material is hauled from the site; remove the work force from the contaminated area; leave all machinery and equipment; secure the area from access by the public until such time as a mitigation team has relieved the Contractor of that responsibility; notify the [jurisdiction] of the situation upon its discovery; and prohibit employees who may have come in contact with the contaminated material from leaving the site until released by the [jurisdiction].

H. Duration of Maintenance. Continuing maintenance after development pursuant to the Erosion Prevention and Sediment Control Plan, including re-vegetation of all graded areas, shall be the responsibility of the developer, subsequent developers or property owners.

1. Erosion prevention and control measures shall be maintained during construction and for one year after development is completed.
2. The [planning official] may, upon a finding that soils are completely stabilized, reduce this period.

(Note: the Appendix contains an additional section that is recommended for implementation if the jurisdiction has specific water resources that need protection from a single, large development. The additional section is not necessary for a complete erosion prevention/control ordinance.)

### **VIII. Security**

[Except as provided by Section VII of this ordinance,] after an Erosion Prevention and Sediment Control Plan [or Water Quality Facility] is approved by the [planning official] and prior to construction or grading, the applicant shall provide a performance bond or other financial guarantee in the amount of [120%] of the value of the erosion prevention/control [and water quality measures] necessary to stabilize the site and maintain water quality. Any financial guarantee instrument proposed other than a performance bond shall be approved by the [City Attorney].

- A. Duration. The financial guarantee instrument shall be in effect for a period of at least one year (or two years in the case of a water quality facility), and shall be released when the Director determines that the site has been stabilized (or the water quality facility is operating as designed). All or a portion of the security retained by the City may be withheld for a period of up to five years beyond the one-year maintenance period, if it has been determined by the [planning official] that the site has not been sufficiently stabilized against erosion [(or the water quality facility is not operating as intended)].
- B. Exemptions. Individual lots zoned for single-family and multi-family residential use prior to the effective date of this Section, and individual lots subject to the standard erosion control plan stated in Section V of this ordinance shall be exempt from the security requirements of Section VIII of this ordinance.
- C. Conflict. Due to the immediate threat to the public health, safety and welfare posed by failure to comply with the strict provisions of the erosion control measures required under this Section, the provisions of Section VIII shall supersede the more general provisions of [jurisdiction's development code], where they exist.

## **IX. Enforcement**

Each violation of any provision of this Section, or any failure to carry out the conditions of any approval granted pursuant to this Section, shall be unlawful and a civil infraction subject to the enforcement provisions of [jurisdiction development code, Section X.X].

- A. Additional Penalties. In addition to those penalties available under [jurisdiction development code, Section X.X], the [planning official] may enforce the following additional penalties:
  - 1. Issue a stop work order where erosion control measures are not being properly maintained or are not functioning properly due to faulty installation or neglect.
  - 2. Refuse to accept any development permit application, revoke or suspend any development or building permit, or deny occupancy of the subject property until erosion control measures have been installed properly and maintained in accordance with this Section.
- B. The owner of the property from which the erosion occurs, together with any person or parties who cause such erosion, shall be responsible for mitigating the impacts of the erosion and for preventing future erosion.
- C. Upon request of the [city/county Administrator or at the direction of the City Council/County Commission], the City Attorney may institute appropriate action in any court to enjoin development of a site or building project which is in violation of this Section, or to require conformance with this Section.