

CHAPTER 2: MODIFICATIONS TO THE 2005 DEPARTMENT OF ECOLOGY STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON

2.1 Redmond Requirements

Clearing, grading, and stormwater management issues relating to construction are regulated by Chapter 15.24 of the Redmond Municipal Code and the Redmond Community Development Guide. Issues not addressed in the RCDG are regulated by the requirements of the Stormwater Notebook. The 2005 Ecology Manual shall regulate issues not addressed in the Redmond Municipal Code, Redmond Community Development Guide, or the Stormwater Notebook.

2.2 Key Modifications for Redmond

In accordance with the Ecology Manual, infiltration is encouraged for recharge or as a method of discharging surface water as an option in areas with highly permeable soils for clean runoff from sidewalks and roofs. However, due to wellhead protection concerns, all other infiltration proposals shall be evaluated by the Stormwater Engineer on a case-by-case basis.

Infiltration of water draining from pollution generating impervious surfaces (streets, parking lots, etc.) in Wellhead Protection Zones 1 or 2 is not permitted. Infiltration for pollutant removal or flow control is permitted in Wellhead Protection Zone 4 with treatment as noted in the Ecology manual. In Wellhead Protection Zone 3, infiltration for treatment is not permitted, but infiltration for flow control is permitted following enhanced treatment.

2.3 Applicability of the 2005 Ecology Manual in Redmond

2.3.1 Volume I: Minimum Technical Requirements and Site Planning

2.3.1.1 Chapter 1: Introduction

No local changes but used for reference only in Redmond.

2.3.1.2 Chapter 2: Minimum Requirements for New Development and Re-development

2.1- Relationship to Puget Sound Water Quality Management Plan

Applies although appropriate applications for infiltration systems are limited.

2.3- Definitions Related to Minimum Requirements

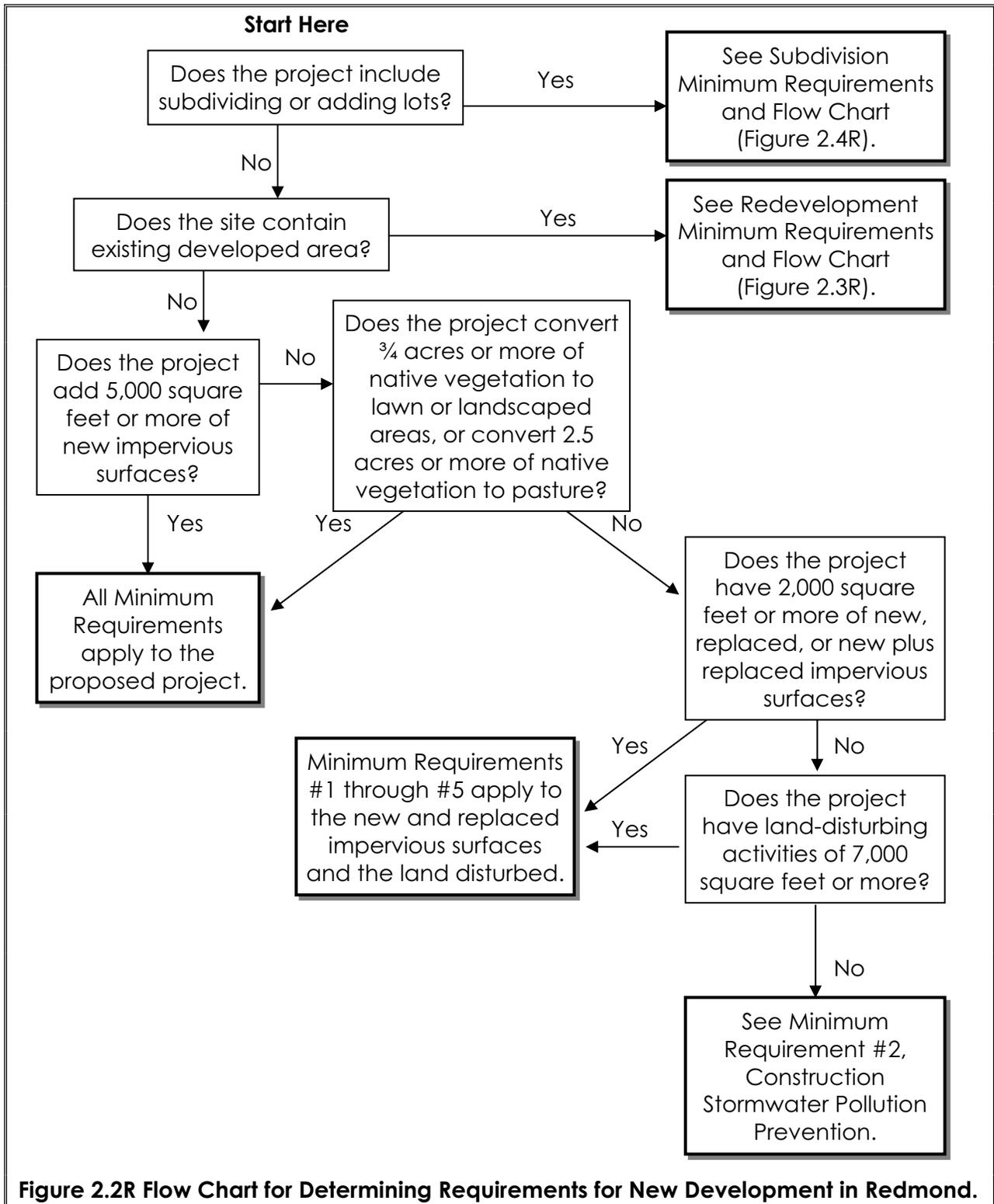
City definitions shall be used where applicable. See glossary revisions below for Pre-developed condition, re-development, and new development.

2.4-Applicability of the Minimum Requirements

Redmond treats re-development differently than the 2005 Ecology Manual. The differences are explained below and require that Figures 2.2 and 2.3 in the 2005 Ecology Manual be revised for Redmond. The revised Redmond figures (labeled 2.2R, 2.3R, and 2.4R) follow.

Figures 2.2 and 2.3

Do not apply in Redmond. See 2.2R, 2.3R, and 2.4R below.



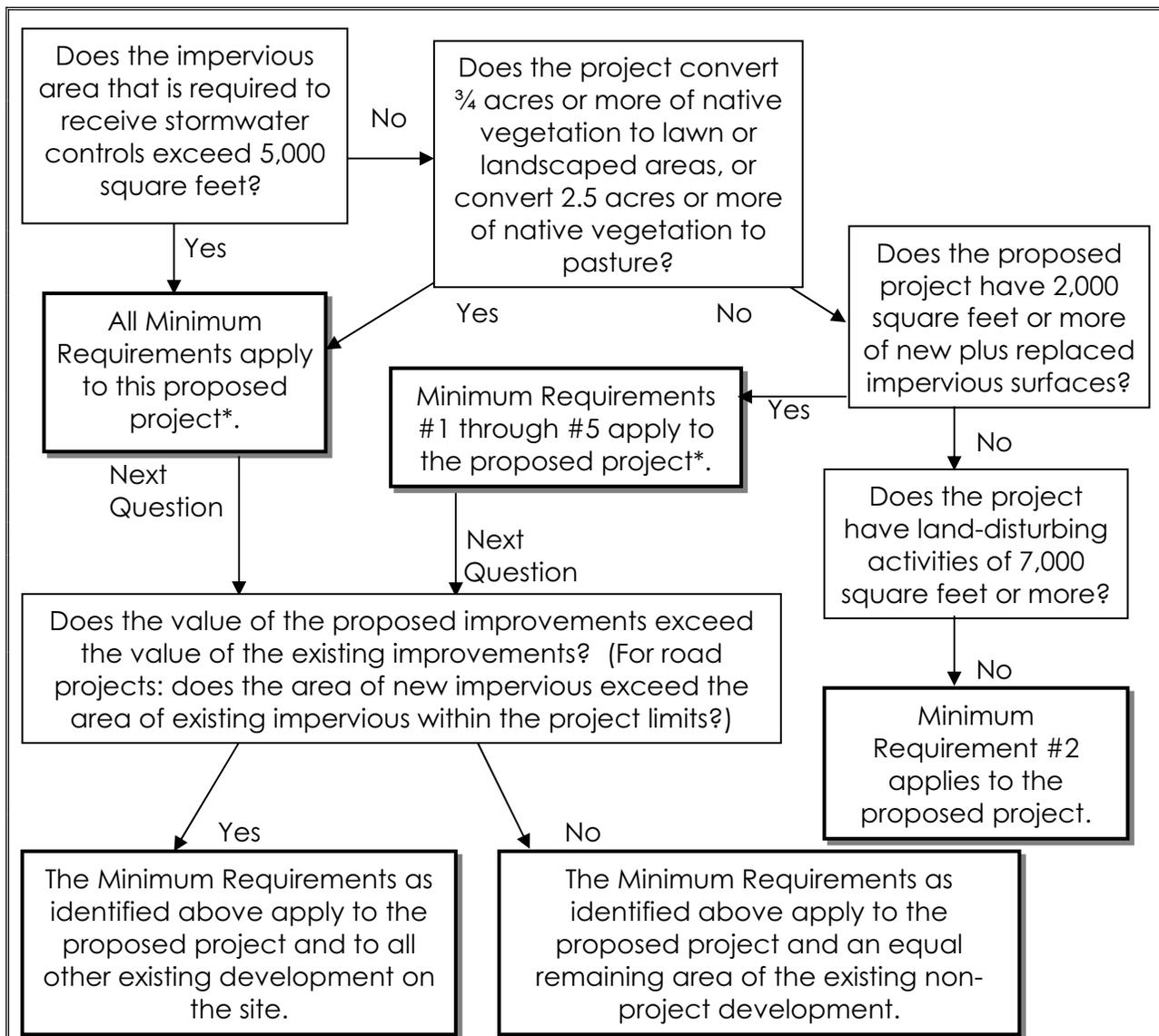
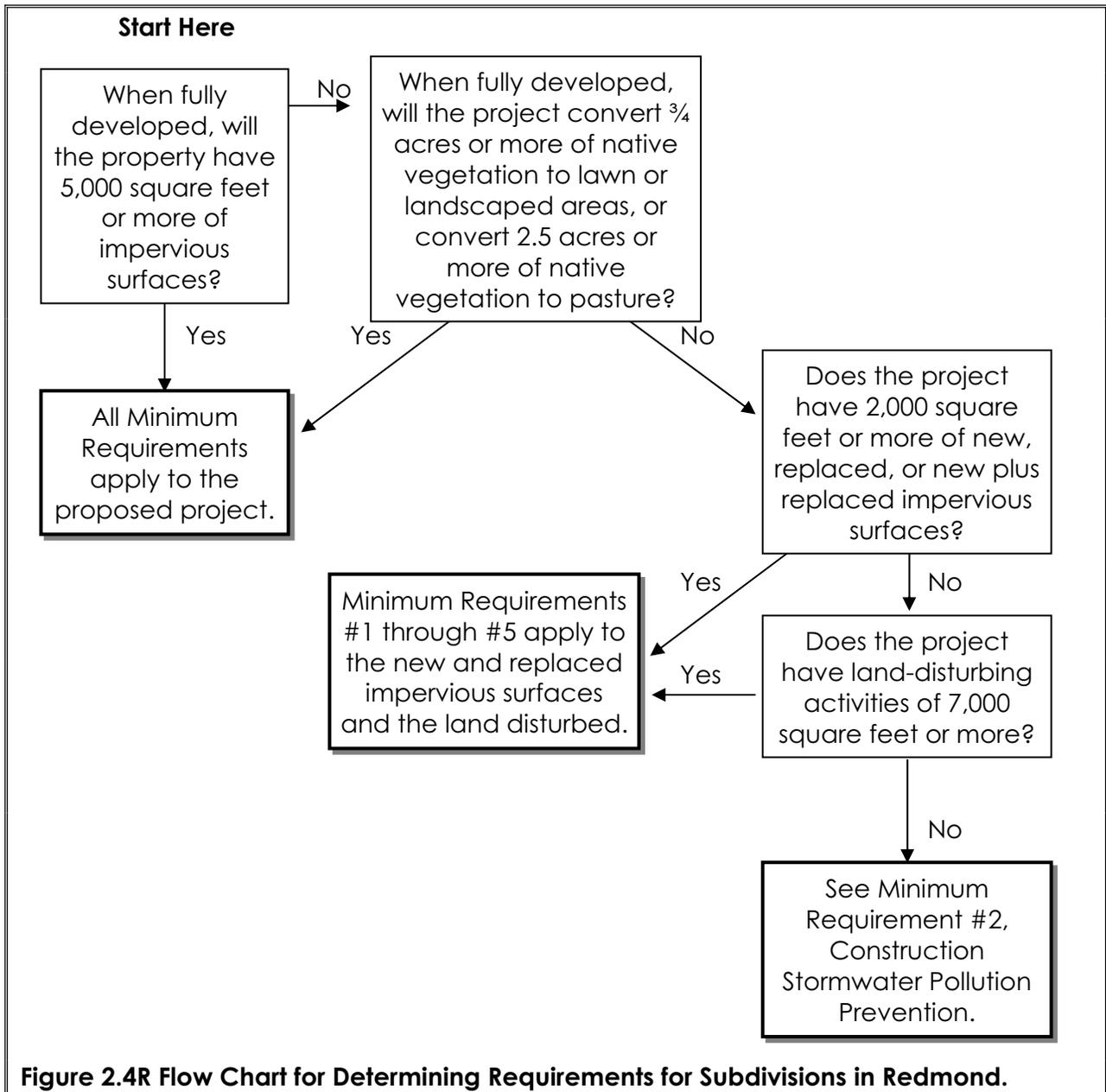


Figure 2.3R Flow Chart for Determining Requirements for Redevelopment in Redmond.

* In determining project area, include areas of the site with:

- Proposed new impervious surfaces, and
- Existing impervious surfaces that will be disturbed as part of the project, and
- All other areas that will be disturbed by the proposed project, and
- Additional existing development as required per "New Development" or "Re-development" definitions.

A landscaped area is disturbed if the earth surface is penetrated or roots are disturbed. A paved area is disturbed if the surface below the base course is disturbed.



2.4.2- Redevelopment

Redmond does not have the "stop-loss" provision described in the 2005 Ecology Manual. However, Redmond does have provisions for fee-in-lieu of stormwater facilities as noted in Chapter 8 of the Stormwater Notebook.

2.5.1-Minimum Requirement #1 Preparation of Stormwater Site Plans

Applies. See Chapter 3 of Volume I of Ecology Manual. Also see Chapter 4, 5, 6 of Stormwater Notebook for requirements based on project size.

2.5.2- Minimum Requirement #2 Construction Stormwater Pollution Prevention (SWPP).

Applies with the following revisions:

Refer to Chapter 10 of this document for seasonal restrictions.

For Element 2, street washing is not permitted, even after shoveling or sweeping.

If material is being deposited on off-site streets, the following alternatives shall be considered:

- Better sweepers (vacuum type) and repeated or continuous sweeping.
- Wheel wash (or an improved wheel wash if one already exists).
- Special site procedures and provisions (such as transferring haul-outs to trucks that travel only on paved and maintained surfaces in the site).
- Suspension of work until dry weather.

For Element 4, note that Redmond's standard for turbidity for runoff leaving a site is 50 NTU.

If this standard is not being met, additional BMPs (including site-specific designs) shall be applied. If additional BMPs are not applied or are not successful, work may be suspended until a new plan for TESC is formulated and approved by the City.

For Element 7, the Contractor shall be responsible for removing inlet protection at the end of the project in a manner that does not release captured sediment into the storm system.

For Element 8, temporary conveyance channels shall be stabilized for the 10-year, 24-hour frequency storm under developed tributary area conditions.

For Element 12, note that Redmond requires special TESC planning for work in the Rainy Season (October 1 through April 30). See Chapter 10 of the Stormwater Notebook.

2.5.3-Minimum Requirement #3 Source Control of Pollution

Applies.

2.5.4-Minimum Requirement #4 Preservation of Natural Drainage Systems and Outfalls

Applies with the following revisions:

Use of dispersal systems is limited. In all cases stormwater runoff shall be conveyed to an acceptable discharge point unless the Stormwater Engineer specifically approves an alternative.

Item C of the supplemental guidelines is modified in Redmond as follows:

Off-site conveyance system is permitted only if the downslope owner(s) grant easements for construction and operation.

If easements are not provided, runoff management shall conform to drainage law and shall, at a minimum, include provisions for detention and water quality and dispersion prior to leaving the development site.

2.5.5-Minimum Requirement #5 On-site Stormwater Management

Applies with the following revision:

On-site dispersal shall only be allowed on rural lots (5-acre minimum). Dispersal systems shall be a minimum of 100' up-gradient of the property line.

2.5.6-Minimum Requirement #6 Runoff Treatment

Stormwater treatment facilities shall be selected in accordance with the process identified in Chapter 4 of Volume I, as modified below.

2.5.7-Minimum Requirement #7 Flow Control

Applies with the following revisions:

Predeveloped conditions in Redmond shall be modeled as pervious Forest or Pasture, regardless of the basin conditions in the last 20 years. In general, the valley floor was historically pasture or wooded wetland. Historical wooded wetlands should be modeled as pasture. The remainder of Redmond was forested. The map in Appendix N identifies the historical land cover based on the City's research.

Depending on the project site's location within Redmond, there are several alternatives that may apply for flow control. Maps of the City showing watersheds, the stormwater system, and Wellhead Protection Zones are available at: <http://www.redmond.gov/cityservices/citymaps.asp>). Some alternatives may not apply due to specific site constraints such as onsite soil conditions. Some alternatives may be made possible if the project obtains permits for and completes offsite improvements with approval from the Stormwater Engineer (i.e. increase size of existing conveyance system downstream). Flow control alternatives are summarized below:

On-Site Detention Alternative (May be used City-wide)

Stormwater discharges shall match developed discharge **durations** to pre-developed durations for the range of pre-developed discharge rates from **50% of the 2-year peak flow up to the full 50-year peak flow**. (This is Ecology's standard requirement.)

Modified On-Site Detention Alternative (Applies only in Wellhead Protection Zones 1, 2, and 3)

Stormwater discharges shall match developed discharge **durations** to pre-developed durations for the range of pre-developed discharge rates from **50% of the 2-year peak flow up to the full 50-year peak flow**. As a protective measure for the City's shallow groundwater aquifer, on-site detention in Wellhead Protection Zones 1, 2, and 3 shall be designed using the assumption that outwash soils are till. (In effect, the applicant shall assume the groundwater is too high to accommodate infiltration, so Ecology's alternative of modeling as till shall be used.)

Infiltration with Enhanced Treatment Alternative (Applies only in Wellhead Protection Zone 3)

Stormwater draining from pollution generating impervious surfaces may discharge to an infiltration system, in Wellhead Protection Zone 3, with enhanced treatment prior to infiltration. Infiltration of water draining from pollution generating impervious surfaces is not permitted in Wellhead Protection Zones 1 or 2.

Infiltration Alternative (Applies only in Wellhead Protection Zone 4)

Stormwater discharge to an infiltration system is acceptable and encouraged, in Wellhead Protection Zone 4, if appropriate soil conditions exist. Provide treatment in accordance with the Ecology manual. Infiltration of water draining from pollution generating impervious surfaces is not permitted in Wellhead Protection Zones 1 or 2. Infiltration of water draining from pollution generating impervious surfaces is permitted following enhanced treatment in Wellhead Protection Zone 3.

Direct Discharge Alternative (Applies to Sites Draining to Lake Sammamish or the Sammamish River)

Systems directly discharging to the Sammamish River or Lake Sammamish can be exempted from detention by the Stormwater Engineer provided the project proposal includes analysis showing that the existing or proposed conveyance system meets all the requirements for direct discharge in the Ecology Manual and: a) the system conveys the **50-year frequency peak event** for the entire basin without surcharging catch basins above the catch basin rim; and b) the 50-year frequency event does not flood proposed buildings or any existing on-site or off-site buildings. The analysis shall consider full build-out conditions, based on current zoning using the direct discharge option for flow control for those parcels that drain to the conveyance system. The analysis shall consider both conveyance impacts to the system downgradient of the proposed project and also the project's backwater impact to upstream and lateral flood stages in the conveyance system.

Modified Detention Alternative for Direct Discharge (Applies to Sites Draining to Lake Sammamish or the Sammamish River)

Systems that directly discharge to the Sammamish River or Lake Sammamish without passing through a stream or wetland do not require the standard measure of detention protection. In these cases, the conveyance system should be designed to convey the 10-year peak flow. An analysis shall be performed to determine the capacity of the existing or proposed direct discharge system. The analysis shall consider full build-out conditions based on current zoning using the modified detention alternative for direct discharge option for flow control for those parcels that drain to the conveyance system. The analysis shall consider both conveyance impacts to the system downgradient of the proposed project and also the project's backwater impact to upstream and lateral flood stages in the conveyance system. If that system is adequate to convey the 10-year peak flow, within freeboard requirements noted in Chapter 8, then the project site shall include a detention facility sized to release the **50-year developed peak flow at the 10-year developed peak flow** rate. Analysis shall verify that relaxing the detention requirement in this way will not cause downstream flooding or damage to the conveyance system. The conveyance system must also meet all the requirements in the Ecology manual for direct discharge.

Contribution in Lieu of Flow Control (Applies City-wide Under Certain Conditions)

With approval from the Stormwater Engineer, projects may be required or allowed to provide a contribution toward the cost of a regional detention or conveyance system in certain circumstances, as a means toward partially or fully satisfying flow control requirements. That alternative is discussed in Chapter 8.

2.5.8-Minimum Requirement #8 Wetlands Protection

Used for reference only. Wetland protection is also addressed in the Redmond Community Development Guide.

2.5.9-Minimum Requirement #9 Basin/Watershed Planning

Applies. The City has a Regional Facilities Program that works to identify appropriate regional facilities for conveyance, flow control, and water quality. Contribution to construction of these regional facilities, in lieu of on-site construction of smaller, less-coordinated facilities is required or allowed in some cases. This program is discussed in Chapter 8 of the Stormwater Notebook.

2.5.10-Minimum Requirement #10 Operation and Maintenance

Applies with the following revision:

An operations and maintenance manual shall be prepared for all detention or water quality facilities for review by the Stormwater Engineer as part of the development proposal, and shall be revised following construction for approval. The development proposal shall include provisions for maintenance of facilities in perpetuity.

At a minimum, the operations and maintenance manual shall include:

- the purpose of the facility;
- the dimensions and other characteristics of the facility (site map);
- the party (parties) responsible for maintenance of the facility, with phone numbers and addresses;
- list of any proprietary components along with information from the vendor describing maintenance schedule and costs;
- what maintenance activities are required, and proposed schedule;
- care and maintenance of any powered devices (aeration);
- inspection procedures and how the maintenance schedule will be modified if inspections determine the facility is not operating properly;
- the minimum requirements for this type of facility as described in Chapter 4 of Volume V of the Ecology Manual as modified in this notebook;

- the minimum requirements for low impact development facilities as described in the following documents:
 - Appendix F of Volume III of the Ecology Manual;
 - the Low Impact Development Technical Guidance Manual for Puget Sound, published by the Puget Sound Action Team, May, 2005 or current edition,
 - Maintenance of Low Impact Development Facilities (Appendix P)
- The final O&M manual shall incorporate any comments made during the development review process, and shall incorporate any field changes made to the facilities during construction.

The review procedure for O&M Manuals shall be as follows:

- For Public Facilities (that will be maintained by the City): A copy of the draft operations and maintenance manual shall be provided to the Stormwater Maintenance Supervisor for Public Works for review at 90% design or earlier. Design of public facilities may be subject to revision through the review process to ensure that the facilities make adequate provisions for maintenance, including easements and physical access requirements. The final O&M manual shall be submitted for review and approval prior to acceptance of the completed construction project. The final approved O&M manual shall be submitted with one hard copy and one electronic copy on CD.
- For Private Facilities (that will be privately maintained): A copy of the draft operations and maintenance manual shall be provided to the Private System Inspection Program Lead for Public Works during the development review process. The developer shall also submit to the Stormwater Engineer for approval, a proposal indicating the method by which ongoing maintenance will be ensured. For developments that include multiple lots, the party (or parties) responsible for maintenance shall be identified (i.e. homeowners association). Notes shall be added to the property title or plat indicating this maintenance requirement. The final O&M manual shall be submitted for review and approval prior to acceptance of the development. The final approved O&M manual shall be submitted with one hard copy and one electronic copy on CD.

2.6.1 Optional Guidance #1 (Financial Liability)

Regarding financial guarantees, Redmond requires a performance bond to cover the cost of all proposed improvements. These bonds are typically released as improvements are completed and have satisfactorily met all inspection requirements of the City. Performance bonds remain in full force and effect until: 1) the obligations secured are fully performed as determined by the City's inspection program; 2) a bond guaranteeing maintenance and operation of all improvements for a guarantee period have been submitted to the City; and 3) the City has released the bonds in writing.

A maintenance bond will be required to guarantee maintenance and operation of the improvements for a period of one year. This guarantee period may be extended to two years for projects that use low impact development or other innovative technologies.

2.6.2- Optional Guidance #2: Off Site Analysis and Mitigation

The Stormwater Engineer may require additional off-site analysis and mitigation based on the results of the ¼ mile downstream analysis (if required).

2.7- Adjustments

Applies. Applicant shall submit a letter to the Stormwater Engineer to request any adjustments. Additional review or requirements may apply.

2.8- Exceptions/Variances

Applies. Applicant shall submit a letter to the Stormwater Engineer to request any exceptions or variances. Additional review or requirements may apply.

2.3.1.3 Chapter 3: Preparation of Stormwater Site Plans

3.1- Stormwater Site Plans: Step-By-Step

Applies.

3.1.3- Step 3 – Perform an Offsite Analysis

The one-quarter mile distance off-site analysis shall be provided for Medium or Large projects (See Chapter 3 of the Stormwater Notebook) unless specifically waived for a project, by the Stormwater Engineer.

3.1.5- Step 5 – Prepare a Permanent Stormwater Control Plan

In addition to the requirements of this section, the report covering the Permanent Stormwater Control Plan (Drainage Report) shall be submitted in electronic format. Submit a CD to the engineer that includes a PDF of the completed report with all electronic modeling and calculations included in their native format.

The drainage report shall be prepared with the following outline:

Drainage Report

- A. Cover Page: Project name; project address; name of developer or owner; name, address, and phone number of engineer of record; engineer's stamp; date of report

- B. Project Overview:
 - o General description of project vicinity
 - o Describe existing site hydrology
 - o Description of proposed project
 - o Description of nearby receiving waters
 - o Site Vicinity Map showing site, nearby roads, and receiving waters
- C. Minimum Requirements
 - o Determine project size: Small, Medium, Large
 - o Determine which Minimum Requirements Apply
 - o Describe how each applicable requirement is being met
- D. Offsite Analysis (See Section 2.6.2 of Ecology Manual Volume I.)
 - o Describe study area
 - o Upstream Analysis
 - o Downstream Analysis
 - o Summarize existing problems downstream
 - o Summarize how project will avoid exacerbating or correct existing downstream problems
 - o If downstream problems can be solved through offsite improvements, those offsite improvements must be sized for full buildout conditions under current zoning.
- E. Conveyance Design
 - o Pipe sizing
 - o Area draining to each structure
 - o HGL calculations for all conveyance
- F. Flow Control Design
 - o Existing hydrology
 - o Proposed hydrology
 - o Soil Types
 - o Summarize existing and proposed land use/condition
 - o Describe modeling inputs
 - o Model results
 - o Describe design criteria for flow control facilities
 - o Summarize dimensions of flow control facilities: volumes, lengths, widths, depths, orifice sizes, bottom elevation, overflow elevations, etc.
- G. Water Quality Design
 - o Summarize new proposed PGIS and PGPS
 - o Summarize treatment level required (basic, enhanced, oil control, phosphorous)
 - o Describe contaminants of concern
 - o Describe proposed source control measures if applicable
 - o Model results
 - o Describe design criteria for water quality facilities
 - o Summarize dimensions of water quality facilities: volumes, lengths, widths, depths, orifice sizes, bottom elevation, overflow elevations, vegetation types, etc.

- If site is in Wellhead Protection Zones 1, 2, or 3, describe how proposed facilities will protect groundwater. Describe measures to be taken during construction to protect groundwater.
- H. Construction cost estimates for stormwater facilities, if required by the Stormwater Engineer.
- I. Draft Operations & Maintenance Manual. As described in Paragraph 2.3.1.2 of the Stormwater Notebook.
- J. If low impact development BMPs are proposed, then submit a site assessment in accordance with Paragraph 8.27 of the Stormwater Notebook.

3.1.6- Step 6 – Prepare a Construction Stormwater Pollution Prevention Plan

Applies. Additional requirements are in Chapter 9 and 10 of the Stormwater Notebook.

2.3.1.4 Chapter 4: BMP and Facility Selection Process for Permanent Stormwater Control Plans

4.2 BMP and Facility Selection Process

Applies. Note that the City of Redmond has preferences for certain types of stormwater treatment over others. These preferences are based primarily on long term performance and maintenance cost. Actual selection of facilities must necessarily address site-specific constraints. However, these preferences are provided to help the designer in cases where more than one alternative exists to meet the same needs. Stormwater fees may reflect these preferences (i.e. lower maintenance-intensive facilities may receive credits toward capital facilities charges. Stormwater fees are found in the Redmond Municipal Code 13.20 and 15.24 and Appendix E.) Capital improvement projects, or projects not subject to stormwater fees shall involve the Stormwater Engineer early in the design process to ensure selection of stormwater treatment facilities that best meet the long term goals of the City.

The Stormwater Engineer may direct substitution of an alternative treatment method based on these preferences. Table 4.4R, below, describes some of the City's preferences for basic, enhanced, phosphorous, and oil treatment. Treatment methods are designated in the table as follows:

- **Preferred.** These treatment methods are preferred by the City. Stormwater fees reflect this preference.
- **Accepted.** These treatment methods are acceptable to the City.
- **Conditional.** These treatment methods may be allowed based on site specific information, with approval from the Stormwater Engineer.
- **N/A.** These treatment methods are not accepted by the City.

Table 4.4R: Treatment Facility Options in Redmond

Facility Option	Basic	Enhanced	Phosphorous	Oil
Biofiltration Swale	Preferred	N/A	N/A	N/A
Wetpond	Preferred	N/A	N/A	N/A
Infiltration Treatment (Wellhead Protection Zone 4)	Preferred	N/A	N/A	N/A
Bio-infiltration Swale (WPZ 4)	Preferred	N/A	N/A	N/A
Stormwater Treatment Wetland	Preferred	Preferred	N/A	N/A
Large Wet Pond	Preferred	Preferred	Preferred	N/A
Stormwater Treatment Wetland / Sand Filter	Preferred	Preferred	Preferred	N/A
Stormwater Treatment Wetland / Sand Filter Vault	Preferred	Accepted	Accepted	N/A
Bioretention or Rain Garden (WPZ 4)	Preferred	Accepted	N/A	N/A
Phosphorous Control Credit	N/A	N/A	Preferred	N/A
Infiltration Treatment with Basic Treatment (WPZ 4)	Accepted	Accepted	Accepted	N/A
Infiltration Treatment with Enhanced Trtmnt (WPZ 3,4)	Accepted	Accepted	Accepted	N/A
Infiltration Treatment with Phosphorous Trtmnt (WPZ 4)	Accepted	Accepted	Accepted	N/A
Media Filter Vault (Iron Media)	Accepted	Conditional	Accepted	N/A
Large Sand Filter	Accepted	Accepted	Accepted	N/A
Amended Sand Filter	Accepted	Accepted	Accepted	N/A
Biofiltration Swale / Sand Filter	Accepted	Accepted	Accepted	N/A
Biofiltration Swale / Sand Filter Vault	Accepted	Accepted	Accepted	N/A
Filter Strip / Linear Sand Filter	Accepted	Accepted	Accepted	N/A
Linear Sand Filter / Filter Strip	Accepted	Accepted	Accepted	N/A
Wet Pond / Sand Filter	Accepted	Accepted	Accepted	N/A
Wet Pond / Sand Filter Vault	Accepted	Accepted	Accepted	N/A
Wet Vault / Sand Filter	Accepted	Accepted	Accepted	N/A
Wet Vault / Sand Filter Vault	Accepted	Accepted	Accepted	N/A
Ecology Embankment	Accepted	Accepted	N/A	N/A
Compost Amended Filter Strip	Accepted	Accepted	N/A	N/A
Biofiltration Swale / Media Filter Vault	Accepted	Accepted	N/A	N/A
Wet Pond / Media Filter Vault	Accepted	Accepted	N/A	N/A
Wet Vault / Media Filter Vault	Accepted	Accepted	N/A	N/A
Sand Filter / Media Filter Vault	Accepted	Accepted	N/A	N/A
Sand Filter Vault / Media Filter Vault	Accepted	Accepted	N/A	N/A
Media Filter Vault (Zeolite/Perlite/Granular Act. Carbon)	Accepted	N/A	N/A	N/A
Sand Filter	Accepted	N/A	N/A	N/A
Filter Strip	Accepted	N/A	N/A	N/A
Wetvault	Accepted	N/A	N/A	N/A
API OWS	N/A	N/A	N/A	Preferred
CP OWS	N/A	N/A	N/A	Accepted
CB Insert	N/A	N/A	N/A	Accepted
Linear Sand Filter	N/A	N/A	N/A	Accepted
Contribution in lieu of Treatment	Conditional	Conditional	Conditional	N/A
Alternative Technologies	Conditional	Conditional	Conditional	Conditional

Step IV: Step 1: Determine whether you can infiltrate

Infiltration of clean water (water draining from non-pollution generating surfaces) is encouraged throughout Redmond. Infiltration of water draining from pollution generating impervious surfaces in Wellhead Protection Zones 1 or 2 (map available at: <http://www.redmond.gov/cityservices/citymaps.asp>) is not permitted. Infiltration of water draining from pollution generating impervious surfaces in Wellhead Protection Zone 3 is permitted following enhanced treatment.

Step V: Step 1: Determine the Receiving Waters and Pollutants of Concern Based on Off-Site Analysis.

The City may adopt a basin plan for any watershed in the City that may place additional stormwater requirements. Contact the Stormwater Engineer to determine if any basin plans apply to your project site.

Step V: Step 2: Determine if an Oil Control Facility/Device is Required.

Traffic counts in Redmond are available for some roadways at: <http://www.redmond.gov/insidecityhall/publicworks/transportation/trafficcounts.asp>. Follow guidance in the Ecology Manual if traffic counts are not available from Redmond for the project site.

Step V: Step 3: Determine if Infiltration for Pollutant Removal is Practicable.

Infiltration for pollutant removal of water draining from pollution generating surfaces in Wellhead Protection Zones 1, 2, or 3 (map available at: <http://www.redmond.gov/cityservices/citymaps.asp>) is not permitted. Infiltration for pollutant removal is permitted in Wellhead Protection Zone 4, provided all requirements in the Ecology Manual are met. Use of infiltration for water quality treatment is also subject to the requirements of the Washington State Department of Ecology's Underground Injection Control program. See Table 3.11R in Section 2.3.3.3 of the Stormwater Notebook.

Step V: Step 4: Determine if Control of Phosphorous is Required.

Phosphorus control treatment is required for "Large Project" sites that drain to Lake Sammamish. The City's watershed map delineates the boundaries between watersheds, and is available on the City's website at: <http://www.redmond.gov/cityservices/citymaps.asp>. See Volume V, Chapter 3, Section 3.3.

Step V: Step 5: Determine if Enhanced Treatment is Required.

Traffic counts in Redmond are available for some roadways at: <http://www.redmond.gov/insidecityhall/publicworks/transportation/trafficcounts.asp>. Follow guidance in the Ecology Manual if traffic counts are not available from Redmond for the project site.

Step V: Step 6: Determine if Fee in Lieu is Required.

Following review of the step by step process for selecting BMPs and review of Table 4.4R, determine if the project will be required or have the option to pay a fee in lieu of construction of the selected onsite BMPs. See paragraph 8.8 of the Stormwater Notebook.

2.3.1.5 Appendix 1-C:

Phosphorus control is required for sites draining to Lake Sammamish. See Step V, Step 4, above.

2.3.1.6 Appendix I-E: Flow Control-Exempt Surface Waters

Applies with the following revision:

The Sammamish River in Redmond is included on the exempt surface waters list.

2.3.1.7 Glossary and Notations

City Definitions shall be used where applicable. The following definitions are different.

New Development:

A project proposed on vacant land or a project that is a modification or expansion to any existing improvements where the value of the proposed modification is of equal or greater value than the existing improvements. If a project is considered a new development the entire site shall be brought into compliance with the current code. (Ord. 1877 (145))

Predeveloped Condition:

Predeveloped conditions in Redmond shall be modeled as pervious Forest or Pasture, regardless of the basin conditions in the last 20 years. In general, the valley floor was historically pasture or wooded wetland. Historic wooded wetlands should be modeled as pasture. The remainder of Redmond was forested. The map in Appendix N identifies the historical information based on the City's research.

Redevelopment:

The expansion or modification that is of lesser value than the existing improvements. If a project is considered a re-development only the proposed improvements and an equal percentage of the existing improvements shall be brought into compliance with the current code. (Ord. 1877 (160))

Stormwater Engineer:

The Stormwater Engineer is the reviewing authority who reports to the Public Works Director and represents the City for projects that involve stormwater management. Private projects are reviewed by a Stormwater Engineer in the Development Services Division of the City's Public Works Department. Public Capital Improvement Projects are reviewed by a Stormwater Engineer within the Natural Resources Division of the Public Works Department.

2.3.2 Volume II: Construction Stormwater Pollution Prevention

2.3.2.1 Chapter 1: Introduction to Constr. Stormwater Pollution Prevention

Applies

2.3.2.2 Chapter 2: Regulatory Requirements

Applies with the following additions:

Additional local requirements can be found in:

- Wellhead Protection Zones (especially Zones 1, 2, and 3) (RCDG 20D.140.50)
- Critical Areas Regulations (RCDG 20D.140)
- Construction Stormwater Pollution Prevention (Chapter 9 of the Stormwater Notebook)
- Rainy-Season construction guidelines (Chapter 10 of the Stormwater Notebook)
- State regulations provide that turbidity in receiving waters shall not be increased over 5 NTU above existing levels due to runoff from a construction site. In addition to that regulation, Contractor shall take all necessary TESC measures to ensure that runoff from a site does not exceed 50 NTU (during construction). All or parts of a project shall be required by City Inspectors to be shut down until a satisfactory plan is developed and implemented with additional TESC measures as needed to meet these requirements. If the violations occur in the Rainy Season (October 1 through April 30) suspension of work until after April 30 may be required.

2.3.2.3 Chapter 3: Planning

3.1-General Guidelines

Stormwater pollution prevention plans are not required for Small Projects as defined in Chapter 3 of the Stormwater Notebook.

3.2.3- Step 3 - Construction SWPPP Development and Implementation

Element #4- BMP C230: Straw bale barrier and BMP C231: brush barrier are not allowed in Redmond.

Element #12- Refer to Chapter 10 of this document for seasonal restrictions/exemptions.

3.3.2-Drawings

Narrative section of Construction SWPPP Checklist applies. Refer to City Standard Notes (Appendix L) and City Plan Review Checklist (Appendix F) for SWPPP drawing requirements.

2.3.2.4 Chapter 4: Standards and Specs for Best Management Practices

4.1-Source Control BMPs

BMP C101: Preserving Natural Vegetation. No disturbance is allowed within 5 feet of drip lines of trees to be saved unless specifically approved by the Project Planner.

BMP C103- High visibility plastic or metal fence. Refer to Redmond Standard Specifications and Details.

BMP C104- Stake and wire fence. Not approved in Redmond.

BMP C105- Stabilized construction entrance. Refer to Redmond Standard Specifications and Details.

BMP C106- Wheel wash. Refer to Redmond Standard Specifications and Details.

BMP C121- Compost mulch may only be used on proposed landscape areas. It is not approved as a general TESC mulch in Redmond.

BMP C140- Chemical dust suppressants are not approved for use in Redmond.

BMP C202- Rubble concrete channel lining is not approved in Redmond.

BMP C204- Pipe slope drain. Note that this is “temporary” only.

BMP C205- The minimum subsurface drain size shall be 6” diameter.

BMP C220- Catch basin filters are required in Redmond for storm drain inlet control. Provisions shall be made to remove filters at the end of the project without dropping accumulated sediment into the catch basin.

BMP C230- Straw Bales. Not approved in Redmond.

BMP C231- Brush Barrier. Not approved in Redmond.

BMP C233- Silt fence. Refer to Redmond Standard Specifications and Details.

BMP C234- Vegetated strips shall have a minimum length of 200 feet.

BMP C240- Sediment trap shall be sized using the 10-year design storm.

BMP C241- Temporary sediment pond shall be sized using the 10-year design storm. Side slopes shall be 3:1 or flatter (interior and exterior).

BMP C250- Construction stormwater chemical treatment and other non-standard treatment systems must be approved by the City. Sizing shall be for the 100-year 7-day storm volume unless otherwise approved by the Stormwater Engineer.

Appendix II-A- Use Redmond Standard Notes (See Appendix L of the Stormwater Notebook).

2.3.3 Volume III: Hydrologic Analysis and Flow Control BMPs

2.3.3.1 Chapter 1: Introduction

1.2- Content and Organization of this Volume

The 2005 Ecology Manual notes that conveyance system design is not addressed in that manual. See Chapter 8 of the Stormwater Notebook.

2.3.3.2 Chapter 2: Hydrologic Analysis

2.1- Minimum Computational Standards

Applies.

2.2- Western Washington Hydrology Model

For basins over 320 acres in size HSPF shall be used.

For commercial sites use actual proposed impervious area for the developed condition. For single-family developments use 80% of the maximum impervious area allowed by the zoning code. Detention systems serving Planned Residential Developments (PRDs) shall be designed based on the allowed maximum impervious lot area. Do not apply the 80% to PRDs. For single family lots, 4,200 s.f. impervious area per lot may be used with approval from the Stormwater Engineer.

Credits for infiltration of roof runoff or use of porous pavement require demonstration that stormwater is "clean" (draining from non-pollution generating surface) and that it will infiltrate without causing a flooding problem nearby.

2.3.3.3 Chapter 3: Flow Control Design

3.1-Roof Downspout Controls:

Applies only to single family detached homes (with or without an attached or detached Accessory Dwelling Unit).

Section 3.1.3 applies to single family detached homes with modifications as follows:

- The setback from any structure, property line, or steep slope (over 40%) shall be 50 feet minimum.
- The perforated pipe shall not be located where percolating water will encounter and be intercepted by another nearby (within 25 feet) utility trench or foundation drain.

Figure 3.1-Flow Diagram Showing Selection of Roof Downspout Controls

Does not apply. Use Figure 3.1R, below, instead.

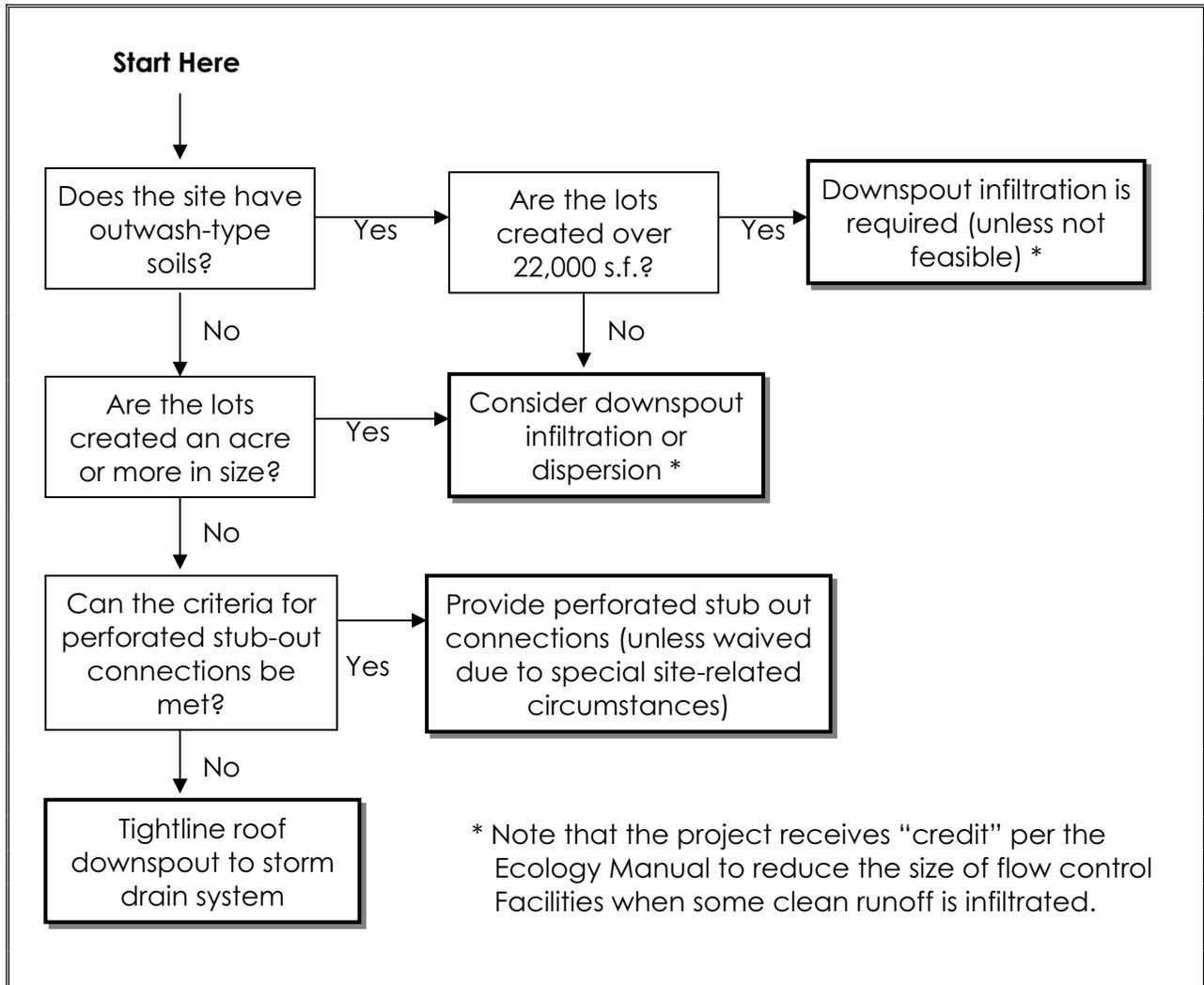


Figure 3.1R Diagram for Selection of Roof Downspout Controls in Redmond (Single Family Homes Only)

Figure 3.2-Typical Downspout Infiltration Trench

6" minimum diameter pipe required. Flexible single wall pipe is not approved in Redmond.

Figure 3.4-Typical Downspout Infiltration Drywell

6" minimum diameter pipe required.

3.2.1-Detention Ponds

Proposed slopes shall be 3:1 or flatter. Up to 25% of the pond perimeter may have vertical walls. Anything greater will require approval of the Stormwater Engineer.

Modular grid pavement is only allowed if specifically approved by the Stormwater Engineer.

Ponds shall be setback a minimum of 10 feet from structures, property lines or required vegetated buffers, and 50 feet from the limits of steep slope areas. The setback from steep slopes may be reduced per Section 20D.140.10-120 of the Redmond Community Development Guide. Conveyance pipes in steep slope areas shall be installed on the surface of the slope, with the minimum disturbance possible, and shall require applicable City approvals.

Minimum setback required for trees is 8 feet in Redmond. Trees shall be setback one (1) vertical foot above the maximum storage elevation to provide maintenance access and liner protection. Trees shall not be planted over any pond liner.

A fire hydrant shall be located within 100 feet of the control structure for maintenance.

Detention ponds in infiltrative soils shall be lined, unless otherwise approved as combination infiltration facilities. Lining may consist of an impermeable till layer 18 inches or thicker, bentonite or synthetic liners approved by the Stormwater Engineer. When a geomembrane is used, provide an analysis demonstrating that the required cover soil will be stable against sliding when saturated. Impervious bottoms and sides shall extend up to the stage of the 50-year event.

Combination infiltration / detention ponds may be approved by the Stormwater Engineer, subject to the restrictions on infiltration in wellhead protection zones noted in Table 3.11R below.

Pond control structures shall be accessible by a Vactor truck. A backhoe must be able to access each pond for maintenance. The detention pond emergency overflow route must be independent from the primary outflow system.

Signs shall be posted at all stormwater ponds using the standard sign format described in Appendix M. There are several alternative sign formats, and they shall be selected based on the following:

- Ponds greater than 5000 square feet in size shall receive the large (24 x 48) sign. Smaller ponds may have either the small (12 x 18) or the large sign.
- Public ponds shall receive the sign with the City of Redmond logo. Private pond signs shall not include the logo, but shall indicate they are privately owned and maintained.
- Ponds with liners shall receive the sign indicating the liner. Ponds that infiltrate shall have the sign indicating the infiltration.

Ponds shall be named by the project proponent. The pond name shall be unique to the City of Redmond. In general, the pond name shall be the same as the name of the subdivision in which the pond is located. Pond names are subject to approval by the Stormwater Engineer.

Figure 3.12- Example of Permanent Surface Water Control Pond Sign

See Appendix M of the Stormwater Notebook for City of Redmond standard sign.

3.2.2- Detention Tanks

Corrugated metal detention tanks are not approved in Redmond.

Corrugated metal pipe (CMP) risers are not approved in Redmond.

Tanks shall be setback a minimum of 10 feet from structures, property lines, required vegetated buffers, and 25 feet from the limits of steep slopes. The setback from steep slope may be reduced per Section 20D.140.10-120 of the Redmond Community Development Guide. For limitations on tree planting, see tree separation information for pipes in Chapter 8.

Add the following note to drawings that include detention tanks: "Pressure tests may be required by the City Inspector. Tanks that do not pass pressure tests shall be repaired or replaced." Avoiding leakage is particularly critical in Wellhead Protection Zones 1, 2, and 3.

Maintenance must be feasible and designs should strive to facilitate maintenance (design adjustments to facilitate maintenance may be required during plan review).

3.2.3- Detention Vaults

Vaults shall be setback a minimum of 10 feet from structures, property lines, required vegetated buffers, and 25 feet from the limits of steep slopes. The Stormwater Engineer may approve integrated vaults constructed as part of a

building structure. The setback from steep slopes may be reduced per Section 20D.140.10-120 of the Redmond Community Development Guide.

Vault setbacks from property lines or right-of-way limits must be a minimum of 10 feet, or the distance required to excavate a 1:1 slope from the bottom of the vault to the ground surface at the right-of-way or property line – whichever is greater. Trees may be as close as 2 feet from concrete vaults provided the trees do not interfere with access for maintenance. Specify shallow rooted trees by species on the project landscape plans for locations closer than 8 feet to vaults.

Maintenance must be feasible and designs should strive to facilitate maintenance (design adjustments to facilitate maintenance may be required during plan review).

Figure 3.17-Flow Restrictor (TEE)

Refer to City Standard Detail in “City of Redmond Standard Specifications and Details”

Figure 3.18-Flow Restrictor (Baffle)

Refer to City Standard Detail in “City of Redmond Standard Specifications and Details”

Figure 3.19-Flow Restrictor (Weir)

Refer to City Standard Detail in “City of Redmond Standard Specifications and Details”

3.2.5- Other Detention Options

Parking lot ponding is only allowed for the 50-year storm event or greater. A maximum ponding depth of 6 inches is allowed. The 50-year event may not impact any buildings or other structures. Provisions to bypass offsite flows shall be included in design of parking lot detention.

Roof detention is not allowed in Redmond at this time.

3.3- Infiltration Facilities for Flow Control and for Treatment

Protection of the drinking water resource is a very high priority in Redmond. Therefore, infiltration of stormwater, even with treatment, is limited within Wellhead Protection Zones (map available at: <http://www.redmond.gov/cityservices/citymaps.asp>). Table 3.11R summarizes available options for infiltration.

Table 3.11R: Infiltration Options by Wellhead Protection Zone				
Facility Type	WPZ 1	WPZ 2	WPZ 3	WPZ 4
Infiltration for flow control per Ecology Manual	No	No	No	Yes
Infiltration as treatment per Ecology Manual	No	No	No	Yes
Infiltration for flow control following enhanced treatment	No	No	Yes	Yes
Infiltration of flow from non-pollution generating surfaces (roofs, sidewalks, etc.) for flow control	Yes	Yes	Yes	Yes

Infiltration of water draining from pollution generating impervious surfaces is not permitted in Wellhead Protection Zones 1 or 2. Infiltration of water draining from pollution generating impervious surfaces for flow control is permitted in Wellhead Protection Zone 3, following enhanced treatment. Infiltration for flow control or treatment is permitted in Wellhead Protection Zone 4. Also, throughout Redmond, infiltration is permitted without basic or enhanced treatment of stormwater from non-pollution generating surfaces like roofs or sidewalks, provided that measures (such as pretreatment, control valves and appropriate signage at inlets) are in place to prevent contamination of that water or clogging of the infiltration facility.

Stormwater infiltration systems that include perforated pipe or drywells are also subject to Washington State Department of Ecology's Underground Injection Control Program. All such infiltration systems shall meet the groundwater protection requirements of Ecology's document, "Draft Guidance for UIC Wells that Manage Stormwater, February 2006", or the current revision.

3.3.5- Site Characterization Criteria

The soil infiltration rate may be determined by a falling head test conducted by a qualified engineer using commonly accepted methods. Infiltration locations will be considered unacceptable if the design infiltration rate is less than 1.0 inches/hour. In no case shall the design infiltration rate be more than 20.0 inches/hour.

Notify the City of Redmond's Wellhead Protection Program prior to installing groundwater monitoring wells. The City may consider allowing placement of such wells within public right-of-way if the City wishes to assume responsibility for the wells in the future. All wells shall either be required to be properly abandoned when they are no longer needed, or may be requested to be turned over to the City for ongoing monitoring by City staff.

3.3.6- Site Suitability Criteria (SSC)

At least 200 feet shall be provided for separation from public wells. Public wells are located within Wellhead Protection Zone 1. A map of wellhead protection zones is available at: <http://www.redmond.gov/cityservices/citymaps.asp>.

3.3.9-General Design, Maintenance, and Construction Criteria for Infiltration Facilities

Construction plans shall include a note to require field verification during construction of the facility, of soil conditions, and infiltration rates by an engineer with experience in stormwater management and licensed in the State of Washington. The engineer shall provide a written statement to the City of Redmond related to the field verification of the design parameters.

3.3.10- Infiltration Basins

Infiltration basins shall meet the same requirements for slopes, fences, signage, etc. as detention ponds.

3.3.11- Infiltration Trenches

Geotextile fabric or sand base required for infiltration trenches in Redmond. Maximum length shall be 100 feet.

2.3.3.4 Appendix IIIB: Western Washington Hydrology Model – Information, Assumptions, and Computation Steps

WWHM Information and Assumptions

5. Vegetation data

Predeveloped conditions shall be modeled as forested or pasture land cover. Forested land cover shall be used, except for the valley floors associated with the Sammamish River, Bear Creek, Evans Creek, and Lake Sammamish. For these valley floors, pre-developed condition is "pasture land cover." 100% of the site shall be assumed pervious. A map of historical land cover is available on the City's website at: <http://www.redmond.gov/cityservices/citymaps.asp>.

6. Development land use data.

For commercial sites use actual proposed impervious area for the developed condition. For single-family developments use 80% of the maximum impervious area allowed by the zoning code. For single family lots, 4,200 s.f. impervious area per lot may be used with approval from the Stormwater Engineer.

2.3.3.5 Appendix IIIC: Washington State Department of Ecology Low Impact Development Design and Flow Modeling Guidance

Note: Use of low impact development BMPs requires more thorough site assessment than traditional measures. See Paragraph 8.29 of the Stormwater Notebook.

7.1 Permeable Pavements

Use of permeable pavements is subject to approval by the Technical Committee. Use of permeable pavements as pollution generating impervious surface is not allowed. A maintenance plan is required. Use of modular pavements in fire lanes is discouraged and is subject to approval from the Technical Committee.

7.2 Dispersion

7.2.5 Dispersion in Urban Areas

As noted in paragraph 2.3.5.5 of this Stormwater Notebook, full site dispersion is only allowed in rural zoned lots of 5 acres or more. However, if native soils are preserved, or are amended with compost, they provide great benefits for reduction of stormwater runoff, even in till soils. Flow credits available for compost-amended soils are described in paragraph 2.3.5.5.

2.3.4 Volume IV: Source Control BMPs

2.3.4.1 Appendix IVG: Recommendations for Management of Street Wastes

Street Waste Liquids

Decant liquid shall be discharged to sanitary sewer or otherwise disposed. It shall not be discharged to the storm system, even if it passes through a stormwater treatment BMP.

2.3.5 Volume V: Runoff Treatment BMPs

2.3.5.1 Chapter 1: Introduction

Applies. See Table 4.4R in Section 2.3.1 of the Stormwater Notebook.

2.3.5.2 Chapter 2: Treatment Facility Selection Process

Applies. Note that the City of Redmond has preferences for certain types of stormwater treatment over others. These preferences are based primarily on long term performance and maintenance cost. Actual selection of facilities must necessarily address site-specific constraints. However, these preferences are provided to help the designer in cases where more than one alternative exists to meet the same needs. Stormwater fees may reflect these preferences (ie lower maintenance-intensive facilities may receive credits toward capital facilities charges. Stormwater fees are found in the Redmond Municipal Code 13.20, 15.24 and Appendix E.) Capital improvement projects, or projects not subject to stormwater fees shall involve the Stormwater Engineer early in the design process to ensure selection of stormwater treatment facilities that best meet the long term goals of the City. The Stormwater Engineer may direct substitution of an alternative treatment method based on these preferences. Table 4.4R, above, describes some of the City's preferences.

Step 1: Determine the Receiving Waters and Pollutants of Concern Based on Off-Site Analysis.

The City may adopt a basin plan for any watershed in the City that may place additional stormwater requirements. Contact the Stormwater Engineer to determine if any basin plans apply to your project site.

Step 2: Determine if an Oil Control Facility/Device is Required.

Traffic counts in Redmond are available for some roadways at: <http://www.redmond.gov/insidecityhall/publicworks/transportation/trafficcounts.asp>. Follow guidance in the Ecology Manual if traffic counts are not available from Redmond for the project site.

Step 3: Determine if Infiltration for Pollutant Removal is Practicable.

Infiltration for pollutant removal of water draining from pollution generating surfaces in Wellhead Protection Zones 1, 2, or 3 (map available at: <http://www.redmond.gov/cityservices/citymaps.asp>) is not permitted. Infiltration for pollutant removal is permitted in Wellhead Protection Zone 4, provided all requirements in the Ecology Manual are met. Use of infiltration for water quality treatment is also subject to the requirements of the Washington State Department of Ecology's Underground Injection Control program. See Table 3.11R in Section 2.3.3.3 of the Stormwater Notebook.

Step 4: Determine if Control of Phosphorous is Required.

Phosphorus control treatment is required for "Large Project" sites that drain to Lake Sammamish. The City's watershed map delineates the boundaries between watersheds, and is available on the City's website at: <http://www.redmond.gov/cityservices/citymaps.asp>. See Volume V, Chapter 3, Section 3.3.

Step 5: Determine if Enhanced Treatment is Required.

Traffic counts in Redmond are available for some roadways at: <http://www.redmond.gov/insidecityhall/publicworks/transportation/trafficcounts.asp>. Follow guidance in the Ecology Manual if traffic counts are not available from Redmond for the project site.

Step 6: Determine if Fee in Lieu is Required.

Following review of the step by step process for selecting BMPs and review of Table 4.4R, determine if the project will be required or have the option to pay a fee in lieu of construction of the selected onsite BMPs. See paragraph 8.8 of the Stormwater Notebook.

2.3.5.3 Chapter 3: Treatment Facility Menus

3.2-Oil Control Menu

Applies. However, the Stormwater Engineer may direct substitution of an alternative treatment method based on the preferences noted in Table 4.4R of Section 2.3.1 of the Stormwater Notebook.

3.3-Phosphorous Treatment Menu

Applies. However, the Stormwater Engineer may direct substitution of an alternative treatment method based on the preferences noted in Table 4.4R of Section 2.3.1 of the Stormwater Notebook.

Projects within the Lake Sammamish Basin that are Large Projects as defined in Chapter 3 of the Stormwater Notebook (subject to Minimum Requirement #6) are required to provide phosphorus controls.

In addition to the Treatment Methods listed in the 2005 Ecology Manual, phosphorous control may be provided by applying measures listed below such that a score of 10 points or more is achieved. Credit options for phosphorus reduction are as summarized in Table 3.3R and are described as follows:

1. **Leaving part of the site undisturbed, including undevelopable land.** Full credit, or 10 points, is awarded for leaving 65 percent of a site in undisturbed native vegetation or areas re-established in native vegetation. Critical Areas and their buffers may be counted. All areas for phosphorus credit must be in tracts dedicated to the City protected in accordance with the requirements set forth for general critical area protective measures in Chapter 20D.140.10-180 of the Community Development Guide. A descending scale of points applies where lower percentages of the site are left undisturbed. Possible credit = 1 to 10 points.

2. **Directing runoff from pollution-generating surfaces to grassy areas with level spreading.** Directing runoff from pollution-generating areas to grassy areas that are not fertilized (a notice shall be made on the plat and signage posted to this effect) or to areas of native vegetation (protected by critical area tract) results in pollutant removals similar to those obtained in swales while also providing an increased opportunity for infiltration. To use this option, flows must remain unconcentrated and be spread uniformly over the intended area. The vegetated area receiving dispersed flows should be at least 25 percent as large as the area contributing flow. The receiving area should be increased by one percent for each percent increase in slope over four percent. The area should be configured so that the length of the flow path is no longer than the width over which flows are dispersed.

Example:

Assume a parking lot is 100'x600', or 60,000 sf. Flows will be dispersed through an adjacent area of native vegetation with a slope of 8 percent.

The area of vegetation must be at least 17,400 sf (25% +4% (for steeper slope) x 60,000 sf). Assuming runoff is dispersed continuously along the wider edge of the parking lot, the flow path would need to be at least 29 feet ($17,400' \div 600'$). If the water were dispersed along the shorter edge, flow path would be 174 feet ($17,400' \div 100'$). However, this flow path would be longer than the width over which flows were dispersed (100'), and would not be a satisfactory option. The parking lot could be graded, however, so that flows would be dispersed at both of the 100-foot ends, making each flow path 87 feet, which would be acceptable.

Credit is proportional to the total volume of runoff diverted; one point is earned for every 25 percent of total volume so directed. Possible credit = 1 to 4 points

3. **Providing covered parking areas isolated from the stormwater conveyance system.** This item applies to all land uses for which covered parking for employees, residents, guests, and the general public is provided. This can be achieved for commercial land uses simply by covering the parking required by code. For other land uses, provision of additional covered parking for guests or the general public (total parking) in lieu of on-street parking can be used to provide this assurance. It is intended that covered parking would isolate the area from stormwater run-on as well as direct rainfall. A low curb, berm, or enclosing walls, in addition to a roof, would typically be needed. The water quality credit is proportional to the percentage of the total surface area that is effectively covered. One point is earned for every 25 percent of parking covered and protected from run-on. Possible credit = 1 to 4 points

4. **Providing covered vehicle washing areas connected to the sanitary sewer system.** This item applies to commercial, industrial, and multi-family sites. Frequent car-washing can contribute significant amounts of phosphorus to stormwater. Note that sewer districts may have pretreatment requirements before allowing connection to the sanitary sewer. Possible credit = 3 points

5. **Providing covered waste disposal and recycling areas isolated from the stormwater conveyance system.** One point is earned if all solid waste management areas are covered and protected from stormwater run-on. Possible credit = 1 point

Credit shall be applied to the whole site.

If the credit option is used, it should be applied for during initial drainage review by the City. The preliminary stormwater report should include a written request for credit based on either the site plan or the grading plan for the project. The request should outline how the point totals are to be achieved. Credit is not given unless requested. Use of the credit option does not release the project from the need for basic or enhanced treatment (as applicable).

Credit Option	Points
Leaving site undisturbed, in native vegetation. Buffers without trails may be counted.	At least 65 % = 10 60 % = 9 55 % = 8 50 % = 7 45 % = 6 40 % = 5 35 % = 4 30 % = 3 25 % = 2 20 % = 1
Directing road runoff to pervious, non-pollution-generating vegetated area.	100 % of volume = 4 75 % of volume = 3 50 % of volume = 2 25% of volume = 1
Covered parking protected from run-on	100 % of parking = 4 75 % of parking = 3 50 % of parking = 2 25% of parking = 1
Covered car wash area connected to sanitary sewer (multi-family)	3
Covered solid waste storage area	1

3.4-Enhanced Treatment Menu

Applies. However, the Stormwater Engineer may direct substitution of an alternative treatment method based on the preferences noted in Table 4.4R of Section 2.3.1 of the Stormwater Notebook.

3.5-Basic Treatment Menu

Applies. However, the Stormwater Engineer may direct substitution of an alternative treatment method based on the preferences noted in Table 4.4R of Section 2.3.1 of the Stormwater Notebook.

2.3.5.4 Chapter 4: General Requirements for Stormwater Facilities

4.3.2-Side Slopes and Embankments

Up to 25% of the pond perimeter may have vertical walls. Anything greater will require approval of the Stormwater Engineer. Provide fence along slopes greater than 3:1.

4.4.1-General Design Criteria

Liners are required for all water quality ponds and most detention ponds (impermeable fill layer, synthetic liner or bentonite).

4.4.3-Design Criteria for Low Permeability Liner Options

Concrete liners are not approved in Redmond.

4.5.3-Outfall Systems

Drop structures are not allowed unless specifically approved by the Stormwater Engineer.

Table 4.5-Maintenance Standards

No. 4 – Control Structure / Flow Restrictor

Under “General”, maintenance is required if Trash and Debris (Includes Sediment) material exceeds **20%** of sump depth or 1 foot below orifice plate.

Figure 4.8-Flow Dispersal Trench

6” minimum diameter perforated pipe required.

2.3.5.5 Chapter 5: On-Site Stormwater Management

BMP T5.10 Downspout Dispersion

Downspout dispersion shall only be used on sites that drain to native growth protection easements. Also, see additional requirements in paragraph 2.3.3.3.

BMP T5.13 Post-Construction Soil Quality and Depth

For landscaped areas and lawns, compost-amended soils are encouraged to be used. Compost-amended soils shall be installed in accordance with the requirements specified in “Guidelines for Landscaping with Compost-Amended Soils” in Appendix Q. If landscaped areas and lawns have slope lengths of at least 50 feet and are made up of contiguous areas with a minimum area of 500 square feet, then landscaped areas with compost-amended soils may be considered to be pasture when modeling with WWHM.

Compost-amended areas shall be marked to prevent vehicle traffic in those areas.

BMP T5.20 Preserving Natural Vegetation

Preserved areas shall be set aside as native growth protection easement and marked accordingly. No vehicle traffic shall be permitted in preserved areas. Full dispersion is only allowed on rural (5-acre minimum) lots.

BMP T5.30 Full Dispersion

Full dispersion credit is only allowed on rural (5-acre minimum) lots.

2.3.5.6 Chapter 6: Pretreatment

Applies

2.3.5.7 Chapter 7: Infiltration and Bio-infiltration Facilities

Applies. Note that infiltration for treatment is not allowed in Wellhead Protection Zones 1, 2, or 3.

2.3.5.8 Chapter 8: Sand Filtration Treatment Facilities

Applies

2.3.5.9 Chapter 9: Biofiltration Treatment Facilities

9.4-Best Management Practices

Swales shall be at least 200 feet long. Swale length may be reduced to 150 feet for re-development projects if no feasible alternative exists. Maximum swale bottom width shall be 8 feet (parallel swales are acceptable if needed to provide adequate treatment area). Biofiltration swales and similar water quality facilities shall be lined (e.g. geomembrane) in Wellhead Protection Zones 1, 2, and 3, and shall be lined in other areas unless constructed over at least one foot of compacted till (native or constructed).

If biofilters are not able to be located off-line, the swale shall be designed so the maximum flow possible in the swale up to the 50 year does not produce a velocity over 3 feet per second.

The size and shape of biofilters (and other surface features) shall be compatible with the terrain and not detract from the landscape value (the latter as determined by the Technical Committee).

At least one side of each biofilter shall be accessible for maintenance by a backhoe.

Plant no trees within 8 feet of biofiltration swale banks. Their resulting shade and leaves impact the dense vegetated cover required for biofiltration. In designing the landscaping for the area, and placement of the biofiltration swale, take into account the need for sunlight within the swale.

Table 9.1- Sizing Criteria

Underdrains are not required.

Figure 9.2-Biofiltration Swale Underdrain Detail

Underdrains are not required.

2.3.5.10 Chapter 10: Wet Pool Facility Designs

10.3-Best Management Practices (BMPs) for Wetpool Facilities

See requirements for Detention Ponds in Volume III.

Provide a 5-foot wide level bench around the perimeter of the pond at or up to 1 foot below the permanent water surface.

All water quality ponds shall be lined to prevent infiltration. Lining may consist of an impermeable fill layer 18 inches or thicker, bentonite or synthetic liners approved by the Stormwater Engineer. When a geomembrane is used, provide an analysis demonstrating that the required cover soil will be stable against sliding when saturated.

Gravity drains are not required for wet ponds or vaults. Access roads to the pond bottom are not required but are encouraged for wet ponds.

Wet ponds that are intended solely for water quality treatment shall have a high flow bypass to divert peak flows above the water quality design storm.

Wetponds shall be setback a minimum of 10 feet from structures, property lines, or required vegetated buffers, and 50 feet from the limits of steep slopes. The setback from steep slopes may be reduced per Section 20D.140.10-120 of the Redmond Community Development Guide.

A minimum, average depth of 3 feet is required for water quality treatment in vaults and tanks.

Storm pipes should discharge into wet ponds at/or above the normal control elevation (elevation of outlet pipe invert). Designs that include pipes discharging below the control elevation must include an analysis demonstrating that sediment will not accumulate within the pipe.

To avoid anaerobic conditions, wet ponds should not have permanent pool depths greater than 8 feet, unless aeration is provided. For publicly owned and maintained ponds, aeration requires approval from the Stormwater Engineer.

2.3.5.11 Chapter 11: Oil and Water Separator BMPs

11.7 Oil and Water Separator BMPs

API separators rise rate shall be 0.2187 foot/minute.

2.3.5.12 Chapter 12: Emerging Technologies

12.7- Use of Emerging Technologies in Redmond

The use of emerging technologies is not discouraged in Redmond, but will require more careful scrutiny, additional submittals, and may require post-construction monitoring. In general:

- Technologies that have received General Use (GULD) designation are acceptable for use in Redmond, within the guidance and recommendations for use provided by Ecology.
- Technologies that have received Conditional Use (CUD) designation are acceptable for use in Redmond for some projects, on a case-by-case basis. Such projects may require post-construction monitoring.
- Technologies that are going through Ecology's Technology Assessment Protocol may be considered for use in Redmond for some projects, on a case-by-case basis. Such projects will require substantial performance data submittals and post-construction monitoring.

Contact the Stormwater Engineer to discuss use of emerging technologies. Final approval will be by a committee that includes a representative from the Natural Resources Division, the Development Services Division, and the Construction Division of Public Works.

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