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**Snohomish County Addendum to the  
2005 Stormwater Management Manual  
for Western Washington, Volumes I – V**

*The 2005 Stormwater Management Manual for Western Washington, Volumes I-V, together with the modifications and additions of the Snohomish County Addendum attached herein, are adopted as the Snohomish County Drainage Manual.*

Adopted by \_\_\_\_\_ Date \_\_\_\_\_  
**Steven Thomsen, Director**  
**Department of Public Works**

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## **Snohomish County Addendum to the 2005 Stormwater Management Manual for Western Washington, Volumes I – V**

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## CHAPTER 1: INTRODUCTION

### 1.1 Surface Water Regulation and Guidance in Snohomish County

Pursuant to Snohomish County's National Pollutant Discharge Elimination System (NPDES) Phase I permit issued by the Washington State Department of Ecology (WSDOE), the County has adopted stormwater management regulations in Snohomish County Code (SCC) chapters 7.53, 30.63A, 30.63B and 30.63C. The regulations are consistent with the requirements in Appendix 1 of the County's NPDES Phase I permit. The County codes are prescriptive and are supported by the adoption of the Snohomish County Drainage Manual, an equivalent to the 2005 Stormwater Management Manual for Western Washington (2005 Ecology Manual) by WSDOE, and the County's Engineering Design and Development Standards (EDDS). The County's Drainage Manual provides guidance regarding methods of meeting the County's stormwater management requirements. Permit applicants should follow the code to a path of compliance. The Drainage Manual should be consulted as needed to determine how code requirements can be met.

The 2005 Ecology Manual together with this Addendum, constitute the Snohomish County Drainage Manual. The Director of the Snohomish County Department of Public Works has adopted the Drainage Manual as authorized by Chapter 30.63A of Title 30, the Snohomish County Unified Development Code. The Drainage Manual shall also serve as the Water Pollution Control Guidance Manual described in Title 7 Chapter 7.53. The purpose of the Drainage Manual is to provide technical guidance for compliance with these Titles.

In designing and constructing drainage facilities and preparing drainage plans, a person will encounter four different documents: the Snohomish County Code, the EDDS, the Drainage Manual, and the Low Impact Development Technical Guidance Manual. A person may also encounter Director's Rules. These documents and their relationship are described below.

### 1.2 Snohomish County Code

The following are code sections that regulate drainage and related activities and development.

#### **SCC Chapter 7.53 – Water Pollution Control**

SCC Chapter 7.53, the Water Pollution Control Code applies to all discharges in unincorporated Snohomish County. The code provides minimum requirements for the control of discharges of contaminants to public drainage facilities, natural drainage systems, surface and storm water, and ground water in the county.

**SCC Chapter 30.63A – Drainage Code**

SCC Chapter 30.63A, the Drainage Code, applies to all development activity in unincorporated Snohomish County, and contains the basic legal requirements for designing and constructing stormwater drainage facilities and preparing drainage plans.

**SCC Chapter 30.63B – Land Disturbing Activity**

SCC Chapter 30.63B regulates land disturbing activity that results in the movement of earth, or a change in the existing soil cover and or the existing topography, and includes, but is not limited to, clearing, grading, filing and excavation.

**SCC Chapter 30.63C – Low Impact Development**

SCC Chapter 30.63C applies to all development using low impact development techniques. The 2005 Edition of the Low Impact Development Technical Guidance Manual for Puget Sound (LID Guidance Manual) as amended, by the Puget Sound Action Team (now Puget Sound Partnership), is adopted as the low impact development guidance manual for development within Snohomish County.

**1.3 Snohomish County Design Standards, Rules, and Manuals**

The following documents relevant to drainage will be encountered in project design and development in Snohomish County:

**Director's Rules**

Rules are authorized under SCC 30.81.010, according to the provisions of SCC 30.82.010 through SCC 30.82.080 (Rulemaking). Rules may be made and issued as necessary in the administration and enforcement of the provisions of Title 30 (Uniform Development Code), by Planning and Development Services, Public Works, or Parks Departments for the appropriate sections of Title 30.

**Drainage Manual**

The Drainage Manual is a technical guidance document that intended to provide assistance in the design and construction of drainage facilities. Alternatives to items contained in the Drainage Manual may be approved by the PDS plan review staff, without need for approval of the director of PDS or PW.

**Engineering Design and Development Standards (EDDS)**

EDDS contains engineering standards for drainage facility design methods, materials, construction practices, and similar aspects typical of such standards. Modifications or waivers of EDDS requirements must be granted by the Director of the Department of Public Works (PW) on specific projects, following the request and submittal requirements in the EDDS.

**Low Impact Development Guidance Manual**

The 2005 Edition of the Low Impact Development Technical Guidance Manual for Puget Sound (LID Guidance Manual) as amended, by the Puget Sound Action Team (now Puget Sound Partnership), is adopted as the low impact development guidance manual for development within Snohomish County.

**1.4 Document Relationship Example**

SCC 30.63A.740 and SCC 30.63A.745, require provision of stormwater treatment for development activities meeting certain threshold, designed on the basis of the 6-month, 24-hour storm, by means of BMPs found in the Drainage Manual or the equivalent. A designer could choose to provide this treatment using a biofiltration swale, for which applicable requirements are found in the Drainage Manual. Alternately, the techniques of the LID Guidance Manual may be used, subject to the requirements of Chapter 30.63C SCC. If the designer wanted to provide no treatment, a code requirement waiver would be needed from the Director of PDS, and the reasons for granting the waiver would have to be in accordance with the criteria found in Title 30. If the designer wanted to use engineering design requirements that vary from those found in EDDS, the approval of the Director of Public Works would be required. If a different seed mixture than those suggested in the Drainage Manual were requested, the approval of the PDS plan reviewer requirements would be needed. The drainage plans submitted for development permit approval must include a Construction Stormwater Pollution Prevention Plan prepared in accordance with SCC 30.63A.710 and SCC 30.63A.720. Checklists and rules for permit submittals may be established by the Director under SCC 30.81.010, according to the provisions of SCC 30.82.010 through SCC 30.82.080.

**1.5 Other Guidance Documents**

The Highway Runoff Manual by the Washington State Department of Transportation is accepted as supplemental technical guidance for road-related projects, subject to Snohomish County Code and EDDS requirements for development in Snohomish County.

**1.6 County Contacts**

The following County Agencies are available to answer questions and give technical and administrative assistance.

Planning and Development Services (PDS)	(425) 388-3385
Public Works – Surface Water Management	(425) 388-3464

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## CHAPTER 2: SUMMARY OF MODIFICATIONS TO THE 2005 STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON

### 2.1 Types of Modifications

There are three types of modifications to the 2005 Stormwater Management Manual for Western Washington (2005 Ecology Manual):

- References to Snohomish County Code (SCC) or to the Engineering Design and Development Standards (EDDS) that directly affect or modify the guidance in the 2005 Ecology Manual. -- *These references are to draft versions of the Unified Development Code (Title 30 SCC) and EDDS that have been updated to conform to and work with the County's NPDES Phase I stormwater permit requirements. The draft documents are available at the website for the update of the Unified Development Code, at : [http://www1.co.snohomish.wa.us/Departments/PDS/Divisions/Code\\_Development/UDC/NPDES.htm](http://www1.co.snohomish.wa.us/Departments/PDS/Divisions/Code_Development/UDC/NPDES.htm) While care was taken in compiling the references as guidance, no warranty is expressed as to the completeness of the citations: the user of this Addendum bears the responsibility for knowing the current applicable Code or EDDS sections. Updates to the Code or EDDS may also occur before the next edition of this Addendum, and the user is responsible for staying current with updates,*
- Modifications to text, figures and tables. – *These are direct changes to the respective text, figures, or tables. Replacement figures and tables have been provided.*
- Modified organization – *This primarily affects the first two chapters of Volume IV- Source Controls, which were revised and reorganized. Replacement sections have been provided.*

### 2.2 Key Modifications for Snohomish County

Substantive changes include the following:

Snohomish County has modified the organization of Volume IV Source Control BMPs for local implementation. Certain BMPs are required for compliance with SCC Chapter 7.53 Water Pollution Code, specific activities and land uses, and for new development and redevelopment. The appendices to the original Volume IV are retained unchanged for reference.

Snohomish County is requesting Department of Ecology for modification of infiltration facility depth to bedrock, water table, or impermeable layer, to allow 3 feet instead of 5 feet depth. Snohomish County uses the Low Impact Development Technical Guidance Manual for Puget Sound (Puget Sound Partnership), which provides reduced vertical

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separations for certain low impact development BMPs. For example, for bioretention cells there is a 3 foot minimum depth for bioretention cells serving 5,000 square feet or more of pollution generating impervious surface, or 10,000 square feet or more of non-pollution generating impervious surface. For bioretention cells serving areas below these thresholds, a 1 foot minimum depth is allowed. (LID Manual, p. 153, 7.7.2 Limitations).

Developments that are required to provide stormwater treatment, that are located in the drainage basins of lakes on the 303(d) list for phosphorus, will be required to provide phosphorus control best management practices. Four Snohomish County lakes which will require phosphorus control are: Blackmans, Ketchum, Loma, and Sunday

The inspection and maintenance checklists in Volume III and Volume V of the 2005 Ecology Manual have been modified for local implementation in Snohomish County, primarily to include suggested inspection frequency.

Snohomish County is requesting Department of Ecology for consideration of allowing the use of alternate methods for hydrology calculations for closed depressions (SCS and SBUH), subject to volume correction factors to maintain equivalence with volumes obtained through continuous simulation modeling (HSPF).

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## **CHAPTER 3: MODIFICATIONS TO THE 2005 STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON FOR USE IN SNOHOMISH COUNTY**

The following pages contain modifications to the 2005 Stormwater Management Manual for Western Washington (2005 Ecology Manual) for use in Snohomish County. The modifications may be inserted at the beginning of the respective volume in the 2005 Ecology Manual for convenient reference. Page references in the 2005 Ecology Manual are occasionally provided below to aid in locating tables and text.

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### 3.1 VOLUME I: MINIMUM TECHNICAL REQUIREMENTS AND SITE PLANNING

#### 3.1.1 Vol. I, Chapter 1: Introduction

Modifications:

No local changes but used for reference only in Snohomish County.

#### 3.1.2 Vol. I, Chapter 2: Minimum Requirements for New Development and Redevelopment

Chapter 2 applies as modified by provisions of Chapters 30.63A SCC and 30.63B SCC. Minimum Requirements for New Development and Redevelopment in Snohomish County are given in Sections 30.63A.700 to 30.63A.850 (Parts 700 and 800) of Title 30 SCC. Where differences in Chapter 2 of the Stormwater Management Manual for Western Washington and Title 30 SCC exist, the code provisions of Title 30 SCC shall apply.

Modifications:

Section 2.2: **Exemptions**

Exemptions are provided in SCC 30.63A Part 200 **Exemptions**.

Section 2.3: **Definitions Related to Minimum Requirements**

Snohomish County definitions shall be used where applicable. See definitions in SCC 30.91A to SCC 30.91Z (Definitions).

Section 2.4 **Applicability of the Minimum Requirements**

Snohomish County provides a process for drainage review of small single family parcel development, and other minor development and redevelopment. This has required the revision of Figures 2.2 and 2.3 in the 2005 Ecology Manual for use in Snohomish County. The revised Snohomish County figures (labeled Figure 2.2SC and Figure 2.3SC) are given in Appendix A to this Addendum.

Section 2.4.2: **Redevelopment**

Code provisions for regional facilities (noted in the top of page 2-13) are given in Section SCC 30.63A.410 **Regional Facilities**.

Figures 2.2 and 2.3:

These figures do not apply in Snohomish County. See

Figure 2.2SC and Figure 2.3SC in Appendix A of this Addendum.

Section 2.5.1 **Minimum Requirement #1: Preparation of Stormwater Site Plans**

Refer to:

- SCC 30.63A.705 **Minimum Requirement 1: Preparation of a stormwater site plan.**

Code thresholds and requirements for Drainage Plans and review are given in SCC 30.63A Part 600 **Development and Redevelopment Drainage Review Thresholds and Requirements**, and in SCC 30.63A.330 **Full drainage plan submittal requirements**, as applicable. The minimum threshold for drainage review, for minor new and other minor development, is 200 square feet of impervious surface in an Urban Growth Area or 400 square feet of impervious surface outside of an Urban Growth Area, in SCC 30.63A.610 **Drainage review thresholds and requirements for minor single-family or duplex residential development** and SCC 30.63A.620 **Drainage review thresholds and requirements for other minor development.**

Code thresholds and requirements for Construction Stormwater Pollution Prevention Plans (SWPPP) are given in SCC 30.63A.710 **Minimum Requirement 2: Stormwater pollution prevention plan (SWPPP)-objectives and applicability**, and SCC 30.63A.715 **Minimum Requirement 2: construction stormwater pollution prevention plan (SWPPP) contents**, and for temporary erosion and sediment controls, in SCC 30.63A.700 **Temporary erosion and sediment controls (TESC).**

Section 2.5.2 **Minimum Requirement #2: Construction Stormwater Pollution Prevention**

Refer to:

- SCC 30.63A.710 **Minimum Requirement 2: Stormwater pollution prevention plan (SWPPP)-objectives and applicability**, and
- SCC 30.63A.715 **Minimum Requirement 2: construction stormwater pollution prevention plan (SWPPP) contents.**

Section 2.5.3 **Minimum Requirement #3: Source Control of Pollution Construction Stormwater Pollution Prevention**

Refer to:

- SCC 30.63A.720 **Minimum Requirement 3: water pollution source control for major development or redevelopment activities**, and
- SCC 7.53 **Water Pollution Control**.

Section 2.5.4 **Minimum Requirement #4: Preservation of Natural Systems and Outfalls**

Refer to:

- SCC 30.63A.725 **Minimum Requirement 4: preservation of natural drainage systems or outfalls for all new development and redevelopment activities**, and
- SCC 30.63A.730 **Minimum Requirement 4: projects using infiltration and dispersion techniques from non-pollution generating surfaces**.

Section 2.5.5 **Minimum Requirement #5: On-Site Stormwater Management**

Refer to:

- SCC 30.63A.735 **Minimum Requirement 5: on-site stormwater management**.

Section 2.5.6 **Minimum Requirement #6: Runoff Treatment**

Refer to:

- SCC 30.63A.740 **Minimum Requirement 6: run-off treatment – thresholds**,
- SCC 30.63A.745 **Minimum requirement 6: treatment facility or BMP selection, design, and maintenance**,
- SCC 30.63A.750 **Minimum Requirement 6: water quality design flow rate**, and
- SCC 30.63A.755 **Minimum Requirement 6: stormwater discharge from pollution-generating impervious surface**.

Section 2.5.7 **Minimum Requirement #7: Flow Control**

Refer to:

- SCC 30.63A.760 **Minimum Requirement 7: flow control requirements for major development or redevelopment activities**,
- SCC 30.63A.765 **Minimum Requirement 7: flow control thresholds**
- SCC 30.63A.770 **Minimum Requirement 7: flow control design—parking lots**.

- SCC 30.63A.775 **Minimum Requirement 7: Western Washington flow control alternative requirement,**
- SCC 30.63A.780 **Minimum Requirement 7: access to detention, retention and treatment facilities,** and
- SCC 30.63A.785 **Minimum Requirement 7: on-site stormwater management and low impact development.**

Section 2.5.7 **Minimum Requirement #8: Wetlands Protection**

Refer to:

- SCC 30.63A.790 **Minimum Requirement 8: detention in wetlands and wetland buffers**

Section 2.5.9: **Minimum Requirement #9: Basin/Watershed Planning**

Refer to:

- SCC 30.63A.400 **Basin Planning.**

Section 2.5.10 **Minimum Requirement #10: Operation and Maintenance**

Refer to:

- SCC 30.63A.795 **Minimum Requirement 9: inspection, operations and maintenance requirements,**
- SCC 30.63A.800 **Minimum Requirement 9: interim maintenance responsibility after construction acceptance,**
- SCC 30.63A.810 **Minimum Requirement 9: release of owner and applicant from maintenance responsibility for certain drainage facilities.**
- SCC 30.63A.820 **Minimum Requirement 9: easements granted to the county.**
- SCC 30.63A.830 **Minimum Requirement 9: recorded drainage easements,**
- SCC 30.63A.840 **Minimum Requirement 9: maintenance covenant,** and
- SCC 30.63A.850 **Minimum Requirement 9: separate tracks or easements for detention.**

Explanatory note: Minimum Requirement 10 in the 2005 Ecology Manual is referred to as Minimum Requirement #9: Operation and Maintenance in the Phase I NPDES Permit, Appendix 1, Section 4.9, page 27. The Snohomish County Code reflects the numbering given in Appendix 1 of the Phase I permit. The Phase I permit omits the 2005 Ecology Manual's Minimum Requirement for Basin/Watershed Planning (in Volume 1, Section 2.5.9 of the 2005 Ecology Manual, page 2-37). However, the County's Drainage

Manual retains the Basin/Watershed Planning minimum requirement to maintain equivalence to the 2005 Ecology Manual.

Section 2.6: **Optional Guidance**

The optional guidance is not used in Snohomish County.

Section 2.7: **Adjustments**

Requirements for adjustments are provided in SCC 30.63A.342 **Modifications**.

Section 2.8: **Exceptions/Variances**

Requirements for waivers are provided in SCC 30.63A.344 **Waivers**.

### 3.1.3 Vol. I, Chapter 3: Preparation of Stormwater Site Plans

This chapter generally applies as technical guidance, but differences in Snohomish County are noted as follows.

Modifications:

Section 3.1: **Stormwater Site Plans: Step-By-Step**

Code thresholds and requirements for Drainage Plans and review are given in are given in SCC 30.63A Part 600 **Development and Redevelopment Drainage Review Thresholds and Requirements**, in SCC 30.63A.310 **Drainage review process**, in SCC 30.63A.320 **Targeted drainage plan submittal requirements**, and in SCC 30.63A.330 **Full drainage plan submittal requirements**, as applicable. The minimum threshold for drainage review, for minor new and other minor development, is 200 square feet of impervious surface in an Urban Growth Area or 400 square feet of impervious surface outside of an Urban Growth Area, in SCC 30.63A.610 **Drainage review thresholds and requirements for minor single-family or duplex residential development** and SCC 30.63A.620 **Drainage review thresholds and requirements for other minor development**.

Code thresholds and requirements for Construction Stormwater Pollution Prevention Plans (SWPPP) are given in SCC 30.63A.710 **Minimum Requirement 2: Stormwater pollution prevention plan (SWPPP)-objectives and applicability**, and SCC 30.63A.715 **Minimum Requirement 2: construction stormwater pollution prevention plan**

(SWPPP) contents, and for temporary erosion and sediment controls, in SCC 30.63A.700 **Temporary erosion and sediment controls (TESC)**.

Section 3.2 **Plans Required After Stormwater Site Plan Approval**  
Code requirements for plans required after stormwater site plan approval are given in SCC 30.63A.340 **Revisions to drainage plans** and SCC 30.63A.360 **Submittal of record drawings**.

### 3.1.4 Vol. I, Chapter 4: BMP and Facility Selection Process for Permanent Stormwater Control Plans

Modifications:

Section 4.2 **BMP and Facility Selection Process**  
This section generally applies as technical guidance. Refer to applicable minimum requirements in the Drainage Code SCC Chapter 30.63A as listed previously. Drainage provisions are also given for Land Disturbing Activity in SCC 30.63B, including SCC 30.63B.340 **Drainage and Terracing**, SCC 30.63B.350 **Erosion Control**, and other sections as applicable.

**Step V Select Treatment Facilities, Step 5: Determine if Enhanced Treatment is Required** (p. 4-9).

For Step 5, Average Daily Traffic (ADT) may be used in lieu of Annual Average Daily Traffic (AADT) in Snohomish County. Snohomish County has developed a Strahler stream order map identifying 4<sup>th</sup> order streams at 1:24,000 scale, and has data for Average Daily Traffic for certain roads.

### 3.1.5 Vol. I, Appendix 1-D: Wetlands and Stormwater Management Guidelines

Modifications:

Code requirements for wetland stormwater management are provided in SCC 30.63A.790 **Minimum requirement 8: detention in wetland and wetland buffers**, and SCC 30.63A.725 **Minimum requirement 4: preservation of natural drainage systems or outfalls for all new development and redevelopment activities**. SCC 30.63A Part 300 **Submittal, Review, Inspection and Acceptance Process** and SCC 30.63A.210 **Right to Farm** contain provisions relating to wetlands.

### **3.1.6 Vol. I, Glossary and Notations**

Modifications:

See additional definitions in SCC 30.91A to SCC 30.91Z (Definitions).

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## 3.2 VOLUME II: CONSTRUCTION STORMWATER POLLUTION PREVENTION

### 3.2.1 Vol. II, Chapter 2: Regulatory Requirements

Modifications:

The following are additional regulations in Snohomish County Code:

- Construction stormwater pollution prevention code requirements (SCC 30.63A.710 to SCC 30.63A.715 (Minimum Requirement 2, relating to construction stormwater pollution prevention plans), and the provisions of SCC 30.63A.700 **Temporary erosion and sedimentation control (TESC)**).
- Critical Area Regulations (SCC 30.62 **Critical Area Regulations**, also provisions in 30.63A **Drainage Code**, 30.63B **Land Disturbing Activity**, and 30.63C **Low Impact Development**. See also the references in SCC 30.63A.150 **Relationship to critical areas chapters 30.62, 30.62A and 30.62B, 30.62C, 30.64 and 30.65 SCC**)

### 3.2.2 Vol. II, Chapter 3: Planning

Modifications:

For Construction stormwater pollution prevention code requirements for SWPPPs, refer to SCC Section 30.63A.710 to SCC 20.63A.715 (Minimum Requirement 2, relating to construction stormwater pollution prevention plans, and SCC20.63A.700 **Temporary erosion and sedimentation control (TESC)**).

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### 3.3 VOLUME III: HYDROLOGIC ANALYSIS AND FLOW CONTROL BMPS

Conveyance system design is not addressed in this manual. See EDDS Chapter 5 for conveyance system design requirements. Also see SCC 30.63A Part 500 **Conveyance System Standards**.

#### 3.3.1 Vol. III, Chapter 1: Introduction

Modifications:

##### Section 1.3 **How to Use this Volume**

Note the modifications to Volume I listed previously in Addendum Section 3.1.

#### 3.3.2 Vol. III, Chapter 2: Hydrologic Analysis

Modifications:

##### Section 2.1, subsection 2

Snohomish County accepts the use of the Western Washington Hydrology Model (Version 3 or higher is required for sites over 320 acres), MGS-Flood, and HSPF. KCRTS was developed for conditions in King County and is not typically used in Snohomish County.

##### Section 2.3 **Single Event Hydrograph Method**

References to “Table 2.3” should read “Table 2.2” on pages 2-4, 2-13, and 2-14. Table 2.2 appears on page 2-15.

On page 2-13, bottom paragraph, the term “residential district” applies to “residential zones” in Snohomish County.

On page 2-14, top paragraph, first sentence, for the list of development types for which percent impervious area must be computed from the site plan, also include the following: Planned Residential Developments, Single Family Detached Units, and Fully Contained Communities.

##### Section 2.4 **Closed Depression Analysis**

Snohomish County is requesting Dept. of Ecology approval for continued use of SCS or SBUH with correction factors as given in the table below, as an alternate approach in Snohomish County for closed depression analysis.

**Table \_\_\_\_\_ : Volume Correction Factors for Using the SCS or SBUH Models in Closed Depressions or within ¼ mile of Downstream Flooding**

Land Use Conversion	Correction Factor
Forest to Single Family	2.5
Forest to Commercial/Industrial	3.7
Pasture to Single Family	2.6
Pasture to Commercial/Industrial	2.7

### 3.3.3 Vol. III, Chapter 3: Flow Control Design

Design specifications for many of the BMPs in Chapter 3 are also provided in EDDS, Chapter 5, and in the Drainage Code, SCC Chapter 30.63A. Where the provisions of the Drainage Manual overlap or conflict with EDDS or the Drainage Code, the EDDS or Drainage Code provisions shall control.

Modifications:

#### Section 3.1 **Roof Downspout Controls**

Roof downspout controls are also subject to the drainage and ditch setback requirements of WAC 246-272A-0210 regarding onsite sewage system (OSS) minimum horizontal separations.

#### Section 3.1.1 **Downspout Infiltration Systems, *Design Criteria for Infiltration Trenches, General*, paragraph 6.**

A geotechnical analysis shall be required for infiltration and detention facilities located within 200 feet of the top of an erosion or landslide hazard area.

#### Section 3.2 **Detention Facilities**

Design standards for drainage facilities, including detention, are also given in EDDS Chapter 5 **Drainage**. Refer to EDDS Chapter 5 **Drainage Facilities**, to **Part I – General Standards**. Specific design requirements for detention facilities and components (ponds, pipes, vaults, overflow, etc.) are given in EDDS section 5-11 **Flow Control: Detention Systems**. Design standards for other related drainage system components (conveyance, manholes, etc.) are also provided in EDDS.

County fencing design requirements for detention facilities are given in EDDS section 5-11 **Flow Control: Detention Systems**.

The County is evaluating signage standards.

Standing water removed during pond or vault cleaning activity must be disposed of at an approved decant or disposal facility, or to the sanitary sewer if allowed by the wastewater treatment purveyor, and is not allowed to discharge to surface waters.

Section 3.2.1 **Detention Ponds, Design Criteria, General**, paragraph 4. A geotechnical analysis shall be required for infiltration and detention facilities located on slopes if located within 200 feet of the top of an erosion or landslide hazard area.

Signage, p. 3-26, and Figure 3-12, p. 3-34.  
The County is evaluating sign criteria.

Table 3.3, p. 3-36 to 3-39

Use Table 3.3SC in Appendix A to this Addendum, which includes suggested inspection frequency.

The revised Table 3.3SC has added text to the row where the "Defect" is "Tree Growth and Hazard Trees," under "Conditions When Maintenance is Needed." The added text is the condition of "If trees or other vegetation reduce pond volume below the design requirements."

Section 3.2.2 **Detention Tanks**

The live load requirement for tanks that may be subject to vehicle loads is HL-93 (Load Resistance Factor Design Method) or HS-25 (Load Factor Design Method). Refer to EDDS, section 5-11 **Flow Control: Detention Systems**.

Table 3.4, p. 3-43

Use Table 3.4SC in Appendix A to this Addendum, which includes suggested inspection frequency.

Section 3.2.3 **Detention Vaults**

The live load requirement for tanks that may be subject to vehicle load is HL-93 (Load Resistance Factor Design Method) or HS-25 (Load Factor Design Method). Refer to EDDS, section 5-11 **Flow Control: Detention Systems**.

Sediment forebays are required for vaults in EDDS, Chapter 5, Section 5-11.D. Vault Detention

Table 3.5, p. 3-55 to 3-57

Use Table 3.5SC in Appendix A to this Addendum, which includes suggested inspection frequency.

Section 3.3.5, **Site Characterization Criteria, Infiltration Receptor**  
(p. 3-72)

Monitoring wells may be required by the Director based on site conditions and review.

Section 3.3.7 **Site Suitability Criteria (SSC) SSC-5 Depth to Bedrock, Water Table, or Impermeable Layer**

Snohomish County is requesting Department of Ecology for modification of infiltration facility depth to bedrock, water table, or impermeable layer, to allow 3 feet instead of 5 feet depth. . This request is subject to Department of Ecology review and approval. Snohomish County uses the **Low Impact Development Technical Guidance Manual for Puget Sound** (Puget Sound Partnership), which provides reduced vertical separations for certain low impact development BMPs. For example, for bioretention cells there is a 3 foot minimum depth for bioretention cells serving 5,000 square feet or more of pollution generating impervious surface, or 10,000 square feet or more of non-pollution generating impervious surface. For bioretention cells serving areas below these thresholds, a 1 foot minimum depth is allowed. (LID Manual, p. 153, 7.7.2 Limitations, bullets 1, 2).

Section 3.3.9 **Verification of Performance**

Verification testing may be required by the Director based on site conditions and review.

Section 3.3.10 **Infiltration Basins**

Refer also to EDDS Chapter 5 Drainage Facilities, Part I – General Standards.

Section 3.3.11 **Infiltration Trenches**

Refer also to EDDS Chapter 5 Drainage Facilities, Part I – General Standards.

### **3.3.4 Vol. III, Appendix IIIB: Western Washington Hydrology Model – Information, Assumptions, and Computation Steps**

Modifications:

The 320 acre limitation has been removed with WWHM 3. Open channel and wet pond routing are also available in WWHM 3.

**3.3.5 Vol, III, Appendix IIIC: Washington State Department of Ecology Low Impact Development Design and Flow Modeling Guidance**

Modifications:

Page C-1 Allowable continuous simulation hydrologic models for use in Snohomish County are the Western Washington Hydrology Model, MGS Flood, and HSPF. The King County Runoff Times Series model is calibrated for King County conditions and not typically used in Snohomish County.

Item 7.1.2 **Design Criteria for Permeable Pavement**

EDDS is developing more specific design criteria to apply to this BMP.

Item 7.7 **Bioretention area (rain gardens)**

EDDS is developing more specific design criteria to apply to this BMP.

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### 3.4 VOLUME IV: SOURCE CONTROL BMPS

Modifications:

Replace the Table of Contents, and Chapters 1 and 2 with the contents of Appendix C to this Addendum (Second Acknowledgement, revised Table of Contents, and new Chapters 1 through 5).

Appendix D ***R.4 Minimum Functional Standards For Containers*** (page D-3)

The reference to “Minimum Functional Standards for Containers” should read “Minimum Functional Standards for Solid Waste Handling.”

The WAC citation should read “WAC 173-350-300” (current regulation).

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### 3.5 VOLUME V: RUNOFF TREATMENT BMPS

#### 3.5.1 Vol. V, Chapter 1: Introduction

Modifications:

Figures           References to King County standards do not apply. Refer to standards in Snohomish County Code, EDDS, or as otherwise cited in the Drainage Manual for local requirements.

Section 1.3    **How to Use this Volume**

Note the modifications to Volume I listed previously in Addendum Section 3.1.

#### 3.5.2 Vol. V, Chapter 2: Treatment Facility Selection Process

Modifications:

Section 2.1    **Step-by-Step Selection Process for Treatment Facilities**

For Step 1, note that Snohomish County does not use the optional off-site analysis in Volume 1, Section 2.6.

For Step 4, the following lakes are identified as water quality impaired for phosphorus in the current 303(d) list, which is in the combined 305(b)/303(d) report by Department of Ecology, and pursuant to SCC 30.63A.740(8) **Phosphorus treatment**, will require phosphorus control to mitigate water quality impacts:

- Blackmans
- Ketchum
- Loma
- Sunday

For Step 5, Average Daily Traffic (ADT) may be used in lieu of Annual Average Daily Traffic (AADT) in Snohomish County. Snohomish County has developed a Strahler stream order map identifying 4<sup>th</sup> order streams at 1:24,000 scale, and has data for Average Daily Traffic for certain roads.

Section 2.2    **Other Treatment Facility Selection Factors**

For Other Physical Factors, note that Snohomish County is requesting Department of Ecology for modification of SCC-5 Depth to Bedrock, Water Table, or Impermeable Layer, to allow 3 feet instead of 5 feet for the infiltration facility depth

to bedrock, water table, or impermeable layer, This request is subject to Department of Ecology review and approval. Snohomish County uses the **Low Impact Development Technical Guidance Manual for Puget Sound** (Puget Sound Partnership), which provides reduced vertical separations for certain low impact development BMPs. For example, for bioretention cells there is a 3 foot minimum depth for bioretention cells serving 5,000 square feet or more of pollution generating impervious surface, or 10,000 square feet or more of non-pollution generating impervious surface. For bioretention cells serving areas below these thresholds, a 1 foot minimum depth is allowed. (LID Manual, p. 153, 7.7.2 Limitations, bullets 1, 2).

### 3.5.3 Vol. V, Chapter 3: Treatment Facility Menus

Modifications:

- Section 3.2 **Oil Control Menu**  
See above note for Vol. V, Section 2.1, Step 2 regarding traffic count data.
- Section 3.3 **Phosphorus Treatment Menus**  
See above note for Vol. V, Section 2.1, Step 4 regarding lakes that will require phosphorus control for water quality mitigation.
- Section 3.4 **Enhanced Treatment Menu**  
See above note for Vol. V, Section 2.1, Step 5 regarding Strahler stream order data.
- Section 3.5 **Basic Treatment Menu**  
The wet vault option on page 3-10 must be used with a biofiltration swale or other water quality system in Snohomish County. See EDDS Section 5-11.

### 3.5.4 Vol. V, Chapter 4: General Requirements for Stormwater Facilities

Modifications:

- Section 4.5.2 **Flow Spreading Options**  
Option A. Designed metal flow spreader plates or equivalent must be used. Wood plates are not allowed.

Table 4.5 – Maintenance Standards (No. 1 to No. 18, pages 4-30 to 4-50)  
Replace with Table 4.5SC in Appendix D to this Addendum.  
Table 4.5SC includes a new column with suggested  
inspection frequency.

### 3.5.5 Vol. V, Chapter 5: On-Site Stormwater Management

Modifications:

#### Section 5.3.1 **Dispersion and Soil Quality BMPs**

Refer to above modifications for onsite stormwater  
management, Volume III, Chapters 1, 2 and 3.

### 3.5.6 Vol. V, Chapter 7: Infiltration and Bio-Infiltration Facilities

Modifications:

Refer to the notes for Vol. III, Chapter 3: Flow Control Design for local  
modifications to infiltration facilities.

### 3.5.7 Vol. V, Chapter 8: Sand Filtration Treatment Facilities

Modifications:

Section 8.6, **Design Criteria, *Additional Design Information***, Item 3  
(pages 8-15 to 8-16)

The 1<sup>st</sup>, 3<sup>rd</sup> and 4<sup>th</sup> bullets are from King County and are  
subject to future modification in Snohomish County Code  
and EDDS.

Section 8.6, **Design Criteria, *Additional Design Information***, Item 4,  
Sand specification (page 8-16).

The specification is from King County and is subject to future  
modification in Snohomish County Code and EDDS.

Section 8.6, **Design Criteria, *Additional Design Information***, Item 5,  
Impermeable liners for sand bed bottom (page 8-17).

The specification is from the City of Austin and is subject to  
future modification in Snohomish County Code and EDDS.

### 3.5.8 Vol. V, Chapter 9: Biofiltration Treatment Facilities

Modifications:

Section 9.4, BMP T9.10 **Basic Biofiltration Swale, *Maintenance Criteria.***  
(page 9-19)

Several criteria are from King County and are subject to future modification in the EDDS.

### 3.5.9 Vol. V, Chapter 10: Wet Pool Facility Designs

Modifications:

Section 10.3, BMP T10.10 **Wetponds-Basic and Large**

Refer to EDDS Section 5-02 **Drainage Facilities – General**, Section 5-11 **Flow Control: Detention Systems**, and Section 5-13 **Water Quality Treatment** for access, berm and other applicable related requirements.

Section 10.3, BMP T10.20 **Wetvaults**

Refer to EDDS Section 5-02 **Drainage Facilities – General**, Section 5-11 **Flow Control: Detention Systems**, and Section 5-13 **Water Quality Treatment** for vault detention structural, emergency overflow, and other applicable design requirements. Structural loading design criterion is HL-93 (HS-25). Snohomish County is evaluating the requirement for a sign on top of ladders providing access to vaults, to provide confined space warning and vault capacity information. See also maintenance note No. 12 Wetvaults, in Table 4.5SC, for the row addressing the defect of “Access Ladder Damage.”

Figure 10.6: Refer to EDDS standards for manholes (Section 5-07) and ladders and other applicable requirements.

Section 10.3, BMP T10.30 **Stormwater Treatment Wetlands**

Refer to EDDS Section 5-02 **Drainage Facilities – General**, Section 5-11 **Flow Control: Detention Systems**, and Section 5-13 **Water Quality Treatment** for access, berm and other applicable related requirements.

### 3.5.10 Vol. V, Chapter 11: Oil and Water Separator BMPs

Modifications:

Figures 11.1 and 11.2 (pages 11-2, 11-3):

Refer to EDDS standards for manholes (Section 5-07) and other applicable requirements.

## Appendix A:

### Volume I

### Figures 2.2SC and 2.3SC

Note: Insert this page and the Replacement Figures as listed below, at the beginning of Volume III of the 2005 Stormwater Management Manual for Western Washington. The Replacement Figures are for use in Snohomish County.

<b>Original Volume I Figures</b>	<b>Replacement Figures</b>
Figure 2.2, p. 2-9	Figure 2.2SC
Figure 2.3, p. 2-10	Figure 2.3SC

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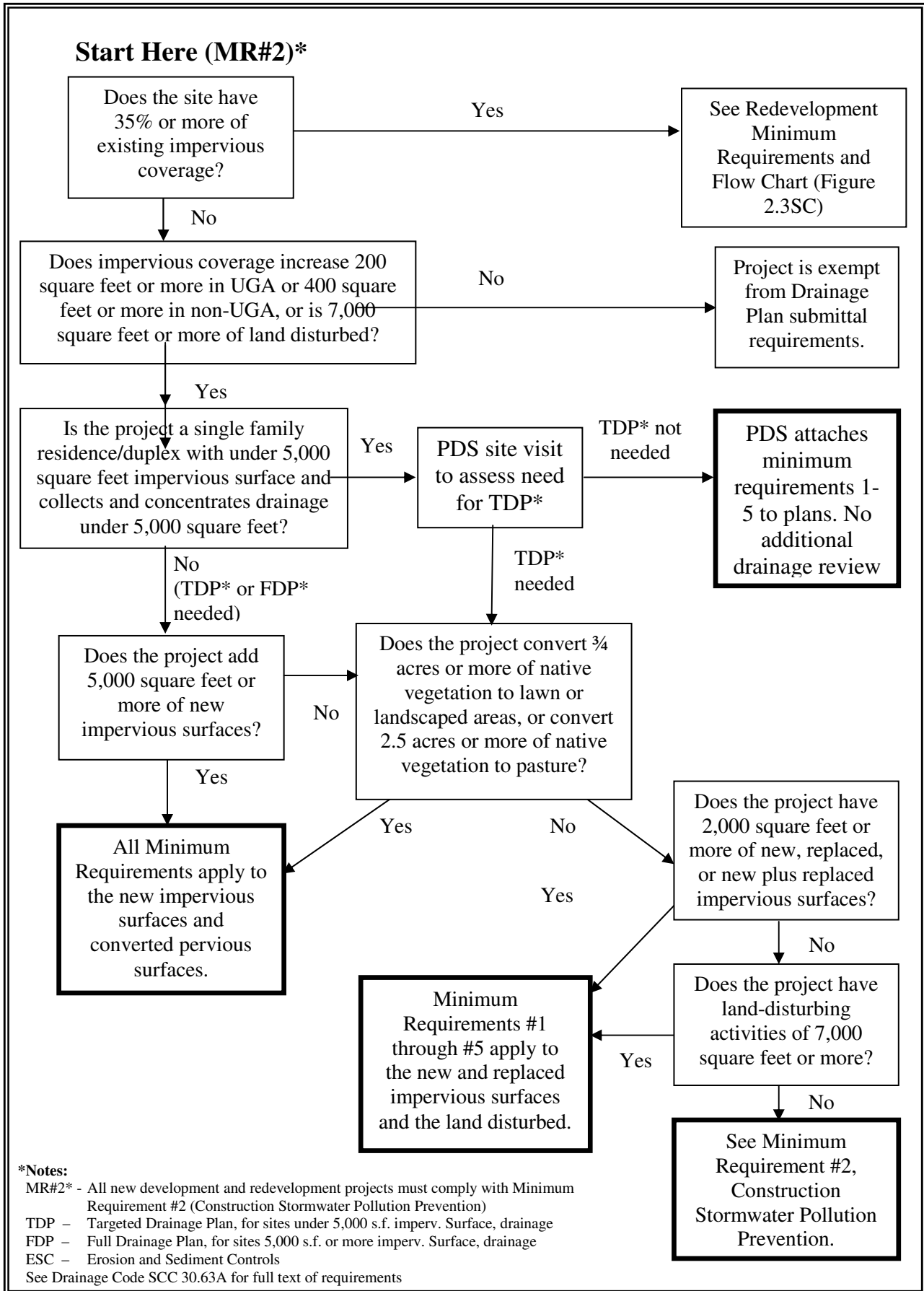


Figure 2.2SC Flow Chart for Determining Requirements for New Development  
 Snohomish Co. Drainage Manual Addendum A-3 Issue No. 1 – Rev. 2/14/08

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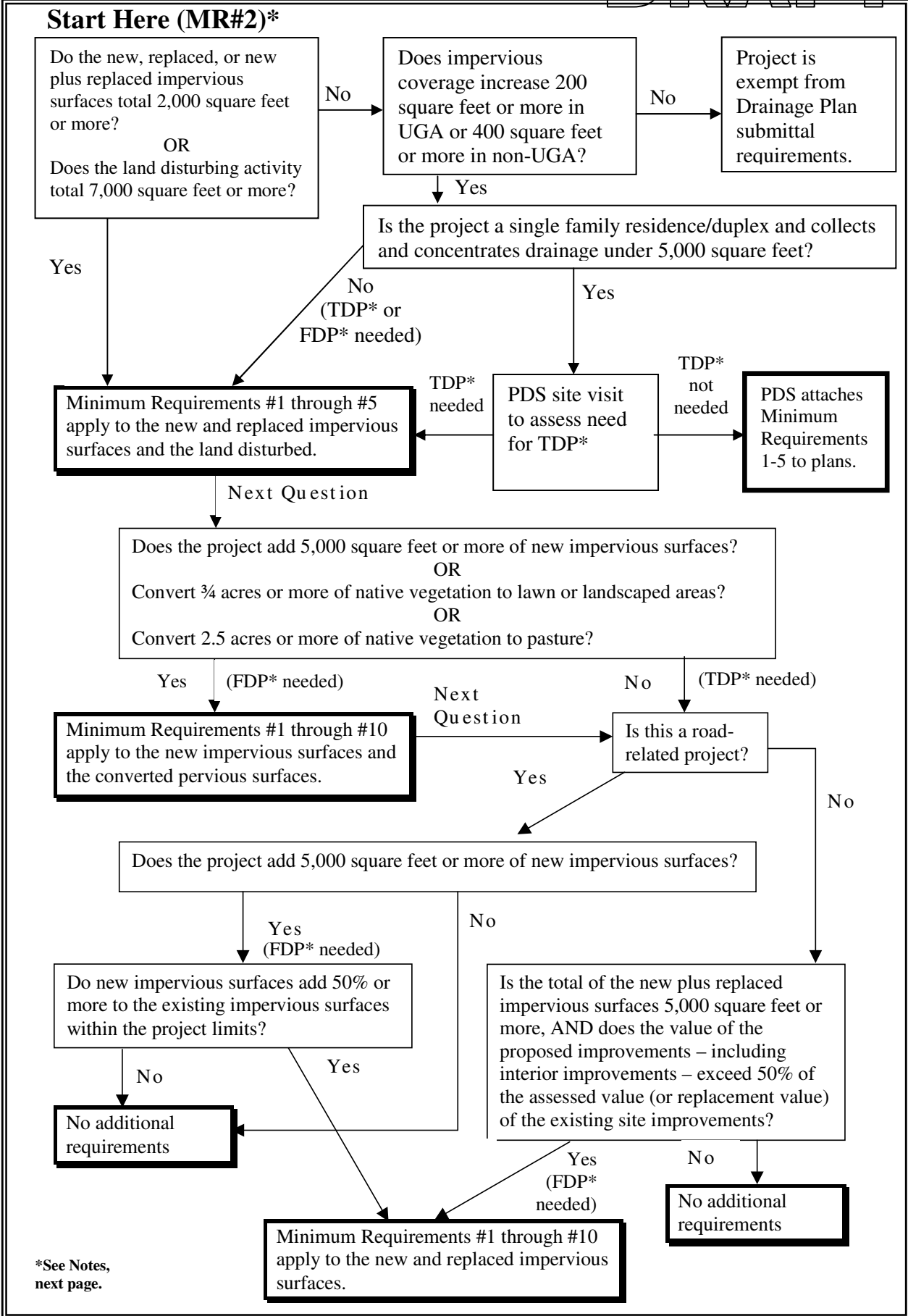


Figure 2.3SC Flow Chart for Determining Requirements for Redevelopment  
 Snohomish Co. Drainage Manual Addendum A-5 Issue No. 1 – Rev. 2/14/08

## Figure 2.3SC Flow Chart for Determining Requirements for Redevelopment

**\*Notes:**

- MR#2\* - All new development and redevelopment projects must comply with Minimum Requirement #2 (Construction Stormwater Pollution Prevention)
  - TDP\* - Targeted Drainage Plan, for sites under 5,000 s.f. imperv. Surface, drainage
  - FDP\* - Full Drainage Plan, for sites 5,000 s.f. or more imperv. Surface, drainage
  - ESC\* - Erosion and Sediment Controls
- See Drainage Code SCC 30.63A for full text of requirements

## Appendix B:

### Volume III Maintenance Requirement Tables (Tables 3.3SC, 3.4SC, 3.5SC)

Note: Insert this page and the Replacement Tables as listed below, at the beginning of Volume III of the 2005 Stormwater Management Manual for Western Washington. The Replacement Tables are for use in Snohomish County.

<b>Original Volume III Tables</b>	<b>Replacement Tables</b>
Table 3.3, p. 3-36 to 3-39	Table 3.3SC
Table 3.4, p. 3-43	Table 3.4SC
Table 3.5, p. 3-55 to 3-57	Table 3.5SC

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**Table 3.3SC  
Specific Maintenance Requirements for Detention Ponds**

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
M,S	General	Trash & Debris	Any trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one standard size garbage can). In general, there should be no visual evidence of dumping.  If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site.
M		Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public.  Any evidence of noxious weeds as defined by State or local regulations. (Apply requirements of adopted IPM policies for the use of herbicides).	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with local health department)  Complete eradication of noxious weeds may not be possible. Compliance with State or local eradication policies required
M,S		Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants (Coordinate removal/cleanup with local hazmat water quality response agency).  <u>Initial Contact:</u> 911 Fire Dept. DEM (Dept. of Emergency Mgt) SWM – Water Quality Group, Stromwater Facility Maint. Group Road Maintenance if in Right of Way	No contaminants or pollutants present.
M		Rodent Holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents destroyed and dam or berm repaired. (Coordinate with local health department; coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)  <u>Contact:</u> SWM Stormwater Facility Maintenance

**Table 3.3SC  
Specific Maintenance Requirements for Detention Ponds**

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
M	General	Beaver Dams	Dam results in change or function of the facility.	Facility is returned to design function. (Coordinate trapping of beavers and removal of dams with appropriate permitting agencies)
M		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted IPM policies
A		Tree Growth and Hazard Trees	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements). If trees are not interfering with access or maintenance, do not remove  If dead, diseased, or dying trees are identified.  If trees or other vegetation impact pond volume.  (Use a certified Arborist to determine health of tree or removal requirements)	Trees do not hinder maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., alders for firewood).  Remove hazard Trees
M	Side Slopes of Pond	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.  Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, soil compaction.  If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.
A	Storage Area	Sediment	Accumulated sediment that exceeds 10% of the designed pond depth unless otherwise specified or affects inletting or outletting condition of the facility.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
A		Exposed and/or punctured Liner (If Applicable)	Liner is visible and/or punctured.	Liner repaired or replaced. Liner is fully covered.
A		Exposed and/or Gouged Control Density fill liner (Clay Bentonite)	Liner is visible and/or Gouged – Either Surfacedly or fully penetrated.	Liner repaired or replaced. Liner is fully covered.

**Table 3.3SC  
Specific Maintenance Requirements for Detention Ponds**

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
A	Pond Berms (Dikes)	Settlements	<p>Any part of berm which has settled 4 inches lower than the design elevation.</p> <p>If settlement is apparent, measure berm to determine amount of settlement.</p> <p>Settling can be an indication of more severe problems with the berm or outlet works. A licensed civil engineer should be consulted to determine the source of the settlement.</p>	Dike is built back to the design elevation.
M		Piping	<p>Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue.</p> <p>(Recommend a Goethechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.)</p> <p><u>Contact:</u> SWM Stormwater Facility Maintenance.</p>	Piping eliminated. Erosion potential resolved.
M	Emergency Overflow/ Spillway and Berms over 4 feet in height.	Tree Growth	<p>Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping.</p> <p>Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.</p> <p><u>Contact:</u> SWM Stormwater Facility Maintenance</p>	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
M		Piping	<p>Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue.</p> <p>(Recommend a Goethechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.)</p> <p><u>Contact:</u> SWM Stormwater Facility Maintenance</p>	Piping eliminated. Erosion potential resolved.
A	Emergency Overflow/ Spillway	Emergency Overflow/ Spillway	<p>Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway.</p> <p>(Rip-rap on inside slopes need not be replaced.)</p>	Rocks and pad depth are restored to design standards.

**Table 3.3SC  
Specific Maintenance Requirements for Detention Ponds**

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
—		Erosion	See "Side Slopes of Pond"	

If you are unsure whether a problem exists, please contact Snohomish County Surface Water Management Stormwater Facility Maintenance Program at 425-388-3464.

**Key:**

- A= Annual (April 15 – Oct. 15)
- M= Monthly
- S= After Major Storms

Note: For any work done in a facility or conveyance system; Avoid the discharge or any water born sediment, debris, hazardous waste, or any other pollutant into the down stream conveyance system. Each pond, vault, pipe, ditch, or catch basin must be sealed off and be self-contained during any maintenance operation. Any discharge could be a violation of Federal Clean Water Act; Federal Endangered Species Act; State Dept. of Ecology and Dept. of Fish & Wildlife Regulations; and Snohomish County Storm Water & Critical Areas Codes.

**Table 3.4SC  
Specific Maintenance Requirements for Detention Vaults and Tanks**

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
S	Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning.
S		Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for 1/2 length of storage vault or any point depth exceeds 15% of diameter.  (Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than 1/2 length of tank.)	All sediment and debris removed from storage area.
A		Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into facility.  (Will require engineering analysis to determine structural stability).	All joint between tank/pipe sections are sealed.
A		Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of its design shape. (Review required by engineer to determine structural stability).	Tank/pipe repaired or replaced to design.
A		Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/4-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound.  Cracks wider than 1/4-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	Vault replaced or repaired to design specifications and is structurally sound.  No cracks more than 1/4-inch wide at the joint of the inlet/outlet pipe.
M,S	Manhole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
A		Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
A		Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
A		Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
_____	Catch Basins	See "Catch Basins," Table 3.5-SC	See "Catch Basins," Table 3.5-SC.	See "Catch Basins," Table 3.5-SC.

**Table 3.5SC  
Maintenance of Control Structures And Catchbasins**

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
M,S	General	Trash and Debris (Includes Sediment)	Material exceeds 25% of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
A		Structural Damage	Structure is not securely attached to manhole wall.	Structure securely attached to wall and outlet pipe.
A			Structure is not in upright position (allow up to 10% from plumb).	Structure in correct position.
A			Connections to outlet pipe are not watertight and show signs of rust.	Connections to outlet pipe are water tight; structure repaired or replaced and works as designed.
A			Any holes--other than designed holes--in the structure.	Structure has no holes other than designed holes.
A	Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing.	Gate is watertight and works as designed.
A			Gate cannot be moved up and down by one maintenance person.	Gate moves up and down easily and is watertight.
A			Rod leading to gate is missing or damaged.	Rod is in place and works as designed.
A			Gate is rusted over 50% of its surface area.	Gate is repaired or replaced to meet design standards.
A	Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
M,S		Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
M,S	Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
---	Manhole	See Table 3.4	See Table 3.4	See Table 3.4
<b>CATCH BASINS</b>				
M,S	General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%.	No Trash or debris located immediately in front of catch basin or on grate opening.

**TABLE 3.5-SC  
MAINTENANCE OF CONTROL STRUCTURES AND CATCHBASINS**

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed	
M,S	General	Trash & Debris	Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.	
M,S			Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.	
M,S			Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.	
M,S	General	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin	
A			Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (Intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
A				Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	Frame is sitting flush on the riser rings or top slab and firmly attached.
A	General	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.	
A	General	Fractures or Cracks in Basin Walls/ Bottom	Grout fillet has separated or cracked wider than 1/4 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Pipe is regouted and secure at basin wall.	
A	General	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.	
M	General	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening.	No vegetation blocking opening to basin.	
M			Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation or root growth present.	
—	General	Contamination and Pollution	See "Detention Ponds" (No. 1).	No pollution present.	

**TABLE 3.5-SC  
MAINTENANCE OF CONTROL STRUCTURES AND CATCHBASINS**

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
M,S	Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is closed
A		Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
A		Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
A	Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
M,S	Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
M,S		Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
M,S		Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

If you are unsure whether a problem exists, please contact Snohomish County Surface Water Management Stormwater Facility Maintenance Program at 425-388-3464.

**Key:**

A= Annual (April 15 – Oct. 15)

M= Monthly

S= After Major Storms

Note: For any work done in a facility or conveyance system: Avoid the discharge or any water born sediment, debris, hazardous waste, or any other pollutant into the down stream conveyance system. Each pond, vault, pipe, ditch, or catch basin must be sealed off and be self-contained during any maintenance operation. Any discharge could be a violation of Federal Clean Water Act; Federal Endangered Species Act; State Dept. of Ecology and Dept. of Fish & Wildlife Regulations; and Snohomish County Storm Water & Critical Areas Codes.

## Appendix C:

### Volume IV - Source Control BMPs

Replacement Sections Modifying Volume IV of the 2005 Stormwater Management Manual for Western Washington:

Note: Insert this page and the Replacement Sections as listed below, at the beginning of Volume IV of the 2005 Stormwater Management Manual for Western Washington. The Replacement Sections are for use in Snohomish County.

<b>Original Volume IV Section</b>	<b>Replacement Section</b>
Table of Contents	Second Acknowledgment Table of Contents
Chapters 1, 2	Chapters 1, 2, 3, 4, and 5

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## Appendix D:

### Volume V Maintenance Standards for Drainage Facilities (Table 4.5SC, Nos. 1-18)

Replacement Tables Modifying Volume V of the 2005 Stormwater Management Manual for Western Washington:

Note: Insert this page and the Replacement Table as listed below, at the beginning of Volume V of the 2005 Stormwater Management Manual for Western Washington. The Replacement Table is for use in Snohomish County.

<b>Original Volume V Table</b>	<b>Replacement Table</b>
Table 4.5 (Nos. 1 to 18, pages 4-29 to 4-50)	Table 4.5SC (Nos. 1 to 18)

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**Table 4.5SC– Maintenance Standards**

**No. 1 – Detention Ponds**

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
M,S	General	Trash & Debris	Any trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one standard size garbage can). In general, there should be no visual evidence of dumping.  If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site.
M		Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public.  Any evidence of noxious weeds as defined by State or local regulations. (Apply requirements of adopted IPM policies for the use of herbicides).	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with local health department)  Complete eradication of noxious weeds may not be possible. Compliance with State or local eradication policies required
M,S		Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants (Coordinate removal/cleanup with local hazmat water quality response agency).  <u>Initial Contact:</u> 911 Fire Dept. DEM (Dept. of Emergency Mgt) SWM – Water Quality Group, Stromwater Facility Maint. Group Road Maintenance if in Right of Way	No contaminants or pollutants present.
M		Rodent Holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents destroyed and dam or berm repaired. (Coordinate with local health department; coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)  <u>Contact:</u> SWM Stormwater Facility Maintenance

## No. 1 – Detention Ponds

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
M	General	Beaver Dams	Dam results in change or function of the facility.	Facility is returned to design function. (Coordinate trapping of beavers and removal of dams with appropriate permitting agencies)
M		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted IPM policies
A		Tree Growth and Hazard Trees	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements). If trees are not interfering with access or maintenance, do not remove  If dead, diseased, or dying trees are identified.  If trees or other vegetation impact pond volume.  (Use a certified Arborist to determine health of tree or removal requirements)	Trees do not hinder maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., alders for firewood).  Remove hazard Trees
M	Side Slopes of Pond	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.  Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, soil compaction.  If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.
A	Storage Area	Sediment	Accumulated sediment that exceeds 10% of the designed pond depth unless otherwise specified or affects inletting or outletting condition of the facility.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
A		Exposed and/or punctured Liner (If Applicable)	Liner is visible and/or punctured.	Liner repaired or replaced. Liner is fully covered.
A		Exposed and/or Gouged Control Density fill liner (Clay Bentonite)	Liner is visible and/or Gouged – Either Surfacely or fully penetrated.	Liner repaired or replaced. Liner is fully covered.

## No. 1 – Detention Ponds

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
A	Pond Berms (Dikes)	Settlements	<p>Any part of berm which has settled 4 inches lower than the design elevation.</p> <p>If settlement is apparent, measure berm to determine amount of settlement.</p> <p>Settling can be an indication of more severe problems with the berm or outlet works. A licensed civil engineer should be consulted to determine the source of the settlement.</p>	Dike is built back to the design elevation.
M		Piping	<p>Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue.</p> <p>(Recommend a Geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.)</p> <p>Contact: SWM Stormwater Facility Maintenance.</p>	Piping eliminated. Erosion potential resolved.

## No. 1 – Detention Ponds

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
M	Emergency Overflow/ Spillway and Berms over 4 feet in height.	Tree Growth	<p>Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping.</p> <p>Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.</p> <p><u>Contact:</u> SWM Stormwater Facility Maintenance</p>	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
M		Piping	<p>Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue.</p> <p>(Recommend a Geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.</p> <p><u>Contact:</u> SWM Stormwater Facility Maintenance</p>	Piping eliminated. Erosion potential resolved.
A	Emergency Overflow/ Spillway	Emergency Overflow/ Spillway	<p>Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway.</p> <p>(Rip-rap on inside slopes need not be replaced.)</p>	Rocks and pad depth are restored to design standards.
—		Erosion	See “Side Slopes of Pond”	

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## No. 2 – Infiltration

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
___	General	Trash & Debris	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
___		Poisonous/Noxious Vegetation	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
___		Contaminants and Pollution	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
___		Rodent Holes	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
M	Storage Area	Sediment	Water ponding in infiltration pond after rainfall ceases and appropriate time allowed for infiltration.  (A percolation test pit or test of facility indicates facility is only working at 90% of its designed capabilities. If two inches or more sediment is present, remove).	Sediment is removed and/or facility is cleaned so that infiltration system works according to design.
M,S	Filter Bags (if applicable)	Filled with Sediment and Debris	Sediment and debris fill bag more than 1/2 full.	Filter bag is replaced or system is redesigned.
M,S	Rock Filters	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Gravel in rock filter is replaced.
___	Side Slopes of Pond	Erosion	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
___	Emergency Overflow Spillway and Berms over 4 feet in height.	Tree Growth	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
___		Piping	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
___	Emergency Overflow Spillway	Rock Missing	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
___		Erosion	See "Detention Ponds" (No. 1).	See "Detention Ponds" (No. 1).
A	Pre-settling Ponds and Vaults	Facility or sump filled with Sediment and/or debris	6" or designed sediment trap depth of sediment.	Sediment is removed.

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## No. 3 – Closed Detention Systems (Tanks/Vaults)

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
S	Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning.
S		Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for 1/2 length of storage vault or any point depth exceeds 15% of diameter.  (Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than 1/2 length of tank.)	All sediment and debris removed from storage area.
A		Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into facility.  (Will require engineering analysis to determine structural stability).	All joint between tank/pipe sections are sealed.
A		Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of its design shape. (Review required by engineer to determine structural stability).	Tank/pipe repaired or replaced to design.
A		Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/4-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound.  Cracks wider than 1/4-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	Vault replaced or repaired to design specifications and is structurally sound.  No cracks more than 1/4-inch wide at the joint of the inlet/outlet pipe.
M,S	Manhole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
A		Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
A		Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
A		Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
—	Catch Basins	See “Catch Basins” (No. 5)	See “Catch Basins” (No. 5).	See “Catch Basins” (No. 5).

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## No. 4 – Control Structure/Flow Restrictor

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
M,S	General	Trash and Debris (Includes Sediment)	Material exceeds 25% of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
A		Structural Damage	Structure is not securely attached to manhole wall.	Structure securely attached to wall and outlet pipe.
A			Structure is not in upright position (allow up to 10% from plumb).	Structure in correct position.
A			Connections to outlet pipe are not watertight and show signs of rust.	Connections to outlet pipe are water tight; structure repaired or replaced and works as designed.
A			Any holes--other than designed holes--in the structure.	Structure has no holes other than designed holes.
A	Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing.	Gate is watertight and works as designed.
A			Gate cannot be moved up and down by one maintenance person.	Gate moves up and down easily and is watertight.
A			Rod leading to gate is missing or damaged.	Rod is in place and works as designed.
A			Gate is rusted over 50% of its surface area.	Gate is repaired or replaced to meet design standards.
A	Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
M,S		Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
M,S	Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
---	Manhole	See "Closed Detention Systems" (No. 3).	See "Closed Detention Systems" (No. 3).	See "Closed Detention Systems" (No. 3).
---	Catch Basin	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

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## No. 5 – Catch Basins

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
M,S	General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%.	No Trash or debris located immediately in front of catch basin or on grate opening.
M,S			Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
M,S			Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.
M,S			Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.
M,S		Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
A		Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (Intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
A			Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	Frame is sitting flush on the riser rings or top slab and firmly attached.
A		Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
A			Grout fillet has separated or cracked wider than 1/4 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Pipe is regouted and secure at basin wall.
A		Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
M	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening.	No vegetation blocking opening to basin.	
M		Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation or root growth present.	
___	General	Contamination and Pollution	See "Detention Ponds" (No. 1).	No pollution present.

## No. 5 – Catch Basins

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
M,S	Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is closed
A		Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
A		Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
A	Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
M,S	Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
M,S		Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
M,S		Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

## No. 6 – Debris Barriers (e.g., Trash Racks)

Suggested Inspection Frequency	Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
M,S	General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier cleared to design flow capacity.
M	Metal Rack	Damaged/ Missing Bars.	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than 3/4 inch.
M			Bars are missing or entire barrier missing.	Bars in place according to design.
M			Bars are loose and rust is causing 50% deterioration to any part of barrier.	Barrier replaced or repaired to design standards.
M		Inlet/Outlet Pipe	Debris barrier missing or not attached to pipe	Barrier firmly attached to pipe

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## No. 7 – Energy Dissipaters

	Maintenance Components	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
<u>Above Ground</u>				
M,S	Rock Pad	Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil.	Rock pad replaced to design standards or by gabion mats and baskets
M,S		Erosion	Soil erosion in or adjacent to rock pad.	Rock pad replaced to design standards.
<u>Below Ground</u>				
A	Dispersion Trench	Pipe Plugged with Sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/flushed so that it matches design.
M,S		Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Trench redesigned or rebuilt to standards.
A		Perforations Plugged.	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Perforated pipe cleaned or replaced.
M,S		Water Flows Out Top of "Distributor" Catch Basin.	Inspection on maintenance person observes or receives credible report of water flowing out during any storm less than the design storm or its causing or appears likely to cause damage.	Facility rebuilt or redesigned to standards.
M,S		Receiving Area Over-Saturated	Water in receiving area is causing or has potential of causing landslide problems.	No danger of landslides.
A		Manhole/Chamber	Worn or Damaged Post, Baffles, Side of Chamber	Structure dissipating flow deteriorates to 1/2 of original size or any concentrated worn spot exceeding one square foot which would make structure unsound.
—	Other Defects		See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

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## No. 8 – Typical Biofiltration Swale

Suggested Inspection Frequency	Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
M,S	General	Sediment Accumulation on Grass	Sediment depth exceeds 1/2 inches.	Remove sediment deposits on grass treatment area of the bio-swale. When finished, swale should be level from side to side and drain freely toward outlet. There should be no areas of standing water once inflow has ceased.
M,S		Standing Water	When water stands in the swale between storms and does not drain freely.	Any of the following may apply: remove sediment or trash blockages, improve grade from head to foot of swale, remove clogged check dams, add underdrains or convert to a wet biofiltration swale.
M,S		Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire swale width.	Level the spreader and clean so that flows are spread evenly over entire swale width.
M		Constant Baseflow	When small quantities of water continually flow through the swale, even when it has been dry for weeks, and an eroded, muddy channel has formed in the swale bottom.	Add a low-flow pea-gravel drain the length of the swale or by-pass the baseflow around the swale.
A		Poor Vegetation Coverage	When grass is sparse or bare or eroded patches occur in more than 10% of the swale bottom.	Determine why grass growth is poor and correct that condition. Re-plant with plugs of grass from the upper slope: plant in the swale bottom at 8-inch intervals. Or re-seed into loosened, fertile soil.
M		Vegetation	When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over.	Mow vegetation or remove nuisance vegetation so that flow not impeded. Grass should be mowed to a height of 3 to 4 inches. Remove grass clippings.
A		Excessive Shading	Grass growth is poor because sunlight does not reach swale.	If possible, trim back over-hanging limbs and remove brushy vegetation on adjacent slopes.
M,S		Inlet/Outlet	Inlet/outlet areas clogged with sediment and/or debris.	Remove material so that there is no clogging or blockage in the inlet and outlet area.
M,S		Trash and Debris Accumulation	Trash and debris accumulated in the bio-swale.	Remove trash and debris from bioswale.
M,S		Erosion/Scouring	Eroded or scoured swale bottom due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. If bare areas are large, generally greater than 12 inches wide, the swale should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident, or take plugs of grass from the upper slope and plant in the swale bottom at 8-inch intervals.

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## No. 9 – Wet Biofiltration Swale

Suggested Inspection Frequency	Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
M	General	Sediment Accumulation	Sediment depth exceeds 1-inches in 10% of the swale treatment area.	Remove sediment deposits in treatment area.
M,S		Water Depth	Water not retained to a depth of about 4 inches during the wet season.	Build up or repair outlet berm so that water is retained in the wet swale.
A		Wetland Vegetation	Vegetation becomes sparse and does not provide adequate filtration, OR vegetation is crowded out by very dense clumps of cattail, which do not allow water to flow through the clumps.	Determine cause of lack of vigor of vegetation and correct. Replant as needed. For excessive cattail growth, cut cattail shoots back and compost off-site. Note: normally wetland vegetation does not need to be harvested unless die-back is causing oxygen depletion in downstream waters.
M,S		Inlet/Outlet	Inlet/outlet area clogged with sediment and/or debris.	Remove clogging or blockage in the inlet and outlet areas.
—		Trash and Debris Accumulation	See "Detention Ponds" (No. 1).	Remove trash and debris from wet swale.
A		Erosion/Scouring	Swale has eroded or scoured due to flow channelization, or higher flows.	Check design flows to assure swale is large enough to handle flows. By-pass excess flows or enlarge swale. Replant eroded areas with fibrous-rooted plants such as <i>Juncus effusus</i> (soft rush) in wet areas or snowberry ( <i>Symphoricarpos albus</i> ) in dryer areas.

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## No. 10 – Filter Strips

Suggested Inspection Frequency	Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
M,S	General	Sediment Accumulation on Grass	Sediment depth exceeds 1 inches.	Remove sediment deposits, re-level so slope is even and flows pass evenly through strip.
A		Vegetation	When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over.	Mow grass, control nuisance vegetation, such that flow not impeded. Grass should be mowed to a height between 3-4 inches.
M,S		Trash and Debris Accumulation	Trash and debris accumulated on the filter strip.	Remove trash and Debris from filter.
A		Erosion/Scouring	Eroded or scoured areas due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. The grass will creep in over the rock in time. If bare areas are large, generally greater than 12 inches wide, the filter strip should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident.
A		Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire filter width.	Level the spreader and clean so that flows are spread evenly over entire filter width.

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## No. 11 – Wetponds

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
M,S	General	Water level	First cell is empty, doesn't hold water.	Line the first cell to maintain at least 4 feet of water. Although the second cell may drain, the first cell must remain full to control turbulence of the incoming flow and reduce sediment resuspension.
M,S		Trash and Debris	Accumulation that exceeds 1 CF per 1000-SF of pond area.	Trash and debris removed from pond.
M,S		Inlet/Outlet Pipe	Inlet/Outlet pipe clogged with sediment and/or debris material.	No clogging or blockage in the inlet and outlet piping.
A		Sediment Accumulation in Pond Bottom	Sediment accumulations in pond bottom that exceeds the depth of sediment zone plus 6-inches, usually in the first cell.	Sediment removed from pond bottom.
M,S		Oil Sheen on Water	Prevalent and visible oil sheen.	Oil removed from water using oil-absorbent pads or vactor truck. Source of oil located and corrected. If chronic low levels of oil persist, plant wetland plants such as <i>Juncus effusus</i> (soft rush) which can uptake small concentrations of oil.
A		Erosion	Erosion of the pond's side slopes and/or scouring of the pond bottom, that exceeds 6-inches, or where continued erosion is prevalent.	Slopes stabilized using proper erosion control measures and repair methods.
A		Settlement of Pond Dike/Berm	Any part of these components that has settled 4-inches or lower than the design elevation, or inspector determines dike/berm is unsound.	Dike/berm is repaired to specifications.
A		Internal Berm	Berm dividing cells should be level.	Berm surface is leveled so that water flows evenly over entire length of berm.
M,S		Overflow Spillway	Rock is missing and soil is exposed at top of spillway or outside slope.	Rocks replaced to specifications.

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Note: For any work done in a facility or conveyance system: Avoid the discharge or any water born sediment, debris, hazardous waste, or any other pollutant into the down stream conveyance system. Each pond, vault, pipe, ditch, or catch basin must be sealed off and be self-contained during any maintenance operation. Any discharge could be a violation of Federal Clean Water Act; Federal Endangered Species Act; State Dept. of Ecology and Dept. of Fish & Wildlife Regulations; and Snohomish County Storm Water & Critical Areas Codes.

## No. 12 – Wetvaults

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
A	General	Trash/Debris Accumulation	Trash and debris accumulated in vault, pipe or inlet/outlet (includes floatables and non-floatables).	Remove trash and debris from vault.
A		Sediment Accumulation in Vault	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6-inches.	Remove sediment from vault.
A		Damaged Pipes	Inlet/outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
A		Access Cover Damaged/Not Working	Cover cannot be opened or removed, especially by one person.	Pipe repaired or replaced to proper working specifications.
A		Ventilation	Ventilation area blocked or plugged.	Blocking material removed or cleared from ventilation area. A specified % of the vault surface area must provide ventilation to the vault interior (see design specifications).
A		Vault Structure Damage - Includes Cracks in Walls Bottom, Damage to Frame and/or Top Slab	Maintenance/inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
A			Cracks wider than 1/4-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.
A		Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection staff.	Baffles repaired or replaced to specifications.
A		Access Ladder Damage	Ladder is corroded or deteriorated, not functioning properly, not attached to structure wall, missing rungs, has cracks and/or misaligned. Confined space warning sign missing.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel. Replace sign warning of confined space entry requirements. Ladder and entry notification complies with OSHA standards.

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## No. 13 – Sand Filters (above ground/open)

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
A,S	Above Ground (open sand filter)	Sediment Accumulation on top layer	Sediment depth exceeds 1/2-inch.	No sediment deposit on grass layer of sand filter that would impede permeability of the filter section.
M,S		Trash and Debris Accumulations	Trash and debris accumulated on sand filter bed.	Trash and debris removed from sand filter bed.
A,S		Sediment/ Debris in Clean-Outs	When the clean-outs become full or partially plugged with sediment and/or debris.	Sediment removed from clean-outs.
A,S		Sand Filter Media	Drawdown of water through the sand filter media takes longer than 24-hours, and/or flow through the overflow pipes occurs frequently.	Top several inches of sand are scraped. May require replacement of entire sand filter depth depending on extent of plugging (a sieve analysis is helpful to determine if the lower sand has too high a proportion of fine material).
A,S		Prolonged Flows	Sand is saturated for prolonged periods of time (several weeks) and does not dry out between storms due to continuous base flow or prolonged flows from detention facilities.	Low, continuous flows are limited to a small portion of the facility by using a low wooden divider or slightly depressed sand surface.
A,S		Short Circuiting	When flows become concentrated over one section of the sand filter rather than dispersed.	Flow and percolation of water through sand filter is uniform and dispersed across the entire filter area.
A		Erosion Damage to Slopes	Erosion over 2-inches deep where cause of damage is prevalent or potential for continued erosion is evident.	Slopes stabilized using proper erosion control measures.
A		Rock Pad Missing or Out of Place	Soil beneath the rock is visible.	Rock pad replaced or rebuilt to design specifications.
A		Flow Spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed across sand filter.	Spreader leveled and cleaned so that flows are spread evenly over sand filter.
A		Damaged Pipes	Any part of the piping that is crushed or deformed more than 20% or any other failure to the piping.	Pipe repaired or replaced.

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## No. 14 –Sand Filters (below ground/enclosed)

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
A	Below Ground Vault.	Sediment Accumulation on Sand Media Section	Sediment depth exceeds 1/2-inch.	No sediment deposits on sand filter section that which would impede permeability of the filter section.
A		Sediment Accumulation in Pre-Settling Portion of Vault	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6-inches.	No sediment deposits in first chamber of vault.
A		Trash/Debris Accumulation	Trash and debris accumulated in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault and inlet/outlet piping.
A		Sediment in Drain Pipes/Cleanouts	When drain pipes, cleanouts become full with sediment and/or debris.	Sediment and debris removed.
A		Short Circuiting	When seepage/flow occurs along the vault walls and corners. Sand eroding near inflow area.	Sand filter media section re-laid and compacted along perimeter of vault to form a semi-seal. Erosion protection added to dissipate force of incoming flow and curtail erosion.
A		Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
A		Access Cover Damaged/Not Working	Cover cannot be opened, corrosion/deformation of cover. Maintenance person cannot remove cover using normal lifting pressure.	Cover repaired to proper working specifications or replaced.
A		Ventilation	Ventilation area blocked or plugged	Blocking material removed or cleared from ventilation area. A specified % of the vault surface area must provide ventilation to the vault interior (see design specifications).
A		Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab.	Cracks wider than 1/2-inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
A			Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.
A	Baffles/Internal walls	Baffles or walls corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.	

## No. 14 –Sand Filters (below ground/enclosed)

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
A	Below Ground Vault	Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel.

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## No. 15 – Stormfilter™ (leaf compost filter)

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
A	Below Ground Vault	Sediment Accumulation on Media.	Sediment depth exceeds 0.25-inches.	No sediment deposits which would impede permeability of the compost media.
A		Sediment Accumulation in Vault	Sediment depth exceeds 6-inches in first chamber.	No sediment deposits in vault bottom of first chamber.
A		Trash/Debris Accumulation	Trash and debris accumulated on compost filter bed.	Trash and debris removed from the compost filter bed.
A		Sediment in Drain Pipes/Clean-Outs	When drain pipes, clean-outs, become full with sediment and/or debris.	Sediment and debris removed.
A		Damaged Pipes	Any part of the pipes that are crushed or damaged due to corrosion and/or settlement.	Pipe repaired and/or replaced.
A		Access Cover Damaged/Not Working	Cover cannot be opened; one person cannot open the cover using normal lifting pressure, corrosion/deformation of cover.	Cover repaired to proper working specifications or replaced.
A		Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/4-inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
A			Cracks wider than 1/4V -inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.
A		Baffles	Baffles corroding, cracking warping, and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
A		Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.
A	Below Ground Cartridge Type	Compost Media	Drawdown of water through the media takes longer than 1 hour, and/or overflow occurs frequently.	Media cartridges replaced.
A		Short Circuiting	Flows do not properly enter filter cartridges.	Filter cartridges replaced.

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## No. 16 – Baffle Oil/Water Separators (API Type)

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
M,S	General	Monitoring	Discharging water shows obvious signs of poor water quality.	Effluent discharge from vault should be clear with out thick visible sheen.
A		Sediment Accumulation	Sediment depth in bottom of vault exceeds 6-inches in depth.	No sediment deposits on vault bottom that would impede flow through the vault and reduce separation efficiency.
A		Trash and Debris Accumulation	Trash and debris accumulation in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault, and inlet/outlet piping.
A		Oil Accumulation	Oil accumulations that exceed 1-inch, at the surface of the water.	Extract oil from vault by vactoring. Disposal in accordance with state and local rules and regulations.
A		Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired or replaced.
A		Access Cover Damaged/Not Working	Cover cannot be opened, corrosion/deformation of cover.	Cover repaired to proper working specifications or replaced.
A		Vault Structure Damage - Includes Cracks in Walls Bottom, Damage to Frame and/or Top Slab	See "Catch Basins" (No. 5)	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
A			Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.
A		Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
A		Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.

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## No. 17 – Coalescing Plate Oil/Water Separators

Suggested Inspection Frequency	Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
M,S	General	Monitoring	Discharging water shows obvious signs of poor water quality.	Effluent discharge from vault should be clear with no thick visible sheen.
A		Sediment Accumulation	Sediment depth in bottom of vault exceeds 6-inches in depth and/or visible signs of sediment on plates.	No sediment deposits on vault bottom and plate media, which would impede flow through the vault and reduce separation efficiency.
A		Trash and Debris Accumulation	Trash and debris accumulated in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault, and inlet/outlet piping.
A		Oil Accumulation	Oil accumulation that exceeds 1-inch at the water surface.	Oil is extracted from vault using vactoring methods. Coalescing plates are cleaned by thoroughly rinsing and flushing. Should be no visible oil depth on water.
A		Damaged Coalescing Plates	Plate media broken, deformed, cracked and/or showing signs of failure.	A portion of the media pack or the entire plate pack is replaced depending on severity of failure.
A		Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and or replaced.
A		Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
A		Vault Structure Damage - Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/4-inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
A			Cracks wider than 1/4-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.
A		Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.

If you are unsure whether a problem exists, please contact Snohomish County Surface Water Management Stormwater Facility Maintenance Program at 425-388-3464.

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## No. 18 – Catchbasin Inserts

Suggested Inspection Frequency	Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
M,S	General	Sediment Accumulation	When sediment forms a cap over the insert media of the insert and/or unit.	No sediment cap on the insert media and its unit.
M,S		Trash and Debris Accumulation	Trash and debris accumulates on insert unit creating a blockage/restriction.	Trash and debris removed from insert unit. Runoff freely flows into catch basin.
M,S		Media Insert Not Removing Oil	Effluent water from media insert has a visible sheen.	Effluent water from media insert is free of oils and has no visible sheen.
M,S		Media Insert Water Saturated	Catch basin insert is saturated with water and no longer has the capacity to absorb.	Remove and replace media insert
M,S		Media Insert-Oil Saturated	Media oil saturated due to petroleum spill that drains into catch basin.	Remove and replace media insert.
M,S		Media Insert Use Beyond Normal Product Life	Media has been used beyond the typical average life of media insert product.	Remove and replace media at regular intervals, depending on insert product.

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## Appendix E:

### Volume V, Appendix C Tables C.1SC and C.2SC

Note: Insert this page and the Replacement Tables as listed below, at the beginning of Volume V of the 2005 Stormwater Management Manual for Western Washington. The Replacement Tables are for use in Snohomish County.

<b>Original Volume V, Appendix C Tables</b>	<b>Replacement Tables</b>
Table C.1, p. C-1	Table C.1SC
Table C-2, p. C-2	Table C.2SC

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Table C.1SC – Geotextile Properties for Underground Drainage Geotextile Property Requirements <sup>1</sup>			
		Low Survivability	Moderate Survivability
Geotextile Property	Test Method	Woven/Nonwoven	Woven/Nonwoven
Grab Tensile Strength, min. in machine and x-machine direction	ASTM D4632	180 lbs/115 lbs min.	250 lbs/160 lbs min.
Grab Failure Strain, in machine and x-machine direction	ASTM D4632	<50%/≥50%	<50%/≥50%
Seam Breaking Strength (if seams are present)	ASTM D4632 and ASTM D4884 (adapted for grab test)	160 lbs/100 lbs min.	220 lbs/140 lbs min.
Puncture Resistance	ASTM D6241	370 lbs/220 lbs	495 lbs/310 lbs
Tear Strength, min. in machine and x-machine direction	ASTM D4533	67 lbs/40 lbs min.	80 lbs/50 lbs min.
Ultraviolet (UV) Radiation stability	ASTM D4355	50% strength retained min., after 500 hrs. in weatherometer	50% strength retained min., after 500 hrs. in weatherometer

<sup>1</sup> All geotextile properties are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in the table).

Table C.2SC – Geotextile for Underground Drainage Filtration Properties Geotextile Property Requirements <sup>1</sup>				
Geotextile Property	Test Method	Class A	Class B	Class C
AOS <sup>2</sup>	ASTM D4751	.43 mm max. (#40 sieve)	.25 mm max. (#60 sieve)	.18 mm max. (#80 sieve)
Water Permittivity	ASTM D4491	.5 sec <sup>-1</sup> min.	.4 sec <sup>-1</sup> min.	.3 sec <sup>-1</sup> min.

<sup>1</sup> All geotextile properties are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in the table).

<sup>2</sup> Apparent Opening Size (measure of diameter of the pores in the geotextile)

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