



Redevelopment Stormwater Guidelines

Introduction

The City of Mountlake Terrace has adopted the 2012 Department of Ecology Stormwater Management Manual for Western Washington as amended in December 2014 (2012/2014 Ecology manual) for development within the City limits. There are 9 Minimum Requirements that your project may be required follow, designed to protect lakes and creeks. The number of requirements that apply to you depends on the size of your project. For more detail, the online, interactive Ecology 2012/2014 Stormwater Management Manual for Western Washington is located here:

<https://fortress.wa.gov/ecy/madcap/wq/2014SWMMWWinteractive/2014%20SWMMWW.htm>

Ecology's Minimum Requirements for stormwater management are:

1. Preparation of Stormwater Site Plans
2. Construction Stormwater Pollution Prevention (SWPP) Plan
3. Source Control of Pollution
4. Preservation of Natural Drainage Systems and Outfalls
5. On-Site Stormwater Management
6. Runoff Treatment
7. Flow Control
8. Wetlands Protection
9. Operation and Maintenance

Please see the chart on page 2, “Flow Chart for Determining Requirements for Redevelopment” to learn which requirements apply to your project.

Flow Chart and Guidelines Definitions:

Redevelopment: On a site that is already substantially developed (has 35% or more existing hard surface coverage.)

Effective impervious surface: Impervious surfaces that are connected via sheet flow or conveyance to a drainage system.

Hard surface: Roof area, driveways, walkways, patios, or parking areas, or any other surface that restricts water from entering soil. Pollution-generating hard surface is a hard surface considered to be a significant source of pollutants in stormwater runoff.

Impervious surface: A non-vegetated surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions before development.

Land disturbing activity: Any activity that results in a change in the existing soil cover (both vegetative and non-vegetative) and/or the existing soil topography. Land disturbing activities include (but are not limited to) compaction, clearing, grading, filling, and excavation.

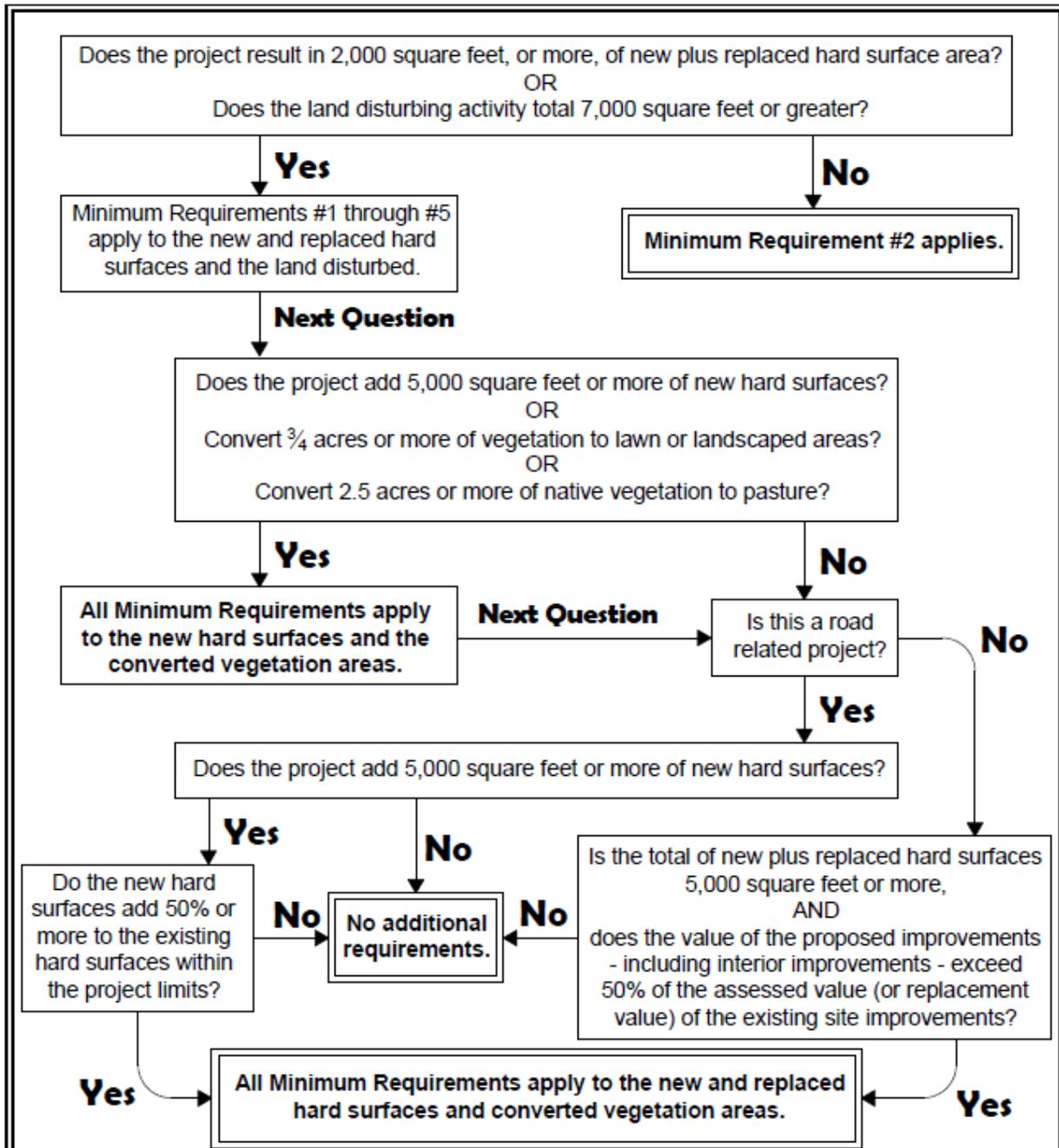


Figure I-2.4.2
Flow Chart for Determining Requirements for Redevelopment



Revised June 2015

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Minimum Requirement #1 (*Required at land use approval*) – **Preparation of Stormwater Site Plan (Ecology 2012/2014 manual, Chapter 3, Volume I)**

- A. Prepare a Site Analysis on Existing Conditions, including:
- A survey prepared by a registered land surveyor showing existing utilities, surface water features, hazard areas, and contour lines.
 - A soils report by a professional soil scientist¹ with underlying soils, an assessment of infiltration capability, and low impact development (LID) feasibility, and any hydraulic restriction layers. The soils report must include:
 - **The results of a small-scale Pilot Infiltration Test (PIT)**
 - Detailed test pit or soil boring logs including stratification; a map of the location of the test pits; results of wet season testing (December 1 – April 1) for saturated hydraulic conductivity (Ksat); results of testing for hydraulic restriction layers; and an assessment of conveyance and possible locations where interflow may emerge.
 - If needed, a survey of existing vegetation cover by a qualified individual.
- B. Prepare a Preliminary Development Layout, considering:
- Minimizing land disturbance
 - Protection of critical areas
 - Preservation of natural vegetation
 - Location of impervious areas over less permeable soil
 - Building clustering
 - Minimization of impervious areas
 - Keeping natural drainage patterns
- C. Perform an *Off-site Analysis* to determine the downstream impact of your project: This analysis must extend ¼ mile downstream of the project site or to the nearest receiving water, whichever is less. If City staff are unable to adequately determine the downstream impact of the project upon review of the submittal, the City reserves the right to require a quantitative off-site analysis. In preparing the off-site analysis, tasks 1 – 4 described in the Supplemental Guidelines of the 2012/2014 Ecology manual Vol. 1, Ch. 2 should be followed. The existing or potential impacts to be evaluated include:
- Conveyance system capacity problems
 - Localized flooding issues
 - Upland erosion impacts

¹ For sites needing Minimum Requirements #1-9, the soils report must be produced by a professional soil scientist certified by the Soil Science Society of America (or an equivalent national program), or by other suitably trained persons working under the supervision of a professional engineer, geologist, hydrogeologist, or engineering geologist registered in the State of Washington. For sites needing only Minimum Requirements #1-5, in addition to the qualified professionals previously listed, a locally licensed on-site sewage designer may produce the soils report.

- Stream channel erosion at proposed outfall location(s)
- Past violations of surface water quality standards in the receiving water body

D. Prepare a permanent *Stormwater Control Plan*.

The level of detail required for the plan depends on the size of your project. Be sure to document the methodology used to develop the plan.

1. Select on-site stormwater control best management practices (BMPs) applicable to your site.
2. Select a runoff treatment method, if required.
3. If flow control facilities are necessary, provide a listing of existing site hydrology, developed site hydrology, plan drawing of the facility with necessary calculations and measurements to show adequate storage volume for the site. See Volume 3 of the 2012/2014 Ecology manual for more guidance.
4. Provide a clear and concise analysis of the overall stormwater conveyance system and how the various components will work together. Please show details on the civil plans and as part of the Stormwater Site Plan narrative.

E. Prepare a *Construction Stormwater Pollution Prevention Plan*. (See Minimum Requirement #2.)

F. Assemble and submit the *Stormwater Site Plan*, include the following documents:

- A Project Overview with vicinity and site map
- B Existing Conditions Summary
- C Off-site Analysis
- D Permanent Stormwater Control Plan
- E Other reports or studies, i.e. land survey report, soils analysis report, survey of existing vegetation, and/or wetland delineation
- F Operation and Maintenance manual
- G Installation cost estimate for establishing performance bond

Minimum Requirement #2 (*Required at civil plan approval*) – **Construction Stormwater Pollution Prevention Plan (SWPPP)** (2012/2014 Ecology manual, Vol. 2)

All projects are responsible for preventing erosion and discharge of sediment and other pollutants into surface water. There are 13 elements that must be addressed as part of the SWPPP. Provide details and documentation on how each of the 13 elements are to be addressed, or describe how and why the requirement does not apply to your project. For each element, provide the BMPs to be used from the 2012/2014 Ecology manual. A recommended Ecology template for SWPP development to make the process of SWPPP development easier is available on-line: https://ecology.wa.gov/Asset-Collections/Doc-Assets/Water-quality/Water-Quality-Permits/Stormwater-General-Permits/Construction-Stormwater-General-Permit/CSWGP_SWPPP_Template

The 13 elements are:

1. Preserve Vegetation/Mark Clearing Limits
2. Establish Construction Access

3. Control Flow Rates
4. Install Sediment Controls
5. Stabilize Soils
6. Protect Slopes
7. Protect Drain Inlets
8. Stabilize Channels and Outlets
9. Control Pollutants
10. Control Dewatering
11. Maintain Erosion Control BMPs
12. Manage The Project
13. Protect Low Impact Development BMPs

Minimum Requirement #3 (*Required at civil plan approval*) – **Source Control of Pollution** (2012/2014 Ecology manual, Vol. 4, Ch. 2)

The intent of source control BMPs is to prevent stormwater from coming in contact with pollutants. All known, available, and reasonable source control BMPs must be applied to all projects. This requirement includes descriptions of Operational BMPs and Structural Source Control BMPs. Operational BMPs must be described as part of the SWPPP (Minimum Requirement #2). Structural source control BMP's must be identified on the stormwater site plan and civil site plans. For design details of these BMPs, see Volume 4 of the 2012/2014 Ecology manual.

Minimum Requirement #4 (*Required at land use approval*) – **Preservation of Natural Drainage Systems and Outfalls** (2012/2014 Ecology manual, Vol. 1, Ch.2)

If the proposed project has natural stormwater drainage or an existing natural outfall to a surface water body, the natural drainage pattern for conveyance and discharge shall be maintained to the maximum extent practicable.

Minimum Requirement #5 (*Required at land use approval*) – **On-site Stormwater Management** (2012/2014 Ecology manual, Vol. 1, Ch.2)

The objective of on-site stormwater management is to infiltrate stormwater as close as possible to the location where it collects. For this minimum requirement, two options exist:

Use the Low Impact Development (LID) Performance Standard (stormwater flow durations from the site must match pre-developed flow durations within a specific range – see 2012/2014 Ecology manual Volume 1, Chapter 2, page 56) AND BMP T5.13: Post-Construction Soil Quality and Depth.

OR

Use List #2 (summarized below, but described in more detail in the Ecology 2012/2014 manual, Volume 1, Chapter 2, page 57). Sites triggering only Minimum Requirements #1 - #5 may substitute BMP T5.14A: Rain Gardens for BMP T7.30: Bioretention Cells, Swales, and Planter Boxes.

List # 2: for each surface, consider the BMPs in the order listed for that type of surface:

Lawn and landscaped areas:

- Post-Construction Soil in accordance with BMP T5.13: Post-Construction Soil Quality and Depth (p.911). Please note, the City will enforce this BMP at all sites.

Roofs:

- Full Dispersion in accordance with BMP T5.30: Full Dispersion (p.939), or Downspout Full Infiltration Systems in accordance with BMP T5.10A: Downspout Full Infiltration (p.905).
- Bioretention (See BMP T7.30: Bioretention Cells, Swales, and Planter Boxes (p.959)) facilities that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.
- Downspout Dispersion Systems in accordance with BMP T5.10B: Downspout Dispersion Systems (p.905)
- Perforated Stub-out Connections in accordance with BMP T5.10C: Perforated Stub-out Connections (p.905)

Other Hard Surfaces:

- Full Dispersion in accordance with BMP T5.30: Full Dispersion (p.939)
- Permeable pavement in accordance with BMP T5.15: Permeable Pavements (p.917)
- Bioretention BMP's (BMP T7.30: Bioretention Cells, Swales, and Planter Boxes (p.959)) that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it
- Sheet Flow Dispersion in accordance with BMP T5.12: Sheet Flow Dispersion (p.908), or Concentrated Flow Dispersion in accordance with BMP T5.11: Concentrated Flow Dispersion (p.905)

Infeasibility: Not all LID is appropriate for all sites. If you have determined that a specific BMP is infeasible for your site, please provide the following information in a table to document your findings. In the table, please include the following information: the BMP name and number evaluated; the infeasibility criteria as stated in the 2012/2014 Ecology manual; and the site conditions which meet this infeasibility criteria.

Minimum Requirement #6 (*Required at land use approval*) – **Runoff Treatment** (2012/2014 Ecology manual, Volume 5)

Projects which total 5,000 square feet or more of pollution-generating hard surface (PGHS), or that convert more than $\frac{3}{4}$ of an acre of native vegetation to lawn or landscaped area must treat the stormwater runoff from these areas. See details in Volume 5 of the 2012/2014 Ecology manual. Treatment facilities must be sized to treat a 24-hour, 6-month storm. For treatment downstream of a detention facility, the full 2-year release rate shall be treated.

Minimum Requirement #7 (*Required at land use approval*) – **Flow Control** (2012/2014 Ecology manual, Volume 3)

Projects that involve the installation of 10,000 square feet or more of effective impervious surface or that convert more than $\frac{3}{4}$ of an acre of native vegetation to lawn or landscaped area must detain stormwater runoff from these areas. See Volume 3 of the 2012/2014

Ecology manual for design criteria. Site conditions, use of full dispersion BMPs, or alternative pavement design techniques may allow for a reduction in the size, cost, and site impact of detention facilities. Developers are encouraged to work with staff to explore ways to reduce the overall cost and impact of stormwater structures on development projects.

Minimum Requirement #8 (*Required at land use approval*) – **Wetlands Protection**
(2012/2014 Ecology manual, Volume 1, Chapter 2)

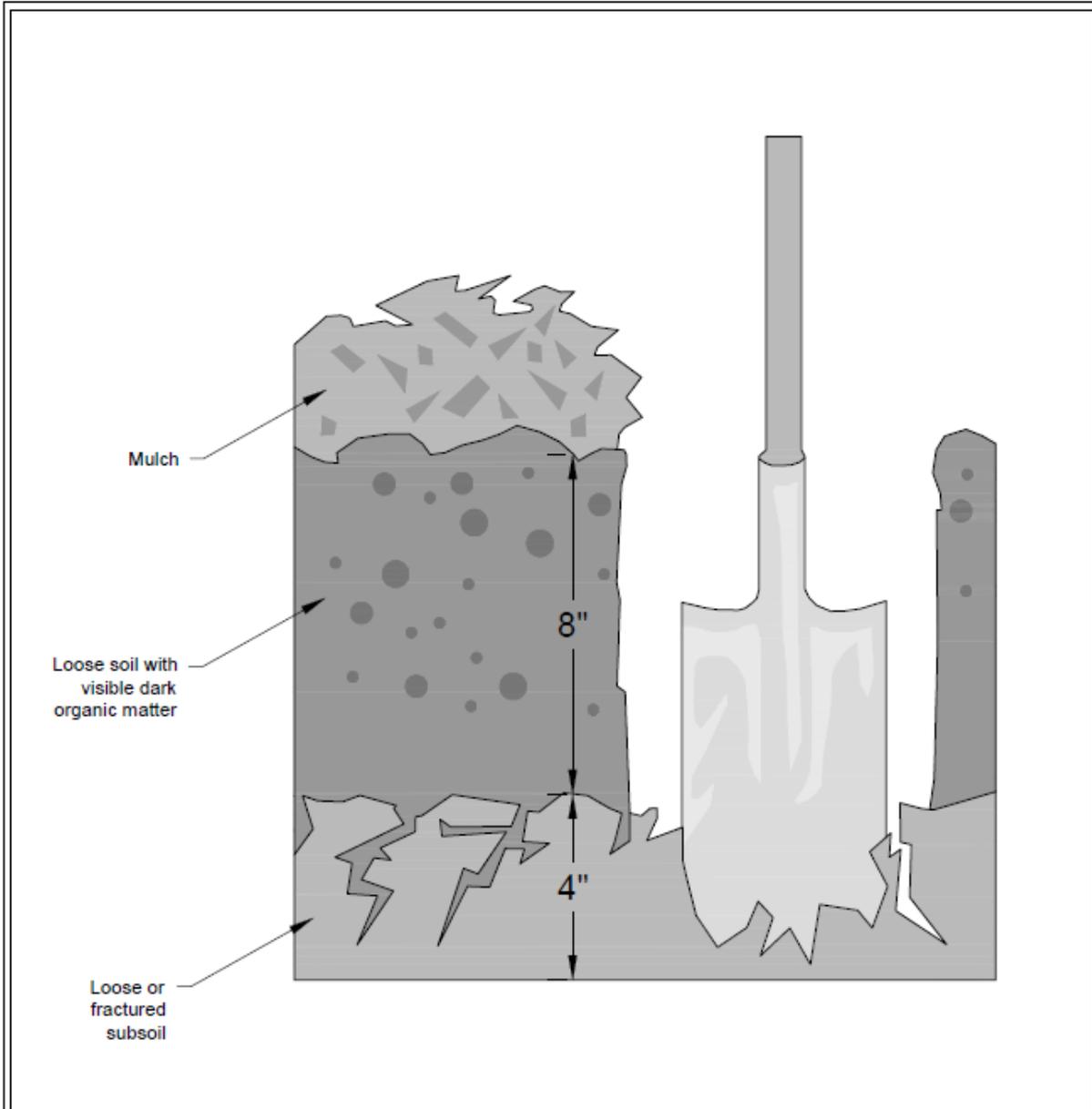
If stormwater from your site discharges into a wetland, either directly or indirectly through a conveyance system, special conditions apply. If this is the case, please see city staff to determine the best approach for your site.

Minimum Requirement #9 (*Required at civil plan approval*) – **Operation and Maintenance**
(2012/2014 Ecology manual, Volume 5)

An operations and maintenance manual that is consistent with the provisions in Volume 5 of the 2012/2014 Ecology manual must be provided for all proposed stormwater facilities and BMP's, and the party (or parties) responsible for maintenance and operation must be identified in the manual.

For more information, please contact:

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Phone: (425) 744-6226



Reprinted from *Guidelines and Resources For Implementing Soil Quality and Depth BMP T5.13 in WDOE Stormwater Management Manual for Western Washington*, 2010, Washington Organic Recycling Council

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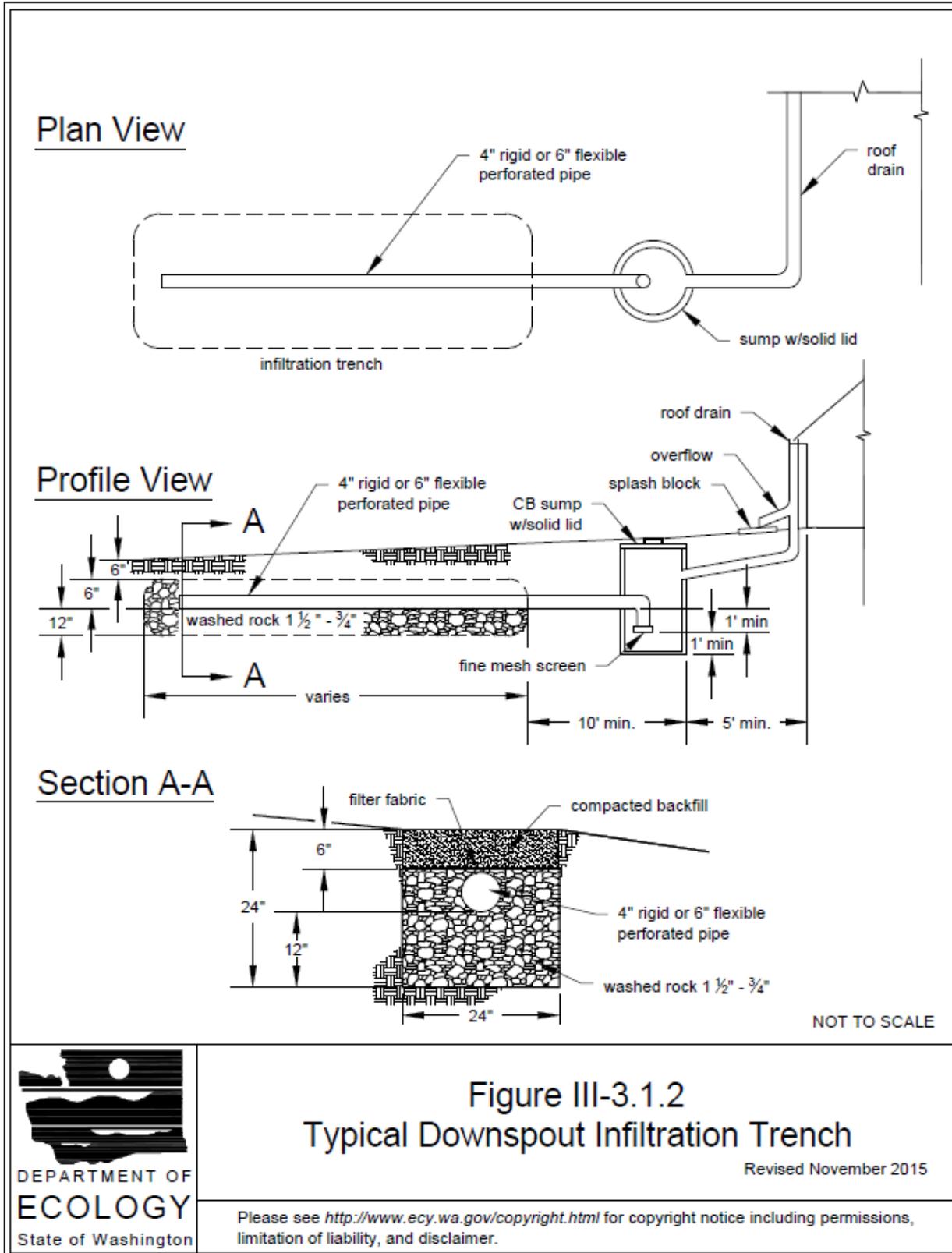


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Figure V-5.3.3
Planting Bed Cross-Section

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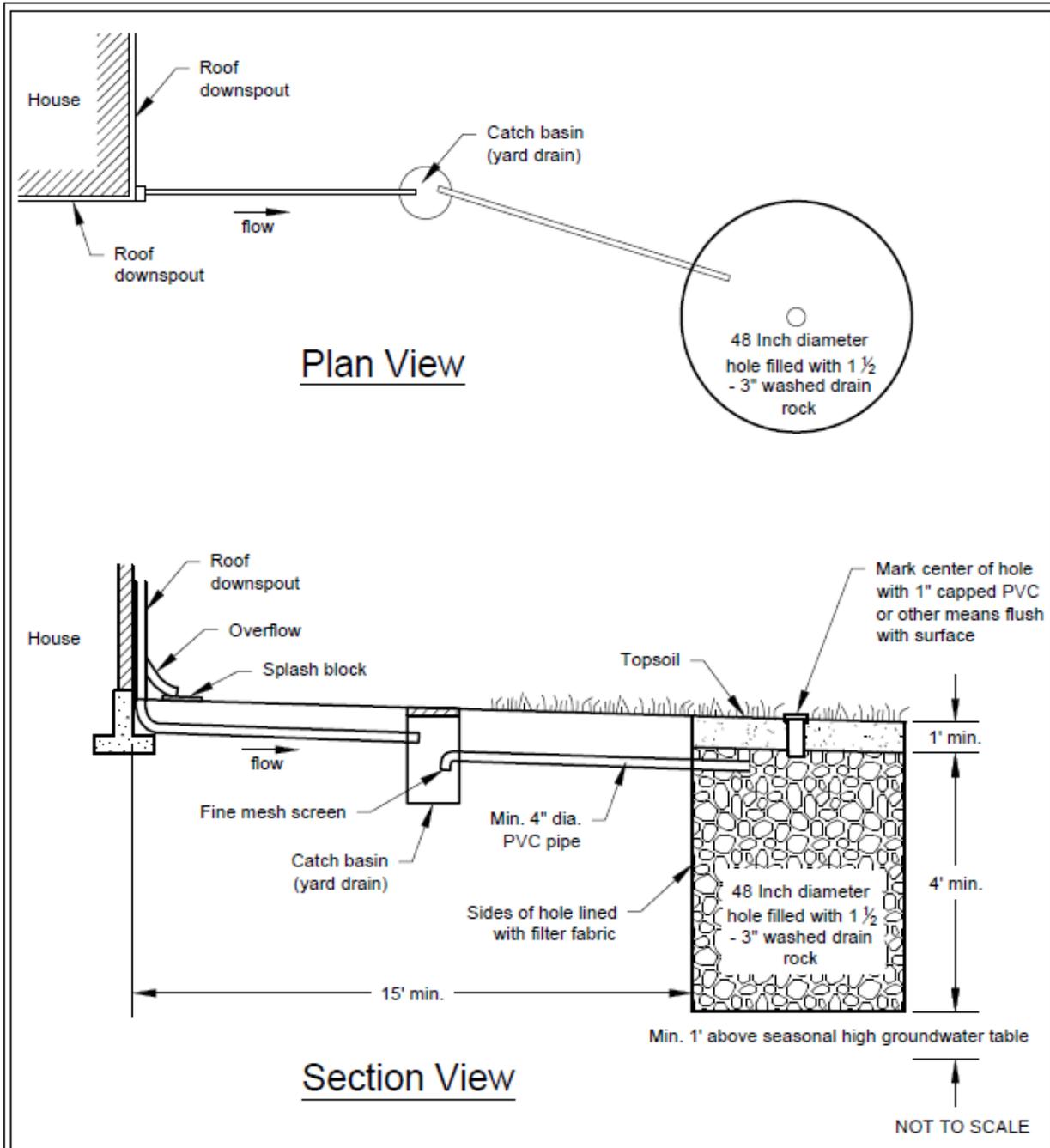
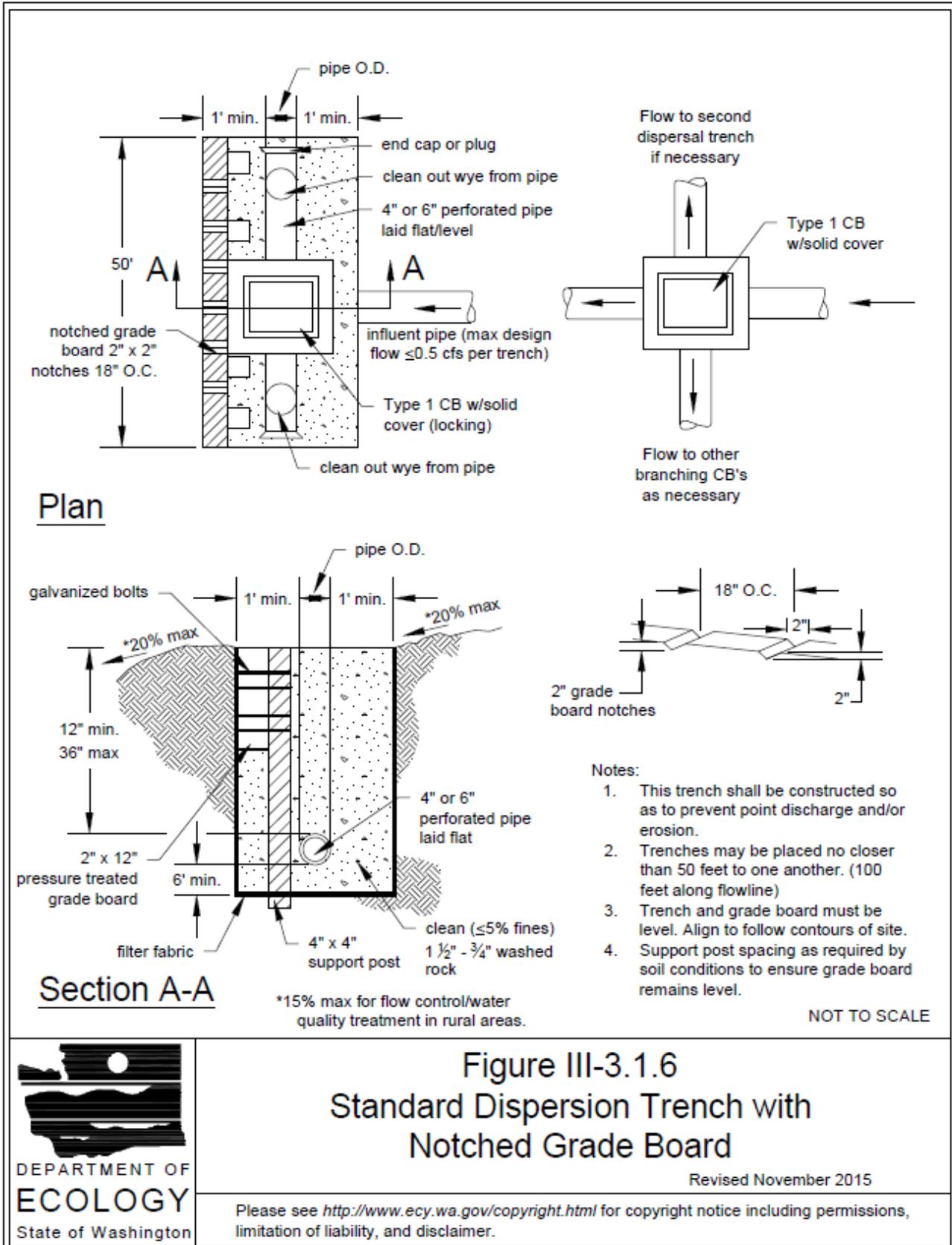


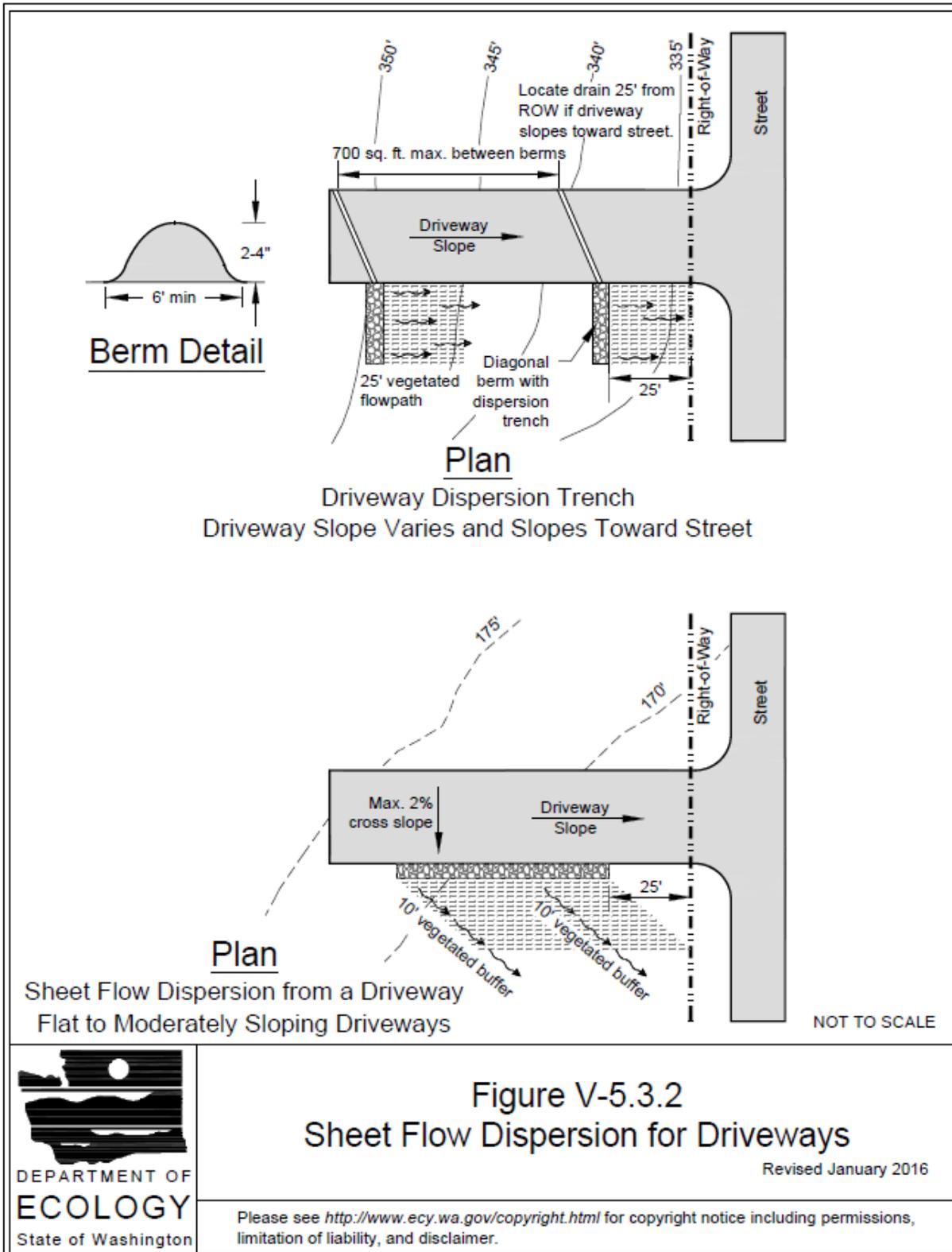
Figure III-3.1.4
Typical Downspout Infiltration Drywell

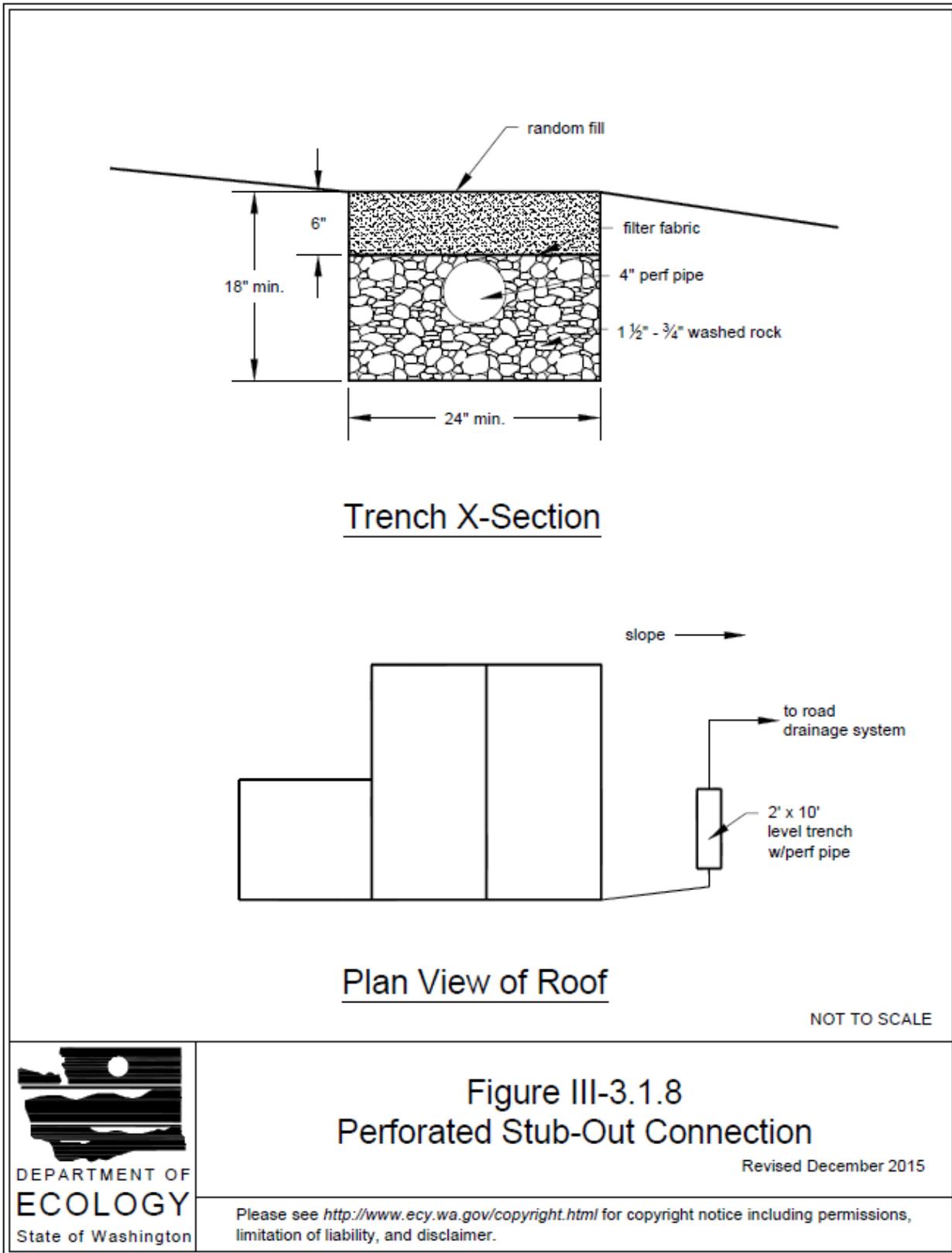
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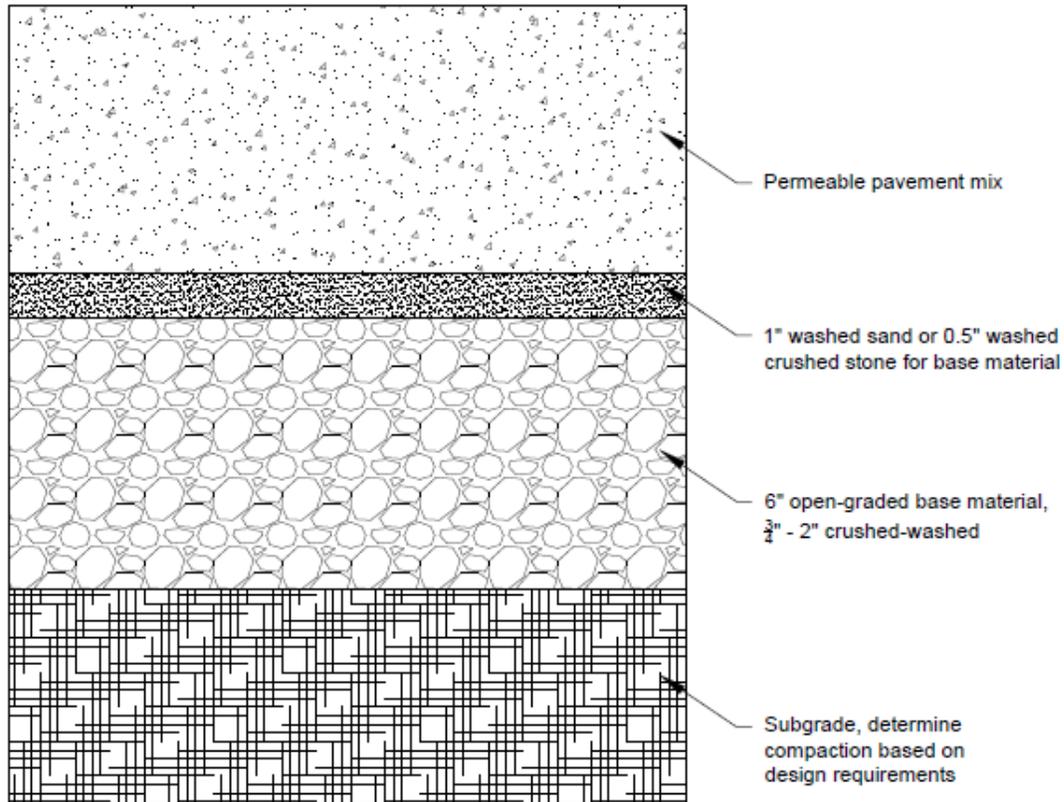


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Figure V-5.3.4
Example of a Permeable Pavement
(Concrete or Asphalt) Section

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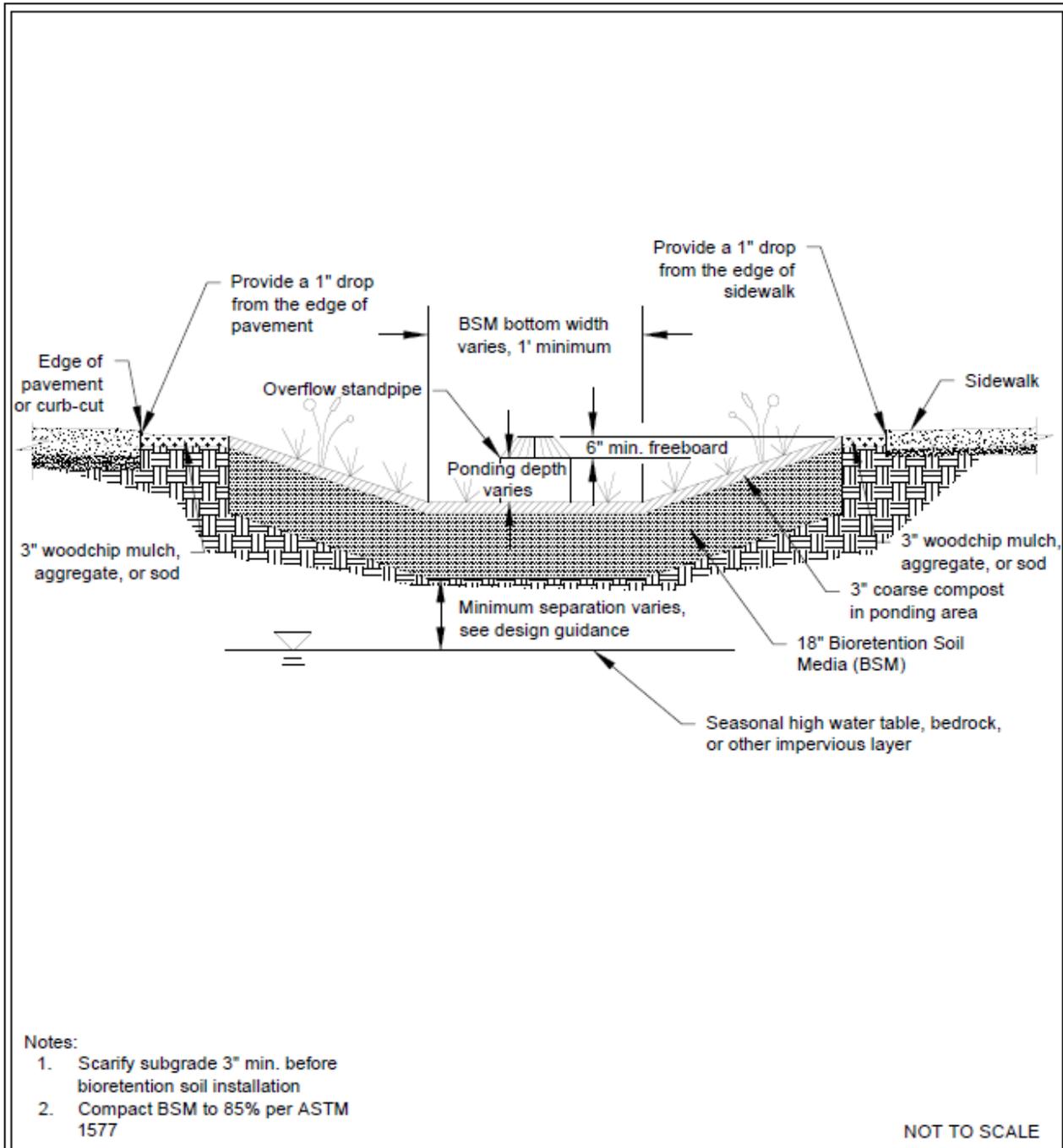


Figure V-7.4.1a
Typical Bioretention

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