

**City of Tacoma Response to Comments and Questions on the City of Tacoma's Responses to Ecology's  
April 10, 2008 Comments on the draft Stormwater Manual**

February 5, 2009

Note: The numbering system below corresponds to the numbers in the Ecology April '08 comments.

The text in red represents the City of Tacoma's response to comments.

2. The City's response needs additional information. The City must more completely describe the extent of their armoring and piping systems. Do they extend throughout the length of the channel? How do they arrive at the conclusion that the only beneficial use of the channel is stormwater conveyance?

Please review the attached T-Street Gulch report and associated letter.

New Comments:

Figure 6 indicates that M.R. #1 - #12 applies to new impervious surfaces on road projects only if there is more than 5,000 sq. ft. of new impervious surface AND (*the new impervious surface?*) amounts to 50% or more of the existing impervious surface within the project limits. This is not equivalent to the City's NPDES permit requirements in Appendix 1 of that permit. The permit indicates that M.R. #1 - #9 (of Appendix 1) apply to new impervious surfaces that exceed 5,000 sq. ft. regardless of whether the new impervious adds 50% or more to the existing impervious area. Exceeding the 50% criterion extends the application of M.R. #6 - #10 to the replaced impervious surfaces. This comment also applies to section 3.3.4 Roads.

The updated flowchart will be included in an errata version #2. Currently, the correct flowcharts are available on the website. They are also included for your review.

3.2.1 Page 25. The Road Maintenance Exemption "resurfacing oil mat roadway with asphalt" is not an allowable exemption from the minimum requirements. As noted in the final bullet in section 3.3.4 Roads (page 31) "resurfacing by upgrading from...a bituminous surface treatment (chip seal) to asphalt or concrete...is considered new impervious surfaces and are subject to the minimum requirements..." The 3.2.1 exemption must be removed.

This has been addressed in errata #1. Errata #1 is included for your review.

20. Section 3.4.7

Ecology expects the City to enforce the flow control requirement to match flow durations to the historic land cover until such time as the City gains Ecology's concurrence to apply a lesser flow control standard. The City must submit evidence that the basins identified at the Ecology website were over 40% as of 1985.

The City anticipates working with Ecology in the future to determine if any basins within the City qualify for this program. This information is not currently ready to be submitted to Ecology. Until Ecology approval, the City will enforce flow control to match historic land cover.

#### 29. Section 3.5 Exceptions

Ecology will need an interpretation of the proposal. Must all exceptions meet the criteria in the first two bullets of this section? If so, then the proposal is approvable with a minor modification. In the last sub-bullet, change “extreme economic hardship” to “severe and unexpected economic hardship.”

Also, the City must submit TMC 12.08.095 for Ecology review.

We will include the new TMC 12.08.095 for Ecology review. We have also revised the manual text in errata #1 to be consistent with permit language and TMC 12.08.095. Errata #1 is included for your review.

#### 30 and 31. Stormwater Site Plans

The City has chosen to eliminate Chapter 5, BMP & Facility Selection. However, Chapter 4 on preparation of Stormwater Site Plans does not direct the reader to Chapter 1 of Volume V for the selection of an appropriate treatment BMP. That is a gap in the guidance of this Chapter. Other gaps created by elimination of Chapter 5 include direction concerning selection of source control BMP’s, and selection of flow control BMP’s and facilities. The city’s guidance for preparation of site plans needs revision to include these topics.

Section 3.4.6.2 of Volume 1 directs readers to Volume 5, Chapter 1, which is the guidance for treatment facility selection. Section 3.4.3 directs readers to Volume 4, Source Control. Section 3.4.7 directs readers to Volume 3. Section 4.1 of Volume 1 also helps to direct readers to other locations throughout the manual. Appendix B directs readers to the appropriate volumes in the manual as well. The City believes that the above references suffice to direct readers to the appropriate locations within the manual.

#### 33. Appendix B, Site Plan checklist:

The City did not make the change that Ecology suggested. That is OK, but it could easily lead to misapplication by project applicants and your reviewers.

We are comfortable with our checklist.

#### 36. Appendix C: Hydraulic Analysis Worksheets

We suggest that it would more helpful to your clients to indicate that complete input and output files from approved continuous runoff models are necessary.

We are comfortable with our worksheet. The complete input and output files often do not include enough information for a complete review of the proposed facility.

#### 42. Element #6: Protect Slopes

In the last line, change “and” to “as.”

We will make this change on page 139, bullet #3 under element #6.

#### 50. BMP C241

The suggested text change for the Principal Spillway was not incorporated. Because the City incorporated all of the other suggested changes for identifying design flow rates, this would seem to be an oversight.

It was an oversight and we will add this language to page 278.

#### 54. Section 2.2, Infiltration Facilities

The Simplified Approach is not approvable unless the City can demonstrate that facilities designed to infiltrate the 91<sup>st</sup> percentile-24 hour runoff volume within 48 hours will reliably infiltrate 91% of the influent runoff file. The latter is the design requirement.

The Detailed Approach is also not approvable for the same reason. We suggest that step 6 in the Simplified Approach, and Step 9 in the Detailed Approach be replaced with reference to Section 2.2.11.

Other Phase I municipalities made the same error in assuming that infiltration of the 91<sup>st</sup> percentile, 24-hour runoff volume in 48 hours was the design requirement. They have all deleted that text.

The City has replaced Step 6 in the Simplified Approach (page 359) with reference to Section 2.2.11, and Step 9 of the detailed approach (page 363) with reference to Section 2.2.11.

56. On page 815, in the next-to-last line, replace 0% with 50%. This is an error from the Ecology manual.

This has been addressed in errata #1. Errata #1 has been included for your review.

57. I cannot find the replacement text in Section 2.2.9. Please provide more specific identification of where the correction was made.

The City of Tacoma spoke with Ed O'Brien and we cannot identify the location for this comment. It appears it was replaced in the last set of revisions, so the comment can be ignored.

58. By deleting Figure 3.28 and related text, Tacoma has restricted method 2 to soils whose D10 is greater than 0.05mm. That is acceptable.

We agree.

67. The City's October '08 policy statement indicates that devices that have not been accepted into the TAPE program may still be submitted for potential approval by Tacoma. Because of the structure established by the NPDES permit program, Tacoma cannot legally approve treatment devices that have not been approved for use by the Dept. of Ecology. If Tacoma wishes to allow use of a treatment device which is outside of the TAPE process, it must obtain Ecology concurrence prior to allowing use of that device.

The City of Tacoma will coordinate with Ecology prior to approving any device not included in the TAPE program.

68. The maintenance tables do not include a chart for Stormwater Treatment Wetlands. They are allowed as a treatment option in Tacoma, so a maintenance table must be included.

The City of Tacoma will include a Stormwater Treatment Wetland maintenance table for your review. New comments: Section 2.1.4 in Volume 3, Chapter 2: Bioinfiltration "Rain Gardens"

And Section 2.2.3.1 in Volume 6, Chapter 2

#### **General Statement:**

As long as threshold discharge areas within the project, within which the rain gardens will be used, do not exceed the Ecology treatment and flow control thresholds, the City has flexibility in its design guidance for rain gardens. This is because those facilities merely serve as an on-site feature to try to reduce runoff flows that would otherwise be unregulated. For threshold discharge areas that exceed any treatment and flow control threshold (5,000 sq. ft. of PGIS, 10,000 sq. ft. of impervious, ¼ acres conversion of forest to lawn, 2.5 acres pasture to lawn, or a 0.1 cfs increase in the 100-year return flow), the City's guidance for designing rain gardens within those TDA's must be rigorous and replicable. This is necessary because those areas must demonstrate compliance with treatment and flow control standards. Even if the facilities themselves are not being claimed for treatment or flow control, their performance in reducing flow must be reasonably estimated so that downstream facilities are sized appropriately. Ecology does not find that the City's design guidance is sufficient to ensure proper sizing of downstream engineered facilities.

The City of Tacoma worked with Ed O'Brien to revise the raingarden BMPs for both Minimum Requirement #5, On-Site Stormwater Management (Volume 3, Section 2.1.4), and for Minimum Requirement #6, Water Quality and Minimum Requirement #7, Flow Control (Volume 6, Section 2.2.3.1). The following comments below try to demonstrate how the various issues of the raingarden BMPs were revised to be acceptable to Ecology.

#### **Modeling and sizing:**

A rain garden soil that uses the aggregate specification in Table 20 (Table 76 in Volume 6), may not be able to meet the maximum specified infiltration rate of 2.4 inches per hour. Based on a report by Dr. Hinman, compost/ aggregate mixtures that have 2% - 4% passing the #200 sieve, may have higher

infiltration rates. We suggest expanding the acceptable range to allow infiltration rates up to 13 inches per hour. This should still allow adequate soil/water contact time to allow for pollutant removal.

The City of Tacoma spoke with Ed O'Brien who has been in contact with other jurisdictions and Dr. Hinman. An initial infiltration rate of 6 inches per hour can be used for the Bioretention Soil Mixes in Table 76 and Table 20. The manual was revised to reflect this change.

Tables 21 and 77:

These pre-sized facilities are OK for projects (as distinguished from tributary drainage area to the rain garden) whose total impervious area is less than 2,000 square feet. They are also acceptable for projects (not drainage areas) that do not exceed any of the thresholds for engineered treatment or flow control facilities. However, for facilities serving all or any part of projects that exceed 10,000 square feet effective impervious surface, 5,000 square feet of effective PGIS, ¾ acres of lawn, or areas with a 0.1 cfs increase in the 100-year flow frequency, these pre-sized facilities need an engineering basis. For instance, did modeling show that when these soils are compost-amended in accordance with the specifications, that they can still infiltrate all of the runoff from the tributary area? Because the text goes on to state that facilities built in accordance with the specifications do not need to be entered into the runoff model, these facilities must infiltrate all runoff (i.e., similar to the pre-sized approach for downspout infiltration).

Tables 22 and 78:

For facilities serving areas larger than 2,000 sq. ft., the text requires continuous runoff modeling and use of the assumptions in Tables 22 & 78. For the "bioretention soil infiltration rate," the tables need to direct the reader to measure the initial bioretention soil infiltration rate. Please refer to page C-16 of Appendix III-C of the '05 SMMWW for the recommended method for infiltration rate determination. Those methods need to be specified in your document. The City's specifications seem to allow a wide range of imported soil or amended native soil mixtures unless the facility will be used to explicitly meet treatment requirements. Those mixtures will have a wide range of infiltration rates and porosity that need confirmation. If the facility is going to be used to completely or partially meet the treatment or flow control requirements, there must be better quality control in estimating long-term infiltration rates of the bioretention soil.

The City of Tacoma added language that Tables 22 and Table 78 should only be used for those facilities sized to meet the requirements of Minimum Requirement #5, On-Site Stormwater Management.

As another alternative, the City could tightly specify a soil mixture for which it provides the reader with an assumed initial infiltration rate based upon testing. A specification from Curtis Hinman for a sand/compost mixture is available. Dr. Hinman's study indicates that for the sand, the percentage of materials passing the #200 sieve is critical for determining the final infiltration rate. A 2-3 % amount passing that sieve seems to provide infiltration rates in the correct range (i.e., around 9 inches per hour).

The City has specified the soil mixture referenced in Dr. Hinman's study. Tables 22 and 78 contain the specifications for this soil mix.

The text on pages 353 and 807 seem to require that bioretention facilities serving larger than 2,000 sq. ft. must fully meet the flow control standard. This seems like an unnecessary restriction that will be an unfortunate disincentive to use of bioretention. The City could allow facilities that do not fully meet the flow duration standard but which can achieve a significant amount of flow reduction. The WWHM and MGS Flood allow project designs that incorporate bioretention facilities serving all or just part of the project. The outflow(s) from the bioretention facility (or facilities) can be summed by WWHM to create a post-development runoff file that can be compared against the flow duration curve compliance standard. If the post-development file does not meet the standard, a retention or detention facility can be designed to make-up the difference.

Language was added in Volume 3 (Section 2.1.4) to direct readers to Volume 6 (Section 2.2.3.1) for sizing pertaining to water quality and flow control. Refer to Section 2.1 for the parameters for Section 2.1.4. Volume 3 raingardens relate to roof runoff control only.

There should be some indication that bioretention facilities can be used to fully or partially meet treatment requirements too. WWHM and MGS Flood can be used to track the total amount of water predicted to infiltrate through the bioretention soil profile. Full compliance with the treatment requirement is infiltration of 91% of the post-development runoff file volume. Projects can also get partial treatment credit. For instance, if a bioretention facility is estimated to infiltrate 50% of the runoff file, a downgradient treatment facility need only demonstrate treatment of another 41 % of the post-development runoff file.

This is assumption that does not need to be included in the Surface Water Management Manual as guidance. This would apply to all treatment facilities. If a proposal to split the water quality between several facilities was presented we would review and approve if appropriate.

e. Within the "Underdrain" subsection, a statement is needed that indicates that bioretention facilities with underdrains receive no credit toward meeting an applicable flow control standard. Underdrained facilities still get credit for meeting the treatment requirements. Ecology is pursuing updates to WWHM and MGS Flood that would allow modeling of underdrained facilities so that they get some credit for flow reduction.

A statement will be included that systems with underdrains (Volume 6, Section 2.2.3.1) do not receive flow control credit. We took the underdrain section out of Volume 3 because this section is solely intended for on-site management.