

City of Seattle
Stormwater Code and Manual 2-2008 Submittal for Ecology Review
Observations and Questions
April 7, 2008

STORMWATER CODE & ENCLOSURES

Exemptions, Adjustments & Exceptions

SMC 22.800.040.B.3 exempts WSDOT development in the WSDOT ROW that complies with WAC 173-270, the Highway Runoff Program. This should refer instead to the Highway Runoff Manual.

SMC 22.800.040 applies to the entire subtitle, including *Prohibited and Permissible Discharges* and *Minimum Requirements for All Discharges and All Real Property*. Does the City really intend to exempt WSDOT from these sections? Are the procedures and criteria described in Adjustments and Exceptions really applicable to the entire subtitle? The Permit requires that they be applicable to the minimum requirements for new, redevelopment and construction projects (Seattle's 22.805 and 22.807)

SMC 22.800.040.D.3, formerly called the "Equally Protective Exception," appears to meet the intent of Ecology's Adjustment criteria. Suggest deleting or incorporating into SMC 22.800.040.C.

SMC 22.800.040.D.4 allows exceptions for emergency situations. What is the City's definition of an emergency situation?

SMC 22.800.040.D.5 allows an exception when the requirement is not technically feasible. This is inconsistent with Appendix 1 of the permit. The single fact that meeting the requirements is not technically feasible is not enough to qualify a project for an exception. If a requirement is not technically feasible, but the exception would either be injurious to the quality of the waters of the state, or not the least possible that could be granted to comply with the intent of the requirements, the exception cannot be granted per Appendix 1 (see Appendix 1 page 28).

SMC 22.800.040.D.6.a and 6.c provide for exceptions where there is no reasonable use of the property and where the requirements would cause extreme or unexpected financial hardship. As is, this is inconsistent with Appendix 1 of the permit.

- Same comment as D.5 (above) – the exception cannot be granted if the exception would either be injurious to the quality of the waters of the state, or not the least possible that could be granted to comply with the intent of the requirement (see Appendix 1 page 28)
- The language in Appendix 1 is "severe and unexpected."

SMC 22.800.040.D.6.b is unusual. What circumstances would this exception address? Ecology needs to understand this better. At a minimum, the same comment as D.5, 6.a and 6.b applies (re: Appendix 1 page 28).

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SMC 22.800.040.D.10 lists information that must be provided in a request for an exception. This information is from Appendix 1 of the permit. However, Ecology intends this information to be criteria upon which to base a decision to grant or deny the exception. Seattle's proposal does not link this "recordkeeping" to the Director's decision. The criteria in Section 10 must be linked to the reasons for granting an exception under D.5 and D.6 (a and c for sure; need more info on b per above). As written, the criteria in D.10 have no standing in the decision process.

22.800.070 Minimum Requirements for City Projects

Public project vesting is an important consideration, and one that the Ecology team is carefully considering, especially in the context of consistency among jurisdictions.

- 22.800.070.A.2.a – suggest change such that Notice to Proceed for all project phases is given within 18 months of effective date. We don't want incidental land disturbing that may not be commensurate with the entire project (or multiple project phases) to vest the project to older standards.
- 22.800.070.A.2.c.iii – suggest change so that grant applications submitted after the Adoption date be consistent with the new code.
- We recognize that 2.a, b and c are "and" clauses, which is good. We need to discuss with you whether a scenario could play out here that a planning and/or conceptual design project (approved by voters or receiving grant funds) could vest the actual design to the older standards.

22.800.080 Authority

If DPD has authority for plan review, etc. per 080.A, how can SPU delegate that authority to DOT in 080.B?

Integrated drainage plan (080.E) – Ecology is considering this to be a "jurisdiction-wide exception" and is reviewing it as such. See Appendix 1 page 27. Alternately, the IDP could be implemented as an Adjustment. Does an IDP fully mitigate for the development project? Discuss.

Voluntary developer agreement (080.G) – This does not appear to necessarily fully mitigate for the development project. What are the criteria for using this authority (e.g. timeframe, basin plan or regional facility component)? The mitigation should be to the same receiving water (as in 080.E). Does this allow a developer to provide flow control or treatment for existing development rather than the project they are implementing? Are they then solving one problems in lieu of addressing the problem they are creating? If so, will Seattle assume complete responsibility for the discharge from the new project site? We are concerned about an "orphaned" unmitigated discharge.

Fee in lieu of facility (080.F) – What are the criteria for using this authority (e.g. timeframe, basin plan or regional facility component)? The funds must be spent on a facility discharging to

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the same receiving water. Section 3.4 of Appendix 1 would allow Seattle to fulfill stormwater requirements in regard to "replaced impervious surfaces" only if you have a plan and a schedule for regional facilities. If you want the fee-in-lieu to apply to "new impervious surfaces" on a project site, the regional facility should be either in-place or constructed soon.

Definitions (22.801)

Adjustment – Definition not consistent with Appendix 1. Do you use the term to refer to "exceptions" as well? May need to revise, build in the 800.040 cross reference, and/or remove footnote.

CECSL – definition should reference certification and associated approved training. See Appendix 1 of the permit (page 2).

Land Disturbing Activity – excludes "hot asphalt mix" from compaction associated with stabilization of structures and road construction. What is hot asphalt mix and how is it used?

Large project – This appears to be used for the "off-site analysis" and tied to Large Project Drainage Control Review. How else is this term used?

Maintenance – definition not submitted; should have a definition consistent with Appendix 1 of the permit. Term is used in several places in the SMC, including 22.807.020.A.e (parks O&M), 22.805.010.C.1 & 2 (utility & roads maintenance exemption).

Model, continuous – definition not submitted.

Nutrient-critical receiving water – should this definition be tied to an impairment designated through the State's Water Quality Assessment (e.g., those waters reported under section 305(b) of the Clean Water Act, and designated as not supporting beneficial uses due to phosphorus)? How will the Director determine these?

Plan – this definition is limited to drawings. Is this definition also applicable to the Director's Rules, or just as used in the code?

Receiving water – *ultimate* surface water body, but no definition for surface water. Compare this definition with that of "Watercourse" below.

Replaced Impervious Surface – for "other impervious surfaces" means removal down to "earth material." For roadways, this definition does not work. For road surfaces, the removal of the overlying wear surface (asphalt or concrete) down to the "base course" (which is an underlying gravel layer), and subsequent installation of another wearing layer constitutes a replaced impervious surface. Does Seattle consider the gravel base course an "earth material?" Would asphalt-treated base (ATB) be an "earth material?" (Does SDOT use ATB?)

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Watercourse – include lakes, bogs streams and creeks, but not designated receiving waters. Creeks, lakes, bogs are receiving waters. Need to understand how this term works.

Designated receiving water – Ecology must determine this; cannot be decided by Director of SPU alone. Seattle must receive Ecology's concurrence for any additions to the list.

Drainage water – includes “surface and irrigation runoff” which is not consistent with IDDE/prohibited discharge requirements in the permit. Ties to source control comments.

Minimum Requirements for All Projects – Scope and Exceptions

22.805.010.B – should tie back to Adjustments and Exceptions in 22.800.040.

22.805.010.C – effectively, these are Exemptions.

- 1) for utilities, exempts from flow control and treatment. Needs definition of maintenance. Does not mention replacing ground surface with in kind material.
- 2) for road maintenance – may need a definition of maintenance.
- 3) continuous model produced no runoff – suggest adding a phrase such as “... and using Best Management Practices in accordance with this code and rules/manuals adopted by the city, ...” to address the fact that Minimum Requirement #5 requires some form of on-site BMP be used.
- 5) normal residential activities – footnote citation n/a; where is this defined? Probably ok due to relevance only to structural source control BMP installation.

Minimum Requirements for All Projects

Simple discussion needed to clarify what is meant by “all projects.”

Construction Site Pollution Prevention

Note that additional construction ESC observations and questions are provided on Volume II later in this document and there may be duplication. In most cases, if the additional detail is or can be provided in Volume II, that detail need not be included in the code.

22.805.020.D – typo. “that” should be deleted from last sentence.

D.2 – Suggestion: Discussion of replacing the top layer could be placed in the context of the soil quality and depth BMP / revised Amend Soils minimum requirement.

D.3 – Establish construction access does not have sufficient detail. The statement should include an indication of stabilizing entrances with quarry spalls, crushed rock, or other equivalent BMP. Also, the reference to cleaning roads promptly is too vague, and the method of cleaning needs to be specified. See Appendix 1 page 14.

D.4 – says prior to “other” LDA; explain

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D6 – should include instructions concerning control of street washwater. According to Appendix 1 page 14, street wash water must either be pumped back on the site, or otherwise prevented from discharging into systems tributary to waters of the state.

D7 – add this statement (from 5.d. on page 15 of Appendix 1) or an equivalent: Soils shall be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast.

D.12 – typo. “that” should be removed. Why no list of dewatering disposal options (Ecy 10c)? Also, should include a statement prohibiting the routing of clean de-watering water through stormwater sediment ponds (Appendix 1 page 17).

D.15 – can a Construction Stormwater Control Plan also be a SWPPP? It should be submitted to DPD and reviewed when above the thresholds.

General D comment – need to indicate that all elements are required unless you document that an element is not applicable. Possibly include this information in 22.807.020.B1b and B2d, etc.?

Amend Soils

22.805.020.E – This appears to be the only place where Seattle addresses the soil quality and depth BMP (BMP T5.13). However, the requirement to amend soils is too vague. Seattle must indicate some minimum specifications such as 10% organic content for landscaping and 5% for turf to a depth of 8 inches. The soil quality and depth BMP is typically considered under MR#5 (Appendix 1 page 19).

Green Infrastructure BMPs

22.805.020.F – This appears to be the primary place where MR#5 Onsite Stormwater Management is invoked. The City's requirement, however, appears to exclude all projects other than SFR and those that trigger flow control and treatment (i.e., it excludes smaller parcel, roadway, and joint roadway parcel projects). This is not consistent with Appendix 1 of the permit. MR#5 is required for all project types at the 2,000 sf/7,000 sf LDA threshold. Also, clarify whether the soil quality and depth BMP is considered to be a Green Infrastructure BMP; current code structure implies it is not.

Wetlands

22.805.020.G – Regarding the protection of wetlands, where is the equivalent of Ecology's Guidesheets 1B and 2B in Seattle's proposal? We could not locate this information.

Source Controls

22.805.020.J – This section should also reference Seattle's Vol. 1 Source Control manual for additional structural BMPs required for specific activities and/or land uses.

Off-site Analysis

22.805.020.K – Discuss how this works in the context of the other minimum requirements for all projects.

Maintenance Standards

22.805.080.B.5 and 22.805.090.B.7 refer to an Inspection and Maintenance Schedule “submitted to the Director.” The Permit requires that the City establish maintenance standards by 8/16/08. These SMC sections should refer to those maintenance standards, instead of allowing each project to propose their own inspection and maintenance schedule.

Flow Control – General

Ecology has numerous questions and concerns regarding Seattle’s application of flow control requirements to different project types and the associated use of Green Infrastructure BMPs as both the MR#5 On-site Stormwater BMP menu and MR#7 Flow Control. We need to discuss this concept in order to refine our comments. Below are our initial thoughts on this topic:

- Review and discuss Enclosure 1, Table 2. Does this apply only to SMC 22.805.080 (e.g. MR#7 Flow Control)? If so, the text in each box in the SFR row (except the “designated receiving water not to capacity constrained system”) is misleading and should instead read “not required.” This is an example of where there are blurred lines between MR#5 and MR#7.
- Our assessment of Seattle’s proposal is that the requirement to apply MR#5 to all projects at the 2,000 sf/7,000 sf LDA threshold would, with some revisions, be addressed by SMC 22.805.020.E (Amend Soils) and F (Green Infrastructure BMPs). Is this how Seattle envisions its response to the MR#5 requirement?
- Relationship between MR#5 On-site Stormwater Management BMPs and MR#7 Flow Control – Seattle’s proposal appears to blur the distinction between MR#5 and MR#7. In order to evaluate equivalency, we need to be sure we understand the proposal from the perspectives of MR#5 and MR#7.
 - SFR projects: Seattle’s Green Infrastructure BMP requirement for SFR, coupled with the revised Amend Soils requirement, is potentially equivalent to Appendix 1 MR#5. Seattle does not propose to require Flow Control for any SFR project because a SFR project is defined to be less than 10,000 sf impervious and less than 5,000 sf PGIS.
 - Roadway Projects: With the exception of the soil quality and depth BMP (a revised Amend Soils), Seattle does not propose requiring MR#5. Since Ecology’s MR#5 BMP menu was designed to address the type of impervious area configurations you would find on a building project, Seattle’s proposal is potentially equivalent.

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- Parcel based projects: With the exception of the soil quality and depth BMP (a revised Amend Soils), Seattle does not propose requiring MR#5.
 - For flow-critical receiving waters (and capacity constrained conveyance systems), Seattle's MR#7 Flow Control is triggered at 2,000 sf new plus replaced impervious surface, which is lower than Ecology's MR#7 threshold. Green Infrastructure BMPs are then required to be used as feasible to help meet Flow Control requirements.
 - For flow-critical receiving waters (and capacity constrained conveyance systems), Seattle's MR#7 is triggered at $\frac{3}{4}$ acres and 2.5 acres of the conversion types, consistent with Ecology's MR#7 threshold. Seattle's MR#7 is also triggered if a 0.1 cfs increase is projected. If the conversion is less than $\frac{3}{4}$ or 2.5 acres, and greater than or equal to 7,000 sf LDA (but does not indicate a 0.1 cfs increase), then Seattle's proposal misses the MR#5 requirement (except revised Amend Soils) for parcel based projects. What kinds of projects would we expect to fall into this – parks and rec, small commercial projects? Would impacts from these projects be sufficiently managed through the soil quality and depth BMP?
 - MR#7 is not triggered for discharges to designated receiving waters (where the conveyance system is not "capacity constrained"). Thus, per Seattle's proposal, in these situations, parcel projects are not required to implement MR#5, except revised Amend Soils. This is not consistent with Appendix 1. Green infrastructure BMPs, where feasible, will still play a role in minimizing impacts to designated receiving water bodies.
 - SMC 22.805.020.F states that Green Infrastructure BMPs are required for other project types when they trigger flow control and treatment. This is internally inconsistent (080.B.1 which is part of Flow Control requires green infrastructure irrespective of the treatment MR).
- Sidewalk/Trail Projects: Seattle's proposal requires MR#5 when discharging to flow-critical receiving waters (and capacity constrained conveyance systems), but exempts these projects from MR#7, irrespective of impervious area.
 - Because Seattle proposes to *not* use the concepts of "effective impervious surface" and "threshold discharge area," the application of project MR#7 thresholds to sidewalk/trail projects could result in more of these projects needing flow control than required by Appendix 1. Effectively, Seattle is requesting a jurisdiction-wide exception for sidewalk/trail projects from MR#7. Ecology will need to understand Seattle's rationale before deciding whether to approve this jurisdiction-wide exception.
 - In this scenario, MR#5 (except revised Amend Soils) is not triggered for discharges to designated receiving waters (and where the conveyance system is not "capacity constrained"). Since Ecology's MR#5 BMP menu was designed to address the type of impervious area configurations you would find on a building project, Seattle's proposal is potentially equivalent.

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- Joint Projects: Seattle's proposal is to trigger on-site stormwater management BMP/flow control and treatment requirements separately for the parcel-based and roadway portions of joint projects. We need to discuss this approach in light of the above comments.
- Seattle is using a smaller 2,000 sf of new plus replaced impervious to trigger on-site stormwater management BMPs/flow control requirements than Ecology's trigger for flow control. Is it Seattle's expectation that flow control standards for these small surface areas will be met by using Green Infrastructure (as modeled in WWHM)? Vaults and orifice size do not achieve flow control standards at these smaller impervious areas.
- 22.805.020.F – Implement Green Infrastructure BMPs is listed as a MR for all projects, but is actually proposed to be only applicable to SFR (reflected in 22.805.030.A) and projects requiring Flow Control (reflected in 22.805.080.B.1) and Treatment (somewhat reflected in 22.805.090.B.6).
- Clarify receiving water issue relative to the concept of direct discharge vs. discharge via MS4:
 - discharges to “designated receiving water” – applies to direct discharges AND discharges to not capacity constrained MS4 → designated receiving water
 - discharges to “flow critical receiving water” – applies to direct discharges to watercourses AND to MS4 → watercourse.
 - Are all watercourses flow critical receiving waters?
 - What are you doing for the partially separated areas?

Flow Control – Analysis of Thresholds and Performance Standards for Parcel Based Project in Creek Basins (Encl 6)

The Seattle proposal as a whole is not acceptable (see bullets below). There are elements of it that are acceptable depending upon % TIA of the basin and whether the project is new development or redevelopment. Because Seattle does not want to distinguish between new and redevelopment, potential solutions are more difficult to identify. Appendix 1 does not provide for deviations where new development projects exceed the thresholds; Appendix 1 does provide for deviations from the standard redevelopment requirement where there is a commensurate or greater benefit with another approach.

- For basins with less than 40% TIA:
 - New development projects with $\geq 10,000$ sq. ft. effective impervious in a TDA must use the Ecology standard (forested; $\frac{1}{2}$ the 2-year through the 50-year).
 - New development and redevelopment projects with $> 2,000$ sq. ft. but $< 10,000$ sq. ft. of effective new and replaced impervious surface in a TDA may use the Seattle standard
 - Redevelopment projects exceeding 10,000 sq. ft. of effective new and flow-eligible replaced impervious surface in a TDA must meet the Ecology standard (with the option of using pasture in projects up to 27,000 sq. ft. because of the limitations caused by 0.5-inch orifice limitation), UNLESS Seattle can demonstrate that the number of projects and the flow benefits of meeting the Seattle standard (2,000 sq. ft. thresholds, pasture conditions and matching peaks

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and durations from ½ the 2-year to the 2-year) outweigh the benefits of the Ecology standard. Seattle may have demonstrated better than equivalency for redevelopment projects in Enclosure #6. However, because Seattle excludes single family residences from flow control, the enclosure's analysis needs to be reinterpreted to compare detention volumes, flow rates, and durations.

- For basins with more than 40% TIA:
 - The Seattle proposal is acceptable for all new development projects < 10,000 sq. ft. but > 2,000 sq. ft. effective impervious area.
 - For new development projects, use the Ecology standard (existing; ½ the 2-year through the 50-year) where the existing condition is forested and the site will exceed 10,000 sq. ft. effective impervious surface in a TDA. Where the site does not exceed 10,000 sq. ft. effective impervious surface in a TDA, the Seattle standard is acceptable.
 - For new development projects, use the Ecology standard (existing condition; ½ the 2-year to the 50-year) where the land cover is pasture or grass and the site has 10,000 sq. ft. or more of effective impervious area in a TDA. Where the site does not exceed 10,000 sq. ft. effective impervious surface in a TDA, the Seattle standard is acceptable.
 - The Seattle proposal is acceptable for all redevelopment projects ≥ 2,000 sq. ft. The assumption is that the benefit of reducing flows from replaced impervious surfaces (down to 2,000 sq. ft.) to a pasture level through the 2-year flood frequency (under the ECY standard, these surfaces would not be subject to any flow reduction) will more than offset the loss of reduction caused by controlling new impervious surfaces (that exceed 10,000 sq. ft. in a TDA) to pasture (through the 2-year flow) instead of forest (through the 50-year flow). Note that under the Ecology standard, new impervious surfaces at redevelopment sites are controlled only to the exiting condition. If the existing condition is grass, there probably is a similar flow reduction in controlling that surface to pasture through the 2 year flow rather than controlling it to grass through the 50-year. In addition, there probably aren't many redevelopment projects where the existing land cover is forested. So it is unlikely that we are missing a benefit in that situation.

Flow Control – Estimated Impervious Area of Seattle Creek Basins (Encl 7)

Seattle has relied on the argument that because almost all of their basins showed no change in impervious area from 1991 through 2001 (as estimated by the Sanborn analysis), that those same basins had no change from 1985 to 1991. This is not a supportable conclusion. Seattle's argument is based upon using generic TIA's for different land use categories. Firstly, Seattle provides no basis for the estimates used for those categories. Secondly, a citywide comparison basis is used to criticize the Sanborn estimates. There isn't an acknowledgement that the city's generic averages may not work well in an individual basin. The Sanborn estimates are at least taken from actual images rather than desktop assumptions. A review of a city street map and satellite images from Google Maps for each of the basins listed above provides some visual

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indication of the reasons for the reduced impervious areas of these larger basins as compared to other larger basins (such as Thornton, Pipers, and Longfellow).

Seattle needs to provide basin-specific analyses to support TIA estimates for 1985. Example analyses include:

- Compare aerial photographs from 1985 or earlier with photographs from anytime after 1991.
- Report building permits for the '85 to '91 time frame for each drainage basin.

Assuming that Seattle can provide adequate and basin-specific justifications to make judgments based on the '91 data, the following comments apply:

Seattle's impervious area estimates for Blue Ridge, Broadview, Durham, Puget, and Taylor creeks are significantly different than the Sanborn estimates. Here are some gross observations to start the discussion based upon approximately locating these basins on city street maps and Google Maps.

Blue Ridge Creek System: These appear to be four separate small drainages that should be evaluated separately rather than cumulatively. Because these are small, narrow basins, the land occupied by the steep, undeveloped drainage channels can have a significant impact on the overall TIA. Here are the Sanborn estimates for each as identified by a basin # assigned by Sanborn:

Basin	Acreage	TIA estimates (91/96/01)
1189	85	32/32/32
1190	50	40/40/40
1191	65	32/32/32
2170	41	23/23/23

Broadview Creek: This also appears to be two separate drainages that should not be combined into one TIA average. The northern basin (2163) seems to have a very light street footprint suggesting a lesser intensity of development in an area of varied topography. Images on Google Earth of this basin and Basin 1187 show areas with significant vegetation as compared to the average residential development in the City. The estimates by Sanborn are:

Basin	Acreage	TIA estimates (91/96/01)
1187	125	24/24/24
2163	92.5	4/4/4

Durham Creek: This is a small drainage next to 509. Google seems to show that it is dominated by a rather large undeveloped area just south of a Park 'N Ride. This explains the low TIA in an area otherwise classified as industrial.

Puget Creek: This drainage includes Puget Park and a good portion of the wooded hillside facing east toward the Duwamish. Its TIA is going to be lower than average.

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Taylor Creek: This drainage includes a significant amount of undeveloped land: Lakeridge Park and an undeveloped area to the west of the north/south park area.

Lots in this area may be larger than the Seattle average too. The Seattle and Ecology estimates of TIA in this basin have the smallest difference as compared to the other contested basins. So, there isn't a reason to dismiss the Ecology estimates or to think that they have less foundation than Seattle's estimates.

Additionally, Figure 1 in the enclosure does not include the City limits. Any basin that is not entirely within the City of Seattle's jurisdiction for which Seattle is proposing an alternate TIA (and thus flow control standard) needs concurrence and support from these other jurisdictions. Based on a simple map comparison, this comment potentially applies to Seola Beach, Durham and Taylor.

Also, note that the creek list in 22.805.080B.3.a. is not consistent with the tables in Encl. 7. We are assuming that the Enclosure reflects Seattle's official proposal.

22.805.080 – Flow Control

Changes to this draft code language will be necessary based on Ecology comments on the flow control-related enclosures.

How does Seattle intend to interpret B.2 regarding wetlands?

Treatment

22.805.060 Minimum Requirements for Joint Roadway and Parcel-Based Projects –Subsections A.4 and C.2 are not consistent with Appendix 1 because they apply the 5,000 sq. ft. PGIS threshold for triggering treatment separately to both aspects of the project. In other words, a project may have just under 5,000 sq. ft. of PGIS in the road, and just under 5,000 sq. ft. of PGIS in the parcel, and not trigger treatment. The threshold must be 5,000 sq. ft. total for the project, regardless of how it is distributed between the parcel and the road. Effectively, Seattle is requesting a jurisdiction-wide exception for joint projects from MR#6. Ecology will need to understand Seattle's rationale before deciding whether to approve this jurisdiction-wide exception.

22.805.090 – Based on draft SMC, it is not clear how Seattle proposes to use the concept of "basic treatment." There is no mention in Section B. of when Basic Treatment is a requirement. It should be required for single family projects, and all parcel-based residential (i.e., multiple residences, subdivisions) projects. It should also be required for all road projects, not meeting the criteria in B.4.b., that exceed 5,000 sq. ft. of new and, in some instances, replaced PGIS in a threshold discharge area. The replaced PGIS is subject to treatment if the new impervious (PGIS and non-PGIS) areas are 50% or more of the existing impervious area within the project limits. Basic treatment is also required for any projects discharging directly or indirectly into a Basic Treatment Receiving Water.

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22.805.090.B.1.b does not make sense. It does not adequately identify a water quality design flow rate.

22.805.090.B.5 incorrectly exempts treatment of new impervious road surfaces if the criteria in subsections a. and b. aren't met. 5,000 sq. ft. or more of new PGIS in a TDA requires treatment regardless. 5.a. is different from the Ecology requirement. What is meant by "project" in subsection a? It would seem more explicit to say new, or new plus replaced – whichever is intended. The 50% criterion is only used by Ecology to trigger application of treatment and flow control to replaced impervious surfaces. What is Seattle's intent?

Chapter 22.807 Drainage Control Review and Application Requirements

Provide an explanation of the intended difference between Standard Drainage Control Review and Large Project Drainage Control Review. What is magical about the one acre or more of LDA in this context? The 5,000 sf threshold is phrased "new *or* replaced" – should this be "and"? For projects that convert between ¾ acre and 1 acre to lawn/landscape, would an engineered facility be effectively reviewed under Standard Drainage Control Review?

Section 807.020.B indicates that Construction Stormwater Site Plans must conform to Section 804, but the citation is n/a. Should this be 805.020.D?

Section 807.020.B.1.b allows submittal of a checklist in lieu of a Construction Stormwater Control Plan. Is this the checklist in Volume 2 Table 1a? The checklist must cover all construction elements, must indicate BMP's that will be used, and must note when an element is not applicable.

Information on Modification to Western Washington Hydrology Model (Encl. #9)

The WWHM3 representation of a bioretention swale is acceptable.

The WWHM3 Eco-roof hydrology model is also acceptable. If Seattle is able to provide more accurate calibration and modeling options (such as growth material porosity) as a result of additional roof monitoring, please submit those proposals to Ecology.

DIRECTORS RULES

Volume 2 – Construction Stormwater Control TRM

General

- Notes regarding the relevant code content are also provided (above). As a practical matter, the director's rules should include sufficient statements to be equivalent to Appendix 1. The private project managers and the public project reviewers only look to the rules for determining what must be done at a site. Many of the details in Appendix 1 of the Permit do not appear anywhere within Chapters 2, 3, or 4 of Volume II, including the following Elements from Appendix 1:
 - 1.b
 - 2.a.
 - 2.d.: The reference to cleaning at the end of the day or more frequently during wet weather. Seattle's use of "immediately" is open to interpretation
 - 2.e. No statement regarding pumping back on-site or otherwise prevented from discharging into systems tributary to waters of the state.
 - 3.b. and c.
 - 4.a., b. and c.
 - 5.e.
 - 6.a., b.
 - 6.c. No reference to the land cover assumptions for the analysis.
 - 6.d. Only covered under the dewatering BMP
 - 6.e.
 - 7.b.
 - 8.b. No reference to the land cover assumptions for the analysis
 - 9. b.
 - 9.c. and e. may be covered adequately by reference to Volume 1, but it can get lost in the clutter.
 - 9.f. Text does not mention adjustment of pH if necessary to....
 - 9.g.
 - 10. b., c. and d.
 - 12.d does not have sufficient direction for modification of the SWPPP on large projects whenever there is a change in design, construction, operation or maintenance that has ... This statement does not appear at all for small projects.

Section 2.3.1 exempts small projects from elements 1,3, 8, and 10. It is OK to say that these elements may not apply to sites of this size. However, Appendix 1 requires that all elements be considered "unless site conditions render the element unnecessary and the exemption from that element is clearly justified" (Appx 1, page 13). Thus, they should not be classified as recommended, they should remain as required elements, and the plan writer should explain why they are not applicable to the subject site.

Seattle offers a "Temporary Erosion and Sediment Control Standard Plan" to help small projects meet submittal requirements. Seattle must submit that for Ecology review.

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Chapter 3 Checklists (Tables 1a and 1b)

- Control Flow Rates:
 - The checklist should include the practice of constructing the permanent flow control facility, and reference the correct volume.
 - Turbidity curtains are not functional for controlling flow rates. They should not be listed in the checklist in that section.
- Install Sediment Controls:
 - The regulations do not say that runoff from disturbed areas must pass through an appropriate sediment removal BMP prior to leaving the site or discharging to an infiltration facility. The checklists give the impression that only sediment ponds and traps are required. But the details for those BMP's indicate that they apply only to larger sites of 1 and 3 acres or more respectively.
- Section 5 in both checklists is inappropriately titled "Retain Native Top Layer." It should read "Stabilize Soils."

BMP E 3.40 Sediment Trap – Because the City is requiring use of continuous runoff modeling for sizing flow control facilities and many treatment facilities, it may want to allow designers to use the continuous runoff model to size sediment traps and ponds as an alternative to using single event methods. The City may choose to add an alternative method for identifying Q2. Ecology suggests the following:

Q2 = Design inflow (cfs) based on the 2-year flow rate (1 hour time step in an approved continuous runoff model) for the developed (unmitigated) site, multiplied by a factor of 1.3. The 10-year peak flow shall be used if the project size, expected timing and duration of construction, or downstream conditions warrant a higher level of protection. Q10 is the 10-year flow rate (1 hour time step in an approved continuous simulation model) for the developed (unmitigated) site multiplied by a factor of 1.6.

BMP E 3.45 Sediment Pond

- The definitions for Q2 and Q10 are the same as those used above for traps. If you want to allow use of continuous runoff modeling, you will have to add parallel continuous runoff terms. For example, you don't use the peak flow for the 2-year event, you use the 2-year, 15-minute flow rate predicted by a continuous runoff model.
- The guidance for the Principal Spillway can have an alternative flow design when using continuous runoff modeling. We suggest adding, "If using the WWHM or MGS Flood, Q10 is the 10-year flow rate (1 hour time step) for the developed, unmitigated site multiplied by a factor of 1.6."
- For the Emergency Spillway, also note that the 100-year peak flow identified by the approved runoff models is a 1-hour flow rate. If you want to estimate a flow rate appropriate for a 15-minute time step (single event methods use a 6 or 10 minute time step), we suggest multiplying the 1-hour rate by 1.6.

BMP E 3.50 – This is a BMP not covered in Ecology's stormwater manual. Design criteria for Sedimentation Tank; how was this equation developed? Also, the note in the text box indicates that sites not covered under the Ecology Construction Stormwater General Permit, and proposing to use chemicals for flocculation must get approval from DPD (Seattle). This note should

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indicate that any site proposing to add chemicals to stormwater must receive approval from Ecology, regardless of their size and regardless of their coverage or lack of coverage under the Construction Stormwater General Permit.

BMP E-3.55 – Construction Stormwater Chemical Treatment; such system need be designed by a professional engineer. Seattle's manual is silent on that. Again, all sites proposing to add chemicals to stormwater must receive an approval for that action from the Ecology.

BMP C1.40: Temporary Dewatering

- The text lists Jersey Barriers lined with Geotextile, and an Enclosure of Hay Bales, Silt Fence or Boths as options. Ecology does not consider those as viable options for removing sediment from dewatering.
- How is dewatering from contaminated sites handled? Explain.

Volume 3 – Flow Control and Treatment TRM

Note that relevant questions and comments regarding the Code (above) apply to Volume 3 as well. Any changes necessary based on code comments would need to be reflected appropriately in Volume 3.

Chapter 2

Figure 2.1 refers to a Table 2.6, which is n/a (probably misnumbered)

Section 2.6 Special Circumstances (pg 2-35) – Explain how these projects would be regulated. The text implies that discretion is available to “identify the specific minimum requirements to be applied.” When a project has a special circumstance, all the minimum requirements still apply. There may be alternate means to achieve the desired outcome, however, and that is what the Adjustment criteria are for.

Table 2.3 indicates that no treatment is required for small lakes. Explain.

In tables 2.2, 2.3, and 2.4, projects discharging to a designated receiving water in a non-capacity restrained system do not have to use green infrastructure. This is a deviation from the requirement for all projects above 2,000/7,000 to use on-site management BMP's. Refer to earlier comments regarding Flow Control – General on the Code and Enclosures.

Chapter 5

Section 5.2.3 – The City lists three continuous runoff models not approved by Ecology: InfoWorks, Mouse, and ModFlow HMS. Ecology will need to approve any continuous runoff models proposed for use.

Table 5.4 and the text of Section 5.4.2.3 would lead the reader to believe that single event methods are acceptable for flow control purposes. This conflicts with earlier text and Table 5.1. Please explain.

Chapter 6

Seattle will need to explain the bases for the credits given in Tables 6.2 through 6.5.

Table 6.5: Is the basis for the sizing factors the ability of the device to meet flow peaks and durations from 50% of a 2-year to a 2-year flow for a pasture condition? If so, the simplified approaches should not be used to size treatment facilities serving > 5,000 sq. ft. of PGIS, nor flow control facilities serving > 10,000 sq. ft. impervious area in basins that must meet the NPDES permit's default flow control requirement (50% of 2-year through the 50-year for an historical or existing land cover). In addition, the tables should not be used for giving flow reduction credit for using the BMP's within areas that must meet the NPDES default flow control requirement.

Tables 6.5 and 6.7: Please inform us when you have a proposal to replace the sections that are "under development."

Section 6.3.3.4: What is the basis for the 0.25 inches per hour design infiltration rate?

Tables 6.6, 6.8, 6.9, 6.11, 6.12, 6.14, 6.18, and 6.20 indicate assumptions to use for the simplified method. Those are acceptable because they apply to sites that do not exceed the flow control threshold. However, what should the user do when they want to model distributed bioretention facilities, vegetated roofs, porous pavement, etc. in drainage basins that exceed the 10,000 sq. ft. threshold or the 0.1 cfs increase threshold? They cannot use the assumptions in the simplified tables because the flow control standard upon which they are based is not applicable.

Section 6.4.1.3: Performance objectives for bioretention facilities – This section indicates that treatment requirements are met if the 91st percentile, 24-hour volume infiltrates through the treatment soil layer within 48 hours. That is not correct. See the comment on sections 7.8.2 and 7.8.5 below.

Section 6.4.1.4.

- The subsection on bioretention soil indicates that for flow control credit, the soil must meet COS specification 9.14. Please provide the specification. We could not find it in the submitted materials.
- In regard to facility modeling, it would seem more direction is needed. We had understood that Seattle had worked with Clear Creek Solutions to create a standard modeling approach for bioretention systems with and without underdrains. It seems that the section of the manual on bioretention should reference the appropriate icon and screens to use and summarize the modeling.

Section 6.4.1.5

- The first paragraph reference to Figure 6.5 should be changed to Figure 6.4.
- How can a bioretention planter be used to meet the flow control requirement when it has an underdrain as a standard design feature?
- Does the WWHM bioretention cell approach with an underdrain apply here?

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Section 6.4.2 Pervious Pavement – The designs all seem to assume that water which has entered the aggregate base cannot resurface by moving laterally. This can occur where the road is elevated above an adjacent roadside ditch. There should be some text to indicate that the storage volume in the aggregate is not only restricted by an overflow pipe, but also by the invert of an adjacent ditch.

Section 6.4.2.3 – Same comment as for Section 6.4.1.3. Also see the comment on sections 7.8.2 and 7.8.5 below.

Section 6.4.2.4

- For designs that use an underdrain, does the City intend to allow any flow reduction credit? If so, please explain why. If Ecology accepts the explanation, then additional modeling directions are needed in the text. If Ecology rejects the explanation, the City should add text to make that explicit.
- The bullet below Table 6.9 does not specify the aggregate base material.
- Table 6.10 – Is there a “pervious pavement facility” icon in the Seattle WWHM? A porosity of 20 percent is allowed, but the specifications listed on page 6-47 allow down to 15% void space. There should be consistency here.
- Table 6.11 – The table seems to indicate that with as little as 2 inches of aggregate sub-base on roads with less than 2% slope, pervious pavement can match flows from ½ the 2-year to the 2-year. Did Seattle perform modeling that indicates that result? That seems hard to believe given that the porosity of the base is 15%. (yielding .3 inches of storage).

Section 6.4.2.5 (Page 6-54) – The first sentence references section 6.4.1.5 bioretention planters, rather than a section establishing design criteria for pervious pavement. Also, the third paragraph says that pervious pavement surfaces may be modeled using the assumptions in 6-10 except for no overflow or underdrain. It should also indicate that the user should enter only the depth of aggregate base that can store water. Table 6-10 indicates that the storage reservoir must be 6-inches below the surface of the pavement. Do you want to retain that for pervious surfaces?

Section 6.4.3.5 (Page 6-63) Vegetated Roofs – Clarify the following statement from the first paragraph:

Because the flow control standard for flow critical basins cannot typically be achieved using a vegetative roof, the flow control credit may be calculated as the lesser of the percent of the peak or duration reduction achieved.

How do those directions help the user get credit for vegetated roofs in a drainage basin that exceeds the Ecology flow control thresholds?

Section 6.4.6.4 (Page 6-79) Table 6-16: New Tree Credits – Please explain the bases for your credits. It would seem a separate set of credits is necessary for trees planted within drainage areas that must meet the NPDES permit default standard.

Section 6.4.6.5: Page 6-81: Table 6-17: Retained Tree Credits – Please explain the bases for your credits. It would seem a separate set of credits is necessary for trees planted within drainage areas that must meet the NPDES permit default standard.

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Section 6.4.7.3 Design Criteria for Dispersion Trenches – Please explain why Seattle proposes to cut the minimum flow path distance in half (from 50 feet to 25 feet) as a condition of modeling the roof area as grass.

Section 6.5.2.1: Infiltration Trenches – The design criterion on the bottom of page 6-96 is incorrect for the same reasons specified above for Section 6.4.1.3 and Sections 7.8.2 & 5 below.

Page 6-143 – In equation 8, the square root symbol should not extend over the quantity $(h-(a/3))$. This is a mistake in the Ecology manual.

Chapter 7

Table 7.9 – Please delete St. John's Wort from the list of suitable groundcovers. It is a nuisance species.

Sections 7.8.2 and 7.8.5 – Section 7.8.2 states that treatment requirements are met if 91% of the runoff volume can infiltrate within 48 hours. Section 7.8.5 states that “*Infiltration treatment* (i.e., an infiltration basin or trench) meets the requirements for *basic, phosphorus, and enhanced* treatment if the 91st percentile, 24-hour runoff volume (indicated by an approved continuous hydrologic model) is successfully infiltrated within 48 hours maximum.” Both statements are incorrect. Infiltration facilities for treatment must be sized to infiltrate at least 91% of the entire influent runoff file. In addition, as a check on whether the facility has enough down-time to allow aeration, the 91st percentile, 24-hour runoff volume must infiltrate within 48 hours. This can be calculated using a horizontal projection of the infiltration basin mid-depth dimensions and the estimated long-term infiltration rate.

Additionally, we suggest that the City require verification testing for all infiltration facilities serving areas over 5,000 square feet - even those it is not accepting responsibility for. Given the vagaries and difficulties in predicting large scale infiltration rates, it seems wise to verify performance. For example, King County requires testing and monitoring of an infiltration facility before accepting the facility. We can provide you with the method King County uses. Testing could also help establish a feedback loop for revising the standard design procedures.

Section 7.8.7 – The next-to-last paragraph in this section also is incorrect for sizing bioinfiltration facilities. See the comment immediately above.

Section 7.8.7.2 – The second method cited for sizing bioinfiltration facilities is incorrect. You do not use the water quality design storm to size infiltration facilities. You may follow the procedures in section 6.5.1.2 (B).

Section 7.8.8 – For treatment purposes, bioretention facilities are required to meet the COS Specification 7-21. Please provide the specification. We could not find it in the submitted materials.

Section 7.9.8 and 7.9.9 – We suggest that brief additional sections referring to the section on sand filter basins for sand media specifications and sizing would be helpful to the reader.

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Section 7.10.8.3 – The next-to-last sentence on page 7-134 needs editing.

Section 7.12.3 – The SPU Director's authority is restricted to allowing CUD technologies in accordance with or more stringent than the criteria under which Ecology has approved them.

Appendix D

Media Filters: The table lists standing water for 72 hours after a storm event as an indicator of infiltration capacity reduction. This should be changed to 24 hours.

Wet Biofiltration Swale: Sediment should be removed when it has accumulated to 2 inches over 10% of the treatment area.

