WWA Stormwater Manual Modification Comments

Volume	Section	Page	Comment
V		7 7-12	Seattle supports Ecology's revision to the Bioretention soils mix (BSM) infiltration rate when using BSM provided in the Ecology Manual. However, the way the edits are currently worded, the long term long term design rate for Option #1 did not actually change; later in the same section safety factor adjustments are required such that the long term design rate required are the overly conservative values previously in the manual. Those FOS's are inappropriate to be applied to Option #1. Based on observed performance from BSM mesocosim data and monitoring of full scale planted bioretention facilities, the 6"/hr infiltration rate already includes a safety factor adjustment consistent with Ecology's recommendations for FOS. See attached memo to support a long term design infiltration rate of 6"/hr for Option #1 (Ecology's BSM spec). To complete the manual edits to reflect the BSM data, Seattle recommends the following changes to Ecology's manual: "~~After~~ <u>If</u> selecting option ~~1 or~~ 2 above, determine the appropriate safety factor for the saturated hydraulic conductivity (Ksat). If the contributing area of the bioretention cell or swale is equal to or exceeds any of the following limitations:"

V	various. 5-25, 7-5, 7-19,	7	Seattle does not support Ecology's edits that remove the use underdrains for bioretention or permeable pavement from the practices credited toward MR#5. Systems with elevated underdrains are an important tool in the toolbox due to the stormwater volumes reductions that can occur from these systems combined with their applicability in dense urban environments when other approaches are not feasible. 1. Systems with underdrains still have the potential for substantial flow volume reduction. As stated by Ecology (Volume 5, p 7-9) "If the underdrain is elevated within a base course of gravel, the bioretention facility will also provide some modest flow reduction benefit". Seattle's experience indicates moderate to high flow reduction benefit of bioretention systems with elevated underdrains. Seattle has monitored two bioretention projects with elevated underdrains, Highpoint and Ballard Roadside Raingardens phase 1, and found significant average annual volume reduction from these systems. Most recent monitoring of cells within the Ballard Phase 1 project that were retrofit to add an underdrain (after it became apparent that native soils could not infiltrate the required volumes of stormwater entering the system) estimates 50% average annual volume loss from those cells. 2. Systems with underdrains are sometime the best approach for dense urban envioronments. When the risk of a system without an underdrain are too high (due to considerations such as horizontal water migration along utility corridors and associated unintended consequences), significant stormwater value can still be achieved by using a system with an elevated underdrain. In order to achieve greater protection of water quality while also addressing geotechnical recommendations for infiltration within Seattle, Seattle's BMP Lists have proposed to require infiltrating bioretention with an underdrain for soils with measured infiltration rates greater than or equal to 0.3 inches per hour and less than 0.6 inches per hour (unless other feasibility restrictions apply). Ecology's change to not allow underdrained systems as part of MR#5 would elliminate this option, significantly reducing the toolset within dense urban environments.