Comments on the Draft 2019 SWMMWW		
Draft 2019 SWMMWW Section (select from drop down)	**Comment**	**Comment Made By**
I-3.4.5 MR5: On-Site Stormwater Management	Figure I-3.3 (Page 131) states in the bottom right corner box, "If the project can't meet the LID Performance Standard, it must seek and be granted an exception/variance". This does not provide the developer or engineer with clear guidance of when an exception/variance would be accepted. I would propose that the manual include a section that states: "An exception to the LID Performance Standard may be granted if all of the following conditions are met...". While not binding, it provides all parties involved with a framwork by which to view the applicability of the LID Performance Standard.	Pablo Lopez-Hilfiker, PE, MIG|SvR
Glossary	Page 1232, Definition of pollution generating pervious surface states "use of pesticides and fertilizers" and that "Typical PGPS includes…..landscape areas: including golf courses, parks, cemeteries, and sports fields (natural and artificial turf)." Can you clarify since "pesticides and fertilizers" is broad by describing chemical or organic content ? Does it apply to compost? If parks O&M use "natural" methods for routine landscape maintenance would the park be considered as not pollution generating? Provide guidance for how plan reviewers would review a project for its landscape not being pollution generating.	Kathy Gwilym, PE, MIG|SvR
I-3.4.6 MR6: Runoff Treatment	Page 1232 and 136 and 137, PGPS definition references landscape areas. Clarify how this applies to the site design for redevelopment of a small lot. For example if a 5001 square feet of new pollution generating hard surface is created but the new landscape area is under 3/4 of an acre, is water quality treatment to be designed for capturing and treating just the 5001 of new PGHS or is it required that the new landscape area (under 3/4 of an acre) also be treated? This can be challenging to design on a small commercial lot (i.e. landscape beds all four corners of the site per development code and parking lot in back). i.e. Is it required that all landscape areas be designed with a collection system and routed to water quality treatment facilities on the project?	Kathy Gwilym, PE, MIG|SvR

I-3.2 Exemptions	Recommend adding ADA pavement retrofits that are done to provide ADA accessibility as an exemption. Often it is required to go down to subgrade of a pavement section to regrade an area in a parking lot or pathway to retrofit it and have it become accessible and provide equity. Curbs may have to be removed, curb ramps added, and grades revised to meet the Americans with Disability Act. Without the exemption, project costs increase and it discourages entities from retrofitting their sites/pathways/intersections to make it more accessible to all pedestrian/mobility users. Underground Utility Projects that replace ground surface with in-kind material with similar runoff characteristics are given an exemption (page 96), which is comparable to mobility ADA retrofits at intersections, parking lots, pathways etc.	Kathy Gwilym, PE, MIG|SvR
III-1.2 Choosing Your Runoff Treatment BMPs	Figure III-1.1 Runoff Treatment BMP Selection Flow chart has a typo in Step 3 "Pacticable". Practicable?	Kathy Gwilym, PE, MIG|SvR
III-1.2 Choosing Your Runoff Treatment BMPs	Figure III-1.1. The box "Select a Pretreatment BMP" is listed in the flow chart after a "yes" answer to "Determine if it is practicable to provide runoff treatment by infiltrating into the native soil." The pretreatment options listed in the "pretreatment bmp" are not typically conducive to the design of permeable pavement and bioretention infiltration facilities. Runon to permeable pavements can be both sheetflow and direct rainfall. Similarly bioretention facilities are via drain curb cuts in the roadway gutter or sheet flow/shallow surface flow into facility, or direct rainfall. Presettling Basin, manufactured treatment device, etc. require the flow to be collected in a pipe which then doesn't allow sheet flow into the facility. Recommend clarifying what is required for "pretreatment" for infiltration systems using permeable pavements and bioretention. OR revise the box "Select a Pretreatment BMP" by deleting the four bullets of pretreatment BMPs and tell users that the pretreatment BMP design options vary with the Infiltration BMP used. Then, in Volume V, a description of what design options for pretreatment are typically applicable is described for each BMP (infiltration basin, infiltration trench, bioretention, permeable pavement). For example BMP T5.15 Permeable Pavements would have a section on "pretreatment" or note that it is not applicable to permeable pavement systems because the permeable pavement top wearing course acts as the pretreatment.	Kathy Gwilym, PE, MIG|SvR
BMP T7.30: Bioretention	Figures V-5.13, V-5.14 and V-5.15 Typical Bioretention references a 2" to 3" drop from the edge of pavement and sidewalk. We do not recommend this amount of drop along sidewalks and areas where people could walk near the pavement edge. This will be a tripping/safety issue for pedestrians, people using strollers/wheelchairs, people getting out of cars etc. Arborist woodchip mulch also breaks down over time and creates an even larger drop.	Kathy Gwilym, PE, MIG|SvR

BMP T7.30: Bioretention	Figures V-5.13, V-5.14, V-5-15 - In speaking with Howard Stenn, soil and plant specialist who has been providing consultation to City of Seattle for roadside bioretention, 2" of arborist wood chip mulch is preferred rather than 3" which can impact plant growth. The picture also references sod along the edges but the scale of the section shows it being a vary narrow section (less than 1' width if the bottom of the rain garden is drawn at 1'). Narrow strips are sod are very hard to maintain since it can not be easily cut with a lawn mower. Suggest not defining the landscape edge surfacing treatment unless it is a requirement. The width of the level area from edge of pavement to top of slope of bioretention varies depending upon site context and adjacent pavement use. Add a label to "bioretention plantings" and graphically show taller plants/shrubs for V-5-13 and V-5-14. For V5-15, compared to unlined facilities, smaller plants would grow unless greater soil depth is provided to support plant growth. Revise "Overflow standpipe" to "Overflow Structure or Flow Path" It may be an area drain, catch basin, standpipe with beehive grate or if its in a park it could just rise up and sheetflow out and designed to convey it into the downstream system.	Kathy Gwilym, PE, MIG|SvR
BMP T7.30: Bioretention	Figure V-5.16 Example of a Bioretention Planter. The relative scale of this graphic is off and may cause designers to build excess when not needed and impact the site context for siting the planter in the ROW. Suggest using a stormwater planter detail that is more applicable to use on private development and not for the ROW. or replace this detail and use one that an agency in Washington has developed (e.g. City of Tacoma). If this is based on an old City of Portland detail note that they have updated their details significantly from this version. Stormwater Planters in the ROW require urban design and tailoring it to street typology and context. NACTO Urban Street Stormwater Guide provides guidance for designing roadside stormwater planters. https://nacto.org/publication/urban-street-stormwater-guide/ Using the 3' bottom width of the planter, the planter appears to be 12' long and on a street with 5% slope the check dams would be unnecessary for this size of planter unless it is needed for the structural purposes for the walls. Similarly, one channel/grate (drain curb cut) that can be both inflow and outflow would be more realistic for a planter of this scale and in a series of planters. Recommend deleting the reference to the width of the concrete or pavers between the stormwater planters because this is an urban design element and context specific. We would not consider 6' typical for high pedestrian traffic areas and it also does not allow for street tree planting and other streetscape elements. We typically see (and design) the concrete sidewalls to the bottom of the excavation - not on a bench as shown for stormwater planters located along streets and/or on parcels.	Kathy Gwilym, PE, MIG|SvR

BMP T5.15: Permeable Pavements	Figure V-5.1 Example of Permeable Pavement Section, What is the source of this section? Recommend updating it to reflect current industry standards, guidance from Ecology's Statewide LID training and what agencies are typically using (see Seattle, Tacoma standard plans). Recommend deleting reference to the 1" washed sand layer and change it to an unspecified depth of "leveling course - if applicable". We have not used leveling course for pervious concrete but it may or may not be included with porous asphalt. Tacoma and Puyallup have used permeable asphalt treated base layer for the leveling course placed over the permeable ballast. Recommend deleting reference to 3/4"-2" crushed-washed for the open-graded base material. Through the WSDOT/Tacoma Permeable Pavement working group, the guidance provides a modified Permeable Ballast for the base course.	Kathy Gwilym, PE, MIG|SvR
BMP T5.15: Permeable Pavements	Figure V-5.2 is old and should be updated to reflect current industry standards and guidance from the Ecology LID Statewide Training curriculum or follow guidance from ICPI's latest edition for designing Permeable Interlocking Concrete Pavers.	Kathy Gwilym, PE, MIG|SvR
BMP T5.15: Permeable Pavements	Volume V-Chapter 5-Page 862, Recommend revising 7 bullet to the following: "Where the subgrade slope exceeds 6 percent after reasonable efforts to grade. Where the permeable pavement wearing course slope exceeds 6 percent after reasonable efforts to design grade." My recollection is that the 10 percent slope for pervious concrete, 12 percent slope for permeable interlocking pavers and 6 to 12 percent for grid-type evolved from vehicle tire traction, whereas the 5% slope for porous asphalt is tied to reasonable design grade for subgrade. Subgrade slopes over 5% require frequent check dams and deep pavement sections to terrace the subgrade for infiltration.	Kathy Gwilym, PE, MIG|SvR
BMP T5.15: Permeable Pavements	Page 865, Permeable Pavement as Runoff Treatment. Will Ecology be updating to recognize the research at Washington Stormwater Center's porous asphalt parking lot that showed treatment through the top permeable pavement wearing course thus not needed to have a 6" sand layer in the pavement section? They also did a literature review of other research that showed treatment through the top few cms/inches of the wearing course of a permeable pavement section.	Kathy Gwilym, PE, MIG|SvR
BMP T5.15: Permeable Pavements	Page 868, Permeable Interlocking Concrete Pavement and Aggregate Pavers. Recommend adding reference to consult with permeable paver manufacturer specifications given the product and varying gap widths between the pavers. Not all 3 types listed work for all paver systems.	Kathy Gwilym, PE, MIG|SvR

BMP T5.15: Permeable Pavements	Page 868, Revise title for "Acceptance Test" to "Infiltration Test for Permeable Pavement Surface" . The tests listed for "acceptance" pertain to infiltration (not other acceptance tests done for pavements and subbase materials - such as density tests, raveling tests etc). Add reference ASTM C1781 which is the infiltration test for permeable interlocking concrete pavers. ASTM C1701 is used for pervious concrete and porous asphalt. Note: The WSDOT special provisions for pervious concrete and porous asphalt that were developed by the volunteer permeable pavement working group (led by Tacoma) provides guidance for other acceptance tests (hardened density, fresh density etc) for pervious concrete and porous asphalt. We do not recommend duplicating the "acceptance testing" noted in the special provisions specifications in the Ecology stormwater manual but recommend that Ecology and WSDOT work together on maintaining the special provision to align with new research, lessons learned and industry standards. The state provides specifications for catch basins, pipes, and other stormwater elements and so to make it easier for implementation permeable pavements and bioretention soil mix specifications should be added into the state standard specifications too. By not having it in the state's standard specifications, makes it a challenge for small and large agencies preparing construction specifications.	Kathy Gwilym, PE, MIG|SvR
BMP T5.15: Permeable Pavements	Page 865, Last two sentences in first bullet suggest revising to address constructability in varying conditions: "Subgrade should not be subject to compaction beyond the qualitative and quantitive levels identified herein. Do not allow construction traffic and equipment onto the subgrade except when construction access on subgrade is required for the pavement section installation. Follow back dumping approach as noted below." For example, a retrofit in a ROW may have limited space for equipment to maneuver and so equipment used in the installation of the pavement subbase may have to drive on the subgrade.	Kathy Gwilym, PE, MIG|SvR
BMP T5.15: Permeable Pavements	Bullet spanning pages 868-869, recommend the minimum initial infiltration rate be higher than 20 inches per hour. Starting with a low rate will be a challenge to maintain and require frequent cleaning. Pervious concrete, permeable interlocking concrete pavers and porous asphalt can all easily provide 100 inches/hour or greater when its new. Other option is revise the second sentence on page 868 to the following: "To improve the probability of long-term performance and ease for maintenance, significantly higher initial infiltration rates (100 inches or greater) are desirable." so that it gives designers a better target.	Kathy Gwilym, PE, MIG|SvR

BMP T5.15: Permeable Pavements	page 875, Add reference to "vacuum surface cleaning machines" (such as Cyclone, Elgin etc) for cleaning the pervious concrete and porous asphalt. The methods referenced are not conducive to large scale porous pavement applications. Guidance for equipment used in cleaning pervious concrete and porous asphalt were discussed during the Statewide LID Trainings. Will the ppts from the 2016-2017 Ecology Statewide LID Trainings be made available?	Kathy Gwilym, PE, MIG|SvR
BMP T5.15: Permeable Pavements	page 875, last bullet under Permeable paver maintenance recommendations, the Permeable Interlocking Concrete Pavements: Design, Specifications, Construction, Maintenance has been updated. Recommend referencing current edition of this document which was published in 2017.	Kathy Gwilym, PE, MIG|SvR
BMP T7.30: Bioretention	Page 916, Discussion on bioretention planting is light compared to other elements described. Suggest adding under plant materials, reference to "Crime Prevention through environmental design" standards. For ROW bioretention plantings recommend adding reference to City of Seattle ROW bioretention plant lists that can be found in Seattle's GSI Manual, Appendix G https://www.seattle.gov/util/cs/groups/public/@spu/@engineering/documents/webcontent/1_079167.pdf . The City has refined their plant lists based on feedback from O&M, suppliers, horticulturists and landscape architects. The design of the bioretention cross section (i.e. whether it has graded side slopes vs concrete side walls or has a liner) affects the type of plants that can be used. For example, the planting design for a cell with liner or concrete side walls is different from a cell that is unlined and with graded side slopes. Also suggest noting that if properly designed, select trees can also be planted along the side slopes or bottom of bioretention cells that are unlined and with graded side slopes.	Kathy Gwilym, PE, MIG|SvR
BMP T7.30: Bioretention	page 900, Under "Site growing characteristics and plant selection", last sentence change to "Invasive species and noxious weed control will be required as typical with all planted landscape areas."	