

KC Surface Water Design Manual (SWDM) Update Summary of Changes

Date: 11/3/15

Chapter 1, Drainage Review and Requirements

Definitions:

1. High Use sites clarified.

- Added aircraft and stationary equipment as more *examples* (an expansion of the *etc.* already present).
- Clarified intersection roadway lead-in length requiring treatment.
- Cleared up ambiguous language regarding heating-oil delivery volume – to make it clear that the exemption is for point of delivery, not commercial storage (i.e. heating oil is not categorically exempt, only where it's delivered for use).

Basis: Clarifications of intent. No expansion of requirements.

2. **New Impervious surface** definition clarified to include pervious surfaces installed with underdrains.

Basis: Clarification. Underdrained systems are not adequately captured in the current definitions of new impervious or new pervious surfaces. Defining underdrained areas as impervious is conservative with regard to protection of downstream properties and resources, more accurate, and consistent with current practice. As it applies to athletic fields, KC will continue to allow detention within the field system that has been allowed under previous SWDM adjustments. KC plans to formalize this “in field” detention via a blanket adjustment that clearly describes conditions of use.

3. **Pollution-generating impervious surface (PGIS)** definition is clarified to include those pervious surfaces installed with underdrains that are considered to be a significant source of pollutants in stormwater runoff. The modified portion is as follows: “Lawns, landscaping, sports fields, golf courses, and other areas that have modified runoff characteristics resulting from the addition of underdrains that have the pollution generating characteristics described under the “pollution-generating pervious surface” definition are to be considered *PGIS*.”

Basis: Clarification. Underdrained systems are not adequately captured in the current definitions of new impervious or new pervious surfaces. Defining underdrained areas as impervious is conservative with regard to protection of downstream properties and resources, more accurate, and consistent with current practice. There is a need to clarify this definition to include these types of impervious surfaces since new PGIS is only defined as “*new impervious surface* that is *pollution-generating impervious surface*.”

4. Pollution-generating impervious surface (PGIS) definition is further clarified with regard to roofing as follows: “PGIS includes metal roofs unless they are coated with an inert, non-leachable material (see Reference 11-E); or roofs that are subject to venting significant amounts of dusts, mists, or fumes from manufacturing, commercial, or other indoor activities. Other roofing types that may pose risk but are not currently regulated are listed in Reference 11-E.” The current 2009 SWDM PGIS definition states “Metal roofs . . . unless they are treated to prevent leaching”.

Basis: Equivalency to Ecology's manual, except for the redirect to Reference 11-E. Reference 11-E includes a specification for the inert, non-leachable coating material referenced in the definition and

also includes information about other roof types that may be pollution generating based on Ecology research and other publications but that are not currently regulated as such. This additional roof type information is offered as a resource only (non-regulatory).

5. **Erodible or leachable materials, wastes, or chemicals** definition is added: “.are those materials or substances that, when exposed to rainfall, measurably alter the physical or chemical characteristics of the rainfall runoff (Examples include but are not limited to erodible soil, uncovered process wastes, manure, fertilizers, oily substances, ashes, kiln dust, garbage dumpster leakage, commercial-scale vehicle and animal wash waste, galvanized structural, architectural, cabinet, and utility steel, architectural copper, bronze, brass, and lead, treated lumber, etc.)”.

Basis: Consistency with Ecology definition with additional examples that focus on “stored” materials and those not either already covered by PGIS/PGPS definitions.

6. **New PGIS definition** edited to capture changes to existing PGIS that result in different or more pollution: “*New PGIS* means *new impervious surface* that is *pollution-generating impervious surface* or any alteration of existing pollution-generating impervious surface that changes the type of pollutants or results in increased pollution loads and/or concentrations.”

Basis: This change is necessary to ensure appropriate water quality treatment is provided where warranted by changes to use or material that result in either more pollution or a different type of pollutant that requires a specific treatment facility.

7. **New PGPS definition** edited to capture changes to existing PGIS that result in different or more pollution: “*New PGPS* means *new pervious surface* that is *pollution-generating pervious surface* or any alteration of existing pollution-generating pervious surface that changes the type of pollutants or results in increased pollution loads and/or concentrations.”

Basis: This change is necessary to ensure appropriate water quality treatment is provided where warranted by changes to use or material that result in either more pollution or a different type of pollutant that requires a specific treatment facility.

8. **Subject to Vehicular Use Definition** updated as follows: “*Subject to vehicular use* means the surface is regularly used by motor vehicles including but not limited to motorcycles, cars, trucks, busses, aircraft, tractors, and heavy equipment. The following surfaces are considered regularly used by motor vehicles: roads, un-vegetated road shoulders, bike lanes within the traveled lane of a roadway, driveways, parking lots, unrestricted access fire lanes, vehicular equipment storage yards, and airport taxiways and runways. The following surfaces are not considered regularly used by motor vehicles: paved bicycle pathways separated from and not subject to drainage from roads for motor vehicles, fenced or restricted access fire lanes, and maintenance access roads with a recurring use of no more than one routine vehicle access per week.”

Basis: Equivalency with Ecology Manual.

9. “**Site**” Definition updated to be consistent w/edit proposed in KCC Title 9 as follows: “*Site* means a single parcel, or either: two or more contiguous parcels that are under common ownership or documented legal control or a portion of a single parcel under documented legal control separate from the remaining parcel, used as a single parcel for a proposed project for purposes of applying for authority from King County to carry out a proposed project. For projects located primarily within dedicated rights-of-way, “*site*” includes the entire width of right-of-way subject to improvements proposed by the project.”

Basis: The edit is to allow a portion of a single parcel to be considered the site to address leaseholds on large parcels (e.g. Boeing).

Projects Requiring Drainage Review

10. Deleted redevelopment project threshold condition (2009 SWDM, #7) for drainage review that essentially captured in threshold condition #1. (Section 1.1.1)

Basis: This language was deemed redundant.

Drainage Review (Section 1.1.2):

11. Re-named “Small Project Drainage Review” to “Simplified Drainage Review” and updated corresponding thresholds.

Basis: This change was made to be consistent with new process and thresholds.

12. **Simplified drainage review thresholds** are edited to include new thresholds of 5,000 square feet of PGIS, and $\frac{3}{4}$ acre of PGPS. Threshold formulas for allowed pervious surfaces relative to impervious surfaces are modified.

Basis: The 5,000 SF PGIS and $\frac{3}{4}$ acre PGPS thresholds are relevant to include since when exceeded, an engineer is required to design a water quality facility. The revised thresholds for pervious surfaces were required based on: the update to a new hydraulic model requires use of different time-steps (15 minute) and more granular rainfall region factors that must be specifically selected; and the smaller sizes of required flow control BMPs (FCBMPs) give less modeling credit. These changes in thresholds are mitigated for agricultural and single family projects with the creation of “Directed Drainage Review” which will capture those project types exceeding the revised thresholds of Simplified Drainage Review and provide a drainage review whose scope is tailored to the individual project.

13. **Directed Drainage Review** is added for single family and agricultural projects that don’t qualify for Simplified Drainage Review. Directed drainage review will utilize DPER engineers to tailor engineering and submittal requirements to the unique project.

Basis: This change was made to more cost effectively serve rural residential and agricultural projects.

Section 1.2.1, Core Requirement 1:

14. Discharge requirements within Landslide Hazard Drainage areas require DPER approval based on geotechnical analysis in addition to listed conditions to exempt from a required tightline system.

Basis: Precautionary adjustment of requirement to reduce the risk of landslides.

Downstream WQ Problems requiring special attention

15. Clarification by addition of downstream problem type 4: “**Potential Impacts to Wetland Hydrology problem**”. Analysis of wetland hydrology impacts is edited to capture evaluation of offsite wetlands impacted by a project’s changes to stormwater if the project is subject to Core Requirement 3. Identification of impacts can require modification of onsite flow control requirements.

Basis: Change is made to be consistent w/Ecology MR#8.

16. Under mitigation for a DO problem', 'nutrients' has been deleted and replaced with 'phosphorus'; mitigation remains a facility from the Sensitive Lakes menu (no change from 2009 SWDM).

Basis: Clarification.

17. Clarified that the Category 5, 4, or 2 listings we already target are found in the combined 305(b) / 303(d) Water Quality Assessment, not just in the 303(d) list. This will make it easier for Applicants and Permitting to find those listings.

Basis: Errata fix. 2009 SWDM incorrectly refers only to the 303(d) list.

Section 1.2.3, Core 3, Flow Control:

18. Re-named Core Requirement #3: “Flow Control *Facilities*”.

Basis: Consistency with code and to clarify in comparison to new core requirement 9 (Flow Control *BMPs*).

19. Edited Basic Exemption Thresholds to 5,000 SF new plus replaced impervious surface and ¾ acre new pervious surface.

Basis: Equivalency with Ecology flow control thresholds and due to fact that KC is now proposing to split out FCBMP standard (Core Requirement 9) from FC facility standard (Core Requirement 3) which have differing thresholds.

20. Eliminated Cost Exemptions #2 and #3.

Basis: Change made to be equivalent with Ecology requirements.

21. Replaced impervious not fully dispersed on non-redevelopment projects is a target surface for flow control if new is 5,000 SF or greater or new pervious is 35,000 SF or more.

Basis: Change made to be equivalent with Ecology requirements.

22. Facility Exception in Conservation and Flood Problem FC areas: Change threshold exception to 0.15 cfs with 15 minute timesteps and 0.1 cfs for 1 hour timesteps (where 15 minute data not available).

Basis: Change made to be equivalent with Ecology requirements due to the higher peak flows generated by Ecology’s hydrologic model based on using 15 minute timesteps.

23. Facility Exception in Conservation and Flood Problem FC areas: **A zoned** projects in agricultural use may use existing site conditions as predeveloped for this exception calculation.

Basis: Allowed by Ecology’s requirements, extended to Ag properties based on understanding that public goal in these areas conflicts w/a forested restoration strategy. This may exempt some Ag properties from facilities.

24. Flow Control Facility Implementation/Sizing Credits: FC modeling credits for limited infiltration, basic dispersion, and bioretention have been modified from 50% impervious/50% grass to 90% impervious/10% grass.

Basis: Standard sizing for FCBMPs per Ecology requirements is smaller and therefore standard FC credits are less based on modeling results.

25. Flow Control Facility Implementation/Sizing Credits: FC modeling credits for BMPs can be used to reduce required water quality facility sizes.

Basis: This provides incentives for applying BMPs while not eliminating more reliable downstream water quality facilities.

26. Added “Impervious Surface Percentage Exemption for Agricultural Projects” that allows agricultural projects in A zones, FPP, or APD to exempt from a flow control facility under specific criteria. This is targeted at very large parcels with relatively small impervious footprints.

Basis: This is intended to obtain the required environmental outcomes while preserving arable land on sites where impacts from increased impervious surfaces are limited.

27. Target Surfaces for flow control is edited to not require flow control for those surfaces that are dispersed using the “Farmland dispersion” BMP that is detailed in Appendix C. Farmland dispersion

is used on Ag in FPP, APD, or A zones and utilizes cropland/pasture for dispersion according to specific criteria.

Basis: This addresses farm field access roads flow control requirements by using agricultural lands for dispersal and may preserve arable land from being displaced by a flow control or water quality facility.

28. Facility Requirement in LS Hazard Drainage Areas: Clarified/expanded conditions for facilities and BMPs in situations where exempted from tight lining. Heightened geotechnical analysis required.

Basis: Precautionary adjustment of requirement to reduce the risk of landslides.

29. Deleted section 1.2.3.3 Flow Control BMPs Requirement.

Basis: Flow Control BMPs will now be a separate Core Requirement 9.

Section 1.2.4, Core 4: Conveyance:

30. Groundwater protection in new channels/ditches modified to include untreated runoff from $\frac{3}{4}$ acre or greater (currently 35,000 square feet or greater).

Basis: Change made to be equivalent with Ecology requirements.

31. All new outfalls directing flows to steep slope and landslide hazard areas require tight lining to bottom of slope unless geotechnical analysis recommends/allows alternative. In no case are alternative systems allowed closer than 50 feet to top of slope of these hazard areas.

Basis: Precautionary adjustment of requirement to reduce the risk of landslides.

Section 1.2.5, Core 5: Erosion and Sediment Control

32. Renamed to “Construction Stormwater Pollution Prevention”.

Basis: Updated to emphasize / clarify pollution prevention measures as well as ESC.

33. Added “SWPPS Performance” section and text under “CSWPP Performance and Compliance Provisions”.

Basis: Ecology equivalency and clarity.

Section 1.2.6, Core 6, Maintenance and Operations

34. For “Drainage Facilities to be Maintained by King County”, clarify that flow control BMP vegetated flow paths (as required for full dispersion and basic dispersion BMPs) shall be within an easement that includes provisions for access and maintenance and that King County maintenance of these vegetated flow paths will be limited to their flow control/FCBMP functionality—all other maintenance shall remain the responsibility of the owner(s).

Basis: Clarification of current requirements.

Section 1.2.8, Core 8: Water Quality

35. Exemptions: Lowered PGPS threshold for required water quality facility to $\frac{3}{4}$ acre (from 35,000 square feet currently).

Basis: Change made to be equivalent with Ecology requirements.

36. Exemptions: New plus replaced PGIS of 5,000 sf or greater triggers water quality on all projects (currently replaced is only considered in redevelopment projects).

Basis: Change made to be equivalent with Ecology requirements.

37. Exemptions: 4, “Soil Treatment Exemption” from Core #8 requirements previously only addressed exempting PGIS. This section is clarified and edited to allow exemption for PGPS as well.

Basis: Clarification.

38. Target Surfaces for water quality facilities is edited to not require treatment for those surfaces that are dispersed using the “Farmland dispersion” BMP that is detailed in Appendix C. Appendix C specifications include requirement for an active farm management plan emphasizing pollutant control/reduction along with described dispersion criteria.

Basis: Agricultural projects in FPP, APD, and A zones utilizing dispersion and farm management plans can achieve an equivalent or better water quality result using the proposed alternative.

39. Area-Specific Water Quality Facility Requirement (1.2.8.1): Exceptions in Basic Treatment areas are modified.
- a. Exception 2: The reduction to basic from enhanced basic treatment is modified to not be allowed where infiltrating within one-quarter-mile of a fresh water designated for aquatic life use or that has an existing aquatic life use into soils that do not meet the groundwater protection standards described in Section 5.2.1.

Basis: Change made to be equivalent with Ecology requirements.

- b. Exception 3: The Major Receiving Waters allowance for reducing the Enhanced Basic treatment requirement to Basic only treatment is not applicable where according to Downstream Analysis the receiving water is impaired for heavy metals.

Basis: Equivalency with Ecology requirements (Ecology's Off Site Analysis mitigation).

- c. Exception 4: The reduction to basic from enhanced basic treatment for commercial land uses is modified to be allowed only if a facility from the Enhanced Basic WQ menu is not feasible.

Basis: It is uncertain how effective Leachable metal covenants are as compared to required treatment facility and should only be used when a facility is determined not feasible. Also, Ecology requirements do not include this exception.

40. Target surfaces for water quality treatment now include replaced PGIS on non-redevelopment projects.

Basis: Change made to be equivalent with Ecology requirements.

41. Exceptions in Sensitive Lake Treatment areas modified.

- (1) Exception 1: Reduction to basic menu from sensitive lake menu is not allowed where infiltrating within one-quarter-mile of a phosphorous sensitive receiving water or a tributary to that receiving water into soils that do not meet the groundwater protection standards described in Section 5.2.1.

Basis: Equivalency w/Ecology requirements.

- (2) Exception 2: Waiver of application of the Enhanced Basic WQ menu is not allowed where infiltrating within one-quarter-mile of a fresh water designated for aquatic life use or that has an existing aquatic life use into soils that do not meet the groundwater protection standards described in Section 5.2.1

Basis: Equivalency with Ecology requirements.

- (3) Exception 3: Waiver of application of the Enhanced Basic WQ menu when discharging via non fish bearing conveyance to a stream with mean annual flow of 1,000 cfs or more or a lake that is 300 acres or larger is not applicable for WQ impaired segments per Section 1.2.2.1: Downstream Analysis, and 1.2.2.1.2: Downstream Water Quality Problems Requiring Special Attention, Metals Problem (Type 4).

Basis: Equivalency with Ecology requirements.

42. Exception 1 in Sphagnum Bog Treatment area is modified: Basic WQ menu may not be used in place of sphagnum bog menu for runoff infiltrated per Section 5.2 where infiltrating within one-quarter-mile of a phosphorous sensitive receiving water or a tributary to that receiving water into soils that do not meet the groundwater protection standards described in Section 5.2.1.

Basis: Equivalency with Ecology requirements for treatment of sensitive lakes/phosphorous sensitive water bodies.

43. Permeable pavements that are tributary to sphagnum bog wetlands should be types other than Portland cement (PCC) permeable pavement, if feasible.

Basis: High alkalinity from PCC permeable pavement is a risk that can be avoided by substituting use of asphaltic permeable pavement in these specific areas.

44. Update and clarification of “Use of Experimental Water Quality Facilities”—requires pre-approval by ECY and may require additional monitoring and evaluation by KC to approve via blanket adjustment and later inclusion in the SWDM.

- a. All facilities are subject to KC monitoring requirements to establish maintenance requirements including maintenance cycle.

Basis: KC's maintenance cycle is no more frequent than annual inspection/maintenance. Facilities with shorter maintenance cycles may be allowed for privately maintained facilities, but not for those maintained by KC.

- b. KC may allow proprietary Basic facilities that have Ecology TAPE General Use Level Designation approval, subject to KC evaluation of data used for Ecology's TAPE approval and subject to maintenance monitoring. For all other treatment facilities, KC will require additional testing equivalent to TAPE where Ecology's approval does not achieve stated TAPE criteria.

Basis: Clarification of KC's existing practice regarding approval of proprietary facilities for use in KC. Ecology has approved facilities where supporting data submittals did not fully meet TAPE criteria and where questions remain that may affect the effectiveness assessment or other suitability criteria. KC wants assurance that alternative facilities will perform as required beyond that shown at a single site.

Section 1.2.9, Core 9, Flow Control BMPs

45. **Core 9 (Flow Control BMPs)** is a new section describing revised FCBMP requirements: FCBMPs are required to the maximum extent feasible using a specified BMP list and approach according to project type, size, and location. Hydraulic modeling is required on large rural projects and road projects to demonstrate compliance with the Low Impact Development (LID) Performance Standard. KC is proposing a pre-modeled BMP “list” alternative for rural short subdivisions and individual lots subject to this modeling requirement. The two general BMP implementation approaches are: A. prescribed BMP lists and B. LID Performance Criteria (modeling).

Basis: This requirement is added to be equivalent with Ecology minimum requirement #5. The alternative list developed by King County is to save time, money, and effort for rural properties. King County has made modifications to the Ecology prescribed list for urban properties in order to provide more flexibility in achieving desired flow control outcome.

46. FCBMPs are now required on road projects (e.g. no longer just incentive based).

Basis: Change made to be equivalent with Ecology requirements.

47. Large rural lots and rural subdivisions (5+ acres), and rural road improvement projects (5+ acres) are required by Ecology to meet an LID modeling performance standard. King County is proposing an alternative BMP list approach to the modeling requirement for large rural lots and rural short subdivisions.

Basis: Proposed to provide equal (pre-modeled) performance while saving rural landowner expense of modeling.

48. Target surfaces for FCBMPs now include replaced impervious surface in addition to new impervious surface and existing impervious added after Jan. 2001 as well as new pervious surface. The current (2009) Surface Water Design Manual defines target surfaces for BMPs that vary depending upon the type/size of lot and impervious coverage (e.g. large lot target surfaces for BMPs are currently new impervious surface and existing impervious added after Jan. 2001).

Basis: Change made to be equivalent with Ecology requirements.

49. Large lot/low impervious and large lot/high impervious BMP requirements are consolidated into “Large Lot” with the BMP requirement based on a sliding scale of impervious surface coverage.

Basis: Change made for simplification and flexibility of implementation.

50. Small and Large Lot BMP category: KC is proposing a broader ‘menu’ approach compared to ECY. Bioretention and limited infiltration are set on par with permeable pavement for use in the prescribed list approach. KC is maintaining its minimum “floor” of BMP compliance, unlike ECY—and allows other BMPs (native growth retention and reduced impervious footprint) which do not have feasibility “outs”, but have broader LID benefit.

Basis: Provide a more flexible, cost effective approach to customers, which encourages lower long term costs and better performance.

51. Added the “Large Rural Lot” category for BMP implementation: Requires either LID Performance standard modeling or the King County developed alternative BMP list. The alternative list includes pre-modeled LID-Performance-Standard-compliant BMPs for all target surfaces.

Basis: LID performance standard modeling for large rural lots is required to be equivalent with Ecology requirements. The alternative list is provided to assist rural landowners by pre-modeling LID-compliant-BMPs. This will save considerable cost and effort that otherwise would be put upon the rural landowner.

52. Added the “Large Rural Subdivision and Large Rural Road Improvement Project requirements” for BMP implementation. Both require LID Performance standard modeling. Short subdivisions are provided an alternative BMP list.

Basis: LID performance standard modeling required to be equivalent with Ecology requirements. KC Alternative list is provided to assist rural landowners by pre-modeling compliant BMPs. This will save considerable cost and effort that otherwise would be put upon the rural landowner.

53. FCBMP Credits: Extending allowance for FCBMP modeling credits to apply to water quality facility sizing under specific circumstances.

Basis: This provides additional incentives for applying FCBMPs.

54. Farmland dispersed areas are considered exempt from additional FCBMP requirements.

Basis: Saves on costs for farmers and achieves required result while maintaining arable land.

55. Deleted vegetated roofs as a BMP.

Basis: The vegetated roofs BMP doesn't disperse, is not infiltrative, is considered a 'hard surface' with underdrains, and is rarely used or proposed. An applicant could still use vegetated roofs, but no BMP or BMP modeling credit would be allowed. An applicant could propose to explicitly model attenuation under an adjustment. Ecology does not include vegetated roof BMPs on their list approaches or give a de facto modeling credit.

Section 1.3, Special Requirements

56. Re-named Flood Hazard Reduction Plan Updates (FHRPs) to Flood Hazard Management Plan (FHMPs) throughout.

Basis: Clarification/consistency with current name of plan.

57. Edited Special Requirement #3, "Flood Protection Facilities" (Section 1.3.3). Added that demonstration that a flood protection facility conforms with structural stability standards should be "as determined by a licensed professional engineer"; added citations to KCC 21A.25 and 16.85; and clarified that flood containment levees "shall meet or exceed the professional engineering standards summarized in FEMA National Flood Insurance mapping regulations (44CFR sub section 65.10) or FEMA's Analysis and Mapping Procedures for non-Accredited Levee Systems".

Basis: Clarification of current requirements and practice. Safety.

58. Added a new threshold for application of Special Requirement #5, "Oil Control" as follows: "is a *redevelopment project* that results in new plus replaced pollution generating impervious surfaces of 5,000 square feet or more or new pollution generating pervious surface of $\frac{3}{4}$ acre or more."

Basis: Equivalency w/Ecology requirements.

59. Edited within Special Requirement #5, "Oil Control" that where there are no left turn pockets, treatment area extends 75 feet from stop line (2009 SWDM specifies "three car lengths").

Basis: Clarification of existing requirements to implementable language.

Section 1.4, Adjustment Process:

60. Eliminated complex and pre-application adjustments.

Basis: Change made to be consistent with DPER's new fee structure.

61. Experimental Design Adjustments section expanded. See "Use of Experimental Water Quality Facilities".

Basis: See "Use of Experimental Water Quality Facilities" basis above.

Chapter 2, Drainage Plan Submittal

General

1. Changed *DDES* to *DPER* throughout.
Basis: Housekeeping.
2. Changed *King County Road Standards (KCRS)* to *King County Road Design and Construction Standards (KCRDCS)* throughout.
Basis: Housekeeping.
3. Changed KCRS references to “the approved model” as generic placeholder for new stormwater model, to be determined.
Basis: This change made to be equivalent w/ECY manual and adoption of new hydrologic model.
4. Changed to 15-min timesteps throughout, no longer 1-hr.
Basis: This change made to be equivalent w/ECY manual and adoption of new hydrologic model.

Chapter 2

5. Integrated Ecology’s Element 11 (Maintain BMPs), Element 12 (Manage the Project) and Element 13 (Protect Existing and Proposed Flow Control BMPs) into appropriate areas for inclusion in ESC and site plans.
Basis: Change made to be equivalent with Ecology requirements and in response to Ecology comment.
6. Incorporated LID, emphasized flow control BMPs inclusion in plans and TIR.
Basis: Change made to be equivalent with Ecology requirements.
7. “Small Project Drainage Review” is now “Simplified Drainage Review” throughout.
Basis: Change made to more accurately reflect the simpler requirements applied to projects that qualify for this type of drainage review.
8. Added references to Directed Drainage Review where applicable, e.g. Section 2.3.
Basis: Housekeeping.
9. Consistent with the renaming of Core Requirement #5 to add focus to SWPPS requirements, developed a SWPPS section akin to the ESC sections; reformatted existing SWPPS requirements and imported supporting text from Ecology’s SMMWW; emphasis now on CSWPP plan with ESC plan and SWPPS plan as components.
Basis: Change made to clarify existing requirements.
10. Datum change for plans NGVD29 to NAVD88 (see Section 2.3.1.2).
Basis: Required to comply with King County Code.
11. Deleted outdated compost references (“Grade A” and outdated WAC) and revised reference for future Reference 11 (Materials Specifications).
Basis: Housekeeping.
12. Landscape Management Plan specific requirements moved to Reference Section 4-C, revisions pending.
Basis: Housekeeping.

13. Fleshed out Final Corrected TIR requirements.

Basis: Clarification.

Chapter 3, Hydrologic Analysis & Design

1. All references to the KCRTS software have been removed. These were replaced with generic references to the “Approved Model” which are added as placeholders. A new Section 3.2.3 titled “The Approved Model” describes how the term is applied in the manual and introduces the currently approved runoff models, and a new Reference section will list the approved models and limited SWDM-specific guidance for each model.

Basis: Because other modeling software is now available in the region, KCRTS is being phased out to save on user support and software maintenance costs. It will be replaced with a different model or models where user support and software maintenance is provided by the software developer. The approved models will be listed in the manual's Reference section.

2. The Low Impact Development Performance Standard Requirement has been added to page 3-4 and 3-5.

Basis: Change made to be equivalent with Ecology requirements.

3. The word *maintaining* has been changed to *matching* in the first paragraph of the Level One Flow Control requirements on the bottom of page 3-5.

Basis: This is consistent with the wording in the first paragraph of Section 3.1.2.

4. Level 2 Flow Control, Page 3-6

The sentence that states “The predevelopment peak flow rates for the 2-year and 10-year runoff events are also intended to be maintained when applying Level 2 flow control.” has been changed to “The predevelopment peak flow rates for the 2-year and 10-year runoff events cannot be exceeded when applying Level 2 flow control.”

Basis: This change clarifies the original intent of this sentence.

Chapter 4, Conveyance System Analysis & Design, List of Changes

General

1. Changed DDES to DPER throughout.

Basis: Housekeeping.

2. Changed King County Road Standards (KCRS) to King County Road Design and Construction Standards (KCRDCS) throughout.

Basis: Housekeeping.

3. Changed KCRTS references to “approved model” as a placeholder for the new stormwater model or models.

Basis: KCRTS is being phased out per a management decision to discontinue support of the KCRTS software. It will be replaced with a different model or models where user support is provided by the software developer. The approved models will be listed in the manual's Reference section.

4. Changed to 15-min timesteps throughout, no longer 1-hr.

Basis: Change made to be equivalent with Ecology requirements and new hydrology model.

Section 4.2.1.1

5. Updated pipe specs to align with current WSDOT Standard Specs, revised “Allowable Structures and Pipe Sizes” table 4.2.1.B for large diameter concrete and CPE.

Basis: Consistency with WSDOT specifications.

6. Re-inserted “Pipe Design Between Structures” text from earlier manuals, maximum distance between structures 300 ft as before.

Basis: Consistency with KCRDCS.

Section 4.4.1.1

7. Low-permeability liner or treatment liner requirement added for relevant ditches, e.g. outwash soils/critical aquifer recharge areas.

Basis: This change made for consistency w/other sections.

Table 4.4.2.B

8. Datum requirements being updated to align with KCC, was NGVD29, now NAVD88; table also appears to have an error as noted, confirmation/correction applied.

Basis: Consistency with King County Code.

Chapter 5, Flow Control Design, List of Major Changes

Section 5.1 and 5.2 (FCBMP Requirements)

1. Deleted Section 5.1 (Low Impact Design) and Section 5.2 (FCBMP requirements). This information is now self-contained in new Core Requirement 9 (FCBMPs)

Basis: Added a separate Core 9 FCBMP requirement to be equivalent with Ecology MR#5.

Section 5.1, Detention Ponds:

2. Detention ponds preceding required water quality treatment facilities must meet the liner requirements described in Section 6.2.4 (Facility Liners) to ensure groundwater protection.

Basis: To provide water quality protection where ponds precede water quality facilities. This is consistent with other water quality protection requirements and was an oversight in the 2009 SWDM. Without this change, we have the potential for “detention ponds” to be acting like infiltration ponds that are absent any water quality protection and more importantly, absent a requirement for analysis of impacts to offsite properties as a result of infiltration.

3. Galvanized Fence posts and rails must be coated w/bonded vinyl.

Basis: To minimize leaching of zinc into the detention pond. We already require that galvanized fencing fabric be vinyl coated to address this concern. The fabric supporting structure (posts and rails) should be vinyl coated for the same reason.

4. Wood fences required to be cedar, eliminating pressure treated wood options.

Basis: To avoid leaching of toxic heavy metals and/or toxic organic chemicals associated with pressure treated wood into the detention pond. Pressure treated wood is treated with toxic heavy metals and/or toxic organic chemicals to inhibit rot.

5. Remove references to KCRTS throughout.

Basis: KCRTS is being phased out as explained in the Chapter 3 list of changes.

6. Fencing is required for ponds serving privately owned/maintained multifamily projects (or land uses) for slopes steeper than 3:1.

Basis: This proposal is to apply the same level of safety precaution to private ponds on multifamily sites as is currently applied to County ponds in residential subdivisions. Both types of developments can have small children who need to be protected in the same way.

7. Ponds in recreational tracts must have split rail fencing (3 ft.) minimum as a visual barrier and to protect pond integrity. The current design manual requires the pond to be designed so as not to require fencing by using 3:1 or flatter slopes.

Basis: Ponds in recreation tracts are designed as an ‘attraction’ and aesthetic amenity—minimal fencing should be required to maintain the integrity of the pond and provide a minimal safety barrier primarily for young children regardless of the side slopes.

8. Simple Detention Pond for Cleared Areas: Pre-sized designs modified.

Basis: Consistency/update w/new approved model (WWWH12/MGS Flood) and scale factors.

9. Geotechnical evaluation is required for ponds proposed w/in 200’ of cited hazard areas and w/in cited setbacks from slopes greater than 15%. Buffer may be reduced to 50 ft. w/geotechnical approval.

Basis: Precautionary change to reduce the risk of landslides.

Section 5.2 Infiltration Facilities:

10. **SOILS:** For projects that perform a groundwater mounding analysis, the basic requirement is a minimum of 3 feet of permeable soil below the bottom of the facility (bottom of pond or excavation for tank) and at least 3 feet between the bottom of the facility and the maximum wet-season water table. For projects that do not perform a groundwater mounding analysis as allowed and described in the “Design Infiltration Rate” section below, the basic requirement is a minimum of 5 feet of permeable soil below the bottom of the facility (bottom of pond or excavation for tank) and at least 5 feet between the bottom of the facility and the maximum wet-season water table. This is a change from the 2009 SWDM, which set 3 feet as the requirement w/no qualification.

Basis: Equivalency w/Ecology requirements.

11. Infiltration Rate Testing Procedure: Updated for clarity and ECY consistency.

Basis: Clarity/consistency and Ecology requirements.

12. Design Infiltration Rate: Clarified groundwater mounding analysis and method for determining design rate. Removed reference to “Simplified Method”.

Basis: Clarity/consistency.

13. Included infiltration rates to be used for bioretention soil mix when modeling to meet LID Performance Standard (3 or 6 inches per hour based on facility size).

Basis: Change made to be equivalent with Ecology requirements.

14. Added Groundwater Mounding Analysis section that describes additional subsurface testing for analysis along with submittal requirements.

Basis: Guidance and Ecology equivalency.

15. Performance Testing: Clarified that where groundwater mounding analysis was used in facility design, the required performance testing and verification must include measured infiltration testing; evaluation of in-situ soil characteristics, and groundwater table location. Clarified that measured infiltration testing must follow the same methodology as that used during the design phase to be comparable. Clarified that for projects where a mounding analysis is not required at the design phase the completed facility must be tested and monitored to demonstrate that the facility performs as designed.

Basis: Clarity.

16. Underground Injection Control Well Registration: Updated requirements.

Basis: Added clarity for customer who has to register their UIC well w/Ecology.

17. Groundwater Protection: Eliminated ability to cite soils alone for groundwater protection for industrial sites—they must provide a water quality facility prior to infiltration to ground in soils that meet soil suitability criteria.

Basis: Industrial sites have typically higher concentrations of pollutants that are better managed by a designed facility which can be maintained to ensure ongoing treatment and performance (as compared to in situ soils).

18. Groundwater Protection: Clarified requirement that projects infiltrating w/in ¼ mile of a sensitive lake must provide water quality treatment prior to infiltration as specified in Core Requirement #8 and Special Requirement #5.

Basis: Clarification of current requirement.

19. Infiltration near Steep Slopes and LS Hazard Areas: Geotechnical evaluation is required for facilities proposed w/in 200' of cited hazard areas and w/in cited setbacks from slopes greater than 15%. Buffer set at 200 feet, but may be reduced to 50 ft. w/geotechnical approval.

Basis: Precautionary adjustment of requirement to reduce the risk of landslides.

Chapter 6, Water Quality Design, List of Major Changes

General:

1. Changed all calls for *KCRTS* to *the Approved Model*.
Basis: Update to new hydraulic modeling software.
2. Revised all modeling methodologies to apply the water quality flow rate and volume as reported by the new models.
Basis: Update to new hydraulic modeling software.

Water Quality Menus, Section 6.1

3. Enhanced Basic Water Quality Menu (6.1.2): The heavy metals removal goal used to be expressed as requiring total Zn removal. That has been replaced with dissolved copper and dissolved zinc removal targets. The text is modified throughout to change the treatment goal for total Zn removal to dissolved copper and dissolved zinc removal as indicators of successful heavy metals removal.
Basis: Equivalency to Ecology's manual.
4. Sensitive Lake Protection Menu (6.1.3): Eliminated phosphorus credit for covered parking.
Basis: Aerial deposition may be a significant source of phosphorus, so covered parking may not provide much benefit if any.
5. High Use Menu (6.1.5): Oil Control 1 (catch basin insert) is clarified to only be allowed for use to meet the oil control requirements for new or redeveloped *high-use sites* where new plus replaced pollution generating impervious surfaces are less than 5,000 square feet AND new pollution generating pervious surfaces are less than $\frac{3}{4}$ acres in a threshold discharge area. High use sites exceeding this threshold must use other oil control options. Oil Control Option 6, "Compliance with Other Agency Requirements" is modified with added details to the note re: Ecology requirements; and Ecology's S409 BMPs for Fueling at Dedicated Stations language is also added.
Basis: Clarification of Ecology requirements.

Section 6.2 General Requirements for Water Quality Facilities

1. Proprietary facilities (e.g. the StormFilter) are now described in the Reference section only.
Basis: Moving proprietary facilitates to the Reference section makes it easier to keep the SWDM up to date with regard to proprietary facilities.
2. Water Quality Design Flows and Treatment Volumes (Section 6.2.1) is updated to reflect changes from *KCRTS* to the approved model.
Basis: Equivalency w/Ecology and approved methods.
3. Added: "Design Criteria Applicable To All Facilities" as follows: "All facilities must be inspectable and maintainable."
Basis: Clarification of existing intent, as this has been an issue in a number of adjustment requests at Permitting. It is an explicit statement of required adjustment criteria #2 "meet objectives of ...maintainability based on sound engineering judgement..."

4. Sizing of water quality facilities can be adjusted based on reduced volumes or flow rates as a result of upstream FCBMPs as implemented by modeling credits detailed in section 1.2.9.

Basis: Accurately reflects loss volume to ground using infiltrative BMPs thus reducing treatable flows at downstream facility. Provides incentives for FCBMPs

5. “Treatable Flows”, regarding buffers where allowed to meet water quality treatment requirements, added the following criteria: “The buffer contains only native vegetation and is not itself subject to application of any fertilizers or pesticides.”

Basis: Ensuring that the buffer is operating in a manner that reduces pollutants from pervious areas being exempted from a facility.

6. “Treatable Flows” discussion: Metal roofs are also considered to be *pollution-generating impervious surface* unless they are coated with an inert, non-leachable material (see Reference 11-E); or roofs that are subject to venting significant amounts of dusts, mists, or fumes from manufacturing, commercial, or other indoor activities.

Basis: Equivalency with Ecology definition.

7. Removed 'joint use' design consideration/encouragement of recreation in wet ponds and sand filters.
 - a. Removed allowance for temporary recreational equipment structures in sand filters.
 - b. Deleted aesthetic considerations that encourage recreational contact with stormwater and/or stormwater sediment.

Basis: Stormwater facilities should not be used for recreation because of potential health risk and/or risk to facility performance, or both. e.g. wading, swimming, and fishing should not be allowed in a wetpond, or stormwater wetland, even in the second cell (health risk), and recreation should not be allowed on sand filters (damage to function of the facility, and possible health risk).

8. “Setbacks, Slopes, and Embankments” (6.2.3) edited to require that all open (non-vault) sand filters require fencing.

Basis: Intent is to prevent sand filters from being used recreationally in any setting, whether residential, commercial, or industrial – for both public safety and to preserve the integrity and function of the facility.

9. Setbacks, Slopes, and Embankments” (6.2.3): Changed fencing exception for other than KC facilities so that all facilities except non-residential commercial and industrial have the same fencing requirements as county facilities.

Basis: Public safety concerns for small children. Private multifamily ponds should meet same requirements as KC subdivision ponds.

10. Setbacks, Slopes, and Embankments” (6.2.3): Deleted dam safety language paraphrasing what may have been an older version of the WAC, and replaced it with language directly from the current WAC, except for replacement of WA Ecology for 'the department'.

Basis: Regulatory consistency.

11. Setbacks, Slopes, and Embankments” (6.2.3), Table 6.2.3.A , “ setback requirements”: Added geotechnical setback requirements for steep slopes and added public health setback note that facilities must be at least 50 feet from septic tanks (per Public Health), and that stormwater tanks and vaults must not impede drainfield flows. Also added Ecology public health setback requirements and a note that: *Where one agency's setback requirements are more or less restrictive than another's, the more restrictive setback is required.*

Basis: The first change is precautionary to reduce the risk of landslides, and the remaining changes are provided for regulatory consistency.

12. Facility Liners (Section 6.2.4) are modified to require lining up to overflow water surface for facilities located in a groundwater protection area; presettling ponds are added to liner table; sand layer treatment liner type has been deleted; and liner requirements for detention facilities and conveyances handling untreated water are clarified.

Basis: Equivalency with Ecology requirements except for elevating liner to overflow water surface which is necessary to secure additional groundwater protection in designated groundwater protection areas (i.e., critical aquifer recharge areas as defined in KCC 21A, sole source aquifer areas as designated by the federal Environmental Protection Agency, and wellhead protection areas mapped by the Washington State Department of Health)

Section 6.3 Vegetated Flowpath Facility Designs

13. Changed name from “Biofiltration Facility Designs” to “Vegetated Flowpath Facility Designs”.

Basis – To correct the assumption/confusion regarding the primary pollutant removal mechanism of these facility types.

14. Changed name from “biofiltration swale” to “bioswale”.

Basis - To correct the assumption/confusion regarding the primary pollutant removal mechanism of this facility type. Filtration plays a role, but particle settling/sedimentation is the primary mechanism.

15. Added Ecology note re: unreliability of bioswales and suggest designer consider other alternatives where feasible.

Basis: Equivalency with Ecology guidance. Non-regulatory.

16. Changed minimum longitudinal slope of bioswales from 1% to 1.5 %.

Basis: Ecology equivalency.

17. New language added regarding fertilizer: “Regardless of location, the fertilizer must meet the requirements of State of Washington House Bill 1489 - 2011-12 limiting the use of fertilizer containing phosphorus, and must also meet the requirements in new Reference 11-C.” Also added language regarding agronomic rate.

Basis: King County has concerns regarding pollutant leachate from fertilizers of any kind, of which phosphorus is subject to state law. Reference 11-C contains standards for compost based on type of application.

18. Geotextile specification tables removed and reference is now to WSDOT's Standard Specifications.

Basis: There are some discrepancies between KC & Ecology & WSDOT, and WSDOT has a huge investment in getting the specifications right, so we're going with them.

19. Changed conditional allowances for bioswales < 1.5% longitudinal slope, with regard to underdrains, soil amendment, and wet bioswale design.

Basis: a wet bioswale with amended subsurface and addition of an underdrain will drain too well to function as a wet bioswale.

20. Changed terminology from “continuous inflow” to “lateral inflow” bioswales.

Basis: Clarification of term to resemble its function.

21. Re-named “Basic Filter Strips” to “Standard Filter Strips”.

Basis: To better distinguish from “narrow area filter strips.”

Section 6.4 Wetpool Facility Designs

22. “Methods of Analysis” (section 6.4.1.1) updated .

Basis: Consistency w/Ecology and new approved model.

23. “Design Criteria” for wetponds (6.4.1.2) updated: “Both cells of a two-cell wetpond and the single cell of a one cell wetpond must retain a permanent pool of water throughout the rainy season. A wetpond is considered non-compliant if the pond level drops more than 12” in any 7 day measurement period. A low permeability liner, per Section 6.2.4 will be required to achieve this standard in infiltrative soils”.

Basis: 2nd cell of wetpond should be lined in infiltrative soils to ensure that the wetpond functions as designed—consistent with intent and is the current practice, therefore clarification. Re: 12” allowable drop: Provide an actionable compliance definition for “permanent wet pools” that accomplishes the water quality goal/mechanism.

24. Design Criteria” for wetponds (6.4.1.2) updated: “Signage” adds : “Signage forbidding wading, swimming, and fishing is required. The sign entitled "No Wading, Swimming, or Fishing" is available to download from the King County Water and Land Resources Division *Surface Water Design Manual* website. This sign, or other approved equivalent sign, shall be placed for maximum visibility from adjacent streets, sidewalks, and paths. More than one sign may be required to be sure the advisory will be noted by anyone approaching the facility. Specifications for installing the sign are shown in Figure 6.4.1.B.” This same edit is made for stormwater treatment wetlands (Section 6.4.3).

Basis: To protect public from activities that are potentially dangerous in a treatment facility.

25. Design Criteria for Stormwater Treatment Wetlands”: Clarified permanent pool requirement for the 1st cell.

Basis: 1st cell of treatment wetland should be lined in infiltrative soils to ensure that it functions as designed—consistent with original design intent and current practice, therefore a clarification. Re: 12” allowable drop: to provide an actionable compliance definition for “permanent wet pools” that accomplishes the water quality goal/mechanism.

26. “Design Criteria for Combined Detention and Wetponds” (Section 6.4.4.2): Deleted criterion 1 for modifying pond geometry.

Basis: The intent of the criterion is to allow modifications to encourage recreational use in the ponds which has been determined to be undesirable from a public safety and pond functionality perspective. Therefore, deleted.

Section 6.5 Filtration Facility Designs

27. Geotextile specification tables removed, and reference is now to WSDOT's Standard Specifications.

Basis: Regulatory consistency and clarity.

28. Clarified that only basic facilities 1-6 may be used to meet the presettling requirement for filtration facilities.

Basis: Options 7 and 8 are filtration facilities that also require presettling to function.

29. New language added regarding fertilizer: “Regardless of location, the fertilizer must meet the requirements of State of Washington House Bill 1489 - 2011-12 limiting the use of fertilizer containing phosphorus, and must also meet the requirements in new Reference 11-C.” Also added language regarding agronomic rate.

Basis: King County has concerns regarding pollutant leachate from fertilizers of any kind, of which phosphorus is subject to state law. Reference 11-C contains standards for compost based on type of application.

30. “Methods of Analysis” for Sand Filters (Section 6.5.2.1) is updated.

Basis: Equivalency w/Ecology and new model methods.

31. Grass Cover in Sandfilters: Added requirement for use of low phosphorous/slow release fertilizers where used in sand filters that discharge to a stream that is listed as a Dissolved Oxygen (DO) Problem (Type 2) under Downstream Water Quality Problems Requiring Special Attention (Chapter 1) and the problem cause has been identified as nutrient loading.

Basis: Consistency with other SWDM requirements.

32. Sandfilters, Recommended Design Features: Recreational use is no longer allowed.

Basis: Interferes with function and facility maintenance; and brings public in contact with pollutants.

33. Sand Filters: Modifications for combining with an infiltration pond is updated to extend liner requirement to overflow water surface of the pond in designated groundwater protection areas.

Basis: Additional water quality protection in designated groundwater protection areas.

34. Linear Sand Filter (Section 6.5.4) Applications and Limitations: Changed statement that Linear Sand Filters are best suited for treating small drainages from less than 5 acres, to less than 2 acres.

Basis: Equivalency to Ecology's Manual.

35. Linear Sand Filter (Section 6.5.4) Applications and Limitations: Added: “The presettling cell in a linear sand filter does not meet standard presettling cell requirements, so it cannot be presumed to achieve the presettling goal of 50% TSS removal. Sediment storage capacity will also be more limited. These factors will necessitate more frequent maintenance than for a standard sand filter, and may result in poorer net pollutant removal overall. Therefore, an application utilizing a linear sand filter with integral presettling cell is discouraged where an alternative facility can be used.”

Basis: Clarification and guidance.

36. Linear Sand Filter Geometry, Sizing, and Overflow: Added divider wall with 6 inch minimum height above sand bed (no minimum given in 2009 SWDM).

Basis: Recommended minimum per consultation with Ecology.

37. Linear Sand Filter Structure Specifications: Deleted first cell alternative material other than concrete allowance (as allowed by DPER).

Basis: Considered a redundant statement. Any allowance would need to be vetted through an official adjustment.

38. Increased sand depth in Linear Sand Filter from 12 to 18 inches reducible to no less than 12 inches deep if grade limitations show a greater depth is not feasible.

Basis: Encourages better treatment and longevity consistent w/standard sand filter designs. Allows applicant to reduce to 12" (as per 2009 SWDM) minimum if grade requires.

39. Removed StormFilter with CSF media as an approved facility except for discharges to sphagnum bog wetlands. Moved to Reference 14-A.

Basis: Ecology Equivalence.

40. Moved ZPG StormFilter to the Reference section.

Basis: Proprietary facilities will now be listed and updated in the Reference section.

Section 6.6 Oil Control Facility Designs

41. Clarified that catch basin inserts are allowed for use to meet the oil control requirements for new or redeveloped *high-use sites* where new plus replaced pollution generating impervious surfaces are less than 5,000 square feet AND new pollution generating pervious surfaces are less than ¾ acres in a threshold discharge area. High use sites exceeding this threshold must use other oil control options.

Basis: Equivalency to Ecology's manual.

Section 6.7 Proprietary Facility Designs

42. Added new Section 6.7 on Proprietary Facilities, which points to new Reference Section 14-A. This section spells out KC monitoring, testing and procedural requirements for approval of proprietary water quality treatment facilities.

Basis: Public domain facilities with long-established design characteristics stay in the main body of the manual, while proprietary manufactured facilities, which may need to be added or removed in the middle of a manual update cycle, or have maintenance requirements amended, are placed in a Reference section, which can be maintained continuously on an as-needed basis. The added text on requirements for KC Approval lays out current policy and practice for approval of proprietary systems.

Definitions

Definitions Section Updated:

Basis: Consistency w/definition changes in Chapter 1, appendix C, and KCC Title 9.

Reference (Existing References)

References

1. Surface Water Runoff Policy (KCC excerpt) will be updated to current KCC.
Basis: Consistency w/King County Code.
2. Clearing Standards for Individual Lots in the Rural Zone (KCC excerpt) will be updated to current KCC.
Basis: Consistency w/King County Code.
3. 4A Grading Code Soil Amendment Standard (KCC excerpt) will be updated to current KCC.
Basis: Consistency w/King County Code. Specs for Grade A compost and several aspects of WAC 173-350-220 are out of date for current compost needs and have been deleted. Reference section being developed for Materials Specifications including compost.
Basis: Consistency w/Ecology requirements.
4. Wetland Hydrology Protection Guidelines is updated to reflect the new Guide Sheets 1 through 3 in Ecology's SMMWW.
Basis: Change made to be equivalent with Ecology requirements.
5. 7A King County Standard Map Symbols update is underway, no draft at this time.
Basis: Standardization/quality improvement.
6. 7B Standard Plan Notes and Example Construction Sequence are modified to highlight SWPPS and change ESC focus to broader CSWPP focus.
Basis: Consistency w/ changes made to Core Requirement #5 title and language.
7. 7C StormFilter Access and Cartridge Configuration: Stormfilter cartridges are no longer acceptable per Ecology. This section has been deleted.
Basis: Consistency with Ecology requirements.
8. 8C Water Quality Facility Sizing Worksheets are revised to complement the new stormwater models (WWHM, MGSFlood).
Basis: Adapting worksheets to change in hydrologic model (basis is described earlier in this summary of changes document).
9. 8D Flow Control and Water Quality Facility Summary Sheet and Sketch: the Summary sheet is being revised, expanding the information provided on the worksheet to facilitate complete MIS data entry.
Basis: To improve maintenance and facility inventory usefulness for King County staff.

10. 8J through 8Q Declaration of Covenant forms are all being revised.

Basis: Updated for consistency, access needs, and enforceability.

Reference (New References):

6-C Level Pool Routing (relocated Section 3.2.4, 2009 SWDM)

Basis: Predicated by changes to runoff models in Chapter 3 and elimination of KCRTS-specific guidance

6-D Modeling Guidelines (SWDM-specific guidance not addressed in software documentation)

Basis: SWDM runoff modeling strategy differs from Ecology (e.g., flow credits vs flows lost through infiltration), requiring clarification for use of specific model features; MODRET guidance provided based on modeling results

11-C Compost, Bioretention Mix, and Mulch (media) specifications

Basis: Provides location for compost quality, aggregate/compost mix ratios, and gradation specification of Bioretention Soil Mix (BSM) that is required for equivalency to Ecology's manual.

11-E Roofing Erodible or Leachable Materials: Provides definition of inert materials allowed for considering a metal roof not pollution generating. Also includes information on roofs that may have potential to pollute, but are not currently regulated.

Basis: Informational.

14-A Approved Proprietary Facilities

Basis: Provides ability to adaptively manage proprietary facilities inclusion, updating, or removal depending on Ecology approvals and other testing and/or monitoring requirements and results.

14-B Approved New Public Domain Facilities

Basis: Provides a location for Blanket Adjustments between SWDM updates should any public domain facilities be added in those windows. e.g. the Media Filter Drain which is not currently included in the SWDM. At each manual update, anything with a blanket adjustment in 14-B will move to the main body of the manual.

Appendix C Simplified Drainage Requirements

General

1. Re-named “Small Project Drainage Requirements” to “Simplified Drainage Requirements”.
Basis: This change was made consistent w/new drainage review thresholds and process changes in Chapter 1.
2. Deleted vegetated roofs and added bioretention FCBMPs.
Basis: Change made to be equivalent with Ecology requirements.
3. Replaced impervious was added as a target surface for BMP implementation. Previously, target surfaces for flow control BMPs just included new impervious surface and any existing impervious surface added on or after January 8, 2001 (the effective date of the Endangered Species Act "take prohibition" issued by the federal government to protect Puget Sound Chinook salmon).
Basis: To be equivalent w/ECY requirements.
4. Revised/clarified Simplified Drainage Review Project thresholds. The new thresholds are based upon calculations of the peak flow exemption (0.15 cfs using 15 minute timesteps) using the new approved model as applied to urban and rural projects on either till or outwash soils. In addition, an added threshold includes agricultural projects that meet the requirements for “Impervious Surface Exemption for Agricultural Projects”.
Basis: This is a process improvement and clarification.
5. Added new BMP lot implementation category, “Large Rural Lots” to meet ECY requirement that large, rural lots model BMPs to demonstrate that the LID Performance Standard is achieved.
Basis: Change made to be equivalent with Ecology requirements.
6. KC proposes a BMP list as an alternative to Ecology’s modeling requirement that includes premodeled BMPs applied to 100% of the target surfaces.
Basis: To assist rural landowners by providing pre-modeled BMPs that achieve Ecology’s required LID performance.
7. Collapsed Large Lot/Low Impervious and Large Lot/High Impervious into a single BMP list w/sliding scale minimum BMP application based on impervious surface coverage.
Basis: Change made for simplification and flexibility of implementation.
8. BMPs now required to achieve maximum feasible implementation for bioretention, limited infiltration, and permeable pavement in addition to meeting implementation minimums as before. Feasibility/Infeasibility Criteria added for bioretention, limited infiltration, and permeable pavement.
Basis: Changes made to be equivalent with Ecology requirements while retaining previous minimum implementation to avoid backsliding on protection levels.
9. Added “Competing Needs” section which explains other situations where a BMP may not be required (e.g., public health and safety standards, transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way, a local Critical Area Ordinance that provides

protection of tree species, or requirements of the following federal or state laws, rules, and standards: Historic Preservation Laws and Archaeology Laws, Federal Superfund or Washington State Model Toxics Control Act, Federal Aviation Administration requirements for airports, Americans with Disabilities Act).

Basis: Change made to be equivalent with Ecology requirements.

10. New BMP approach requires additional geotechnical analysis to show some BMPs are not feasible: infiltration testing (bioretention, permeable pavement); soil quality analysis (pollution generating permeable pavements); and geotechnical analysis (infiltrative and dispersive BMPs within setbacks of steep slope and landslide hazard areas). Within hazard area setbacks, infiltrative BMPs are considered infeasible and therefore not required to be implemented, but remain an option to the applicant if desired on condition of geotechnical analysis and approval.

Basis: Precautionary change to reduce the risk of landslides.

11. Added information on infiltration testing requirements and expanded soils report including # of soil logs, evaluation of groundwater protective characteristics, infiltration testing requirements (# of tests, allowable test method, etc.)

Basis: Change made to be equivalent with Ecology requirements.

12. Clarified that for either a single infiltration system or infiltrative BMP serving either: more than one lot, 10,000 square feet or more of impervious surface, $\frac{3}{4}$ acre or more of pervious surface, 5,000 square feet or more of pollution generating impervious surface OR for any infiltrative BMP used in modeling to demonstrate compliance with the LID Performance Standard (see Section 1.2.9 of KCSWDM); the requirements detailed in Section 5.2 of the KCSWDM shall be met for the following: “Soils, Measured Infiltration Rates, and Design Infiltration Rate”. Those sections detail higher level requirements for soils investigation, permeable soil and depth to seasonal high groundwater, determination of initial infiltration rates, calculation of design infiltration rates, and preparation of soils reports consistent with the larger size and risk associated with these systems.

Basis: Change made to make sure that large BMP facilities meet more stringent requirements consistent w/risk associated with larger systems.

13. Updated “Small Lot “and “Large Lot” BMP lists. Both require BMPs applied to the maximum extent feasible using top-down selection criteria. KC’s proposed lists treat bioretention, permeable pavement, and limited/full infiltration as equal choices.

Basis: Change made to be equivalent with Ecology requirements. KC provides a more flexible list of BMPs per negotiation w/Ecology that should benefit engineers and applicants in picking site appropriate BMPs while minimizing infeasibility related testing and cost.

14. Added “Large Rural lot” BMP implementation category. This category requires modeling to demonstrate LID Performance Standard compliance or use of the alternative BMP list approach. The alternative to modeling includes pre-modeled BMPs applied to 100% of target surfaces.

Basis: LID performance standard modeling required to be equivalent with Ecology requirements. Alternative list is proposed/provided to assist rural landowners by pre-modeling compliant BMPs. This will save considerable cost and effort that otherwise would be put upon the rural landowner.

15. Added “Farmland Dispersion” onto pasture/cropland as an option for agricultural properties under specific, limited circumstances. Criteria are such that sheet flow off of farm field access roads is the likely only application.

Basis: Primarily to address flow control requirements for farm field access roads because where absent this BMP, flow control facilities may be required.

Section C.1.4: APPLICATION OF CSWPP MEASURES:

16. Simplified Site CSWPP Requirements: Added “H. Protect existing and proposed flow control BMPs”; “I. Maintain BMPs During Construction and Final Site Stabilization”.

Basis: Ecology Equivalency.

Section C.2, Flow Control BMPs

17. All BMPs: Tightened the requirement for geotechnical analysis w/in 200’ setbacks of steep slope or landslide hazard areas or 15% slopes.

Basis: Precautionary adjustment of requirement to reduce the risk of landslides.

18. Deleted vegetated roofs BMP.

Basis: This is not on ECY’s required list and doesn’t justify a FCBMP modeling credit. Applicants are free to propose and use vegetated roofs, but they won’t receive BMP or BMP modeling credits.

19. Farmland Dispersion BMP: Added agricultural allowance to disperse over pasture/cropland to exempt from a flow control facility, meet the FCBMP requirement (new Core 9), and exempt from a water quality facility if a farm management plan is also in place. Primarily applies to farm field access roads.

Basis: Meet the intent of Core Requirements 3, 8, and 9 while maintaining arable land. Primarily to address Flow Control and WQ requirements for farm field access roads because where absent this BMP, flow control or water quality facilities may be required.

20. Full and Limited infiltration BMPs: To infiltrate runoff from pollution generating surfaces requires that the underlying soil meets groundwater protection properties, otherwise, infeasible. Optional if the applicant pre-treats prior to infiltration.

Basis: Groundwater quality protection and consistency w/other requirements.

21. Limited Infiltration BMP: trench and drywell sizing is updated.

Basis: These systems have been pre-modeled as LID Performance Standard compliant for inclusion alongside bioretention and permeable pavement on the prescribed BMP implementation lists.

22. Added bioretention BMP. Includes cells, swales, and planters. Required storage volume is based on storage over target tributary area that is required to meet the LID Performance Standard based on project location and soil type. Required storage volumes have been reduced over that prescribed for rain gardens in the 2009 SWDM (3”). Added ECY infeasibility criteria list and additional design criteria related to installation.

Basis: Change made to be equivalent with Ecology requirements.

23. Included Additional Requirements for Large Bioretention Facilities: Bioretention that receives runoff from of impervious surfaces totaling 10,000 square feet or more; or new pervious surfaces totaling $\frac{3}{4}$ acre or more, or a combination of impervious and pervious surfaces that results in a 0.15 cfs increase in the 100 year peak flow when comparing predeveloped (historic) and developed conditions, must meet the following additional requirements to address their larger size, risk, and maintenance needs:

Bioretention Cells: Must meet Section 5.4 (KCSWDM): 100 year overflow conveyance (if applicable); Spill Control Device; Presettling, Protection from Upstream Erosion; Facility Construction Guidelines; Offsite Groundwater Impacts; Groundwater Protection; Infiltration near Water Supply Wells; and Infiltration near Steep Slopes and Landslide Hazard Areas. Section 5.4.2.1 Infiltration Ponds Design Criteria: General, Setbacks.

Bioretention Swales: Must meet Section 5.4 (KCSWDM): 100 year overflow conveyance (if applicable); Protection from Upstream Erosion; Facility Construction Guidelines; Offsite Groundwater Impacts; Groundwater Protection; Infiltration near Water Supply Wells; and Infiltration near Steep Slopes and Landslide Hazard Areas. Section 6.3 (KCSWDM) Biofiltration Swales: Access; Construction Considerations; Flow Velocity, Energy Dissipation, and Flow Spreading (#2, 3, 4 and #5).

Basis: Larger facility sizes have more risk and maintenance need inherent in their larger sizes.

24. Added Roadside Ditch Bioretention BMP:

Basis: Proposing a bioretention swale option that doesn't require check dams, fits in existing road ROW, and integrates into the roadside ditch. KC Roads staff has stated that they need cost effective, easily maintained BMPs if located in the right of way.

25. Deleted Rain Gardens:

Basis: Found to be redundant to bioretention when using the prescribed KC list approach. Bioretention was pre-sized for LID compliance to be considered alongside permeable pavement as an equal choice/option. Rain gardens and bioretention would share the same infeasibility criteria and be no different except for soil mix.

26. Permeable Pavements: Added ECY's list of infeasibility criteria. Added allowance for run-on onto permeable pavement based on LID performance standard modeling for urban and rural areas on both till and outwash soil types. Included optional allowance for use of permeable pavement for pollution generating residential driveways with addition of a sand liner where soils are not protective of groundwater. Permeable pavement proposed for roadway improvements (e.g. roads and sidewalks) shall be per the King County Road Design and Construction Standards (KCRDCS) or as otherwise approved by the King County Road Engineer.

Basis: Change made to be equivalent with Ecology requirements. Run-on and residential PGIS allowance may encourage use of permeable pavement on appropriate low risk residential sites.

27. Rainwater Harvesting updated as follows: For a rainwater harvesting system proposed to be used towards meeting Core 3 (Flow Control) or Core 9 (Flow Control BMPs) requirements, an approved drainage adjustment is required that demonstrates the system's impact/benefit and specifies conditions of use to achieve the same.

Basis: Ecology requested this change for equivalency.

28. Perforated Pipe Connection: The gravel filled trench must be at least 10-feet in length for every 5,000 square feet of impervious surface or 35,000 square feet of non-native pervious surface from which runoff is conveyed. This is a change from the 2009 SWDM which allowed 10,000 sf per 10 foot trench length.

Basis: Ecology requested this change for equivalency.

Section C.3 Construction Stormwater Pollution Prevention Measures

29. Re-named from “ESC”—this change throughout).

Basis: Emphasis on both ESC and construction related pollutants requested by Ecology in equivalency review.

Appendix D Construction Stormwater Pollution Prevention Standards

Appendix D

1. Retitled to *Construction Stormwater Pollution Prevention (CSWPP) Standards*.

Basis: Consistency with contents of this appendix.

2. Revised document structure overall focus from ESC to CSWPP.

Basis: To improve visibility of stormwater pollution prevention and spill control (SWPPS) requirements throughout, to provide clearer references to the King County Stormwater Pollution Prevention Manual (SPPM), and to assure SWPPS requirements get onto the CSWPP plan.

3. Provided SWPPS info for simplified site plan prep (Section D.3)

Basis: Clarification of existing requirements.

4. Added Ecology's Element 11 (Maintain BMPs), Element 12 (Manage the Project) and Element 13, (Protect Existing and Proposed BMPs) to the ESC Principles (Section D.1.1) and ESC Measures (Section D.2.1.10) and to other intermittent entries where applicable.

Basis: Change made to be equivalent with Ecology requirements.

5. Added SWPPS Principles (Section D.1.2), SWPPS performance criteria (Section D.2.3.4), and SWPPS Measures (Section D.2.2) all using or paraphrasing text from Ecology's SMMWW and KCSWDM 2009 (existing requirements do not change).

Basis: Change made to clarify requirements.

6. Added new concrete handling and treatment BMPs and info, expanded references to SPPM BMPs (Sections D.2.2, D.3.5, and other intermittent locations).

Basis: Change made to be equivalent with Ecology requirements.

7. Expanded Standard Notes to include SWPPS concepts (Section D.4.2)

Basis: Change made consistent with refocusing this appendix to emphasize construction site pollution prevention.

8. ESC Supervisor title is now CSWPP Supervisor (Section D.2.3.1); CESCL requirements explicitly remain, but now the CSWPP Supervisor will be responsible to manage the SWPPS efforts and coordinate SWPPS reporting to assure SWPPS is covered in a timely manner per application and reporting requirements.

Basis: Change made consistent with refocusing this appendix to emphasize construction site pollution prevention. It is preferred, and practically, most effective if the contact for both ESC and SWPPS is the same individual, even though SWPPS may be a collective effort by contractors, subcontractors and applicants.