Seattle Department of Construction & Inspections

Drainage Review General Checklist

This checklist is used by reviewers as an aid. It is not comprehensive and does not include all requirements. Refer to the Seattle Stormwater Code and Manual and the new SPU Public Drainage System Director's Rule for additional requirements. See Volume 1 and Appendix B for general submittal requirements and Volume 3, Chapter 5 for specific requirements for each BMP.

Identify type, scope, and minimum requirements of project

☐ Review and Confirm requirements from **Preliminary Assessment Report (PAR)**

Type of Project: ☐ Single-Family ☐ Parcel ☐ Trail and Sidewalk Project ☐ Phased Project
☐ Utility Only ☐ Remediation (Soil/Groundwater) ☐ Stormwater Retrofit

New plus Replaced Hard Surface _____
Existing Hard Surface _____
Pollution Generating Hard Surface _____
Pollution Generating Pervious Surface (includes all lawn, landscaping, turf, etc.) _____

Minimum Requirements:

- ☐ Construction Stormwater Control and Soil Amendment
- ☐ Onsite Stormwater Management
- ☐ Flow Control
- ☐ Water Quality Treatment
- ☐ Source Control

☐ Review any relevant Land Use actions for impacts to project (e.g. Subdivisions or Short Plats, LBA's, or other MUPs that had Preliminary Drainage Review, restrictions to development/disturbance based on ECAs, etc.)

☐ Check any adjacent and or related construction permits (e.g. "Closely Related Projects", easements, etc.)

☐ Buildover Review

Required Documents

Standard Plans (Must be up to date from Stormwater Code Website)

- ☐ Construction Stormwater Control (CSC) Plan
- ☐ Drainage and Wastewater Control (DWC) Plan
- ☐ All relevant SDCI Typical Drainage Details are shown. Custom details may be required.

Required for >5,000 SF of new and replaced hard surface or 1 acre of land disturbance

- ☐ Engineered Plans
- ☐ Drainage Report (See the **Stormwater Modeling Review Checklist** that starts on page 5)

Drawing Standards

- ☐ Legibility
- ☐ North Arrow
- ☐ Drawing Scale
- ☐ Engineered Drawings Stamped and Signed
- ☐ Property Lines, Roadway names, addresses, etc.

Project Area Tabulations

☐ Verify area tabulations are accurately shown on the plans and consistent with OSM Summary

Approved Point of Discharge (POD) for Drainage

☐ Verify POD on the PAR
☐ Approved POD Shown on OSM Summary
☐ All drainage discharge clearly shown to POD on the plans
☐ No Offsite POD – Additional Requirements addressed (**(See the Stormwater Modeling Review Checklist that starts on page 5)**

Approved Point of Discharge (POD) for Wastewater

☐ All sanitary connections are shown on the plans from the building to the main

Approved Point of Discharge (POD) for Sub-Surface Drainage

☐ Footing/ Foundation Drains are shown on the plans with the required Catch Basin

Side Sewer

☐ Side Sewer Conflicts
☐ Existing Side Sewer shown
☐ If reused, verify existing side sewer may be reused
☐ Call out PE Evaluation/Certification of existing side sewer if required

Construction Stormwater Control

☐ Required BMPs shown on Plan
☐ Large Project Checklist provided in Drainage Report for >5,000 SF new and replaced hard surface
☐ Sizing Calculations for BMPs as Required included in Drainage Report

Dewatering

- ☐ Confirm Approved POD for temporary discharge shown on plans
- ☐ Review Geotechnical Report for groundwater table
- ☐ Review Requirement Matrix for Dewatering Permits
- ☐ Side Sewer Permit for Temporary Dewatering (SSPTD) obtained if required
- ☐ King County Construction Dewatering Permit Obtained if discharge is to Combined.
- ☐ Requirements for Permanent Groundwater Discharge

Contaminated Sites

- ☐ Review reports and GIS to confirm if site is Contaminated
- ☐ Show treatment systems on Plans
- ☐ Review Requirement Matrix for Dewatering Permits
    - ☐ Ecology Construction General Coverage Obtained if discharge is to Storm.
    - ☐ King County Construction Dewatering Permit Obtained if discharge is to Combined.

Onsite Stormwater Management – if applicable

☐ Entire OSM Workbook Submitted

☐ Completed Summary Sheet shown on DWC Plan

Infiltration Testing

- ☐ Required?
- ☐ Checklist submitted and complete
- ☐ Results are consistent with OSM Sheet

Performance Standard

- ☐ Modeling Provided by Engineer

List Approach

- ☐ Infeasibility Criteria Completed for each surface and Justified
- ☐ Pre-sized Facilities used

☐ Hard Surfaces Clearly shown and identified consistent with Summary Sheet on DWC Plan

☐ Proposed BMPs clearly shown on DWC Plan and consistent with Summary Sheet

☐ BMP Dimensions Shown on DWC Plan and consistent with Summary Sheet

☐ Downspouts shown to BMP and Overflows shown to Approved POD

☐ Required Setbacks from Infiltrating BMPs shown

☐ Required Catch Basins shown

Flow Control – if applicable (See the Stormwater Modeling Review Checklist that starts on page 5)

☐ Peak ☐ Pasture ☐ Peak and Pasture ☐ Forested ☐ Existing Conditions

Pre-sized Method

- ☐ Pre-sized Calculator shown on Plans
- ☐ Flow Control BMPs clearly identified as FC BMPs or equivalent
- ☐ Dimensions shown on plans consistent with calculator

Modeling Approach

- ☐ Modeling Results provided in stamped and signed report
- ☐ Modeling results meet standards for given BMP and FC Standard
- ☐ Dimensions and details shown on plans consistent with modeling

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Water Quality – if applicable (See the Stormwater Modeling Review Checklist that starts on page 5)

☐ Basic ☐ Oil Control ☐ Enhanced

☐ Modeling results provided in stamped and signed report

- ☐ BMPs are sized based on total contributing area to the BMP, not just pollution-generating

☐ Dimensions and details shown on plans consistent with sizing from Manual/modeling

☐ Mass Load Ratios Applied for Proprietary Systems

Source Control – if applicable

☐ Required Structural Source Control BMPs shown on plans

Legal Documents – All required must be recorded prior to drainage approval

☐ Memorandum of Drainage Control (MDC)

☐ Side Sewer Easement Agreement (SSEA)

☐ Side Sewer Joint Use and Maintenance Agreement (JUMA)

☐ Certificate/Attestation of Mailing Notification Form

☐ Side Sewer Release and Indemnification Agreement

☐ King County Capacity Sewer Certification Form (KC Capacity Charge)

Correction Cycle

☐ Finalize your correction letter in Focused Plan Review (FPR)
☐ Accela Review, Workflow Status + review time, Minor Corrections Y/N, change to Corrections Required
☐ Enter review time in your review in Accela & Import that time into LCS
☐ Verify the correction letter is uploaded into Documents

Project Approval

☐ Enter your "drainage approved pages" Stamping Note added in Accela under Activities
☐ Complete Custom Fields for Sanitary & Drainage Information, Update the LDA Type
☐ Enter Recorded Documents in Accela under Custom Lists / Required Documents
☐ Add Side Sewer Permit notes in Activities as a Note / Other / Title: Side Sewer Info

(See the **Stormwater Modeling Review Checklist** that starts on page 5 if any Stormwater Modeling is required.)

Stormwater Modeling Review Checklist

General

☐ Check Table F.1, Appendix F to verify that the Hydrologic Analysis Method (Stormwater Model Type) used is acceptable for the type of facility being designed.

Continuous Runoff Models (WWHM, MGS Flood, Others)

☐ Time Series: Verify the SPU 158-year Evaporation/Precipitation Time Series is used.

☐ Time Step: Verify that the correction Computational Time Step is used (see Table F.12, Appendix F) for the type of facility being designed

☐ New if using MGS Flood: software version 4.56 or later is required. Also, the new "Ecology Bioretention" element must be used in MGS Flood if modeling any type of bioretention (infiltrating or non-infiltrating).

☐ New HSPF Parameters Modifications (IMPLND and PRLNDS) Requirements: Users are required to change the values for LSUR, SLSUR, and NSUR per guidance in Table F.11 in Appendix F or adjust values for LSUR, SLSUR, and NSUR based on site-specific observations.

☐ Check the Pre-developed Scenario Areas, Land Cover, and Soil Type (Not required for CSC, Peak Flow Control or Water Quality) See Tables F.8 and F.9 for Land Cover and Soil Type descriptions.

☐ Check the Mitigated/Post Development Scenario Areas, Land Cover, and Soil Type

- ☐ Landscaping with amended soils may be modeled as Pasture
- ☐ Mitigated areas modeled as Forested must be permanent (e.g. protected by covenant) and planted at a density to meet 80 percent canopy coverage.
- ☐ Compacted gravel/dirt roads, parking lots, pathways are modeled as impervious.

☐ Verify that each Sub-basin is connected to the correct BMP

☐ Verify that each BMP or Bypass Basin is connected to the Point of Compliance

☐ Check the input for each BMP

- ☐ Verify that the required Continuous Modeling Assumptions from the tables in the BMP Sizing sections at the end of each BMP section in Volume 3, Chapter 5 are followed.
- ☐ Verify that the dimensions used (width, lengths, side slopes, layer thickness, orifice size, riser heights, etc.) match the dimensions shown on the plans/details.

☐ Verify that the flowrates, volumes, or percent filtered or infiltrated meets each required Standard (more than one Standard may apply).

Construction Stormwater Control

☐ Verify that computational time step used is 5 min or 15 min. See Table F.12 (Note: I think there is an error in the table. TESC Design Flowrates should use 5 min time steps and TESC Design Volumes should use 15-minute time steps.)

☐ Verify that correct recurrence interval is used for determination of flowrates/volumes. Typically, 2-year or 10-year for construction stormwater.

☐ Include groundwater discharge rates in calculations.

Onsite Stormwater Management

Performance Standard

☐ Determine which Performance Standard applies. See Volume 3, Section 5.2.1

☐ Check if the existing hard surface coverage is less than 35% **and** if the project is in a Listed Creek basin

If so,

☐ Verify that the full Predeveloped Scenario is modeled as Forested.

☐ Durations must match (or be below) pre-developed 8% of 2-yr to 50% of the 2-yr (same as Ecology LID Standard built into WWHM and MGS Flood)

If not,

☐ Verify that the full Predeveloped Scenario is modeled a Pasture.

☐ Durations must match (or be below) pre-developed discharge rates between 1% and 10% exceedance values (.01 and .1 exceedance probability in the duration curve). See the On-site Performance Standard BMP Design guidance in section F-4 of Appendix F.

Rainwater Harvesting (See Volume 3, Section 5.5.1)

☐ Determine if the sizing is per the Category 2 OSM List or the Category 4 OSM List

☐ For Category 2 Sizing, verify that it is sized to meet the OSM Performance Standard for the contributory area.

☐ Predeveloped Scenario is modeled a Pasture or Forested as required by OSM Performance Standard.

☐ For Category 4 Sizing, verify that the rainwater harvesting system shall reduce discharged rooftop runoff volume by 25 percent on an average annual basis, as determined by an approved continuous simulation model. (This reduction in runoff volume is determined by comparing the total runoff from the roof and the average annual rainwater demand)

☐ Only year round, indoor uses are included for demand (plumbing fixtures). See tables 5.28 and 5.29 in Volume 3, Section 5.

☐ Check the infiltration rate equivalent of the demand calculation and verify that the corrected infiltration rate is input in the BMP modeling element.

☐ Check that the actual contributory area from the plans matches Mitigated Sub-basin area connected to the infiltrating BMP modeling element.

☐ Check assumptions from Table 5.30 (5 minute time step, etc.)

☐ Verify that the volume shown on the plans is equal to or greater than used in the calculations. Note: only the total volume is important. The specific height, width, and length calculated are not important as long as the volume is met.

Flow Control

☐ Verify that a 5 minute computational time step is used. See Table F.12

☐ Verify that the dimensions shown on plans consistent are consistent with calculations

☐ Orifice diameters are correct

☐ Orifice elevations are correct

☐ Riser height is correct and correlates to the live volume (i.e. doesn't include the dead pool/settling height).

☐ Length and width correspond to the square footage shown on the plans. Note: specific length and width are not important as long as the equivalent area is provided. This is not true for the depth.

☐ Pipe length and diameter in calculations relates to the plans. Note: user input stage-storage tables are generated for MGS Flood using an MGS Flood spreadsheet. Check the spreadsheet to verify correct length and diameter are used.

☐ Side slopes are correct if applicable.

Peak Flow

☐ Check the allowable flow rate hand calculations: (Revised for 2021 Code) 0.07 cfs/acre for 2-year recurrence, 0.10 cfs/acre for the 5-year recurrence interval, and 0.4 cfs/acre for the 25-year recurrence interval (These are based on the whole site/parcel area not just the new plus replaced hard surface areas).

☐ If there will be permanent groundwater discharge, deduct the estimated rate from the allowable rate to establish the modeling goal.

☐ Check the 2-year, 5-year and 25-year Mitigated Flow Rates from the continuous runoff model output report to verify they are equal to or less than the allowable flowrates.

Pasture Flow Control

☐ Pre-developed scenario sub-basins are all Pasture.

☐ Total Pre-developed and Mitigated sub-basin areas are equal.

☐Output report indicates "Pass" for Durations of 50% of the 2-year to the 2-year recurrence intervals. Note: this is only a portion of the default WWHM and MGS Flood Duration goals.

Forested Flow Control

☐ Pre-developed scenario sub-basins are all Forested.

☐ Total Pre-developed and Mitigated sub-basin areas are equal.

☐Output report indicates "Pass" for Durations of 50% of the 2-year to the 50-year recurrence intervals. Note: this the default WWHM and MGS Flood Duration goals.

Wetland Protection Flow Control

☐ Route Wetland Reports to Christy Carr to review and verify Wetland Determination.

☐ Determine if Method 1: *Monitoring and Wetland Stage Modeling* or Method 2: *Site Discharge Modeling* is required (Note: this may require a Wetland Report)

☐ Refer to Appendix I-C of Ecology's Stormwater Management Manual for Western Washington (SWMMWW) for monitoring and modeling requirements for each Method.

No Off-site Point of Discharge

☐ Verify that a 5 minute computational time step is used. See Table F.12

☐ Verify that the dimensions shown on plans consistent are consistent with calculations

☐ Gravel Layer used in calculations is equal to the gravel layer where ponding will occur (not necessarily total depth since some BMPs are covered with soil).

☐ Verify that the void space used in the gravel is as indicated in the Stormwater Manual BMP Sizing or BMP Credit section in the end of each BMP section of Volume 3, Chapter 5.

☐ Verify the Mitigated Flow Rates are zero for at least up to the 25-year recurrence interval (New: if the emergency flowpath is not suitable per criteria in the manual Vol. 3, Section 4.3.2.1, then then all Mitigated Flowrates must be zero and 100% infiltration is required.)

☐ Also check the % infiltrated indicated with the BMP modeling element used.

Water Quality

☐ Verify that a 15 minute computational time step is used. See Table F.12

☐ Verify that the dimensions shown on plans consistent are consistent with calculations

- ☐ Number of cartridges
- ☐ Cartridge height

☐Mass Loading Ratios Applied for Proprietary Systems

☐ 91% infiltrated for infiltration BMPs or filtered for non-infiltrating bioretention.

Additional Criteria for Specific BMPs

Drywells, Infiltration Trenches, Gravel Beds

☐ Verify that the gravel layer is equal to the ponding depth below the effective overflow and only includes the gravel reservoir depth, not any soils over the facility.

☐ Verify that riser height is equal to the overflow elevation