CHAPTER 2
DRAINAGE PLAN

SUBMITTAL
KING COUNTY, WASHINGTON
SURFACE WATER DESIGN MANUAL

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CHAPTER 2

DRAINAGE PLAN SUBMITTAL

This chapter details the drainage related submittal requirements for engineering design plans as part of a permit application to the Department of Permitting and Environmental Review (DPER). The intent of these requirements is to present consistent formats for design plans and the technical support data required to develop the plans. These conventions are necessary to review engineering designs for compliance with King County ordinances and regulations, and to ensure the intent of the plan is easily understood and implemented in the field. Properly drafted design plans and supporting information also facilitate the construction, operation, and maintenance of the proposed system long after its review and approval. When plans comply with the formats and specifications contained herein, they facilitate review and approval with a minimum of time-consuming corrections and resubmittals.

Note that this chapter primarily describes how to submit drainage plans for review—what must be submitted, in what formats, at what times and to what offices. The basic drainage requirements that these plans must address are contained in Chapter 1, "Drainage Review and Requirements." The specific design methods and criteria to be used are contained in Chapters 3, 4, 5, and 6.

Several key forms used in the plan review process are reproduced in Reference Section 8, "Forms and Worksheets." The drainage submittal requirements for different types of developments are contained in this chapter with the exception of Master Drainage Plans, which are contained in a separate publication titled *Master Drainage Planning for Large or Complex Site Developments*, available from the King County Department of Natural Resources and Parks (DNRP) or DPER. For information on general requirements for any permit type and on the appropriate submittal location, refer to the **customer information bulletins** prepared by DPER for this purpose.

Chapter Organization

The information presented in this chapter is organized into four main sections as follows:

- Section 2.1, "Plans for Permits and Drainage Review" (p. 2-3)
- Section 2.2, "Plans Required with Initial Permit Application" (p. 2-7)
- Section 2.3, "Drainage Review Plan Specifications" (p. 2-9)
- Section 2.4, "Plans Required After Drainage Review" (p. 2-41).

These sections begin on odd pages so the user can insert tabs if desired for quicker reference.

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2.1 PLANS FOR PERMITS AND DRAINAGE REVIEW

DPER is responsible for the review of all engineering aspects of private development proposals. Drainage review is a primary concern of engineering design. This section describes the **types of engineered drainage plans** required for engineering review at various permit review stages. *Refer to the DPER customer information bulletins for other details or requirements, such as the submittal and expiration periods set for each type of permit application, review fees, right-of-way use requirements, and other code requirements.*

2.1.1 PLANS REQUIRED FOR PERMIT SUBMITTAL

Most projects require some degree of drainage plans or analysis to be submitted with the initial permit application (see Table 2.1.2.A, p. 2-5). Subdivisions, urban plan developments (UPDs), and binding site plans require engineered **preliminary plans** be submitted with the initial permit application. Short plats require **site plans** (may be engineered or non-engineered) to be submitted with the initial permit application. Preliminary plans and site plans provide general information on the proposal, including location of critical areas, road alignments and right-of-way, ***site*** topography, building locations, land use information, and lot dimensions. They are used to determine the appropriate drainage conditions and requirements to be applied to the proposal during the drainage review process.

Single family residential building permits and short plats with one undeveloped lot require only a **site plan** with the initial permit application. Commercial permits require full **engineering plans** (see below). Other permits may have project specific drainage requirements determined by DPER or described in DPER customer information bulletins.

2.1.2 PLANS REQUIRED FOR DRAINAGE REVIEW

For drainage review purposes, **engineering plans** consist of the following:

1. **Site improvement plans** (see Section 2.3.1.2, p. 2-22), which include all plans, profiles, details, notes, and specifications necessary to construct road, drainage, and off-street parking improvements.
2. A **construction stormwater pollution prevention (CSWPP) plan**, which identifies the measures and BMPs required to prevent the discharge of sediment-laden water and other pollutants associated with construction/***land disturbing activities***. The CSWPP plan includes two component plans: an **erosion and sediment control (ESC) plan** (see Section 2.3.1.3, p. 2-30), which addresses prevention of sediment-laden discharges; and a **stormwater pollution prevention and spill (SWPPS) plan** (see Section 2.3.1.4, p.2-34), which addresses prevention of other pollutant discharges.
3. A **technical information report (TIR)** (see Section 2.3.1.1, p. 2-11), which contains all the technical information and analysis necessary to develop the site improvement plan and CSWPP plan.

Note: A landscape management plan is also included if applicable (see Section 2.3.1.5, p. 2-38).

Projects under Targeted Drainage Review usually require engineering plans, except that only certain sections of the technical information report are required to be completed and the site improvement plan may have a limited scope depending upon the characteristics of the proposed project. The scope of these plans should be confirmed during the **project predesign meeting** with DPER For other permits, such as single family residential permits, the scope of the targeted engineering analysis is usually determined during DDES engineering review.

Projects without major drainage improvements may be approved to submit *a modified site improvement plan*. Major drainage improvements usually include water quality or flow control facilities, conveyance systems, bridges, and road right-of-way improvements. For projects requiring engineering plans for road construction, a **modified site improvement plan** is not allowed. See Section 2.3.1.2, (p. 2-22) for further information.

Plans Required for Simplified Drainage Review

Simplified drainage plans are a simplified form of site improvement and CSWPP plans (without a TIR or a

separate SWPPS plan) that may be prepared by a non-engineer from a set of pre-engineered design details. Simplified drainage plans are only allowed for single family or agricultural projects in Simplified Drainage Review but may be required for individual lots created by a subdivision project to show how required flow control BMPs and ESC and SWPPS measures will be applied to future lot construction.

For single family residential permits, the level and scope of drainage plan requirements are determined by DPER during drainage review. Some projects subject to Simplified Drainage Review may also require Targeted Drainage Review.

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TABLE 2.1.2.A DRAINAGE PLAN SUBMITTALS

Type of Permit or Project	Plans Required with Initial Permit Application	Type of Drainage Review	Plans Required for Drainage Review
SUBDIVISIONS, UPDs, AND BINDING SITE PLANS	Plat Map(5) Preliminary Plans Level 1 Downstream Analysis	Full or Targeted Drainage Review(2)	• Preliminary Plans(5) • Engineering Plans(1)
		Large Project Drainage Review	• Preliminary Plans(5) • Master Drainage Plan(4) or Special Study • Engineering Plans(1)
SHORT PLATS	Site Plan(5)	Simplified Drainage Review	Simplified Drainage Plans(3)
	Site Plan(5) Level 1 Downstream Analysis	Simplified Drainage Review AND Targeted Drainage Review(2)	• Simplified Drainage Plans(3) • Engineering Plans(1)
		Full or Targeted Drainage Review(2)	Engineering Plans(1)
COMMERCIAL PERMITS	Engineering Plans(1),(2)	Full or Targeted Drainage Review	Engineering Plans(1)
SINGLE FAMILY RESIDENTIAL BUILDING PERMITS OR PERMITS FOR AGRICULTURAL PROJECTS	Site Plan(5) for Single Family Residential Building Permits Site Plan(5) or other project-specific plan as specified by DPER for ***agricultural projects***	Simplified Drainage Review	Simplified Drainage Plans(3)
		Simplified Drainage Review AND Targeted Drainage Review(2) AND Directed Drainage Review(6)	• Simplified Drainage Plans(3) • Engineering Plans(1)(6)
		Full or Targeted Drainage Review(2)	Engineering Plans(1)
OTHER PROJECTS OR PERMITS	Project-specific (contact DPER or use DPER customer information bulletins)	Full or Targeted Drainage Review(2)	Engineering Plans(1)

Notes:

(1) Submittal specifications for **engineering plans** are detailed in Section 2.3.1 (p. 2-9).

(2) Submittal specifications for **Targeted Drainage Review** are found in Section 2.3.2 (p. 2-39).

(3) Specifications for submittal of **Simplified drainage plans** are found in Appendix C, *Simplified Drainage Requirements* (detached).

(4) Specifications for submittal of **master drainage plans or special studies** are found in the King County publication titled *Master Drainage Planning for Large or Complex Site Developments.*

(5) Submittal specifications for these plans are found in the application packages and in DPER Customer information Bulletins.

(6) Scope of submittals for **Directed Drainage Review** is determined by DPER review staff in a preapplication meeting with the applicant. Submittal specifications per Notes 1, 2, and 3.

2.2 PLANS REQUIRED WITH INITIAL PERMIT APPLICATION

This section describes the submittal requirements for initial permit applications at DPER. The **timing for submittal** of engineering plans will vary depending on permit type. For subdivisions and short plats, this submittal usually follows the County's approval of preliminary plans. For commercial building permits, engineering plans must be submitted as part of the initial permit application. For other permit types the drainage plan requirements are determined during the permit review process.

Note: If engineering plans are required to be submitted with the initial permit application, they must be accompanied by the appropriate supporting documents (e.g., required application forms, an environmental checklist, etc.). For more details, see DPER's customer information bulletins.

Design Plan Certification

All preliminary plans and engineering plans must be stamped by a ***civil engineer***.

All land boundary surveys and legal descriptions used for preliminary and engineering plans must be stamped by a **land surveyor** licensed in the State of Washington. Topographic survey data and mapping prepared specifically for a proposed project may be performed by the ***civil engineer*** stamping the engineering plans as allowed by the Washington State Board of Registration for Professional Engineers and Land Surveyors.

2.2.1 SUBDIVISION, UPD, AND BINDING SITE PLANS

Applications for proposed subdivision, UPD, and binding site plan projects must include engineered **preliminary plans**, which are used to help determine engineering plan requirements to recommend to the Hearing Examiner. Preliminary plans shall include the following:

1. **A conceptual drainage plan** prepared, stamped, and signed by a ***civil engineer***. This plan must show the location and type of the following:

   a) Existing and proposed flow control facilities

   b) Existing and proposed water quality facilities

   c) Existing and proposed conveyance systems.

   The level of detail of the plan should correspond to the complexity of the project.

2. **A Level 1 Downstream Analysis** as required in Core Requirement #2 and outlined under "TIR Section 3, Offsite Analysis" (p. 2-12). This offsite analysis shall be submitted in order to assess potential offsite drainage and water quality impacts associated with development of the project, and to help propose appropriate mitigation of those impacts. A higher level of offsite analysis may be requested by DPER prior to preliminary approval, or as a condition of engineering plan submittal. The offsite analysis must be prepared, stamped, and signed by a ***civil engineer***.

3. **Survey/topographic information.** The submitted ***site*** plan and conceptual drainage plan shall include the following:

   a) Field topographic base map to accompany application (aerial topography allowed with DPER permission)

   b) Name and address of surveyor and surveyor's seal and signature

   c) Notation for field or aerial survey

   d) Datum and benchmark/location and basis of elevation

   e) Location of all critical areas (include the King County designation number, or identify as undesignated)

   f) Contour intervals per the following chart:

Zoning Designation	Contour Intervals
Densities of developed area of over 2 DU per acre	2 feet at less than 15% slope 5 feet at 15% slope or more
Densities of developed area of 2 DU or less per acre	5 feet

2.2.2 SHORT SUBDIVISIONS

Applications for proposed short plats[1] require a proposed **site plan** drawn to scale showing geographic features such as adjacent streets, existing buildings, and critical areas if any are known to be present; and a **Level 1 Downstream Analysis**. Site plans are usually engineered, except for projects exempt from drainage review or projects subject to Simplified Drainage Review for the entire project. The specifications for submittal of site plans are outlined in DPER customer information bulletins.

The Level 1 Downstream Analysis is required for all short plats except those meeting the exemptions outlined in Section 1.2.2 or those subject to Simplified Drainage Review for the entire project. A higher level of offsite analysis may be requested by DPER prior to preliminary approval, or as a condition of engineering plan submittal.

2.2.3 COMMERCIAL SITE DEVELOPMENT

Applications for commercial permits require that **engineering plans** be submitted as part of the initial permit application. Most commercial projects will go through Full Drainage Review and require complete engineering plans. Projects that qualify for limited scope engineering design should request Targeted Drainage Review during the preapplication meeting with DPER.

2.2.4 SINGLE FAMILY RESIDENTIAL

Applications for single family residential permits[1] require a non-engineered **site plan** to be submitted. The specifications for site plans are outlined in DPER customer information bulletins.

2.2.5 OTHER PERMITS

Other permit applications[1] will require project-specific information. Initial submittal requirements can be obtained by contacting DPER or consulting the DPER customer information bulletins.

[1] The specific level of required drainage analysis and design is usually determined during the preliminary drainage review of the plans submitted with the application. The overall plan review process may be expedited if the project is submitted with the appropriate level of detail.

2.3 DRAINAGE REVIEW PLAN SPECIFICATIONS

This section presents the specifications and contents required of plans to facilitate drainage review. Most projects subject to **Full Drainage Review** will require engineering plans that include a "technical information report (TIR)," "site improvement plans," and a "construction stormwater pollution prevention (CSWPP) plan," which includes an "erosion and sediment control (ESC) plan" and a "stormwater pollution prevention and spill (SWPPS) plan." In addition, a "landscape management plan" may also be required to comply with Core Requirement #8 (see Section 1.2.8). For more information on the types of projects subject to Full Drainage Review, see Section 1.1.2.3.

Small projects with specific drainage concerns that are subject to **Targeted Drainage Review** also require engineering plans that include the same elements, except that the TIR may be of limited scope. The site improvement plans, ESC and SWPPS plans may also be of limited scope, but must meet all applicable specifications. For more information on the types of projects subject to Targeted Drainage Review, see Section 1.1.2.2.

Projects subject to **Simplified Drainage Review** may be required to submit "Simplified drainage plans." These are simplified drainage and erosion control plans that may be prepared by a non-engineer from a set of pre-engineered design details, and which do not require a TIR or a separate SWPPS plan. The *Simplified Drainage Requirements* booklet available at DPER and appended to this manual (detached Appendix C) contains the specifications for Simplified drainage plans and details on the Simplified Drainage Review process.

Note: Projects in Simplified Drainage Review may be required to submit engineering plans if they are also subject to Targeted Drainage Review as determined in Section 1.1.2.2 and Appendix C. Also, short plats in Simplified Drainage Review will be required to submit engineering plans if roadway construction is a condition of preliminary approval.

Agricultural and single family residential projects that do not qualify for Simplified Drainage Review may qualify for **Directed Drainage Review**, which requires a specialized list of submittals (plans, technical reports, etc.) and engineering requirements determined by DPER permit review staff that ensures compliance with all core and special requirements of the SWDM. The scope of the submittal requirement is determined in a preapplication meeting with the applicant and DPER review staff. Specifications for the plans and TIR generally follow those described for the other review types but may be reduced in scope or complexity in accordance with DPER's determination.

Design Plan Certification

All preliminary plans and engineering plans must be stamped by a ***civil engineer***.

All land boundary surveys, and legal descriptions used for preliminary and engineering plans must be stamped by a **land surveyor** licensed in the State of Washington. Topographic survey data and mapping prepared specifically for a proposed project may be performed by the ***civil engineer*** stamping the engineering plans as allowed by the Washington State Board of Registration for Professional Engineers and Land Surveyors.

2.3.1 ENGINEERING PLAN SPECIFICATIONS

For drainage review purposes, **engineering plans** must consist of the following:

1. A **TIR** as detailed in Section 2.3.1.1 (p. 2-11), AND
2. **Site improvement plans** as detailed in Section 2.3.1.2 (p. 2-22), AND
3. A **CSWPP plan**, which includes an ESC plan as detailed in Section 2.3.1.3 (p. 2-30) and a SWPPS plan as detailed in Section 2.3.1.4 (p. 2-34).
4. Also, if applicable per Section 1.2.8, a **landscape management plan,** as detailed in Section 2.3.1.5 (p. 2-38), must be included.

Projects in Targeted Drainage Review require a limited scope TIR with site improvement plans and a CSWPP plan, as detailed in Section 2.3.2 (p. 2-39). DPER may allow a **modified site improvement plan** for some projects in Targeted Drainage Review (see Section 2.3.2, p. 2-39) or where major improvements (e.g., detention facilities, conveyance systems, bridges, road right-of-way improvements, etc.) are not proposed.

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2.3.1.1 TECHNICAL INFORMATION REPORT (TIR)

The full TIR is a comprehensive supplemental report containing all technical information and analysis necessary to develop the site improvement plan. This report shall contain all calculations, conceptual design analysis, reports, and studies required and used to construct a complete site improvement plan based on sound engineering practices and careful geotechnical and hydrological design. The TIR must be stamped and dated by a ***civil engineer***.

The TIR shall contain the following **ten sections**, preceded by a table of contents:

1. Project Overview
2. Conditions and Requirements Summary
3. Offsite Analysis
4. Flow Control, Low Impact Development (LID) and Water Quality Facility Analysis and Design
5. Conveyance System Analysis and Design
6. Special Reports and Studies
7. Other Permits
8. CSWPP Analysis and Design
9. Bond Quantities, Facility Summaries, and Declaration of Covenant
10. Operations and Maintenance Manual.

Every TIR must contain each of these sections; however, if a section does not apply, the applicant may simply mark "N/A" and a brief explanation shall be provided. This standardized format allows a quicker, more efficient review of information required to supplement the site improvement plan.

The **table of contents** should include a list of the ten section headings and their respective page numbers, a list of tables with page numbers, and a list of numbered references, attachments, and appendices.

When the TIR package requires **revisions**, the revisions must be submitted in a complete TIR package.

❑ TIR SECTION 1 PROJECT OVERVIEW

The project overview must provide a general description of the proposal, predeveloped and developed ***site*** conditions, ***site*** and ***project site*** area, size of the improvements, and the disposition of stormwater runoff before and after development. The overview shall identify and discuss difficult ***site*** parameters, the natural drainage system, and drainage to and from adjacent property, including bypass flows.

The following figures are required:

Figure 1. TIR Worksheet

Include a copy of the TIR Worksheet (see Reference Section 8-A).

Figure 2. Site Location

Provide a map that shows the general location of the ***site***. Identify all roads that border the ***site*** and all significant geographic features and critical areas (lakes, streams, steep slopes, etc.).

Figure 3. Drainage Basins, Subbasins, and Site Characteristics

This figure shall display the following:

1. Show acreage of subbasins.
2. Identify all ***site*** characteristics.
3. Show existing discharge points to and from the ***site***.

4. Show routes of existing, construction, and future flows at all discharge points and downstream hydraulic structures.
5. Use a minimum USGS 1:2400 topographic map as a base for the figure.
6. Show (and cite) the length of travel from the farthest upstream end of a proposed storm system in the development to any proposed flow control facility.

Figure 4. Soils

Show the soils within the following areas:

1. The ***project site***
2. The area draining to the ***site***
3. The drainage system downstream of the ***site*** for the distance of the downstream analysis (see Section 1.2.2).

Copies of King County Soil Survey **maps** may be used; however, if the maps do not accurately represent the soils for a proposed project (including offsite areas of concern), it is the design engineer's responsibility to ensure that the actual soil types are properly mapped. Soil classification symbols that conform to the *SCS Soil Survey for King County* shall be used; and the equivalent soil type (till, outwash, or wetlands) per the approved stormwater model shall be indicated (see Table 3.2.2.B).

Subdivision projects will need to evaluate the soils on each lot for applicability of the full infiltration and other low impact flow control BMPs as specified in Section Core Requirement 9. This soils report, as well as geotechnical investigations necessary for proposed infiltration facilities, shall be referenced in the TIR Overview and submitted under Special Reports and Studies, TIR Section VI. A figure in the required geotechnical report that meets the above requirements may be referenced to satisfy 1, 2, and 3 above.

Projects located in outwash soils may need to provide a **low-permeability liner** or a **treatment liner** for water quality facilities and upstream conveyance ditches, consistent with the specifications for such liners in Section 6.2.4.

❑ TIR SECTION 2 CONDITIONS AND REQUIREMENTS SUMMARY

The intent of this section is to ensure all preliminary approval conditions and applicable requirements pertaining to ***site*** engineering issues have been addressed in the site improvement plan. All conditions and requirements for the proposed project shall be included.

In addition to the core requirements of this manual, adopted basin plans and other plans as listed in Special Requirement #1 should be reviewed and applicable requirements noted. Additionally, critical area requirements, conditions of plat approval, and conditions associated with development requirements (e.g., conditional use permits, rezones, variances and adjustments, SEPA mitigations, etc.) shall be included.

❑ TIR SECTION 3 OFFSITE ANALYSIS

All projects in engineering review shall complete, at a minimum, an Offsite Analysis, except for projects meeting the exemptions outlined in Section 1.2.2. The Offsite Analysis is usually completed as part of the initial permit application and review process, and is to be included in the TIR. *Note: If offsite conditions have been altered since the initial submittal, a new offsite analysis may be required.*

The primary component of the offsite analysis is the **downstream analysis** described in detail below. Upstream areas are included in this component to the extent they are expected to be affected by backwater effects from the proposed project. Other components of the offsite analysis could include, but are not limited to, evaluation of impacts to fish habitat, groundwater levels, groundwater quality, or other environmental features expected to be significantly impacted by the proposed project due to its size or proximity to such features.

Levels of Analysis

The offsite analysis report requirements vary depending on the specific ***site*** and downstream conditions. Each project submittal shall include at least a Level 1 downstream analysis. Upon review of the Level 1 analysis, DPER may require a Level 2 or Level 3 analysis. If conditions warrant, additional, more detailed analysis may be required. *Note: Potential impacts upstream of the proposal shall also be evaluated*.

Level 1 Analysis

The Level 1 analysis is a qualitative survey of each downstream system leaving a ***site***. This analysis is required for all proposed projects and shall be submitted with the initial permit application. Depending on the findings of the Level 1 analysis, a Level 2 or 3 analysis may need to be completed or additional information may be required. If further analysis is required, the applicant may schedule a meeting with DPER staff.

Level 2 or 3 Analysis

If drainage problems are identified in the Level 1 analysis, a Level 2 (rough quantitative) analysis or a Level 3 (more precise quantitative) analysis may be required to further evaluate proposed mitigation for the problem. DPER staff will determine whether a Level 2 or 3 analysis is required based on the evidence of existing or potential drainage problems identified in the Level 1 analysis and on the proposed design of onsite drainage facilities. The Level 3 analysis is required when results need to be as accurate as possible: for example, if the ***site*** is flat; if the system is affected by downstream controls; if minor changes in the drainage system could flood roads or buildings; or if the proposed project will contribute more than 15 percent of the total peak flow to the drainage problem location. The Level 2 or 3 analysis may not be required if DPER determines from the Level 1 analysis that adequate mitigation will be provided.

Additional Analysis

Additional, more detailed hydrologic analysis may be required if DPER determines that the downstream analysis has not been sufficient to accurately determine the impacts of a proposed project on an existing or potential drainage problem. This more detailed analysis may include a **point of compliance analysis** as detailed in Section 3.3.6.

Scope of Analysis

Regardless of the level of downstream analysis required, the applicant shall define and map the study area (Task 1), review resources (Task 2), inspect the study area (Task 3), describe the drainage system and problems (Task 4), and propose mitigation measures (Task 5) as described below.

Task 1. Study Area Definition and Maps

For the purposes of Task 2 below, the study area shall extend downstream one mile (minimum flowpath distance) from the proposed project discharge location and shall extend upstream as necessary to encompass the offsite drainage area tributary to the proposed ***project site***. **For the purposes of Tasks 3, 4, and 5,** the study area shall extend downstream to a point on the drainage system where the proposed ***project site*** constitutes less than 15 percent of the total tributary drainage area, but not less than one-quarter mile (minimum flowpath distance). The study area shall also extend upstream of the ***project site*** a distance sufficient to preclude any backwater effects from the proposed project.

The offsite analysis shall include a **site map** showing property lines, and the **best available topographical map** (e.g., from DPER, Department of Transportation Map Counter, Sewer District, or at a minimum a USGS 1:24000 Quadrangle Topographic map) with the study area boundaries, ***site*** boundaries, downstream flowpath for a distance of one mile, and potential/existing problems (Task 4) shown. Other maps, diagrams, photographs and aerial photos may be helpful in describing the study area.

Task 2. Resource Review

To assist the design engineer in preparing an offsite analysis, King County has gathered information regarding existing and potential flooding, erosion, and water quality problems. For all levels of analysis, all of the resources described below shall be reviewed for existing/potential problems in the study area (*upstream and one mile downstream of the **project site***):

- Adopted **basin plans** available at DPER, DNRP, and the library. For areas where there is no adopted **basin plan**, **Basin Reconnaissance Summary Reports** may be useful.
- Floodplain/floodway (**FEMA**) **maps** available at King County DNRP and the library.
- Other **offsite analysis reports** in the same subbasin, if available (check with DPER records staff).
- **Sensitive Areas Folio** available at DPER, DNRP, and the library (see also "Sensitive Areas" on the iMap website: http://www.kingcounty.gov/operations/gis/Maps/iMAP.aspx or its successor for critical areas) must be used to document the distance downstream from the proposed project to the nearest critical areas.
- DNRP **drainage complaints**[2] **and studies** available at DNRP Water and Land Resources Division. Call 206-296-1900 for information or to schedule an appointment. See also "Stormwater" on the iMap website: http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx.
- **Road drainage problems** (check with the KCDOT Roads Maintenance and Operations Division 206-296-8143).
- U.S. Department of Agriculture, ***King County Soils Survey*** available at DPER and the library.
- **Wetlands Inventory** maps available at DPER and DNRP.
- **Migrating river studies** available at DPER and the DNRP Water and Land Resources Division.
- Washington State Department of Ecology's latest published Clean Water Act **Section 303d list of polluted waters** posted at the following website: http://www.ecy.wa.gov/programs/wq/303d/currentassessmt.html.
- **King County designated water quality problems** listed and documented in the latest version of Reference Section 10 posted on King County's *Surface Water Design Manual* website. See also "Stormwater" on the iMap website: http://www.kingcounty.gov/operations/gis/Maps/iMAP.aspx.
- Adopted **stormwater compliance plans** available at DNRP Water and Land Resources Division.

Potential/existing problems identified in the above documents shall be documented in the **Drainage System Table** (see Reference Section 8-B) as well as described in the text of the **Level 1 Downstream Analysis Report**. If a document is not available for the ***site***, note in the report that the information was not available as of a particular date. If necessary, additional resources are available from King County, the Washington State Department of Fisheries and Wildlife (WDFW), the State Department of Ecology (Ecology), the United States Army Corps of Engineers (Corps), and the public works departments of other municipalities in the vicinity of the proposed ***project site***.

Task 3. Field Inspection

The design engineer shall physically inspect the existing on- and offsite drainage systems of the study area for each discharge location. Specifically, he/she shall investigate any evidence of the following existing or potential problems and drainage features:

Level 1 Inspection:

1. Investigate any problems reported or observed during the resource review.

[2] *Note: drainage complaints that are more than 10 years old are not required for Level 1 downstream analysis.*

2. Locate all existing/potential constrictions or lack of capacity in the existing drainage system.
3. Identify all existing/potential downstream drainage problems as defined in Section 1.2.2.1.
4. Identify existing/potential overtopping, scouring, bank sloughing, or sedimentation.
5. Identify significant destruction of aquatic habitat or organisms (e.g., severe siltation, bank erosion, or incision in a stream).
6. Collect qualitative data on features such as land use, impervious surfaces, topography, and soil types.
7. Collect information on pipe sizes, channel characteristics, drainage structures, and relevant critical areas (e.g., wetlands, streams, steep slopes).
8. Verify tributary basins delineated in Task 1.
9. Contact neighboring property owners or residents in the area about past or existing drainage problems, and describe these in the report (optional).
10. Note the date and weather conditions at the time of the inspection.

Level 2 or 3 Inspection:

1. Perform a Level 1 Inspection.
2. Document ***existing site conditions*** (approved drainage systems or pre-1979 aerial photographs) as defined in Core Requirement #3.
3. Collect quantitative field data. For Level 2, conduct rough field survey using hand tape, hand level, and rod; for Level 3, collect field survey profile and cross-section topographic data prepared by an experienced surveyor.

Task 4. Drainage System Description and Problem Descriptions

Each drainage system component and problem shall be addressed in the offsite analysis report in three places: on a map (Task 1), in the narrative (Task 4), and in the *Offsite Analysis Drainage System Table* (see Reference Section 8-B).

Drainage System Descriptions: The following information about drainage system components such as pipes, culverts, bridges, outfalls, ponds, tanks, and vaults shall be included in the report:

1. Location (corresponding map label and distance downstream/upstream from ***site*** discharge)
2. Physical description (type, size, length, slope, vegetation, and land cover)
3. Problems including copies of any relevant drainage complaints
4. Field observations.

Problem Descriptions: All existing or potential drainage and water quality problems (e.g., ponding water, high/low flows, siltation, erosion, listed water bodies, etc.) identified in the resource review or field inspection shall be described in the offsite analysis. These descriptions will help in determining if such problems require special attention per Core Requirement #2 (see Section 1.2.2.1) because they are one of three defined drainage problem types or one of seven defined water quality problem types. Special attention may include more analysis, additional flow control, or other onsite or offsite mitigation measures as specified by the problem-specific mitigation requirements set forth in Sections 1.2.2.2 and 1.2.2.3.

The following information shall be provided for each existing or potential **drainage problem**:

1. Description of the problem (ponding water, high or low flows, siltation, erosion, slides, etc.).
2. Magnitude of or damage caused by the drainage problem (siltation of ponds, dried-up ornamental ponds, road inundation, flooded property, flooded building, flooded septic system, significant destruction of aquatic habitat or organisms).

3. General frequency and duration of drainage problem (dates and times the problem occurred, if available).
4. Return frequency of storm or flow (cfs) of the water when the problem occurs (optional for Level 1 and required for Levels 2 and 3). *Note: A Level 2 or 3 analysis may be required to accurately identify the return frequency of a particular downstream problem; see Section 3.3.3.*
5. Water surface elevation when the problem occurs (e.g., elevation of building foundation, crest of roadway, elevation of septic drainfields, or wetland/stream high water mark).
6. Names and concerns of involved parties (optional for all levels of analysis).
7. Current mitigation of the drainage problem.
8. Possible cause of the drainage problem.
9. Whether the proposed project is likely to aggravate (increase the frequency or severity of) the existing drainage problem or create a new one based on the above information. For example, an existing erosion problem should **not** be aggravated if Level 2 flow control is already required in the region for the design of onsite flow control facilities. Conversely, a downstream flooding problem inundating a home every 2 to 5 years will likely be aggravated if only Level 1 flow control is being applied in the region. See Section 1.2.3.1 for more details on the effectiveness of flow control standards in addressing downstream problems.

The following information shall be provided for each existing or potential **water quality problem**:

1. Description of the problem as documented by the State or County in the problem's listing. This should include the pollutant or pollutants of concern, the nature or category of the listing, and any other background information provided in the listing.
2. Flow path distance downstream of the ***project site*** and percentage of area draining to the problem that the ***project site*** occupies.
3. Possible or probable cause of the water quality problem.
4. Any current mitigation of the water quality problem.

Task 5. Mitigation of Existing or Potential Problems

For any existing or potential offsite **drainage problem** determined to be one of the three defined problem types in Section 1.2.2.1, the design engineer must demonstrate that the proposed project neither aggravates (if existing) nor creates the problem as specified in the drainage problem-specific mitigation requirements set forth in Section 1.2.2.2. The engineer must review each relevant drainage complaint found and include a narrative explaining how each complaint problems is addressed or mitigated. Actual copies of the relevant complaints must be included in the Analysis. To meet these requirements, the proposed project may need to provide additional onsite flow control as specified in Table 1.2.3.A (see also Section 3.3.5), or other onsite or offsite mitigation measures as described in Section 3.3.5.

For any existing or potential **water quality problem** determined to be one of the seven defined water quality problem types in Section 1.2.2.1, the design engineer must document how the applicable water quality problem-specific mitigation requirement in Section 1.2.2.3 will be met.

❑ TIR SECTION 4 FLOW CONTROL, LOW IMPACT DEVELOPMENT (LID) AND WATER QUALITY FACILITY ANALYSIS AND DESIGN

Existing Site Hydrology (Part A)

This section of the TIR shall include a discussion of assumptions and ***site*** parameters used in analyzing the existing ***site*** hydrology.

The acreage, soil types, and land covers used to determine existing flow characteristics, along with basin maps, graphics, and exhibits for each subbasin affected by the development, shall be included.

The following information must be provided on a topographical map:

1. Delineation and acreage of areas contributing runoff to the ***site***
2. Flow control facility and BMP location(s)
3. Outfall(s)
4. Overflow route(s).

The scale of the map and the contour intervals must be sufficient to determine the basin and subbasin boundaries accurately. The direction of flow, the acreage of areas contributing drainage, and the limits of development shall all be indicated on the map.

Each subbasin contained within or flowing through the ***site*** shall be individually labeled and parameters for the approved stormwater model referenced to that subbasin.

All natural streams and drainage features, including wetlands and depressions, must be shown. Rivers, closed depressions, streams, lakes, and wetlands must have the 100-year floodplain (and floodway where applicable) delineated as required in Special Requirement #2 (see Section 1.3.2) and by the critical areas requirements in KCC 21A.24.

Developed Site Hydrology (Part B)

This section shall provide narrative, mathematical, and graphical presentations of parameters selected and values used for the developed ***site*** conditions, including acreage, soil types and land covers, roadway layouts, and all constructed drainage facilities and any required flow control BMPs.

Developed subbasin areas and flows shall be clearly depicted on a map and cross-referenced to computer printouts or calculation sheets. Relevant portions of the calculations shall be highlighted and tabulated in a listing of all developed subbasin flows.

All maps, exhibits, graphics, and references used to determine developed ***site*** hydrology must be included, maintaining the same subbasin labeling as used for the existing ***site*** hydrology whenever possible. If the boundaries of the subbasin have been modified under the developed condition, the labeling should be modified accordingly (e.g., Subbasin "Am" is a modified version of existing Subbasin "A").

Performance Standards (Part C)

The design engineer shall include brief discussions of the following:

- The applicable **area-specific flow control facility standard** determined from the Flow Control Applications Map per Section 1.2.3.1, any modifications to the standard to address onsite or offsite drainage conditions, and applicable **flow control BMP requirements** determined from Sections 1.2.3.3 and Core Requirement 9;
- The applicable **conveyance system capacity standards** per Section 1.2.4; and
- The applicable **area-specific water quality treatment menu** determined from the Water Quality Applications Map per Section 1.2.8.1, and any applicable special requirements for **source control** or **oil control** determined from Sections 1.3.4 and 1.3.5.

Flow Control System (Part D)

This section requires:

- An **illustrative sketch** of the flow control facility (or facilities), required flow control BMPs, and appurtenances. The facility sketch (or sketches) must show basic measurements necessary to calculate the storage volumes available from zero to the maximum head, all orifice/restrictor sizes and head relationships, control structure/restrictor orientation to the facility, and facility orientation on the ***site***. The flow control BMP sketch (or sketches) must show basic measurements and dimensions, orientation on the ***site***, flowpath lengths, etc.

- The applicant shall include all **supporting documentation** such as computer printouts, calculations, equations, references, storage/volume tables, graphs, soils data, geotechnical reports and any other aides necessary to clearly show results and methodology used to determine the storage facility volumes and flow control BMP applications.
- **Facility documentation** files, flow duration comparison files, peaks files, return frequency or duration curves, etc., developed with the approved model shall be included to verify the facility meets the performance standards indicated in Part C.
- The **volumetric safety factor** used in the design shall be clearly identified, as well as the reasoning used by the design engineer in selecting the safety factor for this project.
- If **flow control BMP credits** are used as allowed in Core Requirement 9, documentation must be provided, explaining how the credits will be used and how the criteria for use of credits will be met.
- If the flow control system is an infiltration facility, the soils data, groundwater mounding analysis, and other calculations used to determine the **design infiltration rate** shall be provided.
- **Flow control BMP infeasibility** discussion and supporting documentation shall also be included in Part D.

Water Quality System (Part E)

This section requires an **illustrative sketch** of the proposed water quality facility (or facilities), source controls, oil controls, and appurtenances. This sketch (or sketches) of the facility, source controls, and oil controls must show basic measurements and dimensions, orientation on the ***site***, location of inflow, bypass, and discharge systems, etc.

The applicant shall also include all **supporting documentation** such as computer printouts, calculations, equations, references, and graphs necessary to show the facility was designed and sized in accordance with the specifications and requirements in Chapter 6. If the **water quality credit option** is used as allowed in Section 6.1.2, documentation must be provided, identifying the actions that will be taken to acquire the requisite credits.

❑ TIR SECTION 5 CONVEYANCE SYSTEM ANALYSIS AND DESIGN

This section shall present a detailed analysis of any existing conveyance systems, and the analysis and design of the proposed stormwater collection and conveyance system for the development. This section also includes any analysis required for the design of bridges to convey flows and pass sediments and debris per Section 4.4.3. Analysis information should be presented in a clear, concise manner that can be easily followed, checked, and verified. All pipes, culverts, catch basins, channels, swales, and other stormwater conveyance appurtenances must be clearly labeled and correspond directly to the engineering plans.

The **minimum information** included shall be pipe flow tables, flow profile computation tables, nomographs, charts, graphs, detail drawings, and other tabular or graphic aides used to design and confirm performance of the conveyance system.

Verification of capacity and performance must be provided for each element of the conveyance system. The analysis must show design velocities and flows for all drainage facilities within the development, as well as those offsite that are affected by the development. If the final design results are on a computer printout, a separate summary tabulation of conveyance system performance shall also be provided.

❑ TIR SECTION 6 SPECIAL REPORTS AND STUDIES

Some ***site*** characteristics, such as steep slopes or wetlands, pose unique road and drainage design problems that are particularly sensitive to stormwater runoff. As a result, King County may require the preparation of special reports and studies that further address the ***site*** characteristics, the potential for impacts

associated with the development, and the measures that would be implemented to mitigate impacts. Special reports shall be prepared by people with expertise in the particular area of analysis. **Topics of special reports** may include any of the following:

- Floodplain delineation in accordance with Section 1.3.2
- Flood protection facility conformance in accordance with Section 1.3.3
- Critical areas analysis and delineation
- Geotechnical/soils (soils documentation supporting flow control BMP design, infiltration rate determination and infeasibility conclusions may also be located in TIR Section 6)
- Groundwater, including groundwater mounding analyses required for infiltration design
- Slope protection/stability
- Erosion and deposition
- Geology
- Hydrology
- Fluvial geomorphology
- Anadromous fisheries impacts
- Water quality
- Structural design
- Structural fill.

❑ TIR SECTION 7 OTHER PERMITS

Construction of road and drainage facilities may require additional permits from other agencies for some projects. These additional permits may contain more restrictive drainage plan requirements. This section of the TIR should provide the titles of any other permits, the agencies requiring the other permits, and the permit requirements that affect the drainage plan. Examples of other permits are listed in Section 1.1.3. If a UIC well registration is required, a copy must be provided.

❑ TIR SECTION 8 CSWPP PLAN ANALYSIS AND DESIGN

This section of the TIR should include the analysis and design information used to prepare the required **construction stormwater pollution prevention (CSWPP) plan**. This information should be presented in two parts associated with the CSWPP plan's two component plans, the erosion sediment control (ESC) plan (Part A) and the stormwater pollution prevention and spill control (SWPPS) plan (Part B). See Sections 2.3.1.3 and 2.3.1.4 for plan specifications and contents. This CSWPP plan is intended to be equivalent to and may be more stringent than that required for the NPDES Stormwater Construction Permit issued by Ecology.

ESC Plan Analysis and Design (Part A)

This section must include all hydrologic and hydraulic information used to analyze and design the erosion and sediment control measures, including final ***site*** stabilization measures. The TIR shall explain how proposed ESC measures comply with the *Erosion and Sediment Control Standards* in detached Appendix D and show compliance with the implementation requirements of Core Requirement #5, Section 1.2.5.

Part A must include the following:

1. Provide sufficient information to **justify** the overall ESC plan and the choice of individual ESC measures. At a minimum, there shall be a discussion of each of the measures specified in Section 1.2.5 and their applicability to the proposed project.

2. Include all **hydrologic and hydraulic information** used to analyze and size the ESC facilities shown in the engineering plans. Describe the methodology, and attach any graphics or sketches used to size the facilities.
3. Identify areas with a particularly **high susceptibility to erosion** because of slopes or soils, as well as areas to be protected for existing and proposed flow control BMP facilities. Discuss any special measures taken to protect these areas as well as any special measures proposed to protect water resources on or near the ***site***.
4. Identify any ESC recommendations in any of the **special reports** prepared for the project. In the project geotechnical report supporting flow control BMP design, provide recommendations to address mitigation of flow control BMP areas impacted by erosion and/or sedimentation during construction. If these special reports' recommendations are not included in the ESC plan, provide justification.
5. If proposing **exceptions or modifications** to the standards detailed in the *Erosion and Sediment Control Standards* in detached Appendix D, clearly present the rationale. If proposing techniques or products different from those detailed in the *ESC Standards*, provide supporting documentation so the County can determine if the proposed alternatives provide similar protection.

SWPPS Plan Design (Part B)

The **stormwater pollution prevention and spill control plan** must identify all activities that could contribute pollutants to surface and storm water during construction. This section of the TIR must provide sufficient information to justify the selection of specific stormwater pollution prevention (SWPPS) BMPs proposed to be applied to the pollution-generating activities that will occur with construction of the proposed project. BMPs applicable to such activities are found in the *Construction Stormwater Pollution Prevention and Spill Control (CSWPP) Standards* (detached Appendix D) and the *King County Stormwater Pollution Prevention Manual* (viewable at http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/stormwater-pollution-prevention-manual/SPPM-Jan09.pdf) adopted pursuant to KCC 9.12.

At a minimum, there shall be a discussion of each anticipated pollution-generating activity and the pollution prevention BMPs selected to address it. If there are any **calculations** required for the selected BMP, include those in the discussion. If an **alternative BMP** or major modification to one of the County's standard BMPs will be used, a written request must be submitted for review and approval, detailing how the alternative will work. An "Alternative BMP Request Form" is available in the *Stormwater Pollution Prevention Manual*.

Updates or revisions to the SWPPS plan may be requested by King County at any time during project construction if the County determines that pollutants generated on the construction site have the potential to contaminate surface, storm, or ground water.

The SWPPS plan shall also **discuss the receiving waters**, especially if the receiving water body is listed on the **303d list**. Information must be provided that shows the plan meets **TMDL requirements**. Discuss the 303(d) listed pollutant generated or used onsite and any special handling requirements or BMPs.

❑ TIR SECTION 9
BOND QUANTITIES, FACILITY SUMMARIES, AND DECLARATION OF COVENANT

Bond Quantities Worksheet

Each plan submittal requires a construction quantity summary to establish appropriate bond amounts. Using the *Site Improvement Bond Quantities Worksheet* furnished by DPER (see http://www.kingcounty.gov/property/permits/publications/forms/FormsByTitle.aspx#S and locate by title under "S"), the design engineer shall separate existing right-of-way and erosion control quantities from other onsite improvements. In addition, the design engineer shall total the amounts based on the unit prices listed on the form.

Drainage facilities for single family residential building permits, which are normally not bonded, shall be

constructed and approved prior to granting the certificate of occupancy.

Flow Control and Water Quality Facility Summary Sheet and Sketch

Following approval of the plans, a *Flow Control and Water Quality Facility Summary Sheet and Sketch* (see Reference 8-D) shall be submitted along with an $8^1/_2$" x 11" plan sketch for each facility proposed for construction. The plan shall show a north arrow, the tract, the facility access road, the extent of the facility, and the control structure location. The approximate street address shall be noted. At project completion, the Summary Sheet and Sketch shall be updated in the Final Corrected TIR to reflect the completed project (see Section 2.4.2).

Declaration of Covenant for Privately Maintained Flow Control and WQ Facilities

Any declaration of covenant and grant of easement required for proposed flow control and water quality facilities per Section 1.2.6 must be included here for **review and approval before recording**. The necessary covenant exhibits, and maintenance instructions associated with the facility type (see Reference 5), shall be included with the declaration of covenant. **After approval by DPER**, the declaration of covenant and grant of easement must be signed and recorded at the office of King County Records and Elections before any permit is approved. A copy of the recorded document shall be included in the Final Corrected TIR (see Section 2.4.2).

Declaration of Covenant for Privately Maintained Flow Control BMPs

Any declarations of covenant and grant of easement required for proposed flow control BMPs per Core Requirement 9 must be included here for **review and approval before recording**. The necessary covenant exhibits, and maintenance instructions associated with the flow control BMP type (see Reference 5), shall be included with the declaration of covenant. **After approval by DPER**, all such documents must be signed and recorded at the office of King County Records and Elections before any permit is approved. A copy of the recorded document shall be included in the Final Corrected TIR (see Section 2.4.2) or otherwise provided to the County if no TIR was required.

❑ TIR SECTION 10 OPERATIONS AND MAINTENANCE MANUAL

For each flow control and water quality facility and/or BMP that is to be privately maintained, and for those that have special non-standard features, the design engineer shall prepare an operations and maintenance manual. The manual should be simply written and should contain a brief description of the facility or BMP, what it does, and how it works. In addition, the manual shall include a copy of the *Maintenance Requirements for Flow Control, Conveyance, and WQ Facilities* (see Appendix A) and provide an outline of maintenance tasks and the recommended frequency each task should be performed. This is especially important for flow control BMP and water quality facilities where proper maintenance is critical to facility performance. For this reason, most of the flow control facility designs in Chapter 5 and the water quality facility designs in Chapter 6 include "maintenance considerations" (see Reference 5 for BMP maintenance instructions by BMP type) important to the performance of each facility.

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2.3.1.2 SITE IMPROVEMENT PLAN

Site improvement plans shall portray design concepts in a clear and concise manner. The plans must present all the information necessary for persons trained in engineering to review the plans, as well as those persons skilled in construction work to build the project according to the design engineer's intent. Supporting documentation for the site improvement plans must also be presented in an orderly and concise format that can be systematically reviewed and understood by others.

The **vertical datum** on which all engineering plans, plats, binding site plans, and short plats are to be based must be the North American Vertical Datum of 1988 (NAVD88) and the datum must be tied to at least one King County Survey Control Network benchmark. The benchmark(s) shall be shown or referenced on the plans. If a King County Control Network benchmark does not exist within $^1/_2$ mile of the subject property, or if 250 feet or greater of total vertical difference exists between the starting benchmark and the project, an assumed or alternate vertical datum may be used. Approximate datum correlations can be found in Table 4.4.2.B.

Horizontal control for all plats, binding site plans, and short plats shall reference the North American Datum of 1983/91 as the coordinate base and basis of bearings. All horizontal control for these projects must be referenced to a minimum of two King County Survey Horizontal Control monuments. If two horizontal control monuments do not exist within one mile of the project, an assumed or alternate coordinate base and basis of bearings may be used. Horizontal control monument and benchmark information is available from the King County Survey Department.

The site improvement plans consist of all the plans, profiles, details, notes, and specifications necessary to construct road, drainage structure, and off-street parking improvements. Site improvement plans include the following:

- A **base map** (described on page 2-25), and
- ***Site* plan and profiles** (beginning on page 2-26).

Note: Site improvement plans must also include grading plans if onsite grading extends beyond the roadway.

Modified Site Improvement Plan

DPER may allow a modified site improvement plan for some projects in Targeted Drainage Review (see Section 2.3.2, p. 2-39) or Directed Drainage Review, or where major improvements (e.g., detention facilities, conveyance systems, bridges, road right-of-way improvements, etc.) are not proposed. The modified site improvement plan must:

1. Be drawn on a 11" x 17" or larger sheet,
2. Accurately locate structure(s) and access, showing observance of the setback requirements given in this manual, the critical areas code (KCC 21A.24), or other applicable documents,
3. Provide enough information (datum, topography, details, notes, etc.) to address issues as determined by DPER.

❑ GENERAL PLAN FORMAT

Site improvement plans should use *King County Roads Standard Map Symbols* as appropriate, and must include *Standard Plan Notes* (see Reference Section 7). Each plan must follow the general format detailed below:

1. Plan sheets and profile sheets, or combined **plan and profile sheets**, specifications, and detail sheets as required shall be on "D-size" sheets (24" x 36"). "E-size" sheets (36" x 42") are also acceptable for commercial proposals, except that associated right-of-way improvements must be on "D-size" sheets (24" x 36"). Original sheets shall be archive quality reproducibles, Mylar, or equal.
2. **Drafting details** shall generally conform to *King County Standard Map Symbols* (see Reference

Section 7-A) with standard text height of 0.125" (1/8"). Existing features shall be shown with dashed lines or as half-toned (screened) in order to clearly distinguish existing features from proposed improvements.

3. Each submittal shall contain a **project information/cover sheet** with the following:
   a) Title: Project name and DPER file number
   b) Table of contents (if more than three pages)
   c) Vicinity map
   d) Name and phone number of utility field contacts (e.g., water, sanitary sewer, gas, power, telephone, and TV) and the One-Call number (811 or 1-800-424-5555)
   e) King County's preconstruction/inspection notification requirements
   f) Name and phone number of the erosion control/CSWPP supervisor
   g) Name and phone number of the surveyor
   h) Name and phone number of the owner/agent
   i) Name and phone number of the applicant
   j) Legal description
   k) Plan approval signature block for DPER
   l) Name and phone number of the engineering firm preparing the plans (company logos acceptable)
   m) Fire Marshal's approval stamp (if required)
   n) Statement that mailbox locations have been designated or approved by the U.S. Postal Service (where required)
   o) List of conditions of preliminary approval and conditions of approved adjustments and variances on all ***site*** improvements.
4. An **overall site plan** shall be included if more than three plan sheets are used. The overall plan shall be indexed to the detail plan sheets and include the following:
   a) The complete property area development
   b) Right-of-way information
   c) Street names and road classification
   d) All project phasing and proposed division boundaries
   e) All natural and proposed drainage collection and conveyance systems with catch basin numbers shown.
5. Each sheet of the plan set shall be stamped, signed, and dated by a ***civil engineer***. At least one sheet showing all boundary survey information must be provided and stamped by a **land surveyor** licensed in the State of Washington.
6. **Detail sheets** shall provide sufficient information to construct complex elements of the plan. Details may be provided on plan and profile sheets if space allows.
7. A **title block** shall be provided on each plan sheet. At a minimum, the title block shall list the following:
   a) Development title
   b) Name, address, and phone number of the firm or individual preparing the plan
   c) A revision block

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d) Page (of pages) numbering

e) Sheet title (e.g., road and drainage, grading, erosion and sediment control, stormwater pollution prevention and spill control).

8. A blank **approval block** (4" high x 6" wide) shall be provided on each plan sheet. Two such blocks shall be provided on the first sheet of a plan set.
9. The **location and label** for each section or other detail shall be provided.
10. **Critical areas**, critical area buffers, and critical area building setbacks as required by KCC 21A.24 shall be delineated and labeled.
11. All **match lines** with matched sheet number shall be provided.
12. All division or phase lines and the **proposed limits of construction** under the permit application shall be indicated.
13. **Wetlands** shall be labeled with the number from the County's wetland inventory, or shall be labeled as "uninventoried" if not listed on the wetland inventory.
14. The **standard plan notes** that apply to the project shall be provided on the plans (see Reference Section 7-B).
15. Commercial building permit applications shall include the **designated zoning** for all properties adjacent to the development ***site***(s).

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❑ BASE MAP

A site improvement plan **base map** provides a common base and reference in the development and design of any project. A base map helps ensure that the engineering plans, grading plans, and CSWPP plans are all developed from the same background information. This base map shall include the information listed in Table 2.3.1.A.

TABLE 2.3.1.A BASE MAP REQUIREMENTS

Feature	Requirements
Ground Surface Topography	Provide topography within the ***site*** and extending beyond the property lines. Contour lines must be shown as described in "Plan View: Site Plan and Roadway Elements" (p. 2-26).
Surface Water Discharge	Provide ground surface elevations for a reasonable "fan" around points of discharge extending at least 50 feet downstream of all point discharge outlets.
Hydrologic Features	Provide spot elevations in addition to contour lines to aid in delineating the boundaries and depth of all existing floodplains, wetlands, channels, swales, streams, storm drainage systems and BMPs, roads (low spots), bogs, depressions, springs, seeps, swales, ditches, pipes, groundwater, and seasonal standing water.
Other Natural Features	Show the location and relative sizes of other natural features such as rock outcroppings, existing vegetation, and trees 12 inches in diameter and greater that could be disturbed by the project improvements and construction activities (within tree canopy), noting species.
Flows	Provide arrows that indicate the direction of surface flow on all public and private property and for all existing conveyance systems.
Floodplains/ Floodways	Show the floodplain/floodways as required by the flood hazard portion of the critical areas code (KCC 21A.24) and Section 4.4.2.
General Background Information	Show the location and limits of all existing: • Property boundaries • Structures • Easements (including dimensions) • Total property (including dimensions) • Roads and right-of-way • Sanitary sewers and water utilities • Common open space • Public dedications • Other manmade features affecting existing topography/proposed improvements.
Development Limitations	Delineate limitations to the development that may occur as identified on the TIR worksheet, Part 11 (see Reference 8-A).

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❑ SITE PLAN AND PROFILES

The design engineer shall provide plans and profiles for all construction, including but not limited to the following information:

Plan View: Site Plan and Roadway Elements

1. Provide **property lines**, **right-of-way lines**, and widths for proposed roads and intersecting roads. *Note: the condition of all public right-of-way and the right to use it as proposed must be verified.*
2. Provide all existing and proposed **roadway features**, such as centerlines, edges of pavement and shoulders, ditchlines, curbs, and sidewalks. In addition, show points of access to abutting properties and roadway continuations.
3. Show existing and proposed **topography contours** at 2-foot intervals (5-foot intervals for slopes greater than 15 percent, 10-foot intervals for slopes greater than 40 percent). Contours may be extrapolated from USGS mapping, aerial photos, or other topography map resources. However, contours shall be field verified for roadway and stream centerlines, steep slopes, floodplains, drainage tracts easements, and conveyance systems. Contours shall extend 50 feet beyond property lines to resolve questions of setback, cut and fill slopes, drainage swales, ditches, and access or drainage to adjacent property.
4. Show the location of all existing **utilities** and proposed utilities (except those designed by the utility and not currently available) to the extent that these will be affected by the proposed project. Clearly identify all existing **utility poles**.
5. Identify all roads and adjoining subdivisions.
6. Show **right-of-way** for all proposed roadways, using sufficient dimensioning to clearly show exact locations on all sections of existing and proposed dedicated public roadway.
7. Clearly differentiate areas of **existing pavement** and areas of **new pavement**. If the project is a ***redevelopment project***, delineate areas of ***replaced impervious surface***.
8. For subdivision projects, generally use **drawing scales** of 1"=50'; however, 1"=100' is optional for development of lots one acre or larger. For commercial, multi-family, or other projects, generally use scales of 1"=20'; however, 1"=10', 1" = 30', 1"=40' and 1"=50' are acceptable. Show details for clarification, including those for intersections and existing driveways, on a larger scale.

Plan View: Drainage Conveyance

1. Sequentially **number all catch basins and curb inlets** starting with the structure farthest downstream.
2. Represent **existing storm drainage facilities and BMPs** in dashed lines and label with "Existing."
3. Clearly label existing storm drainage **facilities to be removed** with "Existing to be removed."
4. Show the length, diameter, and material for all **pipes**, **culverts**, and **stub-outs**. Include the slope if not provided on the profile view. Material may be noted in the plan notes. Where open conveyance is provided, and a **low-permeability liner** or **treatment liner** is required per Section 6.2.4, indicate the limits of such liner(s).
5. Clearly label **catch basins** as to size and type (or indicate in the plan notes).
6. Clearly label **stub-out locations** for footing drains and other lot-specific connections to the storm drainage system. Locate all stub-outs to allow gravity flow from the lowest corner of the lot to the connecting catch basin.
7. Show **datum**, **benchmark locations**, and **elevations** on each plan sheet.
8. Clearly label all stub-out locations for any **future pipe connections**.

9. Clearly show on the plans all drainage **easements, tracts**, access easements, Native Growth Retention Areas, Critical Area Tracts, Critical Area Setback Areas, and building setback lines. Show dimensions, type of restriction, and use.
10. Using arrows, indicate the **drainage direction** of hydraulic conveyance systems.

Plan View: Other

1. Show the location, identification, and dimensions of all **buildings**, **property lines**, **streets**, **alleys**, and **easements**.
2. Show the locations of **structures on abutting properties** within 50 feet of the proposed ***project site***.
3. Show the location of all proposed **drainage facility fencing**, together with a typical section view of each fencing type.
4. Provide section details of all **retaining walls and rockeries**, including sections through critical portions of the rockeries or retaining walls.
5. Show all existing and proposed **buildings with projections and overhangs**.
6. Show the location of all **wells** on ***site*** and within 100 feet of the ***site***. Note wells to be abandoned.
7. Show the location and dimensions of proposed **flow control BMP** devices, features, pathways, limits, and set-asides.
8. Show the location and dimensions of structural **source control BMPs** required by the *SWPPS Standards* in Appendix D and the *King County Stormwater Pollution Prevention Manual*.

Profiles: Roadway and Drainage

1. Provide **existing centerline ground profile** at 50-foot stations and at significant ground breaks and topographic features, with average accuracy to within 0.1 feet on unpaved surface and 0.02 feet on paved surface.
2. For publicly maintained roadways, provide **final road and storm drain profile** with the same stationing as the horizontal plan, to show stationing of points of curve, tangent, and intersection of vertical curves, with elevation of 0.01 feet. Include tie-in with intersecting pipe runs.
3. On a grid of numbered lines, provide a continuous plot of **vertical positioning against horizontal**.
4. Show finished **road grade and vertical curve data** (road data measured at centerline or edge of pavement). Include stopping sight distance.
5. Show all **roadway drainage**, including drainage facilities and BMPs that are within the right-of-way or easement.
6. On the profile, show slope, length, size, and type (in plan notes or on a detail sheet) for all **pipes and detention tanks** in public right-of-way.
7. Indicate the **inverts** of all pipes and culverts and the elevations of catch basin grates or lids. It is also desirable, but not required, to show invert elevations and grate elevations on plan sheets.
8. For pipes that are proposed to be within 2.0 feet of finished grade, indicate the **minimum cover dimensions**.
9. Indicate **roadway stationing** and offset for all catch basins.
10. Indicate **vertical and horizontal scale**.
11. Clearly label all profiles with respective street names and plan sheet reference numbers, and indicate all profile sheet reference numbers on plan sheets, if drawn on separate sheets.
12. Locate **match points with existing pavements**, and show elevations.
13. Show all **property boundaries**.

14. Label all **match line locations**.
15. Provide profiles for all **12-inch and larger pipes** and for **channels** (that are not roadside ditches).
16. Show the location of all existing and proposed (if available or critical for clearance) **gas**, **water**, and **sanitary sewer crossings**.
17. Show **energy dissipater locations**.
18. Identify **datum** used and all **benchmarks** (may be shown on plan view instead). Datum and benchmarks must refer to established control when available.
19. Use a **vertical scale** of 1"=5'. As an exception, vertical scale shall be 1"=10' if the optional 1"=100' horizontal scale is used on projects with lots one acre or larger. Clarifying details, including those for intersections and existing driveways, should use a larger scale.
20. **Split sheets**, with the profile aligned underneath the plan view, are preferred but not required.

❑ DETAILS

The design engineer shall provide details for all construction, including but not limited to the following.

Flow Control, Water Quality, and Infiltration Facility and BMP Details

1. Provide a scaled drawing and supporting details of each detention pond or vault, flow control BMP, and water quality facility, including the tract boundaries.
2. Show predeveloped and finished grade **contours** at 2-foot intervals. Show and label **maximum design water elevation**.
3. Dimension all **berm widths**.
4. Show and label at least two **cross sections** through a pond or water quality facility, or any BMP large enough to require design elements of ponds and/or water quality facilities. One cross section must include the restrictor when included in the design.
5. Specify **soils and compaction requirements** for pond construction and flow control BMP construction. Specify **low-permeability liners** or **treatment liners** as required for ponds and ditches per Section 6.2.4.
6. Show the location and detail of **emergency overflows**, **spillways**, and **bypasses**.
7. Specify **rock protection/energy dissipation** requirements and details.
8. Provide **inverts** of all pipes, grates, inlets, tanks, and vaults, and **spot elevations** of the pond bottom.
9. Show the location of **access roads** to control manholes and pond/forebay bottoms.
10. Provide plan and section views of all **energy dissipaters**, including **rock splash pads**. Specify the size of rock and thickness.
11. Show **bollard locations** on plans. Typically, bollards are located at the entrance to drainage facility access roads.
12. On the pond or water quality facility detail, show the size, type (or in plan notes), slope, and length of all **pipes**.
13. Show to scale the section and plan view of **restrictor and control structures**. The plan view must show the location and orientation of all inlet pipes, outlet pipes, and flow restrictors.
14. Draw details at one of the following **scales**: 1"=1', 1"=2', 1"=4', 1"=5', 1"=10', or 1"=20'.

Structural Plan Details

Any submittal that proposes a structure (e.g., bridge crossing, reinforced concrete footings, walls, or

vaults) shall include plan sheets that include complete working drawings showing dimensions, steel placement, and specifications for construction. Structures may require a design prepared and **stamped by a professional structural engineer** licensed in the State of Washington, and an application for a separate commercial building permit.

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2.3.1.3 EROSION AND SEDIMENT CONTROL (ESC) PLAN

This section details the specifications and contents for ESC plans. Note that an ESC plan includes the plan's drawings plus an ESC report, which provides all supporting information and any additional direction necessary for implementing ESC measures and meeting ESC implementation requirements. The ESC plan's drawings may be simplified by the use of the symbols and codes provided for each ESC measure in the *Erosion and Sediment Control Standards* in detached Appendix D. In general, the ESC plan's drawings shall be submitted as a separate plan sheet(s). However, there may be some relatively simple projects where providing separate grading and ESC plan drawings is unnecessary.

❑ GENERAL SPECIFICATIONS

The **site improvement plan** shall be used as the base of the ESC plan. Certain detailed information that is not relevant (e.g., pipe/catch basin size, stub-out locations, etc.) may be omitted to make the ESC plan easier to read. At a minimum, the ESC plan shall include all of the information required for the base map (see Table 2.3.1.A, p. 2-25), as well as existing and proposed roads, driveways, parking areas, buildings, drainage facilities and BMPs, utility corridors not associated with roadways, *relevant critical areas*[3] and critical area buffers, and proposed final topography. A smaller scale may be used to provide better comprehension and understanding.

The ESC plan shall generally be designed for proposed topography, not existing topography, since rough grading is usually the first step in ***site*** disturbance. The ESC plan shall **address all phases of construction** (e.g., clearing, grading, installation of utilities, surfacing, and final stabilization). If construction is being phased, separate ESC plans may need to be prepared to address the specific needs for each phase of construction.

The ESC plan outlines the minimum requirements for anticipated ***site*** conditions. During construction, **ESC plans shall be revised as necessary** by the CSWPP supervisor or as directed by King County to address changing ***site*** conditions, unexpected storm events, or non-compliance with the ESC performance criteria in Core Requirement #5.

The **ESC plan** shall be consistent with the information provided in Section 8 of the TIR and **shall address the following:**

1. Identify areas with a high susceptibility to erosion.
2. Provide all details necessary to clearly illustrate the intent of the ESC design.
3. Include ESC measures for all on- and offsite utility construction included in the project.
4. Specify the construction sequence. The construction sequence shall be specifically written for the proposed project. An example construction sequence is provided in Appendix D.
5. Include ESC standard plan notes (see Reference Section 7-B).
6. Include an inspection and maintenance program for ESC measures, including designation of a CSWPP supervisor who is a certified ESC professional and identification of phone numbers for 24-hour contact.
7. Include the basis and calculations for selection and sizing of ESC measures.

❑ MEASURE-SPECIFIC INFORMATION

ESC plan drawings must include the following information specific to applicable ESC measures and implementation requirements. As noted above, this information may need to be updated or revised during the life of the project by the CSWPP supervisor or as directed by King County.

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[3] *Relevant critical areas*, for the purposes of drainage review, include aquatic areas, wetlands, ***flood hazard areas***, ***erosion hazard areas***, ***landslide hazard areas***, ***steep slope hazard areas***, and ***critical aquifer recharge areas***.

Clearing Limits

1. **Delineate** clearing limits.
2. Provide **details** sufficient to install and maintain the clearing limits.

Cover Measures

1. Specify the type and location of **temporary cover measures** to be used onsite.
2. If **more than one type** of cover measure is to be used onsite, indicate the areas where the different measures will be used, including steep cut and fill slopes.
3. If the type of cover measures to be used will vary depending on the time of year, soil type, gradient, or some other factor, specify the **conditions that control the use of the different measures**.
4. Specify the nature and location of **permanent cover measures**. If a landscaping plan is prepared, this may not be necessary.
5. Specify the approximate amount of cover measures necessary to cover all disturbed areas.
6. If **netting, blankets, or plastic sheeting** are specified, provide typical detail sufficient for installation and maintenance.
7. Specify the **mulch types**, **seed mixes**, **fertilizers**, and **soil amendments** to be used, as well as the application rate for each item.
8. For **surface roughening**, describe methods, equipment and areas where surface roughening will be use.
9. If **PAM** is used, show location(s) and describe application method.
10. When **compost blankets** are used, show location, application rates, and the name of the supplier to document that compost meets quality specifications per Reference 11-C.

Perimeter Protection

1. Specify the **location and type** of perimeter protection to be used.
2. Provide **typical details** sufficient to install and maintain the perimeter protection.
3. If **silt fence** is to be used, specify the type of fabric to be used.
4. If **compost berms or socks** are used, documentation must be provided to assure the supplier meets the criteria and compost meets quality standards per Reference 11-C.

Traffic Area Stabilization

1. Locate the **construction entrance**(s).
2. Provide **typical details** sufficient to install and maintain the construction entrance.
3. Locate the **construction roads and parking areas**.
4. Specify the measure(s) that will be used to create **stabilized construction roads and parking areas**. Provide sufficient detail to install and maintain.
5. If a **wheel wash** or **tire bath system** will be installed, provide location, typical details for installation and maintenance.
6. Provide a list of **dust control** products that will be used onsite and the location of potential application areas.

Sediment Retention

1. Show the **locations** of all sediment ponds and traps.
2. Dimension pond **berm widths** and all inside and outside pond slopes.
3. Indicate the **trap/pond storage** required and the depth, length, and width dimensions.

4. Provide typical **section views** through pond and outlet structures.
5. If **chemical or electrocoagulation treatment** of sediment-laden waters will be used, approval documentation from Ecology must be included (see SWPPS plan requirements for chemical storage).
6. Provide details for **disposal of contaminated or chemically treated waters** (e.g., where Chitosan or CO2 have been used) (see SWPPS plan requirements for chemical storage).
7. Include appropriate **approval documentation from local sewer districts** if contaminated or chemically treated water will be discharged to the sanitary sewer.
8. Provide typical details of the **control structure** and **dewatering mechanism**.
9. Detail **stabilization techniques** for outlet/inlet protection.
10. Provide details sufficient to install **cell dividers**.
11. Specify mulch or recommended **cover of berms and slopes**.
12. Indicate the **required depth gage** with a prominent mark at 1-foot depth for sediment removal.
13. Indicate **catch basins** that are to be protected.
14. Indicate **existing and proposed flow control BMP areas** that are to be protected.
15. Provide **details of the catch basin and flow control BMP protection** sufficient to install and maintain.

Surface Water Control

1. **Locate** all pipes, ditches, interceptor ditches, dikes, and swales that will be used to convey stormwater.
2. Provide **details** sufficient to install and maintain all **conveyances**.
3. Indicate locations of **outlet protection** and provide detail of protections.
4. Indicate locations and outlets of any possible **dewatering systems**. Provide details of alternative discharge methods from dewatering systems if adequate infiltration rates cannot be achieved. Do not route dewatering water, clean or untreated, through stormwater sediment ponds.
5. Indicate the location of any **level spreaders** and provide details sufficient to install and maintain.
6. Show all **temporary pipe inverts**.
7. Provide location and specifications for the **interception of runoff from disturbed areas** and the conveyance of the runoff to a non-erosive discharge point.
8. Provide **locations** of **rock check dams**.
9. Provide **details**, including front and side sections, of typical **rock check dams**.

Protection of Existing and Proposed Flow Control BMP Areas

1. Provide perimeter protection at existing and proposed flow control BMP locations
2. Provide cautionary plan notes emphasizing avoidance of negative impacts to receptor soils and existing vegetation to remain..

BMP Maintenance

1. Provide adequate plan notes for guidance of BMP maintenance methods and schedules.
2. Include an inspection and maintenance program for ESC measures.

Management of the Project

1. Provide plan notes to clarify and emphasize the management responsibilities for the project.

2. Include an inspection and maintenance program for ESC measures, including designation of a CSWPP supervisor who is a certified ESC professional and identification of phone numbers for 24-hour contact.

Wet Season Requirements

3. Provide a **list** of all applicable wet season requirements.
4. Clearly identify that from October 1st through April 30th, no soils shall be exposed for more than two consecutive working days. Also note that this **two-day requirement** may be applied at other times of the year if storm events warrant more conservative measures.
5. Clearly identify that **exposed soils shall be stabilized** at the end of the workday prior to a weekend, holiday, or predicted rain event.

Critical Areas Restrictions

1. **Delineate and label** the following critical areas, and any applicable buffers, that are on or adjacent to the ***project site***: aquatic areas, wetlands, ***flood hazard areas***, ***erosion hazard areas***, ***landslide hazard areas***, ***steep slope hazard areas***, and ***critical aquifer recharge areas***.
2. If construction creates disturbed areas within any of the above listed critical areas or associated buffers, specify the type, locations, and details of any measures or other provisions necessary to **comply with the critical area restrictions** in Appendix D and protect surface waters and steep slopes.

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2.3.1.4 STORMWATER POLLUTION PREVENTION AND SPILL (SWPPS) PLAN

This section details the specifications and contents for SWPPS plans, which together with ESC plans, comprise the construction stormwater pollution prevention (CSWPP) plan that must be submitted as part of the engineering plans required for drainage review. Additional guidance for developing the SWPPS plan can be found in the *SWPPS Standards* in the KCSWDM Appendix D, *Construction Stormwater Pollution Prevention Standards*, in the King County *Stormwater Pollution Prevention Manual* and in the *Stormwater Management Manual for Western Washington (SMMWW)* published by the Washington State Department of Ecology (Ecology).

The SWPPS plan must be kept on ***site*** during all phases of construction and shall **address the construction-related pollution-generating activities outlined in Subsection A below**. The plan must include a description of the methods the general contractor will use to ensure sub-contractors are aware of the SWPPS plan. A **form or record** must be provided that states all sub-contractors have read and agree to the SWPPS plan.

A SWPPS plan consists of the following three elements, which are further described in Subsections B, C, and D below:

1. A **site plan** showing the location and description of BMPs required to prevent pollution and control spills from construction activities and from chemicals and other materials used and stored on the construction site. See Subsection B below for more specifics on the SWPPS site plan.
2. A **pollution prevention report** listing the potential sources of pollution and identifying the operational, source control, and treatment BMPs necessary to prevent/mitigate pollution from these sources. See Subsection C below for more specifics on the SWPPS pollution prevention report.
3. A **spill prevention and cleanup report** describing the procedures and BMPs for spill prevention and including provisions for cleanup of spills should they occur. See Subsection D below for more specifics on the SWPPS spill prevention and cleanup report.

A. ACTIVITY-SPECIFIC INFORMATION REQUIRED

At a minimum, the SWPPS plan shall address, if applicable, the following pollution-generating activities typically associated with construction and include the information specified below for each activity. If other pollution-generating activities associated with construction of the proposed project are identified, the SWPPS plan must address those activities in a similar manner.

Storage and Handling of Liquids

1. Identify liquids that will be handled or stored onsite, including but not limited to **petroleum products, fuel, solvents, detergents, paint, pesticides, concrete admixtures, and form oils**.
2. Specify **types and sizes of containers** of liquids that will be stored/handled onsite. Show locations on the SWPPS site plan.
3. Describe **secondary containment methods** adequately sized to provide containment for all liquids stored onsite. Show the locations of containment areas on the SWPPS site plan.

Storage and Stockpiling of Construction Materials and Wastes

1. **Identify** construction materials and wastes that may be generated or stockpiled onsite. Show the **locations** where these materials and wastes will be generated and stockpiled on the SWPPS site plan.
2. Specify type of **cover measures** to be used to keep rainwater from contacting construction materials and wastes that can contribute pollutants to storm, surface, and ground water.
3. If wastes are kept in **containers**, describe how rainwater will be kept out of the containers.

Fueling

1. Specify **method of onsite fueling** for construction equipment (i.e. stationary tanks, truck mounted tanks, wet hosing, etc.). If stationary tanks will be used, show their location on the SWPPS site plan.
2. Describe **type and size of tanks**.
3. Describe **containment methods for fuel spills** and make reference to the SWPPS site plan for location information.
4. If fueling occurs **during evening hours**, describe lighting and signage plan. Make reference to the SWPPS site plan for location information.

Maintenance, Repairs, and Storage of Vehicles and Equipment

1. Identify **maintenance and repair areas** and show their locations on the SWPPS site plan. Use of drip pans or plastic beneath vehicles is required. A note to this effect must be shown on the SWPPS site plan.
2. Describe method for collection, storage, and disposal of **vehicle fluids**.
3. If an area is designated for vehicle maintenance, **signs must be posted** that state no vehicle washing may occur in the area. A note to this effect must be shown on the SWPPS site plan.

Concrete Saw Cutting, Slurry, and Washwater Disposal

1. Assure that washout of concrete trucks is performed off-site or in designated concrete washout areas only. Identify **truck washout areas** to assure such areas are not within a ***critical aquifer recharge area***. If they are, the washout area must be lined with an impervious membrane. Show location information on the SWPPS site plan. Locate washout area at least 50 feet from sensitive areas such as storm drains, open ditches, or water bodies, including wetlands.
2. Specify **size of sumps** needed to collect and contain slurry and washwater. Show location information on the SWPPS site plan.
3. Identify **areas for rinsing hand tools** including but not limited to screeds, shovels, rakes, floats and trowels. Show the locations of these areas on the SWPPS site plan.
4. Describe **methods for collecting, treating, and disposal** of waste water from exposed aggregate processes, concrete grinding and saw cutting, and new concrete washing and curing water.

Handling of pH Elevated Water

New concrete vaults/structures may cause collected water to have an elevated pH. This water cannot be discharged to storm or surface water until neutralized.

1. Provide details on **treating/neutralizing water** when pH is not within neutral parameters. Written approval from Ecology is required before using chemical treatment other than CO2 or dry ice to adjust pH.
2. Provide details on **disposal of water** with elevated pH or of the treated water.

Application of Chemicals including Pesticides and Fertilizers

1. Provide a **list of chemicals** that may be used on the ***project site*** and the application rates.
2. Describe **where and how chemicals will be applied**. Show location information on the SWPPS site plan.
3. Describe **where and how chemicals will be stored**. Show location information on the SWPPS site plan.

B. SWPPS SITE PLAN

The ***site*** plan element of the SWPPS plan shall include all of the information required for the base map (see Table 2.3.1.A, p. 2-25), as well as existing and proposed roads, driveways, parking areas, buildings,

drainage facilities, utility corridors not associated with roadways, *relevant critical areas*[4] and associated buffers, and proposed final topography. A smaller scale may be used to provide more comprehensive details on specific locations of each activity and specific prevention measure. In addition to this information, the following items, at a minimum, shall be provided as applicable:

1. Identify locations where **liquids will be stored** and delineate secondary containment areas that will be provided.
2. Identify locations where **construction materials and wastes** will be generated and stockpiled.
3. Identify location of **fueling for vehicles and equipment** if stationary tanks will be used.
4. Delineate **containment areas** for fuel spills.
5. Show location of **lighting and signage** for fueling during evening hours.
6. Delineate **maintenance and repair areas** and clearly note that drip pans or plastic shall be used beneath vehicles. Also, clearly note that signs must be posted that state no **vehicle washing** may occur in the area.
7. Delineate **truck washout areas** and identify the location of **slurry/washwater sumps and rinsing areas** for tools.
8. Delineate where **chemicals** will be applied and identify where they will be stored.
9. Identify where **spill response materials** will be stored.

C. POLLUTION PREVENTION REPORT

This report provides the specifics on pollution prevention and must include the following information in addition to the activity-specific information specified in Subsection A above:

1. List the possible **sources of pollution** per Subsection A above and identify the BMPs to be used for each source to prevent pollution. Include any **supporting information** (site conditions, calculations, etc.) for the selection and sizing of pollution prevention BMPs.
2. Identify the **personnel** responsible for pollution prevention and clearly list the responsibilities of each person identified. **Contact information** for these personnel must be clearly identified in the report and on the SWPPS site plan.
3. Describe the **procedures** to be used for monitoring pollution prevention BMPs and for responding to a BMP that needs attention, including keeping records/reports of all inspections of pollution prevent BMPs (see Reference Section 8-E for examples of worksheets that may be used).

D. SPILL PREVENTION AND CLEANUP REPORT

This report provides the specifics on spill prevention and cleanup and must include the following information in addition to any activity-specific information in Subsection A above related to spill prevention:

1. List the possible **sources of a spill** and identify the BMPs to be used for each source to prevent a spill.
2. Identify **personnel** responsible for spill prevention and cleanup and clearly list the responsibilities of each person identified. **Contact information** for these personnel must be clearly identified in the report and on the SWPPS site plan. (On typical projects, the primary contact for SWPPS issues will be the CSWPP supervisor, who may be managing other spill responders to assure compliance; complex projects may warrant specialist personnel for specific site applications.)

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[4] *Relevant critical areas*, for the purposes of drainage review, include aquatic areas, wetlands, ***flood hazard areas***, ***erosion hazard areas***, ***landslide hazard areas***, ***steep slope hazard areas***, and ***critical aquifer recharge areas***.

3. Describe the **procedures** to be used for monitoring spill prevention BMPs and for responding to a spill incident, including keeping records/reports of all inspections and spills (see Reference Section 8-E for examples of worksheets that may be used).
4. Identify where **spill response materials** will be stored. Make reference to the SWPPS site plan for location information.
5. Identify **disposal methods** for contaminated water and soil after a spill.

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2.3.1.5 LANDSCAPE MANAGEMENT PLANS (IF APPLICABLE)

Approved landscape management plans are allowed to be used as an alternative to the requirement to formally treat (with a facility) the runoff from pollution generating pervious surfaces subject to Core Requirement #8 (see Section 1.2.8). A *landscape management plan* is a King County approved plan for defining the layout and long-term maintenance of landscaping features to minimize the use of pesticides and fertilizers, and reduce the discharge of suspended solids and other pollutants.

If a landscape management plan is proposed, it must be submitted with the engineering plans for the proposed project. The elements required for evaluation of landscape management plans, and general guidance for preparing landscape management plans, are provided in Reference Section 4-C.

If a landscape management plan is proposed, it must be submitted with the engineering plans for the proposed project. The elements listed below are required for evaluation of landscape management plans.

1. Provide a ***site* vicinity map** with topography.
2. Provide a **site plan** with topography. Indicate areas with saturated soils or high water tables.
3. Provide a **plant list** (provide both common and scientific names) that includes the following information:
   a) Indicate any drought-tolerant plants, disease resistant varieties, species for attracting beneficial insects (if any) and native plants.
   b) For shrubs and groundcovers, indicate the proposed spacing.
   c) For turf areas, indicate the grass mix or mixes planned. Indicate sun/shade tolerance, disease susceptibility, drought tolerance and tolerance of wet soil conditions.
4. Provide a **landscape plan**. Indicate placement of landscape features, lawn areas, trees, and planting groups (forbes, herbs, groundcovers, etc.) on the ***site***.
5. Include information on **soil preparation** and fertility requirements.
6. Provide information on the design of the **irrigation method** (installed sprinkler system, drip irrigation system, manual, etc.)
7. Provide a **landscape maintenance plan**, including the following:
   a) Physical care methods, such as thatch removal or aeration, and mowing height and frequency
   b) Type of fertilizer (including N-P-K strength) and fertilization schedule or criteria
   c) Type of chemicals to be used for common pests such as crane fly larvae, and the criteria or schedule for application
   d) Any biocontrol methods.
8. Provide information about the **storage of pesticides or other chemicals**, and **disposal measures** that will be used.
   a) If applicable, indicate how the chemicals will be stored on the ***site*** between applications to prevent contact with stormwater or spills into the storm drainage system.
   b) Indicate how excess quantities of fertilizers or chemicals will be handled for individual applications.
9. Provide an **implementation plan** (see Reference Section 4-C for guidance on preparing the implementation plan).

2.3.2 PROJECTS IN TARGETED DRAINAGE REVIEW (TDR)

This section outlines the specifications and contents of limited scope engineering plans allowed for projects in Targeted Drainage Review. Table 2.3.2.A specifies the minimum required elements of the targeted technical information report based on the type of permit or project, and on the three categories of project characteristics subject to Targeted Drainage Review per Section 1.1.2.2.

TABLE 2.3.2.A MINIMUM ENGINEERING PLAN ELEMENTS[1] FOR PROJECTS IN TARGETED DRAINAGE REVIEW

Type of Permit or Project	Drainage Review Type	Project Category 1[2] Projects in TDR that contain or are adjacent to a ***flood***, ***erosion***, or ***steep slope hazard area***; or are within a ***CDA*** or LHDA; or propose ≥7,000 sf of ***land disturbing activity*** (3 ac if in Simplified DR).	Project Category 2[2] Projects in TDR that propose to ***construct or modify*** a 12" or larger pipe/ditch, or receive runoff from a 12" or larger pipe/ditch	Project Category 3[2] ***Redevelopment projects*** in TDR that propose $100,000 or more of improvements to an existing ***high-use site***
SINGLE FAMILY RESIDENTIAL (SFR) BUILDING PERMITS SHORT PLATS PERMITS FOR AGRICULTURAL PROJECTS	Targeted Drainage Review ONLY	• TIR Sections 1, 2, and 6 (minimum) • Simplified ESC Plan[3] and SWPPS Plan • Site Improvement Plan[5]	• TIR Sections 1, 2, 3, 5, 6, 7, and 8 (minimum) • Simplified ESC Plan[3] and SWPPS Plan • ESC Plan[4] for conveyance work • Site Improvement Plan[5]	N/A
	Targeted Drainage Review COMBINED WITH Simplified Drainage Review	• TIR Sections 1, 2, and 6 (minimum) • Simplified ESC Plan[3] and SWPPS Plan • Site Improvement Plan[5]	• TIR Sections 1, 2, 3, 5, 6, 7, and 8 (minimum) • Simplified ESC Plan[3] and SWPPS Plan • ESC Plan[4] for conveyance work • Site Improvement Plan[5]	N/A
OTHER PROJECTS OR PERMITS	Targeted Drainage Review ONLY	• TIR Sections 1, 2, 6, and 8 (minimum) • ESC Plan[4] and SWPPS Plan for any site disturbance work • Site Improvement Plan[5]	• TIR Sections 1, 2, 3, 5, 6, 7, and 8 (minimum) • ESC Plan[4] and SWPPS Plan for any site disturbance work • Site Improvement Plan[5]	• TIR Sections 1, 2, 4, 8, and 10 (minimum) • ESC Plan[4] and SWPPS Plan for any site disturbance work • Site Improvement Plan[5]

Notes:

(1) The above plan elements are considered the recommended minimum for most development cases in Targeted Drainage Review. DPER may add to these elements if deemed necessary for proper drainage review. *Predesign meetings with DPER are recommended to identify all required elements*.

(2) For more detailed descriptions of project categories, see Section 1.1.2.2. *If the proposed project has the characteristics of more than one category, the plan elements under each applicable category shall apply.*

(3) Simplified ESC plans are an element of the Simplified drainage plan as explained in the *Simplified Drainage Requirements* booklet (detached Appendix C).

(4) ESC plans shall meet the applicable specifications detailed in Section 2.3.1.3 (p. 2-30)

(5) Site improvement plans shall meet the applicable specifications detailed in Section 2.3.1.2 (p. 2-22). DPER may allow modified site improvement plans as described in Section 2.3.1.2.

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2.4 PLANS REQUIRED AFTER DRAINAGE REVIEW

This section includes the specifications and contents required of those plans submitted at the end of the permit review process or after a permit has been issued.

2.4.1 PLAN CHANGES AFTER PERMIT ISSUANCE

If changes or revisions to the originally approved engineering plans require additional review, the revised plans shall be submitted to DPER for approval prior to construction. The plan change submittals shall include all of the following:

1. The appropriate Plan Change Order form(s)
2. One copy of the revised TIR or addendum
3. Three sets of the engineering plans
4. Other information needed for review.

2.4.2 FINAL CORRECTED PLAN SUBMITTAL

During the course of construction, changes to the approved engineering plans are often required to address unforeseen field conditions or design improvements. Once construction is completed, it is the applicant's responsibility to submit to DPER a **final corrected plan**. These corrected drawings must be professionally drafted revisions applied to the original approved plan, excluding the CSWPP plan, and must include all changes made during the course of construction. This plan need not be a precisely surveyed as-built drawing but should show what was finally constructed in terms of drainage system elements. The final corrected plan must be stamped, signed, and dated by a ***civil engineer***. A CAD drawing file (.dwg) of the final corrected plan must be submitted along with paper copies. The CAD file must contain all the pages of the plan set for road and drainage infrastructure, but need not contain other sheets. A **final corrected TIR**, updated to include all changes made to the originally approved TIR during the course of construction, must be submitted with the final corrected plan. In addition to any design changes and supporting calculations and documentation, the final corrected TIR shall include a final updated Stormwater Facility Summary Sheet (see Reference 8D) and signed/recorded copies of all required easements and declarations of covenant. A copy of any required Landscape Management Plan (see Section 2.3.1.5) shall accompany the plans and TIR. The electronic copy of the final corrected TIR may be in .pdf or other approved format.

Disposition of Approved Engineering Plans for Subdivisions

Upon engineering plan approval of any subdivision (including PUDs, binding site plans, and short plats), DPER will make a set of reproducible mylars (cost to be paid by the applicant) and return the original set to the applicant's engineer. DPER will retain this reproducible set, utilizing it to make copies for public inspection, distribution, and base reference as required. At the time the development is accepted for maintenance by King County, the DPER set of reproducibles shall be replaced by the corrected original set for permanent public records at the Department of Transportation Map Counter, 1st floor, King Street Center Building, 201 South Jackson Street, Seattle, Washington.

2.4.3 FINAL PLAT, SHORT PLAT, AND BINDING SITE PLAN SUBMITTALS

Any subdivision to be finalized, thereby completing the subdivision process and legally forming new lots, requires a **final submittal for approval and recording**. Binding site plans and short plats also require a final submittal for approval and recording. The final plat or map page shall contain the elements summarized and specified in detail in DPER customer information bulletins. Submittals shall be accompanied by appropriate fees as prescribed by King County Code. Final submittals will be allowed only after the approval of preliminary plans (for subdivisions only) and any required engineering plans, and after the construction of any required drainage facilities.

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All final map sheets and pages shall be prepared by a **land surveyor** licensed in the State of Washington and shall conform to all state and local statutes.

The final submittal for recording only applies to **subdivisions** (plats), **binding site plans**, and **short plats**. This plan is required by state and local statutes.

In addition to the requirements described in the DPER customer information bulletins, submittals for final recording of subdivisions, short plats, and binding site plans **must include the following information:**

1. Indicate **dimensions** of all easements, tracts, building setbacks, tops of slopes, wetland boundaries, and floodplains.
2. Include **pertinent restrictions** as they apply to easements, tracts, and building setback lines.
3. Include the **dedication and indemnification clause** as provided in Reference Section 8-G.
4. State the **maximum amount of added impervious surface** and **proposed clearing per lot** as determined through engineering review. The maximum amount of impervious surface may be expressed in terms of percentage of lot coverage or square feet.
5. Include a recorded **declaration of covenant and grant of easement** for each lot on which flow control BMPs are installed or stipulated per Core Requirement 9, Section 1.2.9.4.1, and each lot for which flow control BMPs are installed in a separate dedicated tract per Section 1.2.9.4.1.

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