



King County
Department of Development and Environmental Services
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ENGINEERING REVIEW CHECKLIST
2005 Surface Water Design Manual
1993 King County Road Standards

For alternate formats, call 206-296-6600.

PROJECT INFORMATION

Project Name _____
Activity Number _____
Project Number _____
Development Number _____

DDES Review Engineer _____ Date _____

Notes

OK

- Hearing Examiner's Report Date _____ Revised Report Date _____
- Plat Ordinance Number _____ Date _____
- Preliminary Plat Map Date Approved by Hearing Examiner _____
- Revised Preliminary Plat Map Date Approved by DDES _____
- 5-year Expiration Date _____ (Show on engineering cover sheet)

ROUTING TO OTHER KING COUNTY SECTIONS

OK

- Wetland Report / Plans
Route Date _____ Response Date _____
- Geotechnical Report / Plans
Route Date _____ Response Date _____
- Grading Report / Plans
Route Date _____ Response Date _____
- Structural Designs / Calculations / Civil Plans / Soils Report (Vaults, Retaining Walls, Bridges)
Route Date _____ Response Date _____
- Landscape / Recreation / Street Tree / Plan
Route Date _____ Response Date _____

Activity Number: _____

(Continued)

- Traffic Improvement Plan / Report
Route Date _____ Response Date _____
- Tree Retention / Forestry / Plan
Route Date _____ Response Date _____
- Other Report / Plan
Route Date _____ Response date _____
- Site Inspections - Constructability
Route Date _____ Response date _____
- All required routing stations shown and updated on PRMS

Notes

GENERAL SUBDIVISION REQUIREMENTS

OK

- Site plan layout matches preliminary plat approved by Hearing Examiner (Check for same lot count, tract configuration, road alignments, etc.)
- Compliance with conditions of preliminary approval
- Compliance with Mitigated Determination of Non-Significance
- Tract Table if three or more tracts. Identify name, size and purpose.
- Show and label all critical area tracts, buffers, and 15' BSBL.
- Review maximum height of 6-feet for rockeries and retaining walls per KCC 21A.12.030, 110-170, 220) Also show standard note per policy on Web site.
- Use updated cover sheet showing designation for highly critical sites per Appendix, D73.
- Determine if HPA fisheries permit required – contact CAO staff.
- Tree Retention Plans - Show standard plan note (see section policies).

SURFACE WATER DESIGN MANUAL (2005)

CORE AND SPECIAL REQUIREMENTS

OK SWDM

- 1.2.1 Core #1 – Evaluate diversion of drainage within subbasins, discharge of unconcentrated runoff, and/or tightline requirements for landslide hazard drainage areas.
- 1.2.2 Core #2 – Off-site analysis. Evaluate adequacy and conclusions.
- 1.2.3 Core #3 – Flow control. Determine design standard based upon mapping and/or off-site analysis. Evaluate exemptions from flow control if applicable. Also evaluate target surfaces and BMP criteria.
- 1.2.6 Core #6 – All drainage facilities and road access shall be located in public tracts, right-of-way and/or drainage easements dedicated to King County. For private facilities, specify the required Declaration of Covenant and drainage easements for final recording.
- 1.2.8 Core #8 – Water Quality. Determine design standard based upon mapping and/or off-site analysis. Evaluate need for enhanced basic water quality based upon five land use types, including subdivision density => 8 units per acre developed area. Also evaluate exemptions if applicable and untreated discharge per page 1-67.
- 1.3.1 Special #1 – Area specific requirements. Perform P-suffix search on computer, evaluate grading code restrictions, critical drainage areas, and review for shared facility drainage plan.
- 1.3.2 Special #2 – Floodplain boundaries and channel migration areas shown on plans.

DRAINAGE ADJUSTMENTS

OK SWDM

1.4 Activity No. _____ Approval Date _____

Design Issues

PLANS REQUIRED FOR DRAINAGE REVIEW

OK SWDM

2.1.2

- Site Improvement Plans
- ESC Plan
- Stormwater pollution plan (SWPPS)
- Technical Information Report (TIR)

TECHNICAL INFORMATION REPORT

2.3.1.1

- Section 1 – Project Overview**
- Figure 1: TIR Worksheet
- Figure 2: Site Location
- Figure 3: Drainage Basins
- a. Acreage of subbasins
- b. Identify all site characteristics
- c. Show existing discharge points to and from the site
- d. Show routes of existing, construction, and future flows at all discharge points and downstream hydraulic structures.
- e. Use a minimum USGS 1:2400 topographic map as a base
- f. 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
- a. Show the project site
- b. The area draining to the site
- c. The drainage system downstream for the distance of the downstream analysis
- Section 2 – Preliminary Conditions Summary with responses**
- Section 3 – Off-Site Analysis**
- Section 4 – Flow Control and Water Quality Facility Analysis and Design**
- Existing Site Hydrology (Part A) – Topographical map with listed site information.
- Developed Site Hydrology (Part B) – Data/narrative for developed site conditions.
- Performance Standards (Part C) – Summarize flow control and BMPs.
- Flow Control System (Part D) – Illustrative sketch and documentation.
- Water Quality System (Part E) – Illustrative sketch and documentation.
- Section 5 – Conveyance System Design and Analysis**
- Section 6 – Special Reports and Studies – Geo, Wetlands, Floodplain analysis (4.4.2), etc.**
- Section 7 – Other Permits (HPA, Special Use, WSDOT, etc.)**
- Section 8 – Design Requirements for Erosion / Sedimentation Control and Stormwater Pollution (SWPPS)**
- Section 9 – Bond Quantities Worksheet, R/D Facility Summary, Private Covenants**
- Section 10 – Maintenance and Operations Manual (Section 10 for privately maintained or special non-standard features).**

SITE IMPROVEMENT PLANS

OK SWDM

2.3.1.2

- Vertical Datum NAVD 1988 – show benchmark
- Horizontal Control NAD 1983/91
- Base Map per table 2.3.1.A.

2.3.1.2 General Plan Format

- (1) Sheet size 24" x 36"; quality reproducibles
- (2) King Co. Standard Map Symbols; existing / proposed (Reference 7A)
- (3) Project Information / Cover Sheet
 - a. Title: Project name and DDES file number
 - b. Table of Contents if more than 3 plan sheets
 - c. Vicinity Map
 - d. Name & Phone of Utility field contacts and
One Call Number: 1-800-424-5555 (water, sewer, gas, power)
 - e. Preconstruction / Inspection notification requirements
 - f. Name & Phone of erosion control supervisor
 - g. Name & Phone of Surveyor
 - h. Name & Phone of Owner / Agent
 - i. Name & Phone of Applicant
 - j. Legal description
 - k. Plan approval block for DDES
 - l. Name & Phone of engineering firm preparing plans
 - m. Fire Marshal's approval stamp (if required)
 - n. Mailbox location approval by U.S. Postal Service
 - o. List of conditions of preliminary approval on all site improvements
- (4) An overall site plan if more than three plan sheets are used
 - 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 and TIR is stamped, signed, and dated by a Professional Engineer licensed in Washington State. Survey control plan sheet stamped by licensed PLS in Washington State.
- (6) Detail Sheets Provided
- (7) Title block on each sheet
 - a. Development title
 - b. Name, address and phone number of engineering firm
 - c. Revision block
 - d. Page numbering
 - e. Sheet title (e.g., road and drainage, grading, etc.)
- (8) King County approval block on each plan sheet
- (9) The location and label for each section or other detail shall be provided
- (10) Critical Areas with buffers and setbacks.
- (11) All match lines correspond to the sheet reference
- (12) Division phase lines with limits of construction
- (13) Wetlands with inventory numbers
- (14) Standard Plan Notes – General, Drainage & Structural notes (Reference 7B).

SITE IMPROVEMENT PLANS (continued)OK SWDM**2.3.1.2 Plan View: Site Plan and Roadway Elements**

- (1) Property Lines, R/W lines, roadway widths shown
- (2) Existing / Proposed road features; CL, edge pavement, edge shoulder, ditches, curb, sidewalk & access pts
- (3) Existing / Proposed topographic contours @ 2', 5' > 15% slope, 10' > 40% slope
- (4) All affected utilities are shown; utility poles marked
- (5) All roads and adjoining subdivisions identified
- (6) Existing / Proposed R/W dimensioned and shown
- (7) Existing / Proposed surfacing shown
- (8) Scale generally 1"=50' (1"=100' for lots > 1 Acre).

2.3.1.2 Plan View: Drainage Conveyance

- Sequentially number all catch basins and curb inlets
- Show length, diameter, and material for all pipes, culverts, and stubouts
- Label catch basin size and type
- Show stubout locations for roof drains
- Label all drainage easements, access easements, tracts, and building setbacks
- Provide flow arrows for drainage direction.

2.3.1.2 Plan View: Other

- Show all buildings, property lines, streets, alleys, and easements
- Verify condition of public right-of-way
- Show structures on abutting properties within 50 feet
- Identify fencing for drainage facilities
- Provide section details of all retaining walls and rockeries
- Show all wells on-site and within 100-feet of site. For well abandonment, include notes referencing DOE procedures.
- Show flow control BMPs and source control BMPs for SWPPS.

2.3.1.2 Profiles: Roadway and Drainage

- Existing / proposed roadway centerline (CL) at 50' stations increasing, reading from left to right. Show stationing of points of smooth vertical curve, with elevations
- Show vertical curve data including stopping sight distance
- Show all pipes and detention tanks with slope, length, size and type
- Show all pipe inverts and elevations of catch basins or lids
- Minimum cover dimensions if less than 2.0'
- Indicate roadway stationing and offset for all catch basins
- Show vertical and horizontal scales (vertical 1"=5')
- Label all profiles with street names and reference numbers to plan sheet
- Show all property boundaries and match line locations
- Provide profiles for conveyance systems of 12" and larger pipes or channels other than roadway ditches
- Catch basin lids are flush with ground line.

SITE IMPROVEMENT PLANS (continued)OK SWDM**2.3.1.2 Plan Details**

- Provide scale drawing of each pond, vault, or water quality facility. Include all pipe details for size, type, slope, length, etc.
- Show existing and final grade contours at 2-foot intervals. Show maximum design water elevation.
- Dimension all berm widths
- Provide two cross sections through pond, including one section through restrictor
- Specify soils and compaction requirements
- Show location and detail of emergency overflows, spillways, and bypasses
- Specify rock protection / energy dissipation details
- Provide inverts for all pipes, grates, etc., and spot elevations on pond bottom
- Show location of access roads to control manholes and pond / forebay bottoms
- Provide plan and section views of all energy dissipaters. Specify size and thickness of rock.
- Show bollard locations (typically at entrance to drainage facility and walking trails)
- Restrictor and control structures must have section and plan view drawn to scale.

2.3.1.2 Structural Plan Details

- Verify that designer is a licensed structural P.E. for vaults or bridges.

Notes:

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EROSION AND SEDIMENT CONTROL (SWDM Appendix D)OK SWDM**2.3.1.3 General Specifications**

- Separate plan sheet showing entire site w/features
- Show critical areas and buffers in separate tracts
- Show existing contours and final grades if scope or work includes grading
- Pertinent information from soils report is added to plans
- Drainage features identified (streams, wetlands, bogs, springs, seeps, swales, ditches, pipes & depressions)
- Utility corridors other than roads shown
- Show drainage divides and flow directions
- Specify best management practices
- Show cut and fill slopes with catch lines indicated
- Sufficient conceptual details to convey design intent
- Standard ESC plan notes shown on plans (Page D-92)
- For grading and structural fill within lot areas – show standard notes for geotechnical work (see section policies for geo notes).

2.3.1.4 Stormwater Pollution Prevention and Spill Plan (SWPPS)

- A. Activity Specific Information
- B. SWPPS Site Plan
- C. Pollution Prevention Report
- D. Spill Prevention and Cleanup Report.

2.3.1.3 EROSION AND SEDIMENT CONTROL (SWDM Appendix D) (continued)OK SWDM**D.3.1 Clearing Limits**

- (1) Delineate clearing limits – colored survey tape may be used. Critical areas require plastic / metal safety fence or stake and wire fences.
- (2) Provide detail of fencing.

D.3.2 Cover Measures

- (1) Specify the type and location of temporary and permanent cover measures. Mulch, erosion control nets, blankets, plastic, seeding and sodding.
- (2) Specify the seed mixes, fertilizers and soil amendments to be used and application rates.
- (3) Areas receiving special treatment are specified (jute netting, rock lining or sod).
- (4) Soil cover practices and locations of disturbed areas.

D.3.3 Perimeter Protection

- (1) Specify the location and type of perimeter protection to be used – silt fence, brush barriers, and/or vegetated strips.
- (2) Provide details and specify type of fabric for silt fence.

D.3.4 Traffic Area Stabilization

- (1) Show construction entrance with detail (Figure D.3.4.A).
- (2) Show proposed construction roads and parking areas. Specify details for stabilization.

D.3.5 Sediment Retention

- (1) Show location of sediment pond or sediment trap. Very small areas can be treated with only perimeter protection (see D.3.3).
- (2) Sediment Trap – Can be used for drainage areas of 3 acres or less. Calculate surface area using 2-year design storm. Show detail per Figure D.3.5.A.
- (3) Sediment Pond – Determine pond geometry and show details on plan for required storage, depth, length and width.
- (4) Show sediment pond cross section and detail (Figures D.3.5.B,C,D).
- (5) Provide details of cell dividers and stabilization techniques for inlet / outlet.
- (6) Specify mulch or recommended cover of berms & slopes.
- (7) Specify the 1-foot marker for sediment removal.
- (8) Indicate catch basins for protection and show design details (Fig. D.3.5.E,F,G,H).

D.3.6 Surface Water Collection

- (1) Show conveyance of all surface water to a sediment pond or trap.
- (2) Discharge location shall be downslope from disturbed areas.
- (3) Show details for conveyance with interceptor dike, swales (Figures D.3.6.B,C).
- (4) For ditches, determine capacity for 10-year storm with 0.5 feet freeboard. Show details for check dams (Figure D.3.6.E). Determine check dam spacing and as needed, show inverts and minimum slopes of open channels. Also show direction of open channel flow.
- (5) For pipe slope drains, determine capacity for 10-year storm. Show details per Figure D.3.6.D.
- (6) Determine level of protection for outlet (rock pad, outfall design, or level spreader). See requirements in D-63 through D-64.
- (7) Evaluate off-site flows entering the site and assure bypass of disturbed areas.

2.3.1.3 EROSION AND SEDIMENT CONTROL (SWDM Appendix D) (continued)OK SWDM**D.5.1 ESC Plan**

- (1) Show detailed construction sequence (page D-93)
- (2) All required calculations and soils reports contained in TIR.
- (3) For large projects, determine need for phased clearing.

D.5.2 Wet Season Requirements

- (1) Provide a list of all applicable wet season requirements (details on page D-72).

D.5.3 Critical Area Restrictions

- (1) Consider phased construction during the dry season. See special recommendations on page D-72/73.

D.5.4 Maintenance Requirements

- (1) Plans shall list the name, address and phone number of the ESC Supervisor. A sign shall also be posted on the construction site with information for contacting the ESC supervisor. See KCC 20.20.060(l) and Web site policy for sign details.
- (2) Determine if site is Highly Critical (Soil Types C or D, 5 acres of disturbance, large areas with slopes >10%, proximity to streams, wetlands, or lakes).
- (3) On cover sheet of engineering plans, designate if highly critical site.

D.5.6 NPDES Requirements

- (1) Determine if project will disturb more than 1 acre.
- (2) If disturbed area is greater than 1 acre, show the following note on the plans:
"No construction or site disturbance for this project may begin before the applicant first obtains a General Permit to Discharge Stormwater Associated with Construction Activity permit from the Washington State Department of Ecology (DOE). For more information or application form, please visit DOE's Web site at <http://www.ecy.wa.gov/pubs/9937.pdf>."

D.5.7 Forest Practices Permit

- (1) Determine if project needs FPA permit. Contact DDES grading section.
- (2) Provide a reference note on the cover sheet indicating whether or not an FPA permit has been obtained.

Early Start Plan Review

- (1) Standard cover sheet included with Title for Phased Early Start.
- (2) List the scope of work for early start (scope of work will vary for each project – evaluate clearing, grading for roads, lot grading, utility installation, vault construction, off-site work, etc.).
- (3) Update the sheet index to identify all plans with updated page numbers.
- (4) Include standard ESC plan prepared in accordance with all requirements listed above for erosion and sediment control.
- (5) Include pollution control plan elements as required by SWDM (pg 2-16, 2-28).
- (6) Include detailed construction sequence and identify ESC supervisor.
- (7) Show standard erosion control notes.
- (8) Show early start activity number on all plan sheets.
- (9) Prepare limited scope Technical Information Report (TIR) for early start.

DESIGN REQUIREMENTS**OK SWDM****3.2 Runoff Computation**

- Rational Method required for on-site conveyance (See Table 3.2).
- KCRTS used for flow control design.
- Evaluate correct data: Rainfall region, scale factor, time step, record type, acreages, soil cover groups, and percent impervious. (See correct time steps – page 3-23)
- 1-29 For Conservation Flow Control, apply historic site condition for predevelopment.
- 3-27 For urban areas, unprotected forest modeled as pasture or grass.
- For rural areas, unprotected forest assumes 50% grass, 50% pasture.
- All pre-developed grassland modeled as pasture.
- All post-developed grassland modeled as grass.
- Impervious coverage calculated based upon specific project – clearly summarize types and amounts of impervious.
- For urban development, impervious for each lot, $\geq 4,000$ sq ft or maximum allowed in zoning code.
- For rural development, impervious for each lot, $\geq 8,000$ sq ft or maximum allowed in zoning code.
- Evaluate requirements for modeling with effective impervious area.
- 3.3.6 Point of compliance – evaluate for on-site bypass and off-site closed depression.
- 3.3.7 On-site closed depressions and ponding areas.

4.0 Conveyance System Analysis and Design

- Conveyance systems are in easements of correct width with BSBLs
- Off-site easements must be recorded using standard forms (Reference 8L)
- Determine which easements are public and private, label and dimension
- Pipes are parallel to and alongside property lines
- 4-7 Minimum pipe size 12-inch. Private systems may allow 8 inch.
Show easements for pipes extending outside right-of-way.
- 4-9/10 For connecting pipes at structures, match crowns, 80% diameter, or inverts
- 4-11 Minimum velocity at full flow 3.0 feet per second.
- 4-11 Minimum cover for pipes 2 feet.
- 4-13 Debris barrier for pipes 18-36 inch
- 4-13 Spill Control
- 4-29 Outfall design criteria
- 4-38 Trash Racks
- 4-37 Maximum headwater allowed for culverts
- 4-53 Bridge design
- 4-55 Open channels
- 4-71 Floodplain analysis.

5.2 Flow Control BMP Requirements

- Determine if project proposes BMPs as flow control credits.
If credits not proposed, skip to (A) below.
- 5-6 Small Lot BMPs – Demonstrate feasibility of full dispersion and/or full infiltration.
If not feasible, choose other BMPs as listed.
- 5-7 Large Lot Low Impervious BMPs - Demonstrate feasibility of full dispersion and/or full infiltration.
If not feasible, choose other BMPs as listed.

DESIGN REQUIREMENTS (continued)**OK** **SWDM**

- 5-8 Large Lot High Impervious BMPs – Demonstrate feasibility of full dispersion . If full dispersion not feasible, choose other BMPs as listed.
- For any BMP chosen, designate which lots are proposed for BMPs and show appropriate design details from Appendix C.
- 5-12 Evaluate facility sizing credits for flow control BMPs.
- 5-13 Evaluate BMPs within road right-of-way.
- 5-13 Evaluate BMPs within dedicated tracts.
- 5-14 Evaluate BMP implementation requirements on individual lots and perform lot-specific assessment to determine feasibility.
- Determine which of the following four scenarios apply for site development:
- (A) Flow control credits are not used and all BMP issues are deferred to the building permit review process. In this case, the engineering plans shall show roof drain connections for all lots and the following note must be shown on the design plans:
- “The following note shall be shown on the final recorded plat: “Permit applications for buildings or other improvements constructed on lots created by this subdivision must be reviewed by King County for compliance with best management practices (BMPs) and other applicable drainage standards as specified in the King County Surface Water Design Manual. As determined necessary by King County, the permit applicant for each lot must prepare a drainage site plan with procedures for design and maintenance details, and record a declaration of covenant and grant of easement for implementation of the best management practices.”
- (B) Flow control credits are used for sizing the drainage facility and the plat developer will implement the required BMPs as part of the subdivision process. This will occur only for certain types of BMPs such as full dispersion to an open space tract, full infiltration for entire plat, or construction of a joint use rain garden located within a separate tract. The feasibility of BMPs has been determined with design details shown on the plans including roof drain connections. In this case, the final plat must record a note indicating that BMP requirements are satisfied and building permit review is not required. Additional notes are needed to specify tract ownership and maintenance requirements for BMP facilities and the standard declaration of covenant easement shown in the drainage manual (Reference 8M) shall be recorded as necessary. Show the following notes on the engineering plan:
- 1) The following note shall be shown on the final recorded plat: “Single family residences and other improvements constructed on lots created by this subdivision shall connect roof downspouts and drains from other impervious surfaces to the permanent storm drain outlet shown on the approved construction drawings for this subdivision. All storm drain connections must be constructed and approved prior to final building inspection approval. The designs for best management practices (BMPs) as required by the King County drainage manual have been satisfied during development of the subdivision and no further drainage review is required for individual building permits.”
- 2) The Declaration of Covenant and Grant of Easement shown in Reference Section 8M of the King County drainage manual shall apply to Tracts _____ and be recorded with the final plat.
- (C) Flow control credits are used for sizing the drainage facility and the plat developer chooses to defer implementation of BMPs to the building permit process. This process would apply for certain types of BMPs such as lot infiltration, limited infiltration, basic dispersion, individual lot rain gardens, permeable pavement, reduced impervious surface within lots areas, etc... The subdivision review will demonstrate the feasibility of certain types of BMPs for all or some lots and design details are shown on the plans. In this case, the recorded plat would contain a note requiring future review of building permits as shown on page 5-14 in the drainage manual. At the time of plat recording, the declaration of covenant and grant of easement must also be recorded for specified lots. The following notes shall be shown on the engineering plans:
- 1) The Declaration of Covenant and Grant of Easement shown in Reference Section 8M of the King County drainage manual shall apply to lots _____ and be recorded with the final plat.

OK SWDM

2) The following note shall be shown on the final recorded plat: "Single family residences and other improvements constructed on lots (lots numbered __, __,) created by this subdivision must implement the flow control best management practices (BMPs) stipulated in the drainage plan declaration of covenant and grant of easement recorded for each lot. Compliance with the stipulation must be addressed in the small project drainage plan submitted for drainage review when application is made for a single family residential building permit for the lot."

(D) Flow control facilities may not be required for certain types of subdivisions which meet the flow control exemption criteria; however, the building permits must still comply with BMP requirements in the drainage manual. In this case, the recorded subdivision must contain notes indicating the need for drainage review of each building permit. Show the following note on the engineering plans: " The following note shall be shown on the final recorded plat: "Single family residences and other improvements constructed on lots created by this subdivision must be reviewed by King County for compliance with best management practices (BMPs) and other applicable drainage standards as required by the King County Surface Water Design Manual.""

5-14 Demonstrate compliance with details for declaration of covenant and grant of easement including site plans and maintenance details. For either of options B or C shown above, the following note shall also be shown on the engineering plans: " The final plat shall record the required maintenance responsibilities and declaration of covenant and grant of easement as described in the drainage manual on page 5-9 for each lot within the subdivision required to implement drainage BMPs.

For any connection of roof downspouts to the local drainage system, use perforated pipe connection per Appendix C, page C-77.

Use of credits by projects within rights-of-way.

5.3 Detention Facilities

Emergency overflow – Evaluate flow path for safe and adequate conveyance

Setbacks

Flow-through system.

5.3.1 Detention Ponds

Dam Safety Compliance

Two cross-sections through pond (one x-section to include control structure)

Review pond details in Figures 5.3.1.A and B.

Designed as flow-through system

Side slopes interior 3H:1V or fenced

Vertical interior retaining walls Stamped by licensed structural civil engineer

For pond walls, min. 25% of perimeter vegetated and no steeper than 3:1.

Minimum top width of berm 6 feet. Berms greater than 4 feet require key excavation.

Primary overflow (control structure with riser).

Secondary Inlet to the control structure.

Emergency Overflow Spillway, 100 year developed peak flow

Soil and compaction requirements described (95% modified proctor)

Access road min. turning radius, maximum grade, min. width, fences or gates.

Pond sign (Figure 5.3.1.D)

Fencing and planting requirements

Setbacks – 5 feet from tow of exterior slope or 5 feet from water surface for cut slope.

5.3.2 Detention Tanks

Flow-through system required

6" of dead storage in tank bottom

Minimum pipe diameter of 36".

Materials and structural stability.

Control structure per Section 5.3.4

Buoyancy

Access risers and CBs are spaced properly with max. depth from finished grade to tank invert shall be 20 feet and accessible by maintenance vehicles.

Hanging sign required for OSHA confined space requirements.

DESIGN REQUIREMENTS (continued)OK SWDM

- 5.3.3 Detention Vaults**
- Structural package submitted for approval
- Flow-through system required
- Review design details per Fig. 5.3.3.A. Note: Grate over sump with 2' x 2' hinged access door (2x2 access door also required for 5x10 grate if over inlet or outlet).
- Access positioned a maximum of 50 feet from any location (if over 3 foot cover use cone riser)
- Access required to inlet pipe and outlet
- For vault under roadway, removable panel located outside travel lanes.
- Hanging sign required for OSHA confined space requirements.
- Removable 5x10 panel if vault greater than 1250 sq. ft. floor area.
- Maximum depth from finished grade to vault invert to be 20 feet.
- Minimum internal height shall be 7 feet, min. width shall be 4 feet min.
- Ventilation pipes provided in all four corners.
- 5.3.4 Control Structures**
- Section and plan view shown to scale
- Orifice size and elevation on plans match calculations. Minimum orifice 0.5".
- (Note: Information Plate details are no longer required – see policy on Web site.)
- 5.4 Infiltration Facilities**
- Appropriate soils logs and testing procedures in TIR.
- Pond bottom at least 3 feet above seasonal high water.
- Permeable soil extends minimum 3 feet below bottom of pond.
- Geotechnical report states suitability and determines design infiltration rate.
- Overflow route identified with 100-yr overflow conveyance.
- Spill Control device upstream of facility.
- Presettling
- Review setback requirements, page 5-60. Design water surface setback of 20 feet from external tract, easement or property lines.
- Show the standard note regarding public rule for in operation facility (see section policies).
- 6.0 Water Quality Design**
- 6.1 Water Quality Menus
- 6.2 Water Quality facilities
- 6.2.2A Water Quality Sequencing
- 6.2.3 Setbacks, slopes and embankments
- 6.2.4 Facility Liners
- 6.2.5 Flow Splitter Designs.
- 6.3 Biofiltration Facility**
- 6.3.1 Biofiltration swales and soil amendments
- 6.3.1.1 Methods of Analysis
- 6.3.1 Swale geometry, plantings, flow conveyance, high flows, velocity
- Road access requirements, page 6-43.
- 6.3.4 Filter strip geometry (slopes).

DESIGN REQUIREMENTS (continued)

OK SWDM

- 6.4 Wetpool Facility Designs**
- Wetpool geometry, 2 cells, minimum depth of first cell 4 feet
- Flowpath length to width ratio 3:1, without internal berms or walls.
- 6.4.1.2 Berms, Baffles, Slopes
- Inlet/Outlet Design
- 6.4.1.1 Access, setbacks, and plantings.
- 6.4.2 Wetvaults**
- 6.4.1.1 Sizing basic or large
- 6.4.1.1 Berms, Baffles, Slopes
- 6.4.2.2 Two cells separated by wall or removable baffle.
- Vault bottom forms a broad "V" with 5% sideslopes.
- Inlet is submerged and outlet pipe designed for 100-year overflow.
- Gravity drain provided if grade allows
- Minimum 50 square feet of grate over second cell.
- 5-foot minimum wet pool depth based on inlet design criteria.
- 6.4.3 Stormwater Wetlands**
- 6.4.3.1 Methods of Analysis
- 6.4.3.2 Design Criteria - Wetland geometry, liners, access, plantings.
- 6.4.4 Combination Detention and Wetpool facilities**
- 6.4.4.1 Methods of Analysis
- 6.4.4.2 Design Criteria - Detention and wetpool geometry, berms, baffles, slopes
- 6.4.4.2 Access and plantings.
- 6.5 Media Filtration Facility Designs**
- 6.5.1 Pre-settling / Pre-treatment
- 6.5.2 Sandfilters – Basic and Large
- 6.5.2.1 Methods of analysis
- 6.5.2.2 Design Criteria – Geometry, overflow/bypass, underdrain, and access.
- 6.5.3 Sandfilter Vaults**
- 6.5.3.2 Design Criteria – geometry, pretreatment, flow-spreading, energy dissipation
- 6.5.3.2 Overflow/bypass, underdrain and access.

Notes:

CLEARING AND GRADING CODE

Chapter 16.82

OK Code

- 16.82.100 Soil Amendments – Sections F and G. Note: For subdivision review, apply soil amendments to disturbed areas outside lots. Building permits will be reviewed separately.
- 16.82.150 Clearing standards for individual lots in rural zones.
- 16.82.152 Clearing standards for subdivisions in rural residential zone.
- 16.82.156 Significant trees within the urban growth area.

Notes:

KING COUNTY ROAD STANDARDS (1993)

GENERAL REQUIREMENTS

KCRS

1.03 A, B Off-site and frontage improvements determined by reviewing agency.
 Note: For grading permits, the required extent of road improvements must be determined during engineering review. For subdivisions, the requirements are determined during preliminary review.

1.03 D Subdivisions must have recorded public access except for private roads.

OK KCRS

1.08 Variances:
 Activity No. _____ Approval Date _____

Design Issues

ROAD CLASSIFICATION TABLE	
Name of Roadway	KCRS Classification

DESIGN REQUIREMENTS

OK KCRS

- 2.03C Maximum Superelevation (2.05)
- 2.03D Horizontal curvature (2.05)
- 2.03E Maximum grade (2.11)
- 2.03F Stopping Sight Distance (2.05, 2.12)
- 2.03G Entering Sight Distance (2.05, 2.13)
- 2.03H Minimum pavement width (Note: Footnote 9 - Neighborhood collectors require 36-feet at approach to intersections with arterials)
- 2.03I Minimum roadway width
- 2.03J Minimum R/W width
- 2.03J Min. R/W width (Footnote 12 and 2.19B - include 1 foot extra ROW behind curb or sidewalk)

KING COUNTY ROAD STANDARDS (1993)**DESIGN REQUIREMENTS (continued)**

- | <u>OK</u> | <u>KCRS</u> | |
|--------------------------|-------------|---|
| <input type="checkbox"/> | 2.03K | Curb or shoulder type road (2.01) |
| <input type="checkbox"/> | 2.03L | Minimum Half-Street width |
| <input type="checkbox"/> | 2.06 | Private Street Design Standards |
| <input type="checkbox"/> | 2.06B7 | Verify maximum potential of 16 lots |
| <input type="checkbox"/> | 2.07 | Half Streets |
| <input type="checkbox"/> | 2.08A | Minimum Cul-de-Sac diameters |
| <input type="checkbox"/> | 2.08B | Maximum Cul-de-Sac length |
| <input type="checkbox"/> | 2.08E | Maximum Cross Slope 6% |
| <input type="checkbox"/> | 2.08F | Bulb island shall be offset 2-feet |
| <input type="checkbox"/> | 2.09 | Alleys |
| <input type="checkbox"/> | 2.09B | Private Access Tracts (Note: Must meet all standards for minor access street, except curb cut driveway design is allowed with property line radii dedication) |
| <input type="checkbox"/> | 2.10A | Angle of intersection between 85 and 95 degrees |
| <input type="checkbox"/> | 2.10A | Intersection curb radius |
| <input type="checkbox"/> | 2.10A | Intersection right-of-way radius |
| <input type="checkbox"/> | 2.10B | Intersection spacing |
| <input type="checkbox"/> | 2.10C | Intersection landing |
| <input type="checkbox"/> | 2.10E | Low Speed Curves |
| <input type="checkbox"/> | 2.11A | Maximum Grade - Use AC for grades >12%, Use PCC for grades >20% |
| <input type="checkbox"/> | 2.11B | Grade Brakes – maximum 1% at intersections |
| <input type="checkbox"/> | 2.12D | Intersection stopping sight distance (125' SSD allowed for local access streets) |
| <input type="checkbox"/> | 2.16 | Bus zones - For arterials and neigh. collectors, the designer shall contact metro. |
| <input type="checkbox"/> | 2.18 | Intersections with State Highways |
| <input type="checkbox"/> | 2.20 | Single access serving more than 100 lots |
| <input type="checkbox"/> | 3.01 | Driveways |
| <input type="checkbox"/> | 3.01 | Joint Use Driveways |
| <input type="checkbox"/> | 3.02A | Sidewalks (both sides for subcollectors and higher classification) |
| <input type="checkbox"/> | 3.02B | Location and width |
| <input type="checkbox"/> | 3.05 | Handicapped access ramp (Use updated detail from KC Road Engineer, 3/26/04) |
| <input type="checkbox"/> | 3.09 | School Access - asphalt walkway, sidewalk, or delineated shoulder. |
| <input type="checkbox"/> | 3.10 | Bikeways |
| <input type="checkbox"/> | 3.11 | Equestrian Facilities |

KING COUNTY ROAD STANDARDS (1993)**DESIGN REQUIREMENTS (continued)**

- | <u>OK</u> | <u>KCRS</u> | |
|--------------------------|-------------|---|
| <input type="checkbox"/> | 4.01 | Road Section and Surfacing (drawings 1-001 – 1-006)
Note: Neighborhood collectors require 3-inch asphalt concrete. |
| <input type="checkbox"/> | 4.01F | Perform saw cut of pavement at fog line |
| <input type="checkbox"/> | 4.01F | Pavement overlay for widening and channelization (show special note as approved by Development Engineer - see Web site) |
| <input type="checkbox"/> | 4.02 | Residential street design |
| <input type="checkbox"/> | 4.02 | Poor subgrade evaluation |
| <input type="checkbox"/> | 4.03 | Arterial pavement design |
| <input type="checkbox"/> | 4.05 | Pavement markings, channelization, and tapers (Requires DOT review) |
| <input type="checkbox"/> | 5.01 | Rock facings (Dwg. Nos. 5-004 -- 5-007) |
| <input type="checkbox"/> | 5.02 | Side slopes, generally 2H:1V |
| <input type="checkbox"/> | 5.03 | Street trees and landscaping |
| <input type="checkbox"/> | 5.04 | Mail boxes (Dwg. Nos. 5-010 – 5-012) |
| <input type="checkbox"/> | 5.05 | Street illumination |
| <input type="checkbox"/> | 5.06 | Survey Monuments to be disturbed are shown |
| <input type="checkbox"/> | 5.07 | Roadway Barricades |
| <input type="checkbox"/> | 5.08 | Bollards for walkways or maintenance roads |
| <input type="checkbox"/> | 5.11 | Roadside obstacles (Note: If variance required for utility pole, the utility company must apply for the variance.) |
| <input type="checkbox"/> | 6.00 | Bridges (minimum width 28-feet) |
| <input type="checkbox"/> | 7.02A-D | Grass-lined, pipe or rock lined, special designed ditch |
| <input type="checkbox"/> | 7.03A | Minimum pipe size 12-inch diameter |
| <input type="checkbox"/> | 7.03L | Beveled ends for culverts in ROW |
| <input type="checkbox"/> | 7.04A | Maximum spacing between catch basins |
| <input type="checkbox"/> | 7.04B | Inlets not allowed for collecting water from road surfaces. |
| <input type="checkbox"/> | 7.04E | CBs taller than 5' (grate to invert) are Type II, Max. depth 12-feet per Dwg. 2-005 |
| <input type="checkbox"/> | 7.05A | Vaned grates |
| <input type="checkbox"/> | 7.05B | Through curb inlet frames for sag curves and intersections > 4%.
Notes: a) Through curb inlet not used on rolled curb
b) See Web site for policy on three flanking inlets |
| <input type="checkbox"/> | 7.05D | Use <u>round</u> locking covers for catch basins in roadway which do not collect runoff. |
| <input type="checkbox"/> | 7.05E | All covers and grates shall be locking |
| <input type="checkbox"/> | 8.02 | Utility pole locations and other obstacles. |
| <input type="checkbox"/> | 8.03B | Open cuts on existing roadways, patch requirements |

Notes:

Check out the DDES Web site at www.kingcounty.gov/permits