



CITY OF KIRKLAND

Department of Public Works

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MEMORANDUM

To: Kurt Triplett, City Manager

From: Kelli Jones, Surface Water Engineer
Jenny Gaus, Surface Water Engineering Supervisor
Kathy Brown, Public Works Director

Date: October 20, 2016

Subject: New Surface Water Design Manual Addendum Decision

RECOMMENDATION:

It is recommended that Council direct staff on which alternative Addendum to the 2016 King County Surface Water Design Manual Policy (Attachment A and Attachment B) to include in the Public Works Pre-Approved Plans and Policies.

BACKGROUND AND DISCUSSION:

1. Introduction

Staff provided background on the City's surface water design requirements at the [July 5th regular Council meeting](#), [September 20th study session](#) and [October 18th regular Council meeting](#). At the October 18th regular Council meeting, the Council unanimously adopted Ordinance O-4538, which adopts the King County package, which includes the following components:

- [2016 King County Surface Water Design Manual](#) (KCSWDM)
- [2016 King County Stormwater Pollution Prevention Manual](#)
- City of Kirkland Addendum to the 2016 KCSWDM (Addendum) which includes implementation details specific to the City, including whether flow control facilities are required for projects with less than 10,000 square feet of proposed impervious. Please see discussion of the Addendum below.
- Cross-reference between KMC and King County Code Chapters [9.04](#), [9.12](#) and [16.82](#)

This ordinance will go into effect on January 1, 2017. Prior to that time, staff will need to finalize the Addendum.

The Addendum is part of the Pre-Approved Plans and Policies that are developed and adopted into practice by the Public Works Department. When updates to the Pre-Approved Plans and Policies involve significant policy considerations, the Public Works Director requests Council direction prior to finalizing and implementing the updated Pre-Approved Plans and Policies. At the October 18th City Council meeting, the Public Works Director sought Council direction on two alternatives to the Kirkland Addendum (Attachment A and Attachment B) regarding the concern about requiring storm water detention on small projects (less than 10,000 square feet of proposed impervious surface).

Council was split in their direction (3 for Alternative A, 3 for Alternative B). Council decided to return for a discussion when 7 Council members are present, rather than having the Public Works Director make the decision. If Council remains split in its preference, the Public Works Director will need to make a decision on which alternative will be implemented in the Pre-Approved Plans in time for a January 1, 2017 implementation. The January 1 deadline is a requirement of the City's National Pollutant Discharge Elimination System (NPDES) Permit. Reasonable time will need to be allowed for public and developer outreach prior to the end of the year.

2. Alternatives for the Kirkland Addendum to the 2016 KCSWDM

The Addendum provides details on how the KCSWDM is to be implemented in Kirkland. This includes process information (i.e., review types and thresholds), revisions, and clarifications. Revisions must be made with caution: The NPDES Permit requires that jurisdictions adopt a "package" that is equivalent to the Ecology Manual. This is why staff put forward the King County Package for adoption as detailed above. However, there are a few requirements in the KCSWDM that are above-and-beyond requirements in the Ecology Manual. Some of these items are considered by Ecology to be part of the overall King County package, and therefore cannot be modified, but staff has verified with Ecology that the following item could be modified at the City's discretion:

- Allow use of existing conditions rather than forested conditions in calculating whether a project qualifies for the 0.15 cubic-foot-per-second (cfs) peak flow exception¹.

The result of this change, which is reflected in Attachment B, is that more projects would qualify for the 0.15 cfs exception, meaning fewer projects would need to provide flow control facilities. We estimate that this would impact small projects (less than 10,000 square feet of proposed impervious) that are creating approximately between 7,000 and 10,000 square feet of impervious surface.

Due to the largely built-out nature of Kirkland's single-family residential areas, Kirkland has many of these small projects occurring now, and likely in the future, in the form of small short-plats for single-family homes. Thus, this policy choice was considered significant and presented to Council for direction. In 2015, there were approximately 31 small projects, and staff estimates that 13 of these 31 projects would have needed to have provided flow control under the Attachment A option, but would not have had that same requirement under the Attachment B option. Looking at the Capacity Analysis performed as part of the 2035 Comprehensive Plan, it appears that there are approximately 443 properties out of 1,200 that are reasonably likely to develop that could be impacted by this decision.

Two versions of the Addendum reflect two different approaches to the 0.15 cfs exception:

- Attachment A – Alternative 1: Adopts the 2016 KCSWDM with the implementation and clarification details explained above. Small projects creating approximately between 7,000 square feet to 10,000 square feet of proposed impervious would be required to provide flow control facilities.
- Attachment B – Alternative 2: Adopts the 2016 KCSWDM with an additional implementation detail regarding flow control requirements for the small projects. Small projects creating

¹ See page 1-46 of the [2016 King County Surface Water Design Manual](#). To summarize, the flow control facility requirement is waived for any threshold discharge area in which there is no more than a 0.15 cfs difference in the sum of the developed 100-year peak flows and historic (forested) site conditions 100-year peak flows.

approximately between 7,000 square feet to 10,000 square feet of proposed impervious would be exempt from providing flow control facilities.

As mentioned during the study session, there are costs and benefits to consider when deciding whether to require flow control facilities for small projects. Below are some factors to consider with Attachment A, which would require flow control facilities on the small projects in question:

- Increased flows created by small projects would be detained, protecting downstream infrastructure and stream habitat.
- These potential small development sites are scattered throughout the City. Given current development patterns, flow control volume provided by these projects could provide a significant percentage of the overall flow control volume, depending on where these developments occur. (Although current development patterns suggest that these sites could provide a significant percentage of overall flow control volume, there is also a chance that developments might not occur as expected.)
- This requirement would significantly increase construction costs for small projects. This may impact land prices; the need to provide stormwater facilities could reduce the price that a developer is willing to pay for a property.
- Additional maintenance and inspection by the City will be required, which will require more resources over time. Under current City practice, facilities that serve residential properties are maintained by the City provided that they are either in the right of way or are in a tract or easement dedicated to the City. Thus facilities provided under the Attachment A option would be maintained by the City as long as an easement or tract is provided or the facility is placed in the right of way. Facilities would need to be tracked in the maintenance management system, inspected once per year, and cleaned as needed (probably once every 4 years based on data for similar facilities that already exist in the City).
- Approximately 10-15 of these small facilities would be added to the City's storm system each year (if rates of development are similar to 2015)

Below are concepts for consideration associated with Attachment B, which would not require flow control facilities on the small developments in question:

- The significant cost of control facilities to property owners and/or developers money when property is redeveloped is avoided.
- The City does not incur additional maintenance costs to inspect and maintain these facilities.
- Downstream resources would have a lower level of protection from erosion and channel degradation. The degree to which this lower level of protection would have a measurable impact is unknown. Over a period of years, the cumulative impact of this lower level of protection, together with other factors, could potentially be significant.
- It is possible that there will be increased flooding downstream of newly developed areas if flow control is not provided and downstream pipes are under-capacity. Again, it is not possible to quantify this concern at this time; however, the cumulative impact over a period of years of development could be significant.
- If downstream impacts prove to be significant over time, the City could be tasked with providing this volume of flood protection at a later date, which could cost 2 – 3 times more than building these facilities now because City construction costs are higher than those for private development, because of the need to acquire land, and because delay would result in cost escalation.
- Regional facilities to replace the flow control volume of these facilities (and beyond) could be challenging to site because these small projects are scattered throughout the City, and because the timing of specific development projects is unknown.

Staff recommends adoption of Attachment A because this provides the highest degree of protection for downstream resources and reduces the risk of flooding. The Council-preferred alternative will be incorporated in the pre-approved Plans.

With either policy, a study (proposed as part of the 2017-2018 budget) would analyze the differences between the manuals, including the Addendum, and a change can be made at a later date.

3. Next Steps

With the updates to the KMC, the City will remain in compliance with the NPDES Permit. The effective date of Ordinance O-4538, as adopted by the City Council on October 18th, 2016, is January 1, 2017. Staff will use the time between adoption and the effective date to prepare for implementation: to provide and attend training; to update the Pre-Approved Plans and Policies with details associated with the King County package; and to conduct public and developer outreach. Service packages are being proposed as part of the 2017-2018 budget for staff and consultant resources associated with the King County package.

Attachment A – Alternative 1: Draft Kirkland Addendum to the 2016 KCSWDM (flow control for small projects)

Attachment B – Alternative 2: Draft Kirkland Addendum to the 2016 KCSWDM (no flow control for small projects)

Attachment C – 2-lot short plat example



Addendum to the 2016 King County Surface Water Design Manual

Effective date: January 1, 2017

Introduction

This addendum to the 2016 King County Surface Water Design Manual (KCSWDM) applies to development and redevelopment proposals within the City of Kirkland. The KCSWDM has adopted requirements of the Clean Water Act, the Endangered Species Act, and the State Growth Management Act. This addendum includes minor revisions to the KCSWDM to address the differences between King County's and the City's organization and processes. No major substantive changes have been made to the KCSWDM in order to maintain equivalency in review requirements and level of protection provided by the manual. It is the City of Kirkland's intent to maintain equivalency with the 2012 Ecology Stormwater Management Manual for Western WA, as amended in 2014 (Ecology Manual).

Addendum Organization

The information presented in this addendum is organized as follows:

I. Terminology: At times King County and the City of Kirkland use different terminology to describe or to refer to equivalent subject matter. This section identifies these terms and the City of Kirkland's equivalent terminology.

II. Key Revisions: This section specifically identifies the minor revisions the City has made to the KCSWDM.

III. Code Reference Tables: King County code is referenced in many places throughout the KCSWDM. This section identifies these county code references and states the equivalent city code where applicable.

IV. Mapping: The City of Kirkland equivalents to the Flow Control Applications map, Landslide Hazard Drainage Areas map, and Sensitive/Critical Areas map are available online at:

http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm

V. Reference Materials: This section identifies which reference materials provided in the KCSWDM are applicable and which are not. It also identifies equivalent City of Kirkland reference materials available.

Note: Clarifications and interpretations to the KCSWDM or this addendum are documented and made available through City Regulatory Code and the Public Works Pre-Approved Plans.

I. Terminology

At times King County and the City of Kirkland use different terminology to describe or to refer to equivalent subject matter. This section identifies these terms and the City of Kirkland's equivalent terminology.

- **Critical Drainage Area (CDA).** This definition does not apply in the City of Kirkland.
- **Department of Permitting and Environmental Review (DPER).** All references to DPER conducting drainage reviews or determinations shall refer to City of Kirkland Development Services.
- **Department of Natural Resources and Parks (DNRP).** All references to DNRP shall refer to City of Kirkland Parks, Planning and Community Development and/or Public Works Departments.
- **Director.** All references to the Director shall refer to the City of Kirkland Public Works Director.
- **King County.** All references to King County shall refer to the City of Kirkland (COK).
- **King County Code (KCC).** All references to the KCC shall refer to the City of Kirkland Municipal Code (KMC). Check code reference table for equivalent code sections.
- **King County Designated/Identified Water Quality Problem.** This determination is made on a case-by-case basis in the City of Kirkland.
- **King County Road Standards.** All references to the King County Road Standards shall refer to the City of Kirkland Public Works Pre-Approved Plans.
- **Overflow Pipe:** A pipe shall be considered an overflow if sufficient storage is provided below the invert of the pipe to meet flow control BMP requirements. In these situations, the flow control BMP will be allowed the credit associated with the BMP. Per the new impervious surface definition in the 2016 KCSWDM, if the pipe is used as an underdrain, the area will be counted as new or replaced impervious surface area.
- **Project Size.** The project size is based on the parcel(s) and/or right-of-way included in the project scope. It will be assumed the area disturbed by development will encompass the entire parcel(s) and right-of-way, unless there is an easement, defined stream/wetland and buffer, NGPE, or other condition which limits the amount of developable area.
- **Sensitive Area Folio.** Refer to City of Kirkland Sensitive Areas Map at: http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm
- **Water and Land Resources (WLR) Division.** All references to the WLR Division shall refer to the City of Kirkland Surface Water Management Group.
- **Zoning Classifications: Where the KCSWDM references Agricultural (A) Zoning, Forest (F) Zoning, or Rural (R) Zoning.** These zoning classifications are intended for areas outside of the Urban Growth Boundary, therefore the City of Kirkland contains no equivalent zoning. Refer to city zoning maps to determine which zoning classifications apply to your project. The City of Kirkland Land Use Map can be found at: http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm

II. Key Revisions

This section includes minor revisions and clarifications to the 2016 KCSWDM to address the differences between King County's and the City of Kirkland's organization and processes, as well as to ensure equivalency with the 2014 Ecology Manual. Unless specifically noted as a clarification, the items below are minor revisions.

Chapter 1: Drainage Review and Requirements

Applies with the revisions stated below:

If a project uses multi-family zoning and density, then multi-family stormwater requirements apply to the entire project even if the project includes detached single family homes.

1.1 Drainage Review

Criteria for review levels are defined in the COK Public Works Pre-Approved Plans, Policies D-2 and D-3. Drainage review levels used in the City of Kirkland are listed below:

- Basic drainage review
- Simplified drainage review
- Targeted drainage review
- Full drainage review

When determining the level of drainage review, the following items apply:

- Clarification: Areas that change from existing gravel to paved surface will be counted as new impervious surface area, not replaced impervious area.
- Clarification: Flow control BMPs cannot be used to reduce the level of drainage review, but can be used to reduce the amount of flow control required. For example, proposed driveways and roads will always be counted as fully impervious for the drainage review level, but permeable pavement can be used to meet flow control requirements.

1.2 Core Requirements

1.2.2 Core Requirement #2: Offsite Analysis

1.2.2.1 Downstream Analysis

Exclude the section titled Downstream Water Quality Problems Requiring Special Attention. Water quality problems in the City of Kirkland are addressed through educational programs and source control.

1.2.2.1.1 Downstream Drainage Problems Requiring Special Attention

For item 4, Potential Impacts to Wetland Hydrology problem, refer to COK Public Works Pre-Approved Plans, Policy D-13, to determine the level of review needed for the wetland, reporting information required, and potential modelling to determine impacts.

1.2.3 Core Requirement #3: Flow Control

Clarification: Historic (forested) conditions will be used for pre-developed runoff modeling of all projects in Level 2 flow control areas.

A City of Kirkland flow control map is located at:

http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm

The City will accept non-infiltrating bioretention (planter boxes) for Basic Flow Control (Level 1), provided the design meets the criteria set forth in the City of Seattle Stormwater Manual, Volume 3, Section 5.8.2). The hydraulic restriction layer for planters shall be made of concrete. The planters shall contain plants from the Seattle Green Factor Plant List.

Projects triggering a Full Project Drainage Review proposing infiltration/bioretention facilities or pervious pavement to meet Level 1 or 2 flow control or for onsite flow control BMPs require a soils report per COK Pre-Approved Plans, Policy D-8.

1.2.3.1 Area-Specific Flow Control Facility Requirement

Regarding Exceptions to Flow Control Requirements in both Basic (#1) and Conservation (#2) Flow Control Areas, flow control can be waived if a project generates less than a 0.15 cfs increase in 100-yr peak flows using a 15-minute time step. The intent to still allow the 0.10 cfs increase at the 100-yr peak flow with a 1-hour time step were for areas that do not include a 15-minute time step in the approved model. All areas in Kirkland have a 15-minute time step, and therefore must use 15-minute time step for the exception.

Clarification: Only BMPs listed on Table 1.2.9.A (page 1-95) can be used on a project to meet the 0.15 cfs limit unless otherwise approved through the adjustment process, Policy D-11. For example, products like infiltrator chambers are not equivalent to gravel filled infiltration trenches in Appendix C and shall submit an adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans to show equivalence.

Clarification: To meet the requirements of the 0.15 cfs exception, total pre-developed and post-developed areas must match.

Clarification: Regarding Target Surfaces in Conservation Flow Control Areas to be mitigated, vegetated areas in easements and/or tracts must be modeled from forested in the pre-developed condition to lawn in the developed condition, unless the area is placed in a tract or easement that will preserve the native vegetation during and after construction.

Clarification: Threshold and modeling calculations of pervious and impervious areas, turf areas, including lawn or synthetic turf, that do not have an underdrain are considered 100% pervious. Areas that have an underdrain are considered 100% impervious.

1.2.4 Core Requirement #4: Conveyance System

1.2.4.3 Conveyance System Implementation Requirements

G. Spill Control

City of Kirkland will only require spill control requirements on commercial and multifamily projects that do not require flow control. Single family residential will install a tee/turn down elbow per (COK D.13).

1.2.6 Core Requirement #6: Maintenance and Operations

Refer to KMC 15.52.070 for City Acceptance of new drainage facilities.

If the project proposes a propriety system not covered in the 2016 KCSWDM, the applicant shall submit and adjustment to the manual per Policy D-11 in the COK Public

Works Pre-Approved Plans. The adjustment should include inspection and maintenance standards, including frequency of inspections and a log of maintenance activity.

1.2.7 Core Requirement #7: Financial Guarantees and Liability

This section is replaced by KMC 15.52.080, Bonds.

1.2.8 Core Requirement #8: Water Quality

1.2.8.1 A. Basic WQ Treatment Areas

Reductions of water quality treatment level from Enhanced to Basic, Exception #4, is not allowed in the City of Kirkland. Projects in Kirkland cannot reduce the level of required water quality treatment by prohibiting the use of leachable metals on the property.

For a bioretention to meet enhanced basic water quality treatment, it must be designed, using an approved continuous runoff model, to infiltrate 91% of the influent runoff, consistent with the 2014 Ecology Manual, and designed with no underdrain and designed per 2014 Ecology Manual BMP T7.30.

The City will accept all water quality treatment facility-types identified in the 2014 Ecology Manual, with the following additions and alterations:

- Emerging technologies will be considered on a case-by-case basis, via adjustment process, Policy D-11 in the COK Public Works Pre-Approved Plans, provided the product has received a level of use designation from WA State Dept. of Ecology (see the following website):

<http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html>

1.2.8.1 B. Sensitive Lake WQ Treatment Areas

This section does not apply to the City of Kirkland.

1.2.8.1 C. Sphagnum Bog WQ Treatment Areas

This section does not apply to the City of Kirkland.

1.2.9 Core Requirement #9: Flow Control BMPs

1.2.9.1 Flow Control BMP Requirements Overview

A. Target Surfaces

If a project or threshold discharge area of a project meets the Direct Discharge Exemption per Section 1.2.3.1, soil amendment is required for new pervious areas and flow control BMPs need to be evaluated in the following order for impervious areas:

1. Full Infiltration
2. Basic Dispersion

If basic dispersion is found to be a feasible BMP, limited infiltration, bioretention and/or permeable pavement may be used instead of basic dispersion to meet the flow control BMP requirement. If basic dispersion is found to be infeasible, perforated pipe connection is not required in the City and the flow control BMP requirement is considered met.

1.2.9.2 Individual Lot BMP Requirements

To meet Requirement #3, mitigating impervious surface to the maximum extent feasible, in the public right-of-way for both Small Lot BMP Requirements and

Large Lot BMP Requirements, the BMPs must be evaluated in the order listed in the King County Manual:

1. Full Infiltration
2. Limited Infiltration or Bioretention
3. Permeable Pavement

Requirement #5, implementation of Reduced Impervious Surface Credit and Native Growth Retention Credit, for both Small Lot BMP Requirements and Large Lot BMP Requirements is not required in the City of Kirkland. King County has high lot coverage so the reduction of 10% lot coverage to meet the flow control BMP requirement is achievable. The City of Kirkland justifies meeting this requirement for implementation with an already lower lot coverage than King County (typically 70% lot coverage in King County compared to 50% lot coverage in Kirkland).

Requirement #7, installation of perforated pipe connection, is not required in the City of Kirkland. If the applicant has reached this level, it is viewed that LID is infeasible on the site and do not want to introduce additional water into the ground.

1.2.9.2.3 Large Rural Lot BMP Requirements

This section does not apply to the City of Kirkland.

1.2.9.4.1 Use of Credit by Subdivision Projects

A. Subdivision Implementation of BMPs within Road Right-of-Way Item #3: If the road right-of-way will be maintained by the City of Kirkland, the flow control BMPs must be approved by the public works department. Refer to section 1.2.9.2, Requirement #3, in the Addendum for the order of BMP evaluation in the right-of-way.

1.3.1 Special Requirement #1: Other Adopted Area-Specific Requirements

Projects located in the Holmes Point Area must also comply with lot coverage and other standards included in the Kirkland Zoning Code, *Chapter 70 – Holmes Point Overlay Zone*.

1.3.3 Special Requirement #3: Flood Protection Facilities

This section does not apply to the City of Kirkland.

1.4 Adjustment Process

Refer to the Surface Water Adjustment Process defined in COK Public Works Pre-Approved Plans, Policy D-11.

Chapter 2 Drainage Plan Submittal

Applies with the revisions stated below:

2.1 Plans Required for Drainage Review

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.2 Plans Required with Initial Permit

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.3 Drainage Review Plan Specifications

2.3.1.1 Technical Information Report

An Operation and Maintenance Manual is required for all privately maintained stormwater detention and water quality facilities, and is submitted as part of the permit application.

2.3.1.2 – Site Improvement Plan

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.3.1.3 – ESC Plan Section

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.3.1.4 – Stormwater Pollution Prevention and Spill (SWPPS) Plan

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-12.

2.3.2 – Projects in Targeted Drainage Review (TDR)

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.4 Plans Required After Drainage Review (pg 2-35)

Refer to the COK Public Works Pre-Approved Plans, policies G-7, D-2, and D-3.

Chapter 3 Hydrologic Analysis & Design

Applies with the revisions stated below:

Refer to Policy D-14, WWHM 2012 Guidance, for additional information on sizing requirements and inputs for WWHM 2012.

3.2.2.1 Generating Time Series

Calculation of Impervious Area

For residential development, the assumed impervious coverage shall be the maximum impervious coverage permitted by zoning code, typically 50% lot coverage except for the Holmes Point Overlay Zone (not automatically 4,000sf as in the 2016KCSWDM). The assumed impervious can only be less if a covenant, sensitive area, or native growth protection easement exists.

If an existing house will remain during redevelopment, the following two options are available to address the storm drainage from that house/lot:

1. Evaluate the proposed lot as new/replaced impervious area at the required lot coverage as part of the subdivision drainage technical information report, OR
2. Remove the lot from calculations as non-targeted surfaces. If this method is taken, the existing home cannot be demolished and redeveloped within 5 years of the recording of the short plat. If the home is demolished and redeveloped within that time period, a storm drainage analysis must be provided for the entire subdivision including the lot at full lot coverage as part of the building permit. The following note must be included on the subdivision:

Redevelopment of Lot_: Since the home currently constructed on the existing parcel that is proposed to remain as Lot_ has not been evaluated as part of the storm drainage analysis, the existing home cannot be demolished and redeveloped within 5 years of the recording of this plat. If the home is

demolished and redeveloped within that time period, a storm drainage analysis must be provided for the entire subdivision including Lot_ at full impervious coverage.

3.3.2 Flow Control Design Using the Runoff File Method Evaluating Flow Control Performance

Clarification: If having difficulties meeting the lower part of the duration curve (50% of the 2-year to the 2-year), refer to footnote 10 in the 2016 KCSWDM.

Chapter 5 Flow Control Design

Applies with the revisions stated below:

5.2.1 General Requirements for Infiltration Facilities

For any soil investigation or reporting information, refer to COK Public Works Pre-Approved Plans, Policy D-8.

5.1 Detention Facilities

Use details located in the COK Public Works Pre-Approved Plans, if available.

5.1.4.1 Control Structures Design Criteria

A removable screen is required when the bottom orifice size is 1" or less. The screen shall be made from stainless steel mesh, 8 inch depth, and attached with a minimum of 3 stainless steel screws. The size of the mesh openings must be less than the orifice diameter (0.25 inch mesh typical).

5.1.5 Parking Lot Detention

Parking lot detention is not allowed in the City of Kirkland.

Chapter 6 Water Quality Design

Applies with the revisions stated below:

Use details located in the COK Public Works Pre-Approved Plans, if available.

6.1.2 Enhanced Basic Water Quality Menu

For a bioretention to meet enhanced basic water quality treatment, it must be designed, using an approved continuous runoff model, (WWHM 2012 or MGS Flood) to infiltrate 91% of the influent runoff without an underdrain and per Ecology Manual BMP T7.30.

Appendix A: Maintenance Requirements for Flow Control, Conveyance, and Water Quality Facilities

If the project proposes a propriety system not covered in the 2016 KCSWDM, the applicant shall submit and adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans. The adjustment should include inspection and maintenance standards, including frequency of inspections and a log of maintenance activity.

Appendix B: Master Drainage Plan Objective, Criteria and Components, and Review Process

This Appendix does not apply to projects in the City of Kirkland.

Appendix C: Small project Drainage Requirements

Applies with the revisions stated below:

C.1.3 Application of Flow Control BMPs

For any soil investigation or reporting information, refer to COK Public Works Pre-Approved Plans, Policy D-8.

C.2.2.3 Use of Gravel Filled Trenches for Full Infiltration

Products like infiltrator chambers are not equivalent to gravel filled infiltration trenches in Appendix C. If the project would like to use proprietary items, the applicant shall submit an adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans.

C.2.7.4 Permeable Pavers

Sand is not allowed in between or below permeable pavers in the City of Kirkland. No. 8 Aggregate shall be used in openings between pavers, and in the bedding course.

C.2.7.6 Grassed Modular Grid Pavement

Modular grid pavement with grass planted in the openings or in a thin layer of soil over the grid material cannot be used for single family residential driveways that are used on a daily basis in the City of Kirkland. Past performance shows the grass does not grow well when subject to vehicular traffic on a daily basis.

Appendix D: Construction Stormwater Pollution Prevention Standards

Use details located in the COK Public Works Pre-Approved Plans, if available.

D.2.4.2 Wet Season Requirements

Refer to ESC Notes in the COK Public Works Pre-Approved Plans.

III. Code Reference Tables

King County Code is referenced in many places throughout the KCSWDM. The following table identifies the county code references and states the equivalent City of Kirkland code where applicable (Kirkland Municipal Code is KMC and Kirkland Zoning Code is KZC). Policies are located in the Public Works (PW) Pre-Approved Plans.

King County Code Reference	Subject of Reference	COK Code/Policy Equivalent	Comment
KCC 2.98	Adoption procedures and Critical Drainage Areas	KZC Chapter 90	
Title 9	Surface Water Management	KMC 15.52	
KCC 9.04	Surface Water Run-off policy	KMC 15.52	
KCC 9.04.020	Definitions	KMC 15.04	
KCC 9.04.030	Drainage Review	PW Pre-Approved Plans	Policy D-2, D-3
KCC 9.04.050	Drainage Review-requirements	PW Pre-Approved Plans	Policy D-2, D-3
KCC 9.04.060	Critical drainage and/or erosion areas	KZC 85, KZC 90	
KCC 9.04.070	Engineering plans for the purposes of drainage review	KMC 15.52.050, KMC15.52.060 and PW Pre-Approved Plans	Policy D-2, D-3, D-11

KCC 9.04.090	Construction timing and final approval	KMC 15.52.060	Policy D-12
KCC 9.04.095	Vesting for lots in final short plats	KMC 22.20.370	
KCC 9.04.100	Liability Requirements	KMC 15.52.080	
KCC 9.04.115	Drainage Facilities accepted by King County	KMC 15.52.070	
KCC 9.04.120	Drainage Facilities NOT accepted by King County	KMC 15.52.070	
KCC 9.12.025	Prohibited discharges in the water quality section	KMC 15.52.090	Policy D-4
KCC 9.12	Water Quality	KMC 15.52.090 – 15.52.110	
KCC 9.12.035	Water Quality: Stormwater Pollution Prevention Manual Adoption	KMC, 15.52.090, KMC 15.52.100	Policy D-4
KCC 16.82	Erosion and Sediment Control, Clearing and Grading	KMC 15.52.060	
KCC 16.82.095(A)	ESC standards: seasonal limitation period	PW Pre-Approved Plans	Erosion/Sediment Control Plan Notes
KCC 16.82.100(F)	Grading standards: preservation of duff layer	KZC Chapter 95	
KCC 16.82.100(G)	Grading Standards: soil amendments	KZC Chapter 95, Pre-approved Plans	
KCC 16.82.150	Clearing standards in rural zone	Not applicable	COK does not contain rural zones
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1. Base Map
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V. Reference Materials

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 - ~~D (VACANT)~~
 - E Roofing Erodible or Leachable Materials
- ~~12. (VACANT)~~
- ~~13. (VACANT)~~
- 14. Supplemental Approved Facilities
 - A Approved Proprietary Facilities
 - B Approved Public Domain Facilities

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Addendum to the 2016 King County Surface Water Design Manual

Effective date: January 1, 2017

Introduction

This addendum to the 2016 King County Surface Water Design Manual (KCSWDM) applies to development and redevelopment proposals within the City of Kirkland. The KCSWDM has adopted requirements of the Clean Water Act, the Endangered Species Act, and the State Growth Management Act. This addendum includes minor revisions to the KCSWDM to address the differences between King County's and the City's organization and processes. No major substantive changes have been made to the KCSWDM in order to maintain equivalency in review requirements and level of protection provided by the manual. It is the City of Kirkland's intent to maintain equivalency with the 2012 Ecology Stormwater Management Manual for Western WA, as amended in 2014 (Ecology Manual).

Addendum Organization

The information presented in this addendum is organized as follows:

I. Terminology: At times King County and the City of Kirkland use different terminology to describe or to refer to equivalent subject matter. This section identifies these terms and the City of Kirkland's equivalent terminology.

II. Key Revisions: This section specifically identifies the minor revisions the City has made to the KCSWDM.

III. Code Reference Tables: King County code is referenced in many places throughout the KCSWDM. This section identifies these county code references and states the equivalent city code where applicable.

IV. Mapping: The City of Kirkland equivalents to the Flow Control Applications map, Landslide Hazard Drainage Areas map, and Sensitive/Critical Areas map are available online at:

http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm

V. Reference Materials: This section identifies which reference materials provided in the KCSWDM are applicable and which are not. It also identifies equivalent City of Kirkland reference materials available.

Note: Clarifications and interpretations to the KCSWDM or this addendum are documented and made available through City Regulatory Code and the Public Works Pre-Approved Plans.

I. Terminology

At times King County and the City of Kirkland use different terminology to describe or to refer to equivalent subject matter. This section identifies these terms and the City of Kirkland's equivalent terminology.

- **Critical Drainage Area (CDA).** This definition does not apply in the City of Kirkland.
- **Department of Permitting and Environmental Review (DPER).** All references to DPER conducting drainage reviews or determinations shall refer to City of Kirkland Development Services.
- **Department of Natural Resources and Parks (DNRP).** All references to DNRP shall refer to City of Kirkland Parks, Planning and Community Development and/or Public Works Departments.
- **Director.** All references to the Director shall refer to the City of Kirkland Public Works Director.
- **King County.** All references to King County shall refer to the City of Kirkland (COK).
- **King County Code (KCC).** All references to the KCC shall refer to the City of Kirkland Municipal Code (KMC). Check code reference table for equivalent code sections.
- **King County Designated/Identified Water Quality Problem.** This determination is made on a case-by-case basis in the City of Kirkland.
- **King County Road Standards.** All references to the King County Road Standards shall refer to the City of Kirkland Public Works Pre-Approved Plans.
- **Overflow Pipe:** A pipe shall be considered an overflow if sufficient storage is provided below the invert of the pipe to meet flow control BMP requirements. In these situations, the flow control BMP will be allowed the credit associated with the BMP. Per the new impervious surface definition in the 2016 KCSWDM, if the pipe is used as an underdrain, the area will be counted as new or replaced impervious surface area.
- **Project Size.** The project size is based on the parcel(s) and/or right-of-way included in the project scope. It will be assumed the area disturbed by development will encompass the entire parcel(s) and right-of-way, unless there is an easement, defined stream/wetland and buffer, NGPE, or other condition which limits the amount of developable area.
- **Sensitive Area Folio.** Refer to City of Kirkland Sensitive Areas Map at: http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm
- **Water and Land Resources (WLR) Division.** All references to the WLR Division shall refer to the City of Kirkland Surface Water Management Group.
- **Zoning Classifications: Where the KCSWDM references Agricultural (A) Zoning, Forest (F) Zoning, or Rural (R) Zoning.** These zoning classifications are intended for areas outside of the Urban Growth Boundary, therefore the City of Kirkland contains no equivalent zoning. Refer to city zoning maps to determine which zoning classifications apply to your project. The City of Kirkland Land Use Map can be found at: http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm

II. Key Revisions

This section includes minor revisions and clarifications to the 2016 KCSWDM to address the differences between King County's and the City of Kirkland's organization and processes, as well as to ensure equivalency with the 2014 Ecology Manual. Unless specifically noted as a clarification, the items below are minor revisions.

Chapter 1: Drainage Review and Requirements

Applies with the revisions stated below:

If a project uses multi-family zoning and density, then multi-family stormwater requirements apply to the entire project even if the project includes detached single family homes.

1.1 Drainage Review

Criteria for review levels are defined in the COK Public Works Pre-Approved Plans, Policies D-2 and D-3. Drainage review levels used in the City of Kirkland are listed below:

- Basic drainage review
- Simplified drainage review
- Targeted drainage review
- Full drainage review

When determining the level of drainage review, the following items apply:

- Clarification: Areas that change from existing gravel to paved surface will be counted as new impervious surface area, not replaced impervious area.
- Clarification: Flow control BMPs cannot be used to reduce the level of drainage review, but can be used to reduce the amount of flow control required. For example, proposed driveways and roads will always be counted as fully impervious for the drainage review level, but permeable pavement can be used to meet flow control requirements.

1.2 Core Requirements

1.2.2 Core Requirement #2: Offsite Analysis

1.2.2.1 Downstream Analysis

Exclude the section titled Downstream Water Quality Problems Requiring Special Attention. Water quality problems in the City of Kirkland are addressed through educational programs and source control.

1.2.2.1.1 Downstream Drainage Problems Requiring Special Attention

For item 4, Potential Impacts to Wetland Hydrology problem, refer to COK Public Works Pre-Approved Plans, Policy D-13, to determine the level of review needed for the wetland, reporting information required, and potential modelling to determine impacts.

1.2.3 Core Requirement #3: Flow Control

Clarification: Historic (forested) conditions will be used for pre-developed runoff modeling of all projects in Level 2 flow control areas.

A City of Kirkland flow control map is located at:

http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm

The City will accept non-infiltrating bioretention (planter boxes) for Basic Flow Control (Level 1), provided the design meets the criteria set forth in the City of Seattle Stormwater Manual, Volume 3, Section 5.8.2). The hydraulic restriction layer for planters shall be made of concrete. The planters shall contain plants from the Seattle Green Factor Plant List.

Projects triggering a Full Project Drainage Review proposing infiltration/bioretention facilities or pervious pavement to meet Level 1 or 2 flow control or for onsite flow control BMPs require a soils report per COK Pre-Approved Plans, Policy D-8.

1.2.3.1 Area-Specific Flow Control Facility Requirement

Regarding Exceptions to Flow Control Requirements in both Basic (#1) and Conservation (#2) Flow Control Areas, flow control can be waived if a project generates less than a 0.15 cfs increase in 100-yr peak flows using a 15-minute time step. The intent to still allow the 0.10 cfs increase at the 100-yr peak flow with a 1-hour time step were for areas that do not include a 15-minute time step in the approved model. All areas in Kirkland have a 15-minute time step, and therefore must use 15-minute time step for the exception.

Regarding Exceptions to Flow Control Requirements for Conservation (#2) Flow Control Areas, flow control will be waived for any threshold discharge area if:

- 1) A project generates no more than 0.15 cfs difference (using a 15 minute time step) in the 100-year peak flow event comparing between existing conditions to developed conditions, AND
- 2) The project does not propose more than 10,000 sf of target impervious surface as defined, beginning on page 1-45.

No flow control BMP credits can be used to meet this exception.

Clarification: Only BMPs listed on Table 1.2.9.A (page 1-95) can be used on a project to meet the 0.15 cfs limit unless otherwise approved through the adjustment process, Policy D-11. For example, products like infiltrator chambers are not equivalent to gravel filled infiltration trenches in Appendix C and shall submit an adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans to show equivalence.

Clarification: To meet the requirements of the 0.15 cfs exception, total pre-developed and post-developed areas must match.

Clarification: Regarding Target Surfaces in Conservation Flow Control Areas to be mitigated, vegetated areas in easements and/or tracts must be modeled from forested in the pre-developed condition to lawn in the developed condition, unless the area is placed in a tract or easement that will preserve the native vegetation during and after construction.

Clarification: Threshold and modeling calculations of pervious and impervious areas, turf areas, including lawn or synthetic turf, that do not have an underdrain are considered 100% pervious. Areas that have an underdrain are considered 100% impervious.

1.2.4 Core Requirement #4: Conveyance System

1.2.4.3 Conveyance System Implementation Requirements

G. Spill Control

Added language to reflect language from Ecology manual for the 0.15 cfs exemption (use existing conditions rather than forested conditions)

City of Kirkland will only require spill control requirements on commercial and multifamily projects that do not require flow control. Single family residential will install a tee/turn down elbow per (COK D.13).

1.2.6 Core Requirement #6: Maintenance and Operations

Refer to KMC 15.52.070 for City Acceptance of new drainage facilities.

If the project proposes a propriety system not covered in the 2016 KCSWDM, the applicant shall submit and adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans. The adjustment should include inspection and maintenance standards, including frequency of inspections and a log of maintenance activity.

1.2.7 Core Requirement #7: Financial Guarantees and Liability

This section is replaced by KMC 15.52.080, Bonds.

1.2.8 Core Requirement #8: Water Quality

1.2.8.1 A. Basic WQ Treatment Areas

Reductions of water quality treatment level from Enhanced to Basic, Exception #4, is not allowed in the City of Kirkland. Projects in Kirkland cannot reduce the level of required water quality treatment by prohibiting the use of leachable metals on the property.

For a bioretention to meet enhanced basic water quality treatment, it must be designed, using an approved continuous runoff model, to infiltrate 91% of the influent runoff, consistent with the 2014 Ecology Manual, and designed with no underdrain and designed per 2014 Ecology Manual BMP T7.30.

The City will accept all water quality treatment facility-types identified in the 2014 Ecology Manual, with the following additions and alterations:

- Emerging technologies will be considered on a case-by-case basis, via adjustment process, Policy D-11 in the COK Public Works Pre-Approved Plans, provided the product has received a level of use designation from WA State Dept. of Ecology (see the following website):

<http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html>

1.2.8.1 B. Sensitive Lake WQ Treatment Areas

This section does not apply to the City of Kirkland.

1.2.8.1 C. Sphagnum Bog WQ Treatment Areas

This section does not apply to the City of Kirkland.

1.2.9 Core Requirement #9: Flow Control BMPs

1.2.9.1 Flow Control BMP Requirements Overview

A. Target Surfaces

If a project or threshold discharge area of a project meets the Direct Discharge Exemption per Section 1.2.3.1, soil amendment is required for new pervious areas and flow control BMPs need to be evaluated in the following order for impervious areas:

1. Full Infiltration
2. Basic Dispersion

If basic dispersion is found to be a feasible BMP, limited infiltration, bioretention and/or permeable pavement may be used instead of basic dispersion to meet the flow control BMP requirement. If basic dispersion is found to be infeasible, perforated pipe connection is not required in the City and the flow control BMP requirement is considered met.

1.2.9.2 Individual Lot BMP Requirements

To meet Requirement #3, mitigating impervious surface to the maximum extent feasible, in the public right-of-way for both Small Lot BMP Requirements and Large Lot BMP Requirements, the BMPs must be evaluated in the order listed in the King County Manual:

1. Full Infiltration
2. Limited Infiltration or Bioretention
3. Permeable Pavement

Requirement #5, implementation of Reduced Impervious Surface Credit and Native Growth Retention Credit, for both Small Lot BMP Requirements and Large Lot BMP Requirements is not required in the City of Kirkland. King County has high lot coverage so the reduction of 10% lot coverage to meet the flow control BMP requirement is achievable. The City of Kirkland justifies meeting this requirement for implementation with an already lower lot coverage than King County (typically 70% lot coverage in King County compared to 50% lot coverage in Kirkland).

Requirement #7, installation of perforated pipe connection, is not required in the City of Kirkland. If the applicant has reached this level, it is viewed that LID is infeasible on the site and do not want to introduce additional water into the ground.

1.2.9.2.3 Large Rural Lot BMP Requirements

This section does not apply to the City of Kirkland.

1.2.9.4.1 Use of Credit by Subdivision Projects

A. Subdivision Implementation of BMPs within Road Right-of-Way Item #3: If the road right-of-way will be maintained by the City of Kirkland, the flow control BMPs must be approved by the public works department. Refer to section 1.2.9.2, Requirement #3, in the Addendum for the order of BMP evaluation in the right-of-way.

1.3.1 Special Requirement #1: Other Adopted Area-Specific Requirements

Projects located in the Holmes Point Area must also comply with lot coverage and other standards included in the Kirkland Zoning Code, *Chapter 70 – Holmes Point Overlay Zone*.

1.3.3 Special Requirement #3: Flood Protection Facilities

This section does not apply to the City of Kirkland.

1.4 Adjustment Process

Refer to the Surface Water Adjustment Process defined in COK Public Works Pre-Approved Plans, Policy D-11.

Chapter 2 Drainage Plan Submittal

Applies with the revisions stated below:

2.1 Plans Required for Drainage Review

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.2 Plans Required with Initial Permit

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.3 Drainage Review Plan Specifications

2.3.1.1 Technical Information Report

An Operation and Maintenance Manual is required for all privately maintained stormwater detention and water quality facilities, and is submitted as part of the permit application.

2.3.1.2 – Site Improvement Plan

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.3.1.3 – ESC Plan Section

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.3.1.4 – Stormwater Pollution Prevention and Spill (SWPPS) Plan

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-12.

2.3.2 – Projects in Targeted Drainage Review (TDR)

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

2.4 Plans Required After Drainage Review (pg 2-35)

Refer to the COK Public Works Pre-Approved Plans, policies G-7, D-2, and D-3.

Chapter 3 Hydrologic Analysis & Design

Applies with the revisions stated below:

Refer to Policy D-14, WWHM 2012 Guidance, for additional information on sizing requirements and inputs for WWHM 2012.

3.2.2.1 Generating Time Series

Calculation of Impervious Area

For residential development, the assumed impervious coverage shall be the maximum impervious coverage permitted by zoning code, typically 50% lot coverage except for the Holmes Point Overlay Zone (not automatically 4,000sf as in the 2016KCSWDM). The assumed impervious can only be less if a covenant, sensitive area, or native growth protection easement exists.

If an existing house will remain during redevelopment, the following two options are available to address the storm drainage from that house/lot:

1. Evaluate the proposed lot as new/replaced impervious area at the required lot coverage as part of the subdivision drainage technical information report, OR

2. Remove the lot from calculations as non-targeted surfaces. If this method is taken, the existing home cannot be demolished and redeveloped within 5 years of the recording of the short plat. If the home is demolished and redeveloped within that time period, a storm drainage analysis must be provided for the entire subdivision including the lot at full lot coverage as part of the building permit. The following note must be included on the subdivision:

Redevelopment of Lot_: Since the home currently constructed on the existing parcel that is proposed to remain as Lot_ has not been evaluated as part of the storm drainage analysis, the existing home cannot be demolished and redeveloped within 5 years of the recording of this plat. If the home is demolished and redeveloped within that time period, a storm drainage analysis must be provided for the entire subdivision including Lot_ at full impervious coverage.

3.3.2 Flow Control Design Using the Runoff File Method Evaluating Flow Control Performance

Clarification: If having difficulties meeting the lower part of the duration curve (50% of the 2-year to the 2-year), refer to footnote 10 in the 2016 KCSWDM.

Chapter 5 Flow Control Design

Applies with the revisions stated below:

5.2.1 General Requirements for Infiltration Facilities

For any soil investigation or reporting information, refer to COK Public Works Pre-Approved Plans, Policy D-8.

5.1 Detention Facilities

Use details located in the COK Public Works Pre-Approved Plans, if available.

5.1.4.1 Control Structures Design Criteria

A removable screen is required when the bottom orifice size is 1" or less. The screen shall be made from stainless steel mesh, 8 inch depth, and attached with a minimum of 3 stainless steel screws. The size of the mesh openings must be less than the orifice diameter (0.25 inch mesh typical).

5.1.5 Parking Lot Detention

Parking lot detention is not allowed in the City of Kirkland.

Chapter 6 Water Quality Design

Applies with the revisions stated below:

Use details located in the COK Public Works Pre-Approved Plans, if available.

6.1.2 Enhanced Basic Water Quality Menu

For a bioretention to meet enhanced basic water quality treatment, it must be designed, using an approved continuous runoff model, (WWHM 2012 or MGS Flood) to infiltrate 91% of the influent runoff without an underdrain and per Ecology Manual BMP T7.30.

Appendix A: Maintenance Requirements for Flow Control, Conveyance, and Water Quality Facilities

If the project proposes a propriety system not covered in the 2016 KCSWDM, the applicant shall submit and adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans. The adjustment should include inspection and maintenance standards, including frequency of inspections and a log of maintenance activity.

Appendix B: Master Drainage Plan Objective, Criteria and Components, and Review Process

This Appendix does not apply to projects in the City of Kirkland.

Appendix C: Small project Drainage Requirements

Applies with the revisions stated below:

C.1.3 Application of Flow Control BMPs

For any soil investigation or reporting information, refer to COK Public Works Pre-Approved Plans, Policy D-8.

C.2.2.3 Use of Gravel Filled Trenches for Full Infiltration

Products like infiltrator chambers are not equivalent to gravel filled infiltration trenches in Appendix C. If the project would like to use proprietary items, the applicant shall submit an adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans.

C.2.7.4 Permeable Pavers

Sand is not allowed in between or below permeable pavers in the City of Kirkland. No. 8 Aggregate shall be used in openings between pavers, and in the bedding course.

C.2.7.6 Grassed Modular Grid Pavement

Modular grid pavement with grass planted in the openings or in a thin layer of soil over the grid material cannot be used for single family residential driveways that are used on a daily basis in the City of Kirkland. Past performance shows the grass does not grow well when subject to vehicular traffic on a daily basis.

Appendix D: Construction Stormwater Pollution Prevention Standards

Use details located in the COK Public Works Pre-Approved Plans, if available.

D.2.4.2 Wet Season Requirements

Refer to ESC Notes in the COK Public Works Pre-Approved Plans.

III. Code Reference Tables

King County Code is referenced in many places throughout the KCSWDM. The following table identifies the county code references and states the equivalent City of Kirkland code where applicable (Kirkland Municipal Code is KMC and Kirkland Zoning Code is KZC). Policies are located in the Public Works (PW) Pre-Approved Plans.

King County Code Reference	Subject of Reference	COK Code/Policy Equivalent	Comment
KCC 2.98	Adoption procedures and Critical Drainage Areas	KZC Chapter 90	
Title 9	Surface Water Management	KMC 15.52	
KCC 9.04	Surface Water Run-off policy	KMC 15.52	

KCC 9.04.020	Definitions	KMC 15.04	
KCC 9.04.030	Drainage Review	PW Pre-Approved Plans	Policy D-2, D-3
KCC 9.04.050	Drainage Review-requirements	PW Pre-Approved Plans	Policy D-2, D-3
KCC 9.04.060	Critical drainage and/or erosion areas	KZC 85, KZC 90	
KCC 9.04.070	Engineering plans for the purposes of drainage review	KMC 15.52.050, KMC15.52.060 and PW Pre-Approved Plans	Policy D-2, D-3, D-11
KCC 9.04.090	Construction timing and final approval	KMC 15.52.060	Policy D-12
KCC 9.04.095	Vesting for lots in final short plats	KMC 22.20.370	
KCC 9.04.100	Liability Requirements	KMC 15.52.080	
KCC 9.04.115	Drainage Facilities accepted by King County	KMC 15.52.070	
KCC 9.04.120	Drainage Facilities NOT accepted by King County	KMC 15.52.070	
KCC 9.12.025	Prohibited discharges in the water quality section	KMC 15.52.090	Policy D-4
KCC 9.12	Water Quality	KMC 15.52.090 – 15.52.110	
KCC 9.12.035	Water Quality: Stormwater Pollution Prevention Manual Adoption	KMC, 15.52.090, KMC 15.52.100	Policy D-4
KCC 16.82	Erosion and Sediment Control, Clearing and Grading	KMC 15.52.060	
KCC 16.82.095(A)	ESC standards: seasonal limitation period	PW Pre-Approved Plans	Erosion/Sediment Control Plan Notes
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 - ~~A (VACANT)~~
 - ~~B (VACANT)~~
 - ~~C Bioretention Soil Media Standard Specifications~~
 - ~~D (VACANT)~~
 - ~~E Roofing Erodible or Leachable Materials~~
- ~~12. (VACANT)~~
- ~~13. (VACANT)~~
- ~~14. Supplemental Approved Facilities~~
 - ~~A Approved Proprietary Facilities~~
 - ~~B Approved Public Domain Facilities~~

DRAFT

2 Lot Short Plat Example

Background – Single lot subdividing into 2 lots. Total project size = 18,730 sf with existing impervious onsite = 4,200 sf.

Developed Conditions – This project would create 8,500 sf of new and replaced impervious surface and 10,220 sf of new pervious surface.

Under the 2016 King County Surface Water Design Manual - This project would trigger a **Full Drainage Review**. This project would need to evaluate flow control, water quality, and LID to the maximum extent feasible.

Under Attachment A - Alternative 1 of the Addendum - This project would trigger a flow control facility (~4,800 CF, see Figure 1 for vault layout). LID would be required to the maximum extent feasible. Assumed LID was feasible and included porous pavement for frontage improvements and driveways, and either infiltration trenches or rain gardens for the roofs (with allowed credits to size the detention facility). Water quality is not required

Under Attachment B - Alternative 2 of the Addendum - This project would not trigger a flow control facility because of the 0.15 cfs peak flow exception. LID would be required to the maximum extent feasible. Assumed LID was feasible and included porous pavement for frontage improvements and driveways, and either infiltration trenches or rain gardens for the roofs. Water quality is not required.

Figure 1. 2 Lot Short Plat Example with Possible Detention Vault Layout

