MEETING AGENDA

KELSO STORMWATER ADVISORY COMMITTEE

DATE: February 22, 2010
TIME: 4:00 pm – 6:00
LOCATION: Kelso City Hall, Suite 203

Unfinished Business

1) January meeting minutes approval

2) Comments and review of KEDM Chapter 4, Stormwater Drainage

Engineering Phone 360-423-6590
Fax 360-423-6591
Operations Phone 360-423-5730
Fax 360-423-8196

CITY OF KELSO
Public Works Department
203 S. Pacific Ave., Suite 205
PO Box 819
Kelso, WA 98626

Stormwater Advisory Committee Meeting

January 6, 2010

Call to Order:

Steffanie Taylor called the meeting to order at 4:13 p.m., at City of Kelso City Hall, 203 S. Pacific Ave., Suite 203.

Those present were as follows:

Advisory Committee Members:
Gloria Nichols
Tim Wines
Steffanie Taylor
Dan Howell
Don Lemmons

Excused Absence: Gary Fredricks
Unexcused Absence: Dylan Olson

Staff:
Van McKay, City of Kelso
Stephanie Helem, City of Kelso

Approval of Minutes:

Don Lemmons made the motion, seconded by Gloria Nichols to approve the minutes of December 16, 2009. Motion carried, all in favor.

Unfinished Business:

1. Kelso Engineering Design Manual Chapter 4 Stormwater Drainage Review

A review and discussion of the draft KEDM Chapter 4 was performed. The draft copy provided had been revised from the version presented at the December 16, 2009 meeting and the changes were based upon the December meeting comments and commensurate with the Longview Stormwater Manual changes. Revisions have been marked in red. The following items were discussed:

I. Flow Control Exemption. CDID #3 Flow Control is to be included in KEDM Chapter 4. Per an email received by Van Mckay from Greg Winters with Ecology, approval has been given by Ed O'Brian, also with Ecology, to have the CDID #3 ditches flow control exempt. Van McKay has not received a response from Ecology on whether the DID #1 box culverts can be flow control exempt.
II. Infiltration Test. A conference call was held between Van Mckay, Tim Wines, Josh Johnson and Mr. Lato, Geo Tech firm in Vancouver, Washington, discussing the City of Portland's simplified pit test version. Van and Josh reworked to further simplify pit test, the goal to more

accurately measure the infiltration rate. A one page step by step "how to" document was created and passed out for the committee member's review. Tim reviewed handout and would like clarification on 4 or 15 hours. Van will review with Josh Johnson with the City of Longview. For sites over 1 acre, Department of Ecology infiltration test must be used. Tim Wines feels Ecology's test is too complicated. Van suggested Tim to come up with an alternative.

III. Page 4-19 Section 4.08 (D)(5)(c) Simplified Pit Test Infiltration
- Add the following language at end of sentence "…SMMWW, or other Ecology approved infiltration test for Western Washington."

IV. Page 4-4 Section 4.03 (B)(5)
- Public Exemption section was deleted. Repeat was found on page 4-6 under Section 14(b) Road Maintenance.

V. Page 4-5 Section 4.03 (B)(11) Wetlands.
- Replace semicolon with period after "Wetlands".

VI. Page 4-13 Formatting needs to be checked at the end of each sentence.
- Recommended global check of formatting and justification.

VII. Page 4-18 Section 4.08 (D) Simplified Pit Infiltration Test
- Add Sentence. "See Test Procedures Appendix XXX."

VIII. Page 4-20 Section 4.09
- (1) Private trees
  i. Review justification on 40% urban tree canopy.
- (2)(g) Public Trees
  i. Clarification questions on Tree City USA? There is currently no city program. Van McKay will review and revise this section as necessary.
  ii. Discussion on permit requirements regarding trees.

IX. Page 4-24 Section 4.12 (B)(6) Alignment and Cover
- Clarification on blue highlighted section. Request wording to be more flexible.

X. Page 4-26 Section 4.13 (F)(2) Freeboard
- Remove double period at end of sentence.

XI. Page 4-30 Section 4.17 (D)(2) Bond Estimation
- City attorney to review paragraph for language changes.

XII. Patrick Harbison, contracted City Engineer with Wallis Engineering, is currently in the process of reviewing Chapter 4 of the KEDM and he may have additional comments.

XIII. KEDM Chapter 4 will be presented at the January 19, 2010 Council Meeting for the 1st Reading. 2nd Reading will be presented at the February 2, 2010 Council Meeting and upon approval will be effective 5 days after this date.

Motion:

Dan Howell made the motion, seconded by Gloria Nichols, "Recommending adoption by City Council approval of Chapter 4 with corrections to be made by Van McKay". Motion carried, all in favor.

2. Review of Changes to Development and Redevelopment Ordinance

The ordinance was previously approved by KSAC to recommend adoption by City Council. Van McKay made minor changes to the document based upon the review process of Longview's development ordinance. Members were requested to review the ordinance changes and if they had comments, to have the comments in written form for the January meeting. The following items were discussed:

I. Pages 3, 18, 20, & 21 – Check punctuation at the end of each sentence.
- Recommended global check of formatting and justification.

II. Page 9

- Section 13.09.035 Stormwater Management Program Adopted
    i. Remove "Reserved" after above title.
    ii. Remove the following language from beginning of paragraph, "[At some point in the future, this section will state:"
- Section 13.09.040 (A)(1) Applicability
    i. "…developed and undeveloped lands; and" should read "…developed or undeveloped land; and"

III. Page 12 Section 13.09.060 (E) Redevelopment
- Proposing removal of Items (1) through (6). It is the intent to separate technical information from the ordinance.
- Remove "…shall do one or more of the following:" and replace with "…as described in the Kelso Engineering Design Manual."

IV. Page 19 Section 4-17 Stormwater Performance Bond
- Clarify wording. Recommend adding Stormwater Performance Bond language from page 4-30 of KEDM Chapter 4 to page 19 of the Ordinance.

V. The Flow Chart will be included in the KEDM as an Appendix.

Other Business:

The Kelso Stormwater Advisory Committee will need to be formed as long as the NPDES Permit is active. At the end of each member's term they have the option to leave their position. Van is asking if the members do decide to leave to possibly recommend future members to take their place. Van is recommending meetings occur at least quarterly to discuss maintenance issues or discuss changes in the code.

Next Meeting:

No future meeting has been scheduled at this time.

Meeting adjourned at 5:15 pm.

Approved:

Steffanie Taylor, Chairperson

Stephanie Helem, Recording Secretary

Kelso Stormwater Advisory Committee Meeting
February 22, 2010 @ 4:00 p.m.
City Hall Conference Room 203
203 S. Pacific Ave.

Attendees:

1. Steffanie Taylor
2. Van McKay
3. Tim Wines
4. [illegible]
5. [illegible]
6. Gloria Nichols
7. Dan Howell
8. [illegible]
9. Josh Johnson
10.
11.
12.
13.
14.
15.

Terms of Office and Timetable

Date	Chair Term	Vice-Chair Term	Member 2-1/2 year term	Member 1-1/2 year term
May 2008				
June	Steffanie Taylor One and a half years Term ends Dec. 31	Tim Wines One and a half years Term ends Dec.31	Don Lemmons Lemmons Steffanie Taylor Tim Wines Gloria Nichols Two and a half years Term ends Dec. 31	James Amaral Brad Bender Gary Fredericks Dan Howell One and a half years Term ends Dec. 31
July				
August				
September				
October				
November				
December				
January 2009				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
January 2010	Tim Wines One year Term begins Jan 1 and ends Dec. 31	One year Term begins Jan 1 and ends Dec. 31	Dec. 31, 2010	Two years Term begins Jan. 1 and ends Dec. 31
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
January 2011	One year Term begins Jan. 1 and ends Dec. 31	One year Term begins Jan. 1 and ends Dec. 31	Two years Term begins Jan. 1 and ends Dec. 31	
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
January 2012	One year Term begins Jan 1 and ends Dec. 31	One year Term begins Jan 1 and ends Dec. 31		
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

Dylan Olson

At the discretion of Public Works, the applicant seeking to build a stormwater facility may be required to furnish a stormwater performance bond, or equivalent financial instrument in a form acceptable to the City, in an amount that would cover all costs associated with the construction of the facility. This bond is to secure the installation and performance of the stormwater facilities identified in the approved stormwater management design plan. The applicant shall be responsible for any costs incurred by the City to secure performance of the stormwater faciities that are in excess of the amount of the bond.

Deleted: This is to ensure that action can be taken by the City, at the applicant's expense, should the applicant fail to initiate or maintain those measures identified in the approved stormwater management design plan (after being given proper notice and within the time specified by Public Works). If the City takes such action upon such failure by the applicant, the City shall collect from the applicant the difference should the amount of reasonable cost of such action exceed the amount of the security held.

B. **Term of Performance Bond**

The stormwater performance bond furnished pursuant to this section, or the unexpended or unobligated portion thereof, shall be released to the applicant within sixty (60) days of issuance by Public Works of the final acceptance of the permanent stormwater BMP by the Public Works Department. A final inspection by Public Works is required before any performance bond will be released.

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C. **Term Extended for Initial Maintenance**

At the discretion of Public Works, the stormwater performance bond may be extended beyond the time period specified above to cover a reasonable period of time for testing the BMPs during storm events and for initial maintenance activities. For the purposes of this section, the time shall not exceed 2 years beyond final acceptance of the construction of the BMP, unless the Director determines that an extension is necessary to ensure that the facility satisfies the maintenance and performance requirements identified in the KEDM.

D. **Partial Release of Bond**

The Public Works shall have the sole discretion to adopt provisions for a partial pro-rata release of the performance bond on the completion of various stages or phases of development.

E. **Bond Estimation**

The applicant shall be responsible for determining bond value and submitting the estimation to Public Works for approval. If the Director disagrees with the applicant's estimate, the Director shall determine a reasonable estimate. The bond value for public facilities is to be 125 percent of the estimated cost for the City to construct the stormwater features and achieve final stabilization. For private facilities, the Director may allow a performance security in lieu of a bond. It shall cover 150% of the estimated cost, set or approved by the Director, for the City to fully mitigate the maximum impact that the disturbance and improvements could have on the public storm drainage system.

Deleted: replacement value of

13.09.110 AS-BUILT PLANS.

All applicants are required to submit as-built plans for any permanent stormwater management facilities located on-site after final construction is completed. The plans must show the final design specifications for all stormwater management facilities, meet the criteria for as-built plans in the KEDM, and be sealed by a registered professional engineer.

In the event that the stormwater BMP has not been maintained and/or becomes a danger to public safety or public health, Public Works shall notify the responsible party by registered or certified mail. The notice shall specify the measures needed to comply with the maintenance agreement and the maintenance plan and shall specify that the responsible party has thirty (30) days or other time frame mutually agreed to between Public Works and the responsible party, within which such measures shall be completed. If such measures are not completed, then Public Works shall pursue enforcement procedures pursuant to Section 7 of this Ordinance.

If a responsible person fails or refuses to meet the requirements of an inspection report, maintenance agreement, or maintenance plan the City, after thirty (30) days written notice (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient), may correct a violation of the design standards or maintenance requirements by performing the necessary work to place the BMP in proper working condition. The City may assess the responsible party for the cost of repair work which shall be a lien on the property, or prorated against the beneficial users of the property, and may be placed on the tax bill and collected as ordinary taxes by the City.

13.09.140 MAINTENANCE ESCROW REQUIREMENT.

At the discretion of the Director, the property owner may be required to post a cash escrow, letter of credit, or other acceptable form of performance security in an amount that would cover costs associated with maintenance or repair in the event of BMP failure. This instrument is required to be posted prior to completion of construction and release of the Stormwater Performance Bond and remain in place for a minimum of two (2) years.

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13.09.150 MAINTENANCE, INSPECTION AND ENFORCEMENT.

A. **General Requirements**

(1) **Maintenance required:** All stormwater facilities shall be maintained in accordance with this ordinance and the KEDM. Systematic, routine preventive maintenance is preferred.

(2) **Compliance:** Property owners are responsible for the maintenance, operation and repair of stormwater drainage systems and BMPs on their properties unless the City has accepted maintenance responsibility in writing and a written easement exists granting the City an adequate and sufficient right, at the City's discretion, to enter the property and conduct these activities. Property owners shall maintain, operate and repair the facilities in compliance with the requirements of this ordinance and the KEDM.

B. **Administration:** The Director shall develop and administer an inspection program for stormwater facilities in Kelso.

C. **Inspection Program**

(1) **Authorization:** Whenever implementing the provisions of the inspection program or whenever there is cause to believe that a violation of this ordinance has been or is being

CHAPTER 4 - STORM DRAINAGE

~~PART I: Storm Drainage Introduction~~
~~PART II: Requirements for Development~~
~~PART III: Low Impact Development~~
~~PART IV: Conveyance~~
~~PART V: Additional Requirements~~

~~PART I: Storm Drainage Introduction~~

4.00 Purpose

A. The purpose of this chapter is to provide policy and guidance for stormwater design and management in the City of Kelso, consistent across the Longview-Kelso urbanized area, in order to:
   1. Protect the public health, safety, and welfare by minimizing risk from flood events,
   2. Protect property and habitat from increased runoff caused by development,
   3. Allow efficient operation, repair, and maintenance of the storm drain system, and
   4. Reduce discharge of pollutants to the storm drain system and protect water quality.

B. The requirements of this chapter cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals.

4.01 General

A. The City of Kelso's Phase II Municipal Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (Phase II Permit) requires that, at a minimum, existing local regulations be retained and that portions of the most current Stormwater Management Manual for Western Washington (SMMWW) be adopted. This chapter:

   1. Supersedes and is no less protective than the 2004 Longview-Kelso Stormwater Runoff Control Guidelines, and

   2. Adopts the Stormwater Management Manual for Western Washington (SMMWW, which can be found at www.ecy.wa.gov/programs/wq/stormwater/index.html). This manual references (but does not typically repeat) the SMMWW.

B. Where portions of this chapter and the SMMWW conflict, this chapter shall apply. Where provisions of this chapter conflict with other City of Kelso Code, or state and federal requirements, the more stringent provisions apply.

C. Except as otherwise provided herein, all construction design detail, workmanship, and materials shall be in accordance with the following:

   1. *Longview-Kelso Standard Plans & Specifications*,
   2. Washington State Department of Transportation's (WSDOT's) *Standard Plans* and

Standard Specifications for Road, Bridge, and Municipal Construction, most recent edition,
3. Department of Ecology's (Ecology's) *2005 Stormwater Management Manual for Western Washington*, and the
4. Puget Sound Partnership's *Low Impact Development Manual* (LID Manual).

D. This Chapter is intended to represent the minimum design standards for stormwater.

1. Compliance with these Standards does not relieve the designer of the responsibility to apply sound professional judgment to protect the health, safety, and welfare of the general public.
2. Special site conditions and environmental constraints may require a greater level of protection than would be required under these Standards.
3. The project must be designed (and may require modification) to ensure compliance with the conditions of any permits, codes and regulations, and these Standards.
4. Storm drainage design within a development area must include provisions to adequately control run-off from all public and private streets and the roof, footing, and area drains of residential, multi-family, commercial, or industrial buildings. The design must ensure extension of the system in conformance with the Lower Cowlitz River Flood Control Master Plan.~~Recommendations provided in the Lower Cowlitz River Flood Master Plan shall take precedent.~~

E. The City may temporarily suspend project work or require additional or modified protection measures if it appears to the Director, based upon observed conditions, that the approved plan is insufficient to prevent environmental harm and that such suspension or additional measures will prevent or minimize the harm.

F. All plans, studies, and reports shall be stamped, signed, and dated by a professional civil engineer(s), registered in the state of Washington, and registered soil scientist, if appropriate, responsible for their preparation, and by the project engineer responsible for preparation of the stormwater management plans.

4.02 Scope

All development activity as defined below including all construction and upgrading of public and private roads and drainage systems within the City of Kelso is subject to the requirements of this Chapter.

A. Development – Land disturbing activities, construction or installation of a building or other structure; creation of impervious surfaces; redevelopment; and subdivision, short plats, and binding site plans as defined in the Kelso Municipal Code and this Manual. ~~Chapter 58.17 of the Revised Code of Washington (RCW).~~

B. Land disturbing activities are those activities which are commonly referred to as:

1. Clearing (the act of vegetation removal from the land surface by mechanical or

chemical means),

2. Grubbing (the act of root vegetation removal from beneath the surface of the earth - usually in association with clearing),

3. Excavation (the mechanical removal of earth material),

4. Filling (deposition of earth and rubble material),

5. Grading (excavation or filling or combination thereof),

6. Compaction (densification of earth material),

7. Stockpiling (temporary deposition of earth material), and

8. Stabilizing (counteracting the actions of gravity, wind, or water).

4.03 Exemptions and Variations

A. The following are exempt from the requirements of this Chapter:

1. Commercial agriculture and forest practices regulated under Washington Administrative Code (WAC) Title 222 are exempt from all technical and administrative requirements established in this Chapter. Class IV General Forest Practices that are conversions from timber land to other uses are not exempt.

2. Normal landscape maintenance activities and gardening must control erosion, but are otherwise exempt from the requirements of this Chapter.

3. The following road maintenance practices are exempt:

a. pothole and square cut patching,

b overlaying existing asphalt or concrete pavement with asphalt or concrete without expanding the area of coverage,

c. shoulder grading,

d. reshaping/regrading drainage systems,

e. crack sealing,

f. resurfacing with in-kind material without expanding the road prism, and

g. vegetation maintenance.

B. The following activities are exempt or vary from certain requirements of this Chapter:

1. State Flow Control. Projects within the Consolidated Diking Improvement District #1 (CDID #1) and Consolidated Diking Improvement District #3 (CDID #3) boundaries are exempt from Section 4.06A(2)7 of this Chapter. Flow control is still required for any project that exceeds the thresholds described in Section 4.05 of this Chapter.

2. Erosivity Waiver. Projects disturbing less than five acres that meet the requirements delineated in Chapter 2 (F) of this Manual may apply for an "Erosivity Waiver" to be exempt from Minimum Requirement #2, the requirement to submit a Stormwater Pollution Prevention Plan (SWPPP).

3. Utilities. Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics are subject only to the erosion and sediment control requirements.

4. Amenity. Amenity is holistic stormwater design, along with stormwater quality and quantity design, where stormwater itself becomes a site feature that can engage, educate and entertain visitors as well as enhance a site's attractiveness and value. The following are exempt from meeting the amenity goals, Section 4.05(E)(1), and are subject only to the Facility Requirements of Section 4.05(E)(2).

   a. Projects within the Light Industrial and General Industrial zoning classifications; or

   b. Projects that have less than or equal to 20-parking spaces, less than 60 expected average daily vehicle traffic count (ADT). ~~or a comparably low level of public exposure~~

5. Small-lot Dispersion. The Director may allow lots smaller than 22,000 sq.ft. (as required in the SMMWW Vol. III §3.1 and Vol. IV §5.5) to receive credit for downspout dispersion. The Director may also allow local dispersion credits to apply if the vegetated flow path is less than the minimum specified in Table 4.1 found in Appendix A.

6. Project Planning Area. Any area within the same site having equivalent (or greater) flow and pollution characteristics can be used to meet the local requirements and Ecology's Minimum Requirements (MRs), state and local requirements. For public road projects, the equivalent area can be outside the project limits, provided it drains to the same receiving water.

7. Regional Facilities. The requirements for on-site management and against the transfer of runoff from one basin to another may be waived by the Director in areas served by a regional stormwater control facility. Such a waiver must be conditioned on the following provisions:

a. Basin Planning The alternative or regional approach must comply with the Basin Planning provisions of Volume I, Section 2.5.9 of the SMMWW.

b. Services Contracted. The developer shall provide the City a copy of an executed contract with the ~~owner of the regional public~~regional facility demonstrating full compliance with the applicable standards.

c. Conveyance System Capacity. The conveyance system transporting the stormwater from the development to the facility shall be sized to handle the additional runoff. The developer ~~may~~ shall be required to demonstrate the adequacy of the conveyance system by an ~~registered~~ engineer registered in the State of Washington.

8. Other Manuals Accepted. Relevant technical content (i.e. BMPs, methods, and technologies) from any Ecology-approved stormwater manual in western Washington may be used, subject to Director approval.~~BMP's from an Ecology approved manual for western Washington are allowed.~~ For example, infiltration testing for projects exceeding the one-acre threshold may use the 8-hour method described in the King County Stormwater Manual, instead of the 24-hour test described in the SMMWW.

9. Diking District Maintenance. Routine dike and channel maintenance activities performed by diking districts are exempt from the administrative requirements of Chapter 2 Erosion, Clearing, Grading.

10. Natural Drainage Features. Restoration of flow to natural drainage features may be allowed as an alternative to traditional detention to. ~~Such a bypass must~~ solve significant, pre-existing (i.e. not otherwise caused by the project) flooding, stream stability, water quality or habitat problems as determined by the Director. The project shall also satisfy all conditions of the, Volume I, Section 2.5.7 of the SMMWW, be documented by a ~~stormwater engineer o~~qualified engineer or wetlands biologist~~r scientist~~, and receive approval from all relevant regulatory authorities.

11. Wetlands: New development and redevelopment are exempt from Minimum Requirement #8 (Wetlands Protection), provided that:

a. The project does not change the rate, volume, duration, or location of discharges to and from the project site ~~(e.g., where existing impervious surface is replaced with other impervious surface having similar runoff generating characteristics, or where pipe/ditch modifications do not change existing discharge characteristics)~~, or

b. The project discharges to a slope wetland or riverine wetland where no depressional (impounding) characteristics exist, or

c. The project meets the requirements for and intends to utilize full dispersion in accordance to the SMMWW and these standards ~~this Chapter for flow control~~, or

d. The City determines, based on information in the preliminary stormwater plan, or information submitted for wetland review per KMC 18.20, that the proposed project complies with the City's Critical Areas requirements or constitutes either an adjustment or an exception/variance.

12. Local Threshold ~~Exemptions~~. ~~The following are exempt from the threshold calculations for Ecology's minimum requirements:~~Low impact development credits (see Section 4.07) may be applied to the threshold calculations for local stormwater requirements.

13. State Thresholds. The following are exempt from the threshold calculations for Ecology's MRs (see Section 4.06):

a. Impervious surfaces that are fully dispersed or infiltrated in compliance with the SMMWW; and

b. Open, uncovered retention/detention facilities; however, such facilities shall be considered impervious when modeling runoff.

14. Road Maintenance.

a. Removing and replacing a paved surface to base course or lower, or repairing the roadway base itself, if impervious surfaces are not expanded, are considered redevelopment exempt from MRs #6 - #9. However, in most cases, only MR #2, Construction Stormwater Pollution Prevention, will be germane.

b. Public road projects are exempt from the local redevelopment requirements in Section 4.05(F), provided that low impact development techniques are preferentially used as practicable without causing flooding or erosion impacts.

~~a. Impervious surfaces that are fully dispersed or infiltrated in compliance with the SMMWW and these Standards; and~~

~~b. Open, uncovered retention/detention facilities; however, such facilities shall be considered impervious when modeling runoff.~~

4.04 Overview of Development Requirements

A. Local Requirements. Projects that disturb greater than or equal to 5,000 sq. ft. of land or create/replace greater than or equal to 5,000 sq. ft. of impervious surfaces are subject to the "Local" stormwater requirements described in Section 4.05 of this Chapter.

~~These supersede and, per the Phase II Permit, are no less protective than the 2004 Longview-Kelso Stormwater Runoff Control Guidelines. Projects under 5,000 sq. ft. are subject to erosion and sediment control.~~

B. State Requirements. Projects that disturb one or more acres or that are part of a larger plan of development or sale, are also subject to a set of state-mandated ("State") requirements that are detailed in the SMMWW (Volume I, Section 2.5).

C. Consult the Local Requirements Flowchart and the State Requirements Flowchart in Appendix B to determine which Local or State requirements apply. If these requirements conflict, the stricter condition shall apply.

4.05 Local Requirements for Development and Redevelopment

A. Applicability. All projects shall comply with the City's general design, construction, and maintenance criteria for stormwater drainage systems contained in this Chapter. Projects creating greater than or equal to 5,000 square feet of new impervious surfaces must provide on-site stormwater flow control and must provide on-site water quality control.

~~1.~~

~~2. All projects shall comply with the City's general design, construction, and maintenance criteria for stormwater drainage systems contained in this Chapter.~~

B. General Requirements for Facility Design

1. On-site stormwater management BMPs ~~to~~ that minimize, infiltrate, disperse, and retain runoff on-site shall be preferentially used as practicable without causing flooding or erosion impacts.

2. A development or land disturbing activity may not change the volume, rate, or location of surface or subsurface flow to an adjacent property without City approval and the applicable runoff controls described in this manual.~~No development shall be allowed to increase the rate of stormwater runoff onto an adjacent property or block existing drainage from adjacent lots.~~

3. Flow and water quality control facilities are subject to the site planning and BMP selection, design, and maintenance criteria comparable to those in the SMMWW. ~~LID Credits and Regional Facilities. Projects may be eligible for LID credits or allowed to use regional facilities, as discussed in Part III and Section 4.03 of this Chapter, respectively.~~

4. Creative engineering solutions are encouraged, but they must be approved by the Director prior to approval.

5. If a site is proposed to be constructed in phases, the drainage report (including the preliminary design) shall accommodate all phases of the project.

6. A development is only required to mitigate the new plus replaced impervious surfaces and the converted pervious surfaces; however, stormwater facilities must be sized for the entire flow directed to them.

C. Water Quantity Control

1. ~~Projects creating greater than or equal to 5,000 square feet of new impervious surfaces must provide on-site stormwater flow control.~~All development activities, unless exempted in Section XX, shall provide quantity control of stormwter runoff in accordance with the requirements of this section.

2. Low Impact Development shall be preferentially used as practicable to minimize runoff and disconnect impervious surfaces (See Section 4.07).

3. Hydrologic and Hydraulic Analysis.

   a. Hydrologic and hydraulic analysis shall utilize the Western Washington Hydrology Model (WWHM) or the Single Event Hydrograph Method as outlined in the SMMWW,

   b. Rainfall data. Design storm data (detailed in Appendix C) is summarized below:

24-hour Design Storms for the
Longview-Kelso Urbanized Area

2-Year	2.54″	25-Year	4.37″
5-Year	3.10″	50-Year	5.17″
10-Year	3.60″	100-Year	6.17″

   c. Existing conditions shall be those in 1999 or as approved by the Director. Acceptable documentation may include, but not be limited to, 2002 aerial photos, crop history, or tax assessor records.

   d. Credits and Exemptions: Refer to Section 4.03 of this Chapter

4. ~~Design Storms.~~ Facilities shall be sized such that the peak release rate from the development shall not exceed the peak release rate from:

   a. half of the pre-developed 2-year, 24-hour design storm,
   b. the pre-developed 25-year, 24-hour design storm, and
   c. the pre-developed 100-year, 24-hour design storm.

5. Tailwater. The tailwater effect shall be analyzed with a backwater analysis.

6. Emergency Overflow. If surface detention is used, an overflow shall be included to safely pass the one-hundred (100) year, twenty-four (24) hour design storm without overtopping any part of the pond embankment or inundating neighboring property. Sufficient armoring ~~will~~ shall be required to prevent erosion.

D. Water Quality

1. Basic Treatment.

a. Low Impact Development shall be preferentially used as practicable to improve runoff quality (see Section 4.07 of this Chapter).

b. Minimum capacity for water quality design.

(i) Single Event Hydrograph methodology may be used in the design of stormwater quality facilities in accordance with the SMMWW. ~~The water quality design storm for the Longview-Kelso urban area is defined as two-thirds (⅔) of the two (2) year, 24-hour storm, with an SCS 1A type rainfall distribution; therefore t~~The SCS Type 1A water quality design storm is 1.69 inches in 24-hours (2/3 of the two-year, 24-hour storm). ~~(2.54" x 0.667)~~.

(ii) ~~Alternatively, the~~The Western Washington Hydrology Model (WWHM) may be used to design stormwater quality facilities.

~~(ii)~~(iii) Credits and Exemptions: Refer to Section 4.03 of this Chapter.

2. Source Control. Some new development or re-development projects, regardless of size, may be required to control runoff pollution at its source.

a. Highly Contaminated Runoff. Any project where a City construction permit is required, such as the Building, Fill and Grade, Right-of-Way and others, that is determined by the City to have the potential to generate highly contaminated runoff shall provide a level of treatment commensurate with the risk in accordance with Volume IV of the SMMWW.

Highly contaminated runoff contains toxicants which would violate any water quality standard, including toxicant standards, sediment criteria, and dilution zone criteria. Examples include, but are not limited to:

(i) Uncontrolled runoff from outdoor industrial, maintenance, and storage activities;

(ii) Process wastewater, including washwaters and leachate; and

(iii) Runoff from establishments subject to high-use traffic and/or parking. A high use site at a commercial or industrial site has one of the following characteristics:

- An expected average daily vehicle traffic (ADT) count greater than or equal to 100 vehicles per 1,000 square feet of gross building area (drive-through, big box); or
- Storage of a fleet of 25 or more diesel vehicles that are over 10-tons gross weight (trucks, buses, trains, heavy equipment, etc.)

b. Oil/Water Separation. Additionally, all projects requiring City approval that are changing the use of a parcel shall provide a level of oil/water separation commensurate with the risk, as designated below.

(i) API or CP-type oil/water separators are required for:

- Industrial machinery and equipment, trucks and trailers, aircraft, parts and aerospace, railroad equipment;
- Log storage and sorting yards;
- Airfields and aircraft maintenance;
- Fleet vehicle yards;
- Railroad yards;
- Gas stations;
- Retail/wholesale vehicle and equipment dealers;
- Vehicle maintenance and repair;
- Construction businesses such as paving, heavy equipment storage and maintenance, storage of petroleum products. (This does not include construction sites);
- Other activities that exhibit a significant risk of high oil loading in runoff;

(ii) Spill control (SC) type oil/water separators are required for:

- Restaurants;
- Multi-family residential development activities creating parking spaces for twenty-five (25) or more vehicles;
- Other activities where the risk of oil spills or illegal dumping of oil or grease is significant;

- Where the risk of oil or grease spills or dumping is determined to be minimal by the Director, oil/water separators shall not be required for those portions of a site.

c. Deferment. Projects subject to the local source control requirements, but which do not exceed other ~~local or state~~ thresholds for development, may defer installation of the required treatment, provided:

(i) A stormwater performance bond equal to one hundred fifty percent (150%) of the cost of the facility is provided in accordance with Section 4.19.

(ii) The controls must be installed within two years of receiving City approval.

(iii) The source does not constitute an illicit discharge.

E. Amenity Criteria.

1. Stormwater amenity is ~~a~~ stormwater holistic design where stormwater itself becomes a site feature that can engage, educate and entertain visitors as well as enhance a site's attractiveness and value. A narrative of how the goals are (or are not) met shall be included with the stormwater report.

2. In disputes regarding whether a design satisfies the terms and intent of this section, project proponents may present their case before the Kelso Stormwater Advisory Committee (KSAC) to seek their opinion, prior to the Director's final determination ~~and appeals per KMC XX.XX LMC 17.80.180~~.

3. All developments required to comply with the Facility Requirements of this section shall satisfy at least one of the following goals:

a. Retain existing resources and mimic natural processes (use LID) to the ~~full~~ maximum extent practicable.

b. Use stormwater design to enhance property value. *Suggestions* include:
(i) Create an aesthetic experience (beauty, art, etc.) focused on the stormwater.

(ii) Allow conditions for safe interaction with the stormwater system in a way that is relaxing, amusing, and/or refreshing.

c. Communicate the presence, function, or impact of the site's runoff. Examples include:
(i) Provide statements or symbols communicating the value of the stormwater design in relation to hydrologic and ecological function.

(ii) Create compelling conditions to learn about stormwater issues.

4. Facility Design Requirements

a. Aesthetics

(i) Aboveground storm water facilities shall appear as naturally occurring features or otherwise enhance or complement site aesthetics; or incorporate screening, location, landscaping, and/or artistic elements into the design so that the facility is a positive feature.

(ii) Fencing requirements are located in Section 4.05(E) of this Chapter.

b. Labeling and Signage

(i) All inlets and manholes within shall be stamped "Dump no Pollutants – Outfall to Stream," or equivalent (See City of Longview-Kelso Standard Plan SD-110). Similar-themed markers or stenciling in addition to this minimum requirement are encouraged.

(ii) Permanent markers or signs, such as those described in the SMMWW Vol. III Ch. 3.2.1, shall be installed for significant aboveground facilities such as ponds, bioswales, pervious streets, or developments that rely on numerous dispersed LID BMPs. Signs should identify the feature(s), state the purpose and/or function, provide contact information (for public facilities), and give any advisory message that is key to its proper and continued performance, such as "Dump no debris or pollutants. For more information or to report littering, vandalism, or other problems, call [insert telephone number]."

c. Sustainable Maintenance

(i) Trees may be planted near biofiltration swales as long as they will not inhibit vegetative growth and water flow within the swale.

(ii) To maximize plant survival and performance, species selection shall conform to ~~the following sections of~~ the SMMWW.

- ~~Detention ponds: SMMWW Vol. III Section 3.2~~
- ~~Basic Biofiltration Swale: SMMWW Vol. V Tables 9.3 & 9.4, BMP T9.10~~
- ~~Wet Biofiltration Swale: SMMWW Vol. V. Table 9.5, BMP T9.20~~

~~• Wet ponds: SMMWW Vol. V. Table 10.1, BMP T10.10~~

(iii) Designs shall consider access for maintenance as well as sun and water for vegetation.

(iv) Designs with complex or expensive long-term maintenance are discouraged.

5. Preserving Natural ~~areas~~ Vegetation

   a. The preserved ~~area~~vegetation, such as existing forest, wetlands, and riparian areas:

      (i) Are regulated under KMC Title 18.20;

      (ii) ~~Should~~ Shall be placed in a separate tract or protected through recorded easements for individual lots; and

      (iii) ~~Should~~ Shall be shown on all property maps and should be clearly marked on-site during clearing and construction.

      (iv) ~~Should~~ Shall be sited to promote connectivity to existing forest, wetlands, and riparian areas.

   b. Preserved areas ~~can~~ may be located below the building sites, so that dispersion through the duff, undisturbed soils, and native vegetation can provide flow and water quality for the site.

   c. Vegetation and trees ~~should~~ shall not be removed from the preserved area, except to remove noxious or invasive species, dangerous or diseased trees, and for approved timber harvesting/thinning activities ~~activities and the removal of dangerous and diseased trees~~.

6. Fencing shall be consistent with any hazard.

   a. Facilities shall be designed (or control structures protected) such that peak flows and velocities do not pose an unacceptable risk to children or vulnerable adults.

   b. Designs needing a steep or vertical slope shall provide emergency egress points and fall deterrence.

      (i) Only the portions of the facility associated with a hazard shall be fenced.

      (ii) Guardrails or other barriers will be required for vertical drops greater than 30 inches.

7. Fencing shall be allowed only for legitimate safety concerns or as part of the site's

landscaping design.

a. Designs with slopes steeper than 3:1 or with walls exceeding 30 inches are discouraged.
~~They will be evaluated on a case-by-case basis and may be eligible for site-specific adjustments under KMC 13.09.170.~~

b. Benched retaining walls or natural appearing rockeries are preferred in lieu of vertical walls.

c. Landscaping shall be installed as screening where fencing is required, unless not feasible.

F. Redevelopment.

1. Projects that create and/or replace 5,000 square feet or more of impervious surface that are not otherwise required in Sections 4.05(E), 4.05(F)(1), and 4.06 of this Chapter to provide stormwater controls shall, as part of the project, make at least one of the following improvements (pre-existing controls will not satisfy this requirement unless they are expanded commensurately):

   a. Provide water quality treatment for at least 30 percent of the site's pollution generating surfaces, and/or

   b. Reduce total site run-off by at least 20 percent below existing conditions, and/or

   c. Apply innovative approaches to maximize on-site management of runoff (e.g. green roofs, pervious pavements, or retrofits to parking and landscaping), and/or

   d. Provide an equivalent level of treatment or watershed improvement offsite (e.g. street trees, open space dedication, etc.) and/or

   e. Address downstream channel, capacity, or flooding issues through improvements offsite, and/or

   f. ~~The Director may~~Any ~~allow~~ combinations of (1) through (5) above and/or source controls required in Sections 4.05(F) above will be allowed ~~to satisfy these criteria~~as approved by the Director.

2. Additionally, all projects must rectify any drainage problems upon replacement or refurbishment of the affected system. For example, projects that grind and resurface a parking lot which sheets over a sidewalk shall divert or intercept that runoff to a drainage system or to landscaping.

4.06 State Requirements for Development and Redevelopment

A. Ecology's Minimum Requirements (MRs)

1. The City has adopted Ecology's MRs for projects that disturb one (1) acre or more of land or less if part of a larger common plan of development or sale. Where both local and state thresholds are triggered, the stricter requirement applies.

2. Use the State Requirements Flowchart in Appendix B to determine which of the Minimum Requirements below apply. The SMMWW, Volume I, Chapter 2.5, provides detailed applicability and technical resources needed for compliance. Exceptions and notes are provided below.

1. Preparation of Stormwater Site Plans
Consult Chapter 1 of this Manual for requirements on the preparation of Stormwater Site Plans.

2. Construction Stormwater Pollution Prevention
Consult Chapter 2 of this Manual for Requirements on Erosion Control and Construction Stormwater Pollution Prevention. ~~mirrors the SMMWW. Refer to SMMWW Vol. II for all the Construction BMPs. A few local BMP options are in the Erosion Control section of the Longview-Kelso Standard Plans & Specifications.~~

3. Source Control of Pollution

4. Preservation of Natural Drainage Systems and Outfalls

5. On-site Stormwater Management
Also consult Section XX for LID.

6. Runoff Treatment

7. Flow Control

8. Wetlands Protection (Any Phase II Permit wetland protection or waiver of such requirements does not remove the requirement to comply with the City's Critical Area requirements.)

9. Operation and Maintenance

NOTE: A tenth category discussed in the SMMWW, **Basin/Watershed Planning**, is not required by this manual (or the City's Phase II NPDES Stormwater Permit).

B. Construction and Industrial Stormwater NPDES Permits. Obtain Ecology's

Construction or Industrial Stormwater NPDES Permit if/as required by Ecology. See Ecology website www.ecy.wa.gov/programs/wq/stormwater

C. Other State and Federal requirements that could impact stormwater programs are summarized in Volume IV, Appendix IV-D of the SMMWW.

4.07 Low Impact Development

A. On-site Stormwater Management. The on-site stormwater management BMPs identified in the SMMWW to infiltrate, disperse, and retain runoff on-site shall be preferentially used as practicable without causing flooding or erosion impacts. These BMPs are summarized in Table 4.1 in Appendix A and are illustrated in the figure "Common Onsite Runoff Management BMPs" found in Appendix D. They generally pertain to:

1. Downspouts: Using trenches or splashblocks to spread (or "disperse") runoff over vegetated areas, or using "French drains" to "partially" connect downspouts to the street's curb and gutter, or other storm drain system.

2. Driveways: Building driveways and other larger ground-level impervious areas so that they slope, berm, or intercept runoff to a gravel pad then to a vegetated area.

B. LID Credits.

1. A credit, or runoff model representation, allows an equivalent area of impervious surface to be modeled as a pervious surface (typically lawn) or to be fully mitigated as with infiltration. For example, if stormwater runoff from a roof is infiltrated onsite, the impervious area of the roof can be modeled as landscaped area resulting in reduced stormwater discharge from the site.

2. Table 4.2 below lists the LID credits available to developers. Any project may use the "State" credits summarized in Section 4.10 (i.e. those from the SMMWW Vol. III, App. III-C). Additionally, projects not otherwise subject to MRs #6 or #7, may also use the "Local" credits described in Section 4.09.

Table 4.2: Credits Accepted Towards ~~Local~~ Stormwater Requirements

Local Credits (Section 4.09)	**State Credits** (Section 4.10) (from SMMWW Vol. III, Appendix III-C.)
Infiltration	Permeable Pavements
Innovative LID Designs	Dispersion
Permeable Pavements	Vegetated Roofs
Rain Gardens and Planters	Rainwater Harvesting
Alternate Flow Control Standard	Reverse Slope Sidewalks
Soils	Minimal Excavation Foundations

Trees	Bioretention areas (rain gardens)

4.08 Standards for Dispersion and Infiltration

A. Standards for Infiltration

1. Infiltration designs must account for local soil types, slopes, and groundwater conditions and provide any necessary water quality treatment prior to infiltration. A soils report by a qualified geotechnical engineer (or comparable licensed professional) ~~and both approved field testing and laboratory testing may~~shall be required to determine site suitability.

2. The design infiltration rate ~~for infiltration systems~~ shall be limited to one-half the measured infiltration rate. However, the infiltration rate may be lower; for example, as required by the SMMWW or site conditions. Infiltration rates shall be verified at all sites unless ~~waived~~ otherwise approved by the Director.

B. Standards for Infiltration and Dispersion

1. No erosion or flooding of downstream properties may result.

2. Roof downspout systems must be downslope of primary and reserve septic drainfield areas, unless site specific conditions render this unnecessary (e.g. soil permeability, system separations, or site topography prohibits subsurface flows from intersecting the drainfield). ~~The discharge point must be downslope of any primary and reserve septic drainfield areas. The City may waive this requirement if site topography clearly prohibits flows from intersecting the drainfield.~~

3. Facilities must comply with Ecology's Underground Injection Control (UIC) wells program, the Washington Department of Health's (DOH's) Wellhead Protection Program, 12/93, and other regulatory protections. ~~Except for single unit residential unit designs that use perforated pipe or that are deeper than they are wide are subject to the registration and non endangerment requirements of Ecology's Underground Injection Control (UIC) wells program. Residential roof infiltration BMPs and footing drains are exempt from the registration requirement.~~

C. Setbacks for infiltration and dispersion shall be according to the Table 4.3 below:

Table 4.3: Infiltration and Dispersion Setbacks for Small Systems[1]
From Volume III Section 3.1 and Volume V Section 5.3 of the SMMWW

Setbacks (from edge of trench/well)	*Infiltration*	*Dispersion*
Structure, property line, & sensitive area	10' [2]	5' [3]
(On, above, or near) Slopes (>15%)	50' [4, 5]	50' [5]
(On, above, or near) Slopes ≥20%	-	50' [4, 5]

(On, above, or near) Slopes ≥25%	Not Allowed	Not Allowed
(On, above, or near) Landslide / erosion hazard areas	N/A[4]	N/A[4]
Height above seasonal high groundwater	3′ Trench 1′ Drywell	1′ Perforated stub-out

Notes:

[1] "Onsite" LID systems typically serving residential downspouts and pavements (e.g. ≥700 sq. ft. per splashblock and concentrated pavement BMPs, ≥3,500 sq. ft. for dispersion trenches, etc.)

[2] For roof downspout systems from significant structures (e.g. house), the setback shall be 15′. For infiltration facilities from building foundations, setbacks are 20′ upslope and 100′ downslope.

[3] Dispersion BMPs shall be setback 25′ from the right-of-way.

[4] Requires evaluation by a registered professional civil engineer with geotechnical expertise (geotechnical engineer) or a licensed geologist, hydrogeologist, or engineering geologist.

[5] May be reduced to 15′ based on geotech evaluation, but never less than the buffer width.

4.09 Local Credits

The following BMPs may be used in lieu of, or to reduce, the local development and redevelopment requirements. The credits and, to a lesser degree, technical notes for each BMP are provided below:

A. Infiltration. All infiltration shall be considered full treatment, to the degree allowed by federal and state water quality rules, and as approved by the Director.

B. Innovative LID Designs. Projects may receive a credit determined by the Director for innovative LID designs that are otherwise close to the meeting the local requirements. In the Longview-Kelso area, innovative designs are those that rely primarily on LID or apply particularly salient BMPs such as green roofs, pervious concrete, etc.

C. Pervious Pavements. All pervious pavements may be modeled as landscaping ~~or gravel~~ (including systems with overflow drains) and they may utilize any infiltration and storage within the rock base. To maximize storage and infiltration, the pervious system may be connected to a control structure.

Pervious pavements include pervious concrete, pervious asphalt, and pavers (porous pavers, specialty pavers patterned for extra void space, or regular pavers sufficiently separated with washed sand/aggregate as to allow the passage of water).

D. Rain Gardens and Planters. Properly designed rain gardens and planters are eligible for credit similar to the downspout dispersion trench. Facilities serving significant developments, as described in Section 4.03(B)(4)(b), ~~(e.g. commercial, subdivisions, etc.)~~ shall be professionally engineered and use quality soils as described in 4.09(F) below.

E. Alternate LID Flow Control Standard. Stormwater designs that manage runoff onsite (vs. traditional detention approaches) ~~close to its source by disconnecting impervious~~

~~surfaces~~ are allowed to match the full peak release rate of the pre-developed 2-year, 24-hour design storm instead of half that rate. Requirements for the other design storms are unchanged. Designs may include BMPs from the LID Guidance Manual or those summarized in the SMMWW Vol. III, Appendix III-C; also refer to Table 4.1.

F. Quality Soils. Pasture that is converted to landscaping may be considered fully mitigated if its soils achieve Ecology's T5.13 soil quality requirements, typically by augmenting with compost.

G. Tree Credits. The tree credit allows areas using trees to be modeled as landscaping or forest. Two tree credits are extended to developers.

1. "Private" (and Existing) Trees. Preserved existing trees may allow impervious surfaces equal to half of the tree's canopy area measured at its drip-line (or the minimum credit for public trees below, whichever is greater) to be modeled as landscaping. The tree must:

   a. Be in the project area (i.e. onsite),

   b. Be within 25' of an impervious surface,

   c. Be at least 4" diameter at breast height (DBH),

   d. Be deemed by a City Forester certified by the International Society of Arboriculture (ISA) to be healthy, viable, and compliant with this section, and

   e. Not be in the right-of-way landscaping strip or otherwise managed by the City.

2. "Public" Trees. New public trees, or trees in the City right-of-way or on City property, may allow impervious surfaces equal to 100 square feet for each deciduous tree planted and 200 square feet for each evergreen tree planted to be modeled as landscaping, subject to the following conditions: ~~within 25 feet of ground level impervious surfaces are eligible for the tree credit. The tree credit allows one unit of impervious surface to be modeled as landscaping, and is subject to the following conditions:~~

   a. The tree must be maintained/replaced in perpetuity by a public entity (e.g. those in the within the City right-of-way landscaping strip or around City parks and facilities). For contracts with public entities other than the City of Longview, copies of the tree preservation and maintenance agreement and their policies germane to the perpetual maintenance and replacement of trees shall be provided.~~Each deciduous tree planted is equal to 100 square feet of credit; and~~

   b. The tree must be planted within 25′ of an impervious surface or surface water.

c. Because the time lag between planting and full efficacy of flow control benefits and a tree's decreased efficacy during major events, no more than 20% of a site's new impervious surfaces can be mitigated through the use of this credit. All of the replaced impervious surfaces are eligible for this credit.

d. Trees required by the City or other agency (such as street trees) are eligible for the credit, provided they meet all other requirements of this section.

e. The size, species, and location of trees must be consistent with applicable zoning codes.

f. Trees that do not meet the pre-approved list located in chapter 3 of these standards shall be approved by the Director prior to approval.

g. The tree must be planted either before or as soon as feasible following the placement of the impervious surface receiving the credit and after activities which may harm the tree or its root zone.

h. The tree must be planted in the same drainage sub-basin as the project. The tree may be planted in neighboring basins provided the developer demonstrates the adequacy of the conveyance system.

3. General Requirements for Credit Trees

a. Trees used for stormwater management credit shall be clearly labeled on the site plans and recorded as any other stormwater facility (see Section 4.16 of this Chapter). Use of public trees offsite may be listed in the "Notes" section of the plans.

b. Trees shall be maintained, ~~and~~ protected, and replaced ~~–~~for the life of development or until any approved redevelopment for which a replacement facility is constructed~~.~~, and subject to the following conditions:

(i) Trees used for stormwater credit shall not be removed without prior inspection an ISA-certified City arborist and approval from the Parks Superintendent.

(ii) Trees that are removed or die shall be replaced within six months.

(iii) Replacement size shall be consistent with the standards and procedures of this section, be within the same subbasin, and be of a minimum size or number commensurate with the original credit tree. For example, a private tree documented as 1000 square feet on the plans and drainage report, must be replaced with 10 deciduous or 5 evergreen trees.

c. New or preserved trees shall be marked and protected from land disturbing activities.

d. Trees planted less than 18 feet from a perforated storm drain (or facility) require the installation of a tree root guard.

4.10 State Credits

A. ~~The City will accept all LID credits from the SMMWW Vol. III, Appendix III-C, with any project, including those below the Ecology's "one-acre threshold".~~

~~B.~~ The most common credit-eligible infiltration and dispersion BMPs from Volume III of the SMMWW, Appendix III-C are summarized in Table 4.1 and are illustrated in the "Common Onsite Management BMPs" figure in Appendix D, with two exceptions~~The most common infiltration and dispersion BMPs for which credit is granted are summarized in the Table 4-1, and are illustrated in the "Common Onsite Management BMPs" figure with two exceptions~~:

1. Full dispersion (total exemption) BMPs, which require longer vegetated paths.

2. Roads, sidewalks, soils, and minimal excavation footings.

4.11 Simplified Infiltration Test

The Director may allow this infiltration test for (typically minor) projects not subject to MRs #6 and #7. The test procedure, blank and example data forms are found in Appendix E. Because the test measures a combination of vertical and lateral infiltration, results may exceed the true infiltration rate, particularly for larger events.

4.12 General Conveyance Requirements

A. Conveyance, collection, culvert, and bridge design shall be applied to the entire contributing drainage area projected under full build-out conditions and not adversely affect existing downstream conveyance elements and flow conditions.

B. Natural drainage flow routes to streams and wetlands shall be maintained, and discharges from the site shall occur at the natural location(s) and elevation(s), to the maximum extent practicable.

C. Since open channel conveyance systems can improve water quality treatment, long-term maintenance, and overland flood relief routes, they are preferred over closed conduits, if feasible (e.g. space, topography, etc.). Safety considerations must include public access and adjacent travel ways.

D. Outfalls shall enter existing creeks or drainage channels perpendicular to the channel or

angled downstream and have ~~a head wall and scour pad, or rip rap~~protections to prevent erosion of the existing bank and/or channel bottom during the 100-year design storm.

E. Storm drain conveyance systems shall be, installed in accordance with the Longview-Kelso Special Provisions & Standard Drawings and the current WSDOT Standard Plans and Specifications for Road, Bridge, and Municipal Construction, with the notations as provided in this Section.

F. Discharge to a diking district facility requires the diking district's approval.

4.13 Closed Conduit Systems

A. Design Requirements

1. The **25-year storm** shall show free-flowing conditions through the proposed and/or existing conveyance system.

2. The **100-year storm** may overtop the conveyance system, provided:

   a. The additional flow shall not extend beyond one-half of the width of the outside lane of the traveled way and shall not exceed 4-inch depth at the deepest point, and

   b. Waters do not rise to elevations more than one foot below that of the lowest aboveground floor of buildings and no portions of a building will be flooded.

3. Backwater. At the discretion of the Director, or for the conditions listed below, a backwater analysis shall be conducted to determine the hydraulic grade line to ensure a minimum of 1.0-foot freeboard between the water surface and the top of any manhole or catch basin for the 25-year storm:

   a. Pipes with slopes less than 0.5 percent,

   b. Pipes with velocities over 6.5 feet per second (for sub critical flow only),

   c. Inlet and outlet pipes forming a sharp angle (45 degrees or greater) at junctions, and

   d. Pipe inverts less than 3 feet deep when entering and leaving junctions.

   Detailed information on this procedure can be found in Section 6.6 of the WSDOT Hydraulics Manual (WSDOT 2007) or Section 7 of the Federal Highway Administration (FHWA) Hydraulic Engineering Circular (HEC) 22, "Urban Drainage Design Manual."

4. Pipe. All storm pipes shall be constructed of high-density polyethylene (HDPE)

smooth interior corrugated pipe.

a. Alternate Materials. Where required for strength, such as for shallow bury (less than 3'), Class 52 ductile iron pipe ~~will~~ shall be used. Other pipe materials may be used if approved by the Director.

b. Tracer Wire. Plastic pipe shall be laid with marking tape and tracer wire.

5. Size. The minimum pipe size within the public right-of-way (ROW) shall be 12″ unless otherwise approved by the City Engineer. Storm laterals from private drains to inlets may be 6″ and shall have a cleanout installed at the property line.

6. Velocity. All storm drains shall be on a grade which produces a mean velocity when flowing full of at least three feet per second (fps), unless prohibited by site conditions. The Director may waive this minimum where existing drainage systems make it impractical to meet the standard.

   a. If velocities exceed 15 fps during the 25-year storm, anchors shall be provided at bends and junctions.

   b. Velocities in pipes other than HDPE and iron are limited to 30 fps.

7. Slope. For slopes steeper than 20 percent, closed conduit systems shall be designed per Ecology's *Criteria for Sewage Works Design.*

8. Minimum separations from storm drains to sewers and water lines shall be as required for sewers in the Longview-Kelso Standard Plans & Specifications, or as approved by the Director: Storm lines shall be laid higher than sanitary sewers where possible.

9. Pipes over 8 inches in diameter that "daylight" to the surface shall have a protective grate installed that prohibits wildlife and children from entering the storm line. The grate shall be hinged or otherwise designed to allow for cleaning and to reduce accumulation of debris from behind the grate.

10. The letter 'D' shall be stamped into the curb directly above the point where storm pipes including, but not limited to, mainlines, culverts and roof laterals cross under it.

B. Alignment and Cover

1. All changes in direction shall be made at a manhole, or other approved structure.

2. Storm drain lines shall not be curved between structures unless approved by the Director.

3. Unless otherwise approved, a minimum cover of ~~24~~ 36 inches of cover is required above the top of the pipe to the top of the ground surface. If grades can not be met, the design engineer shall select pipe materials and strengths for H-20 traffic loading. There shall be a minimum of one 1-foot separation from the top of pipe to the bottom of the roadway section (e.g. laterals from catch basins).

4. In areas of relatively flat terrain, the design engineer must show that sufficient depth is provided at the boundary of the development to drain the upstream basins.

5. When necessary to locate drains in easements or tracts, the storm drain shall be centered in the easement. However, drains may be offset due to site conditions.

6. The invert elevation of all upstream pipes shall not be lower than the invert elevation of the downstream pipe.

C. Manholes

1. Manholes shall be located at all changes in slope, alignment, pipe size, and at all pipe junctions with present or future storm drains.

2. Manholes shall be spaced no greater than 300 feet apart.

3. Standard manholes are required when rim to crown of pipe elevations exceed four feet, otherwise flat-top manholes shall be used.

4. The manhole cover shall be stamped "STORM."

5. Manholes having a mainline pipe entering or exiting at a slope of fifteen percent or greater shall have no sump and be pre-channeled.

D. Collection. Stormwater collection systems shall be designed in accordance with the FHWA's HEC 22, "Urban Drainage Design Manual," with the following notes:

1. Curb inlets shall be located in streets at the curb-line to receive stormwater and convey it to the main storm drain.

2. Curb inlets shall be at the following locations, whichever is less, unless otherwise approved by the Director:

   a. Less than 300 feet apart, and in no case shall the spacing be greater than 400 feet,

   b. In the tangent section immediately in advance of the curb returns on the upstream side of the intersection,

   c. At all street ends with a descending grade, and

d. At intermediate locations such that gutter flow does not exceed three 3 feet in width or 3 inches in depth.

3. Catch Basin grates shall be stamped "Dump no Pollutants Outfall to Stream."

4. Catch basins shall have a sump at least 15 inches below the lowest invert to collect sediment and debris.

5. Curb inlets shall be used with curb and gutter installations up to 8% in tangential grade. Combination curb inlets shall be used for steeper grades.

4.14 Open Conveyance

A. The **25-year storm** shall show free-flowing conditions through the proposed and/or existing conveyance system. Culverts with contributing drainage areas greater than 200-acres shall be designed to pass the peak runoff from the 100-year design storm.

B. The **100-year** storm may flow at bank-full, provided~~Culverts shall be designed in accordance with the current WSDOT Hydraulics Manual,~~.:

1. Runoff is contained within defined conveyance system elements,

2. The hydraulic grade line does not exceed the elevation of the roadway subgrade, and

3. Waters do not rise to elevations more than one foot below that of the lowest aboveground floor of buildings and no portions of a building will be flooded.

C. Design. Culverts shall be designed in accordance with the current WSDOT Hydraulics Manual. Fish passage culverts shall meet the design criteria specified in the Washington Department of Fish and Wildlife (WDFW) *Design of Road Culverts for Fish Passage*.

D. Backwater. A backwater analysis (see the King County Surface Water Design Manual for an example) shall be performed if a flow restriction (such as a bridge or culvert) causes flow to rise above normal depth within a channel reach.

E. Side Slopes. Channel side slopes shall not exceed 2:1. Depth, safety, and erosion concerns must be considered with slopes steeper than 3:1. All constructed channels shall be compacted to a minimum 95 percent compaction verified by a modified Proctor test (ASTM D1557/AASHTO T180).

F. Freeboard. Channels designed for 25-year storm flows of 10 cubic feet per second (cfs) or less shall have at least 0.5 feet of freeboard, and 1.0 feet for greater velocities.

G. Lining and Armor. Open channels shall be designed to withstand channel erosion and not degrade water quality.

1. Channels with peak velocities less than 5 feet per second shall be vegetated.

2. Channels with velocities above 5 feet per second shall be sufficiently armored to the maximum water surface elevation.

4.15 Private Drainage

A. Drainage Accessibility. Subdivision lots which drain to the rear should be avoided; but if necessary to collect roof drains, footing drains, and surface run-off, the developer shall:

1. Provide a recorded stormwater easement for the inspection of the private system and for any crossing of private property to reach the approved point of discharge.

2. Design and install the system to meet the Uniform Plumbing Code requirements.

~~3. Use a French drain where feasible to provide some water quality, some peak flow attenuation, and some dewatering of the property during the wet season.~~

B. Stormwater easements shall be in accordance with Section 4.18, except those for pipes which have a 12 inches or smaller hat are up to 5 feet deep. These easements may be a minimum of 10 feet wide ~~or equal to any setback in which it is located~~.

4.16 Subsurface Drainage

Underdrains shall be provided at the following locations:

A. For all existing springs and tile intercepted during construction.

B. Where high ground water exists or when it is necessary to reduce the piezometric surface to an acceptable level to prevent land slippage or under-floor flooding of buildings.

C. The drainage line installed shall begin at a cleanout and terminate at an approved point of disposal. Open jointed storm drain lines will not be accepted.

4.17 Curb Cuts

A. When downspouts and footing drains must be connected to the private or public storm sewer systems, perforated connections from the home to the property line or curb (SMMWW Vol. III Ch. 3.1.3) shall be preferentially used as practicable.

B. Drainage from residential roofs and footings may drain directly to a street through the curb under the following circumstances:

1. ~~The building pad ground elevation is at least 2 feet above the existing street curb, and,~~It can be shown that gravity drainage is possible.

2. The existing street is adequately crowned and its drainage system, including curb, gutter, and storm lines, is adequately sized to accept the additional flow.

3. Pressurized outfalls, e.g. sump pumps, shall not be allowed to plume into the street or where they cause standing pools in the gutter, a slip or a vector hazard.

C. Commercial curb cuts shall not be allowed for new commercial development. Commercial redevelopment may use curb cuts, per approval of the Director.

4.18 Tracts and Easements

A. Storm drainage tract dedication and/or easements shall be required where the conveyance, storage, or treatment of stormwater is identified on the stormwater management design plan and/or where access is needed to maintain and inspect stormwater facilities.

B. Stormwater tracts and easements shall be placed on all plats and property deeds and recorded with the Cowlitz County Auditor, after approval by the City.

C. Easements shall not be used for any purpose which would interfere with the unrestricted use of the storm drain line. No ~~buildings~~ structures or other structures that prevent access are permitted within tracts or easements. Fences crossing tracts shall provide gates of sufficient width to provide access for maintenance.

D. Minimum widths for public easements and/or tracts shall be as follows: ~~although the Director may require alternate widths; for example to accommodate structure location or maintenance equipment needs:~~

1. Storm lines up to twenty-four inches in diameter shall have a minimum easement width of fifteen feet.

2. Storm lines twenty-four inches and greater in diameter shall have a minimum easement width of twenty feet plus the pipe diameter.

3. Depths greater than seven feet to the invert shall require wider easements. A slope of one horizontal to one vertical (1:1) from the storm drain invert to the ground surface shall be used in determining easement width.

4. Channels: sufficient width to cover the 100-year floodplain line, fifteen feet from the waterway centerline, or ten feet from the top of the recognized bank whichever

is greater. A fifteen foot wide access easement shall be provided on both sides of the channel for channel widths greater than fourteen feet at the top of the recognized channel.

4.19 Stormwater Performance Bond

At the discretion of Public Works, the applicant may be required to furnish a stormwater performance bond. This is to ensure that action can be taken by the City, at the applicant's expense, should the applicant fail to initiate or maintain those measures identified in the approved stormwater management design plan ~~(after being given proper notice and after the timeframe specified by Public Works)~~. If the City takes action upon such failure by the applicant, the City shall collect from the applicant the difference, should the amount of reasonable cost of such action exceed the amount of the security held.

A. Term of Performance Bond. The stormwater performance bond furnished pursuant to this section, or the unexpended or unobligated portion thereof, shall be returned to the applicant within sixty (60) days of issuance by Public Works of the final acceptance of the permanent stormwater BMP by the Public Works Department. A final inspection by Public Works is required before any performance bond will be released.

B. Term Extended for Initial Maintenance. At the discretion of Public Works, the stormwater performance bond may be extended beyond the time period specified above to cover a reasonable period of time for testing the BMPs during storm events and for initial maintenance activities. For the purposes of this section, the time shall not exceed two years beyond final acceptance of the construction of the BMP, unless the Director determines that an extension is necessary to ensure that the facility satisfies the maintenance and performance requirements identified in the Manual.

C. Partial Release of Bond. The Director shall have the discretion to adopt provisions for a partial pro-rata release of the performance bond on the completion of various stages or phases of development.

D. Bond Estimation. The applicant shall be responsible for determining bond value and submitting the estimation to the Director for approval.

1. For public facilities, the bond value is to be 125 percent of the estimated cost, approved by the Director, for the City to construct the stormwater features and achieve final stabilization.

2. For private facilities, the Director may allow ~~a cash escrow or other~~a performance security in lieu of a bond. It shall cover 150% of the estimated cost, set or approved by the Director, for the City to fully mitigate the maximum impact that the disturbance and improvements could have on the public storm drainage system. Considerations may include, but are not limited to, project phasing, the erosion control plan, demolition or full disconnection of the new impervious surfaces, final stabilization, and restoration of any hydrologically significant features, such as

critical areas, drainage courses, natural detention areas, quality soils, and trees.

4.20 As-Built Plans

All applicants are required to submit as-built plans for any permanent stormwater management facilities located on-site after final construction is completed. The plans must show the final design specifications for all stormwater management facilities, meet the criteria for as-built plans in Chapter 1 of this Manual, and be sealed by a registered professional engineer.

4.21 Dedication of Facilities

The City ~~may~~ will accept a dedication of a stormwater facility, together with necessary easements and appurtenances, upon a determination and acceptance, as provided herein, except that dedications made during the subdivision platting process shall not be subject to the following process:

A. Preliminary Determination by Public Works. Upon receipt by the City of an offer of dedication of a stormwater facility, the Director shall make a preliminary determination that the dedication of the facility is appropriate to protect the public health, safety and general welfare, and furthers the goals of the City's stormwater management program and/or associated watershed plans. Budgetary implications will be a component of the determination. The Director will forward his/her determination to the City Council. Prior to making his/her determination, the Director will inspect the facility to determine whether it has been properly maintained and is in good repair, and may condition the recommendation of acceptance on completion of any necessary maintenance items.

B. Acceptance by City Council. City Council may accept the offer of dedication by adoption of a resolution. Upon acceptance, the owner shall record the document dedicating the stormwater facility ~~shall be recorded~~ with the Cowlitz County Auditor by and at the owner's expense.

C. Owner to Provide Documentation. The owner, at his or her sole expense, shall provide any document or information requested by the Director and/or the City Council in order for a decision to be reached on whether or not to accept the facility.

4.22 Long-Term Operation and Maintenance

A. Operation and Maintenance Required. All erosion controls, watercourses, and stormwater facilities (including, but not limited to, structural and non-structural BMPs, catch basins and other protective devices, necessary access routes, and appurtenances) shall be operated and maintained in accordance with the manufacturer's specifications, the SMMWW, this Manual, the approved stormwater management design plan, and the stormwater maintenance agreement/plan, as discussed below.

B. Responsible Party. The owner shall be responsible for the proper operation and maintenance of the site's stormwater facilities and shall pass such responsibility to any successor owner~~, unless such responsibility is transferred to the City or to another entity~~

~~as per Section 4.20 of this Chapter~~.

C. Operation and Maintenance Agreement and Plan. The owner of a stormwater facility shall execute a Stormwater Operation and Maintenance Agreement and Plan prior to final acceptance of the project. The agreement shall be approved by the City and recorded with the Cowlitz County Auditor and shall run with the land. The agreement and plan shall, at a minimum, have the following:

1. Designate the responsible party permanently responsible for maintenance.

2. Pass the responsibility for such maintenance to successors in title.

3. Grant ~~Public Works~~the City and its representatives the right of entry for the purposes of inspecting all stormwater BMPs at reasonable times and in a reasonable manner. This includes the right to enter a property when Public Works has a reasonable basis to believe that a violation of this Chapter is occurring or has occurred and to enter when necessary for abatement of a public nuisance or correction of a violation of this Chapter.

4. Establish an operation and maintenance plan to ensure the continued effectiveness of the BMPs. The plan shall, at a minimum, include a list of inspection and maintenance tasks, a schedule for routine inspection and maintenance, and actions to be taken when maintenance is required.

5. Include copies of any educational brochures required in Section 4.22 (G).

D. Maintenance Escrow Requirement

1. At the discretion of the Director, the property owner may be required to post a cash escrow, letter of credit, or other acceptable form of performance security in an amount that would cover costs associated with maintenance and repair in the event of stormwater facility failure, at least 10% of the project engineer's estimate to construct the facility. This instrument is required to be posted prior to completion of construction and release of the Stormwater Performance Bond and remain in place for a minimum of two (2) years.

2. At the discretion of ~~Public Works~~the Director, the stormwater performance bond may be extended in lieu of the maintenance escrow account.

E. Maintenance Records. The responsible party shall keep records of the BMP's installation and all subsequent maintenance and repairs, and shall retain the records for at least five (5) years. These records shall be made available to ~~Public Works~~the City ~~upon inspection or request~~within 1 week upon request by the City.

F. Deeds and Covenants for LID. Private homeowner deed restrictions and homeowners/building covenants shall be required for all properties with on-site LID

BMPs to ensure that the stormwater management applications continue to function as designed. The deed restrictions or covenants shall specifically address and/or append the requirements and responsibilities for long-term management and maintenance of any LID BMPs. Sample covenant language is provided in Appendix F.

G. Stormwater Education ~~for LID~~

1. The developer shall create education measures, for example, fact sheets or brochures, ~~describing the functions of~~for stormwater flow and treatment controls (including conservation areas and LID BMPs) that serve multi-unit residential developments. ~~These education measures~~The literature shall ~~be developed and distributed to the City and new owners during the initial sale of the property. Brochures or plans shall~~ provide the following:

   a. An overview describing the facility (or BMP), its location, function and ~~need for natural resource protection, vegetation retention areas, and LID BMPs~~purpose.

   b. Technical information necessary to ensure long-term performance, including but not limited to, soil characteristics, tree and plant species, and maintenance instructions.~~A description of the tree/plant species located within the vegetation retention areas and guidelines for maintaining the BMPs.~~

   c. Information on any management agreement and plans.

   d. Contacts for questions on maintenance needs and enforcement.

2. The developer shall provide copies of the educational materials first to the City for approval and filing prior to ~~project to completion~~final acceptance of the project, and then to the initial property owner upon sale of the property.

4.23 Enforcement

Enforcement shall be consistent with KMC 13.11.

A. Protection of Watercourses and Facilities. It shall be a ~~civil or~~ criminal violation to break, block, damage, destroy, uncover, deface or tamper with any watercourse, stormwater facility, or erosion control system.

B. Public Nuisance Declared. In addition to other remedies, failure to install and/or maintain watercourses, stormwater facilities, or erosion controls as required in this Manual and applicable permits ~~has been~~is declared to be a public nuisance, subject to abatement as provided by KMC 13.11. ~~or the State of Washington~~.

C. Suspension of Work or Access

1. Access to the municipal stormwater drainage system may be suspended if such termination is needed to abate or reduce an illicit discharge.

2. Work shall be suspended for un-permitted clearing and grading, or for projects that fail to provide required runoff controls for land disturbing activities. After the stop-work period, the Director may allow work on-site to recommence, provided that such work is necessary to ensure compliance with this Manual, permits, or an approved stormwater drainage plan or SWPPP.

3. Resumption of work or reinstatement of connection to the municipal stormwater drainage system, without the prior approval of the City, shall be subject to the civil and/or criminal penalties delineated in KMC 13.11.

D. Financial Liability. The property owner and all persons engaged in development or land-disturbing activity shall be liable, jointly and severally, for all costs incurred by the City in any public nuisance action taken hereunder, or on account of damage or threatened damage to City property or facilities or water bodies, or associated with remedial actions necessitated by the damage or failure to install and/or maintain required stormwater facilities. The City may assess the responsible parties for these costs which shall be a lien on the property, or prorated against the beneficial users of the property, and may be placed on the tax bill and collected as ordinary taxes by the City.