

CITY OF WOODLAND

ORDINANCE NO. 1256

AN ORDINANCE AMENDING TITLE 17 (ZONING) AS IT RELATES TO STORMWATER MANAGEMENT AND ADDING A NEW WOODLAND MUNICIPAL CODE CHAPTER TO TITLE 15 (ENVIRONMENT) THAT COMPREHENSIVELY ADDRESSES STORMWATER MANAGEMENT AS MORE PARTICULARLY SET FORTH HEREIN AND AUTHORIZING A PUBLICATION BY SUMMARY.

FINDINGS OF FACT

The City Council of the City of Woodland finds as follows:

**WHEREAS**, Inadequately controlled stormwater runoff results in increased stormwater runoff volumes, peak flow rates and duration of peak flows in the city's streams, thereby causing flooding and safety hazards, and erosion, scouring, and deposition of sediment;

**WHEREAS**, Untreated stormwater runoff discharges nutrients, metals, oil and grease, toxic materials, and other forms of pollution to the city's surface and ground water resources, thereby endangering their use for recreation, drinking water, and fisheries;

**WHEREAS**, Stormwater problems from new development should be prevented and corrected at the time that such development occurs and that the governmental approval to proceed with new development should be so conditioned;

**WHEREAS**, The most financially sound and most equitable method for financing the improvements necessary to correct existing problems from stormwater runoff and to provide and maintain surface and ground water quantity and quality within drainage basins is for the owners and occupiers of existing properties and future developments within such basins to share the financial burden for such facilities and corrections with other funding sources when available;

**WHEREAS**, The most technically and financially efficient method of addressing problems caused by stormwater runoff is through basin plans;

**WHEREAS**, All procedural requirements of the Woodland Municipal Code (WMC) for these amendments have been met;

**AND WHEREAS**, the Planning Commission held a public hearing on the ordinance on November 15, 2012 and made an affirmative recommendation to the City Council for the ordinance's approval;

ORDINANCE

**NOW THEREFORE, BE IT ORDAINED** by the City Council of the City of Woodland as follows:

- 1. Old Section WMC 17.36.110 – Storm drainage.**

*The existing code section to be repealed reads as follows:*

17.36.110 - Storm drainage.

The C-2 use applicant shall work with the supervisor of public works to provide for effective storm drainage management. At a minimum, storm drainage from the site shall be contained and managed so as not to cause peaks, volume, and flows in the receiving drainage way to measurably increase from present levels. Storm drainage ponds, swales, and other drainage system components shall be incorporated into the overall site design and located so they do not unreasonably impede overall pedestrian or bicycle access to or between buildings.

**2. Old Section WMC 17.44.150 – Storm drainage.**

*The existing code section to be repealed reads as follows:*

17.44.150 - Storm drainage.

The I-1 use applicant shall work with the public works director to provide for effective storm drainage management. Storm drainage shall have two elements, water quality and quantity control (detention). Surface site drainage and detention shall be integrated into the overall landscape design. Detention areas shall be integrated into usable open space. Where possible, drainage solutions/detention basins should be area wide solutions rather than individual site specific solutions. Water quality solutions may be individual site specific or cooperative solutions depending on each land owner's specific needs and requirements.

A. When not inconsistent with this chapter or other provisions of the Woodland Municipal Code, the "Stormwater Management Manual for the Puget Sound Basin" shall be used as the technical manual for guidance as to requirements for erosion and sediment control, runoff control and best management practices.

B. The drainage system and the detention areas shall be designed to adequately contain a twenty-five-year storm without ponding on the development property, or other private property, except within the confines of the designed drainage system.

**3. Old Section WMC 17.46.150 – Storm drainage.**

*The existing code section to be repealed reads as follows:*

17.46.150 - Storm drainage.

The I-2 use applicant shall work with the supervisor of public works to provide for effective storm drainage management. At a minimum, storm drainage from the site shall be contained and managed

so as not to cause peaks, volume, and flows in the receiving drainage way to measurably increase from present levels.

#### **4. Old Section WMC 17.28.190 – Storm drainage.**

*The existing code section to be repealed reads as follows:*

17.28.190 - Storm drainage.

The applicant shall work with the director of public works to provide for effective storm drainage management. At a minimum, storm drainage from the site shall be contained and managed so as not to cause peaks, volume, and flows in the receiving drainage way to measurably increase from present levels.

#### **5. New Ordinance to be added to WMC Title 15 – Environment.**

**NEW ORDINANCE** *(Text to be added as a new WMC Chapter)*

##### **Chapter 15.12**

##### **STORMWATER MANAGEMENT**

Sections:

###### Article I. Introduction

- 15.12.010 Findings.
- 15.12.020 Purpose.
- 15.12.030 Applicability.
- 15.12.040 Definitions.
- 15.12.050 Enforcement.

###### Article II. Standard Requirements

- 15.12.060 Submittal requirements.
- 15.12.070 Water quality treatment.
- 15.12.080 Quantity control.
- 15.12.090 Maintenance and ownership.
- 15.12.100 Other requirements.

###### Article III. Exceptions and Special Cases

- 15.12.110 Basin plans.
- 15.12.120 Regional and subregional facilities.
- 15.12.130 Variances.
- 15.12.140 Other governmental agency projects.
- 15.12.150 Single-family home construction.
- 15.12.160 Small residential projects.
- 15.12.170 Other exemptions.

#### Article IV. Other Provisions

- 15.12.180 Contents of preliminary and final stormwater plans – Technical information report (TIR).
- 15.12.190 Contents of an abbreviated preliminary stormwater plan.

#### Article V. Adopted Basin Plans

- 15.12.200 Reserved.

### **Article I. Introduction**

#### **15.12.010 Findings.**

The council finds that:

- (1) Inadequately controlled stormwater runoff results in increased stormwater runoff volumes, peak flow rates and duration of peak flows in the city's streams, thereby causing flooding and safety hazards, and erosion, scouring, and deposition of sediment;
- (2) Untreated stormwater runoff discharges nutrients, metals, oil and grease, toxic materials, and other forms of pollution to the city's surface and ground water resources, thereby endangering their use for recreation, drinking water, and fisheries;
- (3) Stormwater problems from new development should be prevented and corrected at the time that such development occurs and that the governmental approval to proceed with new development should be so conditioned;
- (4) The most financially sound and most equitable method for financing the improvements necessary to correct existing problems from stormwater runoff and to provide and maintain surface and ground water quantity and quality within drainage basins is for the owners and occupiers of existing properties and future developments within such basins to share the financial burden for such facilities and corrections with other funding sources when available; and
- (5) The most technically and financially efficient method of addressing problems caused by stormwater runoff is through basin plans.

**15.12.020 Purpose.**

The purpose of this chapter is to:

- (1) Prevent surface and ground water quality degradation and prevent erosion and sedimentation of creeks, streams, ponds, lakes, wetlands, and other water bodies;
- (2) Prevent damage to property from increased runoff rates and volumes;
- (3) Protect the quality of waters for drinking water supply, contact recreation, fishing and other beneficial uses;
- (4) Establish sound developmental policies that protect and preserve the city's water resources;
- (5) Protect roads and rights-of-way from damage due to inadequately controlled runoff and erosion;
- (6) Preserve and enhance the aesthetic quality of the city's water resources;
- (7) Protect the health, safety and welfare of the inhabitants of the city;
- (8) Maintain existing ground water levels, in-stream flows, and available water supply volumes; and
- (9) Further the goals of no net change in the quantity of runoff entering streams and no net negative change in the quality of runoff entering streams through the implementation of best management practices.

**15.12.030 Applicability.**

- (1) Unless exempt by WMC 15.10.050, all ground-disturbing activities shall comply with City of Woodland erosion control standards and WMC Chapter 15.10, Erosion Control Ordinance.
- (2) The provisions of this chapter apply to each of the following "development activities":
  - (a) The creation of more than 2,000 square feet of impervious surface or the division of urban single-family residential land creating the reasonable potential for more than 2,000 square feet of additional impervious surface.
  - (b) The addition of more than 1,000 square feet of new impervious surface on existing industrial or commercial parcels.
  - (c) Replacement of existing structures exceeding 5,000 square feet on commercial or industrial parcels.
- (3) The provisions of this chapter also apply to "drainage projects," as defined in WMC 15.12.040.

**15.12.040 Definitions.**

For the purposes of this chapter, the following definitions shall apply:

(1) "Best management practice" or "BMP" means those physical, structural and managerial practices, and prohibitions of practices, that, when used singly or in combination, control stormwater runoff peak flow rates and volumes and prevent or reduce pollution of surface water or ground water.

(2) "Basin plan" means a stormwater management plan adopted by the council and meeting the requirements of Chapter 36.94 RCW.

(3) "City" means the Public Works Director of the City of Woodland or representative(s) designated by the Public Works Director.

(4) "Council" means the City of Woodland City Council.

(5) "Construction" means any site-altering activity, including but not limited to grading, utility construction and building construction.

(6) "Contributing drainage area" means the subject property together with the watershed contributing water runoff to the subject property.

(7) "Design storm" means the rainfall from a storm of 24-hour duration. For example, "two-year storm" means the two-year, 24-hour storm.

(8) "Development activity" means:

(a) The creation of more than 2,000 square feet of impervious surface or the division of urban single-family residential land creating the reasonable potential for more than 2,000 square feet of additional impervious surface;

(b) The addition of more than 1,000 square feet of new impervious surface on existing industrial or commercial parcels; or

(c) The replacement of existing structures exceeding 5,000 square feet on commercial or industrial parcels.

(9) "Development site" means the property on which a development activity is proposed.

(10) "Drainage project" means the excavation or construction of pipes, culverts, channels, embankments or other flow-altering structures in any stream, stormwater facility, or wetland in the City of Woodland.

(11) "Ground water" means water in a saturated zone or stratum beneath the surface of land or below a surface water body (source: WAC 173-200-020).

(12) "Impervious surface" means a hard surface area that either prevents or retards the entry of water into the soil. Examples include, but are not limited to, structures, walkways, patios, driveways, carports, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, haul

roads and soil surface areas compacted by construction operations, and oiled or macadam surfaces. Open, uncovered stormwater facilities are not considered impervious surfaces.

(13) "Natural location" means the location and elevation of those channels, swales, and other nonmanmade conveyance systems as defined by the first documented topographic contours existing for the development site, either from maps or photographs.

(14) "NPDES" means the National Pollutant Discharge Elimination System.

(15) "Peak discharge" means the maximum stormwater runoff rate in cubic feet per second determined for the design storm.

(16) "Project engineer" means a registered professional engineer, licensed in the state of Washington, experienced and knowledgeable in the practice of civil engineering related to stormwater runoff control and treatment, who is responsible for the design and preparation of stormwater plans.

(17) "The Puget Sound Manual" means the State of Washington Department of Ecology's "Stormwater Management Manual for the Puget Sound Basin," February 1992 Edition, and updated errata sheets issued by the City of Woodland may be necessary to correct clear and obvious mathematical and technical errors in manual criteria.

(18) "Regional facility" means a facility designed to treat and control stormwater runoff from a contributing drainage area of at least 40 acres.

(19) "Registered soil scientist" means a professional soil scientist registered with the American Registry of Certified Professionals in Agronomy, Crops and Soils, experienced and knowledgeable in the practice of pedology related to soil survey, who is responsible for design and preparation of soils maps, related soil groups, and identifying soil factors for construction engineering.

(20) "Roof downspout systems" mean disposal systems that infiltrate stormwater runoff from roofs into the ground and meet the requirements stated in WMC 15.12.070(2) for these systems.

(21) "Stormwater facility" means the natural or constructed components of a stormwater drainage system, designed and constructed to perform a particular function, or multiple functions. Stormwater facilities include, but are not limited to: pipes, swales, ditches, open channels, culverts, storage basins, infiltration devices, catch basins, manholes, dry wells, oil/water separators, and sediment basins.

(22) "Stream" shall mean those areas of year-round base flow or where surface waters produce a defined channel or bed at least two feet in width between ordinary high water marks. For the purposes of this chapter, streams shall include both natural channels and manmade channels that were constructed to replace a natural stream.

(23) "Subregional facility" means a facility designed to treat and control stormwater runoff from more than one development in a contributing drainage area of less than 40 acres.

(24) "Wetlands" means those areas defined as wetlands under Chapter 15.08 WMC, Critical Areas Regulation.

**15.12.050 Enforcement.**

The City is authorized to enforce the provisions of this chapter utilizing the remedies and procedures in this code.

**Article II. Standard Requirements**

**15.12.060 Submittal requirements.**

(1) Preliminary Stormwater Plan.

(a) Purpose. The purpose of this plan is to determine whether a proposal can meet the requirements set forth in this chapter. The preliminary stormwater plan shall identify how stormwater runoff originating on the site or flowing through the site is presently controlled and how this will change due to the proposed development activity or drainage project. If the site is within the region covered by a basin plan that is included in Article V of this chapter, then the information needed in the preliminary plan is reduced.

(b) Types of Projects. A preliminary stormwater plan is required for the following activities:

- (i) Short plats;
- (ii) site plan reviews subject to SEPA review;
- (iii) Subdivisions;
- (iv) Conditional use permits; and
- (v) Planned unit developments.

(c) Timing.

(i) A preliminary stormwater plan shall be submitted with the land use application.

(ii) A land use application shall be considered "technically complete" from the standpoint of stormwater information when a preliminary stormwater plan meeting the submittal requirements of this chapter is provided.

(iii) To ensure adequate public review and avoid multiple reviews of preliminary plans by city staff, the preliminary stormwater plan shall not be significantly modified after public notice of the final SEPA determination without issuance of a new SEPA determination.

(d) Contents. The preliminary stormwater plan shall be prepared in the standardized format described in WMC 15.12.180. The purpose of this standardized format is to promote a quick and efficient review of required information and to evaluate the feasibility of the proposed stormwater control and water quality measures.

(e) Modification of Content Requirements. The City may waive in writing some or all of the content requirements in the preliminary stormwater plan if:

(i) The development activity or drainage project is included in an approved final stormwater plan which meets the requirements of this chapter; or

(ii) A basin plan exists that makes some of the information irrelevant.

(f) Review and Approval. For proposals connected with a land use application requiring a public hearing, the preliminary stormwater plan shall be heard and decided in accordance with the procedures applicable to the land use application. All other preliminary stormwater plans shall be acted on by the City within 28 days following submittal of a preliminary stormwater plan meeting the submittal requirements of this chapter.

(g) Appeals. Preliminary stormwater plan decisions may be administratively appealed in conjunction with the associated land use application.

## (2) Final Stormwater Plan.

(a) Purpose. The final stormwater plan provides final engineering design and construction drawings for the stormwater aspects of a proposed development activity or drainage project.

(b) Types of Projects. A final stormwater plan is required for all development activities and drainage projects described in WMC 15.12.030 even when a preliminary stormwater plan is not required under subsection (1)(b) or (e) of this section.

(c) Timing. The final stormwater plan is required and must be approved by the City prior to beginning construction related to a development activity or drainage project.

(d) Contents. The final stormwater plan shall consist of three parts:

(i) The approved preliminary stormwater plan, when required, with an explanation of any differences between the design concepts included in the preliminary stormwater plan and the final engineering plans. A final stormwater plan that differs from the approved preliminary stormwater plan in a manner that, in the opinion of the City, raises material water quality or quantity control issues, shall, if subject to SEPA, require another SEPA determination and, if subject to a public hearing, a second public hearing before the land use hearings examiner.

(ii) Final engineering plans that provide sufficient detail to allow construction of the stormwater facilities. These plans shall be stamped, signed, and dated by the engineer(s) registered in the state of Washington, responsible for hydrologic, hydraulic, geotechnical, structural and general civil engineering design and by the project engineer responsible for the preparation of the final stormwater plan. Additionally, the final engineering plan shall show all utilities to ensure that conflicts between proposed utility lines do not exist.

(iii) A technical information report (TIR).

(A) The TIR shall be a comprehensive report, supplemental to the final engineering plans, containing all technical information and analysis necessary to complete final water quantity and quality engineering plans based on sound engineering practices and careful geotechnical, hydrologic, hydraulic and water quality design.

(B) The TIR shall be stamped, signed and dated by the professional engineer(s), registered in the state of Washington, responsible for hydrologic, hydraulic, geotechnical, structural and general civil engineering design.

(C) The contents and format of the TIR are specified in WMC 15.12.180. This format is intended to serve as a guide to the type of information appropriate in the TIR. The level of detail in the TIR is dependent on the complexity and size of the project.

(e) Modification of Content Requirements. The City may waive, in writing, some of the content requirements in the final stormwater plan if:

(i) The development activity or drainage project is included in an approved final stormwater plan which meets the requirements of this chapter and the applicant demonstrates to the satisfaction of the City that the applicable provisions of the previously approved final stormwater plan will be met;

(ii) The City determines, upon receipt of a letter of request from the applicant, that less information is required to accomplish the purposes of this chapter; or

(iii) A basin plan exists that makes some of the information irrelevant.

(f) Review and Approval.

(i) Final stormwater plans shall be reviewed within 14 days of submittal or resubmittal.

(ii) All final stormwater plans require approval by the City. Approval is only for conformance with City of Woodland standards and does not relieve the engineer of record of responsibility for the design.

(iii) Approval of final stormwater plans does not relieve the applicant from the obligation to comply with this chapter and does not prevent the City from recovering for defective work or violation of this chapter.

(3) As-Built Plans.

(a) As-built plans which accurately represent the project as constructed shall be provided to the City prior to the issuance of building permits for single-family residential subdivisions, the issuance of occupancy permits for projects subject to site plan review, and within 60 days following completion of construction for other projects.

(b) The as-built plans shall include corrected engineering plans for the stormwater system, showing constructed dimensions and elevations. In addition, revisions to the final stormwater plan shall be submitted with the as-built plans where changes which take place during construction significantly alter the calculations and assumptions contained in the plan.

(c) All plans submitted shall be reproducible and submitted in paper and digital CAD files.

(d) The as-built plan submittal shall be stamped, signed and dated by a licensed professional engineer, registered in the state of Washington, certifying that the constructed project is in conformance with the final stormwater plan.

**15.12.070 Water quality treatment.**

(1) General Standards.

(a) All projects shall provide treatment of stormwater runoff through the use of BMPs specified in this section.

(b) Treatment BMPs shall be sized to capture, hold, and treat the water quality design storm, defined as the six-month, 24-hour storm runoff volume.

(c) If site conditions are appropriate and ground water quality will not be impaired, infiltration is the preferred BMP. All discharges to ground water shall comply with the following state laws: "The Water Pollution Control Act" (Chapter 90.48 RCW), "The Water Resources Act" (Chapter 90.54 RCW), and "Water Quality Standards for Ground Waters of the State of Washington" (Chapter 173-200 WAC). Infiltration may be limited near public water supply wells.

(d) The BMPs cited in this section shall be sited, designed, and constructed in accordance with the requirements detailed in the Puget Sound Manual for each BMP, with the following exceptions:

(i) For biofiltration swales (RB.05) and vegetative filter strips (RB.10), alternative design criteria from the publication "Biofiltration Swale Performance, Recommendations, and

Design Considerations – Appendix G” by the Municipality of Metropolitan Seattle, Water Pollution Control Department, dated October 5, 1992, shall be used.

(ii) Where provisions of this chapter conflict with the Puget Sound Manual or other cited design guidance, this chapter shall take precedence.

(e) All discharges to surface waters shall comply with the following state laws: “The Water Pollution Control Act” (Chapter 90.48 RCW) and “Water Quality Standards for Surface Waters of the State of Washington” (Chapter 173-201A WAC).

(2) Standard BMPs.

(a) Standard stormwater treatment BMPs shall be used to treat stormwater throughout the City of Woodland.

(b) Acceptable standard treatment BMPs include the following from the Puget Sound Manual (Chapters III-3, III-4, and III-6):

(i) RI.05 – WQ infiltration basin.

(ii) RI.10 – WQ infiltration trench.

(iii) RI.15 – Roof downspout system.

(iv) RD.09 – Constructed wetland.

(v) RD.06 – Wet pond with marsh.

(vi) RD.05 – Wet pond without marsh.

(vii) RB.05 – Biofiltration swale.

(viii) RB.10 – Vegetative filter strip.

(ix) RF.05 – Sand filtration basin.

(x) RF.10 – Sand filtration trench.

(c) Sand filtration BMPs (RF.05 and RF.10) are not allowed on commercial or industrial sites where the effluent from the treatment systems will drain to ground water.

(d) For biofiltration swales and vegetative filter strips, the hydraulic residence used for design shall be no less than nine minutes. Swale slopes, however, may be less than two percent.

(e) Infiltration BMPs shall not be used as temporary erosion control devices.

(f) Alternative roof downspout systems that provide an equivalent level of performance to the system in the Puget Sound Manual (RI.15) may be approved by the city. Roof downspout systems can be constructed without observation wells.

(3) Source Control BMPs. In addition to the other water quality treatment requirements in this section, commercial, industrial, and public works development activities shall meet the source control BMPs specified in Chapters IV-2, IV-3, and IV-A of the Puget Sound Manual.

(4) Oil/Water Separators.

(a) The following development activities require API or CPS-type oil/water separators:

(i) Industrial machinery and equipment, trucks and trailer aircraft, parts and aerospace, railroad equipment;

(ii) Log storage and sorting yards;

(iii) Airfields and aircraft maintenance;

(iv) Fleet vehicle yards;

(v) Railroads;

(vi) Gas stations;

(vii) Retail/wholesale vehicle and equipment dealers;

(viii) Vehicle maintenance and repair;

(ix) Construction businesses such as paving, heavy maintenance, equipment storage and storage of petroleum products (this does not include construction sites);

(x) Other activities that exhibit a significant risk of high oil loading in runoff.

(b) The following development activities shall require spill control (SC) type oil/water separators:

(i) Restaurants;

(ii) Multifamily residential projects creating parking spaces for 25 or more vehicles;

(iii) Other activities where the risk of oil spills or illegal dumping of oil or grease is significant.

(c) For development activities cited in subsections (4)(a) and (b) of this section, oil/water separators shall not be required on portions of a site where the risk of oil or grease spills or dumping is minimal.

(d) Oil/water separators shall be designed in accordance with Chapter III, Section III-7 of the Puget Sound Manual.

(5) Infiltration BMPs on Industrial and Commercial Sites.

(a) Infiltration of stormwater runoff may not be allowed on commercial and industrial sites, which, due to location or the proposed use, pose a significant threat of contamination to ground water.

(b) Approval for use of infiltration BMPs (RI.05-30 in the Puget Sound Manual) on industrial and commercial sites, including gas stations, shall be conditioned on all the following criteria, unless found inappropriate by the City:

(i) Analysis of the potential for ground water contamination from the site. This analysis shall include a soils and ground water evaluation if deemed appropriate by the City.

(ii) Demonstration that no other feasible alternative exists for disposing of stormwater from the site.

(iii) A "State Waste Discharge Permit," as described in Chapter 173-216 WAC, obtained from the State of Washington Department of Ecology, where required by the state, and other state permits and approvals as appropriate.

(c) The requirements of subsection (5)(a) of this section shall not apply to runoff from portions of a site where the risk of ground water contamination is no greater than single-family residential sites. Examples of these areas include rooftop drainage, runoff from undeveloped portions of a site, and drainage from portions of parking lots where the risk of illegal dumping is minimal.

(d) In cases where infiltration is allowed on commercial and industrial sites and a significant risk of ground water contamination exists, the City may require ground water monitoring to ensure against ground water contamination. The City may also require an agreement from the applicant for full mitigation in the event of ground water contamination.

(e) The provisions of this subsection (5) do not apply to nonindustrial and noncommercial sites that are defined under the NPDES permit system as industrial due to temporary construction activity.

(6) Experimental BMPs.

(a) Experimental best management practices are those which have not been fully tested and evaluated by the Department of Ecology and are not included as accepted practices in this code or the Puget Sound Manual. Experimental BMPs that are adequately tested and proven effective shall be incorporated into this chapter as standard or accepted BMPs in the future.

(b) Experimental BMPs may be allowed if all the following conditions are met:

(i) The experimental BMP usage is part of a Department of Ecology research project;

(ii) Monitoring of the effluent quality produced by the BMP, as well as influent quality, will be conducted for at least two years;

(iii) Results of the research will be published;

(iv) Financing is available to construct the BMP, conduct the testing, and publish the results.

(7) Drainage Structure Labeling and Signage.

(a) All catch basins and manholes capable of accepting stormwater shall be stenciled. The stenciling shall be redone once a year or as necessary to maintain readability. For infiltration systems stenciling shall read: "Dump No Waste – Protect Your Ground Water." For facilities draining to surface waters the stenciling shall read: "Dump No Waste – Drains to Stream."

(b) Signs shall be installed along water quality biofiltration systems that read: "Water Quality Filter – Please Leave Vegetated."

**15.12.080 Quantity control.**

(1) General Standards.

(a) All projects shall provide quantity control of stormwater runoff in accordance with the requirements of this section.

(b) Natural drainage flow routes through streams shall be maintained, and discharges from the site shall occur at the natural location and elevation, to the maximum extent practical.

(c) Transfer of runoff from one basin to another shall not be allowed.

(d) Surface water exiting a parcel shall be discharged with adequate energy dissipaters within the development site to prevent downstream damage.

(e) No reduction of existing conveyance capacity and no net loss of existing storage capacity for the 100-year storm is permitted in special flood hazard areas as defined by the Federal Emergency Management Agency in a scientific and engineering report entitled "The Flood

Insurance Study for the City of Woodland, Washington” revised September 4, 1985. This requirement shall also apply to all areas within the limits of the existing 100-year floodplain, as determined by hydrologic/hydraulic computations in accordance with this chapter, for all streams and manmade channels within the City of Woodland.

(f) Where provisions of this chapter conflict with the Puget Sound Manual or other cited design guidance, this chapter shall take precedence.

## (2) Hydrologic and Hydraulic Analysis.

(a) Hydrologic and hydraulic analysis shall be in accordance with Chapters III-1 and III-2 of the Puget Sound Manual, with the following exceptions:

(i) Table III-1.6, “Hydrologic Soil Groups for Soils in the Puget Sound Basin” is replaced by “Hydrologic Soil Groups for Soils in Clark County” and “Hydrologic Soil Groups for Soils in Cowlitz County”. (Source: SCS TR-55, Second Edition, June 1986, Exhibit A-i. Revisions made from SCS, Soils Interpretation Record, Form No. 5, September 1988). Alternatively, hydrological soil groups can be developed by a registered soil scientist using criteria set in the USDA, SCS National Soils Handbook.

(ii) Appendix AIII-1.1, “Isopluvial Maps for Design Storms” is replaced by “Isopluvial Maps for Design Storms in Cowlitz County”. (Source: NOAA Atlas 2, “Precipitation Frequency Atlas for the Western United States, Volume IX – Washington”).

(iii) The “HEC-1 Flood Hydrograph Package” computer program, developed by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, is an acceptable hydrologic computation program for use in the City of Woodland.

(iv) Design of stormwater collection systems shall be in accordance with Hydraulic Engineering Circular No. 12, “Drainage of Highway Pavements,” 1984 Edition, published by the United States Department of Transportation, Federal Highway Administration (FHWA).

(b) Table III-1.3, “SCS Western Washington Runoff Curve Numbers” of the Puget Sound Manual shall be used to calculate predevelopment and post-development runoff with the following constraints:

(i) Predevelopment land use shall be the typical land use over the past 50 years, as demonstrated by evidence acceptable to the City of Woodland. Alternatively, the land use shown on 1968 aerial photos can be used.

(ii) In areas where the predevelopment land use is determined to be forest, the curve numbers for “undisturbed” forest land shall be used.

(iii) Development activities involving replacement of existing commercial and industrial facilities can assume predevelopment land use equivalent to the facility being replaced.

(c) If surface runoff leaves a development site and the predevelopment runoff calculations do not assume undisturbed forest in determining the runoff curve number, then a hydraulic and hydrologic analysis of the capacity of the downstream conveyance system shall be required.

(i) The analysis shall analyze both the natural and manmade conveyance system to the Lewis River, Horseshoe Lake, and Burris Creek, or a point at least one mile downstream from the development site, whichever is less. This distance may be extended by the city if impacts further downstream are likely due to the development activity.

(ii) Based on the analysis, the system will be assumed to be at capacity if one of the following conditions exists currently or will exist as a result of the proposed development activity:

(A) The conveyance system fails to meet the requirements of this section.

(B) Streams that are part of the conveyance system overflow their banks during a two-year storm.

(C) Significant stream bank erosion is evident.

(D) Existing downstream residences are flooded during the 100-year storm.

### (3) Design Methodology for Quantity Control Facilities.

(a) Except as limited by WMC 15.12.070(5) for commercial and industrial sites, infiltration of the 100-year storm is required for all stormwater discharges from development sites where local soil types and ground water conditions are suitable; provided, that water quality treatment as detailed in WMC 15.12.070 is provided prior to infiltration.

(b) The design infiltration rate for infiltration systems shall be limited to half the percolation rate. Percolation rates shall be tested on-site for all soils.

(c) The City may allow the base of infiltration facilities to be less than three feet above seasonal high water or an impermeable layer if the quality and quantity control requirements of this chapter can be met.

(d) For surface runoff leaving a development site, the following criteria shall be met:

(i) The peak release rate for the two-, 10-, 25- and 100-year design storms after development shall not exceed the respective predevelopment rates.

(e) For development activities where a downstream analysis is performed and the conveyance system is at capacity as defined in subsection (2)(c) of this section, the runoff volumes from the 25- and 100-year design storm after development shall not exceed the predevelopment runoff volumes from the 25- and 100-year storm.

(f) To ensure the standards in this section are met, the volume available for storing runoff in a stormwater facility shall be reduced by:

(i) High seasonal ground water; and

(ii) Assumed starting condition equivalent to an immediately prior two-year storm event.

(g) Design of stormwater control facilities shall be in accordance with the following methods from the Puget Sound Manual (Chapters III-1 and III-3):

(i) Section III-1.4.4 – Hydrograph Routing;

(ii) Section III-1.4.5 – Hydrograph Summation and Phasing;

(iii) Section III-1.4.6 – Computer Applications;

(iv) Section III-3.3 – Feasibility Analysis and General Limitations for Infiltration BMPs;

(v) Section III-3.4 – General Design Criteria for Infiltration and Filtration BMPs;

(vi) Section III-3.5 – Construction and Maintenance;

(vii) Section III-4.3 – General Design Criteria;

(viii) Section III-4.4 – Standards and Specifications for Detention Ponds.

#### (4) Conveyance Systems.

(a) Open channel conveyance systems incorporating water quality treatment, habitat improvement and emergency overland flood relief routes shall be utilized to the maximum extent practicable.

(b) Stormwater conveyance elements to transport water within and from a project site shall be sized to carry flows from the “design storm” from the contributing drainage area based upon the projected full buildout of that contributing drainage area, and be fully compatible with existing downstream conveyance elements and flow conditions.

(c) For stormwater conveyance design, the “design storm” shall be the 100-year storm.

(d) Development sites shall be planned to be able to pass a 100-year storm through the site.

(e) Closed conveyance system elements shall be designed to operate in an open flow, not pressure flow, regime.

(f) Design of conveyance systems shall be in accordance with Chapter III-2 of the Puget Sound Manual.

(g) Design of bridges shall be in accordance with the State of Washington Department of Transportation Bridge Design Standards, 1991 Edition or most current edition.

(h) Stormwater easements shall be provided to the City for access and maintenance of all conveyance systems within the development site which are to be maintained by the City. The minimum widths of easements shall be as follows, although the City may require increased widths when necessary to ensure adequate area for equipment access and maintenance:

(i) Pipes with I.D. less than or equal to 36 inches: 20 feet;

(ii) Pipes with I.D. greater than 36 inches: 20 feet plus pipe I.D.;

(iii) Pipes shall be located with their centerline no closer than one-quarter of the easement width from an adjacent property line;

(iv) Channels: top width of channel plus 15 feet on one side.

(i) Stormwater easements shall be provided to the City for access and maintenance of all streams within a development site.

(i) Easements shall include the land between the top of bank on both sides of the stream.

(ii) Easements shall also include an additional 25 feet adjacent to the top of bank on one side of the stream for equipment and maintenance access, if adequate access is not available in the area between the top of banks.

(iii) Excluded from the easements shall be any existing private structures, such as buildings, which prevent access to the stream.

(j) No buildings or other structures that prevent access are permitted within easements. Fences crossing easements shall provide gates of sufficient width over the easement for access by maintenance vehicles.

(5) Discharge to Large Water Bodies. Projects meeting all the following criteria are exempt from the quantity control requirements of subsections (3)(d) and (e) of this section:

(a) The runoff from the project directly enters the Lewis River, Horseshoe Lake, and Burris Creek.

- (b) Runoff is treated in accordance with the requirements of WMC 15.12.070;
- (c) The discharge and its related structures are approved by the Washington Department of Fish and Wildlife and other appropriate state and federal agencies;
- (d) The discharge structure is designed to avoid erosion during all storms up to the 100-year storm;
- (e) If an existing discharge structure is used:
  - (i) The structure must meet requirements in subsections (3)(d) and (e) of this section; and
  - (ii) The discharge structure and conveyance system leading to the discharge must have adequate capacity to meet the requirements of this chapter.

**15.12.090 Maintenance and ownership.**

(1) City Ownership of Stormwater Facilities.

- (a) Stormwater facilities located within public road rights-of-way shall be owned by the City.
- (b) City ownership of stormwater facilities outside public road rights-of-way is not required and will be considered on a case-by-case basis.
- (c) City ownership of stormwater facilities is required where the City will assume long-term maintenance of the facilities.

(2) Initial Maintenance.

- (a) To ensure satisfactory operation of new stormwater facilities, the applicant constructing the facility shall maintain it for two years after completion of the project.
- (b) In cases where the stormwater facility is within a public road right-of-way or on land owned by the City of Woodland, the applicant constructing the facility, after satisfactory completion of the stormwater facilities and as a condition of acceptance of such facilities by the City of Woodland, shall commence a two-year period of maintenance of the facility. The applicant shall satisfactorily maintain the facility and repair any failure within this two-year period. Additionally, the applicant shall post and maintain a maintenance bond or other security acceptable to the City during this two-year initial maintenance period. The purpose of the maintenance bond is to cover the cost of design defects or failures in workmanship of the facilities. The amount of the maintenance bond shall be 10 percent of the construction cost of the stormwater facilities.

(3) Long-Term Maintenance.

(a) The City of Woodland shall provide long-term maintenance of new stormwater facilities under any of the following situations:

(i) Facilities located in public road rights-of-way; or

(ii) Facilities dedicated to the City of Woodland (dedication to the City of Woodland requires prior approval and acceptance by the City).

(b) If the City of Woodland provides long-term maintenance of a stormwater facility, all the following requirements shall be met:

(i) The requirements in subsection (2) of this section shall be completed;

(ii) The facilities shall be inspected and approved by the City prior to acceptance. Required remedial work to correct design and construction deficiencies shall be completed by the project developer prior to acceptance; and

(iii) All necessary ownerships and easements entitling the City to properly access and maintain the facility shall be conveyed to the City of Woodland and recorded with the county auditor.

(c) For stormwater facilities for which the City of Woodland will not provide long-term maintenance, the applicant shall make arrangements with the existing or future (as appropriate) occupants or owners of the subject property for assumption of maintenance in a manner subject to the approval of the City. Such arrangements shall be approved prior to City approval of the final stormwater plan and completed prior to the end of the two-year initial maintenance period of the applicant's responsibility or in the case of plats, prior to the time of recording.

(d) The City shall inspect privately maintained facilities for compliance with the requirements of this chapter. If the parties responsible for long-term maintenance fail to maintain their facilities to acceptable standards, the City shall issue a written notice specifying required actions to be taken in order to bring the facilities into compliance. If these actions are not performed in a timely manner, the City shall perform this maintenance and bill the parties responsible for the maintenance. The City may record a property lien for all costs associated with the maintenance performed.

(e) Easements or a covenant acceptable to the City shall be provided to the City for purposes of inspection of privately maintained facilities. The minimum dimensions of easements for stormwater facilities are as follows:

(i) Sufficient width around a treatment or storage pond to encompass the pond plus the additional area necessary for equipment accesses;

(ii) Pond design and easements shall allow access to all areas within the pond by standard maintenance equipment vehicles;

(iii) Widths of easements for conveyance facilities shall be as detailed in WMC 15.12.080(4)(l) and (m).

(f) Final plats shall include a note specifying the party(s) responsible for long-term maintenance of stormwater facilities.

**15.12.100 Other requirements.**

**(1) Location of Stormwater Facilities.**

(a) Treatment runoff control and recharge facilities shall be located prior to the point of discharge into a stream, lake, or fish-bearing water or prior to discharge to ground water.

(b) Location of stormwater facilities in relation to wetlands are specified in Chapter 15.08 WMC, Critical Areas Regulation.

(c) Stormwater facilities, other than closed conveyance systems, shall be located at least 100 feet from existing and proposed on-site sewage system drainfields.

(d) Infiltration systems used for stormwater disposal shall be located at least 100 feet from domestic water supply wells.

(e) Swales and other stormwater treatment facilities using biofiltration shall be located outside easements and corridors used by phone, electric, water, natural gas, and other utilities unless the utilities are installed prior to construction of the biofiltration system.

(f) Sites used for stormwater treatment and runoff control facilities shall be owned by the applicant, City, county, or state and:

(i) If the City, county or state owns the site, a letter from the responsible agency allowing use of the site for stormwater control shall be submitted with the preliminary stormwater plan.

(ii) If the City, county or state does not own the site and the proposal involves a development activity, the stormwater control site shall be included for consideration with the land use application for the development activity.

(g) Stormwater treatment and control facilities shall be located on separate tracts which are recommended, but not required, to meet minimum zoning lot size requirements. The plat or other dedication instrument shall indicate tract disposition in the event of City abandonment or vacation.

(2) Protection of Infiltration Systems from Erosion. Stormwater infiltration systems shall be isolated and protected from sedimentation due to erosion during the construction phase of a development activity or drainage project. Furthermore, use of infiltration systems shall be minimized until the erodible parts of a site are stabilized with adequate vegetation.

(3) Fencing of Stormwater Facilities.

(a) Stormwater treatment and runoff control facilities located in or adjacent to residential areas shall be fenced unless these facilities are constructed as part of a project amenity such as a park or the City waives the fencing requirement due to special circumstances.

(b) Stormwater treatment and runoff control facilities, other than those described in subsection (3)(a) of this section, shall be fenced if they pose safety risks to the public.

(c) The size and type of fence shall be determined by the City.

(4) Side Slopes of Stormwater Facilities.

(a) For maintenance and safety reasons, side slopes of stormwater facilities normally shall be no steeper than 4:1.

(b) For facilities to be maintained by the City, vertical slopes are allowed if all the following conditions are met:

(i) No more than 50 percent of the perimeter of the stormwater facility shall have vertical sides except in areas of steep topography where 75 percent of the perimeter may have vertical sides.

(ii) Vertical sides more than three feet high shall be fenced.

(iii) Slopes steeper than 2:1 shall be analyzed for structural stability and shown to be structurally sound.

(iv) Access for maintenance of facilities satisfactory to the City shall be provided.

(v) Side slopes in a biofiltration treatment area shall be no steeper than 4:1.

(c) For facilities that will not be maintained by the City, slopes steeper than 4:1 are allowed if all the following conditions are met:

(i) Side slopes in a biofiltration treatment area shall be no steeper than 4:1.

(ii) Adequate long-term erosion control is provided.

(iii) Slopes steeper than 2:1 shall be analyzed for structural stability and shown to be structurally sound.

(iv) The maintenance and operations manual for the facility shall demonstrate that the facility can be maintained.

(d) Side slope steeper than 4:1 may also be allowed by the City for specialized projects, such as stream bank reconstruction, where all the following conditions are met:

(i) Side slopes do not need to be mowed.

(ii) Adequate long-term erosion control is provided.

(5) Recovering Costs of Stormwater Facilities.

(a) The following costs associated with stormwater facilities may be recoverable through latecomers' agreements (RCW 35.91.010):

(i) Oversizing on-site facilities above their existing capacity or the capacity required for the proposed development;

(ii) A proportionate share of the total cost of off-site facilities.

(b) If a stormwater utility exists, the costs for building or oversizing a stormwater facility may be eligible as a credit against applicable system development charges.

### **Article III. Exceptions and Special Cases**

#### **15.12.110 Basin plans.**

(1) Basin plans are strategies for a watershed designed to protect and enhance surface and ground water within a watershed.

(2) Where conflicts occur, the policies and standards in a basin plan shall supersede the other requirements of this chapter.

(3) To be valid, basin plans must be stamped by a registered professional engineer, adopted by the council and incorporated into this chapter.

(4) Adopted basin plans are identified beginning in WMC 15.12.200.

#### **15.12.120 Regional and subregional facilities.**

(1) If regional or subregional facilities are used to meet some or all of the standard requirements of Article II of this chapter, the following conditions shall be met:

(a) Stormwater runoff shall be transported from a development site to a regional/subregional facility through a pipe or manmade open channel conveyance system.

(b) If the regional/subregional facility does not yet exist, interim quantity control and treatment methods shall be used to meet the standard requirements of Article II of this chapter. All interim methods shall be reviewed and shall require written approval by the City.

(c) The facility must have sufficient capacity to provide the treatment and quantity control specified in Article II of this chapter.

(d) A written commitment from the owner of the facility, or the City, in the case of City facilities, shall be provided that allows use of the facility by the applicant.

(2) Where appropriate, a system development charge shall be assessed for use of a regional/subregional facility.

#### **15.12.130 Variances.**

(1) General.

(a) Variance requests require a public hearing before a City of Woodland hearings examiner. Notice and appeal requirements will be the same as those provided for preliminary subdivision plat applications.

(b) Variances shall be valid only for the life of the land use application permit or approval.

(2) Variances – Hardship. If application of the standard requirements of Article II of this chapter will preclude all reasonable use of a parcel, an applicant can make a written request for a waiver from some or all of the standard requirements of Article II of this chapter. For the variance request to be considered, the applicant must demonstrate all of the following:

(a) The proposed activities will not cause significant degradation of ground water or surface water quality;

(b) The proposed activities comply with all state, local and federal laws, including those related to sediment control, pollution control, floodplain and floodway restrictions, wetland and fish habitat protection;

(c) No material damage to nearby public or private property nor significant threat to the health or safety of people on or off the property will occur; and

(d) The inability to derive any reasonable use of the property is not the result of actions by the applicant in segregating or dividing the property and creating the undevelopable condition after the effective date of the ordinance codified in this chapter.

**15.12.140 Other governmental agency projects.**

The bonding and insurance requirements of WMC 15.12.100(6) shall be waived for development activities and drainage projects undertaken by governmental agencies.

**15.12.150 Single-family home construction.**

The construction of single-family homes, duplexes, and their accessory structures that fall into one of the categories below and meet the conditions stated for that category are exempt from the provisions of Article II (Standard Requirements) and Article IV (Other Provisions) of this chapter. Single-family home construction covered under WMC 15.12.150 will install City approved prescriptive stormwater systems. The City will inspect and approve the installation of these systems before issuing a certificate of occupancy for the structure.

(1) Previously Reviewed and Approved Site. The development site or parcel is included in an approved final stormwater plan that meets the requirements of this chapter or a stormwater plan was approved that provided for detention or retention of runoff from residential lots.

(2) Lots 15,000 Square Feet and Less. Residential structures on lots 15,000 square feet or smaller constructed with roof downspout systems.

(3) Lots 15,000 Square Feet to One and One-Half Acres with Roof Downspout Systems. Lots larger than 15,000 square feet and smaller than or equal to one and one-half acres where the residential structure is constructed with a roof downspout system and the following minimum amounts of storage are provided for stormwater runoff:

(a) Two thousand cubic feet per acre, if the site is unforested at time of occupancy.

(b) Eight hundred cubic feet per acre, if the majority of the site is young second or third growth forest at the time of occupancy.

(c) No storage, if the majority of the site is undisturbed forest at the time of occupancy.

(4) Lots 15,000 Square Feet to One and One-Half Acres without Roof Downspout Systems. Lots larger than 15,000 square feet and smaller than or equal to one and one-half acres where the residential structure is constructed without a roof downspout system and the following minimum amounts of storage are provided for stormwater runoff:

(a) Three thousand cubic feet per acre, if the site is unforested at time of occupancy.

(b) One thousand six hundred cubic feet per acre, if the majority of the site is young second or third growth forest at the time of occupancy.

(c) Five hundred cubic feet per acre, if the majority of the site is undisturbed forest at the time of occupancy.

(5) Lots Larger than One and One-Half Acres. Lots larger than one and one-half acres where the following minimum amounts of storage are provided for stormwater runoff:

- (a) Three thousand cubic feet per acre, if the site is unforested at time of occupancy.
- (b) One thousand five hundred cubic feet per acre, if the majority of the site is young second or third growth forest at the time of occupancy.
- (c) No storage, if the majority of the site is undisturbed forest at the time of occupancy.

**15.12.160 Small residential projects.**

(1) Qualifying Projects. Small residential projects include single-family residential short plats and subdivisions of four lots or less.

(2) Treatment and Runoff Control Requirements.

(a) As an alternative to meeting all the water quality treatment and quantity control requirements specified in WMC 15.12.070 and 15.12.080, small residential projects can utilize the following methods for treating and controlling stormwater runoff:

- (i) Use of roof downspout systems for residential structures.
- (ii) Control of runoff flows through creation of detention volume of at least 8,000 cubic feet per acre of the development site.
- (iii) Use of one of the standard BMPs listed in WMC 15.12.070(2) for treating runoff other than the runoff from roofs.

(b) Small residential projects that utilize the methods identified in subsection (2)(a) of this section shall be exempt from the following sections of this chapter:

- (i) Hydrologic and hydraulic analysis (WMC 15.12.080(2)).
- (ii) Design methodology for quantity control facilities (WMC 15.12.080(3)(b), (c), and (d)).

(3) Information Requirements. The submittal requirements (WMC 15.12.060) for small residential projects are modified as follows:

- (a) An abbreviated preliminary stormwater plan as outlined in WMC 15.12.190 can be substituted for the preliminary stormwater plan.
- (b) A technical information report (WMC 15.12.060(2)(d)(iii)) shall not be required; however, sufficient information and data shall be provided with the final stormwater plan to allow the City to determine conformance with the applicable provisions of this chapter.

**15.12.170 Other exemptions.**

(1) Drainage Projects.

(a) Drainage projects that are not a part of a development activity are exempt from the water quality treatment provisions of this chapter (WMC 15.12.070).

(b) For drainage projects that are not part of a development activity, the City may waive all or parts of the submittal requirements (WMC 15.12.060), maintenance and ownership requirements (WMC 15.12.090), and bonding and insurance requirements (WMC 15.12.100(6)) if the project meets the other appropriate parts of this chapter.

**Article IV. Other Provisions**

**15.12.180 Contents of preliminary and final stormwater plans – Technical information report (TIR).**

The technical information report, which is part of the preliminary and final stormwater plans, shall contain the following information:

(1) Table of Contents.

(a) List of section headings and their respective page numbers;

(b) List of tables with page numbers;

(c) List of figures with page numbers;

(d) List of attachments, numbered;

(e) List of references.

(2) Site Location Map. The site location map (minimum USGS 1:24,000 quadrangle topographic map), shall be as required for the preliminary stormwater plan, updated to reflect additional data or revisions to concepts established in preliminary stormwater plan.

(3) Development Plan. The development plan, which can be combined with the final engineering plans, shall be as required for the preliminary stormwater plan with the following additional information:

(a) Delineate subbasins and show sub-basin acreage used in hydraulic/hydrologic calculations;

(b) Existing and proposed contours (two-foot maximum contour interval);

(c) Show directions and lengths of overland, pipe, and channel flow;

(d) Indicate outfall points and overflow routes for the 100-year storm;

(e) Show storage volumes, pipe and weir invert elevations, and lengths of weir for stormwater control facilities;

(f) Show all existing and proposed easements and rights-of-way.

(4) Soils Map. A soils map as required for the preliminary stormwater plan.

(5) Section A – Project Overview.

(a) Identify and discuss existing stormwater system functions.

(b) Identify and discuss site parameters influencing stormwater system design.

(c) Describe drainage to and from adjacent properties.

(d) Generally describe proposed site construction, size of improvements, and proposed methods of mitigating stormwater runoff quantity and quality impacts.

(6) Section B – Approval Conditions Summary. List each preliminary approval condition related to stormwater control, wetlands, floodplains, and other water-related issues and explain how design addresses or conforms to each condition.

(7) Section C – Downstream Analysis. If this information is required in accordance with WMC 15.12.080(2)(c), then the analysis shall include:

(a) Reference downstream analysis provided in the preliminary stormwater plan and identify any revisions to this analysis.

(b) Identify criteria and assumptions used in completing downstream analysis and their sources.

(c) Complete detailed hydrologic analysis of manmade and natural downstream system in accordance with WMC 15.12.080. Compute existing and proposed peak flows and volumes for the design storms at all discharge points both to and from the site and at downstream stormwater control structures. Calibrate and verify hydrologic models using existing rainfall and stream flow records, where available. Verify reasonableness of results by comparison with results from alternative engineering methods and comparison with available reports and studies. Discharge points should refer to labeled points shown on the site location map.

(d) Tabulate existing and proposed peak flows and volumes. Include and reference all hydrologic and hydraulic computations in the technical appendix.

(e) Verify hydrologic and hydraulic computations in the field by observation and measurement of significant rainfall events, where possible, evaluation of stream erosion, high water marks (e.g., lines of permanent vegetation and debris lines) and other hydrologic and hydraulic

verification techniques. State whether the downstream system is at capacity and describe how runoff from the proposed project will impact the capacity of the system. Describe how the design of the stormwater facilities on the development site addresses the impacts.

(8) Section D – Quantity Control Analysis and Design.

(a) Hydrologic analysis, existing and developed conditions:

- (i) Identify criteria used in completing analyses and their sources.
- (ii) Identify and discuss any assumptions made in completing analysis.
- (iii) Tabulate acreage; imperviousness; curve number; length and grade of overland, pipe, and channel flow; and other hydrologic parameters used in completing analyses.
- (iv) Complete detailed hydrologic analysis for existing and developed site conditions in accordance with the requirements of WMC 15.12.080. Compute existing and developed peak flows and volumes for the design storms for all subbasins. Refer to labeled points shown on the site location map and development plan.
- (v) Include and reference all hydrologic and hydraulic computations in the technical appendix.
- (vi) Include all maps, exhibits, graphics, and references used to determine existing and developed site hydrology.

(b) Quantity Control System Design.

- (i) Reference conceptual design proposed in the preliminary stormwater plan.
- (ii) Identify revisions to conceptual design contained within the final engineering plans.
- (iii) Identify and discuss geotechnical or pedological study or information used in completing analysis and design.
- (iv) Identify criteria used in completing analyses and their sources.
- (v) Identify initial conditions including stream base flows, beginning water surface elevations, hydraulic or energy grade lines, initial ground water elevation, beginning storage volumes, and other data or assumptions used to determine initial conditions in order to complete analyses. Reference sources of information.
- (vi) Identify and discuss any assumptions used in completing analysis.

(vii) Complete detailed hydrologic/hydraulic analysis of all on-site stormwater control facilities impacted by the proposal, in accordance with the requirements of WMC 15.12.080. Compute inflow and outflow hydrographs and peak flows and storage volumes. Reference conveyance and stormwater control facilities to labeled points shown on the development plan.

(viii) Tabulate existing and proposed peak flows and storage volumes.

(ix) Include and reference all hydrologic and hydraulic computations, equations, rating curves, stage/storage/discharge tables, graphs and any other aides necessary to clearly show methodology and results in the technical appendix.

(x) Summarize results of quantity control system analyses and describe how the proposed design meets the requirements of this chapter.

(xi) Include all maps, exhibits, graphics and references used to complete quantity control system analysis and design.

(c) Quantity Control System Plan.

(i) Provide illustrative sketch of quantity control facility and its appurtenances.

(ii) Show basic measurements necessary to confirm storage volumes.

(iii) Show all orifice, weir, and flow restrictor dimensions and elevations.

(iv) Tabulate peak flow rates, storage volumes, and ponding elevations for all design storms.

(v) Sketch shall correspond with final engineering plans. Alternatively, final site grading plan incorporating the above information may be included as an attachment to the final stormwater plan.

(9) Section E – Conveyance Systems Analysis and Design.

(a) Reference conceptual drainage design proposed in the preliminary stormwater plan.

(b) Identify revisions to conceptual drainage design contained within the final stormwater plan.

(c) Identify criteria used in completing analyses and their sources.

(d) Identify and discuss initial conditions including stream base flows, beginning water surface elevations, hydraulic or energy grade lines, beginning storage elevations, and other data or

assumptions used to determine initial conditions in order to complete analyses. Reference sources of information.

(e) Identify and discuss assumptions used in completing analyses.

(f) Complete detailed hydraulic analysis of all proposed collection and conveyance system elements and existing collection and conveyance elements influencing the design or impacted by the proposal, including outfall structures and outlet protection, in accordance with WMC 15.12.080. Compute and tabulate design flows and velocities and conveyance element capacities for all conveyance elements within the development. Compute existing 100-year floodplain elevations and lateral limits for all channels, and verify no net loss of conveyance or storage capacity from development. Reference conveyance system elements to labeled points shown on the site location map or development plan.

(g) Verify capacity of each conveyance system element to convey design flow and discharge at nonerosive velocities. Verify capacity of on-site conveyance system to convey design flows resulting from ultimate buildout of upstream areas.

(h) Include and reference all hydraulic computations, equations, pipe flow tables, flow profile computations, charts, nomographs, detail drawings and other tabular or graphic aids used to design and confirm performance of conveyance systems in the technical appendix.

(i) Summarize results of system analyses and describe how the proposed design meets the requirements of this chapter.

(j) Provide a conceptual drainage design in the preliminary stormwater plan.

#### (10) Section F – Water Quality Design.

(a) Reference conceptual water quality design proposed in the preliminary stormwater plan.

(b) Identify revisions to conceptual water quality design contained within the final stormwater plan.

(c) Identify geotechnical or soils study or other information used in completing analysis and design.

(d) Identify best management practices used in design and their sources.

(e) Identify and discuss initial conditions including ground water elevations, beginning storage elevations, and other data or assumptions used to determine initial conditions in order to complete analyses. Reference sources of information.

(f) Identify and discuss assumptions used in completing analysis.

(g) Complete detailed analysis and design of all proposed water quality system elements in accordance with WMC 15.12.070. Reference water quality system elements to labeled points shown on the site location map or development plan.

(h) Include and reference all computations, equations, charts, nomographs, detail drawings and other tabular or graphic aids used to design water quality system elements in the technical appendix.

(i) Summarize results of water quality design and describe how the proposed design meets the requirements of this chapter.

(j) Provide a conceptual water quality design in the preliminary stormwater plan.

(11) Section G – Soils Evaluation.

(a) Identify on-site soil types and their erosive potential and discuss their suitability for implementation of proposed best management practices (BMPs) and quantity control facilities.

(b) Identify seasonal high water table elevations in cases where this will impact the stormwater facilities.

(c) Identify and discuss soil parameters and design methods for use in hydrologic and hydraulic design of proposed facilities.

(d) Where infiltration BMPs are proposed, complete soil tests to determine the infiltration rates. In some cases the City may require additional geotechnical investigation, in accordance with the requirements of Section III-3.3.3 of the Puget Sound Manual.

(12) H – Special Reports and Studies. Where specific site characteristics, such as steep slopes, wetlands, and sites located in wellhead protection areas, pose difficult drainage and water quality design problems, the city may require additional information or the preparation of special reports and studies which further address the specific site characteristics, the potential for impacts associated with the development, and the measures which would be implemented to mitigate impacts. Special reports shall be prepared by professional persons with expertise in the particular area of analysis, who shall date, sign, stamp and otherwise certify the report. Subjects of special reports may include, but not be limited to, the following:

(a) Geotechnical/pedological;

(b) Wetlands;

(c) Floodplains and floodways;

(d) Ground water;

(e) Structural design;

(f) Fluvial geomorphology (erosion and deposition). All special reports and studies shall be included in the technical appendix, or as an attachment to the TIR.

(13) Section I – Other Permits. Construction of roads and stormwater facilities may require additional water-related permits from other agencies. These additional permits may contain requirements that impact design of the stormwater system. This section shall list the titles of all other required permits, the agencies requiring the permits, and identify the permit requirements, if known, that affect the final stormwater plan. Approved permits that are critical to the feasibility of the stormwater facility design shall be included in this section. Examples of other permits are as follows:

(a) Wetland permit;

(b) On-site sewage disposal: Southwest Washington Health Department or Washington Department of Health;

(c) Developer/local agency agreement: Washington State Department of Transportation;

(d) Short-term water quality modification approval: Washington State Department of Ecology;

(e) Hydraulic project approval: Washington State Departments of Fisheries and Wildlife;

(f) Dam safety permit: Washington State Department of Ecology;

(g) Section 10, 404, and 103 permits: U.S. Army Corps of Engineers;

(h) Surface mining reclamation permits: Washington State Department of Natural Resources;

(i) Floodplain permit;

(j) Shoreline management permit.

(14) Section J – Ground Water Monitoring Program. Where required under WMC 15.12.070, a ground water monitoring program shall be included in the final stormwater plan. The ground water monitoring program shall be prepared by a person with expertise in ground water contamination investigation, prevention, and monitoring, and shall clearly describe a comprehensive ground water testing and evaluation program designed to ensure compliance with federal and state of Washington laws and the requirements of this chapter. Proposed ground water monitoring programs will be reviewed by the City on a site-specific basis.

(15) Section K – Maintenance and Operations Manual. For each stormwater control or treatment facility which is to be privately maintained and for those which constitute an experimental system under WMC 15.12.070(6) to be maintained by the City, the project engineer shall prepare a maintenance and

operations manual. The manual, which may be brief, shall be clearly written in an orderly and concise format that clearly describes the design and operation of the facility. The manual shall also provide an outline of required maintenance tasks with recommended frequencies at which each task should be performed. Use of the maintenance procedures outlined in the Puget Sound Manual for various BMPs is encouraged.

(16) Section L – Technical Appendix. All technical information reports shall contain a technical appendix, including all computations completed in the preparation of the TIR together with copies of referenced data, charts, graphs, nomographs, hydrographs, maps, exhibits, and all other information required to clearly describe the stormwater runoff quantity and quality design for the proposed project. The format of the technical appendix shall follow as closely as possible the section format of the TIR, and shall be adequately cross-referenced to ensure that the design may be easily followed, checked, and verified. The technical appendix shall also contain all special reports and studies, other than those included as attachments to the TIR.

**15.12.190 Contents of an abbreviated preliminary stormwater plan.**

An abbreviated preliminary stormwater plan is allowed for certain projects specified in WMC 15.12.160. These plans shall contain the information listed below. All maps shall contain a scale and north arrow. Ensuring the accuracy of all the information is the applicant's responsibility.

(1) Vicinity Maps. All vicinity maps shall clearly show the site of the development activity or drainage project.

(a) Site Location Map. Minimum USGS 1:24,000 quadrangle topographic map showing natural and manmade drainage features adjacent to site including existing and proposed (if known) stormwater facilities.

(b) Other Maps. The following additional vicinity maps shall be required in the situations noted below:

(i) Floodplains. If a floodplain mapped by FEMA exists on or adjacent to the site.

(ii) Shoreline Management Area. If the site contains or is adjacent to a stream or lake regulated under the State Shorelines Management Act.

(2) Preliminary Development Plan. The preliminary development plan shall show the character of the existing site and proposed features, including but not limited to:

(a) Existing and proposed property boundaries, easements and rights-of-way;

(b) Existing contours with a five-foot maximum contour interval, unless the city determines a lesser interval is sufficient to show drainage patterns;

- (c) Existing on-site water wells, known agricultural drain tiles, areas of potential slope instability, structures, utilities, and septic tanks and drainfields;
- (d) Location of the 100-year floodplain and floodways and shoreline management area limits on the site;
- (e) Existing water resource features on and adjacent to the site including streams, wetlands, springs, sinks, and stormwater facilities;
- (f) Drainage flow routes and existing discharge points to and from the site; and
- (g) Approximate location and size of proposed stormwater facilities, including typical cross-sections of proposed facilities.

(3) Additional Site and Vicinity Information.

- (a) If wetlands exist on the site and will be impacted by the proposal, a wetland delineation report may be required.
- (b) If unstable or complex soil conditions exist which may significantly impact the design of the stormwater facilities, the city may require a preliminary soils report to be completed that addresses stormwater design considerations arising from soil conditions.
- (c) The City may require additional site or vicinity information if needed to determine the feasibility of the stormwater proposal.

(4) Preliminary Stormwater Design Report. A written narrative shall be required to accompany the preliminary stormwater plan. The narrative shall describe the methods for meeting the requirements of this chapter and include the following information:

- (a) Listing of approximate volumes of runoff storage required;
- (b) Listing of tested percolation rates at sites to be used for infiltration, if required;
- (c) Listing of proposed BMPs which will meet the treatment requirements of this chapter and are appropriate for the site;
- (d) Description of the approximate size and location of stormwater facilities on the site;
- (e) Discussion of who will maintain the facility(s) after completion and proposed method of funding for maintenance if the facility(s) will be privately maintained; and
- (f) Listing of additional permits (e.g., wetland, floodplain, and shoreline management permits) that may be required in connection with the stormwater facilities.

Article V. Adopted Basin Plans

15.12.200 Reserved.

6. Severability

If any section, sentence, clause or phrase of this ordinance should be held to be invalid or unconstitutional by a court of competent jurisdiction, such invalidity or constitutionality shall not affect the validity or constitutionality of any other section, sentence, clause or phrase of this ordinance.

7. Effective date

This ordinance shall become effective five (5) days after its publication in the media or paper of record as required by law.

8. Publishing

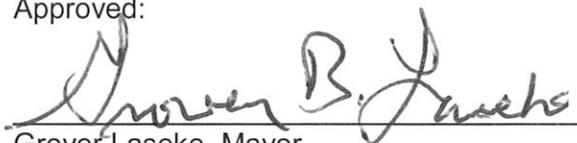
A Summary of this Ordinance shall be published.

This ordinance shall be in full force and effect five days after publication as required by law.

ADOPTED IN OPEN MEETING 7 day of January, 2013.

CITY OF WOODLAND, WASHINGTON

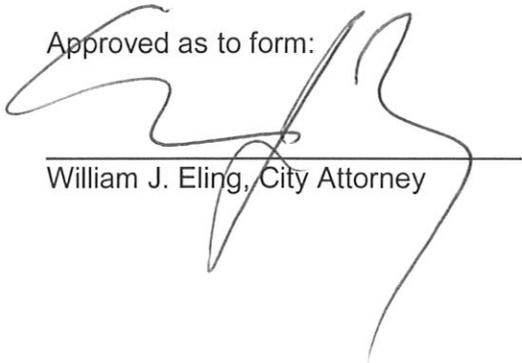
Approved:

  
Grover Laseke, Mayor

Attest:

  
Mari E. Ripp, Clerk / Treasurer

Approved as to form:

A handwritten signature in black ink, consisting of several loops and a long tail, positioned above a horizontal line.

William J. Eling, City Attorney

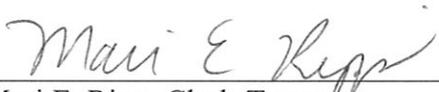
**SUMMARY OF ORDINANCE NO. 1256**  
**OF THE CITY OF WOODLAND, WASHINGTON**

On January 7, 2013 the City Council of the City of Woodland, Washington, approved Ordinance No. 1256 the main point of which may be summarized by its title as follows:

**AN ORDINANCE AMENDING TITLE 17 (ZONING) AS IT RELATES TO STORMWATER MANAGEMENT AND ADDING A NEW WOODLAND MUNICIPAL CODE CHAPTER TO TITLE 15 (ENVIRONMENT) THAT COMPREHENSIVELY ADDRESSES STORMWATER MANAGEMENT AS MORE PARTICULARLY SET FORTH HEREIN AND AUTHORIZING A PUBLICATION BY SUMMARY.**

The full text of this ordinance will be mailed upon request.

APPROVED by the City Council at their meeting of January 7, 2013.

  
\_\_\_\_\_  
Mari E. Ripp, Clerk-Treasurer

Published: January 16, 2013  
Effective: January 21, 2013