City of West Linn
Public Works Design Standards

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SECTION TWO – STORM DRAIN REQUIREMENTS

2.0000 STORM DRAINS

2.0010 General Design Requirements

Performance Standards - 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. For situations not specifically addressed in these standards, the current edition of the City of Portland Stormwater Management Manual may be used as guidance. Each case will be reviewed for approval by the City Engineer. The design must ensure future extension of the drainage system to the entire drainage basin in conformance with the current adopted Surface Water Master Plan and these Design Standards. These provisions include:

1. Surface or subsurface drainage, caused or affected by the changing of the natural grade of the existing ground or removal of natural ground cover or placement of impervious surfaces, shall not be allowed to flow over adjacent public or private property in a volume or location materially different from that which existed before development occurred, but shall be collected and conveyed in an approved manner to an approved point of disposal.
2. Surface water entering the subject property shall be received at the naturally occurring locations and surface water exiting the subject property shall be discharged at the natural locations with adequate energy dissipaters within the subject property to minimize downstream damage and with no diversion at any of these points.
3. The approved point of disposal for all storm water may be a storm drain or a detention or retention pond approved by the City Engineer. Existing open channels, creeks or streams are approved points of disposal after the stormwater has been treated for water quality. Acceptance of suggested systems will depend upon the prevailing site conditions, capacity of existing downstream facilities, and feasibility of the alternate design.
4. When private property must be crossed in order to reach an approved point of disposal, it shall be the developer's responsibility to acquire a recorded drainage easement (of dimensions in accordance with those included in ***Subsection 2.0024, Easements***). Temporary drainage ditch facilities, when approved, must be engineered to contain the storm water without causing erosion or other adverse effects to the private property.
5. The peak discharge from the subject property may not be increased from conditions existing prior to the proposed development, except where it can be satisfactorily demonstrated by the applicant that there is no adverse impact.
6. Where onsite retention is not feasible due to prevailing site conditions, detention facilities will be required to maintain surface water discharge rates at or below the existing design storm peak discharge, except where it can be demonstrated by the applicant that no adverse impact will result from not providing said facilities.
7. Permanent stormwater quality control facilities will be required for all new development creating or replacing more than 500 square feet of impervious area.
8. Drainage from roofs, footings, and downspouts may drain directly to a street through the curb under the following circumstances:
    a. A stormwater quality control facility, adequately sized to treat the additional impervious area, is located downstream of the proposed connection,
    b. The building pad ground elevation is at least 2 ft. above the existing street curb, and

c. The existing street is adequately crowned to avoid sheet flow across the street. This requirement will be waived if curb and gutter (monolithic) is existing or installed across the street.

9. Vegetation shall be established on areas disturbed by/or on areas of construction, as necessary, to minimize erosion in accordance with Erosion Control Design Standards.

   a. All storm drain system designs shall make adequate provisions for collecting all stormwater run-off. The system shall accommodate all run-off from upstream tributary areas whether or not such areas are within the proposed development. The amount of run-off to be accommodated shall be based upon ultimate development of all upstream tributary areas.

   b. Proposed storm drain systems shall not discharge flows into inadequate downstream systems unless approved by the City Engineer.

   c. Public storm lines shall be located within the public right-of-way as directed by the City Engineer, per ***Subsection 2.0021, Right-of-Way Location***. These lines are placed in the public right-of-way for ease of maintenance and access, control of the facility, operation of the facility, and to provide required replacement and/or repair.

10. Applicant must obtain all necessary permits (Division of State Lands, Army Corps of Engineers, Oregon Department of Fish and Wildlife, etc.)

2.0011 Site Drainage Plans

A. Existing Drainage Plan - Provide a topographical contour map defining existing conditions to include the following minimum information:

   1. Two-foot contour intervals; slopes over 10% may use 5 ft. intervals; extend contours a minimum of 100 ft. beyond property.

   2. All structures, buildings, parking lots, and utilities on the property.

   3. Locations of all existing drainage facilities and water courses, including wetlands and floodplain areas.

   4. Locations of all subsurface water outlets (e.g., springs).

   5. Arrows to indicate direction of flow for all drainage information.

B. Proposed Drainage Plan - Show proposed site grading and drainage facilities on a topographical contour map. Unless the detail for proposed improvements will obscure the conditions shown on the existing drainage plan, proposed site grading and drainage may be shown on the existing drainage plan. The following minimum information shall also be shown:

   1. Finished contours of the property, after development, at 2 ft. or 5 ft. intervals as required.

   2. Percent grade for graded slopes; elevations, dimensions and locations for all graded slopes.

   3. Cut/fill areas; structural fill placement areas; erosion/sedimentation control methods; reseeding areas.

   4. All proposed drainage facilities - public and private systems; paved areas, curbs, sidewalks; drainage ditches, culverts.

C. Drainage Calculations - Furnish such supporting information as required per ***Subsection 1.2040, Supporting Information.***

D. Detention Requirements - All proposed development will be required to use adequate drainage management practices. Developments located within a master planned drainage basin will follow the recommendations adopted in that plan. On-site storm detention shall be constructed to ensure that new construction and development does not increase flooding or erosion downstream.

E. Water Quality Requirements – New development and other activities that create new impervious surfaces greater than 500 square feet, including the replacement of existing impervious areas, shall construct permanent water quality facilities to reduce contaminants entering the storm and surface water system.

2.0012 Pipe Materials and Size

A. All public storm drains shall be constructed with concrete, PVC, or HDPE smooth interior, corrugated exterior pipe as specified in **DIVISION SIX–STORM DRAIN TECHNICAL REQUIREMENTS**, of the West Linn Public Works Standard Construction Specifications. Ribbed PVC pipe is the preferred pipe for storm drains of 24 in. or less in diameter. Greater than 24 in. shall be reinforced concrete unless approved otherwise by the City Engineer. Where required for additional strength, ductile iron pipe or concrete pipe meeting the requirements of **DIVISION SIX– STORM DRAIN TECHNICAL REQUIREMENTS**, shall be used.

B. Concrete pipe is the strongly preferred material for culvert applications. Before corrugate aluminum alloy pipe may be used for culvert applications, applicant must demonstrate that concrete pipe is either impractical or unavailable. Additionally, any corrugated aluminum alloy pipe requested must be accompanied by certification of it having a 75-year design life, and must be specifically approved by the City Engineer.

C. Private storm drain pipe shall meet the requirements of the Uniform Plumbing Code.

D. All public storm drain main lines shall be a minimum of 12 in. in diameter. All lateral lines to catch basins and other inlet structures shall be a minimum of 10 in. in diameter. Storm drain lines, which convey water from building rain drains and/or footing drains, may be a minimum of 4 in. in diameter, except where 3 in. are acceptable under sidewalks and curbs. All pipe shall have rubber gasket joints.

2.0013 Minimum Design Criteria

A. Storm Detention Facility

1. Storm detention facilities shall be designed to provide storage up to the 25-year storm event, with the safe overflow conveyance of the 100-year storm event. Calculations of site discharge for both the existing and proposed conditions shall be required using the Unit Hydrograph Method.

2. Storms to be evaluated shall include the 2, 10, 25, and 100-year events. Allowable post-development discharge rate for the 2, 10, and 25-year events shall be that of the pre-development discharge rate. An outfall structure such as a “V-Notch” weir or a single or multiple orifice structure shall be designed to control the release rate for the above events. No flow control orifice smaller than 1 in. shall be allowed. If the maximum release rate cannot be met with all the site drainage controlled by a single 1 in. orifice, the allowable release rate provided by a 1 in. orifice will be considered adequate as approved by the City Engineer.

3. Hydrologic analysis methods to be used in conjunction with and/or to support the Unit Hydrograph Method, shall follow commonly accepted hydrologic principles and practices for drainage/sub-drainage area delineation, estimating time of concentration, time of travel, loss rates, curve numbers, pervious and impervious land coverages, and hydrograph routing/combining methods.

4. Reference sources for commonly accepted hydrologic principles and practices include:

   a. Oregon Department of Transportation – Hydraulics Manual

   b. City of Portland Bureau of Environmental Services – Sewer and Drainage Facilities Design Manual

B. Water Quality Facility

1. All Water Quality Facilities shall meet the design requirements of the current edition of the City of Portland Stormwater Management Manual, as amended and adopted by the City of West Linn and the requirements of ***Subsection 2.0050, Water Quality Facilities*** of this manual.

C. Conveyance Piping

1. Time of Concentration - overland flow of run-off to the initial catchment point into the storm drain system shall be a minimum of 5 min.
2. Velocity and Slope - All storm drains shall be on a grade, which produces a mean velocity, when flowing full, of at least 2 ft. per second. The slope shall not be less than 0.0055.
3. Velocity in Natural Channels - Control of discharge from developed areas to natural channels shall be such that the average velocity resulting from all design storms less than or equal to the 10-year event remains below the erosive velocity of the channel.
4. Manning's Equation - When calculating minimum pipe slopes and velocities, the Design Engineer shall use the Manning pipe friction formula.
5. Pipe Coefficient - the storm drain pipe roughness coefficient to be used in the Manning formula shall be not less than 0.013.
6. Design Storm – The minimum design storm is the 10-year event.

2.0014 Culverts

A. Culverts at road crossings in natural, perennial channels shall be designed to pass the peak discharge for the 25 year design storm such that the headwater:

1. Does not exceed 1.5 times the culvert diameter; OR
2. Remains at least 1 ft. below the roadway subgrade, whichever is less.
3. Does not go over top of the road for 100 year storm event.

B. Culverts must allow for fish passage and must meet the requirements of the Division of State Lands, Army Corps of Engineers and Oregon Division of Fish and Wildlife. Bottomless culverts must be installed at locations that are required by the Oregon Department of Fish and Wildlife, and/or the National Marine Fisheries Service. Additionally, it is recommended that bottomless culverts also be installed at other locations unless it is economically unfeasible, or site conditions do not allow for this type of culvert to be installed. Approval from the City Engineer for other than bottomless culvert must be obtained prior to installation.

2.0015 Bridges

New and replacement bridges over natural, perennial channels shall be designed to pass the 100 year peak discharge from the tributary area assuming full development. Vertical clearance between the design water surface and the bottom of any part of the bridge shall be a minimum of 2 ft., or 25% of the mean channel width between ordinary high water marks at the crossing, whichever is greater.

2.0020 Alignment and Cover

2.0021 Right-of-Way Location

Storm drain lines shall generally be located 5 ft. south and east from right-of-way centerline. All changes in direction of pipe shall be made at an approved structure.

2.0022 Curvature

Storm drain lines shall not be curved between structures.

2.0023 Minimum Cover

A. All storm drains shall be laid at a depth sufficient to protect against damage by traffic and to drain building footings where practical. Sufficient depth shall mean the minimum cover from the top of the pipe to finish grade at the storm drain alignment.

B. Minimum cover shall be 30 in. above the top of the bell of pipe in paved areas and 36 in. at all other locations. If minimum cover requirements cannot be met, then additional strength measures shall be required.

C. In areas of relatively flat terrain, the Design Engineer shall show that sufficient depth is provided at the boundary of the development to properly drain the remainder of the upstream basin tributary area to the site.

2.0024 Easements

A. When it is necessary to locate storm drains in easements, the storm drain shall be centered in the easement. All storm drain easements shall be exclusive and shall not be used for any purpose which would interfere with the unrestricted use of the storm drain line. Exceptions to this requirement will be reviewed on a case by case basis (e.g., a utility corridor in a new subdivision).

B. Easements for storm drain lines 18 in. or less in diameter shall have a minimum width of 15 ft. All pipe lines greater than 18 in. in diameter shall have a minimum width of 20 ft. Larger widths may be required for special circumstances, such as excessively deep pipe or location of building near the easement.

C. Open channels shall have easements sufficient in width to cover the 100-year Floodplain Line when a 100-year design storm is required, or 15 ft. from the waterway centerline, or 10 ft. from the top of the recognized bank, whichever is greater. A 15 ft. wide access easement shall be provided on both sides of the channel for channel widths greater than 14 ft. at the top of the recognized bank.

D. Easement locations for public storm drains serving a PUD, apartment complex, or commercial/industrial development shall be in parking lots, private drives, or similar open areas which will permit unobstructed vehicle access for maintenance.

E. All easements must be furnished to the City Engineer for review and approval prior to recording.

F. Minimum width of an access easement from an existing public road to a drainage facility shall be 15 ft.

G. Easements shall state that the City will not in any way be responsible for replacing landscaping including any shrubs or trees, fencing, or other structures that may exist or have been placed in the easement.

H. Easements may be required, as necessary, to accommodate upstream drainage from future development.

2.0025 Relation to Watercourses

Storm drain lines shall enter a creek or drainage channel at 90° or less to the direction of flow. The outlet shall have a head wall and scour pad or rip rap to prevent erosion of the existing bank or channel bottom. The size of pipe or channel being entered will govern which protective measures are required.

2.0030 Structure Location

2.0031 Manholes

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

B. No drops are allowed unless approved by the City Engineer

C. Manhole spacing shall not be greater than 500 ft.

D. Standard manholes are required when rim to crown of pipe elevations exceed 4 ft. at pipe junctions. Flat-top manholes shall be used when rim to crown of pipe elevations are less than 4 ft.

E. At locations where the downstream pipe size is greater than the upstream pipe size, the crown of all upstream pipes shall not be lower than the crown of the downstream pipe.

F. Manholes shall not have open grate lids with the intent to receive surface flows except in special circumstances approved by the City Engineer. Catch basins or gutter inlets shall typically be used.

G. Manholes shall have 16-hole lids. Tamper proof lids will be required on manholes outside vehicle or pedestrian travel ways. Rims shall be 1 ft. above the finished grade if not in a paved area.

H. All manholes, ditch inlets, etc. shall be within 10 ft. of an access road capable of supporting and allowing access to a loaded maintenance vacuum truck.

I. A pollution control manhole shall be provided prior to any water quality facility. The pollution control manhole shall intercept all water from the site prior to its entry to the water quality facility (see ODOT Standard Drawing RD340).

2.0032 Gutter Inlets / Catch Basins

A. Gutter inlets shall be located in streets at the curbline to receive stormwater run-off and convey it to the main storm drain. Where gutter inlets cannot be installed because of physical limitations, catch basins may be installed with approval from the City Engineer.

B. Gutter inlets or catch basins shall be located at the following locations, but in no case be spaced further than 400 ft.

   1. At curb returns on the upstream side of an intersection.

   2. At the ends of all dead-end streets with a descending grade.

   3. At intermediate locations so that storm flows at the curbline do not exceed 3 ft. in width (measured from the curb face) or 3 in. in depth (measured at the curb face), whichever is less.

C. Gutter inlets or catch basins shall be capable of intercepting completely the design storm flow at the curb. The City Engineer may require multiple or oversized inlets or other special considerations for sags and "downhill" cul-de-sacs. When gutter inlets are installed on a grade over 5%, a combination curb inlet, per ODOT Standard Drawing RD-366, shall be installed.

2.0033 Service Lateral

A. Service laterals are those private storm drain lines to which a private building storm drain connects. Service laterals are privately owned and maintained to the public main.

B. The minimum inside diameter of a storm drain service lateral shall be 4 in. and shall be equal to or greater than the building storm drain diameter. Service laterals located in the right-of-way shall be built to the same construction standards and of the same materials as the storm drain mainline. Service laterals in general shall be placed at 90° to the mainline to avoid excessive exposure to other utilities during excavation for construction or maintenance of the service lines. Angles other than 90° (45° minimum) may be approved for special conditions such as cul-de-sac lots. Service line connections may be made at manholes (90° to storm drain mainline) if such placement would not interfere with other present or future connections to the manhole.

C. The minimum slope of sewer service lines shall be 2% (1/4 in. per ft.), except for unusual conditions, when a slope of 1% (1/8 in. per ft.) may be approved. It will be necessary, however, for the Design Engineer to provide a complete analysis of the need for any storm drain service lateral slope less than 2%. The maximum slope shall be 100% (45° or 1 ft. per ft.). Deep connection risers (see the Standard Drawing for

service laterals to deep storm drains) or drop connections to manholes must be used where service line slopes would exceed 100%.

D. Tees for service laterals shall be installed at 100% slope, and 1/16 or 1/8 bends installed to provide proper grade for service lateral. Service laterals shall be installed to end beyond the street right-of-way line or easement line where storm drain is installed in easement. A watertight plug shall be installed in end of lateral and a 2 in. x 4 in. wood marker shall be placed at lateral end from pipe invert to at least 36 in. above the finish grade. The 2 in. x 4 in. top shall be painted white and marked with the depth of the lateral measured from ground to invert of pipe.

2.0040 Stormwater Management Facility Requirements

2.0041 Development Requiring Detention and/or Water Quality Improvements

A. Single-family residential site redevelopment is required to provide water quality improvements for all newly created impervious area, whether or not replacing existing impervious area, prior to off-site discharge. On-site disposal is preferred for single-family residential site redevelopment.

B. All development creating 500 sq. ft. or more of newly created impervious area, including replacement of existing impervious area, will be required to provide water quality improvements for the newly created impervious area. For development or redevelopment creating more than 1,000 sq. ft. of new impervious area, water quality improvements as well as detention will be required.

C. New development and redevelopment projects may be exempt from detention requirements if they discharge stormwater runoff directly into the Willamette River or Tualatin River or through a conveyance system that has adequate capacity to convey the 10-year storm event to the Willamette River or Tualatin River. This exemption is for detention only. Water quality improvement requirements still apply.

D. Developers may mitigate impervious area by various means, as approved by the City Engineer, to reduce the new effective impervious area (EIA) below the thresholds listed above or to reduce facility size required for detention and/or water quality improvements. Methods contained in the City of Portland Stormwater Manual, as modified by the City of West Linn, may be used in mitigation as approved by the City Engineer. Stormwater facilities must be aesthetically blended into surrounding landscaping to greatest possible extent.

E. When required, retaining wall will be allowed inside stormwater tract but shall be less than four feet. Retaining wall taller than four feet shall be constructed in tier with 1:1 slope and shall be approved by the City Engineer. Handrails per ODOT Standard Drawings RD770 and RD771 are required for facilities with retaining walls four feet and taller.

2.0042 Floodplain Information

A. Floodplain information, delineating the 100-year floodplain limits, shall be shown where it occurs within the development. Floodplain limits shall be based on maps prepared by the U.S. Army Corps of Engineers and the Federal Emergency Management Agency (FEMA). Where better information is available, it shall be used by the Design Engineer.

2.0043 Intentionally Left Blank

2.0044 Emergency Overflow

A. The Design Engineer shall assess the impacts of system failure for on-site detention. Overflow may occur due to rainfall intensity which exceeds the design storm, debris blockage of storm drain system, or some other reason.

B. The storm drain system shall be designed such that overflows do not cause inundation of neighboring properties. Potential overflow routes shall be adequately protected from erosion.

C. An overflow system shall provide controlled discharge of the 100-year, 24-hour design storm event for developed conditions, without overtopping any part of the pond embankment or exceeding the capacity of the emergency spillway. The overflow design shall assume failure of the normal outlet control structure. An emergency spillway shall be able to safely pass all flows over the pond embankment without overtopping the embankment. Sufficient armoring will be required to the toe on each face of the embankment to prevent failure of the embankment from erosion.

2.0045 Detention Facilities

A. All detention facilities shall be subject to testing prior to final acceptance per ***Standard Construction Specifications, Subsection 604.01, Construction Requirements***, unless the City Engineer determines, in writing, testing is not required.

B. Detention volume storage methods, in order of preference, are the following:

1. Surface storage – pond
2. Underground storage by tank or vault will be approved by the City Engineer only when a pond is impracticable. No underground detention facilities will be authorized for residential application.
3. Slopes to detention pond shall not to exceed 3:1 and be vegetated with native materials. Retaining walls of all types for a pond construction shall be approved by the City Engineer only when native sloped enclosure is impracticable.
4. All surface storage detention facilities shall be subject to testing prior to final acceptance per ***Standard Construction Specifications, Subsection 604.02, Pond Testing Requirements***, unless the City Engineer determines, in writing, testing is not required. All underground detention facilities shall be subject to testing prior to final acceptance per ***Standard Construction Specifications, Subsection 604.03, Underground Detention Pond Requirements.*** (Resolution 05-10 4/11/05)
5. Concrete pipe is the strongly preferred material for detention tank applications. Before corrugate aluminum alloy pipe may be used for detention tank applications, applicant must demonstrate that concrete pipe is either impractical or unavailable. Additionally, any corrugated aluminum alloy pipe requested must be accompanied by certification of it having a 75-year design life, and must be specifically approved by the City Engineer.

2.0046 Infiltration Facilities

Infiltration facilities such as storm sumps and drywells are permitted as allowed by the City Engineer and the Department of Environmental Quality and shall be designed and constructed under the supervision of the Design Engineer. When infiltration are proposed, infiltration testing and soil requirements shall follow the current edition of the City of Portland Stormwater Management Manual.

2.0050 Water Quality Facilities

2.0051 Construction Criteria for a Water Quality Facility

A. A water quality facility shall be constructed unless, in the judgment of the City Engineer, any of the following conditions exists:

1. The site topography or soils makes it impractical, or ineffective to construct an on-site facility.
2. There is a more efficient and effective regional site within the subbasin that was designed to incorporate the development.

B. If construction of an on-site facility is not feasible, then the City Engineer may require that development to construct an off-site water quality facility that will treat an equal or greater volume of stormwater elsewhere within the City. It is the Developer's responsibility to acquire the land necessary offsite to construct the proposed facility and to provide proof to the City Engineer that land has been acquired prior to the Land Use Application being deemed complete by the City. If the City is not furnished with adequate proof of ownership, then the application will not be deemed complete.

C. In lieu of constructing a new facility, the City Engineer may permit a development to upgrade an existing public facility at his/her discretion.

2.0052 Plan Requirements

When construction of water quality facilities is required:

1. The application shall include a set of construction plans prepared by the Design Engineer that certifies the proposed water quality facilities have been designed in accordance with the criteria required in ***Subsection 2.0013, Minimum Design Criteria***.
2. For facilities to be dedicated to the City, a financial assurance, meeting the requirements of the City shall be provided for the construction of the water quality facility and for maintenance for 2 years after acceptance of the facility.
3. An operation and maintenance plan shall be prepared showing how the water quality facility is to be maintained.
4. A landscape plan shall be prepared for the proposed facility.
5. A list of recommendations by a Geotechnical Engineer may be required at the discretion of the City Engineer.

2.0053 Facility Design

A. Stormwater facility sizing methodologies, design criteria, and typical drawings in the City of Portland Stormwater Management Manual, as modified by the City of West Linn, shall be used in designing stormwater management facilities for detention and water quality improvements.

B. For water quality facilities sized using the Presumptive Approach Calculator (PAC), the facility surface area shall be increased by 25 percent to account for differences in rainfall patterns. No correction factor is required for onsite detention facilities sized using the PAC with flow control criteria.

C. Stormwater facilities must be aesthetically blended into surrounding landscaping to the greatest possible extent.

D. Manufactured Stormwater Treatment Technologies will generally not be approved for use in public or private stormwater water quality systems within the City, but may be approved by the City Engineer only if an above ground facility will not be functional as determined by the City Engineer. 2.0054 Pond Access Road

Stormwater management facilities shall have an access road that provides for maintenance and inspection of all inflow and outflow structures. The following criteria are the minimum City requirements:

1. 12 in. of 1-1/2"-0 compacted crushed gravel and subgrade shall be compacted to 95% of maximum dry density, as determined by AASHTO T-180.
2. At a minimum, a driveway approach shall be built per ODOT Standard Drawing RD740, RD745 or RD750.
3. Maximum grade is 15% with a 3% cross slope unless approved otherwise by the City Engineer.
4. Minimum width is 15 ft.

5. Access shall extend to within 10 ft. of all control structures, including both inflow and outflow structures, unless otherwise approved by the City Engineer.
6. Access gates to pond, when required, shall be 15 ft. wide, lockable and per ODOT Standard Drawings RD820 and RD815.

2.0060 Erosion Control

All development shall provide erosion prevention measures and sediment control practices during all phases of construction to prevent and restrict the discharge of sediments in accordance with Oregon Administrative Rules Chapter 340 and the following subsections. Erosion and sediment control measures shall be followed in accordance with the Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual, the City of West Linn Municipal and Community Development codes, all applicable Department of Environmental Quality NPDES permits, and the City of West Linn Public Works Construction Standards.

2.0061 Purpose

To require erosion prevention measures and sediment control practices for all development in the City of West Linn during all phases of construction to prevent and restrict the discharge of sediments, and to require final permanent erosion prevention measures after development is completed. Erosion prevention techniques shall be designed to protect soil particles from the force of water and wind from being transported from the site. Sediment control measures shall be designed to capture soil particles after they have become dislodged by erosion and attempt to retain the soil particles on site.

2.0062 Applicability

This document applies to construction activities that may cause visible or measurable erosion on any property within the City of West Linn. Where this section conflicts with other applicable City codes, the more restrictive provision shall apply.

2.0063 Permitting

An erosion and sediment control permit is required prior to, or concurrently with, approval of development that may cause visible or measurable erosion. To obtain an erosion and sediment control permit, an erosion and sediment control plan shall be required. All construction related activities including clearing, grading, excavation, materials or equipment staging and stockpiling within the City of West Linn which disturb between 1,000 sq. ft. and less than five acres of ground are required to obtain a City of West Linn issued Erosion Control Permit. Construction related activities five acres and greater or that have the potential to discharge to a waterbody listed for turbidity or sedimentation on the most recently EPA-approved Oregon 303(d) list that is not addressed by a Total Maximum Daily Load shall apply to DEQ for a 1200-C permit (see www.deq.state.or.us/WQ/assessment/asseessment.htm).

Types of Erosion Control Permits:

Erosion Control Permit: Required if construction activity disturbs between 1,000 sq. ft. and 0.99 acres and is not part of a common plan of development. Complete a West Linn Erosion Control Permit Application and provide plans as specified in 2.0064 or 2.0065 as applicable.

Erosion Control 1200-CN Permit: The Department of Environmental Quality (DEQ) 1200-CN Erosion Control Permit is required for construction activities on site between 1 and 4.99 acres in addition to development of under 1 acre, but part of a common plan of development or sale that will ultimately disturb 1 acre or more. West Linn is authorized by DEQ to issue and inspect the 1200-CN permits. To obtain a 1200-CN permit the applicant must submit the required 1200-CN template style erosion control plans using the Clackamas County 1200-CN plan template and checklist to the City of West Linn for review and approval along with the West Linn

Erosion Control Permit Application. Before applying for a 1200-CN Permit, you must have Land Use Approval and any required Corps of Engineers or Department of State Lands Permits.

Erosion Control 1200-C Permit: Construction activities that will disturb over five acres or that discharge to a waterbody listed for turbidity or sedimentation on the most recently EPA-approved Oregon 303(d) list and is not addressed by a Total Maximum Daily Load requires the applicant to apply direct to DEQ for a 1200-C permit. City of West Linn staff area authorized to oversee and conduct inspections related to the 1200-C permits, however, DEQ issues the permit at the conclusion of a required 14-day public comment period.

2.0064 Application – Single Family Residential

This applies only to the development of an individual, single-family residential development with a valid, City-issued building permit. An abbreviated erosion control plan is allowed whenever the issuance of the building permit will result in the creation of more than 1000 square feet but less than 1 acre of soil disturbance. An application submittal shall include the completed erosion control permit form. The site plan shall include the following information:

A. The plan view shall be no larger than 1" = 50' scale.

B. Building permit number and/or legal description, and the name, address, phone number, and mobile phone number of the person or party to whom the permit is issued.

C. The name, address, 24-hour phone number, mobile phone number, and fax number of the site steward responsible for erosion control at the project site throughout project duration.

D. Location and details of all proposed erosion and sedimentation control Best Management Practices in accordance with the *Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual*.

2.0065 Application – Sites under 1 Acre

An application shall be initiated by the property owner, or the owner's authorized agent, and shall be accompanied by the appropriate fee.

For sites less than one acre, other than individual, single-family residential development, the Erosion and Sediment Control Plan shall follow the guidelines of the current version of the *Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual,* applicable erosion templates, and provide the following information on the cover of the plan:

1. The name, address, phone number, mobile phone number, and fax number of the site steward responsible for erosion control at the project site throughout project duration.
2. The name, address, and 24-hour contact number(s) of the designated emergency contact person.
3. A description of existing topography and soil characteristics described in the Clackamas County Soil Survey.
4. Names and contact information for the owner, developer, planning firm, engineering firm, and surveying firm.
5. Narrative site description including existing site conditions, developed conditions, and nature of construction activity.
6. Site total size, total area of disturbance.
7. The applicant shall submit a plan drawn to an appropriate scale (in order of preference; 1"= 10' to 1"= 30'), which contains the following information:

8. Existing and proposed cut/fills and contour lines at the following minimum intervals:
    a. Two-foot intervals for slopes 0-25 percent; and,
    b. Five-or-ten foot intervals for slopes in excess of 25 percent slope.
9. Location of proposed stormwater utilities and facilities including cross-sections;
10. The location of all existing natural features including, but not limited to, delineation of Water Quality Resource Areas (if applicable) and trees of caliper greater than six inches in diameter at breast height (DBH).
11. Location of all septic tanks, drainfields, existing drywells or other UICs, drinking water wells, springs, wetlands, or other sensitive areas on or adjacent to site.
12. Locations of all existing and proposed channels, swales, or drainage pipes which either convey off-site stormwater through, or route stormwater around, the construction area. Drainage patterns before and after grading clearly identified by contour lines and flow drainage arrows. Identify the nearest receiving waterbody for stormwater runoff for both pre- and post-development.
13. Locations and detailed designs of all proposed erosion and sedimentation control facilities. Designate areas for solid waste, hazardous waste, concrete washout, fuel storage, soil stockpiles and methods of control.
14. Phasing of any proposed erosion and sedimentation control work clearly indicated on the plan. Include an activity schedule for each phase outlining specific Best Management Practices for the duration of the project.
15. Details and notes on the site plan for final stabilization, including mulching and revegetation. Also include detailed planting procedures, topsoil requirements, seed/plant specifications, and plant maintenance specifications.

2.0066 Application – Sites 1 to 4.99 Acres

A. An application shall be initiated by the property owner, or the owner's authorized agent, and shall be accompanied by the appropriate fee.
B. An application submittal shall include one hardcopy and one electronic pdf copy of the completed application from and 1200-CN template style Erosion and Sediment Control Plan drawings designed by an Engineer licensed in the state of Oregon or certified erosion and sediment control specialist. The drawings must follow the Clackamas County standard template drawings and include all information as required by the Clackamas County 1200-CN ESC Plan Checklist which shall submitted with the application.

2.0067 Application – Site 5 Acres or Larger

Application for sites 5 acres and larger shall be directly to Oregon Department of Environmental Quality under their 1200-C permitting program. A copy of the completed application and approved 1200-C permit shall be provided to West Linn Engineering prior to start of any construction activity.

2.0068 Approval Criteria

The City Engineer or designee shall consider the following criteria when approving, approving with conditions, or denying an Erosion Control Permit.

A. The Erosion and Sediment Control plans shall follow the guidelines of the most current edition of the Clackamas County Erosion Prevention and Planning and Design Manual, applicable sections of the City of West Linn Municipal and Community Development codes, all applicable Department of Environmental Quality NPDES permits, and the City of West Linn Public Works Construction Standards.

B. All developments shall be designed to minimize the disturbance of natural topography, vegetation, and soils. Designs shall minimize cuts and fills.

C. The plan shall prevent erosion by employing prevention practices such as non-disturbance, construction phasing, seeding and mulch covers.

D. The applicant shall actively manage and maintain erosion control measures and utilize techniques described in the permit to prevent erosion and control sediment during and following development. Erosion prevention and sediment control measures required by the permit shall remain in place until disturbed soil areas are permanently stabilized by landscaping, grass, approved mulch, or other permanent soil stabilizing measure.

E. No mud, dirt, rock, or other debris shall be deposited upon a public street or any part of the public stormwater system, surface water system, Water Quality Resource Area, or any part of a private stormwater system or surface water system that drains or connects to the publicsStormwater or surface water system.

F. Projects with a minimum development size of one acre, including subdivisions, apartments, commercial and industrial, shall have an Erosion and Sediment Control Plan designed by an Oregon-registered engineer or certified erosion control specialist.

2.0069 Erosion and Sediment Control Design Standards

The following specific methods of soil erosion and sediment control shall be used during construction to control visible and measurable erosion. These methods shall be consistent with the most current edition of the *Clackamas County Erosion Prevention and Planning and Design Manual*.

A. All land area proposed for excavation, vegetation removal, soil stockpiling, or which will have exposed soil shall be considered part of the development site.

B. Regardless of the wet weather date ranges listed below, it is the responsibility of the permit registrant to implement BMPs as needed for weather conditions, it is the permit registrant's responsibility to ensure that soils are stable during rain events at all times of the year. The permit registrant must control stormwater volume and velocity within the site to minimize soil erosion. The permit registrant must prevent or minimize the disturbance of sediment. Avoid or minimize excavation and bare ground activities during wet weather. Temporarily stabilize soils at the end of the shift before holidays and weekends, if needed. Phase clearing and grading to the maximum extent practical to prevent exposed inactive areas from becoming sources of erosion. Minimize the disturbance of steep slopes. Minimize erosion during and after soil disturbance using BMPs such as temporary seeding and planting, final vegetative cover, mulches, compost blankets, erosion control blankets, and soil tackifiers.

C. May 1 through September 30, the duration of soil exposure shall be kept to a maximum of 21 days. All disturbed soil that remains exposed for 21 days or more during construction shall be treated with an erosion control cover (i.e., plastic, seeding or mulching), following grading or construction, until soils are revegetated or otherwise stabilized.

D. October 1 through April 30, the duration of soil exposure shall be kept to a maximum of 7 days. All disturbed soil that remains exposed for 7 days or more during construction shall be treated with an erosion control cover (i.e., plastic, seeding or mulching), following grading or construction, until soils are revegetated or otherwise stabilized.

E. During construction, runoff from the development site shall be controlled, and runoff and sediment resulting therefrom shall be retained on site. The applicant shall actively manage and maintain erosion control measures and utilize techniques described in the permit to prevent erosion and control sediment during and following development.

F. A stabilized pad of gravel shall be laid and maintained at all entrances and exits to any development site from which vehicular traffic may track soil or debris onto public right-of-way. The gravel pad(s) shall be installed and inspected by City staff prior to any development or site preparation. No other vehicular entrance or exit by used to access the development site.

G. Gravel pads shall be maintained to function properly. If the gravel pad does not adequately remove dirt and mud from the vehicle wheels, such that mud tracking is evident off site, additional measures must be taken.

H. Topsoil removed for development shall be stockpiled and reused to the degree necessary to restore disturbed areas to their original or enhanced condition, or to assure a minimum of six inches of stable topsoil for revegetation. Additional soil shall be provided if necessary, to support revegetation. Soil shall be stockpiled outside of tree dripline, so as not to affect existing tree health.

I. The owner shall be responsible for the prompt clean-up of all sediments that are carried onto any public or private streets, or onto adjacent property as soon as the owner becomes aware of such problems ow within the time required by the City. The owner shall be responsible for cleaning and repairing streets, catch basins, drainage ways, storm water drainage facilities, and adjacent properties contaminated or damaged by sediment. Failure to do so will be in violation of this code.

2.0070 Penalties and Enforcement

The City is authorized to make inspections and take such actions as required to enforce the provisions of this document as outlined in the City of West Linn Municipal Code. Failure to comply with any provision of this Chapter or with any term of an Erosion Control Permit shall be deemed a violation of this ordinance and subject to enforcement action pursuant to applicable Agency (i.e. DEQ) and City ordinance.

2.0071 Private Drainage Systems

2.0072 Subdivisions

When subdivision lots drain to the rear it may be necessary to provide a private drainage system in private easements. This system shall be for collection of roof drains, footing drains, and surface run-off. This system shall be designed to meet the Uniform Plumbing Code requirements and shall be privately owned and maintained

2.0073 Subsurface Drainage

Subsurface drains (underdrains) shall be provided at the following locations:

1. Where existing springs and field tiles are intercepted during construction activity for other facilities; i.e., sewer, water, mains, street excavations, foundations, etc. Subsurface drains may not be needed if the tile is removed.
2. Where high ground water exists or when it is necessary to reduce the piezometric surface to an acceptable level to prevent land slippage or underfloor flooding of building.