STORMWATER TECHNICAL NOTEBOOK

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Issue No. 7 Effective:	January 1, 2017

FOREWORD

The Stormwater Technical Notebook contains the goals, specifications, and standards for clearing, grading, and stormwater management authorized and required by Chapter 15.24 of the Redmond Municipal Code (RMC).

How to Get Printed Copies of the Stormwater Notebook

If you would like to receive a copy of the updated manual please stop by the City of Redmond Development Services Center, located on the 2nd floor of City Hall (15670 NE 85th Street). To make other arrangements to receive a copy, contact Development Services Division at 425.556.2760 or mailto:pwgen@redmond.gov.

How to Find the Stormwater Technical Notebook Online

The Stormwater Technical Notebook is available on the City of Redmond's website at http://www.redmond.gov/Stormwater.

How to Find Corrections, Updates, and Additional Information

With a publication of this size and complexity, and with the rapid changes in stormwater management technologies, there may be errors that must be corrected and clarifications that are needed between full document updates. The City publishes corrections, updates, and new technical information on the Stormwater Technical Notebook web page (referenced above).

Overview of Changes from Previous Issue

The Stormwater Technical Notebook has been updated to be consistent with the 2013-2018 Western Washington Phase II Municipal Stormwater Permit, issued August 1, 2012, effective January 16, 2015. The permit requires cities to adopt specific requirements of development and redevelopment to reduce stormwater impacts on natural resources. This version of the Stormwater Technical Notebook has significant changes due to the permit. In addition, the City of Redmond has made further changes with the same intent as the permit. Redmond shares the state's objective that low impact development be the preferred and commonly used approach to site development.

Major changes include:

- Adopt Ecology's 2012 Stormwater Management Manual for Western Washington as amended in 2014 (2014 SWMMWW).
    - Low impact development (LID) requirements for new development and redevelopment.
    - Revised guidance on determining infiltration rates.
    - New and revised stormwater source control and treatment BMPs.
    - New and revised construction BMPs.
    - Western Washington Hydrology Model (WWHM) update and modeling guidance.
- Clarify vesting for capital projects and single-family lots developed long after plat approval.
- Clarify hard surface assumptions for subdivisions.
- Require documentation of applicable and recommended source control BMPs.
- Require LID feasibility assessment in accordance with the 2014 SWMMWW.
- Clarify that pervious pavement may be substituted with functionally equivalent infiltration BMPs that meet design requirements.
- Clarify the process by which the Ecology Manual's "competing needs clause" in Minimum Requirement #5 may be applied to projects.
- Proprietary stormwater treatment facilities are generally not allowed for residential developments.
- Pipe sizing for conveyance is simplified.

Version 7A, approved and effective March 1, 2017, removed language describing "competing needs" within the City's two urban centers. Project proponents are expected to provide low impact development practices identified within the Ecology manual where they have not been demonstrated to be infeasible.

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Chapter 1 INTRODUCTION

The Stormwater Technical Notebook locally modifies the Washington State Department of Ecology's 2012 Stormwater Management Manual for Western Washington as amended in 2014 (2014 SWMMWW), and defines how the 2014 SWMMWW is to be applied in the City of Redmond, and provides information and standards specific to stormwater management in Redmond. The Stormwater Technical Notebook, and Redmond's Stormwater Management Program, applies to all lands within City limits.

The Stormwater Technical Notebook is intended to assist those who prepare and submit applications and construction documents by providing design requirements and permit processing information in Redmond. The methods outlined in the Stormwater Technical Notebook are not the only methods acceptable for use in the City, but any deviations from these must still meet or exceed the intended results and be reviewed and approved by the City.

1.1 Code Requirements

Code requirements regarding stormwater management are in the Redmond Municipal Code, Chapter 15.24. The Stormwater Technical Notebook is a supplement to the code and the code should also be reviewed to understand the procedures and requirements.

The design, construction, and maintenance of all clearing, grading and stormwater management systems and facilities shall comply with the requirements and design standards contained in all the following documents, and provided in order of precedence:

1. RMC 15.24
2. The Stormwater Technical Notebook
3. City of Redmond Standard Specifications and Details
4. The Washington State Department of Ecology's 2012 Stormwater Management Manual for Western Washington as amended in 2014.

1.2 Permitting Review Process

The permitting review process is a partnership between the applicant and City representatives. Throughout the Stormwater Technical Notebook, there are specific stormwater management alternatives that may be approved for a specific project with the approval of the Stormwater Engineer or the Technical Committee. Private development projects are reviewed by a Stormwater Engineer within the Development Services Division of the Planning Department. Public capital improvement projects are reviewed by a Stormwater Engineer within the Natural Resources Division of Public Works. In some instances, the City's Technical Committee will review a project. Chapters 3, 4, 5, and 6 go into more detail about the review process for specific project types.

1.3 Vesting

This document is subject to periodic revision. The issue dates are listed below. The version of the Stormwater Technical Notebook that applies to a particular project is the version that is (or was) in effect when the proposed project was "vested." If a newer version of the Stormwater Technical Notebook is published after a project is vested, the project will have the right to use the newer version of the Stormwater Technical Notebook in its entirety, or the older version in its entirety. Projects are vested when:

- A project subject to a Building Permit is vested when a Building Permit Application is submitted and determined to be complete by the City.
- A Plat or a Short Plat is vested when the application for the Preliminary Plat or Short Plat is submitted and is deemed complete by the City.
- A single-family lot, to be built as part of a plat, is vested as part of the preliminary plat or short plat, provided that its building permit application is submitted within five years of final plat approval.
- A project involving only clearing or grading is vested when an application for the clearing and/or grading work is submitted and determined to be complete by the City.
- Capital project design standards are vested at the completion of 30% design. For larger projects, this is signified by approval of Phase Gate 2 by the City's CIP Governance Committee. For smaller projects, this is signified by acceptance by the Stormwater Engineer of the 30% design documents for review.

Note that this vesting requirement applies only to the requirements of this Stormwater Technical Notebook.

Table 1.0

Issue	Effective Date
1	March 18, 1996
2	April 22, 1996
3	April 1, 1999
4	October 1, 2004
5	January 1, 2007
5A	August 18, 2010
6	February 23, 2012
7	January 1, 2017
7A	March 1, 2017

1.4 Additional Permit Requirements

Additional City of Redmond permit requirements and special conditions apply to clearing, grading, or stormwater work in some circumstances. While not necessarily a complete list, the following regulations often apply to clearing, grading, and/or stormwater work in or near Critical Areas or Shorelines (defined in the Redmond Zoning Code). Contact the City of Redmond Development Services Center for more information about work within Shorelines, critical area or their buffers:

- Shorelines – Can apply to projects within 200 feet of Bear Creek, Evans Creek, the Sammamish River, Lake Sammamish, and their associated floodplains and wetlands.
- Critical Areas – Can apply if your project proposes work (as defined in the Redmond Zoning Code 21.64) within:
    - fish and wildlife habitat conservation areas;
    - wetlands;
    - geologically hazardous areas;
    - frequently flooded areas; or
    - critical aquifer recharge areas.

Other agencies may also have requirements and permits related to work in Redmond. While not necessarily a complete list, the following agencies and their permits may have permits/regulations that apply to your project:

- Washington State Department of Fish and Wildlife – Hydraulic Project Approval (HPA) for work below the Ordinary High Water Mark (OHWM) of surface waters including intermittent streams (work that uses, diverts, obstructs or changes natural flow or bed of State waters).
- Washington State Department of Ecology – NPDES Permit(s): programs related to water quality management from construction sites of 1 acre or more. Water Quality Certification (401) ensures that limits placed in a permit on the quantity and concentration of pollutants discharged are not exceeded.
- U.S. Army Corps of Engineers – a number of permits (under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act) related to protection of “waters of the United States” including wetlands, streams and other surface waters. As appropriate the Army Corps will coordinate with the NOAA Fisheries (regarding federally listed anadromous species such as salmon) and U .S. Department of Fish and Wildlife (regarding federally listed land or freshwater species – such as eagles or bull trout) to ensure Endangered Species Act consistency.
- U.S. Coast Guard & Washington State Department of Natural Resources are also involved in certain projects involving impacts (such as a bridge) over or adjacent to navigable waters (Class 1 Streams)

- Federal Emergency Management Agency – programs related to flood protection near major streams and rivers, including but not limited to Bear Creek, Evans Creek, and the Sammamish River. Compensatory storage may be required for some projects.

Also note that any work proposed beyond the applicant's property limits requires written concurrence of the owners of those properties.

Chapter 2 Modifications to the Washington State Department of Ecology Stormwater Management Manual for Western Washington

2.1 Redmond Requirements

This chapter describes Redmond-specific requirements that may vary from or clarify elements of the Washington State Department of Ecology's 2012 Stormwater Management Manual for Western Washington as amended in 2014 (2014 SWMMWW). Sections 2.2 through 2.8 mirror those sections that appear in Volume I of the 2014 SWMMWW. Modifications and additions specific to the City of Redmond are in *red italic*. Section 2.9 describes modifications in the rest of the 2014 SWMMWW specific to Redmond.

2.2 Exemptions *from Ecology's Minimum Requirements*

Unless otherwise indicated in this Section, the practices described in this section are exempt from the Minimum Requirements, even if such practices meet the definition of new development or redevelopment. *RMC 15.24 requires a clearing and grading permit for some projects that may be exempt from Ecology's Minimum Requirements.*

<u>Forest practices:</u>

Forest practices regulated under Title 222 WAC, except for Class IV General Forest practices that are conversions from timber land to other uses, are exempt from the provisions of the minimum requirements.

<u>Commercial agriculture:</u>

Commercial agriculture practices involving working the land for production are generally exempt. However, the conversion from timberland to agriculture, and the construction of impervious surfaces are not exempt.

<u>Pavement Maintenance:</u>

The following pavement maintenance practices are exempt: pothole and square cut patching, overlaying existing asphalt or concrete pavement with asphalt or concrete without expanding the area of coverage, shoulder grading, reshaping/regrading drainage systems, crack sealing, resurfacing with in-kind material without expanding the road prism, pavement preservation activities that do not expand the road prism, and vegetation maintenance.

The following pavement maintenance practices are not categorically exempt. The extent to which the manual applies is explained for each circumstance.

- Removing and replacing a paved surface to base course or lower, or repairing the pavement base: If impervious surfaces are not expanded, Minimum Requirements #1 - #5 apply.
- Extending the pavement edge without increasing the size of the road prism, or paving graveled shoulders: These are considered new impervious surfaces and are subject to the minimum requirements that are triggered when the thresholds identified for new or redevelopment projects are met.
- Resurfacing by upgrading from dirt to gravel, asphalt, or concrete; upgrading from gravel to asphalt, or concrete; or upgrading from a bituminous surface treatment ("chip seal") to asphalt or concrete: These are considered new impervious surfaces and are subject to the minimum requirements that are triggered when the thresholds identified for new or redevelopment projects are met.

Underground utility projects:

Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics are only subject to *Minimum Requirement #2, Construction Stormwater Pollution Prevention.*

2.3 Definitions Related to the Minimum Requirements

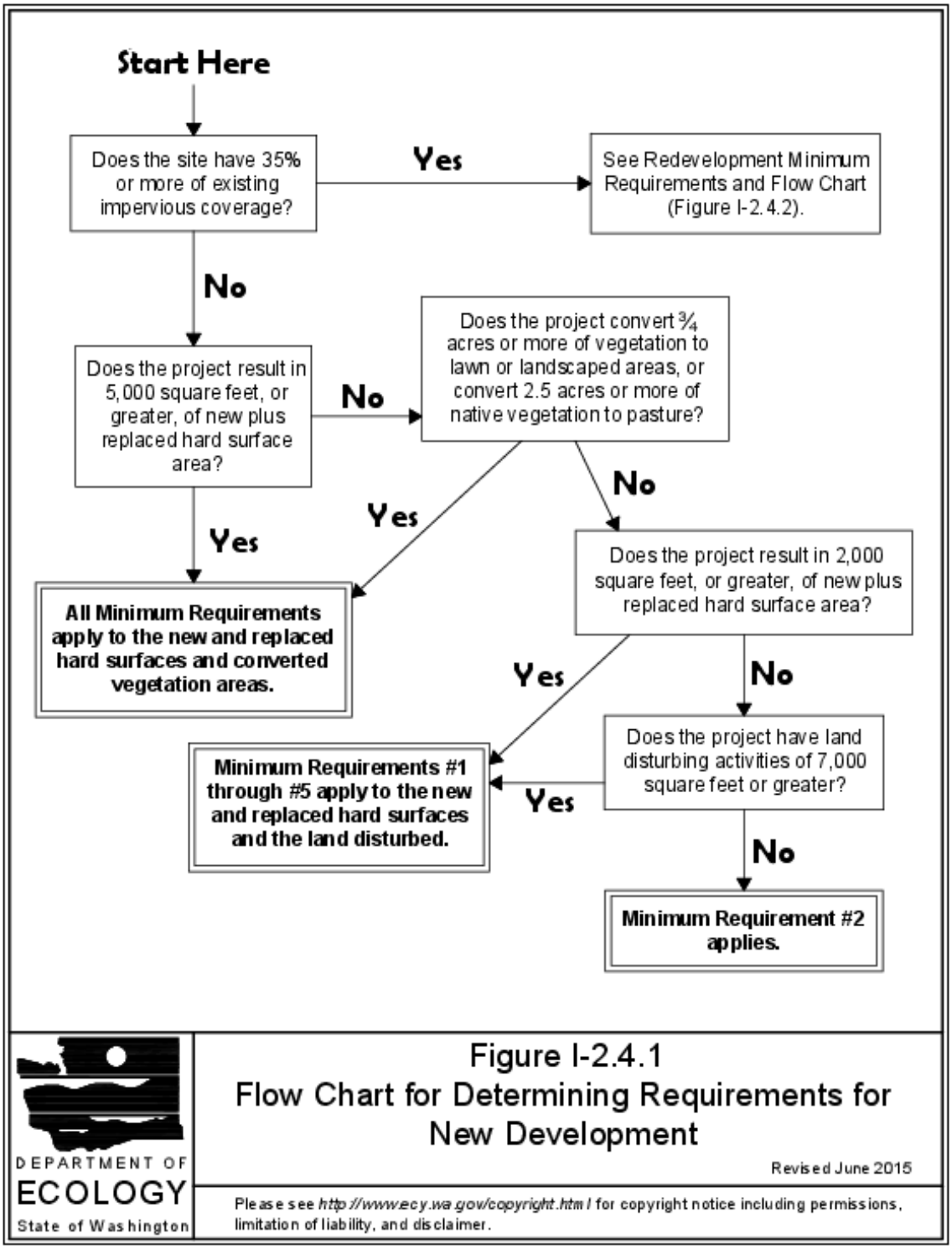
Definitions related to minimum requirements have been adopted and not modified by the City as required by the NPDES permit. Those definitions can be found in the glossary of Volume I of the SWMMWW.

2.4 Applicability of the Minimum Requirements

Not all of the Minimum Requirements apply to every development or redevelopment project. The applicability varies depending on the project type and size. This section identifies thresholds that determine the applicability of the Minimum Requirements to different projects. Use the flow charts in Figure 2.4.1 and 2.4.2 to determine which of the Minimum Requirements apply. The Minimum Requirements themselves are presented in Section 2.5. *Project proponents are required to submit an annotated copy of the flow charts indicating how they determined the Minimum Requirements applicable to their project.*

For purposes of applying the thresholds, all single-family developments that include subdivision of property shall be classified as New Development and all their hard surfaces classified as new hard surfaces. Hard surfaces shall be assumed to equal 80% of the maximum impervious area allowed by zoning code. If actual proposed impervious area is unknown, for large single-family lots, 4,200 s.f. of impervious area per lot may be used with approval from the Stormwater Engineer.

Use the thresholds in Figures 1-2.4.1 and 1-2.4.2 at the time of application for a subdivision, plat, short plat, building permit, or other construction permit. The plat or short plat approval shall identify all stormwater BMPs that are required for each lot. For projects involving only land disturbing activities, (e.g., clearing or grading), the thresholds apply at the time of application for the permit allowing or authorizing that activity. Note the exemption in Section 2.2 for forest practices other than Class IV General.


Start Here
Does the site have 35% or more of existing impervious coverage?
Yes
See Redevelopment Minimum Requirements and Flow Chart (Figure I-2.4.2).
No
Does the project result in 5,000 square feet, or greater, of new plus replaced hard surface area?
No
Does the project convert ¾ acres or more of vegetation to lawn or landscaped areas, or convert 2.5 acres or more of native vegetation to pasture?
Yes
Yes
No
All Minimum Requirements apply to the new and replaced hard surfaces and converted vegetation areas.
Does the project result in 2,000 square feet, or greater, of new plus replaced hard surface area?
Yes
No
Minimum Requirements #1 through #5 apply to the new and replaced hard surfaces and the land disturbed.
Does the project have land disturbing activities of 7,000 square feet or greater?
Yes
No
Minimum Requirement #2 applies.
DEPARTMENT OF
ECOLOGY
State of Washington
Figure I-2.4.1
Flow Chart for Determining Requirements for New Development
Revised June 2015
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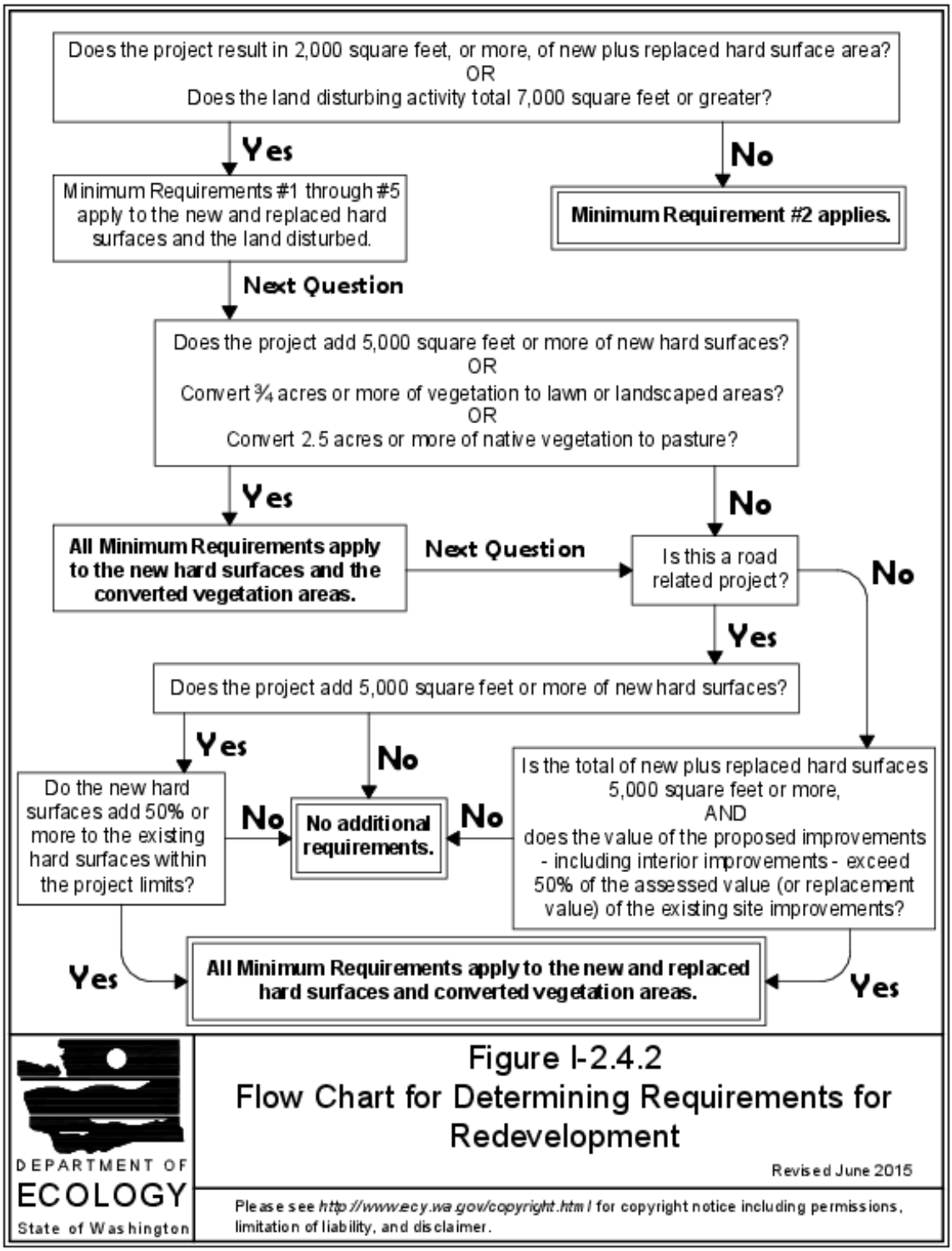
Does the project result in 2,000 square feet, or more, of new plus replaced hard surface area?
OR
Does the land disturbing activity total 7,000 square feet or greater?
Yes
No
Minimum Requirements #1 through #5 apply to the new and replaced hard surfaces and the land disturbed.
Minimum Requirement #2 applies.
Next Question
Does the project add 5,000 square feet or more of new hard surfaces?
OR
Convert ¾ acres or more of vegetation to lawn or landscaped areas?
OR
Convert 2.5 acres or more of native vegetation to pasture?
Yes
No
All Minimum Requirements apply to the new hard surfaces and the converted vegetation areas.
Next Question
Is this a road related project?
No
Yes
Does the project add 5,000 square feet or more of new hard surfaces?
Yes
No
Do the new hard surfaces add 50% or more to the existing hard surfaces within the project limits?
No
No additional requirements.
No
Is the total of new plus replaced hard surfaces 5,000 square feet or more,
AND
does the value of the proposed improvements - including interior improvements - exceed 50% of the assessed value (or replacement value) of the existing site improvements?
Yes
All Minimum Requirements apply to the new and replaced hard surfaces and converted vegetation areas.
Yes
DEPARTMENT OF
ECOLOGY
State of Washington
Figure I-2.4.2
Flow Chart for Determining Requirements for Redevelopment
Revised June 2015
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2.4.1 New Development

All new development shall be required to comply with Minimum Requirement #2.

The following new development shall comply with Minimum Requirements #1 through #5 for the new and replaced hard surfaces and the land disturbed:

- Results in 2,000 square feet, or greater, of new, replaced, or new plus replaced hard surface area, or
- Has land disturbing activity of 7,000 square feet or greater.

The following new development shall comply with Minimum Requirements #1 through #9 for the new and replaced hard surfaces and the converted pervious surfaces:

- Results in 5,000 square feet, or greater, of new plus replaced hard surface area, or
- Converts ¾ acres, or more, of vegetation to lawn or landscaped areas, or
- Converts 2.5 acres, or more, of native vegetation to pasture.

2.4.2 Redevelopment

All redevelopment shall be required to comply with Minimum Requirement #2.

The following redevelopment shall comply with Minimum Requirements #1 through #5 for the new and replaced hard surfaces and the land disturbed:

- Results in 2,000 square feet or more, of new plus replaced hard surface area, or
- Has land disturbing activity of 7,000 square feet or greater.

The following redevelopment shall comply with Minimum Requirements #1 through #9 for the new hard surfaces and converted pervious areas:

- Adds 5,000 square feet or more of new hard surfaces or,
- Converts ¾ acres, or more, of vegetation to lawn or landscaped areas, or
- Converts 2.5 acres, or more, of native vegetation to pasture.

With approval of the Stormwater Engineer, the Minimum Requirements may be met for an equivalent (flow and pollution characteristics) area within the same site. For public roads' projects, the equivalent area does not have to be within the project limits, but must drain to the same receiving water.

<u>Additional Requirements for the Project Site</u>

For road-related projects, runoff from the replaced and new hard surfaces (including pavement, shoulders, curbs, and sidewalks) and the converted vegetated areas shall meet all the Minimum Requirements if the new hard surfaces total 5,000 square feet or more and total 50% or more of the existing hard surfaces within the project limits. The project limits shall be defined by the length of the project and the width of the right-of-way.

Other types of redevelopment projects shall comply with Minimum Requirements #1 through #9 for the new and replaced hard surfaces and the converted vegetated areas if the total of new plus replaced hard surfaces is 5,000 square feet or more, and the valuation of proposed improvements – including interior improvements – exceeds 50% of the assessed value of the existing site improvements.

Redmond does not have the "stop-loss" provision described in the 2014 SWMMWW.

2.5 Minimum Requirements

This section describes the Minimum Requirements for stormwater management at development and redevelopment sites. Section 2.4 should be consulted to determine which requirements apply to any given project. Figures 2.4.1 and 2.4.2 should be consulted to determine whether the minimum requirements apply to new surfaces, replaced surfaces or new and replaced surfaces. Volumes II through V of the *2014 SWMMWW* present Best Management Practices (BMPs) for use in meeting the Minimum Requirements.

2.5.1 Minimum Requirement #1: Preparation of Stormwater Site Plans

All projects meeting the thresholds in Section 2.4 shall prepare a Stormwater Site Plan for *City* review. Stormwater Site Plans shall use site-appropriate *low impact* development principles, as required and encouraged by development codes, to retain native vegetation and minimize impervious surfaces to the extent feasible. Stormwater Site Plans shall be prepared in accordance with *Volume I,* Chapter 3 of the *2014 SWMMWW.*

Site Plans shall identify if the proposed project is classified as small, medium, or large. See Chapter 3 of this Stormwater Technical Notebook for site classifications in Redmond.

Include Standard Notes (Appendix R).

2.5.2 Minimum Requirement #2: Construction Stormwater Pollution Prevention (SWPP)

All new development, redevelopment *and maintenance* projects are responsible for preventing erosion and discharge of sediment and other pollutants into receiving waters.

Projects which result in 2,000 square feet or more of new plus replaced hard surface area, or which disturb 7,000 square feet or more of land must prepare a Construction SWPP Plan (SWPPP) and TESC plan sheet as part of the Stormwater Site Plan (see Section 2.5.1).

Projects that result in less than 2,000 square feet of new plus replaced hard surface area, or disturb less than 7,000 square feet of land are not required to prepare a Construction SWPPP, but must consider all of the 13 Elements of Construction Stormwater Pollution Prevention and develop controls for all elements that pertain to the project site.

Small projects, as classified in Chapter 3 of the Stormwater Technical Notebook, may submit an abbreviated SWPPP and Site Plan in accordance with the City's Small Site Stormwater Site Plan template (Appendix Q).

General Requirements

The SWPPP shall include a narrative and *a TESC Plan sheet for civil review.* All BMPs shall be clearly referenced in the narrative and marked on the drawings. The SWPPP narrative shall include documentation to explain and justify the pollution prevention decisions made for the project. Each of the 13 elements must be considered and included in the Construction SWPPP unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the narrative of the SWPPP.

Clearing and grading activities for developments shall be permitted only if conducted pursuant to an approved site development plan (e.g., subdivision approval) that establishes permitted areas of clearing, grading, cutting, and filling. These permitted clearing and grading areas and any other areas required to preserve critical or sensitive areas, buffers, native growth protection easements, or tree retention areas shall be delineated on the site plans and the development site.

The SWPPP shall be implemented beginning with initial land disturbance and until final stabilization. Sediment and Erosion control BMPs shall be consistent with the BMPs contained in *Chapters 3 and 4 of Volume II of the SWMMWW*.

Seasonal Work Limitations - From October 1 through April 30, clearing, grading, and other soil disturbing activities shall only be permitted if *approved by Redmond's Wet Weather Committee*.

An approval to perform work during the wet weather season (October 1 – April 30) shall require a wet weather plan and seasonal suspension plan. See Chapter 10 of the Stormwater Technical Notebook for additional details. Such approval will only be granted if the proposal has shown that silt-laden runoff will be prevented from leaving the site through a combination of the following:

1. Site conditions including existing vegetative coverage, slope, soil type and proximity to receiving waters.
2. Limitations on activities and the extent of disturbed areas.
3. Proposed erosion and sediment control measures.

Based on the information provided and/or local weather conditions, the City may expand or restrict the seasonal limitation on site disturbance. Redmond may take enforcement action – such as a notice of violation, seasonal suspension of work, administrative order, penalty, or stop-work order under the following circumstances:

- *If, during the course of any construction activity or soil disturbance during the seasonal limitation period, sediment or contaminants leave the construction site causing a violation of the Washington State surface water quality standard or groundwater quality standard; or*
- *If clearing and grading limits or erosion and sediment control measures shown in the approved plan are not maintained.*

The following activities are exempt from the seasonal clearing and grading limitations:

1. Routine maintenance and necessary repair of erosion and sediment control BMPs.
2. Routine maintenance of public facilities or existing utility structures that do not expose the soil or result in the removal of the vegetative cover to soil.
3. Activities where there is one hundred percent infiltration of surface water runoff within the site in approved and installed erosion and sediment control facilities.

Project proponents are required to notify the City of Redmond within 24 hours if a turbidity reading of 250 NTU or higher is measured. Projects discharging water during construction in excess of 25 NTU are required to take immediate action, applying additional temporary sediment and erosion control measures, to lower the NTU in runoff leaving the site below 25 NTU. If a site discharges directly to a surface water body, the NTU limit is based on the standards in WAC 173-201. In general, projects are not allowed to discharge sediment laden water to surface waters unless the background turbidity is not increased by more than 5 NTU. Project sites in seasonal suspension are to meet this requirement.

If a site requires an NPDES General Construction Stormwater Permit from Washington Department of Ecology, the project will be required to show evidence that they hold a permit prior to project commencement. If requested by the construction inspector, copies of information submitted to Ecology for NPDES construction permit compliance will be given to the City of Redmond.

Project Requirements - Construction SWPPP Elements

<u>Element 1: Preserve Vegetation/Mark Clearing Limits</u>

- Before beginning land disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.
- Retain the duff layer, native top soil, and natural vegetation in an undisturbed state to the maximum degree practicable.

Element 2: Establish Construction Access

- Limit construction vehicle access and exit to one route, if possible.
- Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs, to minimize tracking of sediment onto public roads.
- Locate wheel wash or tire baths on site, if the stabilized construction entrance is not effective in preventing tracking sediment onto roads.
- If sediment is tracked off site, clean the affected roadway thoroughly at the end of each day, or more frequently as necessary (for example, during wet weather). Remove sediment from roads by shoveling, sweeping, or pick up and transport the sediment to a controlled sediment disposal area.
- *Street flushing of sediment into stormwater systems is prohibited in Redmond.*
- *Wheel wash station may be required by the City's construction inspector if track out is not controlled with other measures.*

Element 3: Control Flow Rates

- Protect properties and waterways downstream of development sites from erosion and the associated discharge of turbid waters due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the project site.
- Where necessary to comply with the bullet above, construct stormwater retention or detention facilities as one of the first steps in grading. Assure that detention facilities function properly before constructing site improvements (e.g., impervious surfaces).
- *Permanent infiltration facilities shall not be operational or used to control/treat runoff during construction. Runoff may be infiltrated in locations other than where permanent infiltration and LID facilities will be constructed.*

Element 4: Install Sediment Controls

- Design, install, and maintain effective erosion controls and sediment controls *in accordance with the Redmond Standard Specifications and Details* to minimize the discharge of pollutants.
- Construct sediment control BMPs (sediment ponds, traps, filters, etc.) as one of the first steps in grading. These BMPs shall be functional before other land disturbing activities take place, *and shall be maintained and removed once the site is stabilized and the inspector approves removal*.
- Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.
- Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or

before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard in Element #3, bullet #1. *Full stabilization means concrete or asphalt paving; quarry spalls used as ditch lining; or the use of rolled erosion products, a bonded fiber matrix product, or vegetative cover in a manner that will fully prevent soil erosion. Redmond inspectors shall determine if an area is stabilized by means other than pavement or quarry spalls*.

- Locate BMPs intended to trap sediment on-site in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.
- Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.
- *Earthen structures such as dams, dikes, and diversions shall be seeded and mulched according to the timing indicated in element 5*.

<u>Element 5: Stabilize Soils</u>

- Stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, the early application of gravel base early on areas to be paved, and dust control.
- *Soil stabilization measures selected should be appropriate for the time of year, site conditions, estimated duration of use, and potential water quality impacts that stabilization materials may have on downstream waters or groundwater.*
- Control stormwater volume and velocity within the site to minimize soil erosion.
- Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.
- Soils must not remain exposed and unworked for more than the time periods set forth below to prevent erosion:
  - During the dry season (May 1 - Sept. 30): 7 days
  - During the wet season (October 1 - April 30): 2 days
  - *This condition applies to all soils on site, whether at final grade or not. Redmond inspectors may adjust time limits depending on site conditions, forecasted weather, site characteristics, and to protect human safety, habitat, and property downstream.*
- Stabilize soils at the end of the shift before a holiday or weekend if needed based on the weather forecast.
- Stabilize soil stockpiles from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways and drainage channels.
- Minimize the amount of soil exposed during construction activity.
- *Do not disturb* steep slopes.

- Minimize soil compaction and, unless infeasible, preserve topsoil.
- *Linear construction activities, including right-of-way and easement clearing, roadway development, pipelines, and trenching for utilities, shall be conducted to meet the soil stabilization requirement. Contractors shall install the bedding materials, roadbeds, structures, pipelines, or utilities and re-stabilize the disturbed soils so that:*
    - *From October 1 through April 30 no soils shall remain exposed and unworked for more than 2 days; and*
    - *From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days.*

Element 6: Protect Slopes

- Design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).
- Divert off-site stormwater (run-on) or ground water away from slopes and disturbed areas with interceptor dikes, pipes and/or swales. Off-site stormwater should be managed separately from stormwater generated on the site.
- At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.
- Temporary pipe slope drains must handle the peak volumetric flow rate calculated using a 10-minute time step from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year and 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "landscaped" area.
- Place excavated material on the uphill side of trenches, consistent with safety and space considerations.
- Place check dams at regular intervals within constructed channels that are cut down a slope.
- *Provide drainage to remove groundwater intersecting the slope surface of exposed soil areas.*
- *Stabilize soils on slopes, as specified in Element #5.*

Element 7: Protect Drain Inlets

- Protect all storm drain inlets made operable during construction so that stormwater runoff shall not enter the conveyance system without first being filtered or treated to remove sediment. *Catch basins are considered operational when stormwater flows are*

allowed to enter the catch basin. If stormwater is allowed to enter the side of the catch basin, inlet protection is still required for those flows.

- *All approach roads shall be kept clean. Approach roads shall have inlet protection if they could be impacted by the construction site and at the discretion of the City Inspector.*
- Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).
- *When projects are completed, removal of inlet protection devices is required. Removal will be done in a way that does not allow the captured sediment to enter or later be washed into the stormwater inlet*.

Element 8: Stabilize Channels and Outlets

- Design, construct, and stabilize all on-site conveyance channels to prevent erosion from the following expected peak flows:
  - Channels must handle the peak volumetric flow rate calculated using a 10-minute time step from a Type 1A, 10- year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "landscaped area.
- Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream reaches at the outlets of all conveyance systems.

Element 9: Control Pollutants

- Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. *See Section 8.3 for requirements specific to Wellhead Protection Zones.*
- Handle and dispose of all pollutants, including waste materials and demolition debris that occur on-site in a manner that does not cause contamination of *soil, groundwater, or* stormwater.
- Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. On-site fueling tanks must include secondary containment. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume contained in

the largest take within the containment structure. Double-walled tanks do not require additional secondary containment.

- Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.
- Discharge wheel wash or tire bath wastewater to a separate on-site treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland application, or to the sanitary sewer, with *City* approval.
- Apply *agricultural chemicals, including* fertilizers and pesticides in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.
- Use BMPs to prevent contamination of stormwater runoff by pH modifying sources. The sources for this contamination include, but are not limited to: bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping and mixer washout waters.
- *Stormwater discharges shall not cause or contribute to a violation of the water quality standard for pH in the stormwater drainage system or receiving water. Allowable runoff pH concentrations shall be within the range of 6.5 to 8.5 pH*.
- Adjust the pH of stormwater if necessary to prevent violations of water quality standards.
- *Ensure* that washout of concrete trucks is performed off-site or in designated concrete washout areas only. Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams. Do not dump excess concrete on-site, except in designated concrete washout areas. Concrete spillage or concrete discharge to surface waters of the State is prohibited.
- Obtain written approval from Ecology before using chemical treatment other than CO2 or dry ice to adjust pH.
- *In Wellhead Protection Zones 1 and 2 additional care and pollution control BMPs will be required by the City to protect the groundwater aquifer/drinking water supply. Review of SWPPP, TESC civil plans, Seasonal suspension plan, and wet weather plans in Wellhead protection areas will include more scrutiny and strict application of pollution controls.*
- *Spill control materials suitable for applicable chemicals shall be kept on site.*

<u>Element 10: Control De-Watering</u>

- *For projects that involve temporary construction dewatering discharges greater than 500 gallons per minute follow the procedures established under City of Redmond Temporary Construction Dewatering Operating Policy authorized by RMC 13.25*.
- *For projects that involve temporary construction dewatering of less than 500 gallons per minute follow the guidelines below.*

- Discharge foundation, vault, and trench de-watering water, which has similar characteristics to stormwater runoff at the site, into a controlled conveyance system before discharge to a sediment trap or sediment pond.
- Discharge clean, non-turbid de-watering water, such as well-point ground water, to systems tributary to, or directly into surface waters of the State, as specified in Element #8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through stormwater sediment ponds. Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.
- Handle highly turbid or otherwise contaminated dewatering water, *such as from construction equipment operation, clamshell digging, concrete tremie pour, or work inside a cofferdam*, separately from stormwater.
- Other treatment or disposal options may include:
  1. Infiltration.
  2. Transport off-site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.
  3. Ecology-approved on-site chemical treatment or other suitable treatment technologies.
  4. Sanitary or combined sewer discharge with *City of Redmond and King County* approval, if there is no other option.
  5. Use of a sedimentation bag that discharges to a ditch or swale for small volumes of localized dewatering. *Be prepared for possible bag failure*.

<u>Element 11: Maintain BMPs</u>

- Maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.
- Remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

Element 12: Manage the Project

- Phase development projects to the maximum degree practicable and take into account seasonal work limitations.
- Inspection and monitoring – Inspect, maintain and repair all BMPs as needed to assure continued performance of their intended function. Projects regulated under the Construction Stormwater General Permit must conduct site inspections and monitoring in accordance with Special Condition S4 of the Construction Stormwater General Permit.
- Maintaining an updated construction SWPPP – Maintain, update, and implement the SWPPP.
- Projects that disturb one or more acres must have site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL). Project sites disturbing less than one acre may have a CESCL or a person without CESCL certification conduct inspections. By the initiation of construction, the SWPPP must identify the CESCL or inspector, who must be present on-site or on-call at all times.
- The CESCL or inspector (project sites less than one acre) must have the skills to assess the:
  - Site conditions and construction activities that could impact the quality of stormwater.
  - Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.
- The CESCL or inspector must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. They must evaluate the effectiveness of BMPs and determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.

  Based on the results of the inspection, construction site operators must correct the problems identified by:

  - Reviewing the SWPPP for compliance with the 13 construction SWPPP elements and making appropriate revisions within 7 days of the inspection, *or as directed by the inspector.*
  - Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs as soon as possible, addressing the problems not later than within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, the construction site operator may request an extension within the initial 10-day response period.
  - Documenting BMP implementation and maintenance in the site log book (sites larger than 1 acre).
- The CESCL or inspector must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual

discharge events that last more than one day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one inspection is required that week.) The CESCL or inspector may reduce the inspection frequency for temporary stabilized, inactive sites to once every calendar month. *Coordination with Utilities and Other Contractors – The primary project proponent shall evaluate, with input from utilities and other contractors, the stormwater management requirements for the entire project, including the utilities, when preparing the Construction SWPPP.*

Element 13: Protect Low Impact Development BMPs

- Protect all Bioretention and Rain Garden BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the Bioretention and/or Rain Garden BMPs. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the BMP must include removal of sediment and any sediment-laden Bioretention/rain garden soils, and replacing the removed soils with soils meeting the design specification.
- Prevent compaction of Bioretention and rain garden BMPs by excluding construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.
- Control erosion and avoid introducing sediment from surrounding land uses onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment-laden runoff onto permeable pavements or base materials.
- Pavement fouled with sediments or no longer passing an initial infiltration test must be cleaned using procedures in accordance with this manual or the manufacturer's procedures.
- Keep all heavy equipment off existing soils under LID facilities that have been excavated to final grade to retain the infiltration rate of the soils.

2.5.3 Minimum Requirement #3: Source Control of Pollution

All known, available and reasonable source control BMPs must be applied to all projects. Source control BMPs must be selected, designed, and maintained in accordance with *the 2014 SWMMWW*.

"Applicable" and "recommended" source controls in Volume IV of the 2014 SWMMWW are required and shall be documented in the Stormwater Site Plan required by Minimum Requirement #1, and in the Operations and Maintenance Manual if the project triggers Minimum Requirement #9.

2.5.4 Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls

Natural drainage patterns shall be maintained, and discharges from the project site shall occur at the natural location, to the maximum extent practicable. The manner by which runoff is discharged from the project site must not cause a significant adverse impact to downstream receiving waters and down gradient properties. All outfalls require energy dissipation.

Where no conveyance system exists at the adjacent down-gradient property line and the discharge was previously unconcentrated flow or significantly lower concentrated flow, then measures shall be taken to prevent down-gradient *significant adverse* impacts. Drainage easements from downstream property owners may be needed. If offsite easements are needed, they shall be obtained by the project proponent prior to approval of engineering plans. Any runoff concentrated by the proposed project must be discharged as follows:

a. If the 100-year peak discharge is less than or equal to 0.2 cfs (0.3 cfs using 15 minute time steps) under existing conditions and will remain less than or equal to 0.2 cfs under developed conditions, then the concentrated runoff may be discharged onto a rock pad or to any other system that serves to disperse flows.
b. If the 100-year peak discharge is less than or equal to 0.5 cfs (0.75 cfs using 15 minute time steps) under existing conditions and will remain less than or equal to 0.5 cfs under developed conditions, then the concentrated runoff may be discharged through a dispersal trench or other dispersal system, provided the applicant can demonstrate that there will be no significant adverse impact to *down gradient* properties, drainage systems, *or natural areas*.
c. If the 100-year peak discharge is greater than 0.5 cfs for either existing or developed conditions, or if a significant adverse impact to down-gradient properties or drainage systems is likely, then a conveyance system must be provided to convey the concentrated runoff across the downstream properties to an acceptable discharge point (i.e., an enclosed drainage system or open drainage feature where concentrated runoff can be discharged without significant adverse impact).

Designs for outfall systems to protect against adverse impacts from concentrated runoff are included in *Volume V, Chapter 4, of the 2014 SWMMWW.*

Stormwater control or treatment facilities are not permitted within stream or wetland buffers. Conveyance facilities may be permitted. Stormwater control or treatment structures should not be located within the expected 25-year water level elevations for salmonid-bearing waters. Such areas may provide off-channel habitat for juvenile salmonids and salmonid fry. Redmond Stormwater Engineer pre-approval is required for any structure proposed in the 25-year water level elevation of salmonid bearing streams.

If the downstream analysis required in Section 2.6 identifies conveyance deficiencies that may be caused or exacerbated by the proposed project, then offsite improvements may be required to avoid significant adverse impact to down gradient properties.

2.5.5 Minimum Requirement #5: On-Site Stormwater Management

Projects shall employ on-site stormwater management BMPs in accordance with the following projects thresholds, standards, and lists to infiltrate, disperse, and retain stormwater runoff on-site to the extent feasible without causing *groundwater contamination*, flooding, or erosion impacts.

"Flooding and erosion impacts" include impacts such as flooding of septic systems, crawl spaces, living areas, outbuildings, etc.; increased ice or algal growth on sidewalks/roadways; earth movement/settlement, increased landslide potential; erosion and other potential damage.

Section 8.3 describes some clarifications for infiltration in wellhead protection zones to avoid "groundwater contamination" or other risks to the drinking water aquifer. Appendix A "Wellhead Protection Zones" provides a planning level map of where infiltrating runoff from pollution generating surfaces is limited and design requirements are locally amended to protect the drinking water aquifer.

As is noted below, Minimum Requirement 5 On-Site Stormwater Management requirements are customized in areas draining to flow control exempt waterbodies (Sammamish River and Lake Sammamish) or areas where 100% infiltration is required. See Appendix B for a planning level map of the MR 5 custom areas.

2.5.5.1 Flow Control Exempt Areas

Projects qualifying as flow control exempt in accordance with 2.5.7 Minimum Requirement #7: Flow Control do not have to achieve the LID performance standard, nor consider bioretention, rain gardens, permeable pavement, or full dispersion if using List #1 or List #2. However, those projects must implement the following:

- BMP T5.13: Post-Construction Soil Quality and Depth;
- BMP T5.10A: Downspout Full Infiltration, or BMP T5.10B: Downspout Dispersion Systems, or BMP T5.10C: Perforated Stub-out Connections; and
- BMP T5.11: Concentrated Flow Dispersion or BMP T5.12: Sheet Flow Dispersion, if feasible.

2.5.5.2 Marymoor – 100% Infiltration

Marymoor – 100% Infiltration area mapped in Appendix B has limited conveyance capacity or no conveyance at all. The area also has highly infiltrative soils and is outside Wellhead Protection Zones that prohibit infiltration of runoff from pollution generating hard surfaces. As such, 100% of runoff shall be infiltrated in this area. Projects within this area do not need to demonstrate compliance with Minimum Requirement 5 because they will exceed the intent of Minimum Requirement 5 by infiltrating 100% of their runoff.

2.5.5.3 2014 SWMMWW LID Required

All areas mapped as "2014 SWMMWW LID Required" (Appendix B) will follow List 1, List 2, or the LID performance standard based on project characteristics, as described below.

Table 2.0

1-2.5.1 On-Site Stormwater Management Requirements for Projects Triggering Minimum Requirements #1 - #9	
Project Type and Location	**Requirement**
New development	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth; or List #2 (applicant option).
Redevelopment on any parcel inside the UGA, or redevelopment outside the UGA on a parcel less than 5 acres *(* All of Redmond is inside the UGA.)*	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth; or List #2 (applicant option).
Redevelopment outside the UGA on a parcel of 5 acres or larger *(* All of Redmond is inside the UGA.)*	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth.
Note: This table refers to the Urban Growth Area (UGA) as designated under the Growth Management Act (GMA) (Chapter 36.70A RCW) of the State of Washington. If the Permittee is located in a county that is not subject to planning under the GMA, the city limits shall be used.	

<u>Low Impact Development Performance Standard</u>

Stormwater discharges shall match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 8% of the 2-year peak flow to 50% of the 2-year peak flow. Refer to the Standard Flow Control Requirement section in Minimum Requirement #7 for information about the assignment of the pre-developed condition. Project sites that must also meet minimum requirement #7 – flow control - must match flow durations between 8% of the 2-year flow through the full 50-year flow.

List #1: On-site Stormwater Management BMPs for Projects Triggering Minimum Requirements #1 through #5

For each surface, consider the BMP's in the order listed for that type of surface. Use the first BMP that is considered feasible. No other On-site Stormwater Management BMP is necessary for that surface. Feasibility shall be determined by evaluation against:

1. Design criteria, limitations, and infeasibility criteria identified for each BMP in this manual; and
2. Competing Needs Criteria listed in Volume V, Chapter 5 of the SWMMWW - On-Site Stormwater Management.

Lawn and landscaped areas:

- Post-Construction Soil Quality and Depth in accordance with BMP T5.13: Post-Construction Soil Quality and Depth.

Roofs:

1. Full Dispersion in accordance with BMP T5.30: Full Dispersion, or Downspout Full Infiltration Systems in accordance with BMP T5.10A: Downspout Full Infiltration
2. Rain Gardens in accordance with BMP T5.14A: Rain Gardens, or Bioretention in accordance with BMP T7.30: Bioretention Cells, Swales, and Planter Boxes. The rain garden or bioretention facility must have a minimum horizontal projected surface area below the overflow which is at least 5% of the area draining to it.
3. Downspout Dispersion Systems in accordance with BMP T5.10B: Downspout Dispersion Systems
4. Perforated Stub-out Connections in accordance with BMP T5.10C: Perforated Stub-out Connections

Other Hard Surfaces:

1. Full Dispersion in accordance with BMP T5.30: Full Dispersion
2. Permeable pavement in accordance with BMP T5.15: Permeable Pavements, or Rain Gardens in accordance with BMP T5.14A: Rain Gardens, or Bioretention in accordance with BMP T7.30: Bioretention Cells, Swales, and Planter Boxes. The rain garden or bioretention facility must have a minimum horizontal projected surface area below the overflow which is at least 5% of the area draining to it.
   Note: If the project identifies permeable pavement as the required element for new or replaced hard surfaces that will be owned and maintained by the City, the project shall instead construct a functionally equivalent alternative to permeable pavement. If the hard surfaces will be owned and maintained privately, functionally equivalent alternatives may be used. This policy exists because the goal of permeable pavement is to infiltrate stormwater and it is possible to provide that function without the

maintenance burden that comes with permeable pavement. See Chapter 8 of the Stormwater Technical Notebook for discussion of Functional Equivalency.

3. Sheet Flow Dispersion in accordance with BMP T5.12: Sheet Flow Dispersion, or Concentrated Flow Dispersion in accordance with BMP T5.11: Concentrated Flow Dispersion.

<u>List #2: On-site Stormwater Management BMPs for Projects Triggering Minimum Requirements #1 through #9</u>

For each surface, consider the BMPs in the order listed for that type of surface. Use the first BMP that is considered feasible. No other On-site Stormwater Management BMP is necessary for that surface. Feasibility shall be determined by evaluation against:

1. Design criteria, limitations, and infeasibility criteria identified for each BMP in this manual; and
2. Competing Needs Criteria listed in Chapter V-5 - On-Site Stormwater Management.

Lawn and landscaped areas:

- Post-Construction Soil Quality and Depth in accordance with BMP T5.13: Post-Construction Soil Quality and Depth.

Roofs:

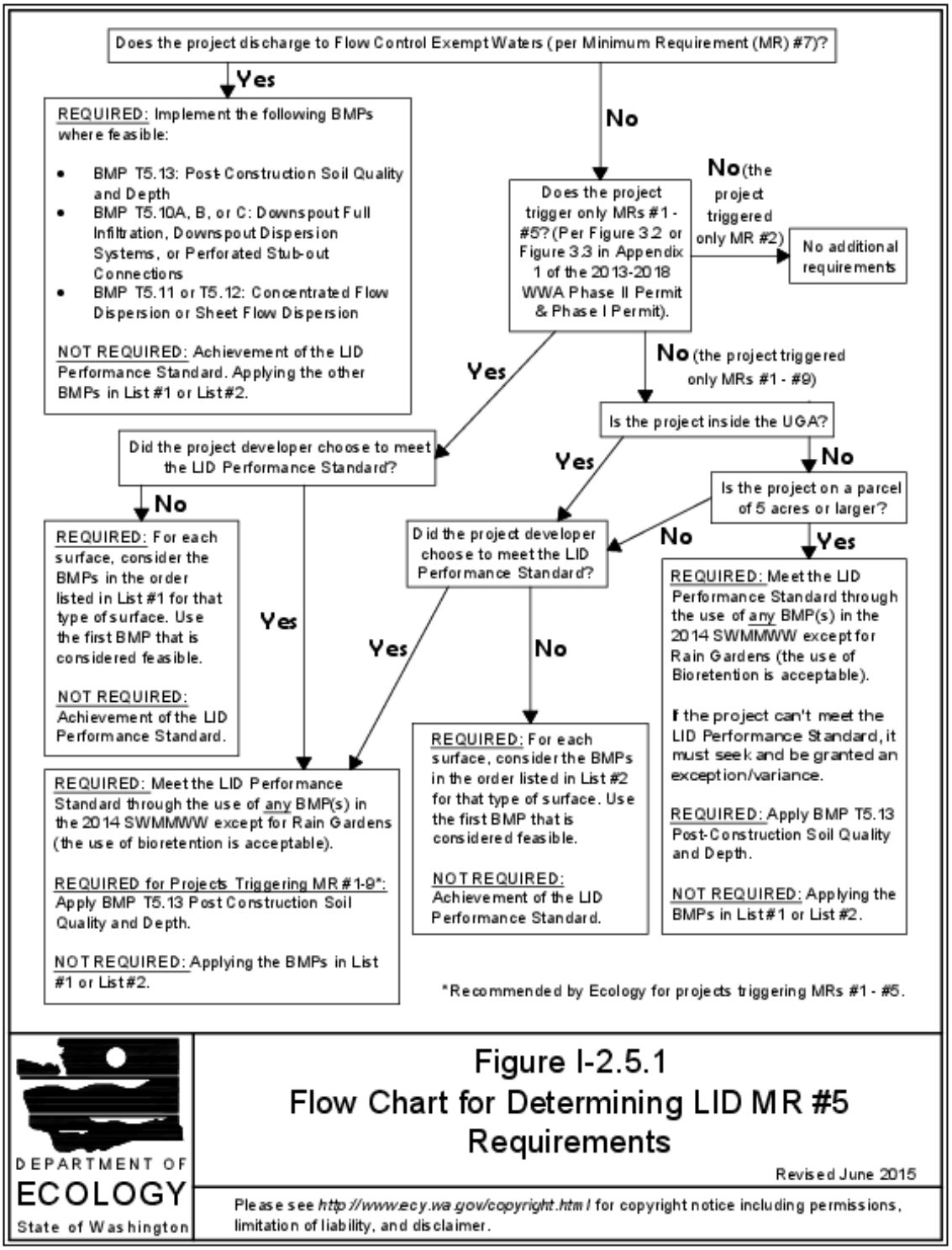
1. Full Dispersion in accordance with BMP T5.30: Full Dispersion, or Downspout Full Infiltration Systems in accordance with BMP T5.10A: Downspout Full Infiltration.
2. Bioretention (See BMP T7.30: Bioretention Cells, Swales, and Planter Boxes) facilities *must* have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.
3. Downspout Dispersion Systems in accordance with BMP T5.10B: Downspout Dispersion Systems
4. Perforated Stub-out Connections in accordance with BMP T5.10C: Perforated Stub-out Connections

Other Hard Surfaces:

1. Full Dispersion in accordance with BMP T5.30: Full Dispersion
2. Permeable pavement in accordance with BMP T5.15: Permeable Pavements
   Note: If the project identifies permeable pavement as the required element for new or replaced hard surfaces that will be owned and maintained by the City, the project shall instead construct a functionally equivalent alternative to permeable pavement. If the hard surfaces will be owned and maintained privately, functionally equivalent alternatives may be used. This policy exists because the goal of permeable pavement is to infiltrate stormwater and it is possible to provide that function without the

maintenance burden that comes with permeable pavement. See Chapter 8 for discussion of Functional Equivalency.

3. Bioretention BMP's (BMP T7.30: Bioretention Cells, Swales, and Planter Boxes) that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.
4. Sheet Flow Dispersion in accordance with BMP T5.12: Sheet Flow Dispersion, or Concentrated Flow Dispersion in accordance with BMP T5.11: Concentrated Flow Dispersion


Does the project discharge to Flow Control Exempt Waters (per Minimum Requirement (MR) #7)?
Yes
No
REQUIRED: Implement the following BMPs where feasible:
• BMP T5.13: Post-Construction Soil Quality and Depth
• BMP T5.10A, B, or C: Downspout Full Infiltration, Downspout Dispersion Systems, or Perforated Stub-out Connections
• BMP T5.11 or T5.12: Concentrated Flow Dispersion or Sheet Flow Dispersion
NOT REQUIRED: Achievement of the LID Performance Standard. Applying the other BMPs in List #1 or List #2.
Does the project trigger only MRs #1 - #5? (Per Figure 3.2 or Figure 3.3 in Appendix 1 of the 2013-2018 WWA Phase II Permit & Phase I Permit).
No (the project triggered only MR #2)
No additional requirements
Yes
No (the project triggered only MRs #1 - #9)
Is the project inside the UGA?
Yes
No
Did the project developer choose to meet the LID Performance Standard?
Is the project on a parcel of 5 acres or larger?
No
Yes
No
REQUIRED: For each surface, consider the BMPs in the order listed in List #1 for that type of surface. Use the first BMP that is considered feasible.
NOT REQUIRED: Achievement of the LID Performance Standard.
Yes
Did the project developer choose to meet the LID Performance Standard?
Yes
No
REQUIRED: Meet the LID Performance Standard through the use of any BMP(s) in the 2014 SWMMWW except for Rain Gardens (the use of Bioretention is acceptable).
If the project can't meet the LID Performance Standard, it must seek and be granted an exception/variance.
REQUIRED: Apply BMP T5.13 Post-Construction Soil Quality and Depth.
NOT REQUIRED: Applying the BMPs in List #1 or List #2.
REQUIRED: Meet the LID Performance Standard through the use of any BMP(s) in the 2014 SWMMWW except for Rain Gardens (the use of bioretention is acceptable).
REQUIRED for Projects Triggering MR #1-9*: Apply BMP T5.13 Post Construction Soil Quality and Depth.
NOT REQUIRED: Applying the BMPs in List #1 or List #2.
REQUIRED: For each surface, consider the BMPs in the order listed in List #2 for that type of surface. Use the first BMP that is considered feasible.
NOT REQUIRED: Achievement of the LID Performance Standard.
*Recommended by Ecology for projects triggering MRs #1 - #5.
DEPARTMENT OF ECOLOGY
State of Washington
Figure I-2.5.1
Flow Chart for Determining LID MR #5 Requirements
Revised June 2015
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2.5.6 Minimum Requirement #6: Runoff Treatment

Some areas in Redmond have unique runoff treatment requirements, as noted below. Appendix C provides a planning level map of "Runoff Treatment Custom Areas." All areas mapped as "2014 SWMMWW Basic or Enhanced" will use the 2014 SWMMWW to determine which type of runoff treatment is required. The following will discuss what is required in runoff treatment "custom areas" as mapped in Appendix C.

Wellhead Protection Zones

Section 8.3 describes infiltrating runoff from pollution generating hard surfaces in wellhead protection zones. Appendix A "Wellhead Protection Zones" provides a planning level map of where infiltrating runoff from pollution generating hard surfaces is limited and design requirements are locally amended to protect the drinking water aquifer.

Overlake and Downtown Regional Facility Surcharge Areas

Regional runoff treatment facilities have been built, or will be built in the Overlake and Downtown Regional Facility Surcharge Areas. Participation in the regional facilities is required in Overlake and Downtown (RMC 13.20). In these areas, projects do not need to build basic or enhanced runoff treatment facilities as those are provided for the project in a regional facility. The surcharge is used by the City of Redmond to recoup some of the investment in providing regional facilities for these areas. If oil control is triggered by a project, oil control must be installed to treat runoff for the areas of the project that trigger oil control. The map in Appendix C shows the portion of the Overlake Surcharge Area where runoff treatment is addressed by these regional facilities. As noted in RMC 13.20, properties south of NE 26th Street are required to provide runoff treatment on site. The map in Appendix F shows the full Overlake Regional Facility Surcharge Area.

Phosphorous Control

In 1989 a cooperative effort of Washington Department of Ecology, Issaquah, Redmond, King County, and Bellevue published the Lake Sammamish Water Quality Management Project Technical Report. In the report, reducing stormwater loading of phosphorous to Lake Sammamish was necessary to preserve water quality in the lake. As such, projects that drain through pipes or streams into Lake Sammamish require phosphorous control treatment. If a project triggers oil control that is still required to treat the runoff that triggers oil control.

SE Redmond

In this area, regional facilities have been built that provide basic treatment. Some projects within this area may trigger enhanced treatment. This area does not have a mandatory surcharge. Projects proponents within this area are encouraged to contact the Stormwater Engineer to determine if the project can pay into the regional facility to address some or all of

their treatment requirements. Otherwise, projects in this area must build runoff treatment facilities on-site.

Thresholds

When assessing a project against the following thresholds, only consider those hard and pervious surfaces that are subject to this minimum requirement as determined in I-2.4 Applicability of the Minimum Requirements.

The following require construction of stormwater treatment facilities (see Table 2.1 below):

- Projects in which the total of pollution generating hard surface (PGHS) is 5,000 square feet or more in a threshold discharge area of the project, or
- Projects in which the total of pollution-generating pervious surfaces (PGPS) – not including permeable pavements - is three-quarters (3/4) of an acre or more in a threshold discharge area, and from which there is a surface discharge in a natural or man-made conveyance system from the site.

Treatment Facility Sizing

Stormwater treatment facilities shall be sized for the entire area that drains to them, even if some of those areas are not pollution-generating, or were not included in the project site threshold decisions (I-2.4 Applicability of the Minimum Requirements) or the treatment threshold decisions of this minimum requirement.

Water Quality Design Storm Volume:

- The volume of runoff predicted from a 24-hour storm with a 6-month return frequency (a.k.a., 6-month, 24-hour storm). Wetpool facilities are sized based upon the volume of runoff predicted through use of the Natural Resource Conservation Service curve number equations in Chapter III-2 - Hydrologic Analysis, for the 6-month, 24-hour storm. Alternatively, when using an approved continuous runoff model, the water quality design storm volume shall be equal to the simulated daily volume that represents the upper limit of the range of daily volumes that accounts for 91% of the entire runoff volume over a multi-decade period of record.

Water Quality Design Flow Rate:

- Preceding Detention Facilities or when Detention Facilities are not required: The flow rate at or below which 91% of the runoff volume, as estimated by an approved continuous runoff model, will be treated. Design criteria for treatment facilities are assigned to achieve the applicable performance goal (e.g., 80% TSS removal) at the water quality design flow rate. At a minimum, 91% of the total runoff volume, as

estimated by an approved continuous runoff model, must pass through the treatment facility(ies) at or below the approved hydraulic loading rate for the facility(ies).

- Downstream of Detention Facilities: The water quality design flow rate must be the full 2-year release rate from the detention facility.

Treatment Facility Selection, Design, and Maintenance

Stormwater treatment facilities shall be:

- Selected in accordance with the process identified in Chapter 4 of Volume I of the 2014 SWMMWW *as modified by the Stormwater Technical Notebook.*
- Designed in accordance with the design criteria in Volume V of the 2014 SWMMWW *as modified by Chapter 8 of the Stormwater Technical Notebook*, and
- Maintained in accordance with the maintenance schedule in Volume V of the 2014 SWMMWW *as modified by the Stormwater Technical Notebook*.

Additional Requirements

Treatment facilities applied consistent with this Stormwater Technical Notebook and the 2014 SWMMWW are presumed to meet the requirement of state law to provide all known available and reasonable methods of treatment (RCW 90.52.040, RCW 90.48.010). This technology-based treatment requirement does not excuse any discharge from the obligation to apply whatever technology is necessary to comply with state water quality standards, Chapter 173-201A WAC; state ground water quality standards, Chapter 173-200 WAC; state sediment management standards, Chapter 173-204 WAC; and the underground injection program, Chapter 173-218 WAC. Additional treatment to meet those standards may be required by the federal government, Washington State *or the City of Redmond*.

Infiltration through use of On-site Stormwater Management BMPs can provide both treatment of stormwater, through the ability of certain soils to remove pollutants, and volume control of stormwater, by decreasing the amount of water that runs off to surface water. Infiltration through engineered treatment facilities that utilize the natural soil profile can also be very effective at treating stormwater runoff, but pretreatment must be applied and soil conditions must be appropriate to achieve effective treatment while not impacting ground water resources. *See Section 8.3 for limitations to infiltration in wellhead protection zones. See Chapter 6 of Volume V of the SWMMWW* - Pretreatment for pretreatment design details.

Impervious surfaces that are “fully dispersed” in accordance with BMP T5.30: Full Dispersion is not considered effective impervious surfaces. Impervious surfaces that are “dispersed” in accordance with BMP T5.10B: Downspout Dispersion Systems, BMP T5.11: Concentrated Flow Dispersion, and BMP T5.12: Sheet Flow Dispersion are still considered effective surfaces though they may be modeled as pervious surfaces if flow path lengths meet the specified minima. See *the 2014 SWMMWW* Appendix III-C: Washington State Department of Ecology Low Impact

Development Flow Modeling Guidance for a more complete description of hydrologic representation of On-site Stormwater Management BMPs.

2.5.7 Minimum Requirement #7: Flow Control

Applicability

Projects must provide flow control to reduce the impacts of stormwater runoff from hard surfaces and land cover conversions. The requirement below applies to projects that discharge stormwater directly, or indirectly through a conveyance system, into a fresh waterbody.

Flow control is not required for projects that discharge directly to, or indirectly through a conveyance system to *Lake Sammamish or the Sammamish River* subject to the following restrictions:

- Direct discharge to *Lake Sammamish or the Sammamish River* does not result in the diversion of drainage from any perennial stream classified as Class 1, 2, 3, or 4 in the State of Washington Interim Water Typing System, or Types "S", "F", or "Np" in the Permanent Water Typing System, or from any Category I, II, or III wetland; (*"Diversion of Drainage" means removing water from a stream, not intercepting stormwater runoff that drains into a stream.*) and
- Flow splitting devices or drainage BMPs are applied to route natural runoff volumes from the project site to any downstream Class 5 (*in the State of Washington Interim Water Typing System*) intermittent stream or Category IV wetland:
  - Design of flow splitting devices or drainage BMPs will be based on continuous hydrologic modeling analysis. The design will assure that flows delivered to Class 4 intermittent stream reaches will approximate, but in no case exceed, durations ranging from 50% of the 2-year to the 50-year peak flow.
  - Flow splitting devices or drainage BMPs that deliver flow to Category IV wetlands will also be designed using continuous hydrologic modeling to preserve pre-project wetland hydrologic conditions unless specifically waived or exempted by regulatory agencies with permitting jurisdiction; and,
- The project site must be drained by a conveyance system that is comprised entirely of manmade conveyance elements (e.g., pipes, ditches, outfall protection) and extends to the ordinary high water line of the exempt receiving water; and
- The conveyance system between the project site and the exempt receiving water shall have sufficient hydraulic capacity to convey *the 50-year storm* from future build-out conditions (under current zoning) of the site, and the *future build-out* condition from non-project areas from which runoff is or will be collected; and
- Any erodible elements of the manmade conveyance system must be adequately stabilized to prevent erosion under the conditions noted above.
- *Use of the manmade conveyance system is subject to restrictions that may be placed by the owner of that system, such as easement requirements or flow limits.*

- *The City of Redmond may require a maximum discharge rate for a site that is flow control exempt. This would typically occur due to existing limits of downstream conveyance capacity.*

If the discharge is to a stream that leads to a wetland, or to a wetland that has an outflow to a stream, both this minimum requirement (Minimum Requirement #7) and I-2.5.8 Minimum Requirement #8: Wetlands Protection apply.

Custom Flow Control Areas in Redmond

Some areas in Redmond have custom flow control requirements due to regional facilities and known conveyance limitations. Custom flow control areas will be discussed below and a planning level map of the areas can be found in Appendix D of the Stormwater Technical Notebook.

North Overlake Flow Control Alternative Area (Appendix J)

This portion of the City directly discharges to the Sammamish River, a flow control exempt receiving water. The conveyance to the Sammamish River is largely owned by Washington Department of Transportation (WSDOT). As such, the City is required to limit flows entering WSDOT conveyance to prevent flooding. Appendix J includes flow restriction information.

Downtown Regional Facility Surcharge Area (Appendix F)

In the Downtown Surcharge Area, the City is constructing stormwater trunk lines that convey 50 year flows to the Sammamish River. Projects may need to construct some conveyance improvements to connect to the Stormwater Trunk. See Section 8.8 for additional information on regional facilities. This does not waive runoff reduction as required in Minimum Requirement #5.

Overlake Regional Facility Surcharge Area (Appendix F)

In the Overlake Surcharge Area, the City is constructing regional detention and infiltration facilities and stormwater trunks to convey flows to those facilities. Projects may need to construct some conveyance improvements to connect to the Stormwater Trunk. See Section 8.8 for additional information on regional facilities. This does not waive runoff reduction as required in Minimum Requirement #5.

Wellhead Protection Areas (Appendix A)

Section 8.3 describes some clarifications for infiltration in wellhead protection zones to avoid "groundwater contamination" or other risks to the drinking water aquifer.

When sizing flow control facilities that are located in outwash soils in Wellhead Protection Zones 1 and 2, where infiltration is feasible, non-pollution generating hard surfaces shall be modeled

as outwash soils in both the developed and predeveloped condition. Pollution generating hard surfaces and other surfaces shall be modeled as till soils in both the developed and predeveloped condition.

The purpose of this adjustment is to treat areas that may create risk to the drinking water aquifer as if they have a high water table and infiltration is not feasible. This is protective of the drinking water and is consistent with Ecology guidance for high water table areas.

Thresholds

When assessing a project against the following thresholds, consider only those impervious, hard, and pervious surfaces that are subject to this minimum requirement as determined in I-2.4 Applicability of the Minimum Requirements.

The following circumstances require achievement of the standard flow control requirement for western Washington:

- Projects in which the total effective impervious surfaces is 10,000 square feet or more in a threshold discharge area; or
- Projects that convert ¾ acres or more of vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture in a threshold discharge area, and from which there is a surface discharge in a natural or man-made conveyance system from the site; or
- Projects that through a combination of impervious surfaces and converted vegetation areas cause a 0.10 cubic feet per second increase in the 100-year flow frequency from a threshold discharge area as estimated using the Western Washington Hydrology Model or other approved model and one-hour time step (or a 0.15 cfs increase using 15-minute time steps).

Standard Flow Control Requirement

Stormwater discharges shall match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow. The pre-developed condition to be matched shall be a forested land cover unless:

- Reasonable, historic information is available that indicates the site was not forested prior to settlement. *A map showing where project proponents may assume pasture for predevelopment conditions (modeled as "pasture" in the Western Washington Hydrology Model) is contained in Appendix E of the Stormwater Technical Notebook;* or

This standard requirement is waived for sites that will reliably infiltrate all the runoff from hard surfaces and converted vegetation areas.

Additional Requirement

Flow Control BMPs shall be selected, designed, and maintained in accordance with Volume III of the 2014 SWMMWW.

Reduction of flows through infiltration decreases stream channel erosion and helps to maintain base flow throughout the summer months. However, infiltration should follow the guidance in this manual to reduce the chance that ground water quality is threatened by such discharges.

Volume III of the SWMMWW includes a description of the Western Washington Hydrology Model. The model provides ways to represent On-site Stormwater Management BMPs described in Volumes III and V. Using those BMPs reduces the predicted runoff rates and volumes and thus also reduces the size of the required flow control facilities.

Application of sufficient types of On-site Stormwater Management BMPs can result in reducing the effective impervious area and the converted vegetation areas such that a flow control facility is not required. Application of BMP T5.30: Full Dispersion, also results in eliminating the flow control facility requirement for those areas that are "fully dispersed."

See the guidelines in SWMMWW Volume I, Appendix I-D: Guidelines for Wetlands when Managing Stormwater for Minimum Requirement #8, and directions concerning use of the Western Washington Hydrology Model for information about the approach for protecting wetland hydrologic conditions.

Diversions of flow from perennial streams and from wetlands can be considered if significant existing (i.e., pre-project) flooding, stream stability, water quality, or aquatic habitat problems would be solved or significantly mitigated by bypassing stormwater runoff rather than providing stormwater detention and discharge to natural drainage features. Bypassing should not be considered as an alternative to applicable flow control or treatment if the flooding, stream stability, water quality or habitat problem to be solved would be caused by the project. In addition, the proposal should not exacerbate other water quality/quantity problems such as inadequate low flows or inadequate wetland water elevations. The existing problems and their solution or mitigation as a result of the direct discharge should be documented by a stormwater engineer or scientist after review of any available drainage reports, basin plans, or other relevant literature. The restrictions in this minimum requirement on conveyance systems that transfer water to an exempt receiving water are applicable in these situations. Approvals by all regulatory authorities with relevant permits applicable to the project are necessary.

2.5.8 Minimum Requirement #8 - Wetlands Protection

Applicability

The requirements below apply only to projects whose stormwater discharges into a wetland, either directly or indirectly through a conveyance system.

Thresholds

The thresholds identified in I-2.5.6 Minimum Requirement #6: Runoff Treatment, and I-2.5.7 Minimum Requirement #7: Flow Control shall also be applied to determine the applicability of this requirement to discharges to wetlands.

Additional requirements to protect wetlands are documented in the Redmond Zoning Code.

Standard Requirement

Projects shall comply with Guide Sheets #1 through #3 in Volume I of the SWMMWW, Appendix I-D: Guidelines for Wetlands when Managing Stormwater. The hydrologic analysis shall use the existing land cover condition to determine the existing hydrologic conditions unless directed otherwise by a regulatory agency with jurisdiction.

Additional Requirements

Stormwater treatment and flow control facilities shall not be built within a natural vegetated buffer, except for:

- necessary conveyance systems as approved by the Stormwater Engineer; or
- as allowed in wetlands approved for hydrologic modification and/or treatment in accordance with Guide Sheet 2 in Volume I of the SWMMWW, Appendix I-D: Guidelines for Wetlands when Managing Stormwater *if also allowed by the Redmond Zoning Code.*

An adopted and implemented basin plan, or a Total Maximum Daily Load (TMDL, also known as a Water Clean-up Plan) may be used to develop requirements for wetlands that are tailored to a specific basin.

Appendix I-D: Guidelines for Wetlands when Managing Stormwater shall be used for discharges to natural wetlands and wetlands constructed as mitigation. While it is always necessary to pre-treat stormwater prior to discharge to a wetland, there are limited circumstances where wetlands may be used for additional treatment and detention of stormwater. These situations are considered in Guide Sheet 2 of Appendix I-D: Guidelines for Wetlands when Managing Stormwater.

Note that if selective runoff bypass is an alternative being considered to maintain the hydroperiod, the hydrologic analysis must consider the impacts of the bypassed flow. For instance, if the bypassed flow is eventually directed to a stream, the flow duration standard, Minimum Requirement #7, applies to the bypass.

2.5.9 Minimum Requirement #9: Operation and Maintenance

An operation and maintenance manual that is consistent with the provisions in Volume V of the 2014 SWMMWW shall be provided for all proposed stormwater facilities and BMPs, and the party (or parties) responsible for maintenance and operation shall be identified. At private facilities, a copy of the operation and maintenance manual shall be retained on-site or within

reasonable access to the site, and shall be transferred with the property to the new owner. For public facilities, a copy of the operation and maintenance manual shall be retained in the appropriate department. A log of maintenance activity that indicates what actions were taken shall be kept and be available for inspection by the local government.

The operations and maintenance manual shall be a stand-alone document prepared in accordance with the City of Redmond O&M Manual Template (Appendix L). The development proposal shall include provisions for maintenance of facilities in perpetuity.

At a minimum, the operations and maintenance manual shall include:

- *the purpose of the facility;*
- *the dimensions and other characteristics of the facility (site map);*
- *description of all BMPs at the facility designed to meet Minimum Requirements 3, 5, 6, 7, and 8;*
- *the party (parties) responsible for maintenance of the facility, with phone numbers and addresses;*
- *list of any proprietary components along with information from the vendor describing maintenance schedule and costs;*
- *except for single-family residential sites, identify potential site activities following site development. "Applicable" and "recommended" source controls in Volume IV of the 2014 SWMMWW are required and shall be documented;*
- *what maintenance activities are required, and proposed schedule;*
- *care and maintenance of any powered devices (aeration);*
- *inspection procedures and how the maintenance schedule will be modified if inspections determine the facility is not operating properly; the minimum requirements for this type of facility as described in Chapter 4 of Volume V of the 2014 SWMMWW as modified in this Stormwater Technical Notebook;*
- *The final O&M manual shall incorporate any written comments made during the development review process, and shall incorporate any field changes made to the facilities during construction. A template Operations and Maintenance Manual is provided in Appendix L.*
- *Any source control measures required by Minimum Requirement 3.*

2.6 Downstream Analysis

Development projects that discharge stormwater off-site shall submit an off-site analysis report that assesses the potential off-site water quality, erosion, slope stability, and drainage impacts associated with the project and that proposes appropriate mitigation of those impacts. An initial qualitative analysis shall extend downstream for the entire flow path from the project site to the receiving water or up to one mile, whichever is less. If a receiving water is within one-quarter mile, the analysis shall extend within the receiving water to one-quarter mile from the project site. The analysis shall extend one-quarter mile beyond any improvements proposed as

mitigation. The analysis must extend upstream to a point where any backwater effects created by the project cease. Upon review of the qualitative analysis, the *stormwater engineer* may require that a quantitative analysis be performed *or that the analysis area limits be extended.*

The existing or potential impacts to be evaluated and mitigated shall include:

- Conveyance system capacity problems;
- Localized flooding;
- Upland erosion impacts, including landslide hazards;
- Stream channel erosion at the outfall location;
- Violations of surface water quality standards as identified in a Basin Plan or a TMDL (Water Clean-up Plan); or violations of ground water quality standards in a wellhead protection area.

Projects *shall* be required to initially submit, with the permit application, a qualitative analysis of each downstream system leaving a site. The analysis should accomplish four tasks:

Task 1 – Define and map the study area

Submission of a site map showing property lines; a topographic map (at a minimum a USGS 1:24000 Quadrangle Topographic map) showing site boundaries, study area boundaries, downstream flowpath, and potential/existing problems.

Task 2 – Review all available information on the study area

This should include all available basin plans, ground water management area plans, drainage studies, floodplain/floodway FEMA maps, wetlands inventory maps, Critical Areas maps, stream habitat reports, salmon distribution reports, *infrastructure conditions information available from the City*, etc.

Task 3 – Field inspect the study area

The design engineer should physically inspect the existing on- and off-site drainage systems of the study area for each discharge location for existing or potential problems and drainage features. An initial inspection and investigation should include:

- Investigate problems reported or observed during the resource review
- Locate existing/potential constrictions or capacity deficiencies in the drainage system
- Identify existing/potential flooding problems
- Identify existing/potential overtopping, scouring, bank sloughing, or sedimentation
- Identify significant destruction of aquatic habitat (e.g., siltation, stream incision)
- Collect qualitative data on features such as land use, impervious surface, topography, soils, presence of streams, wetlands
- Collect information on pipe sizes, channel characteristics, drainage structures
- Verify tributary drainage areas identified in task 1

- Contact the local government office with drainage review authority (*for Redmond, contact the Maintenance Operations Center 425-556-2800)*, neighboring property owners, and residents about drainage problems
- Note date and weather at time of inspection

Task 4 – Describe the drainage system, and its existing and predicted problems

For each drainage system component (e.g., pipe, culvert, bridges, outfalls, ponds, vaults) the following should be covered in the analysis: location, physical description, problems, and field observations.

All existing or potential problems (e.g., ponding water, erosion) identified in tasks 2 and 3 above should be described. The descriptions should be used to determine whether adequate mitigation can be identified, or whether more detailed quantitative analysis is necessary. The following information should be provided for each existing or potential problem:

- Magnitude of or damage caused by the problem
- General frequency and duration
- Return frequency of storm or flow when the problem occurs (may require quantitative analysis)
- Water elevation when the problem occurs
- Names and concerns of parties involved
- Current mitigation of the problem
- Possible cause of the problem
- Whether the project is likely to aggravate the problem or create a new one.

Upon review of this analysis, the Stormwater Engineer may require mitigation measures deemed adequate for the problems, or a quantitative analysis, depending upon the presence of existing or predicted flooding, erosion, or water quality problems, and on the proposed design of the on-site drainage facilities. The analysis should repeat tasks 3 and 4 above, using quantitative field data including profiles and cross-sections.

The quantitative analysis should provide information on the severity and frequency of an existing problem or the likelihood of creating a new problem. It should evaluate proposed mitigation intended to avoid aggravation of the existing problem and to avoid creation of a new problem.

2.7 Adjustments (*Deviations in RMC 15.24*)

Adjustments to the Minimum Requirements may be granted prior to permit approval and construction. *In Accordance with RMC 15.24.084, Deviations, submit a written finding of fact* that addresses the following:

- The adjustment provides substantially equivalent environmental protection.

- The objectives of safety, function, environmental protection and facility maintenance, based upon sound engineering, are met.

2.8 Exceptions (*Variances in RMC 15.24*)

Exceptions may be allowed in Redmond. See RMC 15.24.089 for details and requirements for variances to be granted in Redmond.

Exceptions to the Minimum Requirements may be granted prior to permit approval and construction. The drainage manual administrator (*Technical Committee*) may grant an exception following legal public notice of an application for an exception, legal public notice of the administrator's decision on the application, and a written finding of fact that documents the administrator's decision to grant an exception.

The administrator may grant an exception to the minimum requirements if such application imposes a severe and unexpected economic hardship. To determine whether the application imposes a severe and unexpected economic hardship on the project applicant, the administrator must consider and document - with written findings of fact – the following:

- The current (pre-project) use of the site, and
- How the application of the minimum requirement(s) restricts the proposed use of the site compared to the restrictions that existed prior to the adoption of the minimum requirements; and
- The possible remaining uses of the site if the exception were not granted; and
- The uses of the site that would have been allowed prior to the adoption of the minimum requirements; and
- A comparison of the estimated amount and percentage of value loss as a result of the minimum requirements versus the estimated amount and percentage of value loss as a result of requirements that existed prior to adoption of the minimum requirements; and
- The feasibility for the owner to alter the project to apply the minimum requirements.

In addition, any exception must meet the following criteria:

- The exception will not increase risk to the public health and welfare, nor be injurious to other properties in the vicinity and/or downstream, and to the quality of waters of the state; and
- The exception is the least possible exception that could be granted to comply with the intent of the Minimum Requirements.

2.9 2014 SWMMWW Modifications in Redmond

This section provides Redmond specific changes to the 2014 SWMMWW for all volumes and chapters except Volume I, Chapter 2, which are documented in 2.1-2.8 of this Stormwater Technical Notebook. All information below are local changes to the 2014 SWMMWW.

2.9.1 Volume I.

Below are local modifications to Volume I of the 2014 SWMMWW, beyond those described earlier in this chapter.

2.9.1.1 Volume I. Chapter 3: Preparation of Stormwater Site Plans

SWMMWW I.3.1.6 - Step 6 – Prepare a Construction Stormwater Pollution Prevention Plan

Additional requirements are in Chapter 9 and 10 of the Stormwater Technical Notebook. Additions include wet weather plan and seasonal suspension plan, in addition to the TESC plan and the SWPPP required in the Stormwater Site Plan requirements if work will occur during the wet weather season.

2014 SWMMWW Volume I.3.1.7 – Complete the Stormwater Site Plan

If an Underground Injection Control Well (UIC) is included in the design, proof of registration with the state is required as part of the final Stormwater Site Plan.

Document how each of the Minimum Requirements will be met. In addition to the requirements in the 2014 SWMMWW, document what applicable or recommended source control BMPs will be applied at the project site.

2.9.1.2 Volume I. Chapter 4: BMP and Facility Selection Process for Permanent Stormwater Control Plans

SWMMWW I.4.2 - BMP and Facility Selection Process

Note that the City of Redmond has preferences for certain types of stormwater treatment facilities over others. These preferences are based primarily on long-term performance and maintenance cost. Actual selection of facilities must address site-specific constraints. However, these preferences are provided to help the designer in cases where more than one alternative exists. Capital improvement projects shall involve the Stormwater Engineer early in the design process to ensure selection of stormwater treatment facilities that best meet the long-term goals of the City.

Multifamily, commercial and industrial sites: If stormwater facilities will be privately maintained, then any treatment facility approved for that purpose in the 2014 SWMMWW may be used. If facilities will be publically maintained, then proprietary treatment may be approved by the Stormwater Engineer.

Single Family Residential projects: Stormwater facilities:

- Infiltration BMPs shall be used with pretreatment, where infiltration is feasible, subject to wellhead protection requirements.
- Ponds and swales shall be used for most sites, instead of vaults.
- Proprietary treatment technologies shall not be allowed.

Infiltration BMPs may be limited by wellhead protection requirements as noted in section 2.5.5, above.

Traffic counts in Redmond are available for some roadways at redmond.gov/Transportation/Resources/Engineering/TrafficCounts/. Follow guidance in the 2014 SWMMWW if traffic counts are not available from Redmond for the project site.

2.9.2 Volume II: Construction Stormwater Pollution Prevention

Below are local modifications to Volume II of the 2014 SWMMWW.

The following list of BMPs have specifications and details unique to Redmond. Use of Redmond specified BMPs is required.

- BMP C101 - Preserving Natural Vegetation. No disturbance is allowed within 5 feet of drip lines of trees to be saved unless specifically approved by the City's Project Planner.
- BMP C103 - High visibility plastic or metal fence. Refer to Redmond Standard Specifications and Details.
- BMP C105 - Stabilized construction entrance. Refer to Redmond Standard Specifications and Details.
- BMP C106 - Wheel wash. Refer to Redmond Standard Specifications and Details.
- BMP C121 - Compost mulch may only be used on proposed landscape areas. It is not approved as a general TESC mulch in Redmond.
- BMP C140 - Chemical dust suppressants are not approved for use in Redmond.
- BMP C202 - Rubble concrete channel lining is not approved in Redmond.
- BMP C204 - Pipe slope drain. Note that this is "temporary" only.
- BMP C205 - The minimum subsurface drain size shall be 6" diameter.
- BMP C220 - Catch basin filters are required in Redmond for storm drain inlet control. Provisions shall be made to remove filters at the end of the project without dropping accumulated sediment into the catch basin.
- BMP C231 - Brush Barrier. Not approved in Redmond.
- BMP C233 - Silt fence. Refer to Redmond Standard Specifications and Details.
- BMP C234 - Vegetated strips shall have a minimum length of 200 feet.
- BMP C240 - Sediment trap shall be sized using the 10-year developed design storm.
- BMP C241 - Temporary sediment pond shall be sized using the 10-year design storm. Side slopes shall be 3:1 or flatter (interior and exterior).
- BMP C250 - Construction stormwater chemical treatment and other non-standard treatment systems must be approved by the Stormwater Engineer.

2.9.3 Volume III: Hydrologic Analysis and Flow Control BMPs

2.9.3.1 III-2.1.1 Discussion of Hydrologic Analysis Methods Used for Designing BMPs

WWHM, the most current version, is preferred. Other models may be accepted with Stormwater Engineer approval.

Conveyance system design is addressed in Chapter 8 of the Stormwater Technical Notebook.

2.9.3.2 III-3.1 Roof Downspout Controls

Stormwater runoff from roofs may require treatment prior to infiltration if they are subject to venting significant amounts of dust, mist, fumes from manufacturing, commercial, restaurant, or other similar activity.

2.9.3.3 III-3.1.3 Perforated Stub Out Connections (BMP T5.10C)

The perforated pipe in perforated downspout connections shall not be located where percolating water will encounter and be intercepted by another nearby utility trench or foundation drain. See Section 8.6.11 for infiltration system setback requirements.

2.9.3.4 III-3.2.1 Detention Ponds

Proposed slopes shall be 3:1 or flatter. Up to 25% of the pond perimeter may have vertical walls. Anything greater will require approval of the Stormwater Engineer.

Modular grid pavement is only allowed if specifically approved by the Stormwater Engineer.

Ponds shall be setback a minimum of 10 feet from structures, property lines or required vegetated buffers and 50 feet from the limits of steep slope areas. The setback from steep slopes may be reduced per RZC 21.64.060. Conveyance pipes in steep slope areas shall be installed on the surface of the slope, with the minimum disturbance possible, and shall require applicable City approvals.

Minimum setback required for trees is 8 feet. Trees shall be setback from the liner such that the root ball is at least three (3) feet horizontally from the maximum storage elevation to provide maintenance access and liner protection. Trees shall not be planted over any pond liner.

Detention ponds in infiltrative soils shall be lined, unless otherwise approved as infiltration facilities. Lining may consist of an impermeable till layer 18 inches or thicker, bentonite or synthetic liners approved by the Stormwater Engineer. When a geomembrane is used, provide an analysis demonstrating that the required cover soil will be stable against sliding when saturated. Provide a warning layer, such as colored geotextile to assist maintenance workers protecting the liner during maintenance. Impervious bottoms and sides shall extend up to the stage of the 50-year event.

Combination infiltration/detention ponds may be approved by the Stormwater Engineer, subject to the restrictions on infiltration in Wellhead Protection Zones Section 8.3.

Pond control structures shall be accessible by an inductor truck. A backhoe must be able to access each pond for maintenance. The detention pond emergency overflow route must be independent from the primary outflow system.

Signs shall be posted at all stormwater ponds using the standard sign format described in City of Redmond Standard Specifications and Details. There are several alternative sign formats, and they shall be selected based on the following:

- Ponds greater than 5,000 square feet in size shall receive the large (24 x 48) sign. Smaller ponds may have either the small (12 x 18) or the large sign.
- Public ponds shall receive the sign with the City of Redmond logo. Private pond signs shall not include the logo, but shall indicate they are privately owned and maintained.
- Ponds with liners shall receive the sign indicating the liner. Ponds that infiltrate shall have the sign indicating the infiltration.

Ponds shall be named by the project proponent. The pond name shall be unique to the City of Redmond. In general, the pond name shall be the same as the name of the subdivision in which the pond is located. Pond names are subject to approval by the Stormwater Engineer.

2.9.3.5 III-3.2.2 Detention Tanks

Corrugated metal detention tanks are not approved in Redmond.

Corrugated metal pipe (CMP) risers are not approved in Redmond.

Tank setback requirements from property lines or right-of-way lines must be a minimum of 10 feet, or the distance required to excavate a 1:1 slope from the bottom of the tank to the ground surface at the right-of-way or property line – whichever is greater, and 50 feet from the limits of steep slopes. The setback from steep slope may be reduced per RZC 21.64.060. For limitations on tree planting, see tree separation information for pipes in Chapter 8.

Add the following note to drawings that include detention tanks: “Pressure tests may be required by the City Inspector. Tanks that do not pass pressure tests shall be repaired or replaced.” Avoiding leakage is particularly critical in Wellhead Protection Zones 1, 2, and 3.

Maintenance must be feasible and designs should strive to facilitate maintenance (design adjustments to facilitate maintenance may be required during plan review).

2.9.3.6 III-3.232 Detention Vaults

Vaults shall be setback a minimum of 10 feet from structures, property lines, required vegetated buffers, and 25 feet from the limits of steep slopes. The setback from steep slopes may be reduced per RZC 21.64.060.

Vault setbacks from property lines or right-of-way limits must be a minimum of 10 feet, or the distance required to excavate a 1:1 slope from the bottom of the vault to the ground surface at the right-of-way or property line – whichever is greater. Trees may be as close as 2 feet from concrete vaults provided the trees do not interfere with access for maintenance. Specify shallow rooted trees by species on the project landscape plans for locations closer than 8 feet to vaults.

Maintenance must be feasible and designs should strive to facilitate maintenance (design adjustments to facilitate maintenance may be required during plan review).

2.9.3.7 III-3.2.5 Other Detention Options

Parking lot ponding for detention is allowed in Redmond as approved by the Stormwater Engineer and the Fire Department for developments within certain designated flood zones where traditional detention may not be feasible.

Roof detention is not allowed in Redmond.

2.9.3.8 III-3.3 Infiltration Facilities for Flow Control and for Treatment

Protection of the drinking water resource is a very high priority in Redmond. Therefore, infiltration of stormwater, even with treatment, is limited within Wellhead Protection Zones.

Section 8.3 describes some clarifications for infiltration in wellhead protection zones to avoid "groundwater contamination" or other risks to the drinking water aquifer.

2.9.3.9 III-3.3.5 Site Characterization Criteria

The soil infiltration rate may be determined by a falling head test conducted by a qualified engineer using commonly accepted methods. For Infiltration trenches, ponds, and vaults designed to meet Minimum Requirement #7, infiltration rates less than 1.0 inches/hour or greater than 20.0 inches per hour shall be considered infeasible.

Notify the City of Redmond's Wellhead Protection Program staff prior to installing groundwater monitoring wells. Wells shall be installed by a certified driller and registered with the state. The City may consider allowing placement of such wells within a public right-of-way if the City wishes to assume responsibility for the wells in the future. All wells shall either be required to be properly abandoned when they are no longer needed, or may be requested to be turned over to the City for ongoing monitoring by City staff.

At least 200 feet shall be provided for separation from public drinking water supply wells. Public wells are located within Wellhead Protection Zone 1. A map of Wellhead Protection Zones is available at redmond.gov/Government/MapsGISservices/StandardMaps/.

Construction plans shall include a note to require field verification during construction of the facility, of soil conditions, and infiltration rates by an engineer with experience in stormwater

management and licensed in the State of Washington. The engineer shall provide a written statement to the City of Redmond related to the field verification of the design parameters.

Infiltration basins shall meet the same requirements for slopes, fences, signage, etc., as detention ponds.

To determine groundwater depth, the seasonal high groundwater shall be identified during the wet season. If sufficient data is available, a five-year average may be used. The City has groundwater depth information for areas within wellhead protection zones that is available upon request.

2.9.4 Volume IV: Source Control BMPs

2.9.4.1 Appendix IVG: Recommendations for Management of Street Wastes

Street Waste Liquids

Decant liquid shall be discharged to sanitary sewer or otherwise disposed. It shall not be discharged to the storm system, even if it passes through a stormwater treatment BMP.

2.9.5 Volume V: Runoff Treatment BMPs

2.9.5.1 Chapter V-4 - General Requirements for Stormwater Facilities

Stormwater Runoff Treatment ponds shall meet the requirements of Section 2.9.3.4

Liners are required for all water quality ponds and most detention ponds (impermeable till layer, synthetic liner or bentonite). Concrete liners are not approved in Redmond.

Drop structures are not allowed unless specifically approved by the Stormwater Engineer.

2.9.5.2 Chapter V-5 - On-Site Stormwater Management

BMP T5.13 - Post-Construction Soil Quality and Depth

Compost-amended areas shall be marked to prevent vehicle traffic in those areas.

BMP T5.20 - Preserving Natural Vegetation

Preserved areas shall be set aside as native growth protection easements and marked accordingly. No vehicle traffic shall be permitted in preserved areas.

2.9.5.3 Chapter V-7 - Infiltration and Bioretention Treatment Facilities

Infiltration area setbacks are described in Section 8.6.11.

Section 8.3 describes some clarifications for infiltration in wellhead protection zones to avoid "groundwater contamination" or other risks to the drinking water aquifer.

2.9.5.4 Chapter V-9 - Biofiltration Treatment Facilities

Swales shall be at least 200 feet long. Swale length may be reduced to 150 feet for re-development projects if no feasible alternative exists. Maximum swale bottom width shall be 8 feet (parallel swales are acceptable if needed to provide adequate treatment area). Biofiltration swales and similar water quality facilities in infiltrative soils shall be lined, unless otherwise approved as infiltration facilities. Lining may consist of an impermeable till layer 18 inches or thicker, bentonite or synthetic liners approved by the Stormwater Engineer.

If biofiltration swales are not able to be located off-line, the swale shall be designed so the maximum flow possible in the swale up to the 50-year does not produce a velocity over 3 feet per second.

The size and shape of biofiltration swales (and other surface features) shall be compatible with the terrain and not detract from the landscape value (the latter as determined by the Technical Committee).

At least one side of each biofiltration swales shall be accessible for maintenance by a backhoe.

Plant no trees within 8 feet of biofiltration swale banks. Their resulting shade and leaves impact the dense vegetated cover required for biofiltration. In designing the landscaping for the area, and placement of the biofiltration swale, take into account the need for sunlight within the swale.

Table 9.1 - Sizing Criteria

Underdrains are not required.

Figure 9.2 - Biofiltration Swale Underdrain Detail

Underdrains are not required.

2.9.5.5 Chapter V-10 - Wetpool Facilities

10.3 - Best Management Practices (BMPs) for Wetpool Facilities

See requirements for Detention Ponds in Volume III.

Provide a 5-foot wide level bench around the perimeter of the pond at or up to 1 foot below the permanent water surface.

All water quality ponds shall be lined to prevent infiltration. Lining may consist of an impermeable till layer 18 inches or thicker, bentonite or synthetic liners approved by the Stormwater Engineer. When a geomembrane is used, provide an analysis demonstrating that the required cover soil will be stable against sliding when saturated.

Gravity drains are not required for wet ponds or vaults. Access roads to the pond bottom are not required but are encouraged for wet ponds.

Wet ponds that are intended solely for water quality treatment shall have a high flow bypass to divert peak flows above the water quality design storm.

Wet ponds shall be setback a minimum of 10 feet from structures, property lines, or required vegetated buffers, and 50 feet from the limits of steep slopes. The setback from steep slopes may be reduced per RZC 21.64.060.

A minimum, average depth of 3 feet is required for water quality treatment in vaults and tanks.

Storm pipes should discharge into wet ponds at/or above the normal control elevation (elevation of outlet pipe invert). Designs that include pipes discharging below the control elevation must include an analysis demonstrating that sediment will not accumulate within the pipe.

To avoid anaerobic conditions, wet ponds should not have permanent pool depths greater than 8 feet, unless aeration is provided. For publicly owned and maintained ponds, aeration requires approval from the Stormwater Engineer.

Chapter 3 REDMOND PERMIT TYPES AND PROJECT CLASSIFICATIONS

Projects that involve clearing, grading, installation of new hard surfaces, or modification of drainage patterns are subject to the requirements described in this Stormwater Technical Notebook and the Redmond Municipal Code, Chapter 15.24. Available permits include Rough Grade Permits and Clearing and Grading Permits.

Some very small projects may not require permits. See Redmond Municipal Code, Chapter 15.24.

3.1 Rough Grade Permits

Rough grading is the stage at which the grade is modified to conform approximately to the proposed final grade. This permit usually covers only earthwork but may also include stormwater systems especially if they are part of the pollution prevention system. It is a prelude to further work on a development proposal that has received conceptual approval from the City. A rough grade permit may be applied for upon completion of the first civil construction review (CCR) debrief meeting.

3.2 Clearing and Grading Permits

Projects require a permit if they:

- Move over 50 CY of soil; or
- Change the topography by more than four feet; or
- Perform work within a City of Redmond easement or right-of-way; or
- Work with a stormwater pipe 12-inches in diameter or greater; or
- Clear 7,000 SF of land; or
- Remove 10 or more significant trees; or
- Add 2,000 SF or more of impervious surface; or
- . Work within a fish and wildlife protection area, landslide hazard area or buffer as defined in the RZC 21.64; or
- Modify a private water quality or flow control stormwater facility.

Projects that exceed the above requirements for a Clearing and Grading Permit are classified as Small, Medium or Large.

3.3 Small Projects

Projects are Small Projects if they involve:

- Less than 2000 square feet of new and/or replaced impervious surface; and
- Less than 7000 square feet of land disturbance; and
- Less than 500 CY of grading.

Small projects are subject to Minimum Requirement #2.

3.4 Medium Projects

Projects are Medium Projects if they involve areas that exceed any of the criteria above for Small Projects and involve:

- Less than 5000 square feet of new impervious area; and
- Less than ¾ acre of native vegetation converted to lawn or landscaped areas; and
- Less than 500 CY of grading; and
- Less than 2.5 acres of native vegetation converted to pasture.

Medium projects are subject to Minimum Requirements #1-5 in Chapter 2 of the Stormwater Technical Notebook. For these projects, refer to Chapter 5.

3.5 Large Projects

Large projects are projects that exceed one or more of the criteria for Medium Projects. Large projects trigger Minimum Requirements #1-9 in Chapter 2 of the Stormwater Technical Notebook. Large projects shall comply with the requirements described in Chapter 6.

CHAPTER 4 SMALL PROJECT REQUIREMENTS

4.1 Small Project Submittal Requirements

The detail required for plans submitted for small projects is extremely variable, from very simple, hand-drawn plans, to detailed engineering drawings and reports. Request a meeting with the Stormwater Engineer to discuss your project specifics. Appendix Q includes a template for Small Project Stormwater Site Plan.

In general, the plans and narratives submitted shall include:

1. Written description outlining proposed activity.
2. Existing contours (information may be available from the City), shown as dashed lines, or spot elevations.
3. Sketch showing proposed activity.
4. Owner information – name, address and contact.
5. Project and Site information – title, tax parcel or address.
6. Existing utilities – identify type and size (information may be available from the City).
7. Identify slopes 40% or greater.
8. Location and drip lines of trees 6 inch caliper or greater (measured 4 feet above existing grade. (Only those trees to be cleared or trees within 50 feet of cleared areas need to be specifically designated).
9. Existing surface waters (streams, lakes, wetlands, etc.). Proposed drainage (flow arrows).
10. Proposed retaining walls/rockeries (indicate approximate heights).
11. Disturbed area – approximate (identify on the plan and label quantity in square feet).
12. Proposed contours – show as solid lines, or finished grade spot elevations at a minimum.
13. Proposed utilities – identify.
14. Standard Notes (Appendix R).

Note that if the project triggers State Environmental Policy Act (SEPA) thresholds, the permitting process will be more complex. Examples of SEPA thresholds include:

- Projects include stormwater pipes greater than 12 inches in diameter.
- Projects are located in Critical Areas (See RZC 21.64) such as:
    - Wetlands
    - Wetland buffers
    - Streams
    - Stream buffers
    - Critical wildlife habitat areas
    - Steep slopes
    - FEMA Floodways
    - Wellhead Protection Zones 1, 2, and 3

Contact the Development Services Center at 425.556.2473 or the Development Services Division at 425.556.2760 for further information about critical areas.

4.2 Small Project Construction Stormwater Pollution Prevention Requirements

Small Projects are required to meet Minimum Requirement #2 - Construction Stormwater Pollution Prevention, as described in the 2014 SWMMWW. Small project proponents are also required to review Chapter 10 of this Stormwater Technical Notebook to determine additional requirements for construction monitoring, TESC, and seasonal construction suspension.

In addition to those requirements, the following shall apply:

- It shall be the responsibility of the contractor to obtain street use and other related permits prior to any construction.
- It shall be the responsibility of the contractor to verify the correct locations of utilities to avoid damage or disturbance.
- Keep project impacted off-site streets clean at all times. Use sweepers; flushing streets shall not be allowed.
- Tie impervious surfaces (roof, streets, driveways, etc.) to completed drainage system as soon as possible.
- The City will order stoppage of work and will order sampling and analysis of stormwater discharges if stormwater controls do not meet standards described in this Stormwater Technical Notebook.

4.3 Permit Process for Small Projects

The following is an overview of the steps and requirements for projects that require only a Clearing/Grading and Stormwater Management approval (and no other approvals). Projects requiring other permits may have additional steps and requirements. Consult the Development Services Center for additional guidance.

Table 4.0: Small Project Requirements	
Responsible Party	**Activity**
Applicant	**I. Project Proposal** Prepare project submittal – see requirements above.

Table 4.0: Small Project Requirements	
Responsible Party	**Activity**
Applicant	**II. Complete and Submit Applications** All the following must be completed and submitted to the Stormwater Engineer for review for the application to be considered complete. Only complete applications will be processed. a. One (1) copy of a completed General Application form of the Stormwater Technical Notebook and available at the Development Services Center. b. One (1) set of plans and computations including the applicable information on the application requirements checklist.
City	**III. City Review Process** a. The project engineer or applicant will be contacted when the review is complete. b. The plans and computations are red-lined and one (1) set of each is returned to the applicant.
Applicant	**IV. Revision and Resubmittal, if Required.** a. Revise plans per the City's comments. b. Resubmit the last set of red-lined prints and computations and one (1) set of revised plans and computations as stated above.
City	**V. Review of Revised Plans** a. Once all comments have been satisfactorily addressed, the City will proceed with plan approval. b. The project engineer or applicant will be contacted.
Applicant	**VI. Submit Original Plans for City Approval.** a. Submit three (3) sets of prints to the Stormwater Engineer for approval.

Table 4.0: Small Project Requirements	
Responsible Party	**Activity**
City	**IX. Permit Preparation and Plan Distribution** The Stormwater Engineer prepares the permit letter, signs it, calculates the remaining fee, and determines performance bonds per the standard list. The project engineer or applicant will be contacted when the permit is ready to be issued.
Applicant	**X. Obtain Permit** When applicant is notified that the permit is ready to issue, applicant needs to come to the Development Services Center and pay any remaining fees and post required bonds. The Permit Letter is then issued.
Applicant	**XI. Pre-Construction Meetings** After plan approval and after submitting permit prints, applicant may be required to contact the Construction Division and schedule a Pre-Construction Meeting. Contact the Construction Division at 425.556.2723 for the date, time, and location (the inspector may have the meeting at the site). In addition to permit issuance, <u>construction may not begin before having a Pre-Construction Meeting (unless waived by the Construction Division</u>).
Applicant	**XII. Construction** The applicant shall complete all activities identified in the approved plans to meet City of Redmond standards. As items are completed, and at appropriate times during construction (i.e., before utilities are buried) the applicant shall notify the City inspector assigned to the project at the Preconstruction Conference that elements are ready for inspection. Failure to notify the City of readiness for inspection in a timely manner may result in the requirement to remove and replace buried or hidden elements.
City	**XIII. Release of Performance Bonds** Performance bonds remain in full force and effect until 1) the obligations secured are fully performed to the satisfaction of the City's inspectors; 2) a bond guaranteeing maintenance of all improvements for a guarantee period have been submitted to the City; and 3) the City has released the bonds in writing.

Table 4.0: Small Project Requirements	
Responsible Party	**Activity**
City	**XIV. Cancellation of Non-Issued Permits** a. The permit is only valid for a designated time. It may be to the applicant's benefit to wait until construction is ready to begin before picking up the permit. b. The permit will be held for a maximum six (6) months without issuance (unless specifically stated otherwise in the conditions of approval) but will then be nullified after this period if not picked up. The permit application would have to be started again, from the beginning, if the project is still desired. A new application may be required by the Public Works Department.
Applicant	**XV. Permit Extension Request – (Optional)** a. If the proposed work cannot be completed within the time covered by the permit an extension may be granted. Additional fees for inspection and renewal are required for extension. b. <u>The applicant must submit a written extension request to the Stormwater Engineer at least two (2) working days before the expiration of the permit.</u>

4.4 Fees for Small Projects

Fees are charged for plan review and City inspection. Current fee information is available from the Development Services Center.

- Small project fees often include but are not limited to:
  - Small & Simple Projects: Review
  - Small & Simple Projects: Inspection

Performance security may be required prior to issuance of a permit. Security requirements are determined after application.

Chapter 5 Medium Project Requirements

5.1 Medium Project Submittal Requirements

Medium projects are required to develop site plans and a drainage report (Stormwater Site Plan in accordance with Minimum Requirement 1) addressing all applicable items listed in the Application Checklist available in the Development Services Center. Many items may not apply. Please contact the Development Services Stormwater Engineer for information specific to your project. Additional technical details of engineered plans are in Chapter 7 of this Stormwater Technical Notebook.

5.2 Project Requirements for Medium Projects

Medium Projects are required to meet Minimum Requirements #1-5 of the 2014 SWMMWW. Note that Chapter 2 of the Stormwater Technical Notebook amends some of those requirements. Medium projects also have more strenuous requirements for construction stormwater pollution prevention, as outlined in Chapters 9 and 10.

5.3 Permit Process for Medium Projects

The following is an overview of the steps and requirements for projects that require only a Clearing/Grading and Stormwater Management approval (and no other approvals). Projects requiring other permits may have additional steps and requirements. Consult the Development Services Center for additional guidance.

Table 5.0: Medium Project Requirements

Responsible Party	Activity
Applicant	**I. Project Proposal** a. Prepare project submittal – see requirements below. b. Prepare SEPA Checklist (if required – Consult Stormwater Engineer prior to application). 1. If any work is proposed in a Critical Area the City will require the completion of the SEPA environmental checklist. The Technical Committee may require any project to complete the SEPA process. 2. Checklists are available at the Development Services Center. Redmond has modified the state standard checklist. Therefore, only a City of Redmond SEPA Checklist will be accepted. Complete the checklist to the best of your ability.

Table 5.0: Medium Project Requirements	
Responsible Party	**Activity**
Applicant	**II. Complete and Submit Applications** All the following must be completed and submitted to the Stormwater Engineer for review for the application to be considered complete. Only complete applications will be processed. a. One (1) copy of a completed General Application form (available at the Development Services Center). (If SEPA is required, submit 8 copies of the General Application form.) b. One (1) set of plans and computations addressing Minimum Requirements #1 through #5. c. Projects that require SEPA approval will be processed through the Technical Committee. Submit nine (9) copies of the SEPA document(s). d. Application fee.
City	**III. City Review Process** a. The project engineer or applicant will be contacted when the review is complete. b. The plans and computations are red-lined and one (1) set of each is returned to the applicant with a Plan Review Checklist completed by the City.
Applicant	**IV. Revision and Resubmittal, if Required** a. Revise plans per the City's comments. b. Resubmit the last set of red-lined prints and computations, the Plan Review Checklist and one (1) set of revised plans and computations as stated above.
City	**V. Review of Revised Plans** a. Once all comments have been satisfactorily addressed, the City will proceed with plan approval. b. The project engineer or applicant will be contacted.
Applicant	**VI. Submit Original Plans for City Approval**

Table 5.0: Medium Project Requirements	
Responsible Party	**Activity**
City	**VII. Plan Approval** Plans are approved by signature and returned to the applicant or engineer for reproduction as required.
Applicant	**VIII. Submittal of Permit Prints** Submit three (3) sets of prints made from the signed plans to the Stormwater Engineer.
City	**IX. Permit Preparation and Plan Distribution** The Stormwater Engineer prepares the permit letter, signs it, calculates the remaining fee, and determines performance bonds per the standard list. The completed permit package is sent to the Development Services Center. The project engineer or applicant will be contacted by the Development Services Center when the permit is ready to be issued.
Applicant	**X. Obtain Permit** When applicant is notified that the permit is ready to issue, applicant needs to come to the Development Services Center and pay any remaining fees and post required bonds. The Permit Letter is then issued.
Applicant	**XI. Pre-Construction Meetings** After plan approval and after submitting permit prints, applicant may be required to contact the Construction Division and schedule a Pre-Construction Meeting. Contact the Construction Division at 425.556.2723 for the date, time, and location (the inspector may have the meeting at the site). In addition to permit issuance, <u>construction may not begin before having a Pre-Construction Meeting (unless waived by the Construction Division)</u>.
Applicant	**XII. Construction** The applicant shall complete all activities identified in the approved plans to meet City of Redmond standards. As items are completed, and at appropriate times during construction (i.e., before utilities are buried) the applicant shall notify the City inspector assigned to the project at the Preconstruction Conference that elements are ready for inspection. Failure to notify the City of readiness for inspection in a timely manner may result in the requirement to remove and replace buried or hidden elements.

Table 5.0: Medium Project Requirements	
Responsible Party	**Activity**
City	**XIII. Release of Performance Bonds** Performance bonds remain in full force and effect until 1) the obligations secured are fully performed to the satisfaction of the City's inspectors; 2) a bond guaranteeing maintenance of all improvements for a guarantee period have been submitted to the City; and 3) the City has released the bonds in writing.
City	**XIV. Cancellation of Non-Issued Permits** a. The permit is only valid for a designated time. It may be to the applicant's benefit to wait until construction is ready to begin before picking up the permit. b. The permit will be held for a maximum six (6) months without issuance (unless specifically stated otherwise in the conditions of approval) but will then be nullified after this period if not picked up. The permit application would have to be started again, from the beginning, if the project is still desired. A new application may be required by the Public Works Department.
Applicant	**XV. Permit Extension Request – (Optional)** a. If the proposed work cannot be completed within the time covered by the permit an extension may be granted. Additional fees for inspection and renewal are required for extension. b. <u>The applicant must submit a written extension request to the Stormwater Engineer at least two (2) working days before the expiration of the permit.</u>

5.4 Fees for Medium Projects

Fees for Medium Projects are based on the type and number of activities proposed. Fees are charged for plan review and City inspection. Current fee information is available from the Development Services Center.

- Medium project fees often include but are not limited to:
    - Small & Complex Projects: Review
    - Small & Complex Projects: Inspection

Consult the Development Services Center to determine what actual costs you can expect based on the specifics of your project.

Performance security may be required prior to issuance of a permit. Security requirements are determined after application.

Chapter 6 Large Project Requirements

6.1 Project Classification

See Chapter 3 for project classification.

6.2 Project Requirements for Large Projects

Large Projects are required to meet Minimum Requirements #1 through #9 as detailed in Chapter 2 of the Stormwater Technical Notebook. There are also more strenuous requirements for construction stormwater pollution prevention outlined in Chapters 9 and 10 of the Stormwater Technical Notebook.

6.3 Permit Process for Large Projects

The following is an overview of the steps and requirements for projects that require only a Clearing/Grading and Stormwater Management approval (and no other approvals). Projects requiring other permits may have additional steps and requirements. Consult the Development Services Center for additional guidance.

Table 6.0 - Large Project Requirements	
Responsible Party	**Activity**
Applicant	**I. Project Proposal** a. <u>Prepare Project Plans</u> – an Application Checklist for Project Plan preparation is found in Appendix D. Large projects are subject to Minimum Requirements #1 through #9. b. Prepare SEPA Checklist 1. All Large Projects are required to submit a SEPA Checklist. The Technical Committee will determine if the proposed activity requires formal SEPA process review. 2. SEPA Checklists are available at the Development Services Center. Redmond has modified the state standard checklist. Therefore, only a City of Redmond SEPA Checklist will be accepted. Complete the checklist to the best of your ability.

Table 6.0 - Large Project Requirements	
Responsible Party	**Activity**
Applicant	**II. Complete and Submit Applications** All the following shall be completed and submitted for review for the application to be considered complete. Only complete applications will be processed. a. One (1) copy of a completed General Application Form (available at the Development Services Center). b. Eight (8) sets of Project Plans including the applicable information on the application requirements checklist in Chapter 10. c. Submit nine (9) copies of the SEPA document(s). d. Application fee.
City	**III.City Review Process** All Large Projects are processed through the Technical Committee. The Committee reviews the proposed project in concept and makes the SEPA determination. The Committee prepares a letter of conditions to be addressed during preparation of final construction drawings.
Applicant	**IV. Construction Plan Preparation** a. Prepare construction drawings based on the letter containing the conditions of approval from the Technical Committee and on Redmond's design standards. b. Submit three (3) sets of revised plans and supporting calculations to the Development Services Center (include a copy of the Technical Committee letter of conditions). c. Pay construction drawing review fee at the Development Services Center.

Table 6.0 - Large Project Requirements	
Responsible Party	**Activity**
City	**V. Construction Plan Review** a. Plans are reviewed in house and with City's contracted consultant. b. The project engineer or applicant will be contacted when the review is complete. c. The plans and computations are red-lined and one (1) set of each is returned to the applicant with a Plan Review Checklist completed by the City.
Applicant	**VI. Revision and Resubmittal** a. Revise plans per the City's comments. b. Resubmit the last set of red-lined prints and computations, the Plan Review Checklist and three (3) sets of revised plans and computations.
City	**VII. Review of Revised Plans** a. Once all comments have been satisfactorily addressed, the City will proceed with plan approval. b. The project engineer or applicant will be contacted.
Applicant	**VIII. Submit Original Plans for City Approval** Submit original plans to the City for approval along with the final the calculations/report that accurately describes the drainage system and function. Plans shall be reproducible Mylar.
City	**IX. Plan Approval** Appropriate City staff sign plans and returns them to applicant or engineer.
Applicant	**X. Submittal of Permit Prints** For Clear and Grade Applications only: Submit six (6) sets of prints prepared from the signed plans to the Stormwater Engineer. Otherwise, submit prints to Engineering Division.

Table 6.0 - Large Project Requirements	
Responsible Party	**Activity**
City	**XI.Permit Preparation and Plan Distribution** The Stormwater Engineer completes the permit, signs it, calculates the remaining fee, and determines bonds. The completed package is sent to the Development Services Center. The project engineer or applicant will be contacted by the Development Services Center when the permit is ready.
Applicant	**XII. Obtain Permit** When applicant is notified that the Permit is ready to issue, Applicant needs to come to the Development Services Center and: a. Pay any remaining fees and post required bonds, and b. Receive the permit.
Applicant	**XIII. Pre-Construction Meetings** After plan approval and after submitting permit prints, applicant shall contact the Construction Division and schedule a Pre-Construction Meeting. Contact the Construction Division at 425.556.2723 for the date, time, and location (the inspector may have the meeting at the site). <u>In addition to permit issuance, construction may not begin before having a Pre-Construction Meeting</u>.
Applicant	**XIV. Construction** The applicant shall complete all activities identified in the approved plans to meet City of Redmond standards. As items are completed, and at appropriate times during construction (i.e., before utilities are buried) the applicant shall notify the City inspector assigned to the project at the Preconstruction Conference that elements are ready for inspection. Failure to notify the City of readiness for inspection in a timely manner may result in the requirement to remove and replace buried or hidden elements.
City	**XV. Release of Performance Bonds** Performance bonds remain in full force and effect until 1) the obligations secured are fully performed to the satisfaction of the City's inspectors; 2) a bond guaranteeing maintenance of all improvements for a guarantee period have been submitted to the City; and 3) the City has released the bonds in writing.

Table 6.0 - Large Project Requirements	
Responsible Party	**Activity**
City	**XVI. Cancellation of Non-Issued Permits** a. The permit is only valid for a designated time. It may be to the applicant's benefit to wait until construction is ready to begin before picking up the permit. b. The permit will be held for six (6) months without issuance (unless specifically stated otherwise in the conditions of approval) but will then be nullified after this period if not picked up. The permit application would have to be started again, from the beginning, if the project is still desired.
Applicant	**XVII. Permit Extension Request – (Optional)** a. If the proposed work cannot be completed within the time covered by the permit an extension may be granted. Additional fees for inspection and renewal are required for extension. b. <u>The applicant must submit a written extension request to the Development Services Center at least two (2) working days before the expiration of the permit.</u>

6.4 Fees for Large Projects

Fees are charged for plan review and City inspection. Current fees are available from the Development Services Center.

Large project fees often include but are not limited to:

- Large Projects: Review
- Large Projects: Inspection

There may be additional review fees related to project-specific items. For example, vaults must be designed for appropriate soil, groundwater, and surface loadings. Separate review and permits are required from the Building Department. Consult the Development Services Center to determine what actual costs you can expect based on the specifics of your project.

Performance security may be required prior to issuance of a permit. Security requirements are determined after application.

6.5 Provide Accurate Record Drawings

As-built records of development projects, including Clear & Grade projects involving stormwater facilities, are maintained by the City. Make sure the records are correct when project

information is provided, by submitting accurate record drawings when a project is completed. A record drawing cash bond is required of most projects as part of the final engineering drawing approval process. Before acceptance of improvements, a record drawing shall be prepared by a Professional Land Surveyor or Civil Engineer, licensed in the State of Washington. The record drawing shall include accurate locations, elevations, and sizes of all constructed features. Record drawing documents will bear the signature, stamp, and date of the licensed Land Surveyor preparing them. The process and requirements are found in the City of Redmond publication "Record Drawing Requirements" dated July 2015. This publication is available on-line at the city's website under the Coordinated Civil Review Process, Resources.

Chapter 7 Design Goals

The purpose of the information in Chapters 7 through 10 is to provide engineers, designers, technicians, inspectors, and others with a reference to City of Redmond's goals and standards for the planning and design of clearing and grading activities and stormwater management facilities.

The following design goals are applied to clearing, grading, and stormwater system designs in Redmond. Design goals are broad targets that indicate desirable outcomes, even though they may not be fully met in specific situations. Failure to completely meet a general design goal (e.g., minimize erosion and sedimentation) is not intended to constitute a deficiency subject to legal or procedural challenge. The goal must, however, be reasonably addressed in specific situations. If an alternate approach to a project's stormwater management design would provide a significantly greater achievement of a goal without significant additional cost (monetary, land use, etc.) then the alternative could be considered an alternative that is reasonable and could be required under this chapter. Clearing, Grading, and Stormwater Management goals and design requirements need to be compliant with Redmond Municipal Code 15.24 intent, goals, and requirements. Specific situations can only be evaluated on a case-by-case basis.

7.1 Provide a Basic System of Drainage

The drainage system shall:

- serve all lots and site improvements that are part of or affected by the project;
- reduce stormwater runoff through on-site stormwater management techniques (Minimum Requirement #5);
- direct stormwater runoff away from buildings, traveled ways, and other developed surfaces; and
- provide stormwater runoff treatment where appropriate (Minimum Requirement #6).

Basic systems protect walkways, crosswalks, etc., from concentrated runoff flows (for example, by adding catch basins upslope of the walkways).

7.2 Prevent Flooding of Inhabited Buildings

Overflow and emergency runoff routes shall be provided. Floodways adjacent to defined channels should accommodate flood flows (to at least the 100-year storm from fully developed upstream conditions). Projects that are located within the floodplain shall submit a Flood Control Zone Application (Appendix M) prior to submittal of final engineering drawings.

7.3 Minimize Erosion and Sedimentation

During construction, development activities can have significant and long-term impacts on aquatic ecosystems. Reducing these impacts by meeting all 13 elements of the Temporary

Erosion and Sedimentation Control Plan (Minimum Requirement #2), and responding quickly to unforeseen additional erosion and sediment control needs greatly reduces the impacts from construction. In addition, permanent stormwater controls need to control stormwater runoff peaks and durations to reduce adverse hydrologic impacts.

7.4 Minimize Water Quality Degradation

Runoff treatment facilities are necessary and required by State law and Redmond Municipal Code to reduce degradation of surface water bodies and groundwater (Minimum Requirement #6). Site layouts and stormwater designs that minimize pollution-generating hard surfaces, inherently reduce pollution (Minimum Requirement #5). Last, source control measures in the site design are required to reduce the quantity of pollution sources contaminating runoff (Minimum Requirement #3).

7.5 Don't Mix Clean and Untreated Stormwater

Stormwater that has been treated for water quality should not be mixed with stormwater that has not been treated for water quality.

7.6 Protect Water-Related Habitat

Refer to the Critical Areas Regulations (Redmond Zoning Code 21.64).

7.7 Maintain Recharge and Subsurface Flow Patterns

Maintaining groundwater supplies is important, but do not increase recharge over natural conditions without careful hydro-geologic studies to avoid land stability problems. In areas of existing land stability concerns, recharge should be reduced. Water quality is critical for recharge areas. Infiltration of runoff from PGHS is limited by Wellhead Protection Zones; infiltration from clean surfaces is encouraged (see Section 8.3).

7.8 Address "Real-World" Conditions

Engineering designs should recognize that field conditions, debris, and poor maintenance/repair practices exist which need to be considered so long-term viability is possible.

7.9 Provide for Operation and Maintenance

Elements of the system proposed need to be capable of operating in the municipal context, have good access for maintenance and operation, and need to avoid very specialized parts, equipment, and operator qualifications whenever possible (Minimum Requirement #9).

7.10 Proceed Based on Clear, Professional Thinking

Engineering documents submitted for approval must have clear concepts (including a narrative description if concepts are non-standard or not obvious) and design explanations, calculations,

and other supporting information to show that the construction drawings implement the concepts.

7.11 Meet Standards

Designs need to: (1) comply with City regulations and standards; (2) comply with accepted legal principles; (3) apply sound engineering principles; and (4) include alternatives or adjustments to enhance aesthetics.

Chapter 8 Local Design Standards

This chapter contains information on specific issues for projects in Redmond to help define how to meet Redmond's local codes and regulations and to help define terms in ways that are meaningful to specific engineering design situations in Redmond.

8.1 Standard Specifications and Details

All projects shall be designed and constructed to conform to the City of Redmond Standard Specifications and Details, Current Edition. These are available on the City's website (www.redmond.gov).

8.2 Proper Drainage

The Stormwater Technical Notebook describes minimum drainage requirements. These requirements must be addressed in all projects (Small, Medium, or Large) whether or not plans and permits are required. Even though plans and permits are not required for most Small Projects, proper drainage facilities are required with all projects.

Proper drainage directs runoff away from structures, meets legally accepted practice, and meets the intent of RMC 15.24. For projects not requiring plans or permits, drainage systems are not required by code to have detention or formally designed runoff treatment facilities. Nevertheless, if downstream conveyance capacity is not adequate, the project proponent may elect to provide detention or infiltration. Drainage systems shall be provided to prevent flooding of developed areas, connect downspouts, and provide positive drainage for footing drains.

Runoff from upslope properties must be accepted at natural and established locations at property boundaries and be discharged at natural or established downslope locations along property boundaries or to a constructed drainage system if authorized, subject to required on-site quantity and quality controls.

8.3 Stormwater Management and Infiltration in Wellhead Protection Zones

8.3.1 Wellhead Protection Zones

Wellhead Protection Zones (WPZ) were established based on proximity to City drinking water supply wells. A map of the WPZ is available at www.redmond.gov/Map, and Appendix A. Zones 1 and 2 delineate the 6-month and 1-year time of travel zones for groundwater to reach the wells and are, therefore, the areas of greatest concern regarding infiltrating runoff. Zone 3 delineates the 5-year to 10-year time of travel, and Zone 4 is the rest of the City.

In Zones 1 and 2, certain land uses and activities are prohibited, as noted in Redmond Zoning Code 21.64.050.

If a project area includes portions that are in more than one Wellhead Protection Zone, then the Stormwater Engineer will assess, using criteria found in RZC 21.64.050.d.2, whether any portion

of the site may be considered to be in the Wellhead Protection Zone with fewer restrictions. Otherwise, the whole site shall be considered to be within the Wellhead Protection Zone with more restrictions.

8.3.2 Construction in Wellhead Protection Zones

Projects in Zones 1, 2, and 3 shall address the following:

A. During construction, if construction vehicles will be refueled onsite and/or the quantity of hazardous materials that will be stored, dispensed, used, or handled on the construction site is in aggregate quantities equal to or greater than 20 gallons liquid or 200 pounds solid, exclusive of the quantity of hazardous materials contained in fuel or fluid reservoirs of construction vehicles, the City may require any or all of the items listed in the Redmond Zoning Code 21.64.050.D. Generally, the following items will be required in writing as part of the TESC Plan:

    1. Monitoring plan.
    2. Designated project contact.
    3. Secondary containment.
    4. Provisions to secure hazardous materials.
    5. Response to leaking vehicles and equipment.
    6. Practices and procedures regarding transfer of flammable and combustible liquids.
    7. On-site cleanup materials (materials are to be listed in the TESC Plan) and other containment and cleanup provisions. All hazardous material releases shall be contained, cleaned up, and reported.

B. The Drainage Report required for projects shall include a section describing how each of the items above has been addressed in the plans for the proposed project.

8.3.2 Infiltration in Wellhead Protection Zones

The 2014 SWMMWW allows Redmond to add stormwater requirements to protect the drinking water aquifer (Volume III Section 3.3.7 - Site Suitability Criteria for Infiltration).

Infiltrating runoff from pollution generating hard surfaces in Wellhead Protection Zones 1 and 2 is prohibited, except for single-family residential runoff. Single-family residential projects in Wellhead Protection Zones 1 and 2 may infiltrate runoff from pollution generating hard surfaces after enhanced treatment using a BMP that is exposed to the surface (such as bioretention visible from public sidewalks or roads).

Infiltration of runoff from non-pollution generating hard surfaces considered to be clean, including most roofs and sidewalks, is strongly encouraged where feasible citywide.

8.3.3 Separation from High Groundwater

Separation from high groundwater or bedrock for various BMPs is described in the 2014 SWMMWW, the Guidance for UIC Wells that Manage Stormwater Runoff (2006) and WAC 173-218. These documents are inconsistent. In light of this issue and Redmond's attention to

groundwater/drinking water supply protection, the following is required when infiltrating runoff in Redmond.

In general, the bottom of any infiltrating stormwater facility shall be 5 feet from the high water table. This can be reduced to 3 feet of separation with a mounding analysis as detailed in the 2014 SWMMWW. Exceptions to this rule:

1. Bioretention – with or without an underdrain are not UICs. Bioretention can have 1 foot of separation from the bottom of the facility to the high water table if less than 5,000 square feet of area drain to the facility. If 5,000 square feet or more of area drain to the facility, then 3 feet of separation is required.

2. Single Family roof infiltration – Any type of infiltration facility for the sole purpose of infiltrating runoff from single family roofs is not regulated as a UIC (WAC 173-218) and requires a minimum of 1 foot of separation from the bottom of the facility to the high water table.

3. Permeable pavement – one (1) foot of separation from the bottom of the base course to the high water table is required.

8.3.4 Defined Bottom of Stormwater Infiltration Facility

It is permissible, with Stormwater Engineer approval, to add clean, free-draining fill below a stormwater facility to replace low permeability soils in an effort to improve function. In that case, the “bottom” of the stormwater facility may be considered to not include this free-draining fill.

8.3.5 Using Infiltration as Basic Treatment

The Site Suitability Criteria in Volume III section 3.3.7 shall be used to determine if basic treatment can be achieved by native soil below an infiltration facility. If native soils are to be used for basic treatment, 5 feet of separation from the bottom of the facility to the high water table is mandatory.

8.4 Conveyance System Design

8.4.1 Guidance Documents

For basic conveyance system design in Redmond use the latest edition of the Washington State Department of Transportation (WSDOT) "Hydraulics Manual" (M23-03). The manual is available from WSDOT's website at www.wsdot.wa.gov/publications/manuals/m23-03.htm.

Note that the 2014 SWMMWW shall be used for detention sizing and stormwater treatment requirements.

For computation of hydraulic grade lines in Redmond use one of the following models:

1. King County Surface Water Management Backwater Analysis Program
2. PCSWMM by Computational Hydraulics
3. Equivalent model approved by the Stormwater Engineer

8.4.2 Pipe Sizing

All new pipes shall be sized to convey the 50-year fully-developed peak flow without overtopping catch basins.

All new culverts shall be sized so that the 50-year fully-developed peak flow should not exceed the allowable headwater of 1.25 times the culvert diameter and should not exceed the elevation of the base course of the roadway. All new culverts should be sized such that there is no roadway overtopping during the 100-year flow event. If the culvert is on a stream that is determined to be fish bearing by the City of Redmond or Washington Department of Fish and Wildlife (WDFW), then the culvert should be designed to be fish passable.

Stormwater shall be managed such that the 100-year frequency event does not flood proposed buildings, any existing on-site buildings, or other existing buildings on contiguous parcels. Required conveyance standards may be adjusted by the Stormwater Engineer based on site and downstream conditions. Provide an exhibit to demonstrate the 100-year flow path.

For public stormwater pipe, the minimum size shall be 12-inches. For private stormwater pipe, the minimum size shall be 6-inches. To accommodate special installation scenarios, smaller pipe may be used with Stormwater Engineer approval.

8.4.3 Ditch Sizing

All ditches shall be sized to convey the 100 year storm with one foot of freeboard. Ditch design should include velocity analysis to ensure stable channels.

8.4.4 Horizontal Clearance and Crossing Angle

The minimum horizontal spacing between closed storm drains and water mains, gas mains, other underground utility facilities, and all structures shall be five feet (5') horizontally. The minimum horizontal distance between any open storm drainage facilities (swales, open

channels, biofiltration swales, etc.) and water mains, gas mains, and other underground facilities shall be 10 feet.

For pipe crossings, the preferred angle is 90 degrees, but 20 degrees obtuse or acute of 90 degrees is acceptable.

8.4.5 Vertical Clearance – Utilities

The minimum vertical clearance spacing between the outside of storm drain pipelines and water mains, gas mains, electrical or communication conduits, and other underground utility facilities, shall be as noted in Table 8.2. It is expected that the "Standard" vertical clearance will be provided. If that is not possible, use of Ethafoam pads or pipe sleeves may be allowed with approval from the Stormwater Engineer.

Table 8.1 - Vertical Clearance – Utilities

Utility	Location (Above or below Storm Pipe)	Minimum Clearance	Special Requirement
Electrical	Above or below	12 inches	Standard
Communications	Above or below	12 inches	Standard
Water main or gas main	Above or below	12 inches	Standard
Water main or gas main	Above or below	6 inches	Ethafoam pad
Sanitary Sewer	Below storm pipe	12 inches	Standard
Sanitary Sewer	Above storm pipe	18 inches	Standard
Sanitary Sewer	Above or below storm pipe	6 inches	Pipe sleeve and Ethafoam pad
Liquid petroleum	Above or below	See Stormwater Engineer	

An Ethafoam pad is required for some installations to provide additional protection between adjacent utilities. The size of the pad shall be based on the outside diameter (O.D.) of the larger crossing pipe. The pad shall be O.D. by O.D. square by 2.5 inches thick minimum or as required to protect the pipes. The pad shall be a strong, resilient, medium-density, closed-cell, polyethylene foam plank (Dow Ethafoam 220, or accepted equivalent.)

A pipe sleeve is required for some installations to provide additional protection of stormwater from potential leakage from other utilities. A pipe sleeve shall be a single section of PVC pipe (no joints) with a minimum length of 3 feet to each side of pipe crossing. The pipe sleeve shall be placed around the stormwater pipe with the annular space between the pipe sleeve and the stormwater pipe filled with grout.

Additional measures may be necessary to ensure system integrity and may be required as determined by the Stormwater Engineer on a case-by-case basis.

8.4.6 Minimum Cover

The standard minimum cover over storm drainage lines is dependent on the pipe material. The Redmond Design Standards and Specifications outline cover requirements. The minimum cover over yard drain lines is 18 inches.

8.4.7 Unstable Soils

Unstable soil conditions, such as peat, shall be removed from under pipes unless special measures are approved by the Stormwater Engineer.

8.4.8 Maximum and Minimum Slopes

Maximum slope on storm drain lines is 20%, unless approved by the Stormwater Engineer. Minimum slope on storm drain lines is 0.25%, unless approved by the Stormwater Engineer.

8.4.9 Stream Culverts

Stream culverts shall be designed to have natural bottom conditions, with 1/3 of the pipe diameter buried. Culverts used for stream conveyance shall be a minimum of 24 inches in diameter. Bridges shall be the first choice for stream crossings. More information can be found in the Redmond Zoning Code 21.64.

8.4.10 Trees

Trees shall not be located within 8 feet horizontally from storm drain pipe unless root barriers are provided as approved by the Stormwater Engineer. With root barriers, trees may be no closer than 3 feet to pipes unless approved by the stormwater engineer.

8.4.11 Pump System Requirements

Pumping stormwater as a permanent practice is the method of last resort, not typically permitted for publicly maintained facilities, and requires Technical Committee approval. When no other alternatives are feasible, pump systems may be considered provided they meet the following:

- Pump: 10-year peak flow rate as calculated by the rational method
- Backup Pump
- Alternative Power Source (Emergency Generator)
- Auto-Transfer Switch Disconnecting Generator from Public Grid. Auto-Start Required.
- Audio Alarm for High Water/Pump Failure
- 3-Hour Flow Storage Volume (may be combined with water quality treatment)

In addition to these requirements, a note shall be placed on the plat or title that says, “Property owner is responsible for operation of the stormwater pump, and for any damages to offsite property if the pump fails to transfer stormwater as designed.”

8.4.12 Underdrains

Underdrains shall be a minimum of 6” diameter perforated PVC per WSDOT Standard Specification 9-05.2(6). All underdrains shall have cleanouts every 75 feet, or at a minimum at all bends in the underdrain system.

8.5 Catch Basin and Manhole Requirements

8.5.1 Structure Materials

The City of Redmond Standard Specifications and Details describes structure material requirements.

8.5.2 Structure Spacing

Space catch basins in accordance with best engineering practice and the WSDOT Hydraulics Manual. To accommodate maintenance of the pipes, a manhole or catch basin (structure) shall be placed periodically with the following maximum spacing:

- 200 feet for pipes less than 12 inch or with design velocities less than 3 feet per second (fps); otherwise,
- 300 feet for pipes less than 30 inch diameter with design velocities greater than 3 fps; or,
- 400 feet for pipes equal or greater than 30 inch but less than 42 inch diameter with design velocities greater than 3 fps; or,
- 600 feet for pipes of 42 inch diameter or larger with design velocities greater than 3 fps; or,
- 600 feet for tight lines down steep slopes.

Structures shall be installed at the end of all dead end mainlines, at horizontal or vertical pipe bends, at changes in pipe size or material, and at pipe junctions for access.

8.5.3 Pipe Connections

Match crowns at structures. Inlet pipe crowns shall not be lower than outlet pipe crowns unless specifically waived by the Stormwater Engineer. Pipe connections shall be water-tight.

8.5.4 Spill Prevention Device

Multifamily, commercial, and industrial properties shall include at a minimum a spill prevention device at the last structure on the property before connecting to the public stormwater system. The minimum requirement for a spill prevention device is a downturned elbow, removable for maintenance, located on the outlet pipe leaving a type 2 catch basin. Depending on the uses on the site, the Stormwater Engineer may require additional measures of protection.

8.5.5. Knockouts

Knockouts shall be provided in structures where future extensions are anticipated. These shall be shown on the plans.

8.5.6 Drop Structures

Drop structures shall only be allowed where approved by the Stormwater Engineer. Generally, drop structures will not be approved if the drop is less than 5 feet.

8.5.7 Lot and Area Drains

Lot drains or area drains in excess of 2 feet deep and up to 5 feet deep shall be Type I catch basins. Area drains exceeding 5 feet deep shall be Type 2 catch basins with bolt-down lids.

8.5.8 Through-Curb Inlet Frames

Through-curb inlet frames shall be specified on plans at sag points, at any inlet where by-passing runoff would escape the intended control system and at every third inlet on a continuous run along a continuous slope. Through-curb inlet frames may be used at all points except at proposed or likely driveway locations.

8.5.9 Catch Basins and Americans with Disabilities Act

Storm drains and catch basins are normally placed where they will intercept surface water runoff. Installing a curb ramp at a point of strategic runoff interception can compromise effective drainage. Regrading the section of road or curb ramp location to alter drainage patterns can resolve some situations in which drainage concerns conflict with accessibility requirements. Ideally, inlets should be placed uphill of crossings or curb ramps to drain water before it can puddle where pedestrians are crossing. More frequent drainage inlets, more strategic placement of inlets, and basin pickups will also reduce the frequency of puddles. If catch basins cannot be avoided within ADA accessible pathways, then ADA compliant catch basins grates may be used with approval of the Stormwater Engineer. These are typically maintenance intensive and should be avoided.

8.6 Site Design

8.6.1 Flood Protection

All parts of any structure constructed below the 100-year flood elevation of associated waterways shall be protected from flooding using flood-proofing.

Flood-proof to the 100-year elevation, plus 1 foot. Flood-proofing shall conform to Federal Emergency Management Agency standards in effect at project vesting.

Projects planning work within Flood Control Zones shall submit a Flood Control Zone Application (Appendix M).

8.6.2 Single Family Residential Plats and Short Plats

Projects creating lots for single-family houses (residential plat and short plat projects) shall provide drainage systems for all lots. The drainage systems shall address on-site stormwater management, flow control, and runoff treatment.

8.6.3 Drainage Connections for All Lots

All types of plats and short plats (residential, commercial, industrial, and others) shall provide for drainage connections on each lot, unless otherwise approved by the Stormwater Engineer. (On-Site Stormwater Management measures may make the use of lot connections unnecessary.)

Drainage connection points are to be located at the low elevation point of the allowable building area of each lot. The connections must be below finished grade so as to allow connection of footing drains, roof drain leaders, and other drains.

Providing for drainage connections typically means providing a piped system from the drainage connection points described above to the drainage system in the plat or short plat. A maximum of three (3) lots may be connected to a common private collection pipe. Multiple collection pipes may be used.

In some cases it may be acceptable to include only the plan for the lot drainage connections as part of the City-approved drainage plan for the plat or short plat and defer construction until building construction on the lots.

Infiltration of runoff can reduce hydrologic impacts and water quality impacts and maintain groundwater supplies. Infiltration is generally acceptable where soils and geology are suitable. Infiltration of runoff from pollution generating impervious surfaces is limited based on Wellhead Protection Zones (Section 8.3).

Construction of the lot drainage connection systems must be feasible and allow connection to the proposed plat improvements or to the documented infiltration areas.

8.6.4 Single Family Roof and Foundation Drain Requirements

Size and Connection: Roof drain/foundation drain connection from the house, when required based on Figure III-3.1.8 of Volume III of the 2014 SWMMWW, shall be 6-inch diameter and shall be extended to a storm drain structure (not connected directly to a stormwater pipe). Foundation drains shall be separate from roof drains around the building foundation. Pipes shall be smooth wall, rigid type (sewer grade). Pipes shall not be corrugated polyethylene (such as flexible ADS). Roof and footing drain connection stubs shall be at least one 1 foot below the lowest existing elevation of the building envelope on all newly-created lots, unless a different elevation is approved or required by the Stormwater Engineer. The minimum cover over yard drain lines is 18 inches. For subdivisions, no more than three (3) roof drain stubs are allowed on a single roof drain collection pipe.

Building Footings: Building footings shall be designed, or pipe located, such that the footing shall not bear on the pipe.

These requirements shall also be coordinated with the requirements of Section 2.5.5 that addresses roof runoff dispersion and infiltration.

8.6.5 Separation of Systems Serving Separate Owners

Stormwater facilities provided to for flow control and runoff treatment generally should be provided within the site they are serving although certain exceptions are acceptable.

Facilities for single family plats may be located in common areas (even in public roads that are created by the plat or short plat).

Flow control and runoff treatment provided for the private part of a project shall be separate from flow control and runoff treatment for public impervious surfaces that are part of the project. Individual lots within single-family plats and short plats with public road improvements may drain to the public flow control and runoff treatment systems constructed to serve the development.

In some circumstances, flow control and runoff treatment requirements for the proposed hard surfaces may be met by adding such control(s) to equivalent existing developed areas of the site, which do not already have such controls.

8.6.6 Grading

The maximum ground slope on graded surfaces is 3 horizontal to 1 vertical (3:1) except as approved in association with roadway section in City rights-of-way where the maximum ground slope may be up to 2:1.

Proposed contours shall not create undrained, ponding areas where such areas would not be appropriate (onsite or offsite).

8.6.7 Rockeries/Retaining Walls

Rockeries or retaining walls should not cross or be near storm-drain pipes. Any crossing of a wall shall be perpendicular to the wall and special construction techniques including steel casings may be required.

Rockeries under 4 feet are not regulated. Rockeries over 4 feet shall only be used against cut slopes.

Rockeries and retaining walls shall have foundation drains (6 inches in diameter of approved materials) behind the wall connected to a defined conveyance system. Rockeries 48 inches and taller and retaining walls must be designed by a structural or geotechnical engineer. No retaining structure may be higher than 8 feet (unless a relief from general design standards is obtained). Structural retaining walls over 4 feet in height are reviewed and permitted by the Building Department following UBC Section 106.2.

8.6.8 Easements

8.6.8.1 Public Easements

Where public storm drain line easements are necessary, they shall be 20 feet in width. Easement widths of less than 20 feet may be considered by the Stormwater Engineer, in special situations, but shall not be less than 15 feet in width.

Where public storm drain pipes are to be located across private lots where owners can erect fencing, sheds, and plant landscaping the access for maintenance is severely restricted. An example is a pipeline crossing several single-family lot backyards. City of Redmond standards require a vactor truck to access catch basins for maintenance. See section 8.6.9.1. These pipe installations are to be located in tracts dedicated to the city.

Publicly maintained water quality and detention facilities shall be located in tracts dedicated to the City or City-owned right-of-way. Publicly maintained stormwater facilities may be located within private tracts, provided a public stormwater easement is provided. When located within a private tract, the tract shall be sized to permit a 10-foot minimum maintenance setback, or a 1 to 1 slope setback for excavation from the bottom of the stormwater facility to the property line, whichever is greater. Tracts and easements shall include the entire facility, site access and maintenance area. For facilities in the right-of-way, the entire facility, site access area, and at least 5 feet around the facility should be in the right-of-way. If this is not possible, an easement shall be required. If an easement is permitted, dimensions shall be determined by the Stormwater Engineer.

In cases where pipes and/or other facilities are deeper than 8 feet or have other special conditions, larger tracts or easements may be required.

All easements needed for City stormwater systems shall be provided by the developer in the name of the City. The required easements shall be shown on the construction drawings and the easement legal description or plat markup shall be submitted for review at the same time construction drawings are submitted for review.

Easements shall have language acceptable to the City, similar to the example in Appendix K.

An alternative to separately recording a City of Redmond easement form is to record an easement on the face of a plat. If this is the method used, a standard City of Redmond easement statement shall be included in the plat documents.

Buildings, structures, garages, carports, dumpster enclosures, decks, rockeries over 4 feet, etc., shall not be located in easement areas.

8.6.8.2 Private Easements

In all cases, appropriate easements must be provided, for the specific drainage systems shown on the construction documents. Those documents shall also show anticipated grading,

rockeries, retaining walls, etc. The minimum easement for private stormwater BMPs shall include the entire facility, site access area, and at least 5 feet around the facility. They shall be minimum 10 feet wide.

8.6.9 Stormwater Facilities

8.6.9.1 Maintenance Access

Unless specifically waived by the Stormwater Engineer, all stormwater facilities shall be accessible to maintenance vehicles. The Operations & Maintenance manual for the facility shall identify the equipment and access required for maintenance. Vactor access is required to all entries to vaults, flow splitters, catch basins and control structures. Large ponds, stormwater treatment wetlands, sand filters, etc., need access for a track hoe that includes a stabilized ramp into the facility to allow for cleaning and equipment access to the entire facility. Such areas shall be paved from the street to the stormwater facility. Smaller facilities may be allowed to eliminate the ramp if provisions for access are spelled out in the Operations & Maintenance manual. Smaller facilities like rain gardens or biofiltration swales need a work area adjacent to the facility to support maintenance activities.

For facilities that require Vactor maintenance, the preferred configuration is to have the Vactor truck approach a structure opening with the front of the vehicle with limited maneuvering required from the nearby street. Acceptable access includes an improved roadway surface within 10 feet of a manhole or catch basin with overhead clearance to 20 feet to allow for boom operation. Materials for construction of an improved roadway surface can include asphalt concrete, cement concrete, pervious pavement if designed to infiltrate. A grass-crete type surfacing on level ground, with concrete flush curbing may be approved by the Stormwater Engineer. Maintenance access roads shall be designed to support the weight of a vactor truck with 40 foot inside radius and a 52 foot outside radius on curves, with slopes less than 10% and with widths as determined by the Stormwater Engineer (but not less than 12 feet).

The Stormwater Engineer may require maintenance access roads to be located in separate tracts. Facilities that must be located on steep slopes shall be designed to minimize any requirements for maintenance access. Butt-fused HDPE is the city standard for steep slope installations (See the Standard Specifications). A plan for accessing such facilities with Vactor flex hose or measures to minimize required maintenance shall be identified in the Operations & Maintenance manual.

Outlet control valves shall be detailed so as to be operable from the surface (not subject to confined space entry requirements) unless approved otherwise by the Stormwater Engineer. The specific detail for these valves depends on the type of valve and shall be subject to approval by the Stormwater Engineer. Gravity-flow draw-down systems (for ponds, vaults, etc.) shall be provided with an outlet control valve.

8.6.9.2 Facility Maintenance

Provision shall be made for long-term maintenance of flow control and runoff treatment facilities.

8.6.10 Transfer of Assets to the Public

When projects include construction of improvements that will be turned over to the public, a Public Utility & Stormwater Facilities Bill of Sale Form (Appendix N) and a Developer Extension Asset Summary (Appendix P) shall be completed and submitted to the Development Services Division of Planning and Community Development.

8.6.11 Infiltration Setbacks

Stormwater infiltration facilities shall be located and designed such that the infiltrated stormwater does not cause flooding of buildings or harm existing utilities.

Infiltration facilities setbacks shall be observed as follows:

- Setback to property line: 10 feet
- Setback from off-site structures: As determined appropriate by a registered geotechnical engineer.
- Setback to building protected from groundwater: 0 feet
- Setback to building of zero feet requires the building design be based upon this location. Provide confirmation from geotechnical and structural engineer of knowledge of proximity of infiltration to building.
- Setback to rockeries and retaining walls: 10 feet
- Any other setbacks shall conform to Chapter 3 of Volume 3 of the SWMMWW.

8.7 Low Impact Development (LID)

8.7.1 LID Overview

Low impact development (LID) (also known as “on-site stormwater management”) is a stormwater management and land development strategy applied at the parcel and subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic predevelopment hydrologic functions and provide runoff treatment. Implementation of LID benefits streams, lakes, and Puget Sound by moderating the impacts of stormwater runoff generated by the built environment. These techniques may be accessory or alternative to traditional, structural stormwater management solutions. LID is required by Minimum Requirement #5.

Use of LID is one way to implement the following Comprehensive Plan policies:

- NE-9: Encourage environmentally friendly construction practices such as the build green program and low impact development.

- NE-10: Encourage projects which utilize alternative technologies, engineering, and plans which emphasize Low Impact Development strategies through incentives and flexibility in application of regulatory requirements.

8.7.2 Intent of LID

The City encourages the use of LID techniques, including techniques for stormwater management.

These goals are to:

- Maintain or restore the pre-developed condition surface water flow volumes, durations and frequencies;
- Retain or restore native forest cover to capture, infiltrate and evaporate all or a portion of the rainfall on the site;
- Cluster development and minimize land disturbance;
- Preserve or restore the health and water-holding capacity of soils;
- Incorporate natural site features that promote infiltration of stormwater;
- Minimize total impervious surfaces and effective impervious surfaces;
- Reduce or eliminate piped stormwater conveyance and conventional detention ponds;
- Manage stormwater through infiltration, bioretention, and dispersion; and
- Manage stormwater runoff as close to its origin as possible.

8.7.3 Land Use

LID is not merely the use of specific stormwater management facilities, but is an approach to land development that integrates with and responds to the natural conditions of a site. A low impact development should strive to minimize the impact of development on the pre-developed hydrologic condition. From a land use perspective, this is accomplished by minimizing the development envelope and minimizing impervious surfaces.

8.7.3.1 Minimize Development Envelope

Minimizing the development envelope means confining lots and land uses to confine development and activity areas to the smallest impact area. While the City's development standards are generally designed for conventional development that consumes most or all of a development site with buildings, infrastructure and activity areas, the Redmond Zoning Code provides several mechanisms to focus development on a site. Residential and commercial clustering can be accomplished through provisions of RZC 21.08 and RZC 21.14

8.7.3.2 Retain Areas of Native Vegetation

Minimizing the development envelope allows retention of a portion of the site in its natural or pre-developed state. In addition to offering an aesthetic amenity and opportunities for passive recreation, preservation of natural open spaces provides areas for dispersion of stormwater generated on the developed portion of the site. The extent to which dispersion to a natural area may be allowed depends on the size of the preserved area relative to the tributary area as

well as underlying soil types. Where native forest is preserved or restored to disturbed areas, a portion of the rain that falls on the site will be intercepted and evaporated or absorbed. While preservation of significant natural areas is a challenge in urban areas, conservation of existing habitat is a key element of LID. LID projects should preserve or re-establish a minimum of 35 percent of the overall site area in native vegetation. (This 35 percent does not include any critical areas that are already required to be set aside.) Areas retained as native open space are most effective for dispersion when located downslope of proposed development areas.

8.7.3.3 Preserve Native Soils

In addition to retention of areas of native vegetation, preservation of native soils is an important aspect of low impact development. Native soils have a significantly higher capacity to absorb, retain and transmit water than soils remaining on a site following conventional development. Commonly, native soils are graded and removed from development sites. In the process, the underlying soils are significantly compressed, resulting in a reduction in the ability of the soils to absorb water from the surface.

Prior to any clearing or grading, areas of the site more conducive to infiltration should be identified (see Site Assessment below), and site design should preserve such areas. Ground disturbance should be limited to road, utility, building pad, landscape areas, and the minimum additional area needed to maneuver equipment. A 10 foot perimeter around the building site can provide adequate work space for most activities. The number and extent of construction access roads should be limited and located where future roads and utility corridors will be placed. Where prior clearing or grading has occurred, soils should be restored according to the requirements in the City of Redmond Standard Specifications, Section 9-14.1, in all areas except where impervious surfaces are proposed.

8.7.3.4 Compost Amendment of Soils

Compost amendment of soils shall be in accordance with Redmond Standard Specifications and Details, Section 9-14.1, for disturbed areas of development that will not be impervious surfaces post construction. Amending soils may be a more viable alternative to preservation of native soils for some sites, and can realize many of the same benefits.

8.7.3.5 Minimize Impervious Surfaces

Minimizing the development envelope may also limit the extent of new roadways and other impervious surfaces. Limiting impervious surfaces is a primary emphasis of low impact development. Impervious surfaces can be minimized by limiting vehicular and pedestrian infrastructure (e.g., roads, driveways, parking areas, and sidewalks), to the minimum functional needs of the facilities. The Rustic Street Standards in Appendix 2 of the RZC, while not applicable to all areas or all roadway use conditions, represent a good template for LID road design. LID techniques to minimize impervious surface area also include the use of various pervious paving materials, minimal excavation foundations, and green roofs. These alternatives

to conventional development techniques decrease the effective impact of new surfaces and buildings on the pre-developed conditions.

8.7.4 LID BMPs

To achieve the intent of LID, stormwater should be managed on-site to the greatest extent possible.

8.7.4.1 LID BMPs

The following onsite BMPs, subject to modifications within this Stormwater Technical Notebook or requirements in the Redmond Municipal Code, should be considered:

- Permeable pavements (see 8.7.10, for functional equivalency);
- Dispersion;
- Vegetated rooftops;
- Rainwater harvesting (requires stormwater engineer approval);
- Reverse slope sidewalks;
- Minimal excavation foundations; and
- Bioretention.

Descriptions of these BMPs, along with design criteria, maintenance standards, and modeling guidance, can be found in Appendix III-B of the Ecology Manual.

Other BMPs may be considered for use by the Technical Committee, provided that the committee finds that there is reasonable scientific justification that such BMPs will provide equal or better flow control and water quality results, and that long-term performance is assured.

8.7.4.2 Treatment BMPs

The only LID BMPs that may be approved for stormwater runoff treatment are:

- Dispersion, when consistent with DOE BMP T5.30; and
- Bioretention, when consistent with the design criteria in the Ecology Manual. Any stormwater that infiltrates through designed bioretention soil mix shall be considered to have received the equivalent of Enhanced Treatment.

8.7.4.3 LID in Wellhead Protection Zones

Refer to Section 8.3 for limitations or constraints for infiltration from pollution generating impervious surfaces in Wellhead Protection Zones.

8.7.5 Site Assessment for LID

All projects that trigger Minimum Requirement #1 are required to submit a Stormwater Site Plan that includes a site assessment. If infiltration and/or dispersion are not feasible options, the applicant shall provide justification to demonstrate why.

8.7.6 Maintenance

All BMPs, impervious surface area restrictions, preserved native areas and any project specific LID conditions of approval shall be recorded on a subdivision plat, development covenants, deed restrictions, easements, or other legally binding mechanism approved by the City. Easements shall be provided to the City to allow inspection, maintenance and repair, as necessary, to ensure that approved LID BMPs are preserved and maintained. Maintenance for LID BMPs permitted on private property is the responsibility of the property owners, their heirs and assigns. Subdivision plats shall document who is responsible for maintenance.

Native forest or other natural areas preserved or established as part of a permitted dispersion BMP shall be placed in tracts protected.

When permitted as part of a development approval, bioretention facilities and pervious pavement on private lots shall be located such that they are available for inspection by the City's private stormwater inspection program. If they are not adjacent to right-of-way, then they shall be placed within easements providing the City access for future inspection. Title to properties with LID BMPs shall include clear language stating the property owner is responsible for maintenance.

Low Impact Development Best Management Practices built for capital projects shall typically be maintained by the City.

Bioretention built in the public right-of-way in subdivision projects shall include maintenance provisions that share maintenance responsibility. The City will be responsible for maintaining bioretention facility function, keeping inlets clear, underdrains inspected and clear. The aesthetics of the facilities will be the responsibility of the adjacent land owner or home owners association.

LID best management practices selected for use on development projects must be maintainable in an urban setting. The designer will provide adequate space for maintenance vehicles, including turn-around capabilities to facilitate the continued operation of each LID facility. Plat documents shall include clear descriptions of all LID facilities and the party responsible for on-going maintenance. The plat will include limitations on property owners from altering approved LID facilities on their properties. The alteration of constructed LID facilities will require written approval from the City, in the form of an approved Clear & Grade Permit.

The Stormwater Engineer may require substitution of alternative LID BMPs for private development projects where long term maintenance or protection of the BMPs is not supported

in an urban setting. An example is proposing a bioretention channel passing through multiple single-family lots; a practice that is not supported.

8.7.7 Evaluation and Monitoring

The Stormwater Engineer may require implementation of a monitoring and evaluation program designed to measure the performance of the drainage system or specific elements that are approved for a project under the provisions of this chapter.

8.7.8 Bioretention Limitations

Bioretention shall not be located within one-quarter mile of Lake Sammamish.

Bioretention with underdrains shall not be allowed if those underdrains discharge to pipes or streams that ultimately drain to Lake Sammamish, due to phosphorous control requirements.

Redmond Standard Specifications include approved bioretention mix designs for use within the City.

8.7.9 Green Roofs

Green roofs may be allowed with Stormwater Engineer approval. If green roofs are included in a project design, special inspection will be required during construction by a professional civil engineer who certifies that the green roof was installed properly. This inspection will be the responsibility of the project proponent and this requirement shall appear on the permit drawings.

Green roof maintenance shall be included in the project Operation and Maintenance Manual.

Easements to allow inspection shall be provided to the City of Redmond.

8.7.10 Pervious Pavement Functional Equivalency

The primary function of pervious pavement is for it to serve as sidewalk, road, or similar purpose. The secondary function of pervious pavement is to mimic predeveloped hydrology by infiltrating storms over a large area. Pervious pavement represents a larger maintenance burden for owners of the pavement than traditional pavements. It is possible for an alternative BMP to meet the secondary, hydrologic function while also meeting the primary function, without the added maintenance burden.

Redmond Standard Details include details for functional equivalents to pervious sidewalks, such as the use of reverse slope sidewalks that drain into landscaped areas or the use of infiltration trenches adjacent to sidewalks.

Projects designed to meet the LID Performance Standard shall use modeling to demonstrate how functional equivalency is met.

If a project using the Minimum Requirement 5 Lists identifies pervious pavement as a requirement, the project applicant shall model the site assuming pervious pavement, as an alternative. The project applicant shall then design functional equivalent systems and use modeling to document that the proposed alternative meets or exceeds the LID performance standard just for the permeable pavement functionally equivalent BMP.

8.8 Regional Facilities Program

As a part of the City's coordinated, regional approach to managing stormwater City-wide, some projects will have the requirement or option of contributing a fee, in lieu of building site-specific facilities for flow control or runoff treatment. The fee shall be used toward construction of regional stormwater facilities. The City has responsibility for ensuring that:

Potential impacts from all new development or redevelopment within the City are addressed in a manner that meets the City's obligations on a watershed basis to protect water quality and prevent erosion of streams.

Funds received for construction of regional facilities are used for that purpose.

To meet these responsibilities, the City's program, administered by the Natural Resources Division of the Public Works Department, includes procedures for:

- coordinating with the Development Services Division's review of development and redevelopment projects;
- determining what projects are eligible for "fee in lieu";
- accounting for areas that have been treated by existing regional facilities;
- accounting for funds that have been received for construction of new regional facilities; and,
- locating, designing, and constructing regional facilities.

With the exception of downtown, for new development projects (Section 2.4.2), regional facilities must be operational to be eligible for "fee-in-lieu". Redevelopment projects (Section 2.4.1) are eligible if associated regional facilities are operational or are on the City's Six-year Stormwater Capital Improvement Plan.

To be eligible for "fee-in-lieu", project areas must drain to the applicable regional facility. For public road projects, the project area must drain to the same receiving water as the existing or proposed regional facility.

A project's participation in the Regional Facilities Program is dependent upon where the site is located. Appendix F shows a map of the City's proposed regional facilities and also the City's Regional Facilities Surcharge Areas. Applicants should review the maps to determine if sites fall within regional surcharge areas, and then use the appropriate flow charts below to determine site requirements related to this program.

8.8.1 Downtown

Projects located within the Downtown surcharge area are subject to the Downtown sub-basin stormwater capital facilities charge, per RMC 13.20.045. As described within the RMC, sites located next to the Sammamish River may be eligible to opt out of the regional facilities program with approval of the Technical Committee.

Projects may be required to construct some offsite stormwater improvements such as extending the municipal stormwater system the length of the project site or upsizing existing pipes within the municipal system to prevent downstream flooding. Sites are also required to construct improvements onsite to meet Minimum Requirement #5, and meet infiltration requirements described in Section 2.5.5.

The City's Downtown Facilities Map, shown in Appendix H, identifies planned offsite improvements that may be required of the applicant, depending on the location and scope of the proposed development. The required offsite improvements should be discussed with the Stormwater Engineer early in the planning process. Downstream analysis using the City's model may be required of the applicant.

8.8.2 Overlake

Projects located within the Overlake surcharge area are subject to the Overlake sub-basin stormwater capital facilities charge, per RMC 13.20.047.

Sites located south of the location of the proposed NE 26th Street are required to construct onsite treatment for all pollution generating surfaces.

New development (Section 2.4.1) projects are required to construct interim treatment and/or flow control facilities if regional facilities meeting those requirements have not yet been constructed. (The City doesn't believe there are any sites in Overlake that would be classified as "new development").

Sites are also required to construct improvements onsite to meet Minimum Requirement #5, and meet infiltration requirements described in Section 2.5.5.

The City's Overlake Facilities Plan, shown in Appendix G, identifies planned offsite improvements that may be required of the applicant, depending on the location and scope of the proposed development. The required offsite improvements should be discussed early in the planning process. Downstream analysis using the City's model may be required of the applicant.

Figure 8.1 – Regional Facilities Program

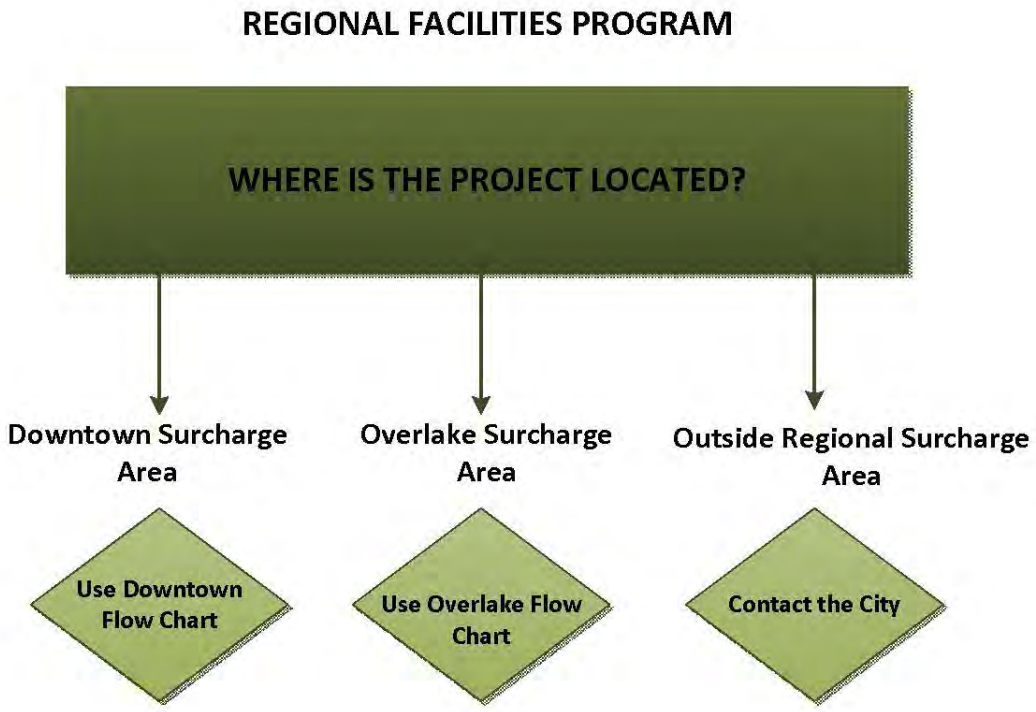


Figure 8.2 – Downtown Surcharge Area

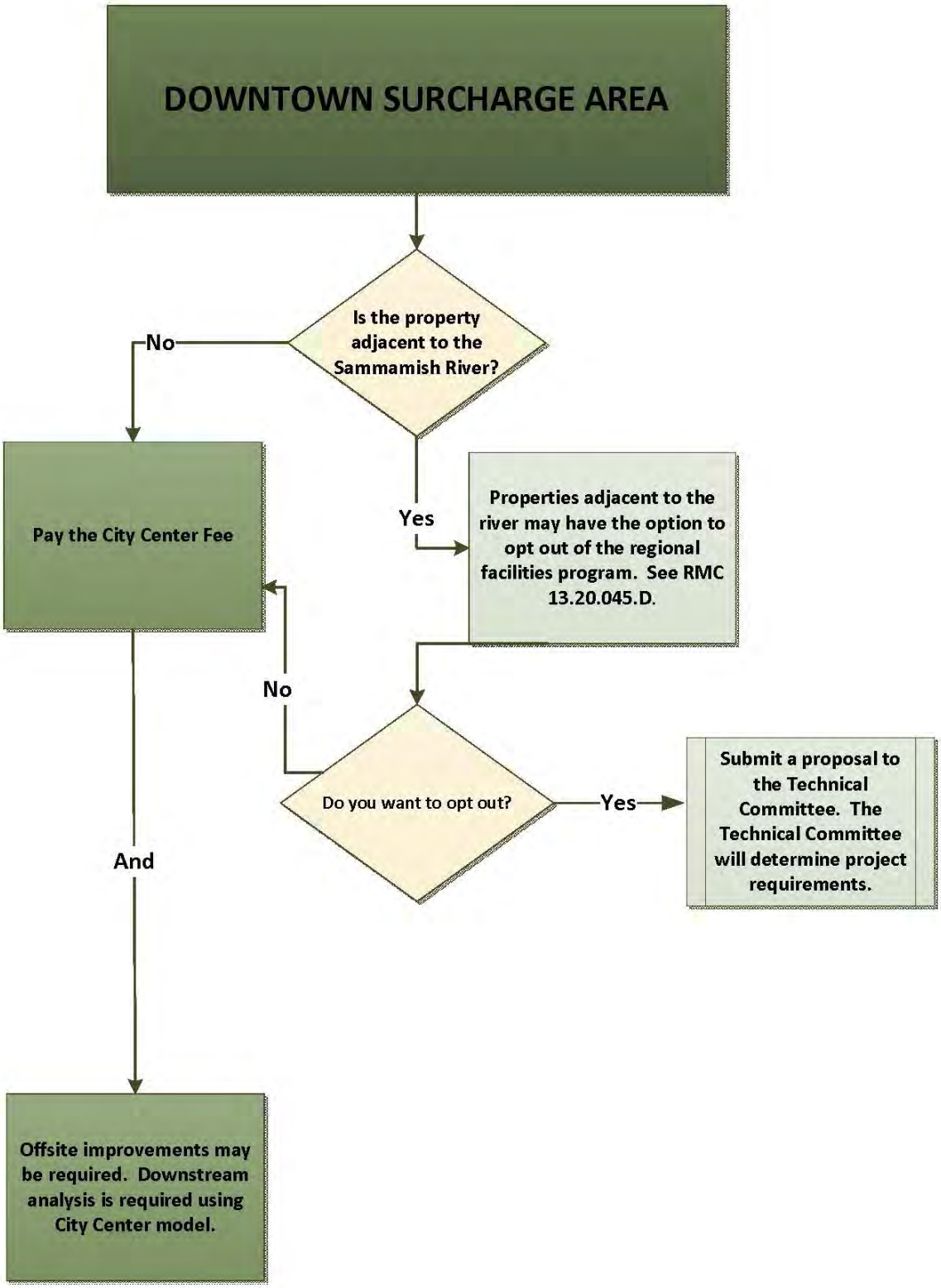
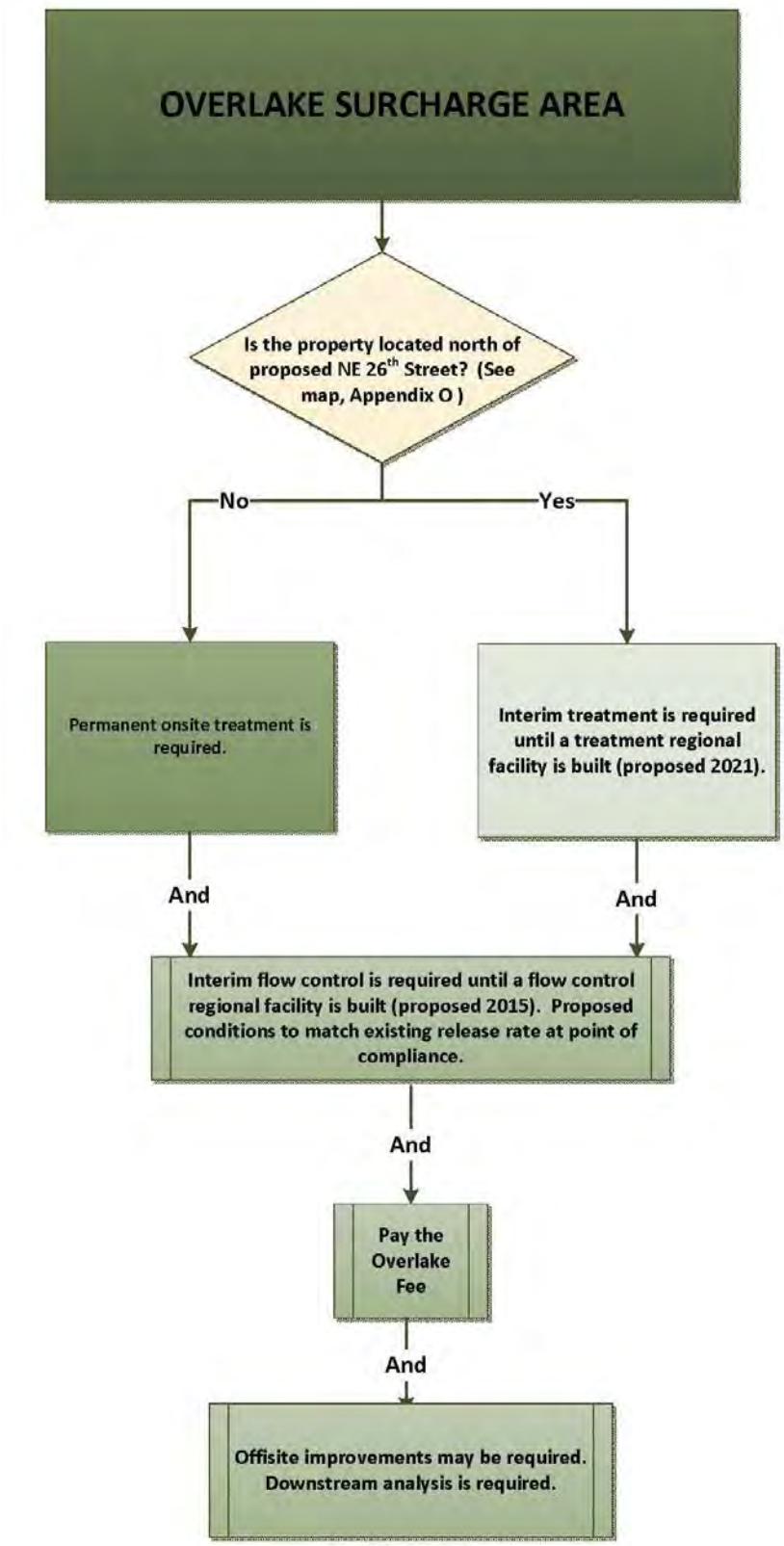


Figure 8.3 – Overlake Surcharge Area



8.8.3 Outside Regional Surcharge Areas

Projects that are not located within the Downtown or Overlake surcharge areas may have the option of negotiating with the City to participate in construction of a regional facility (or use of an existing regional facility) to meet their stormwater requirements. This is effectively a public/private partnership to facilitate private development and public retrofitting of stormwater management. A proposal describing the project will be reviewed by the City to determine if the project may be eligible.

This proposal must include:

- Full drainage report
- Downstream analysis
- Discussion of cumulative impacts
- Proposed fee
- Summary of offsite improvements
- Identified location for regional facility
- Summary of benefits to the City

Due to the large amount of City resources required to accommodate such a request, most sites that lie outside the designated regional surcharge areas are not eligible to participate in this program. Contact the Natural Resources Division for further information.

8.9 Other Development Topics

8.9.1 Internal Building Changes as Redevelopment

Redevelopment projects that are confined to existing interior spaces do not require new drainage controls (except those drainage systems described above as may be required by the City for proper drainage).

If redevelopment projects include any work involving the exterior part of the site, the project shall be subject to redevelopment requirements under this Stormwater Technical Notebook. Where exterior work occurs, the value of the interior work shall be included in determining the extent of exterior redevelopment requirements.

8.9.2 Site Improvements Involving Hazardous Materials

Site improvements to existing facilities that would otherwise not be subject to stormwater system improvement but involve hazardous materials shall meet the water quality requirements of this Stormwater Technical Notebook, Redmond Municipal Code (RMC) 15.24, RMC 15.06 and RZC 21.64.050. There are also specific source control BMPs in Volume IV of the 2014 SWMMWW.

8.9.3 Garbage and Recycling Area Stormwater Drainage

Stormwater from uncovered garbage and recycling areas (trash enclosures), shall not enter the City's stormwater system or infiltrate into the ground. These areas shall be covered, with floor drains discharging to the sanitary sewer.

Chapter 9 Construction Stormwater Pollution Prevention

The 2014 SWMMWW provides detailed guidance regarding the plans for stormwater runoff management during construction. That guidance is to be followed in the City of Redmond. Field adjustments, likely to be required as the project construction progresses, must also be consistent with the Stormwater Technical Notebook and the 2014 SWMMWW.

9.1 Key Points to Address

The following are key points to address when formulating a Stormwater Pollution Prevention Plan (SWPPP) and Temporary Erosion and Sedimentation Control (TESC) Plan in Redmond:

1. Consider Stormwater Pollution Prevention in the "Bigger Picture" of the project.

   A. Review Volume II of the 2014 SWMMWW, particularly the general principles in Section II-3.1.3.
   B. Plan the use of the site or adjust critical parts of the site plan (in Critical Areas, for example) to avoid potential issues and problems. As noted in the Rainy-Season Guidelines (Chapter 10 of this document).
   C. Avoid Rainy-Season work, especially on large and/or weather-sensitive sites. The Rainy-Season Guidelines (Chapter 10 of this document) may show that work can be done in the rainy season but enhanced (and more costly) TESC Plans are typically required.

2. Include a list of Key Contacts on the TESC Plan.

   Key Contacts related to preparation, implementation, and operation of the TESC measures shall be included on a plan sheet. For each person include the name, title, role in preparing the plan, and phone number(s). The number and skill set of people involved in preparing the plan will typically vary depending on the complexity of the project. For relatively small, straightforward projects, the Key Contact may be just the project CESCL. For complex sites and projects the list could include:

   - Project civil engineer
   - Project CESCL
   - Project Manager
   - General Contractor
   - Grading Contractor

3. Include the construction Start-up Sequence on the TESC Plan.

   a. The construction start-up sequence is a list of actions to be followed, in the order presented, to set up the stormwater pollution prevention measures prior to other construction.

b. Initial work in the field needs to follow the sequence on the approved plan, with adjustments to fit field conditions that are approved, in advance, by the City Inspector.

4. Delineate Clearing Limits.

a. Clearing limits show the area(s) of the site to be left undisturbed. Staging and stockpile areas are considered to be disturbed so they need to be included as cleared area(s). In all cases, disturbed areas shall be the minimum necessary for construction.
b. On the TESC Plan, show the Clearing Limits. If there are key dimensions to use in the field for locating the clearing limits, show the dimensions on the plan. Such dimensions involve buffers, setbacks, geotechnical considerations, and other such factors.

5. Include "Disconnection" of Surface Inflows.

a. Runoff from areas upslope of the project's disturbed area(s) must be managed so the upslope runoff does not mix with the disturbed area.
b. The basic approach is to: cut off the approaching runoff using lined trenches or barriers (that are erosion-proof); collect that runoff at one or more points (depending on topography and other site circumstances); and convey the water around (or across) the work area (in erosion-proof ditches and/or temporary pipes).

6. Apply all available measures to surface runoff leaving the disturbed area to meet water quality standards.

Water quality standards include the State Standards and the City Standards. City Standards include the following:

a. At the outflow point(s) from the treatment system(s), the turbidity standard is 25 NTU, maximum. NTU = Nephelometric Turbidity Unit.
b. At downstream points of discharge to surface waters, the standard is as follows: runoff from the site is not to cause the turbidity level in the receiving water(s) to increase more than 5 NTU.
c. At the outflow point(s) from the site, the standard for pH is 6.5, minimum, and 8.5, maximum.
d. All available measures can include, but are not necessarily limited to, project phasing, advanced erosion and sediment control measures, and delaying all or part of any project work that has not commenced to avoid working during the rainy season.
e. Unless a larger design storm is specified for a specific project or pollution control method, the minimum design storm for construction phase measures is the 10-year return frequency storm.

7. Surface runoff leaving the disturbed area shall be controlled using all available measures to meet water quantity limits where sensitive downstream conveyance situations exist. For discharge(s) to streams or channels subject to erosion, the standards for construction phase discharge are the same as those specified for permanent stormwater management for the project.

8. The TESC Plan must include provisions for other pollutants that are likely to be present on site during construction.

   The SWPPP must:

   - list other potential pollutants that are likely to be present on site and provide basic instructions for their management and control;
   - list materials and equipment to be onsite to implement the instructions; and
   - list key emergency phone numbers for resource agencies involved in pollution incidents.

   The 2014 SWMMWW provides additional information about potential problem areas (Volume II, Chapter 4).

9. Include provisions to prevent mud and dirt from being tracked onto off-site streets in the TESC Plan.

   The minimum basic provision for controlling mud and dirt is the temporary quarry spall entry/exit pad. This approach is successful only in limited circumstances.

   A more reliable approach (which may be proposed or required by the City) is a wheel-wash station. At a minimum (unless specifically waived by the City) the TESC Plan must show the standard wheel-wash facility (including site location and related "plumbing") as an optional measure. The City may stipulate that this measure is required. The City Inspector may require immediate implementation of an optional wheel wash if off-site streets become muddy or dirty from the project. Also see 2014 SWMMWW Volume II, Chapter 4, BMPs C105, C106, and C107.

10. Include provisions to prevent sediment-laden stormwater from draining into areas proposed for infiltration BMPs like infiltration basins or areas designed for on-site stormwater management.

11. Include a Minimum Inspection and Maintenance Schedule for all management practices included on the plan.

    The Minimum Inspection and Maintenance Schedule is to be a table or matrix listing the management practices on the left and the inspection and maintenance frequencies across the top. Two types of frequencies need to be specified. One type is the minimum time-related frequency (e.g., once per day, once per week, beginning and end of each work day, etc.). The other type is the event-related frequency (e.g., after each rainfall, after each larger storm rainfall, after each windstorm, etc.).

12. Comply with other federal, State, and City laws and regulations that relate to the construction phase.

    Of primary importance under this title is safety. Safety of the project workers and other personnel, City staff, the neighbors, and other people who could be affected by the work is of paramount concern. The SWPPP should be reviewed by the plan's designers with safety in mind. Extra features (e.g., fencing, signs, walkways, etc.) should be considered.

    Other laws and regulations that typically apply include:
    a. Noise standards (City)
    b. Construction work hours (City)
    c. Dust control (City and the Clean Air Agency)
    d. Rainy-Season Guidelines (City)
    e. A Pre-Construction Meeting with the City prior to starting work (City)

13. Post required Performance Securities prior to starting work.

    The performance securities that are required for a specific project are specified either in the approval conditions for the project or in the requirements for permits that are required for the project.

9.2 Contents of Construction Stormwater Pollution Prevention Plan (SWPPP)

The 2014 SWMMWW requires a Construction Stormwater Pollution Prevention Plan (SWPPP) for Medium and Large Projects. A copy of the SWPPP is to be submitted to the City of Redmond. The SWPPP shall follow the outline and include the elements provided in the step by step procedure in Volume II, Chapter 3, of the 2014 SWMMWW.

9.3 National Pollutant Discharge Elimination Systems Permit

A permit is required from the Washington State Department of Ecology for all soil disturbing activities (including clearing, grading, and/or excavation) where one or more acres will be disturbed, and stormwater will be discharged to a receiving water directly (e.g., wetlands, creeks, unnamed creeks, rivers, marine waters, ditches, estuaries), or to storm drains that discharge to a receiving water. If all stormwater is retained on-site and cannot enter surface waters of the state under any condition, you do not need permit coverage.

Chapter 10 Rainy Season Clearing / Grading

10.1 Introduction

These standards are adopted per Redmond Municipal Code 15.24. These general standards identify which development projects in the City of Redmond can undertake site construction work in the rainy season, what level of Temporary Erosion and Sediment Control (TESC) is necessary and what runoff monitoring is required. Since these are general standards, specific projects and sites may warrant exceptions to these standards.

Planning for rainy-season work needs to begin early in a project. The "Permit Processing Implications" section presents important information for those who may be pursuing construction work in the rainy season. It is important to plan ahead if rainy-season work is to occur given that:

- The SWPPP approved for good weather will probably not be adequate for the rainy season.
- A Seasonal Suspension Plan will be required for rainy-season work.
- Higher levels of TESC require City meetings as these plans are formulated (advance scheduling with City staff is important).
- High TESC levels can involve chemical treatment, so the possible use of such measures must be part of SEPA documents. If such measures become necessary for a project and were not included in SEPA reviews, then SEPA processes would need to be amended prior to approval of the special TESC measures.
- State Department of Ecology approval is required for some state-of-the-art TESC.

Clearing/grading work shall comply with provisions in the Stormwater Technical Notebook and other applicable regulations and standards. Project work shall also comply with City regulations and with requirements developed through SEPA (State Environmental Policy Act) processes, through the City's site plan review processes, and through other project reviews. These project-specific requirements are in addition to and take priority over the general standards in this document where differences occur.

The rest of this chapter contains seven (7) sections:

1. TESC Standards. This section presents the standards that define what constitutes successful Temporary Erosion and Sediment Control for a project.
2. Special Requirements for Rainy-Season Work. This section describes two special requirements that apply to rainy-season project work: the Seasonal Suspension Plan and additional performance security.

3. Rough Grade Permits. This section briefly identifies a permit that allows clearing and grading to get started under certain circumstances, so that such work does not occur in the rainy season.
4. Explanation of the Rainy-Season Clearing/Grading Matrix. This section discusses the elements of the "Matrix" (Table 10.2).
5. How to Use the Rainy-Season Clearing/Grading Matrix. This section describes the steps to follow to use the Matrix.
6. Project Planning Implications. This section outlines the project review and approval implications related to rainy-season work. This section contains information to request an exception to the general standards presented in the Matrix.
7. Appeals: Wet Weather Committee. This section describes the group of City staff that have reviewed these general standards and that considers the Correction Requests and Appeals. This group is called the Wet Weather Committee.

There are four (4) tables in this chapter:

1. Table 10.1-Hydrologic Groups for Area Soils
2. Table 10.2-Rainy-Season Clearing/Grading Matrix (consists of five (5) pages)
3. Table 10.3-TESC Requirements
4. Table 10.4-Monitoring Requirements

10.2 TESC Standards

Successful TESC will meet all the following standards:

a. Site areas which do not need to be disturbed are not disturbed (clearing limits are defined and maintained).

b. Flows of runoff from areas not under construction are kept off of disturbed soils in the construction areas.

c. Disturbed soil in an area that is not being worked receives temporary cover.

d. The turbidity in runoff from the construction area does not exceed 25 NTU.

e. Run-off from the construction area that reaches receiving waters does not cause the turbidity in the receiving waters to increase more than 5 NTU as a result of the project runoff.

f. Disturbed areas receive final, permanent cover in accordance with the approved project plans without unnecessary delay.

g. Off-site streets are kept free of dirt and mud originating from the construction site. (Using sweeping, not flushing, in the streets and, if appropriate, on-site wheel wash facilities.)

h. Dust is controlled and is in compliance with the Puget Sound Clean Air Agency.

i. Contingency plans for controlling spills and other potential pollutants have been developed and are ready to implement at the construction site.

j. Work in Critical Areas conforms to requirements of the City's Critical Areas Ordinance (CAO). See Redmond Zoning Code 21.64 for additional information and definitions regarding Critical Areas.

k. 24-hour, 7-day-per-week point(s) of contact is/are designated who can call out and direct crews, obtain materials, and authorize immediate expenditures for on-site temporary erosion and sediment control (TESC) work.

l. Compliance exists with all project approval conditions and permits (including applicable non-City permits such as, but not necessarily limited to, the Hydraulics Project Approval from Washington State Department of Fish and Game and the Washington Department of Ecology NPDES Permit).

10.3 Special Requirements for Rainy-Season Work

There are two special requirements that apply specifically to rainy-season clearing and grading:

a. Project must have a City-approved Seasonal Suspension Plan for suspending work until the end of the rainy season if on-site TESC is found to be inadequate.

   A Seasonal Suspension Plan is a separate outline on the TESC PLAN that describes how the site is closed for the duration of the rainy season if directed by the City. Sites may be closed if they cannot meet the criteria for successful TESC outlined in Section 2. The Seasonal Suspension Plan must have sufficient detail to clearly define the work to be performed under this plan if it is implemented.

   The Seasonal Suspension Plan can include measures in the TESC Plan and /or additional BMPs. No site work is allowed under the Seasonal Suspension Plan in the rainy season except for work that is necessary to implement the measures in the TESC Plan and the Seasonal Suspension Plan.

b. Performance security must be provided in a manner acceptable to the City. Performance security will need to provide for monitoring (Level M2 minimum; discussed later in these General Standards), operation of TESC measures, implementation of the Seasonal Suspension Plan, and site restoration.

10.4 Rough Grading Permits

a. Note that a separate permit for clearing and grading may be issued in certain circumstances when such action could allow substantial clearing and grading work to be completed before the rainy season begins. This permit is called a "Rough Grade Permit." See Chapter 3 of the Stormwater Technical Notebook for requirements.

10.5 Explanation of the Rain-Season Clearing/Grading Matrix

Four factors are considered to classify sites and set standards for clearing and grading work during the rainy season:

a. Location of work areas as related to surface waters (streams and lakes) or wetlands and the buffers of these Critical Areas.
b. The slope of the land surface in the work areas. In some instances the direction of the slope relative to nearby surface waters or wetlands is also a factor.
c. The actual soils in the work area expressed as Soil Conservation Service (SCS) Soil Hydrologic Groups designations (A, B, C, or D) (Table 10.1).
d. Amount of land that is disturbed, considering both the cleared area and volume of earth to be moved.

10.5.1 Location(s) of Work Area(s)

For purposes of these General Standards, the entire City of Redmond is classified into five (5) types of work areas.

Class 1 Work Areas: areas within the banks of a stream, in a lake, in a regulated wetland or on steep slopes (equal to or over 40 percent).

Class 2 Work Areas: areas that are the buffers of streams, lakes, regulated wetlands, or steep slopes.

Class 3 Work Areas: areas within the current conditions 100-year frequency floodplains of major streams or lakes but outside the buffers of the stream or lake (the Sammamish River, Bear Creek, Evans Creek, and Lake Sammamish).

Class 4 Work Areas: areas that have "potential hydraulic influence" on a stream, lake, or regulated wetland (See glossary section regarding this term).

Class 5 Work Areas: consist of all other areas not included in any of the previous four (4) areas.

Work areas are further defined and sub-divided in Table 10.2.

10.5.2 Slope of the Land Surface

This factor refers to the general slope of the land in and immediately adjacent to a work area. The slope used in these General Standards generally refers to the steepest gradient before work or during work, prior to final cover.

Slopes are considered in categories as shown in Table 10.2. The percent of slope is the vertical rise divided by the horizontal run between two points on the ground surface (measured in the steepest direction) multiplied by 100.

10.5.3 Soil(s)

This document is based on soil hydrologic groups as defined by the United States Soil Conservation Service (SCS):

Group A (Low runoff potential). Soils having high infiltration rates even when thoroughly wetted. These consist chiefly of deep, well-to-excessively drained sands or gravels. These soils have a high rate of water transmission in that water readily passes through them.

Group B Soils having moderate infiltration rates when thoroughly wetted. These consist chiefly of moderately deep-to-deep, moderately well-to-well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Group C Soils having slow infiltration rates when thoroughly wetted. These consist chiefly of soils with a layer that impedes downward movement of water or soils with moderately fine-to-fine texture. These soils have a slow rate of water transmission.

Group D (High runoff potential) Soils having very slow infiltration rates when thoroughly wetted. These consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.

Group A soils have high infiltration capacity in their natural locations because they are associated with permeable underlying geology. In these guidelines, a work area is considered to have Group A soils only if the underlying geology is highly permeable (to a depth of at least 6 feet below the elevation of the lowest project excavation) and only Group A material is used in any filling.

A site's soil types must be determined by a qualified professional engineer based on field observations, borings, and test pits at the site. For reference, Table 10.1 shows hydrologic groups for various soils found in the SCS Soil Survey for King County.

10.5.4 Amount of Land Disturbed

The area disturbed is measured in acres and includes all land area that will be cleared at any one time. An area is considered cleared or disturbed until it has the final permanent cover as shown in approved project plans.

Permanent cover can include: final landscaping; buildings (at least to pad or first floor stage); and walkways, parking, and roadways (at least to first lift of compacted gravel sub-base or equal).

For some projects, project phasing can be part of the TESC Plan so the amount of land disturbed at any one time is reduced (see Table 10.2 to determine how disturbed area can affect requirements for a site).

The volume of material to be moved on a site is also a factor in setting standards. The volume of material to be moved is measured in cubic yards, independent of site area.

10.6 How to Use the Rainy-Season Clearing/Grading Matrix

Table 10.2 classifies sites, determines if clearing/grading work can occur in the rainy season, determines the level of TESC required, and determines the level of monitoring required. Table 10.3 defines the four (4) levels of TESC shown in Table 10.2. Table 10.4 defines the three (3) levels of monitoring shown in Table 10.2.

To use Table 10.2, it is recommended that this document be reviewed to understand site factors and other issues related to rainy-season work. For specific projects, start with the first page of Table 10.2. If any part of the proposed rainy-season work area is in a Class 1 area, then the entire rainy-season work area must comply with requirements for the Class 1 area.

If none of the proposed rainy-season work area is in a Class 1 area, do the same review using the second page of Table 10.2. Continue through the table until the proposed rainy-season work area is shown in the table. That point in the table defines the class for the proposed work.

Once the work area class is found, Table 10.2 shows whether or not work can be undertaken in the rainy season and if so, what levels of TESC and monitoring are required.

10.6.1 Temporary Erosion and Sediment Control (TESC) Levels

Table 10.2 requires different levels of TESC for different site circumstances. The TESC Levels are defined in Table 10.3. Level TESC-1 is the most basic level and Level TESC-4 is to be used in critical or sensitive situations. The levels of TESC effort shown in Table 10.3 specify the nature of the TESC Plan and:

- The expertise involved in preparation of the TESC Plan.
- The expertise and experience of the TESC implementation team (during project construction).

Moving large volumes of earth is also a factor in determining the TESC Level required. If rainy-season work involves large quantities of earthwork (over 10,000 cubic yards, as a general threshold), then Level TESC-3 is the minimum required.

As experience is obtained by the City concerning TESC-3 and TESC-4 levels, additional guidance will be added to this document.

10.7 Project Planning Implications

These standards are intended to protect surface and ground water quality and fisheries resources during construction and keep streets in the vicinity of construction sites safe, free of dirt and mud.

Almost all construction sites have the potential to adversely affect water quality and the safety of nearby streets. Such potential greatly increases in the rainy season. It is this increased potential that led to formulation of these general standards for rainy-season work.

The best general strategies to avoid the risks associated with rainy-season work are:

Strategy One: Plan projects so that major, if not all, site work is done in the dry season.

Strategy Two: Plan projects so the site work is phased, if rainy-season work is to be pursued. Work phasing can be applied in two ways as related to these general standards.

First, if part of the site is in an area where work would not generally be allowed during the rainy season, a proposed rainy-season work plan might exclude the site work that cannot be constructed in the rainy season.

Second, project phasing may be used as a general strategy to reduce the area of bare earth exposed at any one time during the rainy season. Such project phasing can reduce costs and land area required for the more complex TESC measures. This approach can reduce the scope and costs (including bonding) for implementation of the Seasonal Suspension Plan.

Even with phasing, some work areas pose such a risk to water quality and fisheries resources that they are not suitable for rainy-season work. These standards identify such work areas.

These standards also identify work areas that pose a high risk but one that can be reduced by using exceptional temporary erosion and sediment control (TESC) measures. Further guidance is provided in this document.

Even lower risk sites need to carefully plan and implement TESC measures in the rainy season.

10.7.1 General Project Planning Stage

a. The City has significant limitations and conditions regarding clearing and grading work in the rainy season. Is there any way that this project can be scheduled to

conduct all clearing and grading activities in the dry weather? This will expedite permitting and reduce the cost of erosion control measures during construction.

b. Can work avoid Critical Areas altogether? A project that avoids or at least minimizes work in Critical Areas also avoids or minimizes permitting issues related to Critical Areas.

c. Can work be phased? This strategy is discussed above.

10.6.2 Monitoring Requirements

Table 10.2 requires different levels of monitoring for different site circumstances. The three (3) levels of monitoring are defined in Table 10.4. The monitoring relates to inspection of the TESC measures and to monitoring of site runoff and receiving waters for turbidity levels. Portable, electronic turbidity meters are required TESC tools for Contractors working in this area.

If monitoring or other inspections lead to a determination that the TESC measures are not adequate to meet the standards outlined in Section 2, the City may stop work on the entire project and issue further direction. The developer must take actions that are necessary (subject to City approval) to meet the TESC criteria listed in Section 2. Such actions may include compliance with the approved TESC Plan, preparation of an improved TESC plan, suspension of work during the rainy season, or other actions depending on the situation.

10.7.2 Preliminary Design and Application Stage

a. If site work is allowed in the rainy season under these general standards, what levels of TESC and Monitoring will be required? See Tables 10.2, 10.3, and 10.4.

b. If state-of-the-art TESC-4 is required, what notifications need to be included in the SEPA documents to allow such TESC options to be used?
Note: If chemical treatment options for TESC may be required, this option must be included in the SEPA Environment Checklist (or EIS) for the project. It is possible to amend a SEPA determination at a later date to add the chemical treatment options but initial disclosure is preferable and saves time for the applicant.

c. Are appropriate TESC planning and implementation team members and those with monitoring expertise being brought into the design process?
Note: For sites and projects requiring only TESC-1 or TESC-2 levels, the specialized expertise of the team may be less critical. For TESC-3 and TESC-4 levels, the composition, knowledge, and experience of the team will be a major consideration in allowing rainy-season work. See Table 10.3 for requirements regarding team participants.

d. Is adequate scheduling, including lead times, being included to involve the City staff in TESC issues?
Note: The TESC-1 and TESC-2 levels require a minimum of City staff involvement in addition to normal project review activities. However, TESC-3 and TESC-4 require additional review by City staff. Joint meetings will likely be needed. As the rainy season

approaches in each year, demands for City staff time can increase to the point where scheduling involves significant lead time. Please plan ahead if rainy-season work is a possibility.

10.7.3 Project Approval Stage

As part of the City's initial, written preliminary approval for a project, the Rainy-Season Classification will be included.

The City's classification may be appealed based on specific issues of fact or the project's context. Appeals may be submitted only after the written preliminary project approval is issued. Appeals are submitted as described in Paragraph 10.9.

10.7.4 Construction Documents Stage

As construction documents are being developed, it is imperative to apply the expertise of appropriate team members. For most sites, rainy-season TESC will involve significant costs. The TESC measures and their costs are an inherent part of rainy-season work. The design team needs to produce high-quality TESC plans for projects to proceed in the rainy season.

10.7.5 Pre-Construction Stage

The main interaction with the City in this stage is the Pre-Construction Meeting. This meeting needs to include members of the TESC and monitoring, planning and implementation team including contractors and sub-contractors. The contractor doing the clearing and grading work must attend.

If appropriate parties are not represented at the Pre-Construction Meeting, the City may cancel that meeting and require it to be rescheduled.

10.7.6 Construction Stage

The construction stage is the critical stage. It is the responsibility of the developer to meet the standards outlined in Paragraph 10.3 of this chapter. (If the approved plan is not sufficient, the developer must take actions to propose and, after approval by the City, implement additional measures.)

If the revised and improved erosion/sediment control plan is found to be inadequate and work is again ordered stopped, then the following shall be required:

A. If it is the rainy season, work will be suspended until the end of the season (until April 30th, or later if weather conditions warrant, and work shall not continue beyond October 1st or earlier if weather conditions warrant).
B. A revised plan shall be required to be submitted to the city public works department. Once approved, work can continue between April 30th and October 1st.
C. An on-site, full-time erosion control inspector (provided by developer) shall be required to monitor all work involving land disturbance. All costs for this inspector shall be paid

by the contractor. The inspector shall provide weekly reports to the city regarding all clearing and grading work; monitor all erosion control features; and be a direct contact for the city inspectors.

It is the TESC standards—not just the measures on the approved plan—that must be achieved.

If TESC (including monitoring) is not being successfully addressed, the City may take action ranging from "Notices of Correction" to "Stop Work Orders" that apply to the whole project including all trades and activities. The 'Stop Work Order' can apply for the entire rainy-season duration and can require implementation of the Seasonal Suspension Plan.

The construction stage does not end under these general guidelines until all disturbed earth surfaces are covered with the final, permanent cover as shown on approved project plans.

10.8 Appeals: Wet Weather Committee

After the City has issued the initial written approval or disapproval for a project (which will include the classification of the site and project under these general standards) an appeal may be made based on issues of fact and/or the project's context.

Appeals are to be submitted to the Development Services Division and will be considered by the Wet Weather Committee. The Wet Weather Committee is composed of one representative from each of the following divisions of the Public Works Department:

- Construction Division
- Development Services Division
- Natural Resources Division

Appeals must be in writing (five copies) and must include clearly organized supporting data developed by well-qualified professionals for all key points.

Upon reviewing written appeals, the Wet Weather Committee may take one of six (6) actions:

- Determine that inadequate or insufficient information has been provided or that information was not developed by appropriate, well-qualified professionals. (The appeal will be returned without action and additional details may or may not be included.)
- Approve the appeal.
- Approve the appeal with conditions.
- Deny the appeal.
- Deny the appeal but include information that could be addressed so as to warrant reconsideration.
- Request additional information.

For sites that require an NPDES permit from the State Department of Ecology, initial review(s) of appeals may be made by the Wet Weather Committee but final approval for rainy-season work will require submittal of the NPDES Permit.

For sites that require an HPA from the Washington State Department of Fish and Wildlife, a copy of the state-approved HPA must be submitted with an appeal to the Wet Weather Committee.

Table 10.1
Hydrologic Groups for Area Soils*

SCS Symbol	SCS Soil Name	SCS Hydrologic Group
Ag	Alderwood gravelly sandy loam	C
Be	Beausite gravelly sandy loam	B
Bh	Bellingham silt loam	C
Br	Briscot silt loam	B
Bu	Buckley silt loam	B/C
Ea	Earlmont silt loam	B/C
Ed	Edgewick fine sandy loam	B
Ev	Everett gravelly sandy loam	B
In	Indianola loamy fine sand	A
Kp	Kitsap silt loam	C
Ks	Klaus gravelly loamy sand	A
Ne	Neilton very gravelly loamy sand	A
Ng	Newberg silt loam	B
Nk	Nooksack silt loam	B
No	Norma sandy loam	B
Or	Orcas Peat	D
Os	Oridia silt loam	C
Ov	Ovall gravelly loam	C
Pc	Pilchuck loamy fine sand	A
Pu	Puget silty clay loam	C
Py	Puyallup fine sandy loam	B
Ra	Ragnar fine sandy loam	B

*Compiled from Soil Conservation Service information that applies to King County.

** Note: The terms Outwash and Till are used frequently. “Outwash” soils are A/B soils. “Till” soils are C/D soils.

Table 10.2 Rainy-Season Clearing / Grading Matrix[1] Work Located in Critical Areas				
Area Class[2]	**Description[3]**	**Surface Slope**	**Soil Group**	**Work in Rainy Season, General Guidance** (Guidance may be modified or waived during City-designated emergencies)
1a	• Within the Ordinary High Water mark of a stream (all stream classes) • Within a lake • Within a regulated wetland (all wetland classes) • On steep slopes (equal to or greater than 40 percent)	All	All	No work in rainy season

[1] Decisions for a specific project regarding work in the rainy season may be appealed to the Public Works Department's "Wet Weather Committee." Contact the Engineering Division for details. For TESC Levels and Monitoring Levels see Tables 3 and 4, respectively.

[2] "Area Classes" are labels used to identify sub-parts of a project site that meet the descriptions presented in this table.

[3] See Redmond's Critical Areas Ordinance (RZC 21.64) for additional definitions and information regarding streams, lakes, wetlands, and buffers. "Artificially Created Wetlands" as mitigation to maintain wetland resources are to be treated as closest wetland type.

Table 10.2 - Continued Rainy-Season Clearing / Grading Matrix[1] Work Located in Critical Area Buffers				
Area Class[2]	**Description[3]**	**Surface Slope**	**Soil Group**	**Work in Rainy Season, General Guidance** (Guidance may be modified or waived during City-designated emergencies)
2a	Buffers associated with: • Class I Streams • Class II Streams where native fish are present or could be present during the construction time • All classes of regulated wetlands • The area within 25 feet of Lake Sammamish Ordinary High Water (elevation 27, City Datum) • The area within 15 feet of steep slopes (those equal to or greater than 40 percent)	All slopes less than 40 percent	All	No work in rainy season
2b	Buffers associated with: • Class II Streams not included in 2a above • Class III Streams • The area within 5 feet of Class IV Streams	Ground slopes away from stream (at slope of at least 5 percent at all times before, during, and after project construction) or work area is isolated from stream by dike or equal; slopes less than 40 percent	All	Work Possible if: • TESC-3 or TESC-4 Plan (as directed by City); M3 monitoring • Separation of work from 100-year stream flows • Restoration/mitigation and performance assurances are approved by City
2c		All other ground slopes less than 40 percent	All	No work in rainy season

Table 10.2 - Continued Rainy-Season Clearing / Grading Matrix[1] Work Located in Major Floodplain (Outside Buffers)				
Area Class[2]	**Description[3]**	**Surface Slope**	**Soil Group**	**Work in Rainy Season, General Guidance** **(Guidance may be modified or waived during City-designated emergencies)**
3a	Within the current 100-year FEMA Floodplain but outside of stream buffers and wetland buffers (all stream classes, and wetland types)	Ground slopes away from stream (at slope of at least 5 percent at all times before, during and after project construction) or work area is isolated from stream by dike or equal; slopes less than 40 percent	All	Work Possible if: • TESC-3 Plan minimum; M3 monitoring • Separation of work from 100-year stream flows • Restoration/mitigation and performance assurance are approved by City
3b		All other ground slopes less than 40 percent	All	No work in rainy season (unless the work area has been isolated from current 100-year frequency flood flows)

Table 10.2 - Continued Rainy-Season Clearing / Grading Matrix[1] Work Located in "Hydraulic Influencing" Areas				
Area Class[2]	**Description[3]**	**Surface Slope**	**Soil Group**	**Work in Rainy Season, General Guidance (Guidance may be modified or waived during City-designated emergencies)**
4a	Potential hydraulic influence;[4] disturbed area for entire project is less than ¼ acre	All slopes less than 40 percent	A	Work possible with: • TESC-1 • M1 monitoring
4b			All other soils (B, C, and D)	• TESC-2 • M1 monitoring
4c	Potential hydraulic influence;[4] two or more phases used so maximum disturbed area does not exceed ¼ acre at any one time	All slopes less than 40 percent	A	Work possible with: • TESC-3 • M1 monitoring
4d			All other soils (B, C, and D)	• TESC-3 • M2 monitoring
4e	Potential hydraulic influence;[4] disturbed area(s) over ¼ acre	All slopes less than 40 percent	A	Work possible with: • TESC-3 • M2 monitoring
4f			All other soils (B, C, and D)	• TESC-3 minimum; TESC-4 approved and ready to implement at site • M3 monitoring

[4] Potential Hydraulic Influence means surface runoff from the site would follow an identifiable conveyance route to a surface water or regulated wetland and would not be infiltrated enroute.
Disturbed areas less than ¼ acre typically include:

- Trenching/backfill operations
- Berm construction/cover work
- Small sites, including single family homes
- Large sites where work can be phased so as to create only a small disturbed area at any one time.
  TESC Plans for disturbed areas in Area Classification 4a, 4b, 4c, and 4d must provide methods to cover all disturbed areas and temporarily cease work during rainfall.

Table 10.2 - Continued Rainy-Season Clearing / Grading Matrix[1] Work Located in Other Areas				
Area Class[2]	**Description[3]**	**Surface Slope**	**Soil Group**	**Work in Rainy Season, General Guidance (Guidance may be modified or waived during City-designated emergencies)**
5a	Areas not included in previous types with disturbed area of 1 acre or less	0-10% slope	All	Work possible if: • TESC-2 plan minimum; M1 monitoring
5b		Slopes over 10%, but less than 40%	All	Work possible if: • TESC-2 plan minimum; M2 monitoring
5c	Areas not included in previous types with disturbed area over 1 acre	0-10% slope	Group A Soils	Work possible if: • TESC-2 plan minimum; M1 monitoring
5d			Group B, C, or D Soils	Work possible if: • TESC-3 plan minimum; M2 monitoring
5e		Slopes over 10%, but less than 40%	All	Work possible if: • TESC-3 minimum; TESC-4 approved and ready to implement at site; M2 monitoring

Table 10.3 TESC Requirements[5]			
TESC Level Number	**Recommended Participants in TESC Plan**	**TESC Plan General Formulation and Features (Note: Seasonal Suspension Plan required for all TESC Levels)**	**TESC Implementation Team (during construction)**
TESC-1	• Applicant's Engineer	Focus is on standard, common BMPs for site and project type. General sequencing list required.	Designated contractor or sub-contractor[6]
TESC-2	• Applicant's Engineer • Applicant's Project Manager • Designated Contractor or Sub-Contractor for TESC[6]	Focus is still on standard BMPs. Written summary required outlining how TESC is to be addressed through main construction phases. More detailed sequencing info on plan.	Designated contractor or sub-contractor with documented experience[7]
TESC-3	• Applicant's TESC Engineer(s) • Applicant's Project Manager • General Contractor • Designated Contractor or Sub Contractor[6] for TESC • Grading Contractor • City's Stormwater Engineer • City's Construction Inspector	Plan content similar to Level TESC-2, above. More attention to all aspects of plan from conceptual to practical considerations included by team during plan formulation so as assure successful TESC.	Designated contractor or sub-contractor(s)[6] with Level TESC-3 experience[7]
TESC-4	Same as Level TESC-3 plus: • Representative from City's Natural Resources Division	Same as Level TESC-3 but will include state-of-art stormwater treatment systems, currently including chemical/filtration systems and such systems as "electrofloc".	Designated contractor(s) or sub-contractor(s) with Level TESC-4 experience[7]

[5] Projects moving over 10,000 cubic yards of earth require TESC-3 or TESC-4.
[6] Designated 24-hour, 7-day-per-week contact list is required.
[7] TESC Contractor must document prior experience in TESC at level designated. For Level 4, TESC Contractor must document experience in chemical treatment and latest mechanical TESC methods (even if they are not initially included in TESC Plan).

Table 10.4 Monitoring Requirements[8]			
Monitoring Level	**Turbidity Monitoring[9]**		
	Monitoring to be by	**Monitoring What and When**	**Frequency[10]**
M1	• Contractor or sub-contractor acceptable to City	• Monitoring of surface runoff whenever it is leaving the work area	• Frequency and details as directed by City; adjusted as project proceeds
M2	• City-approved contractor • Supplemental verification, if directed by City, by third party to be approved by City and hired by Developer	• Monitoring of surface runoff whenever it is leaving the work area • Monitoring of receiving waters (if applicable) if and when directed by City	• Surface runoff to be monitored at least twice per day • Receiving waters to be monitored immediately after surface runoff monitoring
M3	• Monitoring to be done by City-approved "third party" hired by Developer • If so specified, monitoring shall be done by "third party" hired by City and paid for by Developer's advance deposit of funds	• Monitoring of surface runoff whenever it is leaving the work area • Monitoring of receiving waters whenever surface runoff is leaving site and is reaching the receiving waters	

[8] For all three (3) Monitoring Levels, the minimum inspection frequency of all of the TESC measures shall be:

- After each day of site work (but not less than 3 times per week even if no site work has occurred)
- After each storm
- Twice per day during storms; more frequently if directed by City

[9] TESC Contractor must have portable, electronic turbidity meter. At all monitoring levels, a log is to be kept on-site by the TESC Contractor showing monitoring dates, times, locations, weather conditions, estimated discharge rates, monitoring readings, name(s) of those doing the monitoring and equipment used.

[10] Frequencies listed are minimum frequencies. More frequent monitoring including continuous monitoring during heavy storms may be required.

GLOSSARY

Clearing - The removal of timber, brush, grass, ground cover or other vegetative matter from a site which exposes the earth's surface or any actions which disturb the existing ground surface.

Engineer - A professional engineer licensed by the State of Washington, who is qualified to practice those aspects of engineering reviewed in Chapter 15.24 RMC, Clearing, Grading and Storm Water Management. (Ord. 1877 (75))

Existing grade - The land surface elevation prior to grading. (Ord. 1877 (95))

French drains - Perforated storm drain pipes used to collect water underground. (Ord. 1877 (97))

Grading - Any action which changes the elevation of the ground surface. Grading includes, but is not limited to, dredging, landfills, excavations, filling, earthwork, embankments, etc.
NTU - The letters "NTU" stand for Nephelometric Turbidity Units. These units are a quantitative measure of water clarity based on the scattering of a standard beam of light directed into a standard sample of the water. A higher reading means the sample is less clear (more cloudy/muddy). See also the definition for turbidity.

Outwash Soils - Streams flowing from glaciers deposited outwash soils. Water of varying speeds deposits particles of different sizes, sometimes resulting in distinct layers of gravel, sand, and rock in the soil profile. Usually, glacial outwash soils drain rapidly and have low organic matter content. Soils formed from highly permeable sands and gravels. SCS Hydrologic Soil Group A/B soils may be considered Outwash Soils for the purposes of this manual.

Potential hydraulic influence - Surface runoff from the project would follow an identifiable conveyance route to surface water (including wetlands) and would not be infiltrated en-route.

Quality Control Systems - Stormwater facilities that are intended to reduce the pollutants in runoff. (Ord. 1877 (157))

Quantity Control Systems - Stormwater management facilities that are intended to reduce the rate of runoff. (Ord. 1877 (159))

Rainy season - The period of time starting on October 1 of each year and ending April 30 of the following year. These dates may be adjusted by the Public Works Director based on climatic conditions for a particular year.

Restoration - The re-establishment of the land characteristics and ecological values to pre-development conditions that were lost by alteration, development or catastrophic events. (Ord. 1954; Ord. 1877 (165))

Rough Grading - The stage at which the grade is modified to approximately conform to the proposed final grade. It is a prelude to and shall be based on a known development proposal. (Ord. 1877 (190))

Speculative Clearing and Grading - Clearing or grading without an approved viable site development concept, consisting of a site layout and other appropriate documents, as determined by the City's Technical Committee.

Stormwater Capital Improvement Plan - The Stormwater Capital Improvement Plan is a six-year plan of capital improvements, including facilities, programs, projects necessary to serve the current and future stormwater needs of those who live and work in Redmond. The CIP is a six-year financial planning document of City revenues and expenditures for those improvements.

Stormwater Engineer -The Stormwater Engineer is the reviewing authority who reports to the Public Works Director and represents the City for projects that involve stormwater management. City of Redmond Capital Improvement Projects are reviewed by a Stormwater Engineer within the Natural Resources Division of the Public Works Department. All other public or private projects are reviewed by a Stormwater Engineer in the Development Services Division of the Public Works Department.

Till Soils - A layer of poorly sorted soil deposited by glacial action that generally has very low infiltration rates. SCS Hydrologic Soil Group C/D soils may be considered Till Soils for the purposes of this manual.

Turbidity - The visual cloudiness of runoff, especially as caused by suspended solids and settle-able solids in runoff. Turbidity shall be measured as specified in Method 2130-B of the following reference:

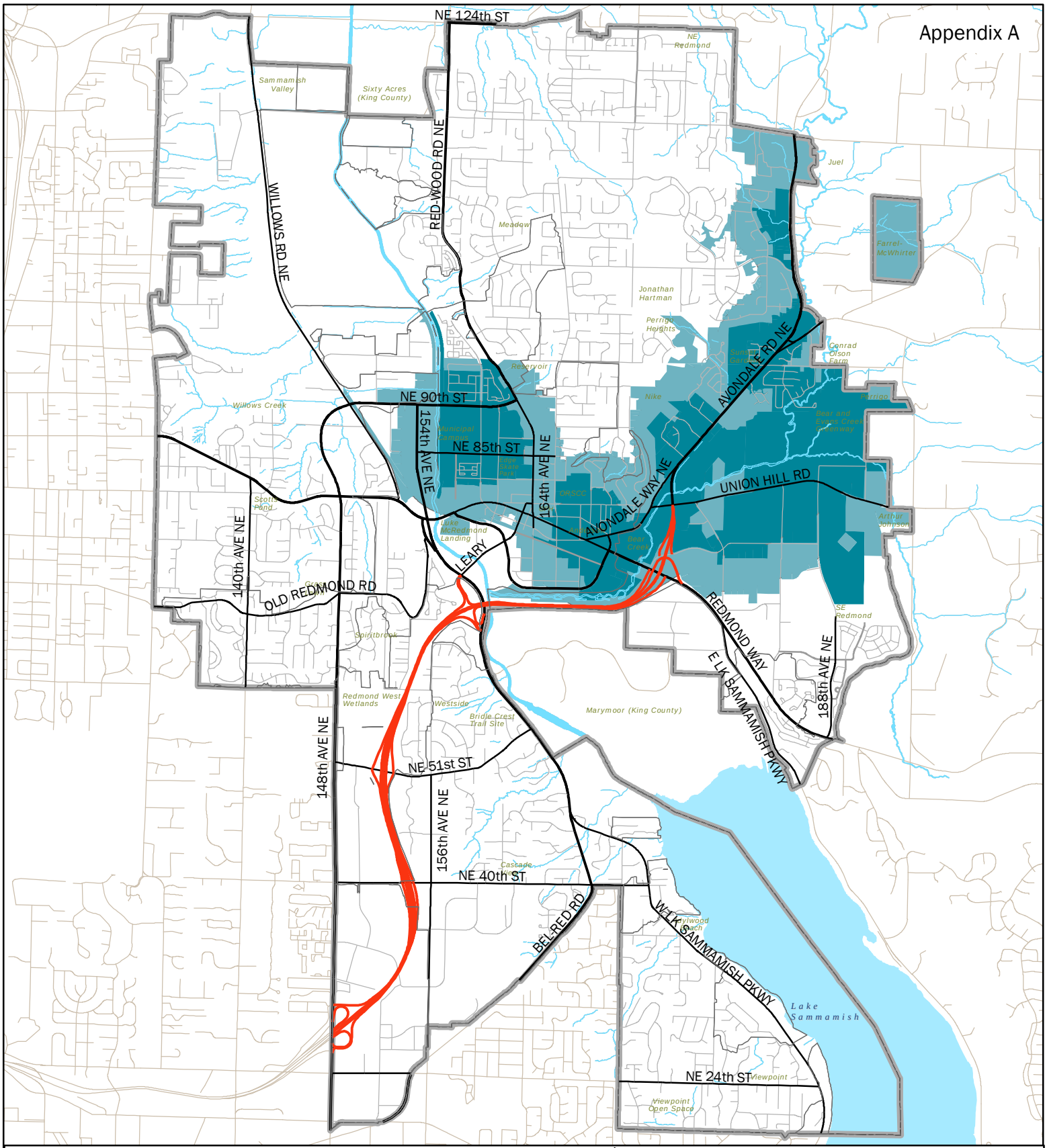
> Standard Methods for the Examination of Water and Wastewater. Current Edition. Franson, Mary Ann H., Managing Editor. Clesceri, Lenore S; Greenberg, Arnold E; and Eaton, Andrew D editorial board. Published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation.

Turbidity Meter - A portable, electric, hand-held measuring device designed to give a numerical value of the turbidity (cloudiness) of a sample of water. The numerical values are expressed in units known as Nephelometric Turbidity Units (NTUs).

APPENDIX A

WELLHEAD PROTECTION ZONES

Appendix A



Wellhead Protection Zones

City of Redmond, Washington

08/10/2016

Disclaimer: This map is created and maintained by GIS Services Group,Finance and Information Services, City of Redmond, Washington, for reference purposes only. The City makes no guarantee as to the accuracy of the features shown on this map.

N

0 0.5 1 Miles

Wellhead Zone 1

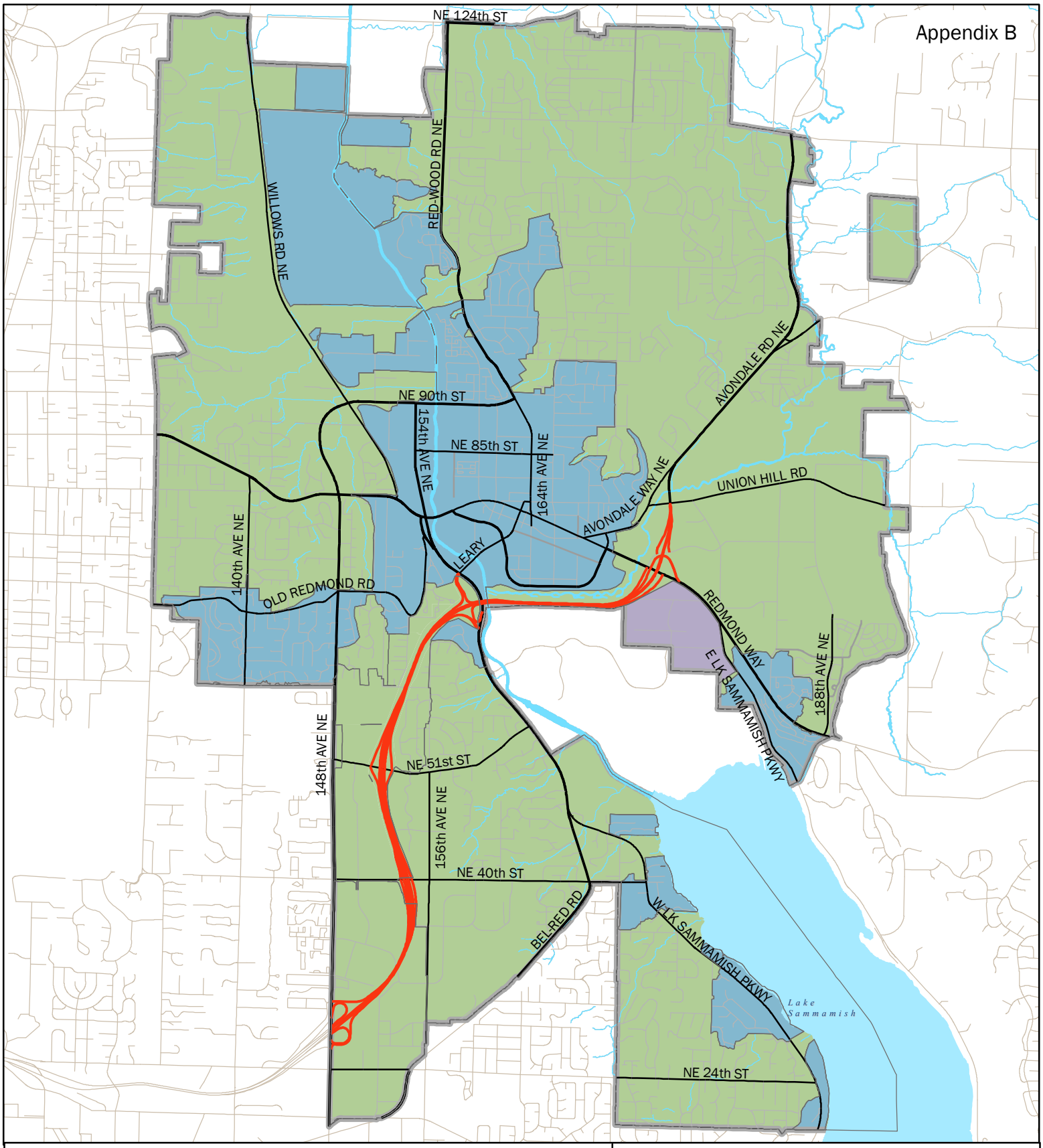
Wellhead Zone 2

File Name:Q:\Q:\NRDivision\NRFunctions\04MappingGISDatabase\SECTION

APPENDIX B

MINIMUM REQUIREMENT 5 MAP

Appendix B



MR 5: Onsite Stormwater Management Custom Areas

City of Redmond, Washington

03/01/2017

Disclaimer: This map is created and maintained by GIS Services Group,Finance and Information Services, City of Redmond, Washington, for reference purposes only. The City makes no guarantee as to the accuracy of the features shown on this map.

N

0 0.5 1 Miles

- Standard LID
- Flow Control Exempt
- Marymoor - 100% Infiltration

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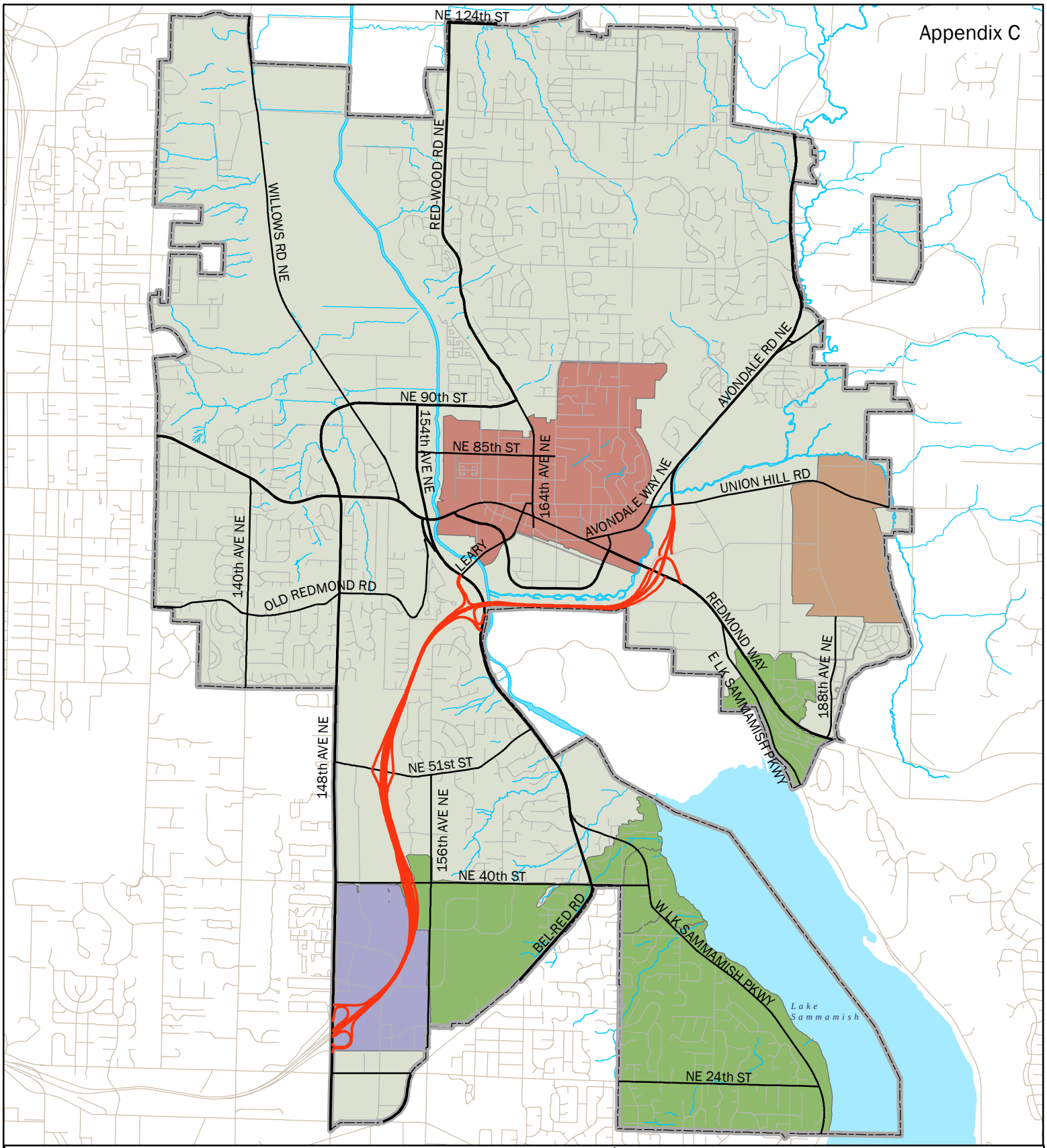
APPENDIX C

MINIMUM REQUIREMENT MAP 6

Appendix C



MR 6: Runoff Treatment Custom Areas

City of Redmond, Washington

08/10/2016

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N

0 0.5 1 Miles

- Downtown Regional Facility Surcharge Area
- Overlake Regional Facility Surcharge Area
- Phosphorous Control
- SE Redmond
- Basic or Enhanced

Note: Oil/water separator applies where required city wide

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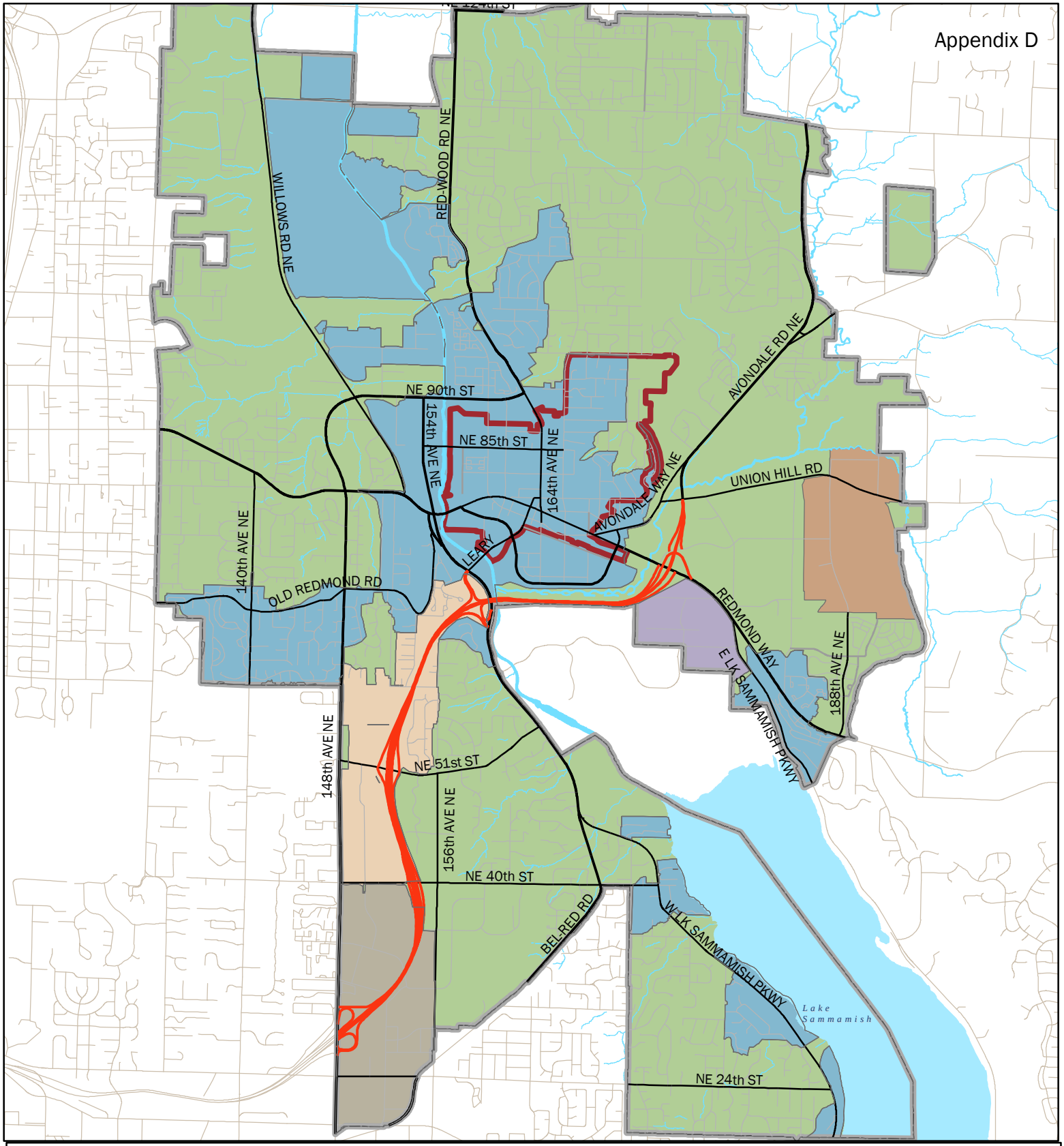
APPENDIX D

MINIMUM REQUIREMENT MAP 7

Appendix D



MR 7: Flow Control Requirements Custom Areas

City of Redmond, Washington

08/10/2016

Disclaimer: This map is created and maintained by GIS Services Group,Finance and Information Services, City of Redmond, Washington, for reference purposes only. The City makes no guarantee as to the accuracy of the features shown on this map.

0 0.5 1 Miles

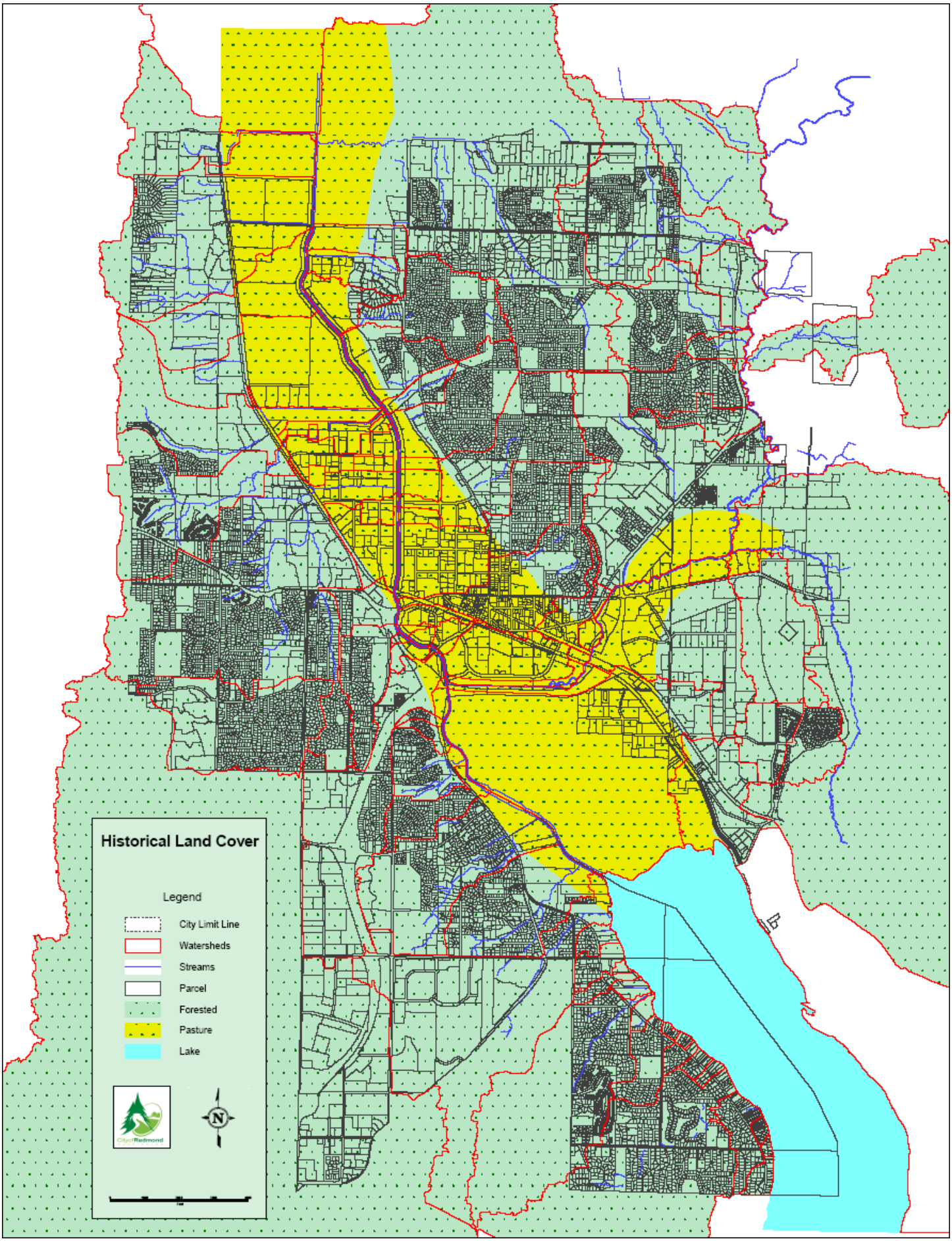
N

- Downtown Regional Facility Surcharge Area
- SE Redmond
- 520 Drainage Basin
- Flow Control Required
- Flow Exempt
- Overlake Regional Facility Surcharge Area
- Marymoor - 100% Infiltration

File Name:Q:\Q:\NRDivision\NRFunctions\04MappingGISDatabase\SECTION

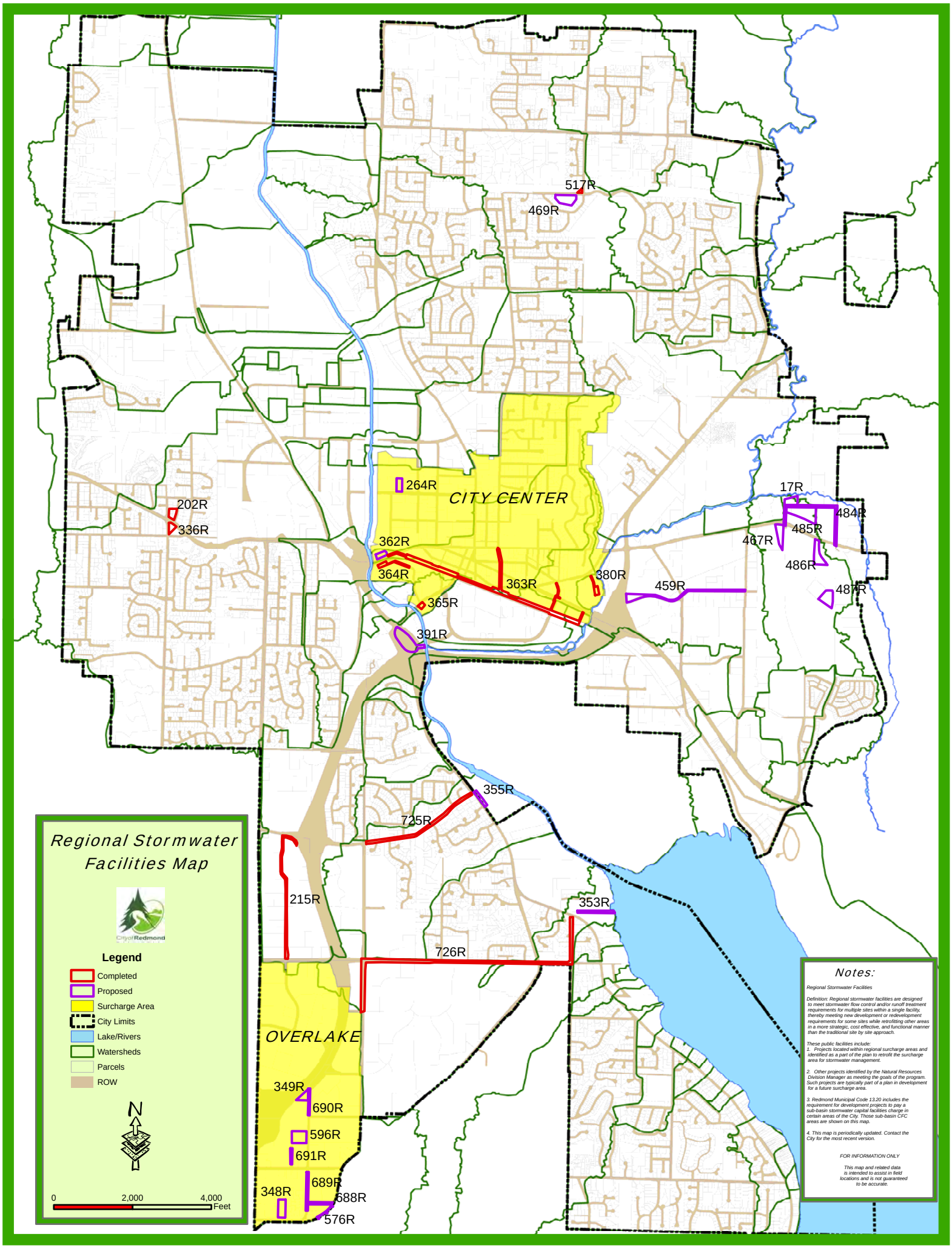
APPENDIX E

MAP OF HISTORICAL LAND COVER


Historical Land Cover
Legend
City Limit Line
Watersheds
Streams
Parcel
Forested
Pasture
Lake
N

APPENDIX F

REGIONAL FACILITIES MAP


Regional Stormwater Facilities Map
City of Redmond
Legend
Completed
Proposed
Surcharge Area
City Limits
Lake/Rivers
Watersheds
Parcels
ROW
N
0
2,000
4,000
Feet
CITY CENTER
OVERLAKE
517R
469R
264R
202R
336R
362R
364R
363R
380R
365R
391R
459R
17R
484R
485R
467R
486R
487R
355R
725R
215R
353R
726R
349R
690R
596R
691R
689R
348R
688R
576R
Notes:
Regional Stormwater Facilities
Definition: Regional stormwater facilities are designed to meet stormwater flow control and/or runoff treatment requirements for multiple sites within a single facility, thereby meeting new development or redevelopment requirements for some sites while retrofitting other areas in a more strategic, cost effective, and functional manner than the traditional site by site approach.
These public facilities include:
1. Projects located within regional surcharge areas and identified as a part of the plan to retrofit the surcharge area for stormwater management.
2. Other projects identified by the Natural Resources Division Manager as meeting the goals of the program. Such projects are typically part of a plan in development for a future surcharge area.
3. Redmond Municipal Code 13.20 includes the requirement for development projects to pay a sub-basin stormwater capital facilities charge in certain areas of the City. Those sub-basin CFC areas are shown on this map.
4. This map is periodically updated. Contact the City for the most recent version.
FOR INFORMATION ONLY
This map and related data is intended to assist in field locations and is not guaranteed to be accurate.

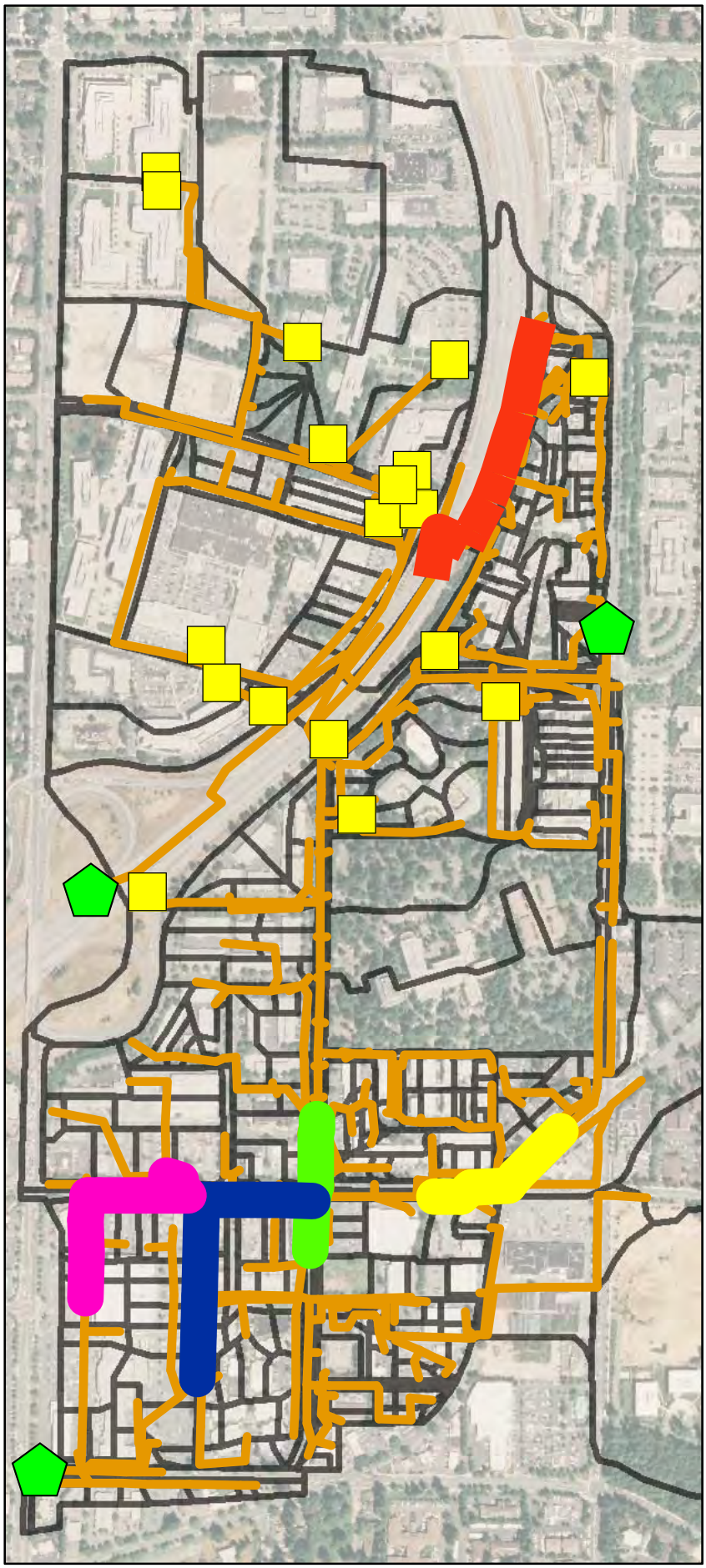
APPENDIX G

OVERLAKE STORMWATER INFRASTRUCTURE MAP

Overlake Facilities Plan Map

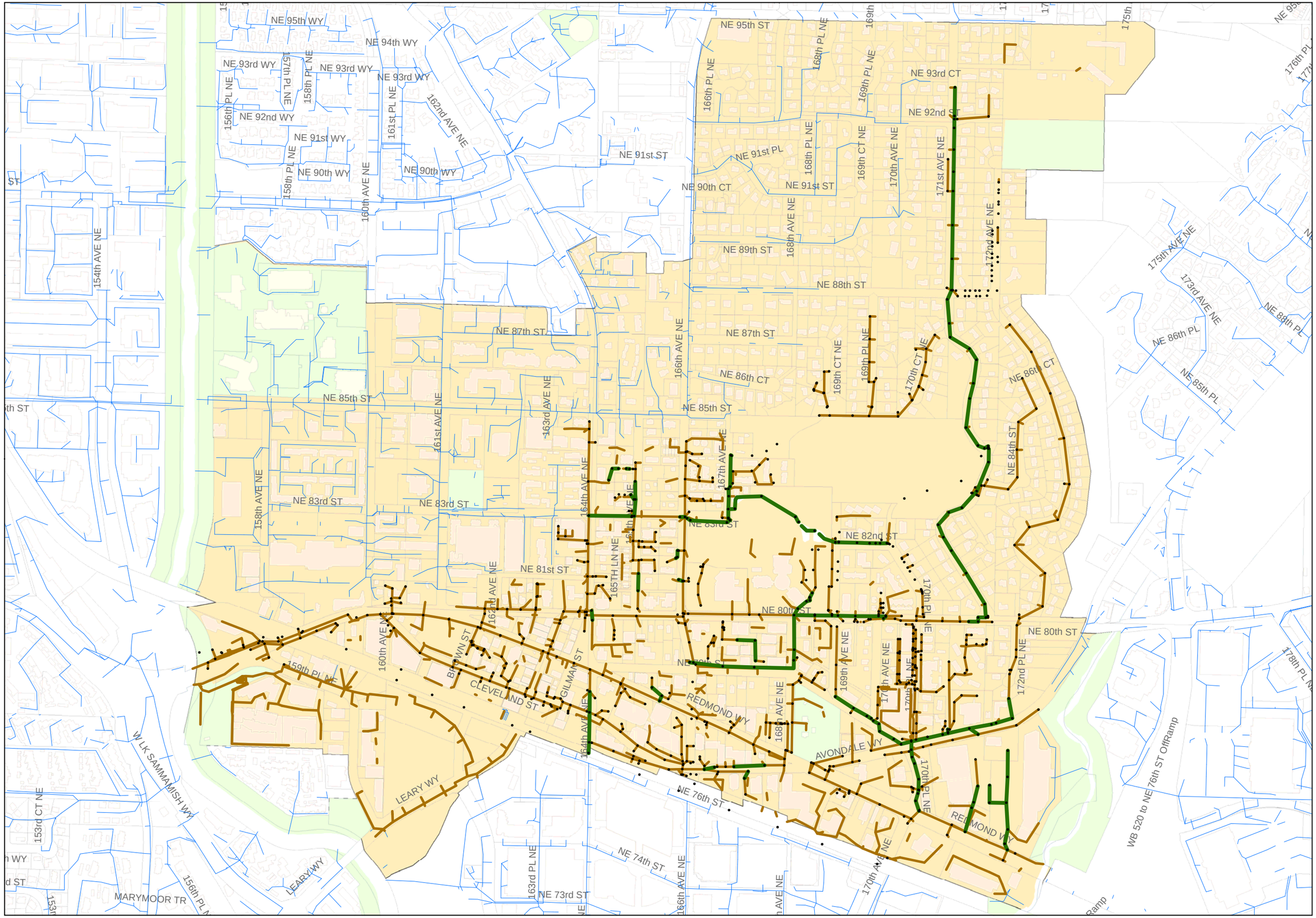
The City has a PCSWMM model of all pipes 12-inches or larger within the Overlake basin, represented in orange on the above map. The other colored areas represent potential trouble areas where flooding might occur under a 50-year flood event. The City has a consultant currently working on the design of three large regional stormwater facilities that are expected to resolve all of these issues. That design is expected to be completed in 2012.

Until the City finalizes this Overlake Facilities Plan Map, project proponents should contact the City to discuss their development application and determine how the proposed project may be impacted by the identified trouble spots. City staff believe that the trouble areas will be resolved by the proposed regional facilities.



APPENDIX H

DOWNTOWN STORMWATER INFRASTRUCTURE MAP



Legend

- Catch Basins
- Inadequate Pipe Capacity
- Adequate Pipe Capacity
- Pipes Not Studied
- Surcharge Area

N

0 250 500 750

Scale: 1" = 600'

Disclaimer: This map is created and maintained by the City of Redmond, for reference purposes only. The City makes no guarantee as to the accuracy or completeness of the features shown on this map.

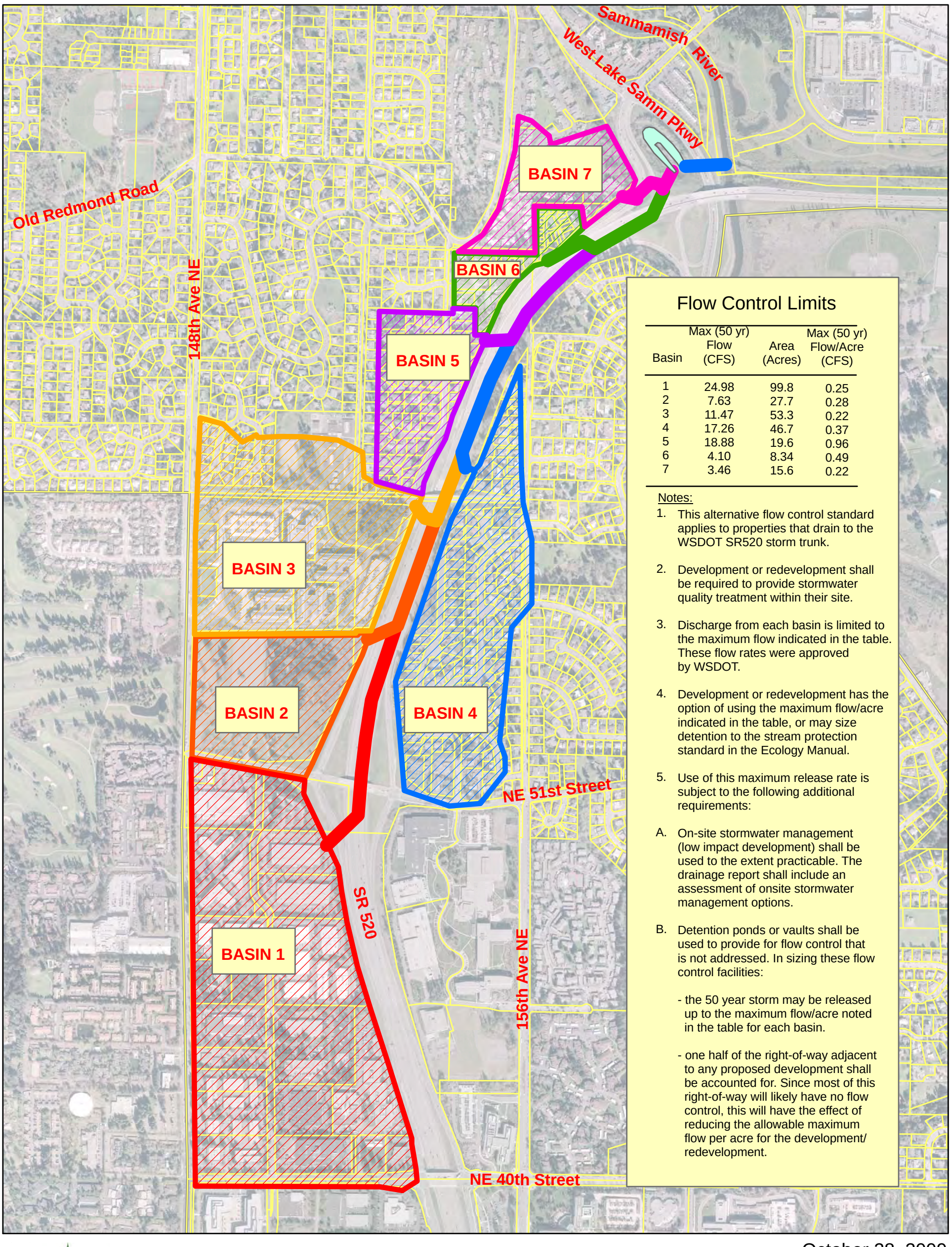
Draft Downtown Basin

NHCStormDowntown.mxd *Draft Date 02/22/2012*

APPENDIX J

NORTH OVERLAKE FLOW CONTROL STANDARD

CITY OF REDMOND PUBLIC WORKS
NORTH OVERLAKE DRAINAGE AREA
ALTERNATIVE FLOW CONTROL STANDARD



Flow Control Limits

Basin	Max (50 yr) Flow (CFS)	Area (Acres)	Max (50 yr) Flow/Acre (CFS)
1	24.98	99.8	0.25
2	7.63	27.7	0.28
3	11.47	53.3	0.22
4	17.26	46.7	0.37
5	18.88	19.6	0.96
6	4.10	8.34	0.49
7	3.46	15.6	0.22

Notes:

1. This alternative flow control standard applies to properties that drain to the WSDOT SR520 storm trunk.

2. Development or redevelopment shall be required to provide stormwater quality treatment within their site.

3. Discharge from each basin is limited to the maximum flow indicated in the table. These flow rates were approved by WSDOT.

4. Development or redevelopment has the option of using the maximum flow/acre indicated in the table, or may size detention to the stream protection standard in the Ecology Manual.

5. Use of this maximum release rate is subject to the following additional requirements:

A. On-site stormwater management (low impact development) shall be used to the extent practicable. The drainage report shall include an assessment of onsite stormwater management options.

B. Detention ponds or vaults shall be used to provide for flow control that is not addressed. In sizing these flow control facilities:

- the 50 year storm may be released up to the maximum flow/acre noted in the table for each basin.

- one half of the right-of-way adjacent to any proposed development shall be accounted for. Since most of this right-of-way will likely have no flow control, this will have the effect of reducing the allowable maximum flow per acre for the development/ redevelopment.

October 28, 2009

tyofRedmond
ASHINGTON

N
W E
S

0 360 720 1,440 2,160 2,880
Feet

APPENDIX K

TYPICAL DRAINAGE EASEMENT

Please Return To:
City of Redmond
Public Works Adm. MS: 4NPW
Attn: D. Wilson
P.O. Box 97010
Redmond, WA 98073-9710

WASHINGTON STATE COUNTY AUDITOR/RECORDER INDEXING FORM

Document Title(s) (*or transactions contained therein*):

EASEMENT

Reference Number(s) of Documents assigned or released:
Additional reference numbers on page ____ of document

Grantor(s): (*Last name first, then first name and initials*)
1.

☐ Additional names on page __ of document

Grantee(s): (*Last name first, then first name and initials*)
1. **REDMOND, CITY OF**

☐ Additional names on page __ of document

Legal Description: *(abbreviated form i.e. lot, block, plat name, section-township-range)*

Ptn

■ Additional legal on **Exhibit "A"** of document

Assessor's Property Tax Parcel Account Number(s):

City of Redmond Reference*:*

Project Number: Permit Number:

The Auditor/Recorder will rely on the information provided on the form. The staff will not read the document to verify the accuracy or completeness of the indexing information provided herein.

EASEMENT

THE GRANTOR(S), _____, a _____ _____, for Ten and no/100 Dollars ($10.00) or other valuable consideration, in hand paid, receipt of which is hereby acknowledged, conveys and grants to **CITY OF REDMOND** (Grantee), its successors and assigns, a permanent non-exclusive easement, over, under, in, along, across and upon, that certain land legally described as:

Exhibit "A", attached hereto and incorporated herein by reference,

and graphically depicted on Exhibit "B", for the purpose of constructing, reconstruction, installing, repairing, replacing, operating and maintaining a public storm drain system, with ordinary and necessary appurtenances, together with the right of ingress and egress thereto without prior institution of any suit or proceedings of law and without incurring any legal obligation or liability therefore. This easement is granted subject to the following terms and conditions:

1. The Grantee shall, upon completion of any work within the property covered by the easement, restore the surface of the easement, and any private improvements disturbed or destroyed during execution of the work, as nearly as practicable to the condition they were in immediately before commencement of the work or entry by the Grantee.

2. Grantor shall retain the right to use the surface of the easement as long as such use does not interfere with the easement rights granted to the Grantee. Grantor shall not, however, have the right to:

   (a) Erect or maintain any building or structures within the easement; or
   (b) Plant trees, shrubs or vegetation having deep root patterns which may cause damage to or interfere with the utilities to be placed within the easement by the Grantee; or
   (c) Develop, landscape, or beautify the easement area in any way which would unreasonably increase the cost to the Grantee of restoring the easement area and any private improvements therein.

   This easement shall be recorded with the King County Recorder, shall run with the land described herein, and shall be binding upon the parties, their heirs, successors in interest and assigns.

   Grantor covenants that he is the lawful owner of the above-described property and has authority to convey such easement.

   Dated this _____ day of _____, 20__

   Grantor:

By: _____

Its _____

STATE OF _____)
) §
COUNTY OF _____)

I certify that I know or have satisfactory evidence that_____ _____is the person who appeared before me, and said person acknowledged that __he signed this instrument, on oath stated that __he was authorized to execute this instrument and acknowledged it as _____of _____to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated this _____ day of _____, 20__.

Notary Seal Please stay within block.

Notary Signature: _____

Print Name: _____

Notary Public in and for the State of _____

Residing in _____

My Commission Expires: _____

EXHIBIT "A"

EASEMENT
KING COUNTY TAX ID #

EXHIBIT "B"

Map

APPENDIX L

O & M MANUAL TEMPLATE

Stormwater Management Facility
Operation and Maintenance (O&M) Manual

for

Insert Development Name

Located at:

Insert Site Location/Address/contact information

Prepared for:

Insert Developer Name, Address and Phone #

Prepared by:

Insert Name, Company Name, Address and Phone #

Stormwater Management Facility
Operation and Maintenance (O&M) Manual

Table of Contents

I Contact Information
II Compliance with Redmond Municipal Code
III. Maintenance
IV. Preventative Measures to Reduce Maintenance Costs
V. Safety
VI. General Location and Description of Stormwater Management Facilities
VII. Inspecting Stormwater Management Facilities
VIII. Maintaining Stormwater Management Facilities
IX. Maintenance Documentation

Appendices

Appendix A – Maintenance Agreements
Appendix B – Maintenance Activity Log
Appendix C – Site Plan
Appendix D – As-Built Drawings
Appendix E – Maintenance Standards
Appendix F – Pollution Source Control Best Management Practices

Stormwater Management Facility
Operation and Maintenance (O&M) Manual

I Contact Information

Owner _____

Phone _____

Email _____

Maintenance Responsible Party: _____

Phone _____

Email _____

Emergency Contact _____

Phone _____

Email _____

City of Redmond, Stormwater Inspection: 425.556.2825

The above contact information shall be updated any time that the information changes. Notify the City of Redmond Division of Natural Resources Stormwater Inspector, with this information within 30 days of changes.

II Compliance with Redmond Municipal Code

In accordance with Redmond Municipal Code 13.06, all property owners are responsible for ensuring that stormwater facilities installed on their property are properly maintained and that they function as designed. The maintenance responsibility for a stormwater facility may be designated on the subdivision plat, the site development plan, and/or within a maintenance agreement for the property. Property owners should be aware of their responsibilities regarding stormwater facility maintenance. Maintenance agreement(s) associated with this property are provided in Appendix A.

In accordance with Redmond Municipal Code 13.06, d**ischarging pollutants to the stormwater drainage system is prohibited. No person shall throw, drain, or otherwise discharge, cause or allow others under its control to discharge into a stormwater drainage system any materials other than stormwater. Pollutant discharges shall be reported immediately to the City at 425-556-2868.**

III. Maintenance

Maintenance Manuals shall be transferred with the ownership of the property, including from the developer to the first property owner. Maintenance logs shall be provided to the City of Redmond's Public Works Director or his/her designee upon request. A sample Maintenance Log

is provided in Appendix B.

You should be in possession of the O&M plan for any stormwater facility on your property. If you are not able to locate your O&M plan, call Joe Capis at 425-556-2865 to receive a copy.

IV. Preventative Measures to Reduce Maintenance Costs

The most effective way to maintain your water quality facility is to prevent the pollutants from entering the facility in the first place. Common pollutants include sediment, trash & debris, chemicals, dog wastes, runoff from stored materials, illicit discharges into the storm drainage system (like car wash or pressure washing runoff) and many others. A thoughtful maintenance program will include measures to address these potential contaminants, and will save money and time in the long run. Key points to consider in your maintenance program include:

- Educate property owners/residents/tenants to be aware of how their actions affect water quality, and how they can help reduce maintenance costs.
- Keep properties, streets and gutters, and parking lots free of trash, debris, and lawn clippings.
- Ensure the proper handling, storage and disposal of hazardous wastes and chemicals.
- Plan landscaping care to minimize the use of chemicals and pesticides.
- Sweep paved surfaces and dispose of in the regular solid waste.
- Be aware of automobiles leaking fluids. Use absorbents such as clean cat litter to soak up leaked fluids– dispose of properly.
- Re-vegetate disturbed and bare areas to maintain vegetative stabilization.
- Clean out the upstream components of the storm drainage system, including inlets, storm sewers and outfalls.
- Do not store materials outdoors (including landscaping materials) unless properly protected from runoff.
- Close the covers on dumpsters to prevent liquids from leaking into the storm system.
- Ensure that garbage compactor units are functioning properly and are not leaking, including during pick-up and hauling procedure.
- Fleet and commercial car washing should be conducted in an area that drains to sanitary sewer, not stormwater system.

Source control best management practices (BMPs) as identified in Volume IV of the current Stormwater Management Manual for Western Washington are required to reduce or eliminate the release of pollution. See Appendix F for examples of common source control best management practices.

V. Safety

Never enter a confined space (outlet structure, manhole, etc.) without proper training and equipment. A confined space should never be entered without at least one additional person present.

If a toxic or flammable substance is discovered, leave the immediate area and call 911. Potentially dangerous (e.g., fuel, chemicals, hazardous materials) substances found in the

areas must be referred to the local Fire Department immediately for response by the Hazardous Materials Unit. The emergency contact number is 911.

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop.

If any hazard is found within the facility area that poses an immediate threat to public safety, call 911 immediately.

Identify site specific hazards here.

VI. General Location and Description of Stormwater Management Facilities

Insert a description of the stormwater management facilities specific to the site including treatment and flow control facilities, conveyance systems, valves, constructed source controls, green infrastructure, proprietary components, and powered devices (aerators or pumps). Description should include the purpose of each stormwater facility and how it functions.

Identify the equipment and access required for maintenance including provisions for access in the absence of a ramp and access for a vactor truck and might require flex hose.

Maintenance personnel may use the site plan located in Appendix C containing the locations of the Stormwater Management facilities.

VII. Inspecting Stormwater Management Facilities

The City of Redmond, Department of Public Works, inspects private stormwater systems.

VIII. Maintaining Stormwater Management Facilities

Stormwater management facilities must be properly maintained to ensure that they operate correctly and provide the water quality treatment for which they were designed. Routine maintenance performed on a frequently scheduled basis, can help avoid more costly rehabilitative maintenance that results when facilities are not adequately maintained. The Maintenance requirements are contained in Appendix E. These requirements should be updated to reflect changes and updates to these facilities.

Routine Work

The majority of this work consists of inspection, scheduled mowing, weed control, and trash and debris pickups for stormwater management facilities during the growing season. This includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash rack, and weed control. These activities normally will be performed numerous times during the year. These items can be completed without any prior correspondence with City of Redmond.

Minor Work

This work consists of a variety of isolated or small-scale maintenance and work needed to address operational problems. Most of this work can be completed by a small crew, with minor tools, and small equipment. These items can be completed without any prior correspondence with City of Redmond.

Major Work

This work consists of large-scale maintenance and major improvements needed to address failures within the stormwater management facilities. This work may require an engineering design with construction plans to be prepared for review and approval by the City. This work may also require more specialized maintenance equipment, surveying, construction permits or assistance through private contractors and consultants. These items require prior correspondence with City of Redmond and may be subject to permits.

IX. Maintenance Documentation

The Stormwater Management Facility Maintenance Activity Form provides a record of maintenance activities. Maintenance Forms for each facility type are provided in Appendix B. Maintenance shall be completed by the contractor completing the required maintenance items. The form shall then be reviewed by the property owner or an authorized agent of the property owner and kept on site and submitted to the City of Redmond upon request.

Appendix A

Maintenance Agreements

Appendix B

Stormwater Facility Maintenance Activity Log

Stormwater Facility Maintenance Activity Log

Property Address:

Inspection Date:
Inspection Time:
Inspected By:
Approximate Date/Time of Last Rainfall:
Type of Stormwater Facility:
Location of Facility on Site (in relation to building or other permanent structures):

Water levels and observations (oil sheen, smell, turbidity, etc.):

Sediment accumulation & record of sediment removal:

Condition of vegetation (Height, survival rates, invasive species present, etc.) and record of replacement and management (mowing, weeding, etc.):

Condition of physical properties such as inlets, outlets, piping, fences, irrigation facilities, and side slopes. Record damaged items and replacement activities:

Presence of insects or vectors. Record control activities:

Identify safety hazards present. Record resolution activities:

Appendix C

Site Plan

This is a simplified map of the site that shows the location of the stormwater system.

Appendix D

Stormwater As-Built Drawings

Appendix E

Maintenance Standards

The facility-specific maintenance standards contained in this section are intended to be conditions for determining if maintenance actions are required as identified through inspection. They are not intended to be measures of the facility's required condition at all times between inspections. In other words, exceedance of these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these standards. However, based upon inspection observations, the inspection and maintenance schedules shall be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action.

Insert only the Maintenance Standards from 2012 Stormwater Management Manual for Western (SMMWW) Washingtion, Volume V, Chapter 4.6 that pertain to this development. Site specific maintenance standards should be included for any stormwater facilities not included in those provided in the SMMWW.

There a couple of maintenance standards that Redmond has a higher level than stated in the SMMWW. These are summarized below:

- Catch Basins. Maintenance is needed if trash or debris in any inlet or outlet pipe block more than 10%.
- A 10% blockage of pipes trigger a cleaning.

Appendix F

Pollution Source Control Best Management Practices

Insert source control best management practices likely relevant to this development

PRESSURE WASHING (aka Power Washing)

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Stormwater Management Manual for Western Washington

Volume IV - Source Control BMPs – December 2014

S431 BMPs for Washing and Steam Cleaning Vehicles/ Equipment/ Building Structures

Description of Pollutant Sources: Pollutant sources include the commercial cleaning of vehicles, aircraft, vessels, and other transportation, restaurant kitchens, carpets, and industrial equipment, and large buildings with low- or high-pressure water or steam. This includes "charity" car washes at gas stations and commercial parking lots. The cleaning can include hand washing, scrubbing, sanding, etc. Washwater from cleaning activities can contain oil and grease, suspended solids, heavy metals, soluble organics, soaps, and detergents that can contaminate stormwater.

Pollutant Control Approach: The preferred approach is to cover and/or contain the cleaning activity, or conduct the activity inside a building, to separate the uncontaminated stormwater from the washwater sources. Convey washwater to a sanitary sewer after approval by the local sewer authority. Provide temporary storage before proper disposal, or recycling. Under this preferred approach, no discharge to the ground, to a storm drain, or to surface water should occur.

The Industrial Stormwater General Permit prohibits the discharge of process wastewater (e.g., vehicle washing wastewater) to ground water or surface water. Stormwater that commingles with process wastewater is considered process wastewater.

Facilities not covered under the Industrial Stormwater General Permit that are unable to follow one of the preferred approaches listed above may discharge washwater to the ground only after proper treatment in accordance with Ecology guidance WQ-95-056, Vehicle and Equipment Washwater Discharges/Best Management Practices Manual, November 2012 or most recent update.

The quality of any discharge to the ground after proper treatment must comply with Ecology's Ground Water Quality Standards, Chapter 173-200 WAC.

Facilities not covered under the Industrial Stormwater General Permit that are unable to comply with one of the preferred approaches and want to discharge to storm sewer, must meet their local stormwater requirements. Local authorities may require treatment prior to discharge.

Contact the local Ecology Regional Office to discuss permitting options for discharge of washwater to surface water or to a storm drain after on-site treatment.

Applicable Structural Source Control BMPs: Conduct vehicle/ equipment washing in one of the following locations:

• At a commercial washing facility in which the washing occurs in an enclosure and drains to the sanitary sewer, or

• In a building constructed specifically for washing of vehicles and equipment, which drains to a sanitary sewer.

Conduct outside washing operation in a designated wash area with the following features:

• In a paved area, construct a spill containment pad to prevent the run-on of stormwater from adjacent areas. Slope the spill containment area to collect washwater in a containment pad drain system with perimeter drains, trench drains or catchment drains. Size the containment pad to extend out a minimum of four feet on all sides of the washed vehicles and/or equipment.

• Convey the washwater to a sump (like a grit separator) and then to a sanitary sewer (if allowed by the local Sewer Authority), or other appropriate wastewater treatment or recycle system. The containment sump must have a positive control outlet valve for spill control with live containment volume, and oil/water separation. Size the minimum live storage volume to contain the maximum expected daily washwater flow plus the sludge storage volume below the outlet pipe. Shut the outlet valve during the washing cycle to collect the washwater in the sump. The valve should remain shut for at least two hours following the washing operation to allow the oil and solids to separate before discharge to a sanitary sewer.

• Close the inlet valve in the discharge pipe when washing is not occurring, thereby preventing the entry of uncontaminated stormwater into the pretreatment/ treatment system. The stormwater can then drain into the conveyance/discharge system outside of the wash pad (essentially bypassing the sanitary sewer or recycle system). Post signs to inform people of the operation and purpose of the valve. Clean the concrete pad thoroughly until there is no foam or visible sheen in the washwater prior to closing the inlet valve and allowing uncontaminated stormwater to overflow and drain off the pad.

• Collect the washwater from building structures and convey it to appropriate treatment such as a sanitary sewer system if it contains oils, soaps, or detergents. If the washwater does not contain oils, soaps, or detergents (in this case only a low pressure, clean, cold water rinse is allowed) then it could drain to soils that have sufficient natural attenuation capacity for dust and sediment.

Note that the purpose of the valve is to convey only washwater and contaminated stormwater to a treatment system.

Recommended Additional BMPs:

• Mark the wash area at gas stations, multi-family residences and any other business where non-employees wash vehicles.

• Operators may use a manually operated positive control valve for uncovered wash pads, but a pneumatic or electric valve system is preferable. The valve may be on a timer circuit and opened upon completion of a wash cycle. After draining the sump or separator, the timer would then close the valve.

• Use phosphate-free biodegradable detergents when practicable.

• Consider recycling the washwater.

Operators may use soluble/emulsifiable detergents in the wash medium and should use it with care and the appropriate treatment. Carefully consider the selection of soaps and detergents and treatment BMPs. Oil/water separators are ineffective in removing emulsified or water soluble detergents. Another treatment appropriate for emulsified and water soluble detergents may be required.

Exceptions

• At gas stations (for charity car washes) or commercial parking lots, where it is not possible to discharge the washwater to a sanitary sewer, a temporary plug or a temporary sump pump can be used at the storm drain to collect the washwater for off-site disposal such as to a nearby sanitary sewer.

• New and used car dealerships may wash vehicles in the parking stalls as long as employees use a temporary plug system to collect the washwater for disposal as stated above, or an approved treatment system for the washwater is in place.

At industrial sites, contact Ecology for NPDES Permit requirements even when not using soaps, detergents, and/or other chemical cleaners in washing truck City of Redmond Commercial Pressure Washing Outreach Information:

KEEP PRESSURE WASHING WASTEWATER FROM ENTERING STORM DRAINS

City of Redmond

Puget Sound Starts Here

POLLUTED PRESSURE WASHING WASTEWATER CANNOT ENTER:

- **Storm drains and drainage systems** (anywhere rain water goes).
- **Surface water** (creeks, lakes, rivers, or other natural waterways).
- **Groundwater** (onto soil where it sinks into water underground).

STORMWATER IS NOT TREATED

Stormwater is rain water that flows into a storm drain.

- It flows directly to the nearest stream, river or lake.
- It is not treated, meaning no pollutants are removed.
- Soap, oil, washwater or any other polluting substance that enters a storm drain goes directly into the nearest natural waterway.

WHAT'S THE HARM?

Pressure wash wastewater often contains pollutants that can harm the environment and wildlife. Pollutants examples include:

- **Sediment and dirt**
- **Soaps and detergents**
- **Fecal bacteria**
- **Petroleum/oil/grease**
- **Metals**
- **Chemical cleaners**

WHY IS THIS SO IMPORTANT?

Pollutants in pressure washing wastewater go directly from the storm drain to the environment where they can harm wildlife and contaminate areas used for swimming and recreation. Polluted washing water can also contaminate groundwater, and harm Redmond's drinking water supply.

HOW TO CLEAN THE RIGHT WAY - WITHOUT CAUSING POLLUTION AND VIOLATING CITY REGULATIONS

- **For slightly dirty surface (sidewalk, building exterior)** filter the wash wastewater before discharging to a storm drain.
- **For very dirty or polluted surfaces (parking lots, dumpster areas)** block storm drains and dispose of wash wastewater into sanitary sewer after filtering.
- **If using corrosives, or other hazardous substances,** block storm drains and recover wastewater for approved hazardous waste disposal.

REGULATIONS PROHIBIT PRESSURE WASHING WASTEWATER FROM ENTERING STORM DRAINS. (Redmond Municipal Code 13.06)

FOR QUESTIONS PLEASE CALL

425-556-2826

City of Redmond

CITY OF REDMOND
PRESSURE WASH WASTEWATER DISPOSAL REQUIREMENTS

(Redmond Municipal Code 13.06)

Surface Being Cleaned	Wash Wastewater Disposal Requirement	Other Requirements/ Suggestions
All surfaces cleaned using corrosives, or other harmful chemicals, or that may have hazardous materials (e.g. lead paint) on it	✗ NO DISCHARGE TO STORM DRAINS ✓ Wash wastewater must be contained collected and recovered for approved off-site disposal	Disposal of wastewater containing hazardous substances must be appropriately documented (retain disposal receipts)
• Parking lots • Roadways • Driveways • Drive-thrus • Loading docks • Dumpster & Compactor Areas • Any other potentially polluted surfaces	✗ NO DISCHARGE TO STORM DRAINS ✓ Discharge to sanitary sewer equipped with pretreatment device (oil/water separator, interceptor, filters, etc.) or collected for approved off-site disposal. Contact your local sewer authority for specific details 206-477-5300	* No discharge to septic systems * Collect/ recover wash wastewater * Wash wastewater must be filtered for oil, sediment, and debris before discharging to sanitary sewer * Heated water and detergents okay to sanitary sewer
Outdoor eating areas or sidewalk cafes	✗ Discharge to storm drains of heated water, detergents, soaps, or other additives is prohibited ✓ Discharge to storm drains allowed if wash wastewater is filtered (e.g. catchbasin insert filter) ✓ Discharge to sanitary sewer may be required if the surface has excessive staining and/or other pollutant build-up that may contaminate stormwater	* Sweep up or vacuum loose debris prior to pressure washing * Discharge wash wastewater to landscaped areas if possible * City may determine excessive pollution is occurring and prohibit storm drain discharge
• Pedestrian-use sidewalks, with typical dust, moss, and algae build-up • Building exteriors • Roofs	✗ Discharge to storm drains of heated water, detergents, soaps, or other additives is prohibited ✗ Extremely muddy or turbid wastewater bypassing filtration is prohibited ✓ Discharge to storm drains allowable if wash wastewater is filtered	* Discharge wash wastewater to landscaped areas if possible * City may determine excessive pollution is occurring and prohibit storm drain discharge

Call the City of Redmond at 425-556-2826 for questions or clarification

LANDSCAPING

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Stormwater Management Manual for Western Washington

Volume IV - Source Control BMPs – December 2014

S411 BMPs for Landscaping and Lawn/ Vegetation Management

Description of Pollutant Sources: Landscaping can include grading, soil transfer, vegetation removal, pesticide and fertilizer applications, and watering. Stormwater contaminants include toxic organic compounds, heavy metals, oils, total suspended solids, coliform bacteria, fertilizers, and pesticides.

Lawn and vegetation management can include control of objectionable weeds, insects, mold, bacteria, and other pests with pesticides. Examples include weed control on golf course lawns, access roads, and utility corridors and during landscaping; sap stain and insect control on lumber and logs; rooftop moss removal; killing nuisance rodents; fungicide application to patio decks, and residential lawn/plant care. It is possible to release toxic pesticides such as pentachlorophenol, carbamates, and organometallics to the environment by leaching and dripping from treated parts, container leaks, product misuse, and outside storage of pesticide contaminated materials and equipment. Poor management of the vegetation and poor application of pesticides or fertilizers can cause appreciable stormwater contamination.

Pollutant Control Approach: Control of fertilizer and pesticide applications, soil erosion, and site debris to prevent contamination of stormwater.

Develop and implement an Integrated Pest Management Plan (IPM) and use pesticides only as a last resort. Carefully apply pesticides/ herbicides, in accordance with label instructions. Maintain appropriate vegetation, with proper fertilizer application where practicable, to control erosion and the discharge of stormwater pollutants. Where practicable grow plant species appropriate for the site, or adjust the soil properties of the subject site to grow desired plant species.

Applicable Operational BMPs for Landscaping:

• Install engineered soil/landscape systems to improve the infiltration and regulation of stormwater in landscaped areas.

• Do not dispose of collected vegetation into waterways or storm sewer systems.

Recommended Additional Operational BMPs for Landscaping:

• Conduct mulch-mowing whenever practicable

• Dispose of grass clippings, leaves, sticks, or other collected vegetation, by composting, if feasible.

• Use mulch or other erosion control measures on soils exposed for more than one week during the dry season or two days during the rainy season.

• Store and maintain appropriate oil and chemical spill cleanup materials in readily accessible locations when using oil or other chemicals. Ensure that employees are familiar with proper spill cleanup procedures.

• Till fertilizers into the soil rather than dumping or broadcasting onto the surface. Determine the proper fertilizer application rate for the types of soil and vegetation encountered.

• Till a topsoil mix or composted organic material into the soil to create a well-mixed transition layer that encourages deeper root systems and drought-resistant plants.

• Use manual and/or mechanical methods of vegetation removal rather than applying herbicides, where practical.

Applicable Operational BMPs for the Use of Pesticides:

• Develop and implement an IPM (See section on IPM in Applicable Operational BMPs for Vegetation Management) and use pesticides only as a last resort.

• Implement a pesticide-use plan and include at a minimum: a list of selected pesticides and their specific uses; brands, formulations, application methods and quantities to be used; equipment use and maintenance procedures; safety, storage, and disposal methods; and monitoring, record keeping, and public notice procedures. All procedures shall conform to the requirements of Chapter 17.21 RCW and Chapter 16-228 WAC (Appendix IV-D R.7).

• Choose the least toxic pesticide available that is capable of reducing the infestation to acceptable levels. The pesticide should readily degrade in the environment and/or have properties that strongly bind it to the soil. Conduct any pest control activity at the life stage when the pest is most vulnerable. For example, if it is necessary to use a Bacillus thuringiens application to control tent caterpillars, apply it to the material before the caterpillars cocoon or it will be ineffective. Any method used should be site-specific and not used wholesale over a wide area.

• Apply the pesticide according to label directions. Do not apply pesticides in quantities that exceed manufacturer's instructions.

• Mix the pesticides and clean the application equipment in an area where accidental spills will not enter surface or ground waters, and will not contaminate the soil.

• Store pesticides in enclosed areas or in covered impervious containment. Do not discharge pesticide contaminated stormwater or spills/leaks of pesticides to storm sewers. Do not hose down the paved

areas to a storm sewer or conveyance ditch. Store and maintain appropriate spill cleanup materials in a location known to all near the storage area.

• Clean up any spilled pesticides. Keep pesticide contaminated waste materials in designated covered and contained areas.

• The pesticide application equipment must be capable of immediate shutoff in the event of an emergency.

• Spraying pesticides within 100 feet of open waters including wetlands, ponds, and rivers, streams, creeks, sloughs and any drainage ditch or channel that leads to open water may have additional regulatory requirements beyond just following the pesticide product label. Additional requirements may include:

• Obtaining a discharge permit from Ecology.

• Obtaining a permit from the local jurisdiction.

• Using an aquatic labeled pesticide.

• Flag all sensitive areas including wells, creeks, and wetlands prior to spraying.

• Post notices and delineate the spray area prior to the application, as required by the local jurisdiction or by Ecology.

• Conduct spray applications during weather conditions as specified in the label direction and applicable local and state regulations. Do not apply during rain or immediately before expected rain.

<u>Recommended Additional Operational BMPs for the use of pesticides:</u>

• Consider alternatives to the use of pesticides such as covering or harvesting weeds, substitute vegetative growth, and manual weed control/moss removal.

• Consider the use of soil amendments, such as compost, that are known to control some common diseases in plants, such as Pythium root rot, ashy stem blight, and parasitic nematodes. The following are three possible mechanisms for disease control by compost addition (USEPA Publication 530-F-9-044):

1. Successful competition for nutrients by antibiotic production;
2. Successful predation against pathogens by beneficial microorganism; and
3. Activation of disease-resistant genes in plants by composts.

Installing an amended soil/landscape system can preserve both the plant system and the soil system more effectively. This type of approach provides a soil/landscape system with adequate depth, permeability, and organic matter to sustain itself and continue working as an effective stormwater infiltration system and a sustainable nutrient cycle.

• Once a pesticide is applied, evaluate its effectiveness for possible improvement. Records should be kept showing the effectiveness of the pesticides considered.

• Develop an annual evaluation procedure including a review of the effectiveness of pesticide applications, impact on buffers and sensitive areas (including potable wells), public concerns, and recent toxicological information on pesticides used/proposed for use. If individual or public potable wells are located in the proximity of commercial pesticide applications, contact the regional Ecology hydrogeologist to determine if additional pesticide application control measures are necessary.

• Rinseate from equipment cleaning and/or triple-rinsing of pesticide containers should be used as product or recycled into product.

For more information, contact the Washington State University (WSU) Extension Home-Assist Program, (253) 445-4556, or Bio-Integral Resource Center (BIRC), P.O. Box 7414, Berkeley, CA.94707, or EPA to obtain a publication entitled "Suspended, Canceled, and Restricted Pesticides" which lists all restricted pesticides and the specific uses that are allowed.

Applicable Operational BMPs for Vegetation Management:

• Use at least an eight-inch "topsoil" layer with at least 8 percent organic matter to provide a sufficient vegetation-growing medium. Amending existing landscapes and turf systems by increasing the percent organic matter and depth of topsoil can substantially improve the permeability of the soil, the disease and drought resistance of the vegetation, and reduce fertilizer demand. This reduces the demand for fertilizers, herbicides, and pesticides. Organic matter is the least water-soluble form of nutrients that can be added to the soil. Composted organic matter generally releases only between 2 and 10 percent of its total nitrogen annually, and this release corresponds closely to the plant growth cycle. Return natural plant debris and mulch to the soil, to continue recycling nutrients indefinitely.

• Select the appropriate turfgrass mixture for the climate and soil type. Certain tall fescues and rye grasses resist insect attack because the symbiotic endophytic fungi found naturally in their tissues repel or kill common leaf and stem-eating lawn insects. However, they do not, repel root-feeding lawn pests such as Crane Fly larvae, and are toxic to ruminants such as cattle and sheep. The fungus causes no known adverse effects to the host plant or to humans. Endophytic grasses are commercially available; use them in areas such as parks or golf courses where grazing does not occur. Local agricultural or gardening resources such as Washington State University Extension office can offer advice on which types of grass are best suited to the area and soil type.

• Use the following seeding and planting BMPs, or equivalent BMPs to obtain information on grass mixtures, temporary and permanent seeding procedures, maintenance of a recently planted area, and fertilizer application rates: Temporary and Permanent Seeding, Mulching, Plastic Covering, and Sodding as described in Volume II.

• Adjusting the soil properties of the subject site can assist in selection of desired plant species. For example, design a constructed wetland to resist the invasion of reed canary grass by layering specific strata of organic matters (e.g., composted forest product residuals) and creating a mildly acidic pH and carbon-rich soil medium. Consult a soil restoration specialist for site-specific conditions.

• Aerate lawns regularly in areas of heavy use where the soil tends to become compacted. Conduct aeration while the grasses in the lawn are growing most vigorously. Remove layers of thatch greater than ¾-inch deep.

• Mowing is a stress-creating activity for turfgrass. Grass decreases its productivity when mown too short and there is less growth of roots and rhizomes. The turf becomes less tolerant of environmental stresses, more disease prone and more reliant on outside means such as pesticides, fertilizers, and irrigation to remain healthy. Set the mowing height at the highest acceptable level and mow at times and intervals designed to minimize stress on the turf. Generally mowing only 1/3 of the grass blade height will prevent stressing the turf.

Irrigation:

• The depth from which a plant normally extracts water depends on the rooting depth of the plant. Appropriately irrigated lawn grasses normally root in the top 6 to 12 inches of soil; lawns irrigated on a daily basis often root only in the top 1 inch of soil. Improper irrigation can encourage pest problems, leach nutrients, and make a lawn completely dependent on artificial watering. The amount of water applied depends on the normal rooting depth of the turfgrass species used, the available water holding capacity of the soil, and the efficiency of the irrigation system. Consult with the local water utility, Conservation District, or Cooperative Extension office to help determine optimum irrigation practices.

Fertilizer Management:

• Turfgrass is most responsive to nitrogen fertilization, followed by potassium and phosphorus. Fertilization needs vary by site depending on plant, soil, and climatic conditions. Evaluation of soil nutrient levels through regular testing ensures the best possible efficiency and economy of fertilization. For details on soils testing, contact the local Conservation District, a soils testing professional, or a Washington State University Extension office.

• Apply fertilizers in amounts appropriate for the target vegetation and at the time of year that minimizes losses to surface and ground waters. Do not fertilize when the soil is dry. Alternatively, do not apply fertilizers within three days prior to predicted rainfall. The longer the period between fertilizer application and either rainfall or irrigation, the less fertilizer runoff occurs.

• Use slow release fertilizers such as methylene urea, IDBU, or resin coated fertilizers when appropriate, generally in the spring. Use of slow release fertilizers is especially important in areas with sandy or gravelly soils.

• Time the fertilizer application to periods of maximum plant uptake. Ecology generally recommends application in the fall and spring, although Washington State University turf specialists recommend four fertilizer applications per year.

• Properly trained persons should apply all fertilizers. Apply no fertilizer at commercial and industrial facilities, to grass swales, filter strips, or buffer areas that drain to sensitive water bodies unless approved by the local jurisdiction.

Integrated Pest Management

An IPM program might consist of the following steps:

Step 1: Correctly identify problem pests and understand their life cycle

Step 2: Establish tolerance thresholds for pests.

Step 3: Monitor to detect and prevent pest problems.

Step 4: Modify the maintenance program to promote healthy plants and discourage pests.

Step 5: Use cultural, physical, mechanical or biological controls first if pests exceed the tolerance thresholds.

Step 6: Evaluate and record the effectiveness of the control and modify maintenance practices to support lawn or landscape recovery and prevent recurrence.

For an elaboration of these steps, refer to Appendix IV-F.

PARKING LOTS

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Stormwater Management Manual for Western Washington

Volume IV - Source Control BMPs – December 2014

S421 BMPs for Parking and Storage of Vehicles and Equipment

Description of Pollutant Sources: Public and commercial parking lots such as retail store, fleet vehicle (including rent-a-car lots and car dealerships), equipment sale and rental parking lots, and parking lot driveways, can be sources of toxic hydrocarbons and other organic compounds, including oils and greases, metals, and suspended solids.

Pollutant Control Approach: If the parking lot is a high-use site as defined below, provide appropriate oil removal equipment for the contaminated stormwater runoff.

Applicable Operational BMPs:

• If washing a parking lot, discharge the washwater to a sanitary sewer, if allowed by the local sewer authority, or other approved wastewater treatment system, or collect washwater for off-site disposal.

• Do not hose down the area to a storm sewer or receiving water. Vacuum sweep parking lots, storage areas, and driveways regularly to collect dirt, waste, and debris.

Applicable Treatment BMPs: An oil removal system such as an API or CP oil and water separator, catch basin filter, or equivalent BMP, approved by the local jurisdiction, is necessary for parking lots meeting the threshold vehicle traffic intensity level of a high-use site.

Vehicle High-Use Sites

Establishments subject to vehicle high-use intensity are significant sources of oil contamination of stormwater. Examples of potential high use areas include customer parking lots at fast food stores, grocery stores, taverns, restaurants, large shopping malls, discount warehouse stores, quick-lube shops, and banks. If the PGIS for a high-use site exceeds 5,000 square feet in a threshold discharge area, an oil control BMP from the Oil Control Menu (in Volume V) is necessary. A high-use site at a commercial or industrial establishment has one of the following characteristics: (Gaus/King County, 1994)

• Is subject to an expected average daily vehicle traffic (ADT) count equal to or greater than 100 vehicles per 1,000 square feet of gross building area: or

• Is subject to storage of a fleet of 25 or more diesel vehicles that are over 10 tons gross weight (trucks, buses, trains, heavy equipment, etc.).

OUTDOOR WASTE AND CHEMICAL STORAGE

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Stormwater Management Manual for Western Washington

Volume IV - Source Control BMPs – December 2014

S427 BMPs for Storage of Liquid, Food Waste, or Dangerous Waste Containers

Description of Pollutant Sources: Steel and plastic drums with volumetric capacities of 55 gallons or less are typically used at industrial facilities for container storage of liquids and powders. The BMPs specified below apply to container(s) located outside a building. Use these BMPs when temporarily storing accumulated food wastes, vegetable or animal grease, used oil, liquid feedstock, cleaning chemicals, or Dangerous Wastes (liquid or solid). These BMPs do not apply when Ecology has permitted the business to store the wastes (Appendix IV-D R.4). Leaks and spills of pollutant materials during handling and storage are the primary sources of pollutants. Oil and grease, acid/alkali pH, BOD, COD are potential pollutant constituents.

Pollutant Control Approach: Store containers in impervious containment under a roof, or other appropriate cover, or in a building. When collection trucks directly pick up roll-containers, ensure a filet is on both sides of the curb to facilitate moving the dumpster. For storage areas on-site for less than 30 days, consider using a portable temporary secondary system like that shown in Figure 2.2.8 in lieu of a permanent system as described above.

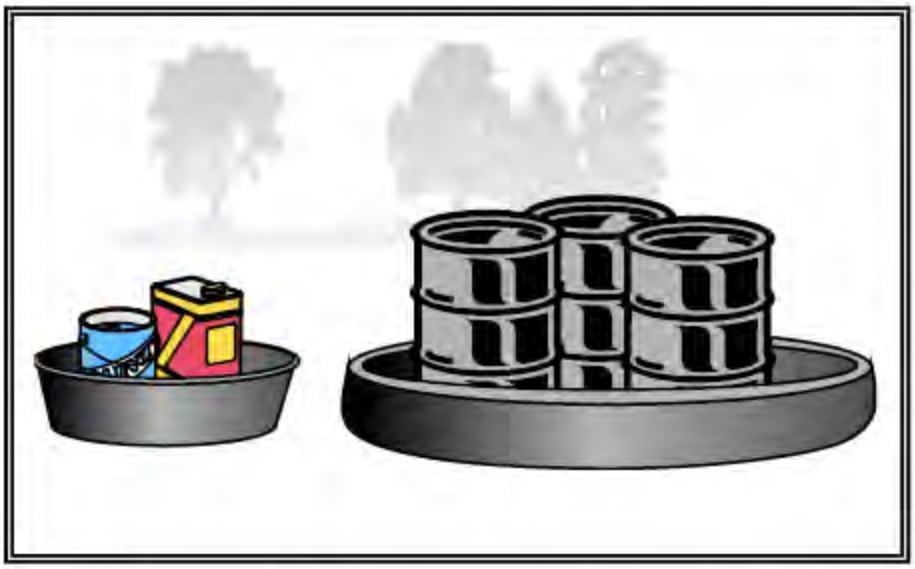


Figure 2.2.8 – Secondary Containment System

Applicable Operational BMPs:

• Place tight-fitting lids on all containers.

• Place drip pans beneath all mounted container taps and at all potential drip and spill locations during filling and unloading of containers.

• Inspect container storage areas regularly for corrosion, structural failure, spills, leaks, overfills, and failure of piping systems. Check containers daily for leaks/spills. Replace containers, and replace and tighten bungs in drums as needed.

• Businesses accumulating Dangerous Wastes that do not contain free liquids need only to store these wastes in a sloped designated area with the containers elevated or otherwise protected from storm water run-on.

• Secure drums when stored in an area where unauthorized persons may gain access in a manner that prevents accidental spillage, pilferage, or any unauthorized use (see Figure 2.2.9).

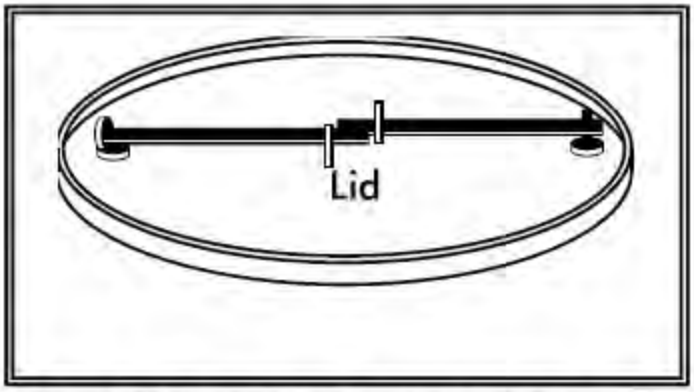


Figure 2.2.9 – Locking System for Drum Lid

• If the material is a Dangerous Waste, the business owner must comply with any additional Ecology requirements as specified in Appendix IV-D R.3.

• Storage of reactive, ignitable, or flammable liquids must comply with the Uniform Fire Code (Appendix IV-D R.2).

• Cover dumpsters, or keep them under cover such as a lean-to, to prevent the entry of stormwater. Replace or repair leaking garbage dumpsters.

• Drain dumpsters and/or dumpster pads to sanitary sewer. Keep dumpster lids closed. Install waterproof liners.

Applicable Structural Source Control BMPs:

• Keep containers with Dangerous Waste, food waste, or other potential pollutant liquids inside a building unless this is not feasible due to site constraints or Uniform/International Fire Code requirements.

• Store containers in a designated area, which is covered, bermed or diked, paved and impervious in order to contain leaks and spills (see Figure 2.2.10). Slope the secondary containment to drain into a dead-end sump for the collection of leaks and small spills.

• For liquid wastes, surround the containers with a dike as illustrated in Figure 2.2.10. The dike must be of sufficient height to provide a volume of either 10 percent of the total enclosed container volume or 110 percent of the volume contained in the largest container, whichever is greater.

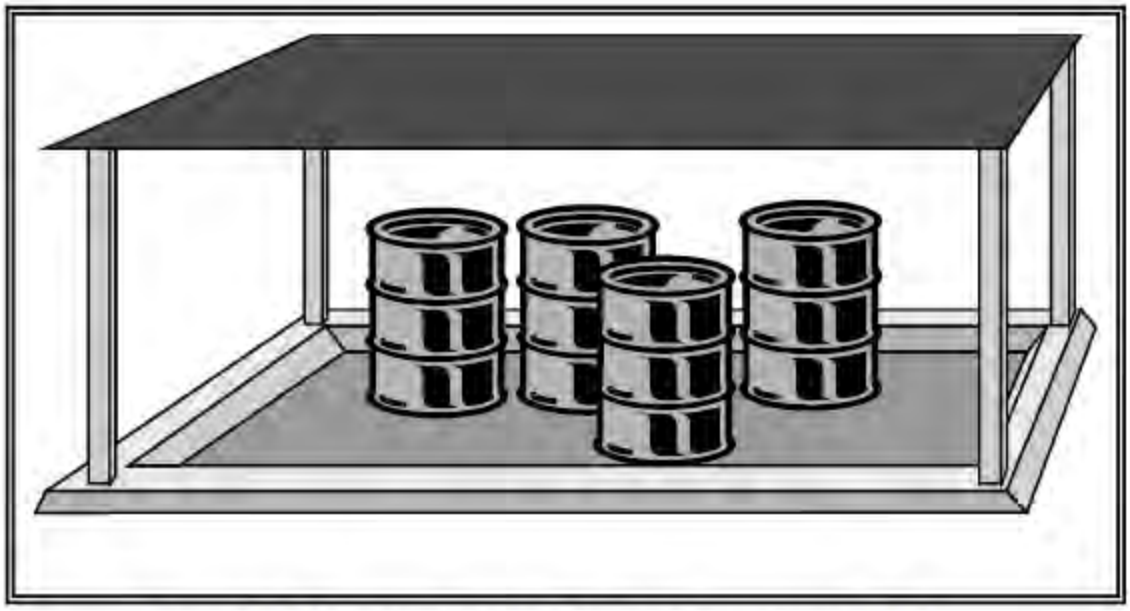


Figure 2.2.10 – Covered and Bermed Containment Area

• Where material is temporarily stored in drums, use a containment system as illustrated, in lieu of the above system (see Figure 2.2.8).

• Place containers mounted for direct removal of a liquid chemical for use by employees inside a containment area as described above. Use a drip pan during liquid transfer (see Figure 2.2.11).

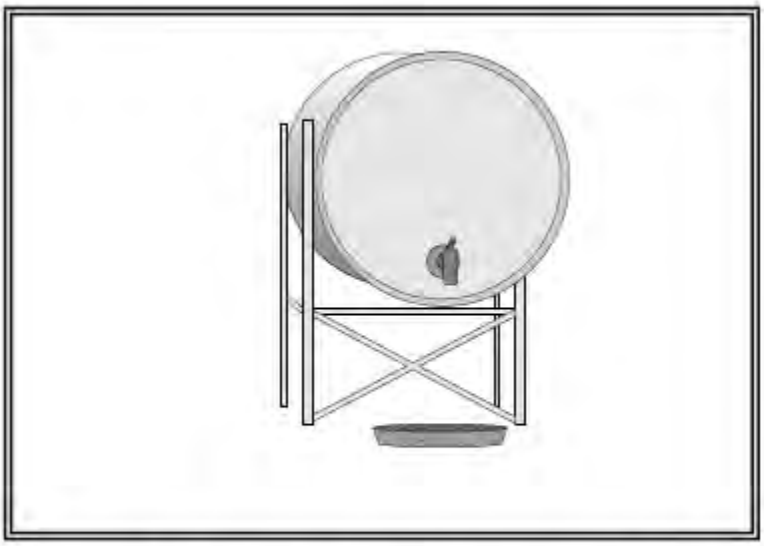


Figure 2.2.11 – Mounted Container - with drip pan
(note that the secondary containment is not shown in this figure)

Applicable Treatment BMP:

• For contaminated stormwater in the containment area, connect the sump outlet to a sanitary sewer, if approved by the local Sewer Authority, or to appropriate treatment such as an API or CP oil/water separator, catch basin filter or other appropriate system (see Volume V). Equip the sump outlet with a normally closed valve to prevent the release of spilled or leaked liquids, especially flammables (compliance with Fire Codes), and dangerous liquids. Open this valve only for the conveyance of contaminated stormwater to treatment.

• Another option for discharge of contaminated stormwater is to pump it from a dead-end sump or catchment to a tank truck or other appropriate vehicle for off-site treatment and/or disposal.

APPENDIX M

FLOOD CONTROL ZONE APPLICATION FORM

FLOOD CONTROL ZONE APPLICATION

APPLICANT:

Name: _____
Company: _____
Address: _____
_____
Telephone: _____

OWNER (if different from applicant):

Name: _____
Company: _____
Address: _____
_____
Telephone: _____

PROJECT IDENTIFICATION AND SCHEDULE:

Type of Work: _____ Construct _____ Reconstruct _____ Modify
Project Description_____
_____
Project Name_____
Construction to commence on_____
and to be completed by_____
Permit if sought for period_____

PROJECT LOCATION:

Tax parcel number_____
Project address_____
Located in _____ ¼ Section ___ T ___ R ___ E (WM)
Within the flood plain of_____
(Body of water)

F065 (10/04)

APPLICANT'S SIGNATURE

Applicant, by signature following, herby applies for a Flood Control Zone Permit and stipulates that information provided is correct to the best of applicant's knowledge:

_____ _____
Date

_____
Print

PERMIT: This document grants permission under provision of Chapter 86.16 RCW when and only when signed below and is subject to all conditions noted:

Minimum Finished Elevation shall be _____ NGVD, 1929

Permit Granted

_____ _____
City of Redmond Flood Control Zone Administration Date

Permit and Conditions:

_____

_____

_____

_____

_____

Acknowledged_____ _____
Date

Print_____

APPENDIX N

BILL OF SALE AND INSTRUCTIONS FORM

PUBLIC UTILITY & STORMWATER FACILITIES
BILL OF SALE FORM
INSTRUCTIONS

PURPOSE:

To transfer ownership of a newly constructed public utility and/or stormwater system and appurtenances that have been newly constructed as part of the following project to the City of Redmond.

The project name, as shown on official City approvals is:

_____

PROPERTY DESCRIPTION:

All constructed stormwater conveyance systems and appurtenances constructed as part of the subject project that: (1) are located in City Rights-of-Way; and (2) any stormwater conveyance systems and appurtenances not in City Rights-of-Way that: (a) have been specifically approved for acceptance by the City in writing and (b) are contained within approved easements granted to the City.

SIGNATURE

The Bill of Sale shall be signed by the party who paid for the system improvements. Signature shall be notarized. The notary space for individuals or corporations as appropriate.

QUESTIONS:

If you have any questions about how to complete the form, please contact the Public Works Development Services Division at (425)556-2760.

BILL OF SALE

FOR VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, the undersigned hereby conveys, bargains and sells and transfers to the City of Redmond, hereinafter referred to as the "City", all its present and future right, title and any interest in and to all of the following property:

to have and hold the same for itself, its successors and assigned forever, free of all liens and encumbrances, or interest of third parties.

The undersigned, on behalf of itself and its successors, and assigns covenants and agrees that the undersigned is the owner of said property and has good right and authority to sell the same and that it will, and does, hereby warrant title to said property and agrees to defend and hold harmless the City, its successors and assigns, against all and every person or persons whomsoever lawfully claiming any right, title, or interest in or to the same.

The undersigned warrants that the above-described property is in good operating condition and repair; that the undersigned has not received any citation or warning to the effect that these assets do not comply with all governmental laws or regulations; and further covenants and agrees with the City to replace, repair and correct any defect in work or materials in respect to the personal property subject to this Bill of Sale arising during a period of one (1) year from the date of Acceptance by Public Works Development Services Division, without cost to the City.

DATED this _____ day of _____, 20 _____.

By _____

Its _____

STATE OF WASHINGTON)
) ss.
COUNTY OF _____)

I certify that I know or have satisfactory evidence that _____ signed this instrument, acknowledged it to be his/her free and voluntary act for the uses and purposes mentioned in the instrument.

DATED this _____ day of _____, 20 _____.

_____

NOTARY PUBLIC

My Commission Expires: _____

STATE OF WASHINGTON)
) ss.
COUNTY OF _____)

I certify that I know or have satisfactory evidence that this instrument, acknowledged it to be his/her free and voluntary act for the uses and purposes mentioned in the instrument.

DATED this _____ day of _____, 20 _____.

_____

NOTARY PUBLIC

My Commission Expires: _____

APPENDIX P

DEVELOPER EXTENSION ASSET SUMMARY FORM

DEVELOPMENT SERVICES DIVISION

DEVELOPER EXTENSION ASSET SUMMARY

Project Name: _____

Developer: _____

Contractor: _____

****

WATER SYSTEM CONSTRUCTION COSTS

Land $ _____

Storage $_____

Pump Station $ _____

Pressure Reducing Valve $ _____

Water Mains and Appurtenances:

Main Size:	4"	6"	8"	12"	16"	Other ( )
Length:						
Type:						
Lineal Ft $:						
Main Cost:						

Water Mains and Appurtenances Total $_____

Service Lines (Line, Meter Box / Vault, Meter Setter) $_____

Meter Size _____ Qty _____ $_____

Hydrant Q ty _____ $_____

Water Total **$_____**

****

SEWER SYSTEM CONSTRUCTION COSTS

Pump Station $ _____

Side Sewer (Within Right of Way) Qty _____ $_____

Manholes Q ty _____ $_____

Sewer Mains and Appurtenances:

Main Size:	8"	8”	10”	10”	12”	Other ( )
Length:						
Type:	PVC	DI	PVC DI			
Lineal Ft $:						
Main Cost						

Sewer Mains and Appurtenances Total $_____

Sewer Total **$_____**

(Combined Water/Sewer) Project Total **$_____**

F060 (10/04)

****

PUBLIC STORMWATER SYSTEM CONSTRUCTION COSTS

Land $ _____

Pond / Vault / Tank Construction $_____

Pipe Storage Size _____ & Length_____ $_____

Water Quality Type _____ $ _____

Stormwater Mains and Appurtenances:

Main Size:	8"	12"	18"	24"	36"	Other ( )
Length:						
Type:						
Lineal Ft $:						
Main Cost:						

Stormwater Mains and Appurtenances Total $_____

Stormwater Total $_____

****

NOTES:

1. Include total cost of improvements including sales tax, engineering and administration.
2. As a separate instrument, a Bill of Sale has been provided for the above improvements.

****

I hereby certify that all bills pertaining to the installation of the improvements have been paid in full and that the above costs represent the true value of the improvements.

HERE AND IN WITNESS WHEREOF, the undersigned have hereunto set their hand and seal.
DATED this _____ day of _____, 20____.

_____

_____

STATE OF WASHINGTON)
)ss
COUNTY OF KING)

On this da y personally appeared before me_____to be known to be the individual _____ as described in and who executed the within and foregoi ng instrument and acknowledged that (he/she/they) signed the same as (his/hers/their) free and voluntary act and deed of the uses and purposes therein mentioned.

GIVEN under my hand and official seal this _____day of _____ 20____.

_____
Notary Public
My commission expires_____

F060 con't (10/04)

APPENDIX Q

SMALL SITE STORMWATER SITE PLAN TEMPLATE

TRUNCATED SWPPP

PROJECT NUMBER
PROJECT NAME
PROJECT ADDRESS

PREPARED FOR:
APPLICANT NAME
APPLICANT ADDRESS
APPLICANT TELEPHONE
APPLICANT EMAIL ADDRESS

PREPARED BY:
ENGINEER NAME
ENGINEER FIRM
ENGINEER ADDRESS
ENGINEER TELEPHONE
ENNGINEER EMAIL ADDRESS

Washington
Engineer Stamp,
Signed and Dated

Construction Stormwater Pollution Prevention Plan Checklist

Project Name: _____
Project Number: _____
Review Date: _____
On-site Inspection Review Date: _____
Construction SWPPP Reviewer: _____

Section I – Construction SWPPP Narrative

1. Construction Stormwater Pollution Prevention Elements

___ a. Describe how each of the Construction Stormwater Pollution Prevention Elements has been addressed though the Construction SWPPP.
___ b. Identify the type and location of BMPs used to satisfy the required element.
___ c. Written justification identifying the reason an element is not applicable to the proposal.

12 Required Elements - Construction Stormwater Pollution Prevention Plan

___ 1. Mark Clearing Limits.
___ 2. Establish Construction Access.
___ 3. Control Flow Rates.
___ 4. Install Sediment Controls.
___ 5. Stabilize Soils.
___ 6. Protect Slopes.
___ 7. Protect Drain Inlets.
___ 8. Stabilize Channels and Outlets.
___ 9. Control Pollutants.
___ 10. Control De-Watering.
___ 11. Maintain BMPs
___ 12. Manage the Project.

2. Project Description

Describe the project; include the items a through d below

___ a. Total project area.
___ b. Total proposed impervious area.
___ c. Total proposed area to be disturbed, including off-site borrow and fill areas.
___ d. Total volumes of proposed cut and fill.

3. Existing Site Conditions

Describe the existing site conditions; include the items a through c below

___ a. Description of the existing topography.
___ b. Description of the existing vegetation.
___ c. Description of the existing drainage.

Construction Stormwater Pollution Prevention Plan Checklist

Project Name: _____
Project Number: _____

4. Adjacent Areas

___ I. Description of adjacent areas which may be affected by site disturbance

- ___ a. Streams
- ___ b. Lakes
- ___ c. Wetlands
- ___ d. Residential Areas
- ___ e. Roads
- ___ f. Other

___ II. Description of the downstream drainage path leading from the site to the receiving body of water. (Minimum distance of 400 yards.)

5. Critical Areas

___ a. Description of critical areas that are on or adjacent to the site.
___ b. Description of special requirements for working in or near critical areas.

6. Soils

___ Description of on-site soils.

- ___ a. Soil name(s)
- ___ b. Soil mapping unit
- ___ c. Erodibility
- ___ d. Settleability
- ___ e. Permeability
- ___ f. Depth
- ___ g. Texture
- ___ h. Soil Structure

7. Erosion Problem Areas

___ Description of potential erosion problems on site.

8. Construction Phasing

___ a. Construction sequence
___ b. Construction phasing (if proposed)

Construction Stormwater Pollution Prevention Plan Checklist

Project Name: _____
Project Number: _____

9. Construction Schedule

___ I. Provide a proposed construction schedule.

___ II. Wet Season Construction Activities
- ___ a. Proposed wet season construction activities.
- ___ b. Proposed wet season construction restraints for environmentally sensitive/critical areas.

10. Financial/Ownership Responsibilities

___ a. Identify the property owner responsible for the initiation of bonds and/or other financial securities.

___ b. Describe bonds and/or other evidence of financial responsibility for liability associated with erosion and sedimentation impacts.

11. Engineering Calculations

___ 1. Provide Design Calculations.
- ___ a. Sediment Ponds/Traps
- ___ b. Diversions
- ___ c. Waterways
- ___ d. Runoff/Stormwater Detention Calculations

Construction Stormwater Pollution Prevention Plan Checklist

Project Name: _____

Project Number: _____

Section II - Erosion and Sediment Control Plans

1. General

___ a. Vicinity Map
___ b. City of _____ Clearing and Grading Approval Block
___ c. Erosion and Sediment Control Notes

2. Site Plan

___ a. Legal description of subject property.
___ b. North Arrow
___ c. Indicate boundaries of existing vegetation, e.g. tree lines, pasture areas, etc.
___ d. Identify and label areas of potential erosion problems.
___ e. Identify any on-site or adjacent surface waters, critical areas and associated buffers.
___ f. Identify FEMA base flood boundaries and Shoreline Management boundaries (if applicable)
___ g. Show existing and proposed contours.
___ h. Indicate drainage basins and direction of flow for individual drainage areas.
___ i. Label final grade contours and identify developed condition drainage basins.
___ j. Delineate areas that are to be cleared and graded.
___ k. Show all cut and fill slopes indicating top and bottom of slope catch lines.

3. Conveyance Systems

___ a. Designate locations for swales, interceptor trenches, or ditches.
___ b. Show all temporary and permanent drainage pipes, ditches, or cut-off trenches required for erosion and sediment control.
___ c. Provide minimum slope and cover for all temporary pipes or call out pipe inverts.
___ d. Show grades, dimensions, and direction of flow in all ditches, swales, culverts and pipes.
___ e. Provide details for bypassing off-site runoff around disturbed areas.
___ f. Indicate locations and outlets of any dewatering systems.

4. Location of Detention BMPs

___ a. Identify location of detention BMPs.

Construction Stormwater Pollution Prevention Plan Checklist

Project Name: _____
Project Number: _____

5. Erosion and Sediment Control Facilities

___ a. Show the locations of sediment trap(s), pond(s), pipes and structures.
___ b. Dimension pond berm widths and inside and outside pond slopes.
___ c. Indicate the trap/pond storage required and the depth, length, and width dimensions.
___ d. Provide typical section views through pond and outlet structure.
___ e. Provide typical details of gravel cone and standpipe, and/or other filtering devices.
___ f. Detail stabilization techniques for outlet/inlet.
___ g. Detail control/restrictor device location and details.
___ h. Specify mulch and/or recommended cover of berms and slopes.
___ i. Provide rock specifications and detail for rock check dam(s), if applicable.
___ j. Specify spacing for rock check dams as required.
___ k. Provide front and side sections of typical rock check dams.
___ l. Indicate the locations and provide details and specifications for silt fabric.
___ m. Locate the construction entrance and provide a detail.

6. Detailed Drawings

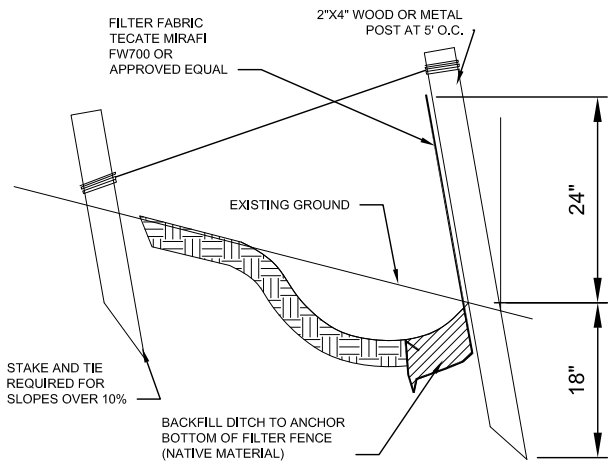
___ a. Any structural practices used that are not referenced in the Ecology Manual should be explained and illustrated with detailed drawings.

7. Other Pollutant BMPs

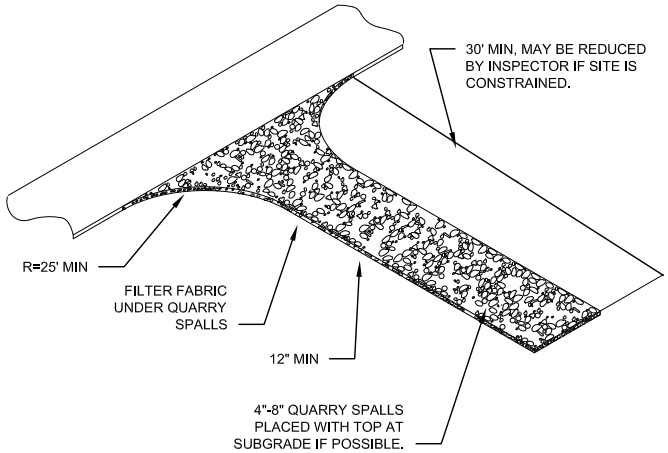
___ a. Indicate on the site plan the location of BMPs to be used for the control of pollutants other than sediment, e.g. concrete wash water.

8. Monitoring Locations

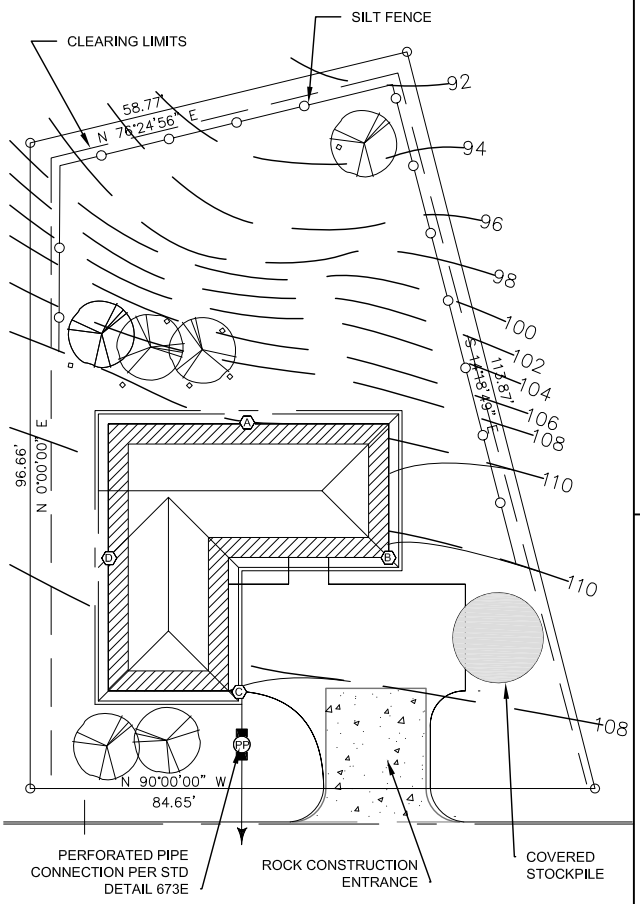
___ a. Indicate on the site plan the water quality sampling locations to be used for monitoring water quality on the construction site, if applicable.



SILT FENCE

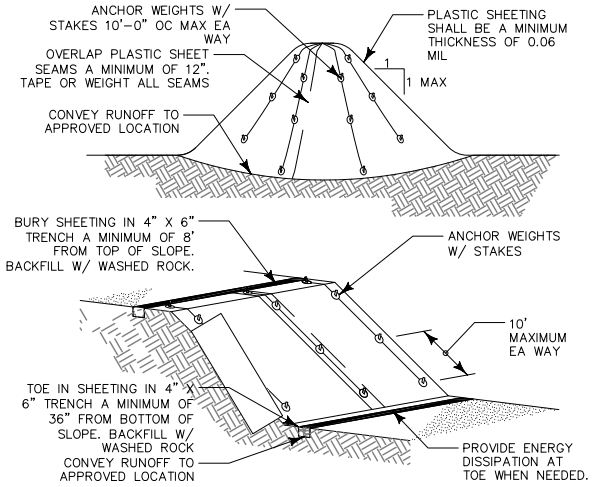


ROCK CONSTRUCTION ENTRANCE

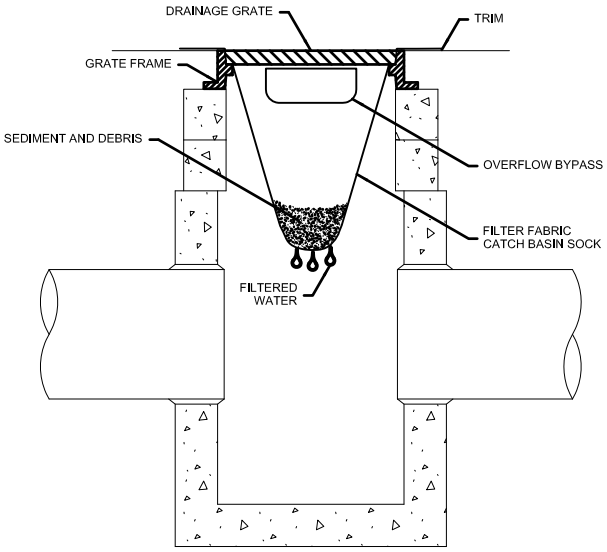


MAIN STREET

SAMPLE CONSTRUCTION SITE



STOCKPILES & SLOPE PROTECTION



STORM DRAIN INLET PROTECTION

SINGLE FAMILY RESIDENCE EROSION AND SEDIMENT BEST MANAGEMENT PRACTICES

CityofRedmond
WASHINGTON

TESC TIP SHEET

Appendix R
Standard Notes

STANDARD NOTES

CLEARING, GRADING AND TEMPORARY EROSION CONTROL PLANS

1. All work and materials to be per City of Redmond Standards.

2. Keep off-site streets clean at all times. Flushing streets shall not be allowed. All streets should be swept.

3. Additional erosion/sediment control measures may be required by City Inspector.

4. When work is stopped/completed in an area, the City Inspector may require post-construction erosion control including seeding or other measures.

5. Locations shown of existing utilities are approximate. It shall be the responsibility of the contractor to verify the correct locations to avoid damage or disturbance.

6. It shall be the responsibility of the contractor to obtain street use and other related permits prior to any construction.

7. All ground cover is to remain undisturbed outside of clearing areas.

8. The temporary erosion/sediment controls shall be installed, inspected, and operating before any grading or extensive land clearing. These controls must be satisfactorily maintained until construction and landscaping are complete.

9. Tie impervious surfaces (roof, streets, driveways, etc.) to completed drainage system as soon as possible.

10. A Pre-Construction Meeting with the Construction Division and all permits must be completed before start of construction.

11. Clearing limits shall be located by a licensed Civil Engineer or Land Surveyor.

12. Approval of this temporary erosion/sedimentation control (TESC) plan does not constitute an approval of permanent road or drainage design.

13. This approval for TESC is valid for construction between May 1 and September 30. This approval for TESC is not valid for the rainy season (October 1 through April 30).

14. Remove all TESC measures once all work is completed and site is permanently stabilized.