

CITY OF BRIER



2015 STORMWATER MANAGEMENT PLAN UPDATE

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2015 Stormwater Comprehensive Plan
City of Brier, Washington

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EXECUTIVE SUMMARY

The City of Brier is faced with a number of significant stormwater management (SWM) challenges, including local flooding issues and expanding regulatory requirements. To assist the City in addressing these challenges, PACE Engineers, Inc. (PACE) has been retained to review its existing Stormwater Management Program and develop a Stormwater Management Plan Update. The purpose of this Plan is to provide the City with a planning document that satisfies local, state, and federal stormwater regulatory requirements and allows the City to plan for and replace critical Capital Improvement Projects (CIP) Plan, as well evaluate funding options.

This Plan evaluates the City's existing Stormwater Management Program, including facility infrastructure and regulatory compliance. It also includes funding options and an implementation plan to satisfy the requirements of the National Pollutant Discharge Elimination System (NPDES) Western Washington Phase II Permit (Permit) and initiate the City's CIP Plan.

The Plan defines the City's stormwater drainage program needs by setting priorities and identifying corresponding funding, equipment, and stormwater capital improvements. A long-term funding strategy was developed to address CIPs and regulatory compliance activities, has been developed to help guide the funding and implementation process.

This report has been built upon and summarizes the technical information and memoranda that were prepared during this Plan development and other available data sources including:

- The City's 1998 Stormwater Management Plan
- The City's 2008 Comprehensive Plan
- The 2013 Stormwater Management Program NPDES Permit document
- The 2010 Stormwater Pollution Prevention Plan (SWPPP)
- The 2010 Stormwater Utility Rate Study

The main outcome of this Plan is a proposed stormwater utility rate increase to help the City fund increasing regulatory requirements and four CIP projects with a total cost of \$1,740,00. See Table EC-1 below for a summary of the CIPs and their estimated project costs and construction year.

Table EC-1: Future Capital Improvements Program			
Project Name	Priority Ranking	Estimated Project Cost	Construction Year
Murphy Pond Stabilization	#1	\$276,000	2020
Brierwood Pond LID Retrofit	#2	\$664,000	2017
Public Works Decant Facility	#3	\$500,000	2024
Abbeyview Culvert Repairs	#4	\$300,000	2027
Total		\$1,740,000	
<i>The total project costs includes an escalation factor of 2.0 percent per year to represent the future cost of the project in the year scheduled for design and construction.</i>			

Based on the forecasted revenues for the Stormwater Utility consistent with the City goals and policies set forth herein, the proposed rate adjustments are anticipated to produce additional revenues to allow for the continued implementation of the NPDES Permit requirements and also build a reserve for equipment repairs and replacements, capital projects, and Stormwater Program management. Table EC-2 below provides the proposed stormwater rates for 2015-2020.

Table EC-2: 2015 – 2020 Proposed Stormwater Rates						
Year	2015	2016	2017	2018	2019	2020
Rate (Per Month)*	\$9.50	\$10.00	\$10.50	\$11.00	\$11.50	\$12.50
<i>*The stormwater utility fee is for a developed single family residence with an equivalent charge for non-residential properties based upon the rate per each 2,000 square feet of impervious area.</i>						

The structure of the Plan is presented in the following chapters and technical Appendices, as outlined below:

CHAPTERS

- Chapter 1 – Introduction
- Chapter 2 – Planning Area Characteristics
- Chapter 3 – Regulatory Requirements
- Chapter 4 – Operation and Maintenance
- Chapter 5 – Capital Improvement Program
- Chapter 6 – Stormwater Program Recommendations
- Chapter 7 – Stormwater Utility Rate Study

APPENDICES

- Appendix A: SEPA Checklist
- Appendix B: Interlocal Agreement with Snohomish County Conservation District
- Appendix C: 2012 Buildable Lands Report from Snohomish County
- Appendix D: Isopluvial Maps
- Appendix E: NPDES Phase II Permit for Western Washington
- Appendix F: Swamp Creek TMDL Monitoring Data
- Appendix G: NPDES Phase II Permit Code Gap Analysis Technical Memorandum
- Appendix H: Stormwater Pollution Prevention Plan for the Public Works Facility
- Appendix I: Murphy Pond Memo (dated August 12, 2009 and updated on June 18, 2010) prepared by Hammond Collier Wade Livingstone

Appendix J: CIP Sheets and Cost Estimates

Appendix K: 2014 Association of Washington Cities Stormwater Utility Rate Survey

Appendix L: Stormwater Utility's Annual Revenue and Expenditures (2011-2014)

Appendix M: 2015-2020 Stormwater Utility Financial Model

To assist in the reading of the document, *lists of abbreviations and definitions* have been provided in the front to the document.

This project was funded and managed through a Department of Ecology Capacity Grant, and administered by City staff. Input and direction were also periodically received from City staff.

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ACRONYMS AND ABBREVIATIONS

<u>TERM</u>	<u>DEFINITION</u>
BMC	Brier Municipal Code
BMP	Best Management Practices
CCWF	Centennial Clean Water Fund
CIP	Capital Improvement Projects
City	City of Brier
Corps	Army Corps of Engineers
CPI	Consumer Price Index
CWA	Clean Water Act
Ecology	Department of Ecology
EPA	Environmental Protection Agency
ERU	Equivalent Rate Unit.
ESU	Equivalent Service Unit
ESA	Endangered Species Act
GMA	Growth Management Act
HSG	Hydrologic Soil Group
HPA	Hydraulic Project Approvals
IDDE	Illicit Discharge Detection and Elimination
ILA	Interlocal Agreement
LID	Low Impact Development
MRSC	Municipal Research Service Center of Washington
MS4	Municipal Separate Storm Sewer System
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System Program
O&M	Operation and Maintenance
Permit	NPDES Phase II Permit
QAPP	Quality Assurance Project Plan
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SRF	State Revolving Fund
SWM	Stormwater Management
SWM Plan	Stormwater Management Plan
SWMMWW	Stormwater Management Manual for Western Washington
SWMP	Stormwater Management Program
TMDL	Total Maximum Daily Load
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area 8

DEFINITIONS¹

TERM

DEFINITION

AKART

An acronym that means all known, available, and reasonable methods of prevention, control, and treatment. AKART shall represent the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge. The concept of AKART applies to both point and nonpoint sources of pollution. The term “best management practices” typically applies to nonpoint source pollution controls, and is considered a subset of the AKART requirement. The stormwater management manual may be used as a guideline, to the extent appropriate, for developing best management practices to apply AKART for stormwater discharges.

Best Management Practice (BMP)

The schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices, that when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington State.

Catch Basin

A drainage structure which collects water. May be either a structure where water enters from the side or through a grate.

Conveyance System

The drainage facilities, both natural and man-made which collect and carry surface and stormwater flow. Includes gutters, drainage inlets, pipes, catch basins, manholes, channels, swales, ditches, small drainage courses, streams, and rivers.

Critical Areas

At a minimum, areas which include wetlands, areas with a critical recharging effect on aquifers used for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, geologically hazardous areas, including unstable slopes, and associated areas and ecosystems.

Detention

The release of stormwater runoff from the site at a slower rate than it is collected by the stormwater facility system, the difference being held in temporary storage.

¹ The majority of these definitions are sourced from the Washington Department of Ecology (Ecology) Western Washington Phase II Municipal Stormwater Permit (Phase II Permit). Definitions not provided from the Phase II Permit were taken from other sources, including Ecology's Stormwater Management Manual for Western Washington and Environmental Protection Agency's (EPA) NPDES website glossary.

TERM**DEFINITION**

Detention Facility	A type of drainage facility designed either to hold water for a considerable length of time and then release it by evaporation, plant transpiration, and/or infiltration into the ground; or to hold surface and stormwater runoff for a short period of time and then release it to the surface and stormwater management system.
Groundwater	Water in a saturated zone or stratum beneath the land surface or a surface water body.
Impervious	A surface which cannot be easily penetrated. For instance, rain does not readily penetrate paved surfaces.
Infiltration	Means the downward movement of water from the surface to the subsoil.
Low Impact Development (LID)	Low Impact Development (LID) is an innovative stormwater management approach with a basic principle that is modeled after nature: manage rainfall at the source using uniformly distributed decentralized micro-scale controls. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. Techniques are based on the premise that stormwater management should not be seen as stormwater disposal.
Maintenance	Activities conducted to extend the life cycle and ensure proper operation of existing facilities. Maintenance should not expand the use or capacity of a facility beyond the existing or designed use and results in no significant adverse hydrologic impact.
Maintenance Standard	Describes the condition when cleaning, repair, or other maintenance is required for a given facility.
National Pollutant Discharge Elimination System (NPDES)	The national program for issuing, modifying, revoking, reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Federal Clean Water Act, for the discharge of pollutants to surface waters of the state from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington Department of Ecology.
Permit	NPDES Western Washington Phase II Municipal Stormwater Permit, issued by the Department of Ecology on January 17, 2007, and modified June 17, 2009. A new Permit was issued on August 1, 2013.

TERM**DEFINITION**

Plan	Stormwater Management Plan: The document that describes the City's Stormwater Management Program, including capital improvement projects and the enforcement of regulations and requirements of the Department of Ecology and other agencies. The Plan also includes a financial analysis and a stormwater utility rate study.
Pollutant	A waste material that pollutes wind, water, or soil. A non-stormwater discharge that enters the stormwater collection and conveyance system.
Receiving Waters	Any water body receiving stormwater runoff, including surface water, groundwater, and the stormwater collection and conveyance system.
Runoff	Water originating from rainfall and other precipitation that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes and wetlands as well as shallow ground water. As applied in this manual, it also means the portion of rainfall or other precipitation that becomes surface flow and interflow.
Stormwater	That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.
Water Quality	The chemical, physical, and biological characteristics of water, usually with respect to its suitability for a particular purpose.

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CHAPTER 1

INTRODUCTION

The City of Brier, Washington, is a suburban residential community occupying 1,382.3 acres¹ with approximately 6,345 residents. In 2012, a 35-acre area called Allview Heights was annexed to the City. The City is located in Snohomish County, Washington, about 15 miles north of the City of Seattle. It is also just north of the City of Lake Forest Park and Lake Washington, east of the City of Mountlake Terrace, and north of the City of Kenmore. Interstate-5, located just to the west, is the region's major north-south Interstate Highway system. Figure 1-1 on page 1-3 shows a vicinity map of the City showing its general location in relationship to Interstate-5, Lake Washington, and Puget Sound, and Figure 1-2 on page 1-5 presents the 35-acre area of Allview Heights which was recently annexed to the City.

1.1 BACKGROUND AND PURPOSE OF THE STUDY

The City of Brier desires to update their current Stormwater Management Plan (Plan) prepared by Hammond, Collier & Wade-Livingstone Associates in December 1998. The project's scope of work included the following three elements:

- 2015 Stormwater Management Plan Update
- GIS Mapping Update
- Stormwater Utility Rate Study

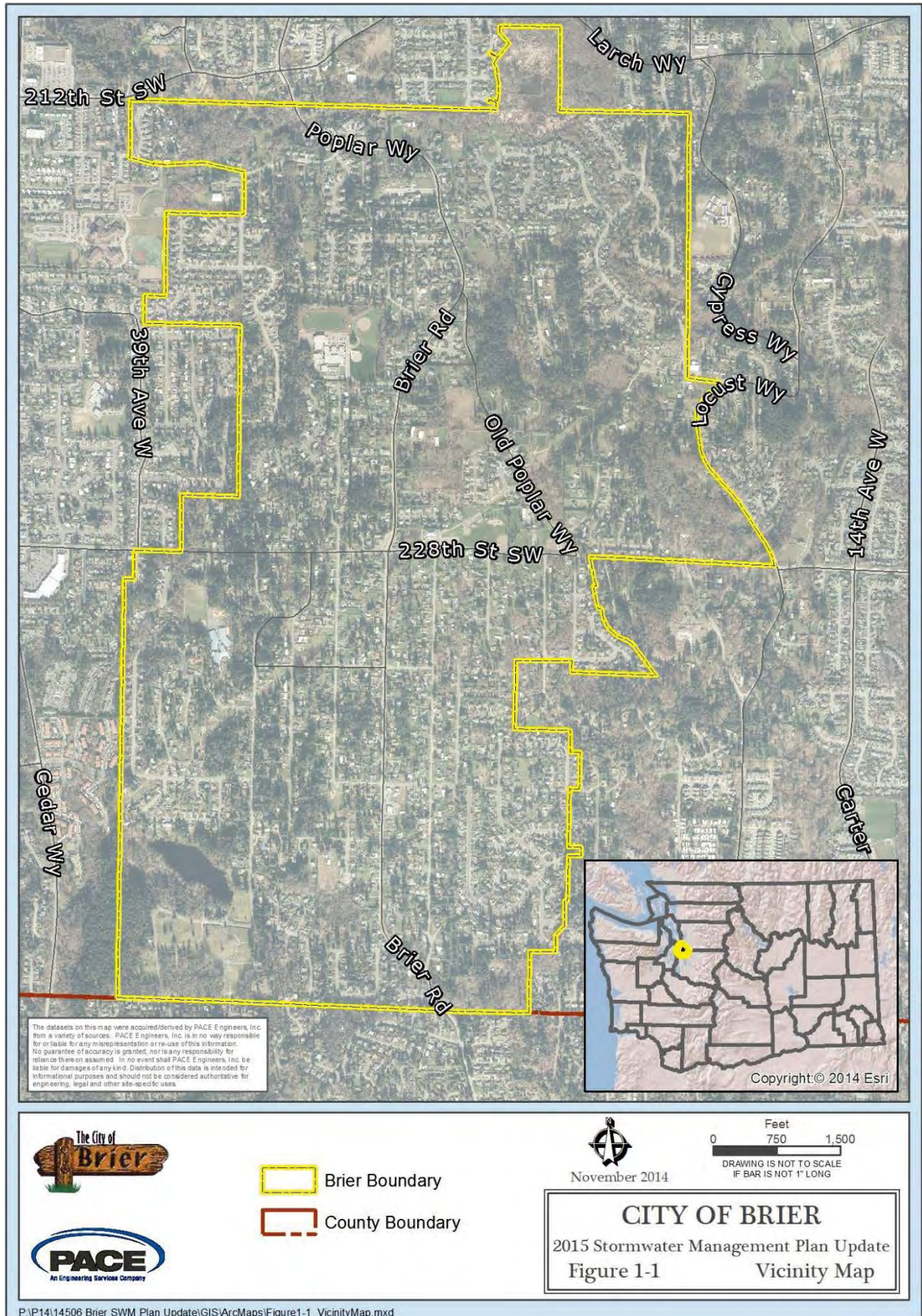
The Stormwater Management Plan is to act as the basis for the City's overall approach to stormwater management. The objective of this update is to remain compliant with the new National Pollution Discharge Elimination Permit (NPDES) Phase II Permit (August 2013-2018) for Western Washington, provide City staff with a workable plan to maintain the Municipal Separate Storm Sewer System (MS4), identify needed capital improvements, and conduct a stormwater utility funding and rate analysis.

The purpose of the City's SWM Program is to:

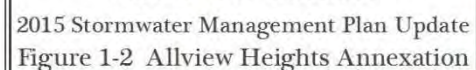
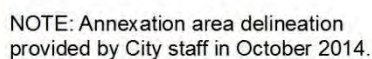
- Protect life and property from excess surface waters.
- Protect water quality by preventing siltation, contamination, and erosion of waterways.
- Protect local waterways, such as Swamp Creek, Scriber Creek, Lyon Creek, Creek 0056, and Lake Washington.
- Assure compliance with federal and state stormwater management and water quality requirements.
- Increase public education and citizen involvement.
- Encourage the preservation and enhancement of natural drainage systems that include wetlands and streams within the City.
- Continue to be an active participant in regional stormwater programs and groups.

¹ Acreage calculated by PACE Engineers on 11/7/2014. Source: City of Brier provided GIS City Boundary shapefile.

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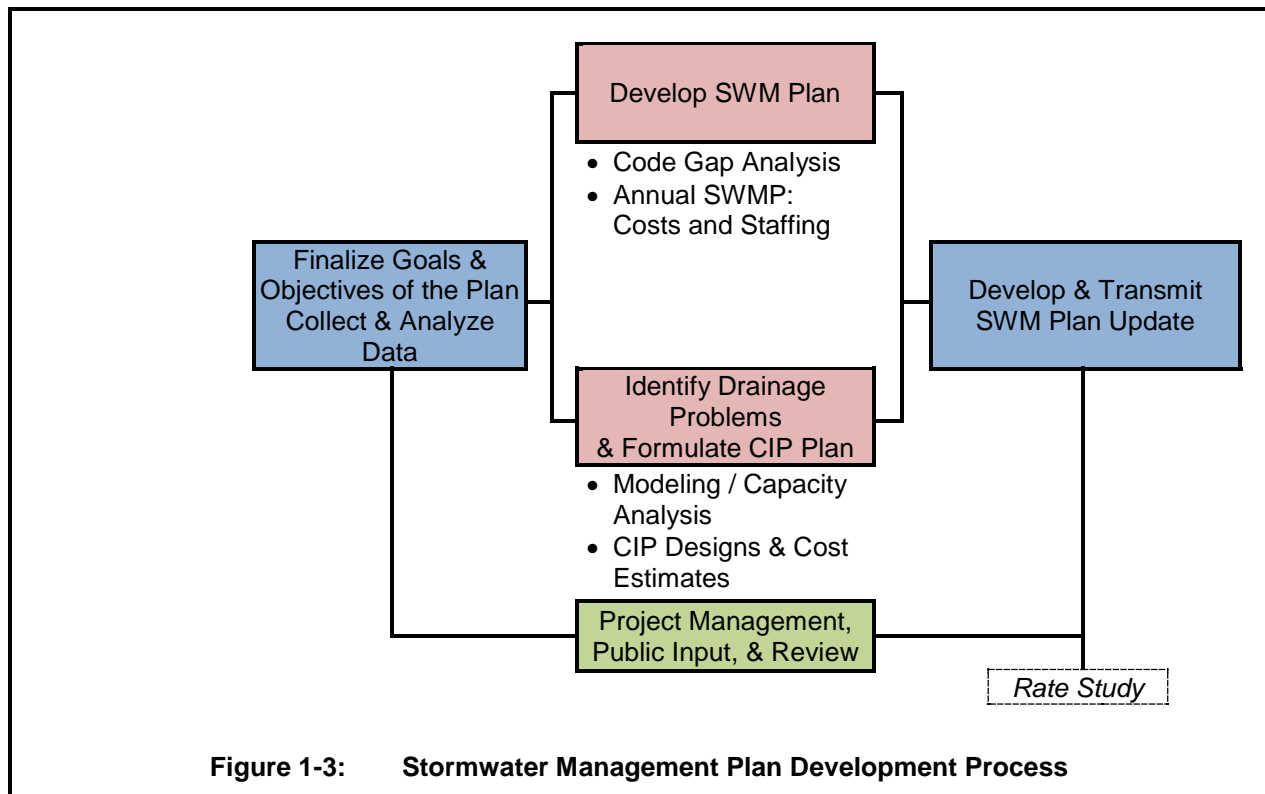
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1.2 OVERVIEW OF THE STORMWATER MANAGEMENT PLANNING PROCESS

The development of the City's updated Plan was conducted in a series of steps that consisted of the following activities, as listed below and shown in the flow chart presented in Figure 1-3 below. The Stormwater Management Plan development process included the following:

- Data collection
- NPDES Phase II Permit Gap Analysis of City's Stormwater Codes
- Listing of various City regulatory requirements and Stormwater Management Program (SWMP) objectives
- Identifying stormwater operation and maintenance needs including equipment and facilities
- Developing an annual Capital Improvement Projects (CIP) Plan
- Compiling the City's SWMP elements into a guidance document that establishes needed SWMP activities and CIPs
- Conducting a Stormwater Utility Rate Study



1.3 STORMWATER PLANNING GOALS

The goal of this Plan development process is to create an updated SWMP that:

1. Supports the Growth Management Act (GMA) planning process by providing the water quality, habitat, and stormwater infrastructure program elements.
2. Provides drainage infrastructure to support future growth.
3. Assesses the current level of services being provided by the Utility and recommends activities for an improved SWM Program, as documented in an updated SWM Plan.
4. Develops a comprehensive stormwater CIP list for short- and long-term implementation that addresses the City's stormwater conveyance and flow control objectives as well as its water quality challenges.
5. Develops an effective financial plan that identifies and ensures adequate levels of long-term funding to address both capital and programmatic needs.

1.4 PLAN OVERVIEW, ORGANIZATION AND SUMMARY OF RESULTS

1.4.1 *Chapter 1: Introduction*

Chapter 1 summarizes the Plan planning process and provides an overview of the organization, format, and content of the study. It also presents a listing of the goals, objectives, and policies of the City's Stormwater Program.

1.4.2 *Chapter 2: Planning Area Characteristics*

Chapter 2 summarizes the characteristics of the City's Planning Area and includes a description of this area and discussion of the City's existing stormwater collection system. The study area is characterized by land use, population, climate, topography, and soils.



City of Brier Stormwater Detention Pond

1.4.3 Chapter 3: Regulatory Requirements

Chapter 3 summarizes the stormwater regulatory requirements under which the City is currently operating, or could be in the near future, including: the Clean Water Act (CWA), the NPDES Phase II Permit, the Endangered Species Act (ESA), the Puget Sound Action Agenda, the Growth Management Act (GMA), and regional watershed planning and coordination.

1.4.4 Chapter 4: Operation and Maintenance

Chapter 4 summarizes the existing Operation and Maintenance (O&M) Program and makes recommendations for a future O&M program including equipment needs and costs. Like the SWM Program, the future O&M program is designed around the requirements of the NPDES Phase II Permit.

1.4.5 Chapter 5: Capital Improvement Projects Plan

Chapter 5 summarizes the recommended stormwater CIPs, including detailed descriptions, project sketches, and cost estimates. Problem areas and proposed projects are rated and ranked to form the prioritized annual CIP Plan presented in this chapter.

1.4.6 Chapter 6: Future Stormwater Management Program Recommendations

Chapter 6 summarizes the future SWM Program recommendations. The recommendations include those stormwater activities needed to address the requirements of the NPDES Phase II Permit, as well as CIP needs and associated annual levels of staffing and funding.

1.4.7 Chapter 7: Stormwater Utility Rate Study

Chapter 7 summarizes the stormwater utility rate study conducted as part of this project, as well as other funding strategies the City could pursue to fund CIPs and the annual SWM Program.

1.4.8 Appendices

The documents included in the appendices provided technical support that was needed for the development of an effective SWM Plan.

1.5 STORMWATER IN BRIER

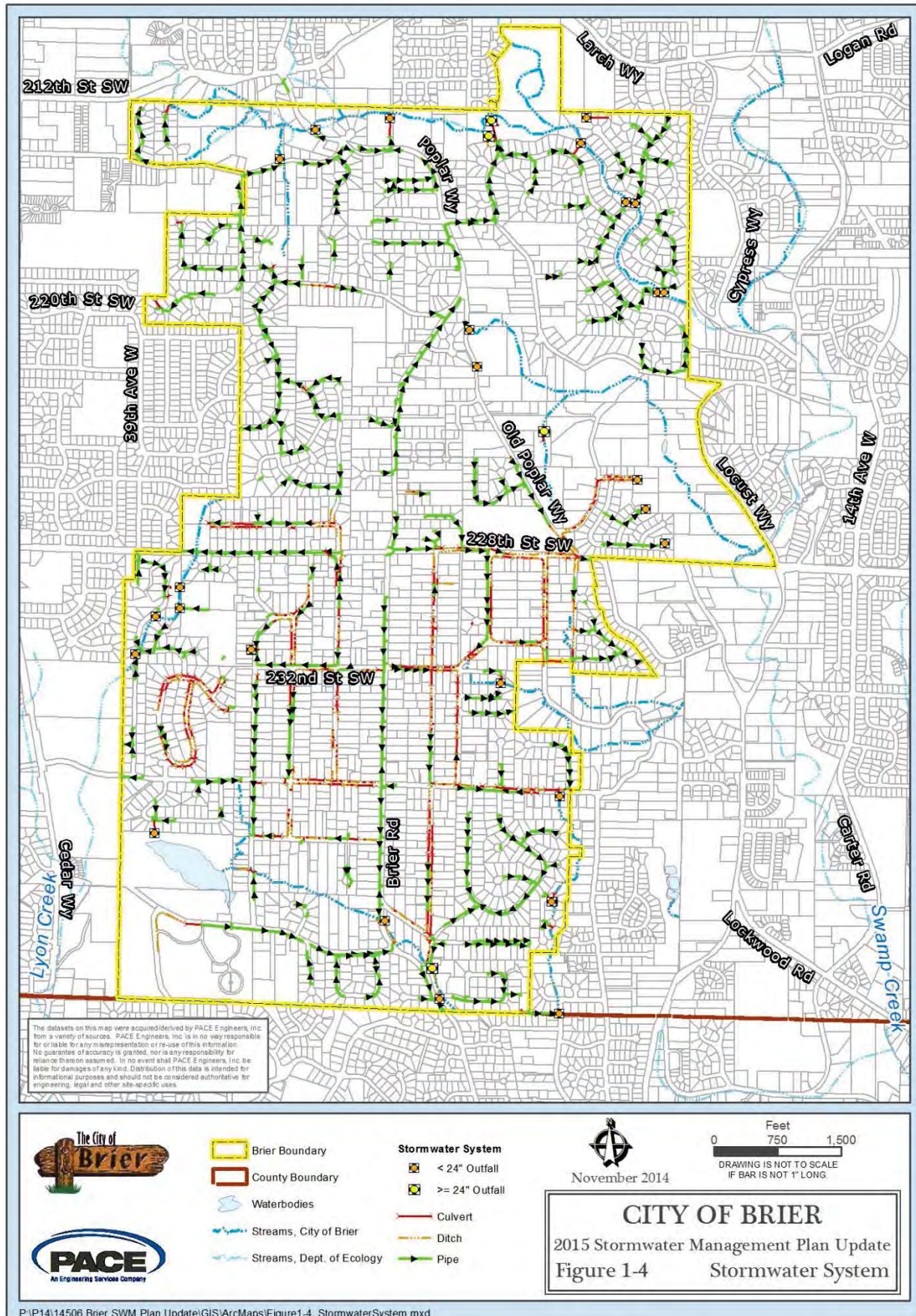
The 2008 Stormwater Management Plan identifies four primary watersheds in Brier: Swamp Creek, Scriber Creek (tributary to Swamp Creek), Lyon Creek, and Creek 0056 ("Kenmore Creek"). The Swamp Creek watershed consists of approximately 222 acres and is located in the east central part of Brier. The Scriber Creek watershed is the largest watershed, containing approximately

Brier is served primarily by a system of open grass-lined ditches and 12-inch-diameter storm drains/culverts with catch basins in the older developed areas of the City. In the newer developments in the City, stormwater detention vaults and detention pipes are used for stormwater drainage. Figure 1-3 shows the areas of the City that are served by the stormwater drainage systems.

476 acres, and is located in the north part of the City. The Lyon Creek watershed is located in west central Brier and is comprised of approximately 215 acres. Creek 0056 is located in the south part of Brier and consists of approximately 450 acres.²

Brier is served primarily by a system of open grass-lined ditches and 12-inch-diameter storm drains/culverts with catch basins in the older developed areas of the City. In the newer developments in the City, stormwater detention vaults and detention pipes are used for stormwater drainage. Figure 1-3 on page 1-11 shows the areas of the City that are served by the stormwater drainage systems.

² 2008 City of Brier Comprehensive Plan



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Dual Culverts under Brierwood Road

1.5.1 Summary of Flooding and Water Quality Issues

The 1998 Stormwater Management Plan identified general drainage problems in Brier that include local ponding, erosion, basement or crawl space flooding, and potential water quality problems. The Plan concluded that these problems are due to the increase of impervious surface and the presence of glacial till soils in the area.

Since the 1998 SWM Plan was published, several areas of concern have been addressed, including:

1. An area detention facility has been completed on Old Poplar Way east of the street at Hickory Way.
2. Old Poplar Way cracking and settlement problems have been addressed through improvements made by new development in the area.
3. The City has installed culverts and catch basins to reduce ponding and pavement scouring in the Vine Road area between approximately 219th Street SW and the Seattle City Light easement.
4. The accelerated erosion in the ravine at Brier Road and Old Poplar Way caused by storm drain discharge from an 18-inch storm drain is addressed as part of conditions on development in that area.
5. In the ravine on the east side of Old Poplar Way at approximately 222nd Street SW the City addressed the erosion problems from stormwater piped under Old Poplar Way by capping off the pipe.
6. Open ditch installation and piping under driveways on Hickory Way has been completed.

There are four remaining areas of concern that are addressed in the CIP Plan and detailed in Chapter 5:

- Abbeyview Pond Conveyance
- Brierwood Pond Low Impact Development (LID) Retrofit
- Public Works Decant Facility Upgrade
- Murphy Regional Pond Stabilization

1.6 VISION, MISSION, GOALS, AND POLICIES OF THE CITY'S STORMWATER MANAGEMENT PROGRAM

The City has seen increased urban development and changes in the stormwater regulatory environment in the last ten years, warranting the development of an updated SWM Plan. The SWM Plan builds on existing policies of the City to ensure that the goals of the SWM Program are being met. The SWM Plan also builds off the work completed as part of the 1998 City of Brier Stormwater Management Plan and the 2008 City of Brier Comprehensive Plan, including the completion of the following projects to address flooding and water quality problems and the need for a new stormwater decant facility:

- Abbeyview Pond Conveyance
- Brierwood Pond Low Impact Development (LID) Retrofit
- Public Works Decant Facility Upgrade
- Murphy Regional Pond Stabilization



Abbeyview Pond

1.6.1 Vision:

The Vision of the City's SWM Program is to preserve and enhance the standard of living for the people of Brier by strengthening economic conditions and restoring and protecting the unique natural environment and water quality of Lake Washington and Puget Sound Basins.

1.6.2 Mission:

The Mission of the City's SWM Program is to develop and maintain a comprehensive stormwater infrastructure management program to protect property, health, and safety; to enhance quality of life; to preserve and improve the environment for the benefit of the public, and to be responsive and sensitive to the needs of residents, property owners, and public partners.

1.6.3 SWM Program Goals:

The SWM Program goals are to:

- Ensure that utilities including stormwater are available or can be provided to support current and future development. (*GOAL UT 1.0 from the 2008 Comprehensive Plan*).
- Address flooding problems with drainage improvement projects to reduce the occurrence of property flood damage.
- Review, enact, and enforce ordinances and policies as needed to prevent future flooding of developed areas.
- Enhance water quality to preserve the natural environment while maintaining regulatory compliance with the Department of Ecology's Western Washington NPDES Phase II Permit.
- Enhance the natural environment to benefit people, fish, and wildlife.
- Provide adequate and sustained funding for the City's stormwater management programs with an equitable stormwater utility rate.

The City's SWM program goals above are met by the development and implementation of specific policies, each with their own unique set of objectives. The four sets of policies include:

- Policies for Drainage and Flow Control
 - Adopt the most current Department of Ecology (Ecology) standards for stormwater runoff (*includes Policy UT 4.1 from 2008 City of Brier Comprehensive Plan*).
 - Encourage non-structural as well as structural solutions to stormwater control (*includes Policy UT 4.3 from 2008 City of Brier Comprehensive Plan*).
 - New construction should be designed so that peak stormwater discharge is no greater than the discharge that occurred prior to any previous or supposed development (*includes Policy UT 4.4 from 2008 City of Brier Comprehensive Plan*).

- Design street systems to provide that stormwater within the right-of way will be maintained within the street area (*includes Policy UT 4.5 from 2008 City of Brier Comprehensive Plan*).
- Policies for Water Quality
 - Adopt the most current Washington Department of Ecology standards for stormwater runoff (*includes Policy UT 4.1 from 2008 City of Brier Comprehensive Plan*).
- Policies for Financial Stability
 - Provide an adequate and cost-effective method of preventing property damage from local stormwater (*includes Policy UT 4.2 from 2008 City of Brier Comprehensive Plan*).

Each set of policies is discussed below.

1.6.4 Drainage and Flood Control Policies

By design, the primary function of the City's stormwater system is to convey urban runoff away from homes and businesses in order to reduce flooding during major storm events. The following policies support the goal of managing urban drainage to protect public and private property:

1. Continuing to use the design criteria presented in the Department of Ecology's 2012 Stormwater Management Manual for Western Washington (*and 2014 Manual modifications – due to be published 12/17/2014*) (*Policies UT 4.1 and UT 4.3 from 2008 City of Brier Comprehensive Plan*).
2. Implementing the Department of Ecology's 2012 Stormwater Management Manual for Western Washington (*and 2014 Manual modifications – due to be published 12/17/14*) or the latest edition adopted by the City for the design and construction of all stormwater facilities on new development or redevelopment sites (*Policies UT 4.1 and UT 4.3 from 2008 City of Brier Comprehensive Plan*).
3. Ensuring that stormwater planning efforts are consistent with the comprehensive planning efforts of the City (i.e., roads, land use, water, sewer, parks, etc.).
4. Continuing public education and outreach on the issues of stormwater, water quality, and urban drainage (*Policy UT 4.3 from 2008 City of Brier Comprehensive Plan*).
5. Requiring improvements to the City's stormwater system as part of new development and redevelopment projects.
6. Utilizing historic rainfall data to properly size stormwater collection and conveyance systems, including stormwater trunk lines.
7. Implementing an ongoing stormwater Capital Improvement Program to design, repair, and replace stormwater infrastructure throughout the City.
8. Designing street systems to ensure that stormwater within the right-of-way will be maintained within the street area (*Policy UT 4.5 from 2008 City of Brier Comprehensive Plan*).

1.6.5 Water Quality Policies

The goal of reducing stormwater pollution and protecting water quality throughout the City is achieved by implementing the following water quality policies:

1. Maintain compliance with the Federal Clean Water Act through compliance with the existing Department of Ecology's Western Washington NPDES Phase II Permit and the new NPDES Permit, effective August 1, 2013 (*Policy UT 4.1 from 2008 City of Brier Comprehensive Plan*).
2. Implement the Department of Ecology's 2012 Stormwater Management Manual and 2014 Manual Modifications for Western Washington for water quality treatment and LID design.
3. Continue participation in the Western Washington NPDES Phase II Permit Coordinators' Meeting.
4. Encourage Low Impact Development (LID) practices in CIPs and new/redevelopment projects.
5. Encourage onsite infiltration and the development of landscape and screening standards that facilitate dual use as stormwater facilities and increase stormwater infiltration.
6. Eliminate illicit discharges and connections throughout the City.
7. Implement and enforce the City's ordinances to reduce stormwater pollution from illicit discharges, construction activities, and the operation and maintenance of post-construction stormwater facilities.
8. Use the 2012 Puget Sound LID Guidance Manual to guide the use of LID practices in BMPs through the Utility Service Area.

1.6.6 Financial Policies

The City's financial goal is to provide adequate and sustained funding to support the SWM Plan, including the City's stormwater management programs. In order to meet this goal, the City's financial policies are:

1. Maintain equitable and local utility rates.
2. Provide an adequate and cost-effective method of preventing property damage from local stormwater (*Policy UT 4.2 from 2008 City of Brier Comprehensive Plan*).
3. Use stormwater utility rate methodologies that are consistent with other Western Washington NPDES Phase II Permittees.
4. Ensure the stormwater utility rate will generate the revenue needed to cover operating and capital costs for the City's stormwater management programs.
5. Pursue grant opportunities for capital improvement projects and NPDES Permit compliance activities; use a "pay as you go" approach to fund capital improvement projects.
6. Develop a plan for long-term stormwater infrastructure replacement, and ensure that it is included in Financial Policy #2 above.

1.7 SEPA CHECKLIST

As part of this Plan, a State Environmental Policy Act (SEPA) document was completed to identify possible environmental impacts that may result as an outcome of the adoption of this Plan. A copy of the SEPA is provided in Appendix A.

1.8 INTERLOCAL AGREEMENTS

The City of Brier currently has an Interlocal agreement (ILA)³ with the Snohomish County Conservation District for educational services. The City's education program is developed locally and regionally, and coordinated with the District. See Appendix B for a copy of the ILA.

The City currently has a verbal agreement (no written ILA has been signed) with the City of Mountlake Terrace to conduct Swamp Creek TMDL Monitoring. However, due to recent staff changes at the City of Mountlake Terrace, the City of Brier may be conducting their own Swamp Creek TMDL/water quality monitoring in the future.

³ Letter of program commitment – *Natural Yard Care – Regional Delivery & Education* dated September 4, 2013.

CHAPTER 2

PLANNING AREA CHARACTERISTICS

To characterize the City of Brier from a drainage and stormwater management perspective, the technical information presented in Chapter 2 has been grouped according to the following topics, as outlined below: description of the City, description of physical features of the planning area, description of the city's stormwater drainage system.

- Description of the City
 - Location
 - City Population
 - Existing
 - Future
 - Land Use
 - Existing
 - Future
- Description of the Physical Features of the Planning Area
 - Climate/Rainfall
 - Topography
 - Soils
 - Vegetative Cover
 - Groundwater
 - Critical Areas
 - Drainage Basins
- Description of the City's Stormwater Drainage System
 - Existing Stormwater Collection System
 - Description of the Collection System
 - Major Drainage Features
 - Pipe Sizes and Materials

2.1 LOCATION

The City is located in Snohomish County, Washington, about 15 miles north of the City of Seattle. It is also just north of the City of Lake Forest and Lake Washington, east of the City of Mountlake Terrace, and west of the City of Kenmore. I-5, located just to the west, is the region's major north-south Interstate Highway system.

The City of Brier is located in Snohomish County to the east of Interstate-5 and just north of Lake Washington. The City totals 1,382.3 acres¹ and includes the City's Urban Growth Area (UGA) (see Figure 1-1: Vicinity Map on page 1-3 for the location of the City) and the recent annexation area of 35 acres. The City is located in Snohomish County, Washington, about 15 miles north of the City of Seattle. It is also just north of the City of Lake Forest and Lake Washington, east of the City of Mountlake

Terrace, and west of the City of Kenmore. I-5, located just to the west, is the region's major north-south Interstate Highway system.



City of Brier City Hall, home of Public Works and the Stormwater Management Program

2.2 CITY POPULATION²

2.2.1 Historic Growth In Population

The City of Brier's population target provided from Snohomish County shows a 2011 population estimate of 6,201 with a 2035 population target of 7,011.³ The projected population growth rate will be less than historical growth trends.

¹ Acreage calculated by PACE Engineers on 11/7/2014. Source: City of Brier provided GIS City Boundary shapefile.

² 2008 City of Brier Comprehensive Plan

³ Population data provided by City Staff (Nicole Gaudette, City Planner) via email correspondence on October 16, 2014.

In the ten-year period between 1980 and 1990, the population of Brier grew by 2,718 people, for an average annual growth rate of 9.32%. In the ten-year period between 1990 and 2000, population grew by 750 people for an average growth rate of 1.33%.⁴ In this case, the projections forecast an additional 1,330 people in Brier, an increase of 13.06% from 2011 to 2035. This slowing growth rate reflects the overall trend in existing urban areas in the County similar to Brier. As the amount of vacant land decreases over time, the rate of growth also slows. The projected increase in population 2011 to 2035 can largely be accommodated within the City limits, with some portion in the UGA.

For additional information see the 2012 Buildable Lands Report from Snohomish County in Appendix C.

2.3 LAND USE⁵

The Land Use Element addresses existing and future land uses in the City of Brier and its surrounding UGA, and presents the community's policy plan for growth over the next 20 years.

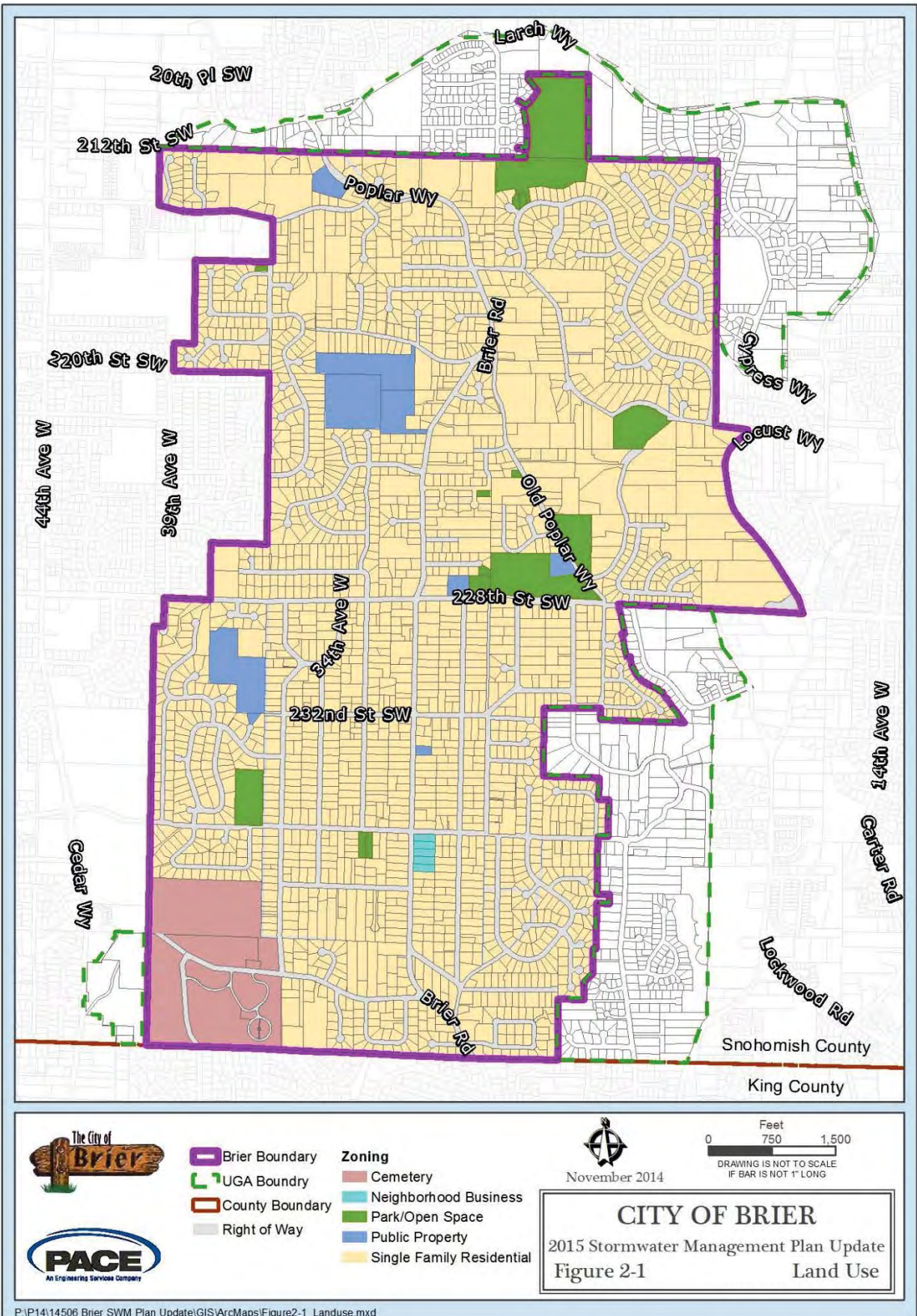
The Land Use Element is the heart of the City's 2008 comprehensive plan. It is the focal point for analyzing and weighing the interrelationships between various comprehensive plan elements and for achieving consistency between elements. The Land Use Element serves to carry out the long-range character and "vision" of its citizens.

A community's Land Use Element establishes the desirable character, quality, and pattern of the physical environment, which is the stage on which a community's day-to-day activities are played out. It specifies the appropriate amount and location of various land uses and establishes the appropriate densities of permitted land use in the City. The Land Use Element guides public and private decisions about when, where, and how future development takes place and where public facilities are located. It governs the development of land use regulations and other programs that will implement land use policy direction, including the stormwater program (see Figure 2-1 on page 2-5, the City's Land Use Map)

⁴ 2008 City of Brier Comprehensive Plan

⁵ 2008 City of Brier Comprehensive Plan

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2.3.1 Land Use Inventory

The inventory of existing land uses can be used to gauge the proportion of total land area that the city may need to devote to each land use in the future. The existing proportions and distribution of land uses may be adjusted for shifts in the desires or needs of citizens, or to accommodate projected future needs, including addressing stormwater management program needs for new facilities and the construction of CIPs.

The City of Brier is almost entirely composed of low-density single-family residential development. There is one residential zoning designation, which comprises approximately 1,219 acres, almost 90 percent of the area of the City. The purpose of the residential use designations, as stated in the Zoning Ordinance (5/91), "is to provide an area for single-family residential development, while retaining Brier's semi-rural character and lifestyle."

The existing proportions and distribution of land uses may be adjusted for shifts in the desires or needs of citizens, or to accommodate projected future needs, including addressing stormwater management program needs for new facilities and the construction of CIPs.

Other land uses in Brier include parks and open space (57.0 acres), cemetery (67.65 acres), and public property (38.77 acres). There are no known sites, structures, or lands with historical or archaeological significance within Brier.

Table 2-1 below provides the approximate acreage of various land use types present in the City of Brier.

Table 2-1: Land Use ⁶	
Land Use Type	Total Area (acres)
Cemetery	67.65
Neighborhood Business	2.61
Park/Open Space	57.00
Public Property	38.77
Single-Family Residential	1218.04
Total	1384.07*
*Please note: the City's Land Use GIS shapefile has overlapping polygons. The GIS shapefile/data was not revised for this project; therefore the total area reported in this table is greater than the City's total boundary area of 1,382.3 acres reported in Chapter 1 and previously in this chapter.	

⁶ Land Use Acreage calculated by PACE Engineers, Inc. on 11/7/2014. Source: City of Brier provided GIS City Land Use shapefile.

2.3.2 Urban Growth Area (UGA)

The proposed UGA expansion for Brier is comprised of approximately 115 acres.⁷ The UGA boundaries were changed in cooperation with the City of Bothell in order to eliminate an overlap in the Urban Growth Boundary area. The boundaries were redrawn in order to be consistent with the Fire District 1, which serves the City of Brier, and Fire District 10 which serves the City of Bothell only.

2.4 CLIMATE/RAINFALL EVENTS

The Snohomish County area has a mild climate, which is classified as a “Marine West Coast” climate by meteorologists. Moist air flowing from the North Pacific condenses to rainfall as it meets the western face of the Cascades. The wet season is from October through April and the dry season is from May through September. The City can expect approximately 36 inches of rain annually. The normal July temperature is about 63 degrees Fahrenheit, while a normal January temperature is 40 degrees Fahrenheit.⁸

The precipitation data for the City are⁹:

- 2-year, 24 hour: 1.75 inches
- 10-year, 24 hour: 2.30 inches
- 100-year, 24 hour: 3.50 inches

Copies of the Isopluvial maps from the 2009 King County Surface Water Design Manual can be found in Appendix D.

2.5 TOPOGRAPHY

The topography of the City dictates where stormwater naturally flows, and defines the drainage basin boundaries. It also influences where future development may occur. The topography of the area is shown on Figure 2-2: City of Brier Topography on page 2-9. The topographic map is developed from GIS data provided by the City of Brier.

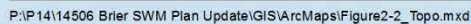
The elevation in the City ranges from approximately 170 feet where Locust Creek meets Swamp Creek to 480 feet. The high point is roughly in the middle of the City in the vicinity of 228th Street SW and Brier Road. Generally, this central portion of the City is relatively flat, with water draining into the four major watersheds of Swamp Creek, Scriber Creek (tributary to Swamp Creek), Lyon Creek, and Creek 0056. The steep slopes in the City are generally along seasonal and year-round stream corridors. The steepest slopes are approximately 50 to 55 percent.¹⁰ Figure 2-2 shows the various topographic elevations throughout the City of Brier.

⁷ UGA Acreage provided by City Staff (Nicole Gaudette) via email correspondence on October 28, 2014.

⁸ 1998 City of Brier Stormwater Management Plan

⁹ <https://fortress.wa.gov/ecy/publications/publications/0510031.pdf>

¹⁰ 1998 City of Brier Stormwater Management Plan



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2.6 SOILS

The soils types found in any given area greatly influence stormwater runoff, infiltration potential, and water table level. A majority of the soils within the Brier city limits are of the Alderwood group. The other major soil groups inside the City are found in smaller areas, and include the Everett series, Kitsap series, McKenna series, Mukilteo series, and the Norma series.

Information on the various soil types is presented below and is taken from the Soil Survey of Snohomish County, U.S. Soil Conservation Service and Snohomish County GIS soils data.¹¹

For this study, the soils within the City have been grouped according to the Soil Conservation Service hydrologic soil groups, which gives general indication of stormwater runoff potential. The Hydrologic Soil Group (HSG) classifies the soils according to the infiltration rates of soils bare of vegetation. Slope and plant cover are not considered in grouping, but are separate factors in predicting runoff.¹² The four groups and their characteristics are summarized in Table 2-2.

Table 2-2: City of Brier Soil Types¹³			
Soil Type	Acres	Percent	HSG
Alderwood gravelly sandy loam, 15 to 25 percent slopes	184.48	13.36%	C
Alderwood gravelly sandy loam, 8 to 15 percent slopes	33.20	2.40%	C
Alderwood-Everett gravelly sandy loams, 25 to 70 percent slopes	14.34	1.04%	C
Alderwood-Urban land complex, 2 to 8 percent slopes	735.41	53.26%	C
Alderwood-Urban land complex, 8 to 15 percent slopes	199.61	14.46%	C
Everett gravelly sandy loam, 0 to 8 percent slopes	19.23	1.39%	A
Everett gravelly sandy loam, 15 to 25 percent slopes	45.82	3.32%	A
Kitsap silt loam, 0 to 8 percent slopes	12.14	0.88%	C
McKenna gravelly silt loam, 0 to 8 percent slopes	51.26	3.71%	D
Mukilteo muck	19.32	1.40%	D
Norma loam	37.07	2.68%	D
Urban land	22.98	1.66%	–
Water	5.95	0.43%	–
Grand Total	1,380.81	100.00%	
<i>*Please note: The Snohomish County GIS soils shapefile for the City of Brier has a deficient of approximately 50,000 square feet; therefore the total area reported in this table is less than the City's total boundary area of 1,382.3 acres reported in Chapter 1 and previously in this chapter.</i>			

Figure 2-3 on page 2-13 shows the various soil types throughout the City of Brier. What follows is a written descriptive summary of each soil type in the City.

¹¹ 1998 City of Brier Stormwater Management Plan

¹² 1998 City of Brier Stormwater Management Plan

¹³ Soils Acreage calculated by PACE Engineers, Inc. on 11/7/2014. Source: Snohomish County Soils Layer.

- Alderwood Gravelly Sandy Loam and Alderwood Urban Land¹⁴

The soils of the Alderwood series formed in glacial till are the most common of the soils in the study/interest area. Native vegetation is mainly conifers and hardwoods. These soils are moderately deep and moderately well drained. The surface layer is gravelly sandy loam. The subsoil is very gravelly sandy loam. A weakly cemented hardpan is at a depth of about 35 inches, but can range from 20 to 40 inches.

The Alderwood Urban Land area consists of Alderwood gravelly sandy loam and urban land that has been altered such that soils identification is not feasible.

Permeability of the Alderwood soil is moderately rapid above the hardpan layer, and very slow through it. Infiltration potential is moderately low, and runoff is moderate. Seasonal perched water is at a depth of 18 to 36 inches from January to March due to the shallow perched water table. Drainage systems are needed for buildings with crawlspaces and basements.

- Everett Gravelly Sandy Loam¹⁵

The Everett Series soils are found in the northeast of the City in the lower Scriber Creek watershed, and in the south of the City, southeast of the Abbey View Cemetery and along Alaska Road. The soils of the Everett series formed in glacial outwash (advance stratified drift) and occur on terraces and outwash plains. These soils are very deep and somewhat excessively drained. The surface layer is typically dark brown gravelly sandy loam to about 6 inches. The upper substratum is very gravelly sandy loam and very gravelly loamy sand. The lower substratum, to about 60 inches, is extremely gravelly sand, which is weakly cemented in some areas.

Permeability of the Everett soil is rapid, and runoff is typically slow. These soils generally are well suited for infiltration systems. However, due to rapid seepage, there is some risk of groundwater contamination from onsite sewage systems, and stormwater treatment via infiltration may have limited success. Site-specific soil testing should be done to determine feasibility of onsite stormwater infiltration.

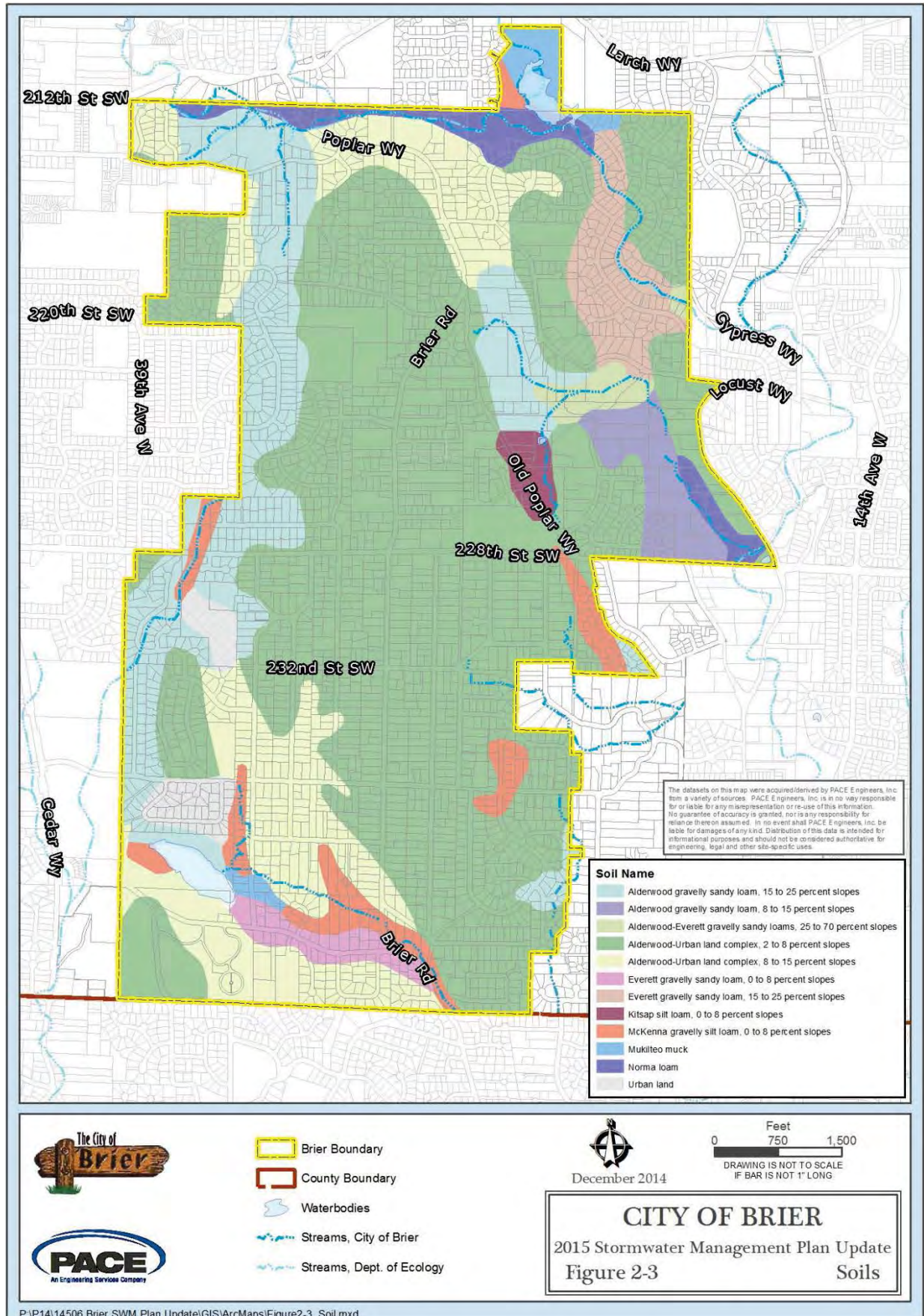
- Kitsap Loam¹⁶

Kitsap soils are identified in one area of the City, along Old Poplar Way near the Public Works Yard. The Kitsap series consists of very deep, moderately well drained soils on terraces and terrace escarpments. These soils formed in lacustrine (lake) sediment. Permeability is slow with a high water-holding capacity. A seasonal perched water table occurs at a depth of 18 to 30 inches from December to May. Drainage systems are needed for buildings with crawlspaces or basements, and conventional septic drainfields often fail.

¹⁴ 1998 City of Brier Stormwater Management Plan

¹⁵ 1998 City of Brier Stormwater Management Plan

¹⁶ 1998 City of Brier Stormwater Management Plan



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- McKenna Gravelly Silt Loam (32)¹⁷

McKenna soils are found in small areas of the City, in several pockets near Abbey View Cemetery near 236th Street SW, the intersection of 27th Place W, and in the vicinity of 27th Avenue W.

The soil of this series occurs in depressional areas and drainage ways on till plains. It formed in glacial till. A seasonal perched water table is at a depth of 0 to about 6 inches and ponding occurs from November to April. Compact glacial till is at a depth of 33 inches and the effect of this layer on use and management is similar to that of hardpan. Permeability of this soil is slow and is generally not well suited to stormwater infiltration systems.

- Mukilteo Muck¹⁸

Soils in the Mukilteo series are found in the City at the outlet of the Abbey View Cemetery Pond, in the vicinity of 35th Avenue W. Mukilteo muck is a very deep, very poorly drained soil in depressional areas. It formed in organic material, and the native vegetation is sedges and rushes. The upper layer is typically 4 inches of muck underlain by about 50 inches of varying organic materials. Below this depth to about 60 inches is fine sandy loam. Small areas of peat are included in some places. The water table is at or near the surface from October to May, and ponding is common.

- Norma Loam(39)¹⁹

Norma soils are hydric soils located in the City along Scriber Creek and the lower portions of Locust Creek. Hydric soils are almost always associated with wetlands, except when the soils have been drained for very long periods. This soil is very deep, poorly drained, and is found in depressional areas on outwash plains and till plains. It is formed in alluvium. Permeability of the Norma soil is moderately rapid; however, due to the moderate water holding capacity of the soil and the presence of a high water table, ponding occurs from November to April. This soil series is poorly suited to urban development.

- Urban Land²⁰

This map unit consists of gently sloping areas previously covered with streets, buildings, and other development, such that soils identification is not feasible.

¹⁷ 1998 City of Brier Stormwater Management Plan

¹⁸ 1998 City of Brier Stormwater Management Plan

¹⁹ 1998 City of Brier Stormwater Management Plan

²⁰ 1998 City of Brier Stormwater Management Plan

Below is a written descriptive summary of each hydrologic soil group.

Hydrologic Soil Group Type A: Low runoff potential. Soils having slow infiltration rates, even when thoroughly wetted, and consisting of chiefly deep, well-drained to excessively-drained sands or gravels. These soils have a high rate of water transmission. Note: There are no HSG Type A soils in the City.

Hydrologic Soil Group Type B: Moderately low runoff potential. Soils having moderate infiltration rates when thoroughly wetted, and consisting chiefly of moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission. Note: There are no HSG Type B soils in the City.

Hydrologic Soil Group Type C: Moderately high runoff potential. Soils having slow infiltration rates when thoroughly wetted, and consistently chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine textures. These soils have a slow rate of water transmission.

Hydrologic Soil Group Type D: High runoff potential. Soils having very slow infiltration rates when thoroughly wetted, and consisting chiefly of clay soils with a high swelling potential; soils with a permanent high water table; soils with a hardpan, till, or clay layer at or near the surface; soils with a compacted subgrade at or near the surface; and shallow soils or nearly impervious materials. These soils have a very slow rate of water transmission.

2.7 VEGETATIVE COVER

From an aerial viewpoint, the City of Brier's vegetative cover is mostly forested between the single-family residential rooftops and roadways.

2.8 GROUNDWATER²¹

The occurrence of groundwater is determined in part by the presence of certain soil types. According to the 1998 Stormwater Management Plan, an aquifer underlies the area in the unconsolidated deposits of Vashon tills and advance stratified

The occurrence of groundwater is determined in part by the presence of certain soil types. An aquifer underlies the area, in the unconsolidated deposits of Vashon tills and advance stratified drift.

drift. It is thought to be lens-shaped and flow in a southeasterly direction. Another aquifer underlies the Vashon till, and is located in the advance stratified drift of Esperance Sand. It has a depth of approximately 400 to 500 feet. Localized perched water tables also occur in areas of the City, created by the relatively shallow hardpan layers.

Further information can be obtained from "Ground-Water Resources of Snohomish County, Washington", USGS, 1952.

²¹ 1998 City of Brier Stormwater Management Plan

2.9 CRITICAL AREAS

The Brier 2008 Comprehensive Land Use Plan discusses sensitive areas within the City Limits, including wetlands, fish and wildlife conservation areas, and geologic hazard areas. The City adopted a Sensitive Areas Ordinance in February 1992 in accordance with the Growth Management Act. The Ordinance provides regulations to protect environmentally sensitive areas such as wetlands, habitat areas, and flood and geologic hazard areas by specifying protective buffers and setbacks for development.²²

In 2011 the City passed Ordinance 389 § 1 (Exhibit A) to codify Title 18: Critical Areas of the Brier Municipal Code (BMC). Critical areas discussed in the code includes²³:

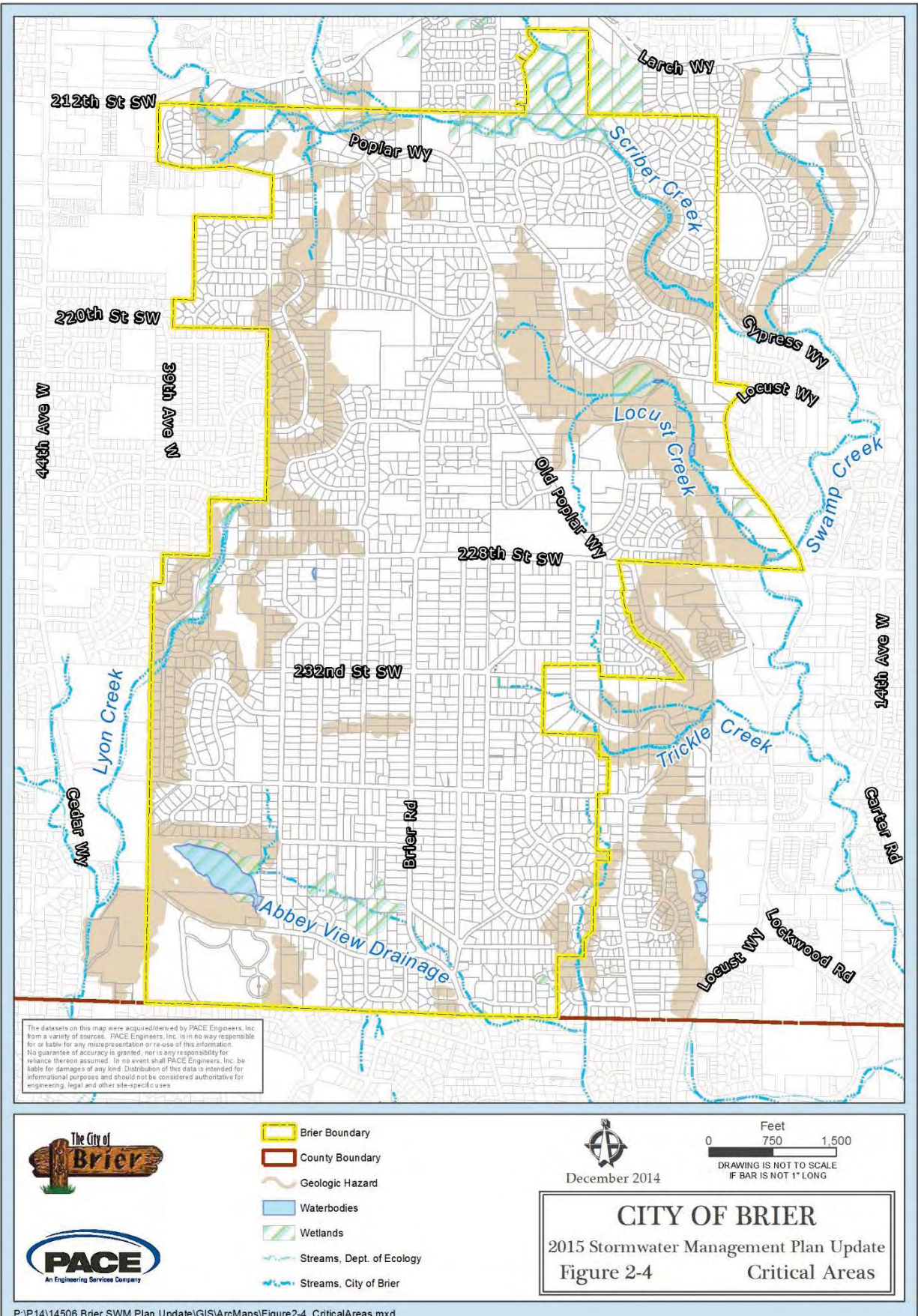
- Wetlands (BMC 18.20)
- Critical aquifer recharge areas (BMC 18.30)
- Frequently flooded areas (BMC 18.40)
- Geologically hazardous areas (BMC 18.50)
- Stream (BMC 18.60)
- Fish and wildlife habitat conservation area (BMC 18.70).

See Figure 2-4 on page 2-19 for the City's Critical Areas mapping.

²² 1998 City of Brier Stormwater Management Plan

²³ BMC Title 18: Critical Areas

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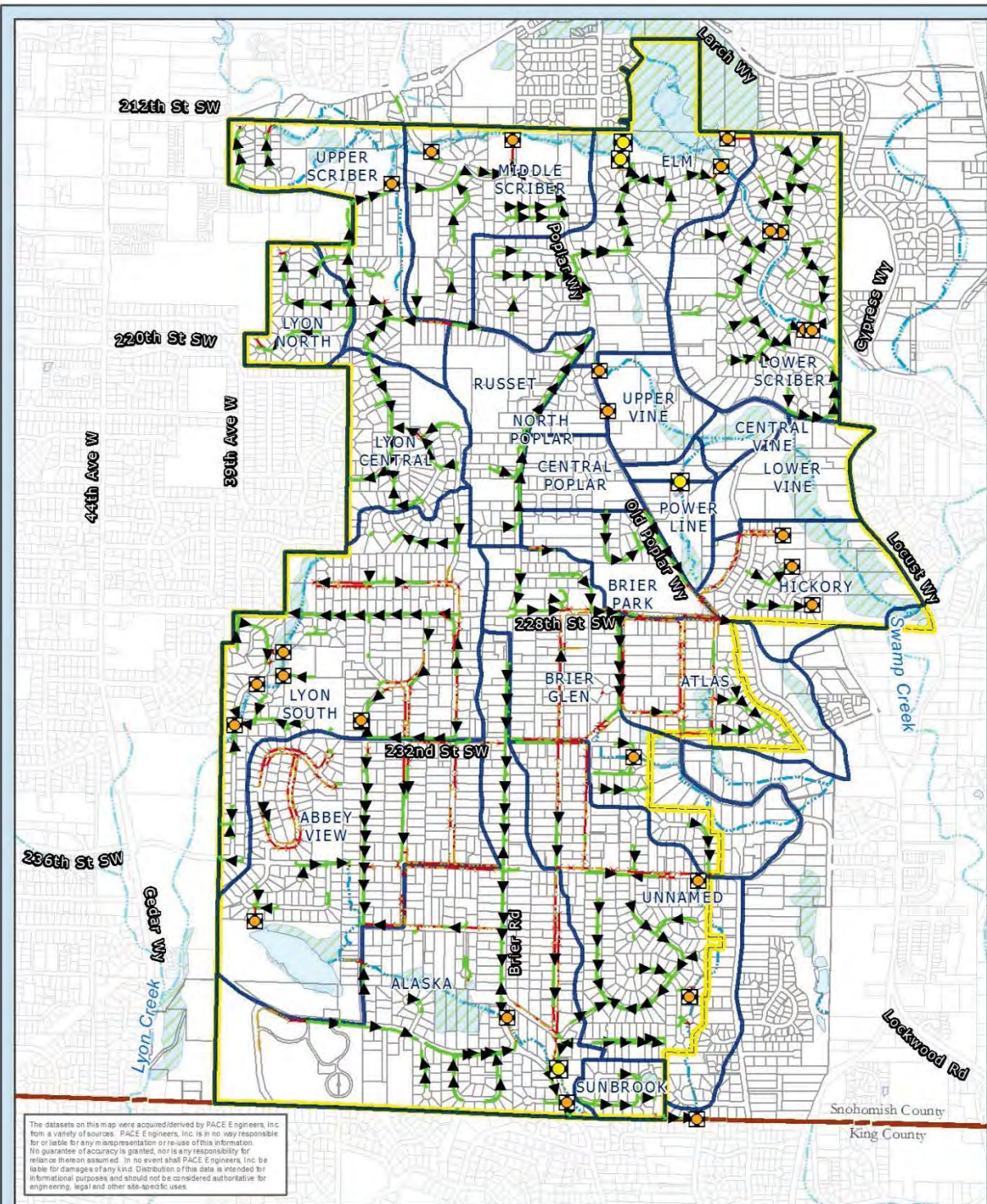
2.10 DRAINAGE BASINS

For the purposes of this study, the City's drainage basins have been grouped based on four primary watersheds as shown in Figure 2-5: Drainage Basins on page 2-23. See Table 2-3 for the total areas of all drainage subbasins within the City, including the recently annexed area of Allview Heights.

Table 2-3: Subbasin Areas²⁴			
Subbasin Name (Drainage Basin)	Total Area (acres)	Area within City Limits (acres)	Percentage (%) of Total within City Limits
Abbey View (Creek 0056)	141.21	141.21	10.2
Alaska (Creek 0056)	195.17	195.17	14.1
Atlas (Swamp Creek)	62.68	42.43	3.1
Brier Glen (Swamp Creek)	101.73	78.73	5.7
Brier Park (Swamp Creek)	31.60	31.60	2.3
Central Poplar (Swamp Creek)	20.88	20.88	1.5
Central Vine (Swamp Creek)	10.97	10.97	0.8
Elm (Scriber Creek)	114.54	114.54	8.3
Hickory (Swamp Creek)	54.85	49.57	3.6
Lower Scriber (Scriber Creek)	106.27	106.27	7.7
Lower Vine (Swamp Creek)	32.87	32.87	2.4
Lyon Central (Lyon Creek)	44.45	44.45	3.2
Lyon North (Lyon Creek)	25.97	25.97	1.9
Lyon South (Lyon Creek)	144.60	144.60	10.4
Middle Scriber (Swamp Creek)	68.62	68.62	4.9
North Poplar (Swamp Creek)	10.02	10.02	0.7
North Power Line (Swamp Creek)	5.20	5.20	0.4
Power Line (Swamp Creek)	14.66	14.66	1.1
Russet (Swamp Creek)	44.50	44.50	3.2
Sunbrook (Creek 0056)	12.97	12.97	0.9
Unnamed (Creek 0056)	123.78	99.83	7.2
Upper Scriber (Scriber Creek)	67.29	67.29	4.8
Upper Vine (Swamp Creek)	25.73	25.73	1.9
Total	1,460.56	1,388.08*	100.0
<i>*Some drainage basins in the GIS shapefile (Source: City of Brier GIS shapefile) had a sliver of area that went beyond the City boundary (approximately 10 feet); therefore the total drainage basin area is greater than the total City area (Source: City of Brier GIS shapefile) reported in Chapters 1 and earlier in this chapter.</i>			

²⁴ Drainage Basins Acreage calculated by PACE Engineers, Inc. on 11/7/2014. Source: City of Brier provided GIS City Drainage Basins shapefile.

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- Brier Boundary
- County Boundary
- Drainage Basins
- Waterbodies
- Wetlands
- Streams, City of Brier
- Streams, Dept. of Ecology

- Stormwater System**
- < 24" Outfall
 - ≥ 24" Outfall
 - Culvert
 - Ditch
 - Pipe



November 2014

Feet
0 750 1,500
DRAWING IS NOT TO SCALE
IF BAR IS NOT 1" LONG

CITY OF BRIER
2015 Stormwater Management Plan Update
Figure 2-5 Stormwater Basins

P:\P14\14506 Brier SWM Plan Update\GIS\ArcMaps\Figure2-5_Basins.mxd

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2.10.1 Swamp Creek²⁵

Although a very short length of Swamp Creek flows through the City of Brier city limits, a large portion of the area within the city limits drains into Swamp Creek and one of its tributaries, Scriber Creek.

The Swamp Creek basin is located in south Snohomish County and north King County. The area of the basin is approximately 15,500 acres (24.2 square miles), and is approximately 11 miles long and 2 miles wide. The basin drains from north to south, roughly from Paine Field in Everett to the Sammamish River and Lake Washington in the south. The predominant existing land use is developed and developing residential areas, commercial areas, Paine Field, and a smaller amount of industrial development. Greater than 27 percent of Swamp Creek watershed is in impervious surfaces as of the 1994 SWMP.



Local Stream located downstream of 35th Avenue

Anadromous (migratory) and resident fish are found in Swamp Creek, including coho and chinook salmon (both natural and hatchery fish), sockeye salmon, trout, and steelhead (King County, 1997). However, fisheries habitat has been degraded due to several factors related to development within the watershed, and salmonid populations have significantly decreased since the late 1970s (King County, 1997).

The City is currently responsible for complying with a Total Maximum Daily Load (TMDL) on Swamp Creek per the requirements of their NPDES Phase II Permit. For further details on the TMDL, see *Chapter 3 – Regulatory Requirements*.

2.10.2 Scriber Creek²⁶

Scriber Creek is located in south Snohomish County, and originates from Scriber Lake in Lynnwood. The Scriber Creek watershed is approximately 6.8 square miles (4,352 acres), with 460 acres within the City of Brier. Scriber Creek flows southeasterly, through Lynnwood, unincorporated Snohomish County, and into the northwest corner of Brier. Scriber Creek is a tributary to Swamp Creek, which flows just east of the city limits, near Cypress Way.

²⁵ 1998 City of Brier Stormwater Management Plan

²⁶ 1998 City of Brier Stormwater Management Plan

2.10.3 Lyon Creek²⁷

Western portions of the city drain to Lyon Creek which flows through the City of Mountlake Terrace and the City of Lake Forest Park where it is discharged into Lake Washington.

2.10.4 Creek 0056 (“Kenmore Creek”)²⁸

Abbeyview Pond and other southern drainage basins drain to Creek 0056 which flows through the City of Kenmore where it discharges into Lake Washington.

2.11 EXISTING STORMWATER COLLECTION SYSTEM

The City has a complete and updated stormwater GIS geodatabase. Table 2-4 provides a summary of the total number of catch basins, total number of outfalls, total miles of open channels, total miles of culverts and total miles of pipe within the City. The City’s stormwater system mapping does not include any map of detention ponds or other related stormwater features such as tanks or bioswales. See Figure 1-4 for a map of the City’s stormwater system.

Table 2-4: City of Brier Stormwater System Summary²⁹

Type of Conveyance or Facility	Total
Catch Basins	1,356
Outfalls	38
Open Channels	4.7 miles
Culverts	3.9 miles
Pipe	18.5 miles



Example of a City-owned Catch Basin

²⁷ 1998 City of Brier Stormwater Management Plan

²⁸ 1998 City of Brier Stormwater Management Plan

²⁹ Calculated by PACE Engineers, Inc GIS Staff on 10/16/2014. City’s GIS Stormwater System shapefile/data last updated in September, 2013.

CHAPTER 3

REGULATORY REQUIREMENTS

This chapter describes the various regulatory requirements and guidance documents that play a role in shaping the City's existing and future Stormwater Management Program. These requirements include various federal, state, regional, and local regulatory requirements, laws, and permits that help define the City's various stormwater-related policies, codes, and activities. For the purpose of writing this chapter, the requirements have been grouped by their origin: federal, state, regional, and local. The City's stormwater-related regulatory requirements include compliance with the following:

Federal Laws, Permits, and Requirements

- Clean Water Act
 - Department of Ecology's Western Washington National Pollutant Discharge Elimination System Program (City's NPDES Phase II Permit)
 - State 303d List and TMDL (Total Maximum Daily Load for Swamp Creek)
 - Section 404 Permits (as administered by the U.S. Army Corps of Engineers)
- Endangered Species Act (as administered by the Washington State Department of Ecology)

State Laws, Permits, and Requirements

- Growth Management Act
- Department of Fish and Wildlife Hydraulic Code

Regional Laws, Permits, and Requirements

- Puget Sound Action Agenda
- Regional Watershed Planning (WRIAs)

Local Laws, Permits, and Requirements

- City of Brier Municipal Code

3.1 CLEAN WATER ACT

The 1972 amendments to the Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), provide the regulatory and legal basis for the National Pollution Discharge Elimination System Permit (Permit) (See Appendix E for a copy of the Washington State NPDES Municipal General Stormwater Phase II Permit). The CWA includes a series of regulatory guidance documents, permits, and technical requirements to protect the water quality in the United States. The Federal Environmental Protection Agency (EPA) provides the basic structure for regulating the discharge of pollutants from point sources to waters of the United States through the NPDES Permit. The CWA allows the EPA to authorize the NPDES Permit Program to be delegated to the Washington State government for administration and enforcement of the Permit and associated TMDL water quality violations. The Permit applies to

both industrial and municipal stormwater discharges. The specific purpose of the Permit is to reduce stormwater runoff and the discharge of pollutants into our nation's receiving waters.

The City also comes under the regulatory arm of the U.S. Army Corps of Engineers in regard to Section 404 permits and the State Department of Fish and Wildlife in regard to Hydraulic Project Approvals (HPAs) related to streams, habitat, water quality, and wetland protection during construction projects within the City.

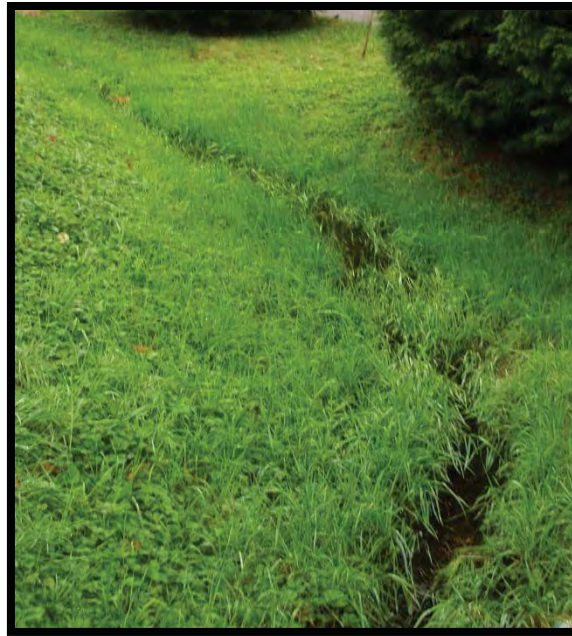
3.1.1 Department of Ecology's Western Washington National Pollutant Discharge Elimination System Program (NPDES)

Cities of a certain size and development density that own and operate a stormwater collection/conveyance system, referred to as Municipal Separate Storm Sewer System (MS4), are required to meet the requirements of the Permit, as defined for Western Washington by the Department of Ecology (Ecology). The origin of the Permit is the Federal CWA, as amended in the mid-1990s to include non-point sources of pollution that include stormwater and surface water runoff. Under federal and state law, municipalities that collect stormwater runoff in separate storm sewers and discharge to surface waters are required to have this Permit. This Permit is regulated and locally implemented by Ecology through the EPA delegation process. Most states in the Northwest, except for Idaho and Alaska, have assumed the delegation of the Permit from EPA at the state level.

The EPA stormwater regulations are administered through a two-phase Permit program: Phase I for large cities and counties, and Phase II for smaller cities. The Department of Ecology has been delegated authority to develop and administer these Permits throughout Washington State. The EPA regulations went into effect in early 2003 and apply to all cities, counties, and ports with regulated stormwater collection/conveyance systems.

For the State of Washington, the Department of Ecology has established separate permits for Eastern Washington and Western Washington. Each permit has a duration of five years. Ecology first issued the Western Washington NPDES Phase II Permit in 2007 and modified it in 2009. Ecology extended and reissued the 2007-2012 Permit on August 1, 2012, at legislative direction, to be effective through July 31, 2013. After an extensive public process, Ecology then reissued the updated 2013-2018 Permit on August 1, 2012, effective August 1, 2013. Ecology recently issued the new Permit, effective August 1, 2013, to over 80 cities and the urbanized areas within five counties in Western Washington, including the City of Brier. After a recent Pollution Control Hearings Board ruling (March 2014), the 2013-2018 Permit was modified. A modification to this Permit was published on December 17, 2014, and is effective on January 16, 2015¹. See Appendix E for a copy of the Western Washington NPDES Phase II Municipal Stormwater Permit.

¹ <http://www.ecy.wa.gov/programs/wq/stormwater/municipal/2012appeals.html> and <http://www.ecy.wa.gov/programs/wq/stormwater/municipal/phaseIIwww/wwphiipermit.html>



Local City of Brier Drainage Way

3.1.2 State 303(d) List and Total Maximum Daily Loads (TMDL)

The CWA requires all states to protect and restore their waters to be “fishable and swimmable.” Section 303(d) of the CWA establishes a process to identify and clean up polluted waters by measuring and listing polluted bodies of water. Every two years, the

The CWA requires all states to protect and restore their waters to be “fishable and swimmable.” Section 303(d) of the CWA establishes a process to identify and clean up polluted waters by measuring and listing polluted bodies of water.

State of Washington is required to perform a water quality assessment of the surface waters throughout the state, including all streams, rivers, lakes, and marine waters. Ecology compiles its own water quality data using appropriate scientific methods predetermined by EPA².

This Washington State Water Quality Assessment, developed by the Department of Ecology, lists the status of the water quality for each water body in the State using the relative Categories of 1 through 5, with Category 5 being the most degraded. Category 5 represents water bodies listed on the EPA’s 303(d) list.

Within the City limits, Swamp Creek is the only listed impaired waterbody. Swamp Creek is currently listed as Category 5 for dissolved oxygen, Category 4A for bacteria, Category 2 for temperature and Category 1 for pH.³

² <http://www.ecy.wa.gov/programs/wq/303d/introduction.html>

³ Water Quality Assessment for Washington
<https://fortress.wa.gov/ecy/wqamapviewer/default.aspx?res=1344x840> accessed November 24, 2014 at 9:20am.

3.1.2.1 Swamp Creek Total Maximum Daily Load

Appendix 2 of the City's NPDES Phase II Permit (see Appendix E) details the requirements of the City's Swamp Creek TMDL for fecal coliform bacteria⁴. The City currently has an informal ILA with the City of Mountlake Terrace to conduct TMDL monitoring on Swamp Creek. The City may be taking over monitoring in 2015 due to staff changes at the City of Mountlake Terrace. See Appendix F for a copy of the Swamp Creek TMDL Monitoring data reported in the City's 2011 and 2012 Annual Reports to Ecology.

The City's requirements for the Swamp Creek TMDL include:

- Business Inspections of commercial animal handling areas and commercial composting facilities to ensure implementation of source control Best Management Practices (BMPs).
- Public Education and Outreach for specific bacterial pollution problems and promotion of proper pet waste management behavior.
- Operation and Maintenance activities that include installing and maintaining animal waste collection and/or education stations at municipal parks and other City-owned and operated lands that have substantial domestic animal (dog and horse) use.
- Illicit Discharge Detection and Elimination (IDDE) activities include IDDE-related field screening for bacteria sources in any MS4 subbasins which discharge to surface waters.
- Targeted Source Identification & Elimination includes review of fecal coliform data collected per approval QAPPs under the 2007 Permit with the purposes of identifying a high priority area to focus on fecal coliform source identification and elimination.
- Surface Water Monitoring shall begin by August 1, 2014, with the collection of 12 samples annually per selected location. Data summaries and narrative evaluation of the data will be provided in the TMDL section of the City's annual report.

The City currently takes the following measures to comply with the Swamp Creek TMDL for fecal coliform.

- A. The City evaluates and documents the applicability of the following approaches to bacterial pollution control:
 - 1. Ambient water quality and stormwater quality sampling to specifically identify bacterial pollution sources within targeted subbasins.

⁴ NPDES Phase II Permit, for Western Washington, Appendix 2
<http://www.ecy.wa.gov/programs/wq/stormwater/municipal/phaseIIww/5YR/Appx2WWAPhaseII2013.pdf>
<accessed October 22, 2014 at 9:45am>

2. Development and implementation of a Pet Waste Ordinance or other equivalent mechanism.
 3. Evaluation of current water pollution ordinance enforcement capabilities.
 4. Evaluation of critical areas ordinance in relation to TMDL goals.
 5. Implementation of an educational program directed at reducing bacterial pollution, including a program for K-12 students to increase their awareness of bacterial pollution problems.
 6. Investigation and implementation of methods that prevent additional stormwater bacterial pollution through stormwater treatment, reducing stormwater volumes from existing areas using LID retrofitting, and preventing additional sources of stormwater in association with new development using low impact development strategies.
- B. The City conducts additional Illicit Discharge Detection and Elimination (IDDE) activities within those areas of the City affected by the TMDL:
1. There are no commercial animal handling areas or commercial composting facilities.
 2. There are no known composting or animal waste handling facilities within the city.
 3. Water bodies addressed by the Swamp Creek Tributaries TMDLs have been designated as high priority water bodies (see Permit condition S.5.C.3.(c)(ii)) and will receive field assessments and screening prior to other receiving water bodies unless approved in writing from Ecology. The presence of sewage/septic system sources shall be investigated as part of all screenings.
- C. The City conducts water quality monitoring for fecal contamination. Within the area covered by the Swamp Creek TMDL, the City will perform water quality monitoring in accordance with Option 2 of the Swamp Creek TMDL

The Quality Assurance Project Plan (QAPP) was approved by Ecology on February 28th, 2008 and final signed copies were delivered to Mountlake Terrace and Brier in March 2008. Monthly sampling began on April 15th, 2008. Monitoring will be performed at a frequency that will produce at least 60 data points at each sampling location by February 15, 2012. The City will also use continuous flow monitoring at a representative location as approved by Ecology, to determine if a sampling event is affected, or dominated, by storm flows.

The City conducts TMDL Activity Documentation and Tracking. The City will keep records of all actions required by the Permit for TMDL compliance. The City discusses implementation status, program changes and BPCP activities completed during the previous year in a subsection of the City's annual report to Ecology.

For additional details on the Swamp Creek TMDL, see Appendix 2 of the NPDES Phase II Permit for Western Washington (Appendix E).

3.1.3 Section 404 Permits

Section 404 of the CWA establishes programs to regulate the discharge of dredged and/or fill material into the waters of the United States, including wetlands. Projects and activities that are included under this regulation include water resource projects, infrastructure development, and mining operations. This section of the CWA is regulated by the U.S. Army Corps of Engineers (Corps).

Under Section 404, the Corps authorizes activities by issuing permits for construction and habitat enhancement projects. Individual permits include Standard Individual Permits and General Permits, including the Nationwide Permits and Regional General Permits. The Corps determines which type of permit is needed depending on the type of activity and potential impacts to the environment. A Corps permit can include authorization under Section 10 and/or Section 404. Typical activities that may require Section 404 permits are:

- Depositing fill, dredged, or excavated material in waters of the U.S. and/or adjacent wetlands.
- Grading or mechanized land clearing of wetlands.
- Placing spoils from ditch excavation into wetlands.
- Moving soil during vegetation clearing into wetlands.
- Depositing fill for residential, commercial, or recreational site developments.
- Constructing revetments, groins, breakwaters, beach enhancements, jetties, levees, dams, dikes, or weirs.
- Placing riprap and road fill.

3.2 ENDANGERED SPECIES ACT

As with all jurisdictions in the state, the City of Brier is responsible for monitoring all development for impacts to endangered species under the Endangered Species Act (ESA). This act was passed by Congress in 1973 to “provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and to provide a program for the conservations of these species.” The Act seeks to preserve the ecosystems (including critical areas) upon which species depend, while finding a balance between conservation of endangered species and private use of land.

Two federal agencies, the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (FWS) are responsible for regulating marine species (including anadromous salmon) and terrestrial

The City of Brier, as with all jurisdictions in the state, is responsible for monitoring all development for impacts to endangered species under the Endangered Species Act (ESA). This act was passed by Congress in 1973 to “provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and to provide a program for the conservations of these species.”

and freshwater fish species. Local jurisdictions are responsible for ensuring compliance with the federal ESA regulations.

When development applications are submitted, projects that may affect an endangered species would be required by the City to mitigate impacts through conditions on development (including grading and building permits), through State Environmental Policy Act (SEPA) mitigation and/or through enforcement of the requirements of the sensitive areas ordinance.

In 1973, the United States Congress passed the ESA with the purpose of protecting and recovering imperiled species and their supporting habitat ecosystems. The ESA is administered by the FWS and the Commerce Department's NMFS. The FWS is responsible for terrestrial and freshwater organisms, while the NMFS is responsible for marine wildlife such as salmon. Within the State of Washington, the Department of Fish and Wildlife works closely with federal agencies in administering the ESA at the local level. Most projects requiring ESA-related permitting are jointly permitted by both federal and State agencies, often using a common permit.

3.3 GROWTH MANAGEMENT ACT PLAN

The Growth Management Act (GMA) requires cities to prepare a land use element that designates the proposed general distribution and general location and extent of the uses of land and includes population densities, building intensities, and estimates of future population growth. The element must provide for protection of the quality and quantity of groundwater used for public water supplies. Where applicable, the land use element must review drainage, flooding, and stormwater run-off in the area and provide guidance for preventing degradation of waters of the state.

The City is currently updating its Comprehensive Plan under the guidance of the Washington State GMA. This citywide planning effort includes land use, development, transportation, housing, capital facilities, and utilities. It also includes the regional planning objectives adopted through the Puget Sound Regional Council Vision 2040, the Snohomish County Countywide Planning Policies in 2012b, and the City's local environmental and economic objectives and policies. The updated Comprehensive Plan is required to address a period of at least 20 years into the future and will include the results of this SWMP, along with the results of the City's concurrent water supply, wastewater, and transportation comprehensive planning efforts. One of the primary objectives of this planning effort is to anticipate and plan for the infrastructure needs of future growth before the growth occurs. This process allows for effective planning, design, and funding of the City's future utilities and infrastructure.

3.4 DEPARTMENT OF FISH AND WILDLIFE HYDRAULIC CODE

The Washington Department of Fish and Wildlife (WDFW) administers and enforces the Washington State Hydraulic Code and its associated Hydraulic Project Approval (HPA) Permit. The purpose of this the program, and its associated HPA Permit, is to protect the State's fisheries resources, including spawning and rearing habitats for returning fish. The HPA Permit must be obtained from WDFW before work is conducted that uses, obstructs, diverts, or changes the natural flow or bed of any of the state's bodies of water. The permit usually applies

to work being conducted within the normal high water mark of streams and associated tributaries.

3.5 PUGET SOUND ACTION AGENDA

In 2007, the Puget Sound Partnership (Partnership) was requested by the State Legislature to coordinate a regional effort to clean up the water quality of Puget Sound.

The Partnership wrote the 2014/2015 Puget Sound Action Agenda (Action Agenda) that identifies two major priorities, Priorities C and D, which are relevant to Brier. Priority C applies to Reducing and Controlling the Sources of Pollution in Puget Sound and Priority D applies to Strategic Leadership and Collaboration, and includes the following activities which are relevant to the City's SWMP:

The Partnership wrote the 2014/2015 Puget Sound Action Agenda¹ (Action Agenda) that identifies two major priorities, Priorities C & D, which are relevant to Brier. Priority C applies to Reducing and Controlling the Sources of Pollution in Puget Sound and Priority D applies to Strategic Leadership and Collaboration.

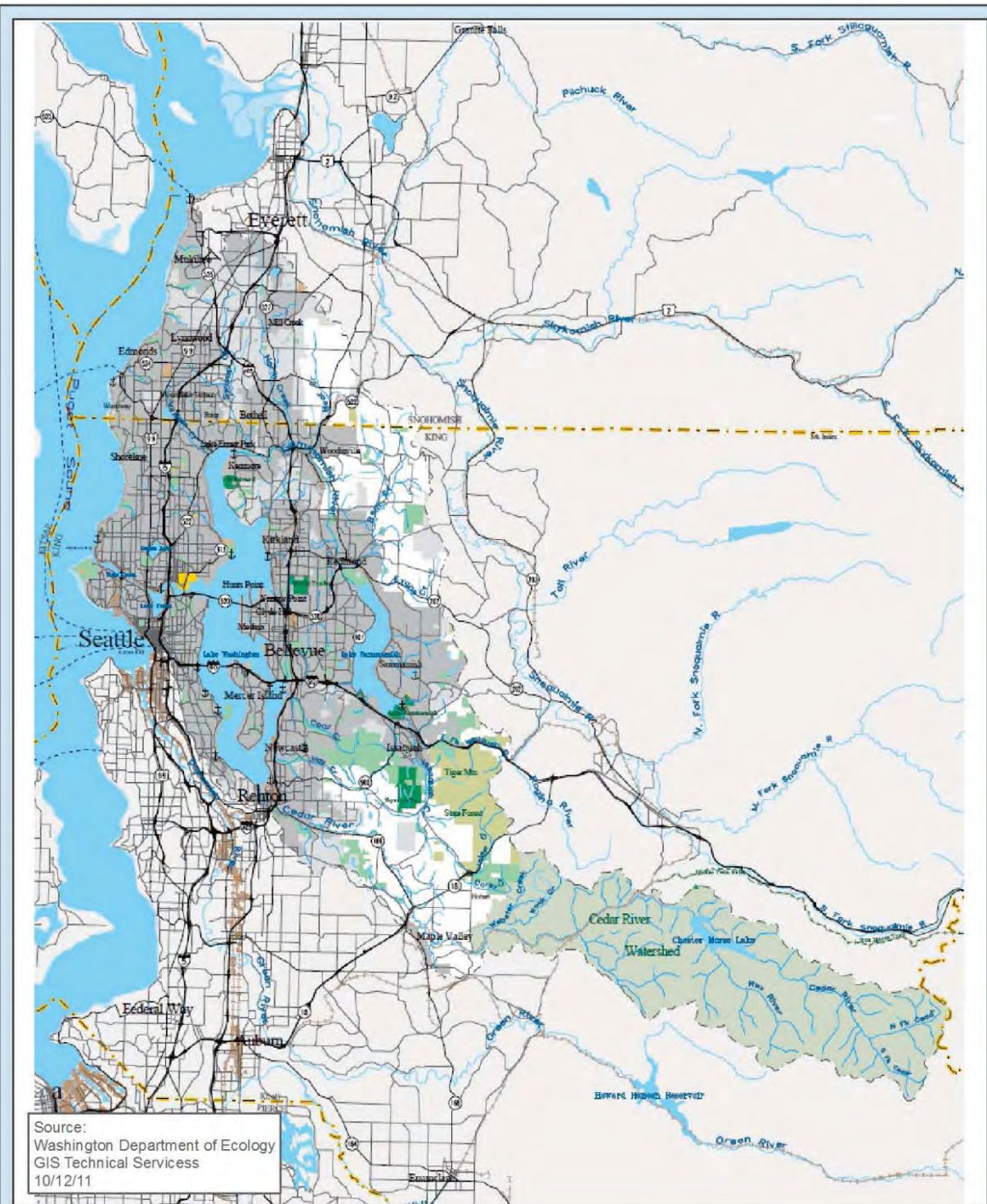
- C-1: Prevent, reduce, and control the sources of toxic contaminants entering Puget Sound.
- C-2: Use a comprehensive approach to manage urban stormwater runoff at the site and landscape level.
- C-3: Not Applicable.
- C-4: Prevent, reduce, and control surface runoff from forest lands.
- C-5: Prevent, reduce, and/or eliminate pollution from decentralized wastewater treatment systems.
- C-6: Prevent, reduce, and/or eliminate pollution from centralized wastewater systems.
- C-7: Not Applicable.
- C-8: Effectively prevent, plan for, and respond to oil spills.
- C-9: Address and clean up cumulative water pollution impacts in Puget Sound.
- D-1: Provide the leadership frameworks to guide the Puget Sound recovery effort and set action and funding priorities.
- D-2: Support and Build Strategic, Collaborative Partnerships.
- D-3: Implement Performance Management.
- D-4: Not Applicable.
- D-5: Cultivate broad-scale stewardship practices and behaviors among Puget Sound Residents that Benefit Puget Sound.
- D-6: Build issue awareness and understanding to increase public support and engagement in recovery actions.
- D-7: Build social and institutional infrastructure that supports stewardship behaviors and removes barriers.

The Partnership typically identifies and implements the reduction of pollutants into Puget Sound by working with and through local implementation organizations and associated regional planning efforts.

3.6 REGIONAL WATERSHED PLANNING (WRIA)

The Watershed Planning Act provides local governments a framework and resources for developing local solutions to watershed issues on a watershed basis that addresses water supply, water quality and habitat. The Act prescribes a specific process for adoption of a watershed plan and voluntary acceptance of obligations under the plan. See Figure 3-1 on page 3-11 for the detailed extents of the WRIA planning area.

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November 2014

CITY OF BRIER

2015 Stormwater Management Plan Update
Figure 3-1 WRIA 8 Planning Area

P:\P14\14506 Brier SWM Plan Update\GIS\ArcMaps\Figure3-1_WRIA 8 Planning Area.mxd

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3.7 BRIER MUNICIPAL CODE

In 2013, the City of Brier reviewed and updated the stormwater sections of the Brier Municipal Code (BMC). This review process included identification of gaps in the existing BMC with the City's current (2007-July 2013) National Pollution Discharge Elimination System (NPDES) Phase II Permit (Permit) and the new NPDES Permit (August 2013 – 2018) and other relevant topics. Results of this stormwater code gap analysis are summarized below.

Conducting a gap analysis and updating the City's BMC specific to stormwater allowed the City to achieve the following:

- Ensure compliance with current NPDES Permit.
- Compliance with the new NPDES Permit, including the new Low Impact Development (LID) Code requirements.
- Address the challenges that the City has been having with applying, implementing, and enforcing its current municipal code, particularly in regard to Best Management Practices (BMPs).

Findings and recommendations from each major code type are summarized in detail in the Code Gap Analysis Memorandum (*by PACE Engineers, Inc. dated February 12, 2013*) found in Appendix G and acted as the basis for developing new code language. For the current version of the BMC please visit the Municipal Research Service Center of Washington (MRSC) website <http://www.mrsc.org/codes.aspx>.

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CHAPTER 4

OPERATION AND MAINTENANCE

4.1 INTRODUCTION

Chapter 4 provides an overview of the City's stormwater Operation and Maintenance Program (O&M), equipment activities, and costs. Drainage facility maintenance is one of the most essential components of an effective Stormwater Management Program. Stormwater facilities require regular inspection, cleaning, and repair to ensure that they are functioning as intended in order to provide the required flow control, water quality treatment, detention, and conveyance. An effective O&M Program aims to protect public health and safety, maintain drainage system integrity and function, reduce infrastructure repair and life cycle costs, enhance water quality, and achieve future regulatory compliance.

Both roadway and non-roadway areas contribute excess stormwater runoff, sediment, and pollutants to the City's stormwater drainage system; the system also receives excess runoff from adjacent County roads and lands. Providing regular maintenance is one of the best, most cost-effective ways to realize the capacity that has been designed into the City's drainage system. It is this optimization of the existing capacity that allows the City to both reduce flooding and property damage, as well as control and remove sediments and other contaminants from the system and from entering into local receiving waters.

As a result of the City being issued an NPDES Phase II Permit, the City is required to develop a specific annual Operation and Maintenance Program, map and inventory the system and its outfalls, provide routine facility performance inspections, conduct and record operation and maintenance activities within specific timeframes.

As a result of the City being issued an NPDES Phase II Permit, the City is required to develop a specific annual Operation and Maintenance Program, map and inventory the system and its outfalls, provide routine facility performance inspections, and conduct and record operation and maintenance activities within specific timeframes. The O&M Program is run according to the predetermined methodologies/standards of the NPDES Phase II Permit, and requires routine annual maintenance functions, including facility cleaning, repair, and replacement.

4.1.1 Core O&M Goals

The goals of the City's stormwater Operation and Maintenance Program are to:

- Maintain the proper function of each of the City's stormwater facilities in order to realize the full design capacity of the existing facilities.
- Interact and have a positive exchange with the community by conducting effective and responsive maintenance activities.
- Effectively respond to public drainage complaints by performing small works projects or minor improvements using O&M crews, and identifying and recommending larger projects for capital design, funding, and construction.
- Reduce particulate and pollutant loading into the conveyance system.

- Establish a plan that outlines how the City's O&M Program can become more proactive in conducting its annual maintenance program and anticipating future maintenance, staffing, equipment, and facility repair/replacement needs.

4.1.2 Stormwater System Mapping

An accurate stormwater inventory, developed in a GIS geodatabase, is a key development and implementation tool for an effective O&M Program. The City currently has an up-to-date GIS stormwater system mapping geodatabase. The City has also purchased ESRI Software to maintain their system mapping and is purchasing tablet devices to use in the field to track inspections, system mapping update needs, and O&M practices.

The O&M Program geodatabase needs to be regularly updated and expanded in order to ensure it is always complete, up-to-date, and accurate. This is the type of stormwater investment that will always pay off. It is also an invaluable staffing and budget management tool, as the inventory and mapping network can be routinely used to plan the sequencing of O&M activities, create daily work orders for the crews, and support annual staffing, equipment, and budget requests. The uses of an up-to-date stormwater facility inventory and mapping system are numerous and may include the following:

An accurate stormwater inventory, developed in a GIS geodatabase, is a key development and implementation tool for an effective O&M Program.

- Asset management
- Recordkeeping
- Support to the annual budget processes
- Quick response to citizen and City Council requests
- When under a Permit, an up-to-date map of stormwater facilities supports compliance by providing the information needed for the development of an annual report to Ecology

4.1.3 Development of City's MS4 Stormwater System Map¹:

The City has updated its municipal storm sewer system map which is available at City Hall. The map shows locations of City-owned stormwater system facilities throughout the City and includes the following information:

1. The location of all known municipal separate storm sewer outfalls and receiving waters and structural stormwater BMPs owned, operated, or maintained by the City. The City has mapped the attributes listed below for all storm sewer outfalls:
 - Tributary conveyances (indicates type, material, and size where known)
 - Associated drainage areas
 - Land use

¹ City of Brier, 2013 SWMP

2. As part of the building permitting process, the City initiated a program that developed and maintains a map of all connections to the municipal separate storm sewer authorized or allowed by the City after February 16, 2007.
3. There are no geographic areas served by the City's MS4 that do not discharge stormwater to surface waters.
4. The City will make available to Ecology, upon request, the municipal storm sewer system map depicting the information required in Items 1 through 3.
5. Upon request, and to the extent appropriate, the City will provide mapping information to co-Permittees and secondary Permittees.

4.2 BRIER STORMWATER PROGRAM O&M PLAN/PROGRAM

The City has developed and implemented an Operations and Maintenance (O&M) Program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.²

The City takes the following minimum measures:

A. Maintenance Standards:

The City has adopted the most recent version of the *Stormwater Management Manual for Western Washington*. A set of standards is found in Volume V Chapter 4.

1. The City Public Works Department determines if maintenance is required upon inspection. Exceeding the maintenance standard during the period between inspections is not a violation. An inspection program has been developed to schedule inspections and record the findings from said inspections.
2. Unless there are circumstances beyond the City's control, when an inspection identifies an exceedance of the maintenance standard, maintenance will be performed:
 - Within one year for wet pool facilities and retention/detention ponds.
 - Within six months for typical maintenance.
 - Within nine months for maintenance requiring re-vegetation.
 - Within two years for maintenance that requires capital construction of less than \$25,000.

Circumstances beyond the City's control include denial or delay of access by property owners, denial or delay of necessary permit approvals, and unexpected reallocations of maintenance staff to perform emergency work. For each exceedance of the required timeframe, the City will document the circumstances and how they were beyond their control.

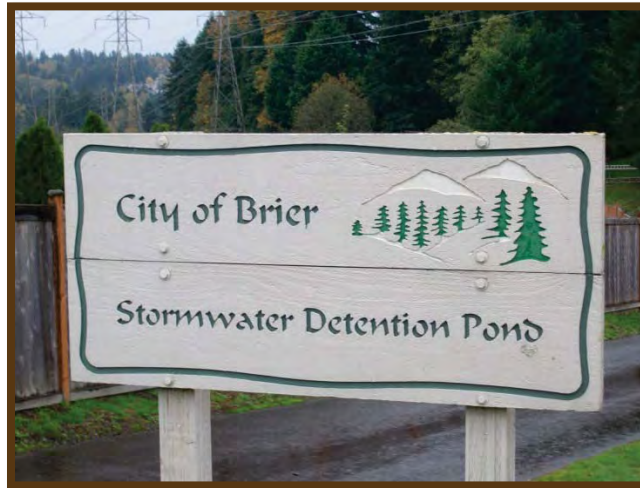
B. General Inspections:

The City Public Works staff perform annual inspections of all stormwater treatment and flow control facilities that are City-owned and operated and take appropriate maintenance actions in accordance with the adopted Stormwater Management

² City of Brier, 2013 SWMP

Manual for Western Washington. An inspection program is being developed to schedule inspections and record the findings from said inspections.

Reducing the inspection frequency will be based on maintenance records of double the length of time of the proposed inspection frequency. In the absence of maintenance records, the City may substitute written statements to document a specific less frequent inspection schedule. Written statements will be based on actual inspection and maintenance experience and will be certified in accordance with G19 of the City's Permit, *Certification and Signature*.



City of Brier's Public Works staff maintains their Stormwater Detention Ponds

C. Post-Storm Inspections:

The City performs spot checks of potentially damaged permanent treatment and flow control facilities after major storm events. If spot checks indicate widespread damage/maintenance needs, all facilities that may be affected are then inspected. Repairs and maintenance actions are taken immediately upon inspection if required.

D. Catch Basins and Inlet Inspections:

Inspection of all catch basins and inlets owned or operated by the City at least once before the end of the City's Permit term. Clean catch basins if the inspection indicates cleaning is needed to comply with maintenance standards established in the most recent version of the *Stormwater Management Manual for Western Washington*. Decant water will be disposed of in accordance with Appendix 6 of the City's Permit, *Street Waste Disposal* (found in Appendix E of this report).

Inspections may be conducted on a "circuit basis" whereby a sampling of catch basins and inlets within each circuit is inspected to identify maintenance needs. Included in the sampling is an inspection of the catch basin immediately upstream of any system outfall. All catch basins within a given circuit are cleaned at the same time if the inspection sampling indicates cleaning is needed to comply with maintenance standards established under Section 4.C.

As an alternative to inspecting catch basins on a “circuit basis,” the City may inspect all catch basins, and clean only catch basins where cleaning is needed to comply with maintenance standards.

E. Compliance:

The City’s Stormwater O&M Program has an established inspection program designed to inspect all sites.

F. Reduction of Stormwater Impacts:

The City Stormwater O&M Program has established practices from the Stormwater Management Manual for Western Washington to reduce stormwater impacts associated with runoff from streets, parking lots, roads, and highways resulting from the following maintenance activities:

- Pipe cleaning
- Cleaning of culverts that convey stormwater in ditch systems
- Ditch maintenance
- Street cleaning
- Road repair and resurfacing, including pavement grinding
- Snow and ice control
- Utility installation

G. Policies and Procedures:

The City’s Stormwater O&M Program has established policies and best management practices from the Stormwater Management Manual for Western Washington to reduce pollutants in discharges resulting from the following activities

- Application of fertilizer, pesticides, and herbicides including the development of nutrient management and integrated pest management plans
- Sediment and erosion control
- Landscape maintenance and vegetation disposal
- Trash management
- Building exterior cleaning and maintenance

H. Training:

A training program has been developed for employees of the City whose construction, operations, or maintenance job functions may impact stormwater quality. The training program will address the importance of protecting water quality, the requirements of the City’s Permit, operation and maintenance standards, inspection procedures, selecting appropriate BMPs, ways to perform their job activities to prevent or minimize impacts to water quality, and procedures for reporting water quality concerns, including potential illicit discharges. Follow-up training will be provided as needed to address changes in procedures, techniques, or requirements. The City will document and maintain records of training provided.

I. Special Facility Requirements:

Development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) for all heavy equipment maintenance or storage yards, and material storage facilities owned or operated by the City in areas subject to the City's Permit that are not required to have coverage under the Industrial Stormwater General Permit. Implementation of non-structural BMPs began immediately after the SWPPP was developed. A schedule for implementation of structural BMPs is included in the SWPPP. Generic SWPPPs that can be applied at multiple sites may be used to comply with this requirement. The SWPPP will include periodic visual observation of discharges from the facility to evaluate the effectiveness of the BMP.

J. Recordkeeping:

Records of inspections and maintenance or repair activities conducted by the City will be maintained in accordance with S9 of the City's Permit, *Reporting Requirements*.

4.3 O&M EQUIPMENT

The City would like to purchase the following equipment to replace aging fleet. The percentage listed is the amount the piece of equipment would be used by the stormwater utility.

Table 4-1: O&M Equipment		
Equipment	Utility Usage Percent	Equipment Cost
Dump Truck	26.63%	\$70,000
Vactor Truck	26.63%	\$400,000
Boom Mower	26.63%	\$60,000
Backhoe	26.63%	\$70,000

The City will continue to contract catch basin cleaning for half of the City to be cleaned annually at a cost of \$10,000 to \$15,000. As a result, no specific equipment is needed for catch basin cleaning.

4.4 OPERATION AND MAINTENANCE FACILITIES

The City of Brier has their own Public Works Facility located at the northeast corner of Brier Park at 22750 Poplar Way, Brier, Washington. The City has a Stormwater Pollution Prevention Plan (SWPPP) that they implement at the Public Works Facility. The City of Brier Public Works Department stores its vehicles and equipment at the public works facility. The vehicles include pickup trucks, riding lawn mowers, backhoes, street sweepers, and a vactor truck. Public works staff park their personal vehicles on the north side of the facility. Most of the vehicles and equipment are stored inside the sheds and open-air bays of the shop. General maintenance consisting of oil changes, brake replacement, etc., is completed onsite inside the maintenance bays. See Appendix H for a copy of the SWPPP.

It is recommended the City build a stormwater decant facility for enhanced stormwater O&M Program activity efficiencies. For further details on the stormwater decant facility, see *Chapter 5 – Capital Improvement Program*.



City of Brier's Public Works Facility Materials Storage Area

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CHAPTER 5

CAPITAL IMPROVEMENT PROJECTS PLAN

5.1 INTRODUCTION

One main objective of the development of the City's Stormwater Management Plan (Plan) was to identify and resolve drainage and flooding problems, and identify stormwater facility needs. The primary product of Chapter 5 is a prioritized list of identified stormwater problems or needs and a planning level solution.

Interviews with City staff identified two current flooding problem areas and three facilities with deficiencies. These interviews also concluded that the City's stormwater collection system is well-maintained and current condition is satisfactory. Annual visual and CCTV inspections within the system have not identified any significant deterioration. What few issues that are identified will be repaired by City crews upon discovery.

The two flooding problems identified within the Abbeyview drainage system are the 35th Avenue and Brier Road culvert crossings. The facilities identified include the Brierwood Detention Facility, Murphy Regional Detention Pond, and the City's Stormwater Decant Facility.

City crews have witnessed and received periodic public concerns for stormwater runoff backing up in open ditches behind the 35th Avenue and Brier Road culverts. Typically, this happens during extreme rainfall events or combine snow and rainfall events. Flooding has not damaged private residences, but has flooded onto private yards and driveways and into landscaping.

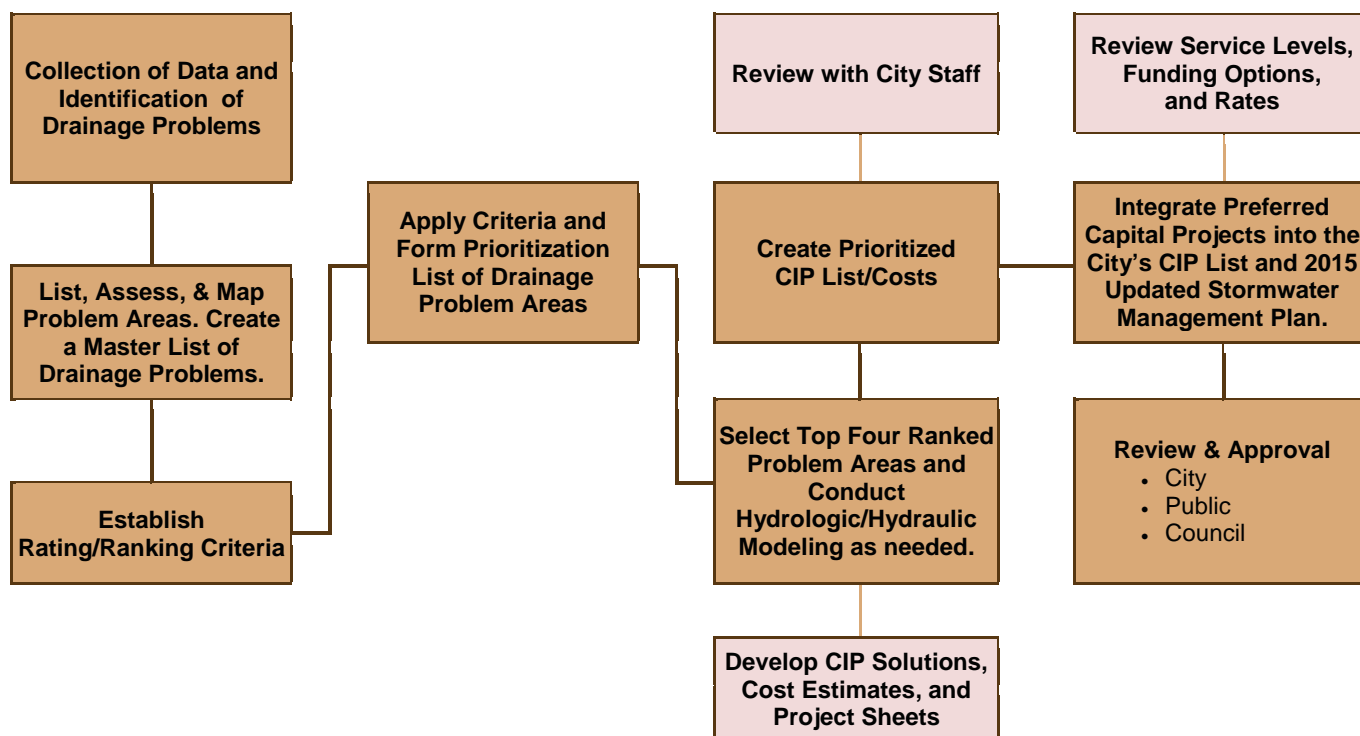
The facilities needs range from water quality enhancements to structural repairs in order to maintain expected levels of service. The Brierwood pond is in disrepair and in need of sediment and vegetation removal, improved runoff control, and general design updates. In early 2014, the City received a design grant from Ecology to retrofit this facility with Low Impact Development (LID) best management practices. This LID retrofit design is currently ongoing with 90 percent engineering plans and design report due to Ecology for approval by January 31, 2015. The City's Stormwater Decant Facility is in need of upgrades to improve operational deficiencies including treatment of the decanted liquids from the solids storage areas, covers over the solids holding bins, and improved access for vector truck liquids discharge. Finally, the Murphy Regional Detention Pond was built by a developer and deeded to the City. The regional pond was identified in the 1998 Brier Stormwater Management Plan. Shortly after completing construction, the pond began to experience settlement in the gabion basket retaining wall and liner leakage such that the pond could not maintain any permanent liquid levels for water quality treatment.

5.2 CIP PRIORITIZATION

The City's stormwater capital facility planning process consists of numerous activities that are outlined in Figure 5-1 below:

1. Collect data and identify drainage problems
2. List, assess, and map drainage problem areas
3. Establish rating and ranking criteria, and receive City approval
4. Apply criteria and form prioritized list of drainage problem areas
5. Create a master prioritized list of drainage problems
6. Select top four ranked problem areas and conduct modeling as needed
7. Conduct engineering flow capacity analysis, prepare and evaluate design options, and select the preferred designs
8. Finalize CIP designs and develop cost estimates
9. Integrate preferred capital projects into the City's CIP list
10. Integrate the resulting CIP list into the City's updated Stormwater Management Plan.

Figure 5-1: Schematic Diagram of the City's Stormwater Capital Facilities Planning Process



Following the outlined process above, the problem areas were inspected and capacity/condition assessments completed to summarize current deficiencies. Then the projects were rated to establish priority. The following five criterion were used to score the priority of the CIP Projects:

1. MS4 Benefit Area (Improvement Benefit Area)
2. Water Quality Benefit to Receiving Waters
3. Flow Control where Flooding Occurs
4. Retrofit of Existing Facility
5. LID Enhancement Opportunity

The criterion were collectively determined and included City staff involvement. The project ratings did not include a quantitative analysis of the deficiency. Specifically, each project was compared to one another using current data and knowledge of the project deficiencies. A decision matrix employing the five criteria above was used to rate and rank each project. The City's stormwater management team independently rated each project and the scores were input into the decision matrix below to arrive at the final CIP project ranking.

Table 5-1: CIP Project Ranking Decision Matrix

Decision Model		CAPITAL PROJECTS							
		Abbeyview Pond Outlet and Conveyance		Brierwood Pond LID Retrofit		Public Works Decant Facility Upgrade		Murphy Regional Pond Stabilization	
Criterion	Weight	Rating	Score	Rating	Score	Rating	Score	Rating	Score
MS4 Benefit Area (Improvement Benefit Area)	5	8	40	13	65	10	50	15	75
Water Quality Benefit to Receiving Waters	4	5	20	14	56	16	64	13	52
Flow Control Where Flooding Occurs	3	13	39	4	12	0	0	6	18
Retrofit of Existing Facility	2	6	12	10	20	16	32	14	28
LID Enhancement Opportunities	1	0	0	14	14	8	8	2	2
Total		32	111	55	167	50	154	50	175

CIP Project Ranking	#4	#2	#3	#1
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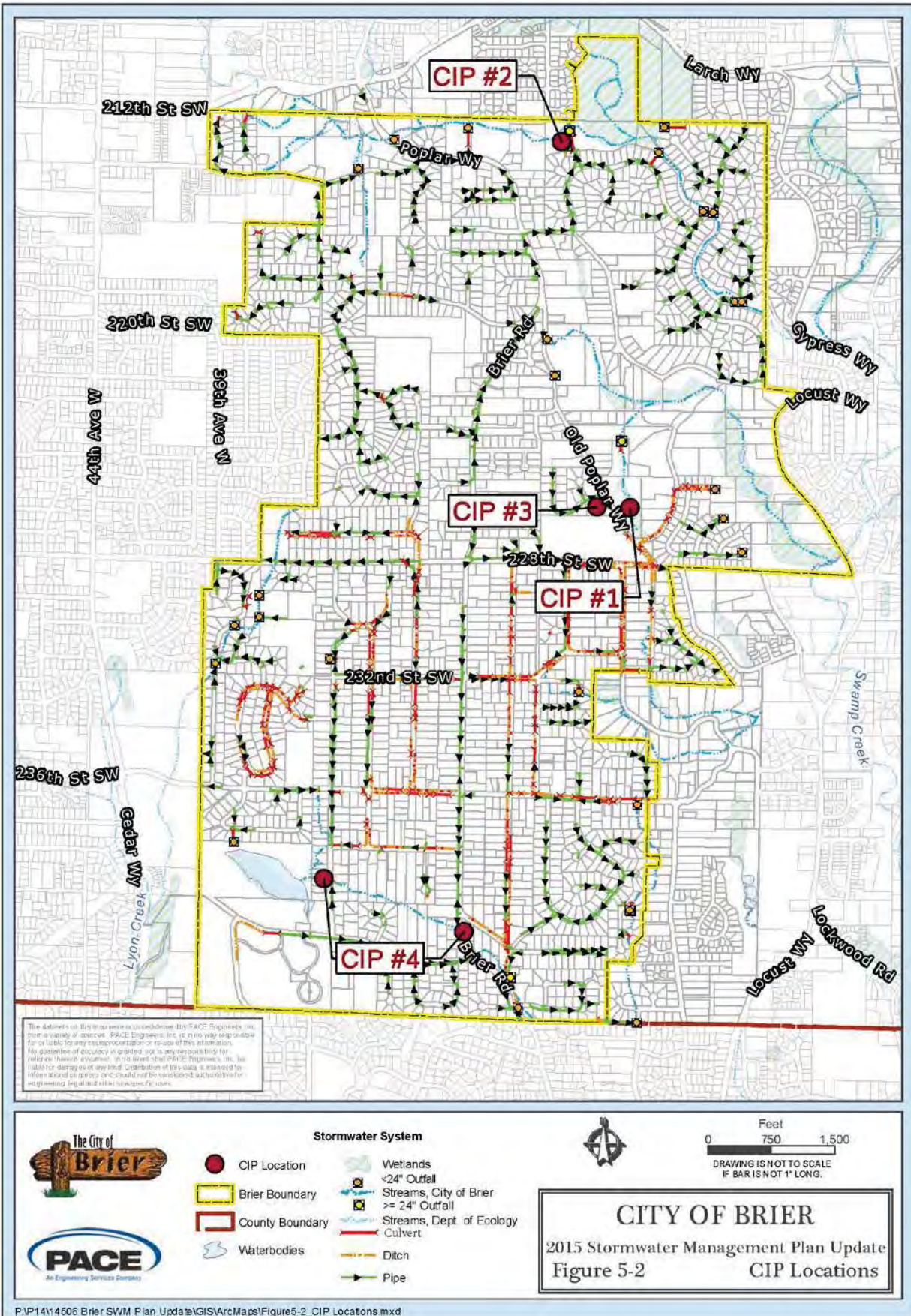
How to rate an option?

Rating	Description
0	No fit
1	Low fit
2	Fit
3	Good fit
4	Excellent fit

The Decant Facility and Murphy Regional Detention Pond Stabilization projects did not require Hydrologic/Hydraulic modeling to verify design solutions. The Decant Facility needs were determined using regulatory guidelines and similar project scopes of work. The repairs and rehabilitation for the Murphy Regional Detention Pond were summarized in a previous memo to the City dated August 12, 2009, and updated on June 18, 2010, prepared by Hammond Collier Wade Livingstone, included in Appendix I. A preliminary design report and 30 percent design were completed under a separate project for the Brierwood Pond. The findings and conclusions of this report, "Brierwood Pond LID Retrofit," May 2014, prepared by PACE Engineers, were used to create the project description and cost estimate. Hydrologic/hydraulic modeling was completed to verify and quantify the flooding issues at the two culvert crossing, at 35th Avenue and Brier Road, for the Abbeyview drainage basin.

5.3 CAPITAL IMPROVEMENT PROJECTS

This section provides a brief description of the four proposed Capital Improvement Projects. For further details on each project, see Appendix J: CIP Sheets and Cost Estimates. See Figure 5-2 for the CIP Locations.



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5.3.1 Capital Improvement Project No. 1: Murphy Regional Detention Pond **\$275,338**

Remove the existing liner install a cut off trench to prevent subsurface water from piping beneath the berm and migrating the finer material from the berm. Install a liner all the way to the top of the berm. Lower the maximum water surface for the pond to the current tributary area capacity. This would reduce storage of the pond, therefore, it would not be able to accept future development as a regional pond. The lowering of the water surface would allow the top of the berm to be lowered an equivalent amount in order to maintain one foot of freeboard above the maximum water surface. Lowering the top of the berm reduces the soil pressure against the wall and bearing pressure beneath the wall, as well as reducing water pressure from the water storage.

5.3.2 Capital Improvement Project No. 2: Brierwood Stormwater Pond Retrofit – Bioretention Cell **\$593,045**

The City's goal with this project is to protect the functions and values of Scriber Creek, a salmonid-bearing creek, and the associated wetland from untreated runoff. The existing Brierwood Park Pond will be renovated by removing sediment, replacing nonnative plants with native plants, increasing storage capacity by elevating existing dikes, removing one outfall, and constructing a new outfall and emergency spillway. A bioretention cell will also be built that will be approximately 3,400 square feet in size and designed to treat the water quality flow rate of the 94-acre drainage basin. Wetland mitigation will also be included as part of this project that will include restoration in the buffer and wetland areas that will be impacted during construction.



Existing Brierwood Pond to be Retrofitted with LID Features and Water Quality treatment

5.3.3 Capital Improvement Project No. 3: Stormwater Decant Facility

\$500,000

The decant facility will be designed with three bays, with an approximate total width of 60 feet and a depth of 40 feet. There will be a 10-foot pad along the back of the facility for a trench drain, a steel frame roof over the top, an electronic keycard-activated gate, and other appurtenances (sediment trap/septic tank, stormwater drainage, asphalt approach, etc.) as necessary for an operational facility. Decant water from the operations will flow to the City's sanitary sewer system and solids will be dried, stored, and periodically hauled offsite for disposal. An oil/water separator onsite may also be required.

5.3.4 Capital Improvement Project No. 4: Abbeywood Pond Conveyance Channel Flooding

\$143,000

Hydrologic and hydraulic modeling of the Abbeyview sub-basin concluded that the 24-inch-diameter culvert under 35th Avenue is undersized. The modeling also confirmed that the two 36-inch culverts under Brier Road are adequately sized to convey the storm water without overtopping the roadway.

Based upon input from City staff, the outlet of the two 36 inch culverts at Brier Road now receives routine maintenance including sediment removal and pipe cleaning. It is recommended this routine maintenance activity continue.

It is recommended that the 24 inch culvert crossing 35th Street be replaced. Hydraulic modeling output concluded the need for two 36-inch-diameter culverts to convey the 40 cfs runoff volume for the 100-year design storm event.

CHAPTER 6

STORMWATER PROGRAM RECOMMENDATIONS

6.1 CITY OF BRIER'S NPDES PHASE II PERMIT PROGRAM REVIEW

This section describes the City of Brier's current stormwater management program specific to the requirements of the NPDES Phase II Permit.

6.1.1 SWM Element #1: Public Education and Outreach¹

The City's Stormwater Management Program (SWMP) includes an education program aimed at residents, businesses, elected officials, policymakers, planning staff, and other employees of the City. The goal of the education program is to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts. The City's education program is developed locally and regionally, and coordinated with the Snohomish County Conservation District.

The City will take the following minimum measures:

A. Education and Outreach Program:

The City has developed and plans to update an education and outreach program for the area served by its Municipal Separate Storm Sewer System (MS4). The outreach program was designed to achieve measurable improvements in the target audience's understanding of the problem and what they can do to solve it.

The City's SWMP includes an education program aimed at residents, businesses, elected officials, policymakers, planning staff, and other employees of the City. The goal of the education program is to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts.

Education and outreach efforts will be prioritized to target the following audiences and subject areas:

1. General public

The Plan will include the following:

- A poster describing general impacts of stormwater flows into surface waters is available.
- A regular newsletter article will be published in the City's quarterly newsletter.
- An information table will be staffed at City events throughout the year.

¹ City of Brier, 2013 SWMP

2. General public and businesses, including home-based and mobile businesses:

The Plan is likely to include the following:

- Posters for responsible automotive care including use and disposal of hazardous chemicals are available.
- A brochure detailing the effects of illicit discharges and how to report them has been distributed and information is on the City's website as well.

3. Homeowners, landscapers, and property managers

The Plan is likely to include the following:

- A poster profiling yard care techniques protective of water quality is available.
- Natural yard care and stream-side landowner workshops hosted by the Snohomish Conservation District have been offered.
- Farm animal-keeping classes hosted by the Snohomish Conservation District have been offered.
- A brochure detailing BMPs for use and storage of pesticides and fertilizers is available.
- A brochure detailing BMPs for auto repair and maintenance is available.
- Low Impact Development techniques, including site design, pervious paving, and retention of forests and mature trees, are available on the City's website and at City Hall and are discussed by staff at meetings with developers and potential developers.

4. Engineers, contractors, developers, review staff, and land use planners

- A Stormwater Management Program was created to educate this target audience on technical standards for stormwater site and erosion control plans.
- Low Impact Development techniques, including site design, pervious paving, retention of forests and mature trees, are available on the City's website and at City hall and are discussed by staff at meetings with developers and potential developers.
- A brochure providing information on stormwater treatment and flow control BMPs is available.

B. Measurement:

The City contracted with a research firm to conduct a survey to measure the understanding and adoption of the behaviors among the targeted audiences. The resulting measurements will be used to direct education and outreach resources most effectively, as well as to evaluate changes in adoption of the targeted behaviors.

C. Tracking:

The City tracks and maintains records of public education and outreach activities.

6.1.2 SWM Element #2: Public Involvement and Participation²

The City's SWMP has considered ongoing opportunities for public involvement through advisory councils, watershed committees, stewardship programs, environmental activities, or other similar activities. The City complies with applicable State and local public notice requirements when developing its SWMP.

The City will take the following minimum measures:

A. Opportunities for Public Participation:

The City has made the SWMP available for public comment on the City's website. The City is also interested in environmental activities including the Adopt-A-Stream Program where citizens monitor streams. The City would also like to arrange a program with a local Boy Scout troop that would be involved in labeling catch basins and detention facilities throughout the area.

B. Availability of Documents:

The City has made its SWMP Plan, the annual report required under S9.A of the City's Permit, and all other submittals required by the Permit, available to the public. The annual report, and the SWMP that was submitted with the latest annual report, are posted on the City's website.

6.1.3 SWM Element #3: Illicit Discharge Detection and Elimination³

The City's SWMP includes an ongoing program to detect and remove illicit connections, discharges as defined in 40 CFR 122.26(b)(2), and improper disposal, including any spills not under the purview of another responding authority, into the municipal separate storm sewers owned or operated by the City. The City has implemented an ongoing illicit discharge detection and elimination program.

The City has taken the following minimum measures:

A. Development of MS4 Map:

The City has updated its municipal storm sewer system map. The map is available at City hall. The map shows locations of city-owned stormwater systems throughout the city and includes the following information:

The City's SWMP includes an ongoing program to detect and remove illicit connections, discharges as defined in 40 CFR 122.26(b)(2), and improper disposal, including any spills not under the purview of another responding authority, into the municipal separate storm sewers owned or operated by the City.

1. The location of all known municipal separate storm sewer outfalls and receiving waters and structural stormwater BMPs owned, operated, or maintained by the City. The City has mapped the attributes listed below for all storm sewer outfalls:
 - Tributary conveyances (indicate type, material, and size, where known).

² City of Brier, 2013 SWMP

³ City of Brier, 2013 SWMP

- Associated drainage areas.
 - Land use.
2. As part of the building permitting process, the City initiated a program that developed and maintains a map of all connections to the municipal separate storm sewer authorized or allowed by the City after February 16, 2007.
 3. There are no geographic areas served by the City's MS4 that do not discharge stormwater to surface waters.
 4. The City will make available to Ecology, upon request, the municipal storm sewer system map depicting the information required in 1 through 3.
 5. Upon request, and to the extent appropriate, the City will provide mapping information to co-Permittees and secondary Permittees.

B. IDD&E Ordinance:

The City has developed an ordinance to prohibit non-stormwater, illegal discharges, and/or dumping into the City's municipal separate storm sewer system to the maximum extent allowable under State and Federal law. The City is currently revising these regulations again.

1. The regulatory mechanism does not need to prohibit the following categories of non-stormwater discharges:
 - Diverted stream flows.
 - Rising groundwaters.
 - Uncontaminated groundwater infiltration (as defined at 40 CFR 35.2005(20)).
 - Uncontaminated pumped groundwater.
 - Foundation drains.
 - Air conditioning condensation.
 - Irrigation water from agricultural sources that is comingled with urban stormwater.
 - Springs.
 - Water from crawlspace pumps.
 - Footing drains.
 - Flows from riparian habitats and wetlands.
 - Non-stormwater discharges covered by another Permit.
 - Discharges from emergency firefighting activities.
2. The regulatory mechanism prohibits the following categories of non-stormwater discharges unless the stated conditions are met:
 - Discharges from potable water sources, including water line flushing, hyper-chlorinated water line flushing, fire hydrant system flushing, and

pipeline hydrostatic test water, unless planned discharges are de-chlorinated to a concentration of 0.1 ppm or less, pH-adjusted, if necessary, and volumetrically and velocity controlled to prevent re-suspension of sediments in the MS4.

- Discharges from lawn watering and other irrigation runoff, unless these discharges are reduced through, at a minimum, public education activities (see Section 1) and water conservation efforts.
- Chlorinated swimming pool discharges, unless the discharges are de-chlorinated to a concentration of 0.1 ppm or less, pH-adjusted and re-oxygenized if necessary, and volumetrically and velocity controlled to prevent re-suspension of sediments in the MS4. Swimming pool cleaning wastewater and filter backwash will not be discharged to the City's MS4.
- Street and sidewalk wash water, water used to control dust, and routine external building wash down that does not use detergents, unless the City reduces these discharges through, at a minimum, public education activities (see section 1) and/or water conservation efforts. To avoid washing pollutants into the City's MS4, the City will minimize the amount of street wash and dust control water used. At active construction sites, street sweeping will be performed prior to washing the street.
- Other non-stormwater discharges, unless the discharges are in compliance with the requirements of the stormwater pollution prevention plan reviewed by the City, which addresses control of construction site de-watering discharges.

3. The City's SWMP, at a minimum, addresses each category in #2 above in accordance with the conditions stated therein.
4. The City's SWMP further addresses any category of discharges in #1 or #2 above if the discharges are identified as significant sources of pollutants to waters of the State.
5. The SWMP includes a training program for Public Works employees to help educate workers on how to spot and report illicit discharges.
6. The City will develop an enforcement strategy and implement the enforcement provisions of the ordinance or other regulatory mechanism.

C. Ongoing IDD&E Program:

Public Works staff has developed a program to detect and address non-stormwater discharges, spills, illicit connections, and illegal dumping into the City's municipal separate storm sewer system. The program includes:

1. Procedures for locating priority areas likely to have illicit discharges, including at a minimum: evaluating land uses and associated business/industrial activities present; areas where complaints have been registered in the past; and areas with storage of large quantities of materials that could result in spills.
2. Field assessment activities, including visual inspection of priority outfalls identified in #1, above, during dry weather and for the purposes of verifying

outfall locations, identifying previously unknown outfalls, and detecting illicit discharges.

- Scriber Creek, a tributary of Swamp Creek, was identified as a priority receiving water and was visually inspected on February 16, 2010. Field assessments on the creek have been made each year thereafter.
 - Screening for illicit connections will be conducted using: *"Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments,"* Center for Watershed Protection, October 2004, or another methodology of comparable effectiveness. The presence of sewage/septic system sources shall be investigated as part of all screenings.
3. Procedures for characterizing the nature of, and potential public or environmental threat posed by, any illicit discharges found by or reported to the City. Procedures include detailed instructions for evaluating whether the discharge must be immediately contained and steps to be taken for containment of the discharge.
- Compliance with this provision will be achieved by investigating (or referring to the appropriate agency) within seven (7) days, on average, any complaints, reports, or monitoring information that indicate a potential illicit discharge, spill, or illegal dumping; and immediately investigating (or referring) problems and violations determined to be emergencies or otherwise judged to be urgent or severe.
4. Procedures for tracing the source of an illicit discharge; including visual inspections and, when necessary, opening manholes, using mobile cameras, collecting and analyzing water samples, and/or other detailed inspection procedures.
5. Procedures for removing the source of the discharge including notification of appropriate authorities, notification of the property owner, technical assistance for eliminating the discharge, follow-up inspections, and escalating enforcement and legal actions if the discharge is not eliminated.

Compliance with this provision will be achieved by initiating an investigation within 21 days of a report or discovery of a suspected illicit connection to determine the source of the connection, the nature and volume of discharge through the connection, and the party responsible for the connection. Upon confirmation of the illicit nature of a storm drain connection, termination of the connection will be verified within 180 days, using enforcement authority as needed.

D. Public Information:

The City continuously coordinates with neighboring Phase I and Phase II jurisdictions to implement an education program to educate public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.

1. The City has distributed appropriate information to target audiences identified pursuant to Section 6.1.1.
2. The City has added a hotline connected to the City's automated answering system for public reporting of spills and other illicit discharges. The City keeps a record of calls received and follow-up actions taken in accordance with Section 3.C.2 through 5 of the NPDES Phase II Permit; and includes a summary in the annual report in accordance with Section S9 of the City's Permit, *Reporting and Recordkeeping Requirements*.

E. Program Evaluation and Assessment:

The City has adopted and implemented procedures for program evaluation and assessment, including tracking the number and type of spills or illicit discharges identified, inspections made, and any feedback received from public education efforts. A summary of this information is included in the City's annual report in accordance with Section S9 of the City's Permit, *Reporting and Recordkeeping Requirements*.

F. Training:

The City continuously provides appropriate training for municipal field staff on the identification and reporting of illicit discharges into MS4s.

1. The City has trained municipal field staff who are responsible for identification, investigation, termination, cleanup, and reporting illicit discharges, including spills, improper disposal and illicit connections to conduct these activities. Follow-up training will be provided as needed to address changes in procedures, techniques or requirements. The City will document and maintain records of the training provided and the staff trained.
2. The City has established a training program for all municipal field staff, who, as part of their normal job responsibilities, might come into contact with or otherwise observe an illicit discharge or illicit connection to the storm sewer. They are trained to identify an illicit discharge/connection, and the proper procedures for reporting and responding to the illicit discharge/connection. Follow-up training will be provided as needed to address changes in procedures, techniques, or requirements. The City will document and maintain records of the training provided and the staff who were trained.

6.1.4 SWM Element #4: Controlling Runoff from New Development, Redevelopment, and Construction Sites⁴

The City has in place and enforces a program to reduce pollutants in stormwater runoff to its MS4 from new development, redevelopment and construction site activities. The City has adopted the *Stormwater Management Manual for Western Washington* by the Department of Ecology. This manual meets or exceeds the thresholds identified in Appendix 1 of Ecology's Stormwater Management Manual for Western Washington.

The City has taken the following minimum measures:

A. Ordinance:

The City has adopted and enforces the *Stormwater Management Manual for Western Washington* created by the Department of Ecology throughout the permit process. The manual includes:

1. The Western Washington Stormwater Management Manual includes the following minimum requirement topics for new development, redevelopment, and construction sites: Mark clearing limits, establish construction access, control flow rates, install sediment controls, stabilize soils, protect slopes, protect drain inlets, stabilize channels and outlets, control pollutants, control dewatering, maintain BMPs, and manage the project. More information on each minimum requirement can be found in the Western Washington Stormwater Management Manual.
2. A site planning process and BMP selection and design criteria that, when used to implement the minimum requirements in Appendix 1 of the City's NPDES Phase II Permit (or equivalent approved by Ecology under the Phase I Permit) will protect water quality, reduce the discharge of pollutants to the maximum extent practicable, and satisfy the State requirement under Chapter 90.48 RCW to apply all known, available, and reasonable methods of prevention, control, and treatment (AKART) prior to discharge. The City will document how the criteria and requirements will protect water quality, reduce the discharge of pollutants to the maximum extent practicable, and satisfy State AKART requirements.

The City has in place and enforces a program to reduce pollutants in stormwater runoff to its MS4 from new development, redevelopment and construction site activities. The City has adopted the Stormwater Management Manual for Western Washington by the Department of Ecology.

The City chooses to use the site planning process and BMP selection and design criteria in the most recent version of the *Stormwater Management Manual for Western Washington*. The City may cite this choice as its sole documentation to meet this requirement.

⁴ City of Brier, 2013 SWMP

3. The legal authority, through the approval process for new development, to inspect private stormwater facilities that discharge to the City's MS4.
4. Provisions to allow nonstructural preventive actions and source reduction approaches such as Low Impact Development (LID) techniques, measures to minimize the creation of impervious surfaces, and measures to minimize the disturbance of native soils and vegetation. Provisions for LID should take into account site conditions, access, and long-term maintenance.

B. Permitting Process:

The City has a permitting process with plan review, inspection, and enforcement capability to meet the standards listed in #1 through #4 below, for both private and public projects, using qualified personnel. The City is revising the language of the municipal code to comply with the NPDES regulations. This process is applied to all development resulting in 500 square feet or more of new impervious surface on previously undeveloped or developed property.

1. The City has contracted with a consulting engineering firm that works with the Public Works Department and reviews all stormwater site plans for proposed development/redevelopment activities.
2. The Public Works Department inspects, prior to clearing and construction, all known development sites that have high potential for sediment transport. The City is in the process of adopting Appendix 7 of the NPDES Phase II Permit, Determining Construction Site Sediment Potential, to the review process (see Appendix E for Appendix 7 of the Permit).
3. The Public Works Department inspects all known permitted development sites during construction to verify proper installation and maintenance of required erosion and sediment controls. The City enforces when necessary based on inspection.
4. The Public Works Department inspects all permitted development sites upon completion of construction and prior to final approval or occupancy to ensure proper installation of permanent stormwater controls such as stormwater facilities and structural BMPs. A maintenance plan is completed and responsibility for maintenance is assigned. The City enforces when necessary based on inspection. A tracking system is being implemented to monitor proper installation of permanent stormwater controls.
5. Compliance with the inspection requirements in #2, #3, and #4 above will be determined by the presence and records of an established inspection program designed to inspect all sites and achieving at least 95 percent of scheduled inspections.
6. The City has developed a strategy to respond to the issues of noncompliance with regulations of stormwater site plans.

C. Long-term Operation and Maintenance:

The program includes provisions to verify adequate long-term operation and maintenance (O&M) of post-construction stormwater facilities and BMPs that are permitted and constructed pursuant to (B) above. These provisions include the following:

1. The City is revising ordinances to clearly identify the party responsible for maintenance, to require inspection of facilities, and to establish enforcement procedures.
2. The City has adopted the most current version of the *Stormwater Management Manual for Western Washington*. Maintenance standards can be found in Volume V Chapter 4 of the SWMMWW.
 - a. The purpose of the maintenance standard is to determine if maintenance is required. The maintenance standard is not a measure of the facilities required condition at all times between inspections. Exceeding the maintenance standard between the period of inspections is not a Permit violation.
 - b. Unless there are circumstances beyond the City's control, when an inspection identifies an exceedance of the maintenance standard, maintenance will be performed:
 - Within one year for wet pool facilities and retention/detention ponds.
 - Within six months for typical maintenance.
 - Within nine months for maintenance requiring re-vegetation.
 - Within two years for maintenance that requires capital construction of less than \$25,000.

Circumstances beyond the City's control include denial or delay of access by property owners, denial or delay of necessary permit approvals, and unexpected reallocations of maintenance staff to perform emergency work. For each exceedance of the required timeframe, the City must document the circumstances and how they were beyond their control.

3. Annual inspections will be conducted of all stormwater treatment and flow control facilities (other than catch basins) permitted by the City according to Section 4B above, unless there are maintenance records to justify a different frequency.

Reducing the inspection frequency will be based on maintenance records of double the length of time of the proposed inspection frequency. In the absence of maintenance records, the City may substitute written statements to document a specific less frequent inspection schedule. Written statements will be based on actual inspection and maintenance experience and will be certified in accordance with G19 of the City's Permit, *Certification and Signature*.

4. An inspection schedule has been developed for inspections of all new flow control and water quality treatment facilities, including catch basins, for new residential developments that are a part of a larger common plan of development

or sale, that requires inspection every six months during the period of heaviest house construction (i.e., 1 to 2 years following subdivision approval) to identify maintenance needs and enforce compliance with maintenance standards as needed.

D. Recordkeeping:

The City's Stormwater Management Program has in place a procedure for keeping records of inspections and enforcement actions by staff, including inspection reports, warning letters, notices of violations, and other enforcement records. Records of maintenance inspections and activities are maintained.

E. Availability of NOIs:

The City provides copies of the "Notice of Intent for Construction Activity" and copies of the "Notice of Intent for Industrial Activity" to representatives of proposed new development and redevelopment. The City will continue to enforce local ordinances controlling runoff from sites that are also covered by stormwater permits issued by Ecology.

F. Training:

All staff responsible for implementing the program to control stormwater runoff from new development, redevelopment, and construction sites, including permitting, plan review, construction site inspections, and enforcement, are trained to conduct these activities. Follow-up training will be provided as needed to address changes in procedures, techniques, or staffing. The City will document and maintain records of the training provided and the staff trained.

The City has developed and implemented an operations and maintenance (O&M) program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.

6.1.5 SWM Element #5: Municipal Operations and Maintenance⁵

The City has developed and implemented an operations and maintenance (O&M) program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.

The City takes the following minimum measures:

A. Maintenance Standards:

The City has adopted the most recent version of the *Stormwater Management Manual for Western Washington*. A set of standards is found in Volume V Chapter 4.

1. The City Public Works Department determines if maintenance is required upon inspection. Exceeding the maintenance standard during the period between inspections is not a violation. An inspection program has been developed to schedule inspections and record the findings from said inspections.

⁵ City of Brier, 2013 SWMP

2. Unless there are circumstances beyond the City's control, when an inspection identifies an exceedance of the maintenance standard, maintenance will be performed:
 - Within one year for wet pool facilities and retention/detention ponds.
 - Within six months for typical maintenance.
 - Within nine months for maintenance requiring re-vegetation.
 - Within two years for maintenance that requires capital construction of less than \$25,000.

Circumstances beyond the City's control include denial or delay of access by property owners, denial or delay of necessary permit approvals, and unexpected reallocations of maintenance staff to perform emergency work. For each exceedance of the required timeframe, the City will document the circumstances and how they were beyond their control.

B. General Inspections:

The City Public Works staff perform annual inspections of all stormwater treatment and flow control facilities that are City-owned and operated and take appropriate maintenance actions in accordance with the adopted *Stormwater Management Manual for Western Washington*. An inspection program is being developed to schedule inspections and record the findings from said inspections.

Reducing the inspection frequency will be based on maintenance records of double the length of time of the proposed inspection frequency. In the absence of maintenance records, the City may substitute written statements to document a specific less frequent inspection schedule. Written statements will be based on actual inspection and maintenance experience and will be certified in accordance with G19 of the City's Permit, *Certification and Signature*.



*Stormwater Pond Wall
maintained by the City of Brier*

C. Post-Storm Inspections:

The City performs spot checks of potentially damaged permanent treatment and flow control facilities after major storm events. If spot checks indicate widespread damage/maintenance needs, all facilities that may be affected are then inspected. Repair and maintenance actions are taken immediately upon inspection, if required.

D. Catch Basins and Inlet Inspections:

Inspection of all catch basins and inlets owned or operated by the City will occur at least once before the end of the City's Permit term. Catch basins will be cleaned if the inspection indicates cleaning is needed to comply with maintenance standards established in the most recent version of the *Stormwater Management Manual for Western Washington*. Decant water will be disposed of in accordance with Appendix 6 of the City's Permit, *Street Waste Disposal*.

Inspections may be conducted on a "circuit basis" whereby a sampling of catch basins and inlets within each circuit are inspected to identify maintenance needs. Include in the sampling an inspection of the catch basin immediately upstream of any system outfall. Clean all catch basins within a given circuit at one time if the inspection sampling indicates cleaning is needed to comply with maintenance standards established under Section 4C, above.

As an alternative to inspecting catch basins on a "circuit basis," the City may inspect all catch basins, and clean only catch basins where cleaning is needed to comply with maintenance standards.

E. Compliance:

The City has an established inspection program designed to inspect all sites.

F. Reduction of Stormwater Impacts:

The City Stormwater Management Program has established practices from the *Stormwater Management Manual for Western Washington* to reduce stormwater impacts associated with runoff from streets, parking lots, roads and highways resulting from the following maintenance activities:

- Pipe cleaning
- Cleaning of culverts that convey stormwater in ditch systems
- Ditch maintenance
- Street cleaning
- Road repair and resurfacing, including pavement grinding
- Snow and ice control
- Utility installation

G. Policies and Procedures:

The City's Stormwater Management Program has established policies and best management practices from the *Stormwater Management Manual for Western Washington* to reduce pollutants in discharges resulting from the following activities:

- Application of fertilizer, pesticides, and herbicides including the development of nutrient management and integrated pest management plans
- Sediment and erosion control
- Landscape maintenance and vegetation disposal
- Trash management
- Building exterior cleaning and maintenance

H. Training:

A training program has been developed for employees of the City whose construction, operations, or maintenance job functions may impact stormwater quality. The training program will address the importance of protecting water quality, the requirements of the City's Permit, operation and maintenance standards, inspection procedures, selecting appropriate BMPs, ways to perform their job activities to prevent or minimize impacts to water quality, and procedures for reporting water quality concerns, including potential illicit discharges. Follow-up training will be provided as needed to address changes in procedures, techniques, or requirements. The City will document and maintain records of training provided.

I. Special Facility Requirements:

Development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) for all heavy equipment maintenance or storage yards, and material storage facilities owned or operated by the City in areas subject to the City's Permit that are not required to have coverage under the Industrial Stormwater General Permit. Implementation of non-structural BMPs began immediately after the pollution prevention plan was developed. A schedule for implementation of structural BMPs is included in the SWPPP. Generic SWPPPs that can be applied at multiple sites may be used to comply with this requirement. The SWPPP will include periodic visual observation of discharges from the facility to evaluate the effectiveness of the BMP.



City of Brier Public Works Facility where SWPPP is being implemented for this NPDES Phase II Permit cycle.

J. Recordkeeping:

Records of inspections and maintenance or repair activities conducted by the City will be maintained in accordance with S9 of the City's Permit, *Reporting Requirements*.

6.1.6 SWM Element #6: Program Implementation⁶

- A. No later than March 31 of each year, the City will submit an Annual Report to Ecology. The reporting period for all annual reports will be the previous calendar year.
- B. An electronic (PDF) copy of each document will be submitted to Ecology. All submittals will be delivered to:
- Department of Ecology
Water Quality Program Municipal Stormwater Permits
P.O. Box 47696
Olympia, WA 98504-7696
- C. The City will keep all records related to the Permit and the SWMP for at least five years. Except for the requirements of the annual reports described in this permit, records will be submitted to Ecology only upon request,
- D. The City will make all records related to the Permit and the City's SWMP available to the public at reasonable times during business hours. The City will provide a copy of the most recent annual report to any individual or entity, upon request.
1. A reasonable charge may be assessed by the City for making photocopies of records.
 2. The City may require reasonable advance notice of intent to review records related to this Permit.
- E. Each annual report will include the following:
1. A copy of the City's current Stormwater Management Program documentation.
 2. Submittal of Appendix 3 of the Permit, Annual Report Form for Cities, Towns, and Counties, which is intended to summarize the City's compliance with the conditions of the Permit, including:
 - a. Status of implementation of each component of the SWMP in Sections 1 through 6 of the Permit.
 - b. An assessment of the City's progress in meeting the minimum measures in Sections 1 through 6 of the Permit.
 - c. A description of activities being implemented to comply with each component of the SWMP, including the number and type of inspections,

⁶ City of Brier, 2013 SWMP

- enforcement actions, public education and involvement activities, and illicit discharges detected and eliminated.
- d. The City's SWMP implementation schedule and plans for meeting Permit deadlines, and the status of SWMP implementation to date. If permit deadlines are not met, or may not be met in the future, the following will be included: reasons why, corrective steps taken and proposed, and expected dates that the deadlines will be met.
 - e. A summary of the City's evaluation of the City's SWMP, according to sections S5.A.4 and S8.B.2 of the Permit.
 - f. Notice, if applicable, that the City is relying on another governmental entity to satisfy any of the obligations under this permit.
 - g. Updated information from the prior annual report plus any new information received during the reporting period, pursuant to S8.B.2 of the Permit.
 - h. Certification and signature pursuant to G19.D of the Permit, and notification of any changes to authorization pursuant to G19.C.
3. Notification of any annexations, incorporations, or jurisdictional boundary changes resulting in an increase or decrease in the City's geographic area during the reporting period, and implications for the SWMP.
 4. A description of any stormwater monitoring or studies conducted by the City during the reporting period. If stormwater monitoring was conducted on behalf of the City, or if studies or investigations conducted by other entities were reported to the City, a brief description of the type of information gathered or received shall be included in the annual report(s) covering the time period(s) the information was received.
 5. An assessment of the appropriateness of the BMPs identified by the City for each component of the SWMP; and any changes made, or anticipated to be made, to the BMPs that were previously selected to implement the SWMP, and why.
- F. The City will prepare for future, long-term monitoring
1. The City will prepare to participate in the implementation of a comprehensive long-term monitoring program. The monitoring program will include two components: stormwater monitoring and targeted Stormwater Management Program (SWMP) effectiveness monitoring.
 - a. Stormwater monitoring will be intended to characterize stormwater runoff quantity and quality at a limited number of locations in a manner that allows analysis of loadings and changes in conditions over time, and generalization across the City.

- b. Stormwater program effectiveness monitoring will be intended to improve stormwater management efforts by evaluating issues that significantly affect the success of, or confidence in, stormwater controls.

The monitoring program may include long-term monitoring and short-term studies. The results of the monitoring program will be used to support the adaptive management process and lead to refinements of the SWMP.

2. Stormwater monitoring

- a. The City will identify three outfalls or conveyances where stormwater sampling could be conducted. One outfall or conveyance will represent commercial land use, the second will represent high-density residential land use and the third will represent industrial land use. The City of Brier does not have any industrial land or high-density residential land, and only a very small amount of commercial land use, but will identify three outfalls or conveyances where stormwater sampling could be conducted.
- b. The City will document how sites are selected and justify the basin size, based on comparison of the times of concentration with rainfall durations for typical seasonal storms. Each will represent a discernible type of land use, but not be a single industrial or commercial complex. Ideally, to represent a particular land use, no less than 80 percent of the area served by the outfall or conveyance will be classified as having that land use. The City may move upstream in the conveyance system to achieve the desired land use, or, if a primarily industrial or commercial area is not present, an area of mixed industrial and commercial land use may be selected.

3. SWMP effectiveness monitoring

- a. The City will prepare to conduct monitoring to determine the effectiveness of the City's SWMP at controlling stormwater-related problems that are directly addressed by actions in the City's SWMP. This component of the monitoring program shall be designed to answer the following types of questions:
 - How effective is a targeted action or narrow suite of actions?
 - Is the SWMP achieving a targeted environmental outcome?
- b. By December 31, 2010, the City had identified at least two suitable questions and selected sites where monitoring will be conducted. This monitoring includes, at a minimum, plans for stormwater, sediment, or receiving water monitoring of physical, chemical, and/or biological characteristics. This monitoring may also include data collection and analysis of other measures of program effectiveness, problem identification, and characterizing discharges for planning purposes.

- c. For each question, the City will develop a monitoring plan containing the following elements:
 - i. A statement of the question, an explanation of how and why the issue is significant to the Permittee, and a discussion of whether and how the results of the monitoring may be significant to other MS4s.
 - ii. A specific hypothesis about the issue or management actions that will be tested.
 - iii. Specific parameters or attributes to be measured.
 - iv. Expected modifications to management actions depending on the outcome of hypothesis testing.
- 4. Monitoring program reporting requirements
 - a. The 2011 annual report:
 - i. Described the status of identification of sites for stormwater monitoring.
 - ii. Included a summary of proposed questions for the SWMP effectiveness monitoring and describe the status of developing the monitoring plan, including the proposed purpose, design, and methods.

6.1.7 SWM Element #7: Total Maximum Daily Load/Bacterial Pollution Control Plan: Swamp Creek⁷

This section constitutes the City's Bacterial Pollution Control Plan (BPCP), and has been developed to meet the requirements of applicable Total Maximum Daily Loads (TMDLs) approved for stormwater discharges from MS4s owned or operated by the City.

Applicable TMDLs are those which were approved by the EPA on or before the issuance of the Permit and are included in Appendix 2 of the permit.

There is one TMDL listed in Appendix 2 of the Permit that is applicable within the City of Brier. It is the Swamp Creek TMDL. The Swamp Creek TMDL addresses fecal coliform bacteria in Swamp Creek. The coverage of this TMDL includes all areas of the City that eventually drain to Swamp Creek prior to its confluence with the Sammamish River in King County.

The City will take the following measures to comply with the applicable TMDLs:

- A. The City will evaluate and document the applicability of the following approaches to bacterial pollution control:
 - 1. Ambient water quality and stormwater quality sampling to specifically identify bacterial pollution sources within targeted subbasins.

⁷ City of Brier, 2013 SWMP

2. Development and implementation of a Pet Waste Ordinance or other equivalent mechanism.
 3. Evaluation of current water pollution ordinance enforcement capabilities.
 4. Evaluation of critical areas ordinance in relation to TMDL goals.
 5. Implementation of an educational program directed at reducing bacterial pollution, including an educational program for K-12 students to increase their awareness of bacterial pollution problems.
 6. Investigation and implementation of methods that prevent additional stormwater bacterial pollution through stormwater treatment, reducing stormwater volumes from existing areas using low impact development retrofitting, and preventing additional sources of stormwater in association with new development using low impact development strategies.
- B. The City will conduct additional Illicit Discharge Detection and Elimination (IDDE) activities within the areas of the City affected by the TMDL:
1. There are no commercial animal handling areas or commercial composting facilities.
 2. There are no known composting or animal waste handling facilities within the city.
 3. Water bodies addressed by the Swamp Creek Tributaries TMDLs have been designated as high priority water bodies (see Permit condition S.5.C.3.(c)(ii)) and will receive field assessments and screening prior to other receiving water bodies unless otherwise approved in writing from Ecology. The presence of sewage/septic system sources shall be investigated as part of all screenings.
- C. The City will conduct water quality monitoring for fecal contamination:
- Within the area covered by the Swamp Creek TMDL, the City will perform water quality monitoring in accordance with Option 2 of the Swamp Creek TMDL.
- The Quality Assurance Project Plan (QAPP) was approved by Ecology on February 28, 2008, and final signed copies were delivered to Mountlake Terrace and Brier in March 2008. Monthly sampling began on April 15, 2008. Monitoring will be performed at a frequency that will produce at least 60 data points at each sampling location by February 15, 2012. The City will also use continuous flow monitoring at a representative location as approved by Ecology, to determine if a sampling event is affected, or dominated, by storm flows.
- D. The City will conduct TMDL Activity Documentation and Tracking. The City will keep records of all actions required by the Permit for TMDL compliance. The City will discuss implementation status, program changes and BPCP activities completed during the previous year in a subsection of the City's annual report to Ecology.

6.2 OTHER FUTURE STORMWATER PROGRAM RECOMMENDATIONS⁸

The City should review its current stormwater program to ensure it is in compliance and planning for all the new requirements and new due dates of the NPDES Phase II Permit (2013-2018), including their IDDE and O&M programs. The new requirements and due dates are summarized in Figure 6-1 on pages 6-21 to 6-23.

⁸ City of Brier, 2013 SWMP

Figure 6-1: City of Brier's New NPDES Phase II Permit Requirements and Schedule

Requirements				Due Dates					
New Permit Section Reference or Other Reference	Stormwater Program Element	Brief Description of the New Permit Requirements	New NPDES Permit Milestone Dates	Aug-13	2014	2015	2016	2017	2018
Element #1 - Public Education and Outreach									
S5.C.1.a and b	1.1 Outreach to Target Audiences	Focus Efforts on Prioritized Target Audiences; LID and IDDE Education; Create Stewardship Opportunities	Start in New Permit Term, Ongoing						
S5.C.1.c	1.2 Measure Results of the Educational Activities	Measure Understanding and Behaviors of One New Target Audience	No Later Than 2/2/2016						
N/A	1.3 Maintain Records	Ongoing Public Education and Outreach Record Maintenance							
Element #2 - Public Involvement and Participation									
S5.A.2	2.1 Input to SWM Plan and Annual Report	New Requirements for the Organization of the CSP Components	Annually						
S5.A.5.b		Include Description of Internal Coordination Mechanisms in Annual Report	First SWM Plan and Annual Report Due 3/31/2015						
S5.C.2.a		Create Ongoing Opportunities for Public Involvement and Participation	Continue in New Permit Term, Ongoing						
S5.C.2.b	2.2 Availability of Stormwater Program Documents	The Annual Report and SCP Must be Posted to the Website by May 31, Starting in 2015	May 31 Each Year						
Element #3 - Illicit Discharge Detection and Elimination									
S5.C.3.a	3.1 Storm Sewer System Map	Update Stormwater System Map Per the New Requirements Listed in the Permit; Update Stormwater System Map on an Ongoing Basis as New Projects are Built or Changes are Made	8/1/2017, Ongoing						
S5.C.3.b	3.2 Illicit Discharge Ordinance	Update IDDE Ordinance as Specified in the Permit	Adopt New Ordinance by 2/2/2018						
S5.C.3 & S5.C.3.c	3.3 Detection and Elimination Program	Implement the City's IDDE Program	Continue in New Permit Term	Due Dates are Variable by Requirement under this Element					
		Field Screenings of 40% of the City's Conveyances and Outfalls	Start in New Permit Term						
		Field Screenings of at Least 40% of the MS4 by 12/31/2017 and 12% Each Year Thereafter	12/31/2017 (40% Completed), Annually (Avg. 12% Completed)						
		Characterization and Source Tracing of Illicit Discharges and Connections, as Needed	As Needed in New Permit Term						
		IDDE Investigations and Responses, Spill Response	Within 21 days Report Suspected Illicit Connection, Response to Spills Immediately, Begin Investigation within 7 Days						
S5.C.3.d	3.4 Public Education and Spill Reporting	Public Education on IDDE	Continue in New Permit Term						
		Spill Reporting Hotline							
		IDDE Response/Follow-Up							
S5.C.3.e	3.5 Program Evaluation and Tracking	IDDE Program Tracking	Continue in New Permit Term						
S5.C.3.e	3.6 Staff Training	Training of All Staff on IDDE	Continue in New Permit Term						
		Follow-up IDDE Training, as Needed							
		Maintain IDDE Training and Program Records							

New Permit Section Reference or Other Reference	Requirements			Due Dates					
	Stormwater Program Element	Brief Description of the New Permit Requirements	New NPDES Permit Milestone Dates	Aug-13	2014	2015	2016	2017	2018
Element #4 - Controlling Runoff from New Development, Redevelopment, and Construction Sites									
S5.C.4.a	4.1 Stormwater Runoff Control Ordinance	Adopt Updated Runoff Control Ordinance; Adopt 2012 Ecology Stormwater Management Manual for Western Washington (Ecology Manual)	Adopt Ordinance by 06/30/2017					<div></div>	
		Adopt LID Codes, Rules, and Standards	Adopt LID Codes by 12/31/2016				<div></div>		
S5.C.4.b	4.2 Site Plan Review and Inspection	Develop a Permitting Process Consistent with the 2012 Ecology Manual	Once 2012 Ecology Manual is adopted						
S5.C.4.c	4.3 Long-Term Operation and Maintenance	Adopt Legal Authority to Inspect and Enforce the Maintenance Standards for All Private Stormwater Facilities	Implement by 12/31/2015			<div></div>			
		Adopt Maintenance Standards Consistent with the 2012 Ecology Manual; Include Provisions for Long-Term Maintenance	Implement by 12/31/2016				<div></div>		
		Inspect All New Stormwater Facilities and CBs for Residential Developments Every 6 Months or Until 90% of the Lots are Constructed	Implement by 12/31/2016				<div></div>		
		For New Residential Developments, Inspect New Water Quality and Flow Control Facilities Every Six Months	Continue During New Permit Term						
S5.C.4.c	4.4. Permit Tracking and Inspection Records	Implement a Formal Procedure for Keeping Records of Inspections and Enforcement Records	Continue in New Permit Term, Ongoing						
S5.C.4.d	4.5 NOI for Construction Activity	Continue to Make Copies of the NOI Available to Public	Continue in New Permit Term						
S5.C.4.e	4.6 Staff Training	Conduct Staff Training on New Requirements; Keep Records of Trainings	Train Staff After New Stormwater Runoff Control is Adopted						
S5.4.f	4.7 LID Code	Update the City's Code on Local Development to Incorporate LID	12/31/2016 3/31/2017				<div></div>	<div></div>	
S5.4.g	4.8 Watershed-Scale Stormwater Planning	To be Determined	To Be Determined	N/A					
Element #5 - Municipal Operations and Maintenance									
S5.C.5.a	5.1 Adopt Maintenance Standards	Adopt Maintenance Standards Consistent with the 2012 Ecology Manual	Adopt Maintenance Standards by 12/31/2016				<div></div>		
S5.C.5.b	5.2 Annual Inspections of Water Quality and Flow Control Facilities	Annual Inspection Water and Flow Control Facilities in Accordance with the 2012 Ecology Manual	Continue Annually in New Permit Term						
S5.C.5.c	5.3 Spot Checks After Storm Events	Spot Checks of Stormwater Treatment and Flow Control Facilities After Major Storm Events (24-hour Storm Event with a 10-year or Greater Recurrence Interval)	Continue in New Permit Term after Specified Storm Events						
S5.C.5.d	5.4 Catch Basin Inspection	Inspect All Catch Basins and Inlets Once by 8/1/2017 and Every Two Years Thereafter	8/1/2017 and Every Two Years Thereafter					<div></div>	
S5.C.5.f	5.5 Road Maintenance/Non-Roadway Maintenance	Implement Practices to Reduce Stormwater Impacts on All Roads, Highways, Buildings, Parks, etc.	*No Date or Frequency Provided in New Permit	No date provided					
		Application Methods for Fertilizer, Pesticides, and Herbicides; Clean MS4 on a Circuit and Once During the Permit Term	Continue in New Permit Term, Complete by 2018						
S5.C.5.g	5.6 Staff Training	Implement Ongoing Staff Training for New O&M Requirements and Activities	Continue in New Permit Term						
S5.C.5.h	5.7 SWPPP for Maintenance Yards	Update SWPPP in New Permit Term, as Needed, Continue to Implement SWPPP	Update as Needed in New Permit Term						
S5.C.5.i	5.8 Recordkeeping	Maintain O&M Program Records	Continue in New Permit Term						

Requirements				Due Dates					
New Permit Section Reference or Other Reference	Stormwater Program Element	Brief Description of the New Permit Requirements	New NPDES Permit Milestone Dates	Aug-13	2014	2015	2016	2017	2018
Element #6 - Program Implementation									
S5.A.1	6.1 SWM Plan Implementation	Develop and implement a CSP that Covers the Geographic Areas Subject to the NPDES Permit	Continue Annually in New Permit Term						
S5.A.2	6.2 SWM Plan Documentation	Document the NPDES Program Activities	March 31 Each Year in the New Permit Term						
		Submit Annual Report Electronically Using Ecology's WA WebDMR							
S5.A.3	6.3 NPDES Program Tracking	Track All Costs and Activities Associated with NPDES Program Activities	Continue in New Permit Term						
S5.B	6.4 MEP and AKART	Design the CSP to Reduce Pollutants to MEP and to Meet State AKART Requirements	N/A						
Element #7 - Total Maximum Daily Load Allocations: North Creek and Swamp Creek Fecal Coliform Bacteria TMDL									
App. 2	7.1 Swamp Creek TMDL	Business Inspections, Public Education and Outreach, Operation and Maintenance, IDDE, Targeted Source Identification and Elimination, Continue Surface Water Monitoring	Business Inspections = 8/1/2016, Targeted Source Identification & Elimination = 8/2/2014, Surface Water Monitoring = 2/2/2015, 8/1/2015, 5/31 Annually Starting 2015, Monthly Samples						
Element #8 - Monitoring									
S8.B	8.1 Existing Monitoring	N/A	N/A in New Permit Term	N/A					
S8.C.1.a	8.2 Stormwater Monitoring	N/A	N/A in New Permit Term	N/A					
S8.C.1.b	8.3 SWMP Effectiveness Monitoring	N/A	N/A in New Permit Term	N/A					
S8.A, S8.C.2	8.4 Annual Reporting	Annual Reporting on Selected Monitoring Option	Annually 3/31, First Annual Report Due 3/31/2015						
S8.B.1, 2	8.5 Status and Trends Monitoring	Pay-in, Option #1 for Status and Trends Monitoring	Annually, Payment Due 8/15 Starting in 2014 Selection of Option due 12/1/2013						
S8.C.1,2	8.6 Effectiveness Studies	Pay-in, Option #1 for Effectiveness Studies	Annually, Payment Due 8/15 Starting in 2014 Selection of Option due 12/1/2013						
S8.D.1,2	8.7 Source Identification and Diagnostic Monitoring Information Repository	Pay-in, Option #1 for Source Identification and Diagnostic Monitoring Information Repository	Annually, Payment Due 8/15 Starting in 2014 Selection of Option due 12/1/2013						
Element #9 - Reporting									
S9.A&B	9.1 Annual Reports	Submit Annual Report Electronically Using Ecology's WA WebDMR	March 31 Each Year, first Annual Report Due 3/31/2015						
S9.C.2	9.2 Ongoing Tracking	Ongoing Tracking of NPDES Program Activities	Ongoing						
S9.C	9.3 Maintaining Records	Maintain records of NPDES program activities.	Ongoing						
S9.D	9.4 Public Access	Make all Records Available to the Public	Ongoing						
S9.E.4	9.5 LID Barriers	N/A in New Permit	N/A	N/A					

Ongoing or Annually
Variable
As Needed
One Time
● Due Date

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CHAPTER 7

STORMWATER UTILITY RATE STUDY

7.1 BACKGROUND

The City of Brier formed a stormwater utility in accordance with the Revised Code of Washington (RCW)¹ 35.67 and 39.34 to provide a consistent revenue source for the City to fund required regulatory stormwater activities. Stormwater Management Fund 407 was established to operate and maintain the stormwater utility. In 1999, Ordinance 294 established a stormwater utility fee as \$3.00/month per developed single-family residence with an equivalent charge for nonresidential properties based upon \$3.00/month per each 2,000 square feet of impervious area. In 2010, an analysis of the revenue required to comply with NPDES Phase II Permit was completed. This rate study concluded that the \$3.00 monthly rate was insufficient to meet the financial requirements for compliance with the NPDES Phase II Permit requirements.

The 2010 rate study analyzed two options: funding NPDES Phase II Permit compliance only and funding NPDES Phase II Permit Compliance and capital improvement projects. Due to the significant increase in the rate necessary to fund capital projects, the City approved the option to fund only NPDES Phase II Permit compliance. Table 7-1 summarizes the adjusted rate structure approved by resolution for the period of January 2011 through 2016.

Table 7-1: 2010 – 2016 Stormwater Rates							
Year	2010	2011	2012	2013	2014	2015	2016
Rate (per month)*	\$3.00	\$5.00	\$5.75	\$6.50	\$6.50	\$6.50	\$6.50
<i>*The stormwater utility fee is for a developed single family residence with an equivalent charge for non-residential properties based upon the rate per each 2,000 square feet of impervious area.</i>							

A new NPDES Phase II General Permit was developed by the Department of Ecology in August 2013. This new Permit cycle is 2013 through 2018 and includes several modifications including enhanced recordkeeping, IDDE field screening, increased O&M frequencies, water quality regional monitoring payment, and Swamp Creek TMDL activities. Anticipating the new Permit conditions, the City contracted with PACE Engineers, Inc., (PACE) to prepare a stormwater code gap analysis in February 2013. The conclusions of this analysis were that several municipal codes were required to meet the new Permit conditions. Since these new requirements were not anticipated in the current rate structure, the City has requested PACE review the sufficiency of their current rates to meet the 2013 – 2018 NPDES Phase II Permit requirements. PACE also included a Capital Improvements Program in their rate evaluation.

Prior to the 2010 rate adjustment, the City's stormwater rates were lower than those charged by most neighboring jurisdictions. The 2010 rate adjustment was comparable, if not slightly lower than neighboring jurisdiction rates. However, to comply with the new 2013 – 2018 NPDES Phase II Permit, neighboring MS4 jurisdictions have made or are evaluating the need to adjust their rates, as well. In January of 2014, a stormwater rate survey was conducted by the Association of Washington Cities. The survey reported the following monthly residential rates for other neighboring NPDES Phase II Permittees. The City of Brier's stormwater rates are

¹ Revised Code of Washington <http://app.leg.wa.gov/rcw/> <accessed November 12, 2014 at 7:55am>

generally significantly lower than its neighbors. The complete survey can be found in Appendix K.

Table 7-2: Residential Rate Study Results	
Neighboring Community	Current Rate
Bothell	\$12.42
Kenmore	\$13.95*
Lake Forest Park	\$15.09*
Mountlake Terrace	\$21.38
<i>* Kenmore and Lake Forest Park bill semi-annually including the stormwater rate on property tax invoices. The annual amount was converted to a monthly equivalent for this comparison.</i> <i>‡ Source: Association of Washington Cities</i>	

7.2 BMC STORMWATER UTILITY FINANCIAL REVIEW

7.2.1 Customer Classifications

Per Brier Municipal Code (BMC) 12.32 the following customer classifications were adopted and assessed a monthly user fee beginning January 1, 2011.

- A. Residential Parcels: The single-family residential charge shall be \$5.00 per month for the year 2011 for each parcel having one residential dwelling; the rate will increase to \$5.75 for the year beginning 2012 and the rate will increase to \$6.50 for the year beginning 2013. This uniform rate is based on each residential parcel being equal to one equivalent service unit (ESU).
- B. Non-Single-Family Parcels: Each residential unit that has an assigned number or address for postal purposes shall be charged \$5.00 per month for the year 2011 for each parcel having one residential dwelling; the rate will increase to \$5.75 for the year beginning 2012, and the rate will increase to \$6.50 for the year beginning 2013. This uniform rate is based on each residential parcel being equal to one ESU.
- C. Undeveloped Parcels: Undeveloped parcels shall not be charged.
- D. Schools, Churches, and Neighborhood Businesses.
 - 1. The charge for all other parcels except residential parcels and undeveloped parcels shall be based upon the total amount of impervious surface as measured by the City's Public Works Department.
 - 2. The charge for all such parcels shall be \$5.00 per month for year 2011 for each two thousand square feet of impervious surface; the rate will increase to \$5.75 for the year beginning 2012 and the rate will increase to \$6.50 for the year beginning 2013. (Ord. 385 § 1, 2010: Ord. 294 (part), 1999)

As of September 2014, the City billed 2,309 single family residential and 6 School/Church/Business properties \$6.50/month/ESU. The six School/Church/Business properties represent 192 ESUs based upon dividing the total impervious area by 2,000 square feet to calculate the ESU per parcel. Table 7-3 lists these current customers.

Table 7-3: 2014 School/Church/Business Customer Class

Customer	Impervious Area (sf)	ESU
Brier Elementary School	83,040	41
Brier Terrace Middle School	240,360	120
Brier Pizza	25,240	13
Brier Grocery	7,040	3
Brier Library	2,000	1
Brier Community Church	27,460	14
TOTAL:		192 ESUs

It is recommended that City staff review the School/Church/Business customer class periodically to reflect any site improvements that may result in increased impervious surfacing.

7.2.2 Revenue

The City provided actual annual revenue and expenditure data from 2011 through September 2014. This information is included in Appendix L. Table 7-4 summarizes the revenue for the Stormwater 407 Fund.

Table 7-4: 2011-2014 407 Fund Revenue

Stormwater Management Fund 407		Actuals 2011	Actuals 2012	Actuals 2013	Actuals 2014
Revenue					
407-000-000-334-03-10-00	DOE Stormwater Grant	\$7,634.61	\$0.00	\$0.00	\$0.00
407-000-000-334-03-10-01	DOE Stormwater Capacity Grant	\$12,528.98	\$26,437.39	\$98,189.63	\$98,109.60
407-000-000-343-13-00-00	Storm Drainage Fees	\$135,591.61	\$161,804.43	\$188,436.63	\$133,350.12
407-000-000-361-10-00-00	Investment Interest	\$214.14	\$215.27	\$174.11	\$75.58
407-000-000-367-00-00-00	Stormwater Hook Up Fee (\$100.00/connection)	\$2,800.00	\$0.00	\$1,200.00	\$2,175.00
407-000-000-369-00-00-00	Miscellaneous Revenue	\$0.00	\$139.32	\$0.00	\$0.00
Totals 407 Fund – Revenue		\$158,769.34	\$188,596.41	\$288,000.37	\$233,710.30
Rates (ESU/mo)		\$5.00	\$5.75	\$6.50	\$6.50
Estimated ESUs		2,259.86	2,344.99	2,415.85	2,564.43

Table 7-4 above includes annual Ecology Stormwater Capacity grants received by the City, revenue from user fees, investment interest, Stormwater Hook-up fees, and miscellaneous revenue. This table also lists the user rates in effect for each respective year. Total ESUs were estimated by dividing the annual Storm Drainage fees by the respective user rates.

- The discrepancy between the estimated ESUs shown in Table 7-4 and the 2,309 ESUs actually billed is due to a significant amount of late fees and accumulated interest.
- Ecology Capacity grants are provide for the specific purpose of augmenting MS4s revenue to fund required NPDES Phase II Permit programs and

activities. These funds are used to purchase needed tools and equipment, public outreach, monitoring/effectiveness study, and other eligible expenses.

- Storm Drainage fees are the monthly user fees set by City Ordinance.
- Investment Interest is interest earned on monies retained in Fund 407 throughout the year.
- Stormwater hookup fees are assessed to new development to cover inspection fees.
- Miscellaneous Revenue is any other revenue attributable to Fund 407 and is rarely received.

7.2.3 Expenses

Table 7-5 below summarizes the actual expenditures for Fund 407 for the same time period as Table 7-4 on page 2-3. Generally, the user rates have been able to maintain NPDES Phase II Permit compliance with the assistance of the Ecology Capacity grants. The rate structure in place through the first NPDES Permit cycle appeared to be adequate. However, the new NPDES 2013 – 2018 Permit cycle has additional program requirements which are discussed in this Plan in *Chapter 3: Regulatory Requirements* and *Chapter 6: Stormwater Program Recommendations*. Further, the current rate structure does not include any capital reserves, capital improvements, or equipment purchases by design. The current rate structure has met the intended goals of the 2010 rate study, but will need to be adjusted to meet the new Permit cycle requirements.

Table 7-5: 2011-2014 407 Fund Expenditures				
Stormwater Management Fund 407	Actuals 2011	Actuals 2012	Actuals 2013	Actuals 2014
Annual Expenditures	\$190,268.52	\$168,971.11	\$234,298.57	\$250,478.79*
* Actual expenses through September 30, 2014.				

7.3 STORMWATER UTILITY HISTORICAL REVENUE REQUIREMENTS

Table 7-5 above provides historical annual Stormwater Utility expenses. These expenses include NPDES Phase II Permit Program Management, Operation and Maintenance, and grant-funded Capital Improvements. These program costs were broken out to evaluate the cost to manage regulatory compliance for NPDES Phase II Permit and maintain system level of service to the users. The various components of costs associated with operating and maintaining a municipally-owned utility, as well as financing the renewal and replacement of equipment and capital improvements, are generally referred to as the revenue requirements

7.3.1 Stormwater Management Program Responsibilities and Costs

The City's Stormwater Management Program includes, but is not limited to, the following activities for compliance with the current NPDES Phase II Permit requirements: Program management, operation and maintenance, IDDE inspections, development review, reporting, recordkeeping, accounting, mapping, public outreach, and water quality monitoring. The program activities are shared between the Public Works and

Administrative staff for the City. The following is a brief summary of the task and City staff position responsible for the work.

- **Program Management:** The City Planner is responsible for maintaining compliance with the NPDES Phase II Permit, oversees the program, and organizes the education and public outreach efforts.
- **Stormwater Operation and Maintenance:** The City Public Works Superintendent is responsible for oversight of the Stormwater O&M Program.
- **Annual Reporting and SWMP update:** The City has contracted with the on-call engineer for the effort to update the SWMP and preparing the Annual Report to Ecology.
- **Administration Clerks:** The City Clerk and the Deputy Clerk maintain the stormwater management fund.
- **Utility Billing Clerk:** The Utility Billing Clerk is responsible for billing the stormwater management utility fee.
- **Reception:** The Receptionist's time is devoted to issues surrounding stormwater management, including managing stormwater-related public complaints and comments and providing customer service.
- **GIS Operator:** Updating existing CAD mapping with new connections and new construction by both the City and private developers. The NPDES Phase II Permit requires the City to map all new connections to the municipal system. City staff maintain the City mapping with their GIS software.
- **Control Runoff from Development and Construction Sites:** Permit review and inspection costs are currently covered by the Permit application fees.

Table 7-6 on page 7-6 summarizes the annual costs from 2011 through September of 2014 to manage the stormwater program compliant with NPDES Phase II Permit.

Table 7-6: NPDES Phase II Permit Stormwater Management Annual Expenses

Expenditure	Description	2011	2012	2013	2014
407-000-000-531-10-10-01	Salaries/Wages – Admin Clerks	\$29,817.89	\$31,090.72	\$32,560.85	\$24,191.29
407-000-000-531-10-12-01	Overtime – Admin Clerks	\$0.00	\$0.00	\$0.00	\$8.35
407-000-000-531-10-41-00	Professional Services – Legal	\$55.75	\$0.00	\$0.00	\$0.00
407-000-000-531-10-41-03	Professional Services – Audit Costs	\$2,618.35	\$173.50	\$0.00	\$0.00
407-000-000-531-10-41-04	Professional Services – Billing	\$0.00	\$2,235.23	\$2,177.51	\$1,501.62
407-000-000-531-10-48-00	Repairs/Maintenance Admin	\$1,161.79	\$270.74	\$520.40	\$0.00
407-000-000-531-10-49-00	Miscellaneous Admin.	\$452.38	\$477.19	\$712.81	\$43.00
407-000-000-531-80-31-00	Office and Operating Supplies	\$967.18	\$764.79	\$1,103.23	\$621.69
407-000-000-531-80-41-01	Professional Services – IT	\$0.00	\$0.00	\$62.98	\$478.65
407-000-000-531-80-41-02	Sno. Co. Allview Annex Surface Water	\$0.00	\$0.00	\$0.00	\$0.00
407-000-000-531-80-41-03	Ecology Stormwater Permit	\$4,283.93	\$2,811.90	\$3,162.30	\$3,415.78
407-000-000-531-80-41-04	Ecology monitoring/effectiveness study	\$0.00	\$0.00	\$0.00	\$0.00
407-000-000-531-80-49-02	Sno. Conservation Stormwater Education	\$0.00	\$0.00	\$0.00	\$4,470.00
Total:		\$39,357.27	\$37,824.07	\$40,300.08	\$34,730.38

* Actual expenses through September 30, 2014.

7.3.2 Operation and Maintenance Responsibilities and Costs

Program Management: The Public Works Foreman has the responsibility for implementing the maintenance and operation effort of the program and aids in the field work when required during emergency response. These responsibilities include oversight of the day to day operations and maintenance efforts and ensuring compliance with the stormwater management program and NPDES Phase II Permit.

The City's Public Works crews complete the following annual Operation and Maintenance (O&M) Program activities and services as assigned by the Public Works foreman.

- Complaint response.
- Annual maintenance.
- Facility inspection/cleaning repair/replacement.
- Waste disposal.
- Adoption of maintenance standards consistent with the Department of Ecology's 2012 Stormwater Management Manual for Western Washington (SWMMWW) Manual (*Note: 2014 modification to SWMMWW is to be released in December of 2014*).
- Development and implementation of specified stormwater O&M standards, as defined in the Ecology Stormwater Manual for Western Washington and the Permit.

- Conducting annual inspections of City-owned stormwater treatment and flow control facilities, and performing needed maintenance.
- Spot checking stormwater treatment and flow control facilities after major stormwater events (>10-year recurrence interval); conducting repairs.
- Inspecting all catch basins and inlets at least once every two years and conducting needed maintenance.
- Implementing maintenance practices, policies, and procedures to reduce stormwater impacts from the various types of land uses throughout the City.
- Regularly conducting training activities for all O&M staff and applicable City staff whose primary job functions include drainage O&M and construction-related activities.
- Developing and implementing a Stormwater Pollution Prevention Plan (SWPPP) document for the Public Works/Maintenance Yard.
- Continuing to keep O&M records of all activities.

The above activities are consistent with the City's current SWMP and NPDES Phase II Permit. Table 7-7 summarizes the annual costs from 2011 through 2014 to manage operation and maintenance program.

Table 7-7: NPDES Stormwater O&M Annual Expenses					
Expenditure	Description	2011	2012	2013	2014
407-000-000-531-10-10-00	Salaries/Wages – Public Works	\$48,839.93	\$57,339.18	\$53,349.74	\$55,357.18
407-000-000-531-10-12-00	Overtime – Public Works	\$138.18	\$183.17	\$93.78	\$66.41
407-000-000-531-10-20-00	Personnel Benefits – Public Works	\$17,359.24	\$18,775.19	\$19,438.95	\$15,255.44
407-000-000-531-10-22-00	Uniforms	\$224.48	\$274.02	\$335.26	\$129.41
407-000-000-531-30-32-00	Vehicle Fuel	\$0.00	\$0.00	\$4,000.00	\$3,400.00
407-000-000-531-80-31-02	Small Tools & Equipment	\$66.79	\$1,412.46	\$772.29	\$1,173.03
407-000-000-531-80-41-00	Professional Services – Public Works	\$7,908.13	\$0.00	\$2,022.33	\$232.68
407-000-000-531-80-42-00	Communications	\$2,509.47	\$399.30	\$599.38	\$246.12
407-000-000-531-80-45-00	Rentals	\$0.00	\$0.00	\$0.00	\$0.00
407-000-000-531-80-46-00	Insurance	3500	\$2,923.00	\$4,590.24	\$4,504.92
407-000-000-531-80-47-00	Utilities	\$879.83	\$777.47	\$806.11	\$542.10
407-000-000-531-80-48-00	Repair/Maintenance – System	\$11,970.74	\$6,267.92	\$9,182.63	\$4,451.29
407-000-000-531-80-48-01	Repair/Maintenance – Dump Fees	\$1,760.64	\$498.00	\$3,717.85	\$510.00
407-000-000-531-80-48-02	Community Service WK Mgmt – Ponds	\$996.73	\$612.76	\$690.36	\$242.10
407-000-000-531-80-42-03	Machinery/Equipment Repairs	\$2,013.20	\$1,390.13	\$663.69	\$238.18
407-000-000-531-80-48-04	Repairs/Maintenance Vehicles	\$0.00	\$0.00	\$1,857.96	\$994.89
407-000-000-531-80-49-00	Misc.	\$1,417.35	\$411.64	\$364.06	\$126.72
Total:		\$99,584.71	\$91,264.24	\$102,484.63	\$87,470.47
<i>* Actual expenses through September 30, 2014.</i>					

7.3.3 Capital Improvements Program Costs

While the City's 2011-2016 Stormwater rates did not include funding capital projects, the City has been successful in augmenting stormwater revenue with Ecology Capacity grants. To date, these grants have not included a local match and are intended to help MS4s fund their SWMP activities. The City has used these funds for program compliance reporting, maintenance activities, stormwater system mapping, and most recently Water Quality LID Retrofit project design for the Brierwood Pond. Table 7-8 below identifies the capital project expenditures funded with Ecology grant funding received over the past four years. *Please note: The capital defined as operating transfer to Fund 201 is not funded with Ecology grants, but rather with user rates. This capital expenditure is the stormwater utility's annual share of the debt service to repay the City Hall construction bond and will sunset in 2019.*

Table 7-8: 2011 – 2014 Capital Projects Annual Expenses

	Expenditure	Description	2011	2012	2013	2014
Capital Projects	407-000-000-531-80-49-01	Misc. Ecology Grant G1 NPDES	\$37,253.35	\$25,131.37	\$75,404.44	\$116,460.83
Capital	407-000-000-597-00-01-00	Operating Transfer to Fund 201	\$3,220.00	\$3,000.00	\$3,100.00	\$2,915.00
		Total:	\$40,473.35	\$28,131.37	\$78,504.44	\$119,375.83

* Actual expenses through September 30, 2014.

7.4 FUTURE REVENUE REQUIREMENTS

The various components of costs associated with operating and maintaining a municipally-owned utility, as well as financing the renewal and replacement of equipment and capital improvements, are generally referred to as the revenue requirements. The sum of these cost components, after adjusting for other income and other operating revenues available to the utility, represents the total revenue requirements of the utility system. The revenue requirements for this rate study were based on an estimate of Stormwater Utility costs for the six (6) year period ending December 31, 2020. The projected revenue requirements include the various generalized cost components described below:

- **Operating Expenses:** These expenses include the cost of labor and personnel-related costs, vehicle maintenance, stormwater collection system repairs, utilities, operating supplies, equipment repairs and maintenance, and other items necessary for the operation and maintenance of the MS4.
- **Other Revenue Requirements:** This component of costs includes, in general, recurring capital improvements to be financed from revenues such as vehicle and equipment replacement and acquisition of rights-of-way and easements. Other revenue requirements may include debt service payments on funds borrowed on behalf of the stormwater utility.

These projected expenses need to remain consistent with the utility goals and policies. To maintain the level of service to customers, revenue requirements need to be adjusted for

inflation, future labor contracts, changes in regulatory requirements, and system repairs and rehabilitation.

- **Inflation** – A nationally recognized benchmark for tracking inflation is the Consumer Price Index (CPI). The Puget Sound region has seen an average increase in CPI of 2.0 percent over the past four years, per the Bureau of Labor Statistics of the U.S. Department of Labor. However, some goods and services may exceed this trend, specifically in the healthcare industry. Taking into account these adjustments, the specific expenditure account for the past four years was reviewed and averaged to estimate future budgets.
- **Labor Costs** – The City's current bargaining unit contract was used to estimate future labor and benefit expenses.
- **Regulatory Changes** – The NPDES Phase II Permit defines stormwater program requirements. This Permit typically extends over a six-year duration defining specific timelines for implementing ongoing and new program requirements. The City's current NPDES Phase II Permit was renewed in August of 2013 and extends through July 31, 2018.
- **System Repairs and Rehabilitation** – Typically, system repair and rehabilitation costs are estimated based upon system depreciation. Therefore, as the system ages the utility reinvests at least the depreciation amount back into the system in the form of repairs and rehabilitation, maintaining the level of service to the customer and preserving the service life of the infrastructure. Since the City operates on a cash basis they do not account for depreciation. Therefore, the Public Works staff provided a historical average annual allowance for general system repairs and rehabilitation. Any other system improvements will be budgeted under the capital improvement program.

7.4.1 Future Stormwater Management Program Evaluation

The new requirements of the 2013-2018 NPDES Permit Phase II Requirements and associated due dates can be found in *Figure 6-1: NPDES Phase II Permit New Requirements and Schedule* located in *Chapter 6: Stormwater Program Recommendations*. These new requirements would not result in additional staffing needs at this time. However, periodic water quality testing will increase for the current permit cycle. The increase in cost would mainly result from inflation and frequency of testing.

7.4.2 Future O&M Program Evaluation

7.4.2.1 Staffing

The City's current Operations and Maintenance program is consistent with the requirements of the current NPDES Phase II General Permit terms and conditions. The City Public Works Department augments their current staffing levels with summer interns and private contractors to meet their operation and maintenance program needs. The City will continue this practice for the foreseeable future to provide cost-effective levels of service to their ratepayers.

As NPDES Phase II Permit requirements for operations and maintenance change, the City will reevaluate their staffing needs.

Future labor costs for the City are subject to labor union negotiations for salary and benefits. Labor costs for 2015 were estimated based upon the current labor contract in effect. Future labor costs are estimated using a 3.5-percent increase per year and benefits were estimated using historical trends to project these values for the 6-year and through the 20-year planning horizon.

7.4.2.2 Equipment Renewals and Replacements

City Public Works Department allocates the cost to operate and maintain their equipment to each program including Sewer Fund, Stormwater Fund, and General Fund for Roads. The Stormwater Fund is responsible for 26.63 percent of the cost for repairs and replacements of this equipment. Public Works has identified the need to replace the following equipment, the projected cost of the equipment, the Stormwater Utility's pro rata share of the cost for the equipment, and the schedule for replacement. Table 7-9 provides a summary of the future capital equipment costs.

Table 7-9: Future Capital Equipment Costs			
Equipment	Total Cost	Stormwater Fund	Year
Boom Mower	\$64,000	\$17,000	2017
Dump Truck	\$77,000	\$21,000	2020
Vactor Truck	\$456,000	\$122,000	2022
Backhoe	\$84,000	\$22,000	2025

The total cost and Stormwater fund pro rata share of the total cost for the equipment includes an escalation factor of 2.0 percent to represent the future cost of this equipment in the year scheduled for the purchase.

7.4.3 Future Capital Improvements Program

In *Chapter 5: Capital Improvement Projects Plan*, four projects were identified for the City's Capital Improvements Program. The following Table 7-10 lists the projects by priority and includes the estimated future cost of the project and the year anticipated for construction of the project.

Table 7-10: Future Capital Improvements Program			
Project Name	Priority Ranking	Estimated Project Cost¹	Construction Year
Murphy Regional Detention Pond Stabilization	#1	\$276,000	2020
Brierwood Pond LID Retrofit	#2	\$664,000	2017 ²
Public Works Decant Facility	#3	\$500,000	2024
Abbeyview Culvert Repairs	#4	\$300,000	2027
¹ The total project cost includes an escalation factor of 2.0 percent per year to represent the future cost of the project in the year scheduled for design and construction.			
² Grant application during FY2016 was a requirement of the LID Project Design Grant.			

7.4.4 Summary of Future Revenue Requirements

A financial model was prepared for the City's Stormwater Utility for the six-year planning period of 2015 through 2020, and can be found in Appendix M. Revenue requirements were also estimated continuing through the 20-year planning horizon for 2021 through 2034. The projections were consistent with the City's goals and policies for this plan including compliance with the NPDES Phase II Permit terms and conditions and maintaining current levels of service to customers.

The City will maintain current SWM program staffing levels. Labor costs for the six-year planning horizon were increased consistent with the current labor agreements. For the 20-year planning horizon similar factors were used to estimate future labor costs. However, these costs should be evaluated upon completion of each contract and appropriate adjustments made to the financial model.

SWM program expenses were inflated to account for the new compliance requirements identified in the 2013-2018 NPDES Phase II Permit and for Swamp Creek TMDL testing and monitoring, water quality effectiveness testing and monitoring pay-in, and enhanced recordkeeping.

City Public Works crews maintenance activities and frequencies are in compliance with the NPDES Phase II Permit requirements. The City Public Works Department will continue to operate at current staffing levels and continue to augment their work force by contracting for specific maintenance services as needed. Public Works has determined that aging equipment will need to be replaced in the six-year and twenty-year planning horizons. Capital equipment replacements were programmed into the financial model including total cost, pro rata costs borne by the Stormwater Utility, and projected year for equipment replacements.

Capital Improvements were identified to minimize flooding and improve facility operations and water quality. Four improvements were included in the financial model. Since the City's policy is to fund capital improvements on a "pay as you go" methodology, funding for capital projects will need to come from utility fund reserves and will need to be augmented with available grant funding.

The City's current user rate structure is insufficient to fund the Stormwater Utility for the future revenue requirements necessary to meet the goals and policies of this plan and maintain compliance with the NPDES Phase II Permit. Even with additional revenue received from the Ecology Stormwater Capacity annual grants, the current fee structure is deficient.

7.5 STORMWATER FEE EVALUATION

The City's Stormwater Utility receives revenue from user fees, connection charges, investment interest, and grants. Connection charges, per BMC, fund compliance inspections for installation of private stormwater improvements and, at \$100.00 per connection, will not generate significant revenue. The City does not maintain a large Stormwater Utility reserve fund; therefore, revenue

derived from investment interest is minimal. The City relies upon user rates and Ecology grants to fund their Stormwater Utility. Ecology has offered Capacity grants to aid NPDES Phase II MS4's in establishing their Stormwater Utility and maintaining compliance with Permit terms and conditions. The amount varies annually up to approximately \$50,000, but cannot be considered a reliable source of revenue into the future. As stated earlier, the City has been aggressively collecting late billings and the associated interest charges. These overdue user fees were not considered a reliable source of revenue and were not included in future revenue forecasting. Ultimately, the City must rely upon user fees to manage, operate, and maintain their Stormwater Utility.

The financial model in Appendix M forecasts revenue for the 6-year and 20-year planning horizons. Growth projections developed earlier in this report concluded approximately ten new single-family residential units annually. The financial model uses the September 2014 billing accounts, i.e., 2,309 ESUs, as the baseline and the estimated annual growth rate of ten new ESUs for future revenue forecasting. This model assumes Ecology Capacity grants will remain available through the current 2013-2018 NPDES Permit cycle. However, the availability of the grants will not be considered in revenue forecasting beyond this current Permit cycle.

Based on the forecasted revenues for the Stormwater Utility consistent with the City goals and policies set forth herein, the proposed rate adjustments are anticipated to produce additional revenues to allow for the continued implementation of the NPDES Permit requirements and also build a reserve for equipment repairs and replacements, capital projects, and SWMP management. Table 7-11 provides the proposed stormwater rates for 2015-2020.

Table 7-11: 2015 – 2020 Proposed Stormwater Rates						
Year	2015	2016	2017	2018	2019	2020
Rate (Per Month)*	\$9.50	\$10.00	\$10.50	\$11.00	\$11.50	\$12.50
<i>*The stormwater utility fee is for a developed single family residence with an equivalent charge for non-residential properties based upon the rate per each 2,000 square feet of impervious area.</i>						

7.6 FUNDING ALTERNATIVES

This section describes potential funding alternatives that municipalities have traditionally used to fund their stormwater management programs, including maintenance and capital improvements. For each funding alternative, a brief listing of advantages and disadvantages is provided. Most agencies have found that it takes more than one funding option to adequately fund their stormwater needs. Some options are limited by the amount of revenue, their duration, and/or the types of equipment, projects, or services that they can legally provide. It is ultimately the preferences of the agency staff, as supported by elected officials and the public, that ultimately determine how many of these potential funding alternatives are able to be realized by any single municipality.

Five common financial options have been selected and described in greater detail below. The City has preferred a “Pay as You Go” policy consisting of user fees, grants, and interfund loans to finance capital equipment repairs and replacements and capital projects.

- Development Review Fees, Grants
- Loans
- Revenue Bonds
- Special Purpose Districts
- Future Coordination with Other Agencies

7.6.1 Grants

Although increasingly competitive, the State of Washington still operates grant programs that are available to cities and counties, including:

- Department of Ecology's State Water Pollution Control Revolving Fund – Planning Projects, Pre-Construction Projects
- Department of Ecology's Centennial Clean Water Fund (CCWF) – Planning Projects, Pre-Construction Projects
- Public Works Trust Fund – Design and Construction Projects
- Community Economic Revitalization Board – Construction Program

These grants can be a good source of planning/pre-design, habitat, stormwater CIP construction, or water quality project funding.

7.6.2 Loans

The State's Public Works Trust Fund and State Revolving Fund (SRF), as well as the CCWF, each contain loan programs for drainage and flood control-related projects. Interest rates are usually low (1 to 5%). These types of low-interest loans are a good funding source for some of a city's smaller future projects and activities, and are an especially good opportunity for small communities which have already established a stable source of annual revenue via existing stormwater utilities. Most loans are available for either planning or capital types of projects.

7.6.3 Revenue Bonds

Financing options utilizing bonding can contribute substantial annual revenue to a stormwater program. However, bonds are normally limited to capital projects that have already been designed and permitted. The use of bonding is dependent upon the annual utility rates, the financial stability of the stormwater utility, and the financial rating and bonding of the municipal agency.

Using bonds may help to prevent fluctuating monthly charges that may be necessary when a pay-as-you go approach is used to address CIP needs. However, to qualify for the use of bonding, it is important for the utility to have a reasonable operating reserve fund in order to demonstrate solvency and obtain an adequate bond rating. Annual utility rates must be high enough to allow revenue bonds to be issued for capital projects; there is always an annual payment to service the bond debt, which is usually about 10% of the bonded amount.

7.6.4 Special Purpose Districts

Special purpose districts can be an equitable approach to generate adequate levels of revenue for local and regional projects. The major advantages of this funding mechanism are:

- They can be set up to cross jurisdictional boundaries in order to follow basin and/or watershed boundaries.
- They foster partnering with landowners and future developers and/or other agencies.
- They are equitable.
- They have many of the same authorities for land acquisition, condemnation, rights-of-way, and fundraising that cities or counties have.

The formation of some districts requires a majority vote of the existing property owners, and as such is often difficult to get established initially. In addition, some special districts are controlled by a private board of supervisors and operate outside the control of the City, instead reporting directly to the County. Such an arrangement could reduce the control the City has over the SWM Program, which may make it more difficult to ensure compliance with state and federal regulations.

7.6.5 Future Coordination Opportunities with Other Agencies

Municipalities are generally encouraged to look for opportunities to collaborate with neighboring jurisdictions and agencies on stormwater work in order to: (a) promote efficiency and save money; (b) obtain fair solutions to problems that cross political boundaries; and (c) promote consistency of standards and practices throughout the region. Drainage basin boundaries are fully contained within the City limits, eliminating the possibility of local problems either resulting from or causing impacts to a neighboring jurisdiction. The City should continue to look for teaming and coordination opportunities that may be available through Snohomish County, other local NPDES Phase II Permittees (i.e., Mountlake Terrace or Lake Forest Park), conservation/environmental/stream groups, and other state and local governments. Partnering may be useful in purchasing maintenance equipment, conducting maintenance, or conducting public outreach activities.

7.7 UTILITY FINANCIAL REVIEW SUMMARY

Section 7.4.4, Summary of Future Revenue Requirements, summarized future NPDES Phase II Permit compliance, equipment renewals and replacements, and capital improvements to meet the goals and policies established for the City's Stormwater Utility. These projected annual revenue requirements were input into a financial model, in Appendix M. Evaluation of the Utility's historic annual revenue sources was found to be insufficient to meet current and future regulatory compliance and maintain current levels of service to customers discussed in Section 7.4.4.

To meet future utility financial needs, a financial model was used to determine adequate adjustments to the current user fee structure for the next six years and on into the future through

the 20-year planning horizon. The adjusted fee schedule shown in Table 7-11 will meet forecasted revenue requirements maintaining NPDES Permit compliance through the 2013-2018 Permit cycle, developing a capital reserve, and funding equipment renewals and replacements. The proposed fee schedule includes an initial 46-percent increase in the current stormwater fee from \$6.50/mo/ESU to \$9.50/mo/ESU in 2015, then incremental increases over the next six years to \$12.50/mo/ESU by 2020.

The City prefers a “Pay as You Go” policy for funding equipment purchases and capital improvements. These anticipated needs were programmed into the model maintaining small incremental increases in the annual user fees for the six year and 20-year planning horizons. The equipment purchases only include the Stormwater Utilities pro-rata share of the total cost at 26.63 percent. The Capital Improvements funding anticipates augmenting accumulating capital reserves with Grant opportunities and City interfund loans. Continuing with the “Pay as You Go” policy, capital reserves would be used to meet the typical 25 percent local matching requirements for Ecology grants and use interfund loans for interim financing of the project costs. The model anticipates repayment of the interfund loans over a two year term.

Should the City not be successful in obtaining grant funding or consider alternate methods of funding, i.e., low interest loans, bonding, or special purpose districts, the financial model will need to be updated to reflect debt service requirements, required bond coverage reserves, and interim financing needs.

The financial model will need periodic review and adjustment for new regulatory mandates, new programs, capital needs, and changes to the goals and policies for the utility.

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