

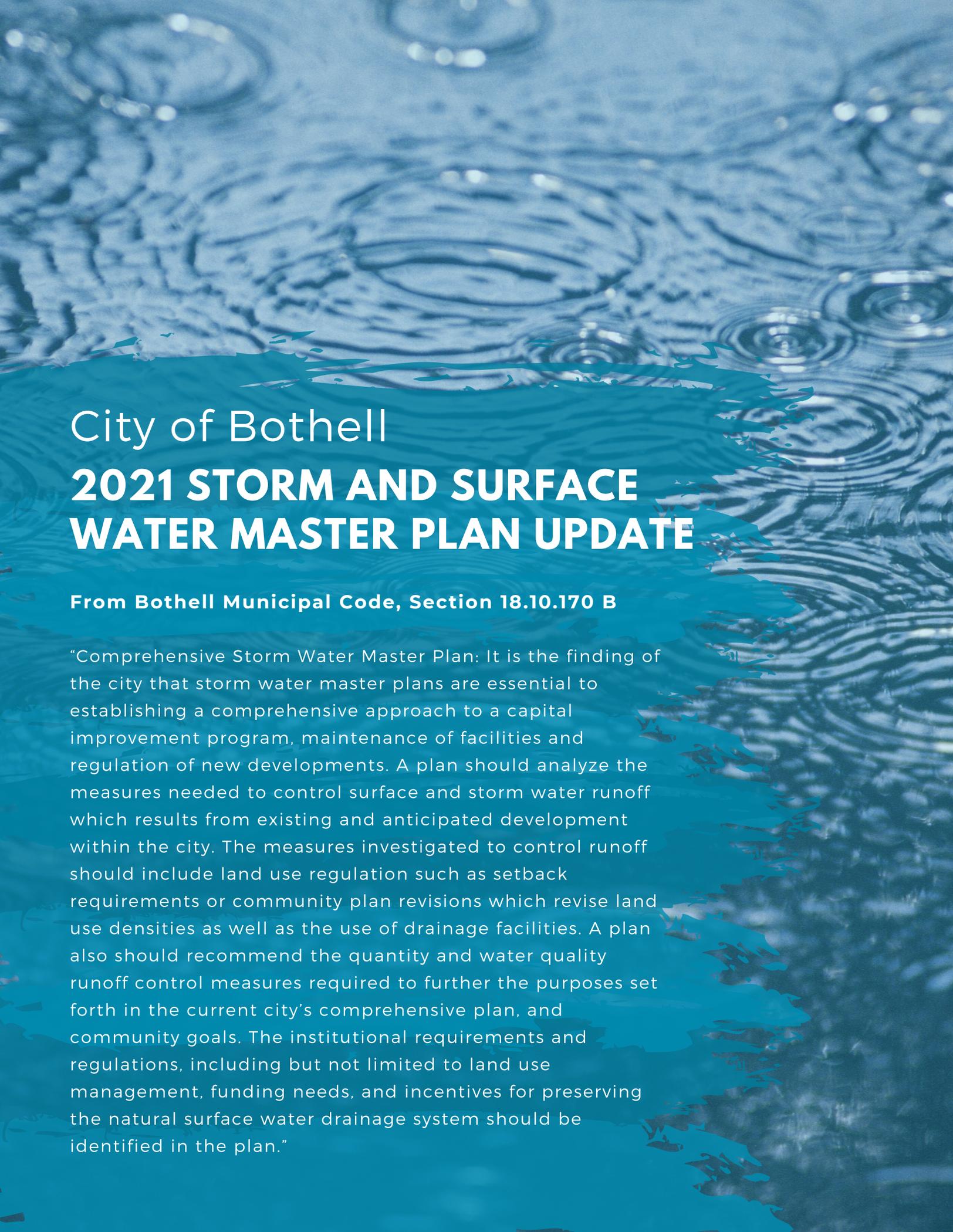


Bothell

# 2021 STORM AND SURFACE WATER MASTER PLAN UPDATE



City of Bothell™

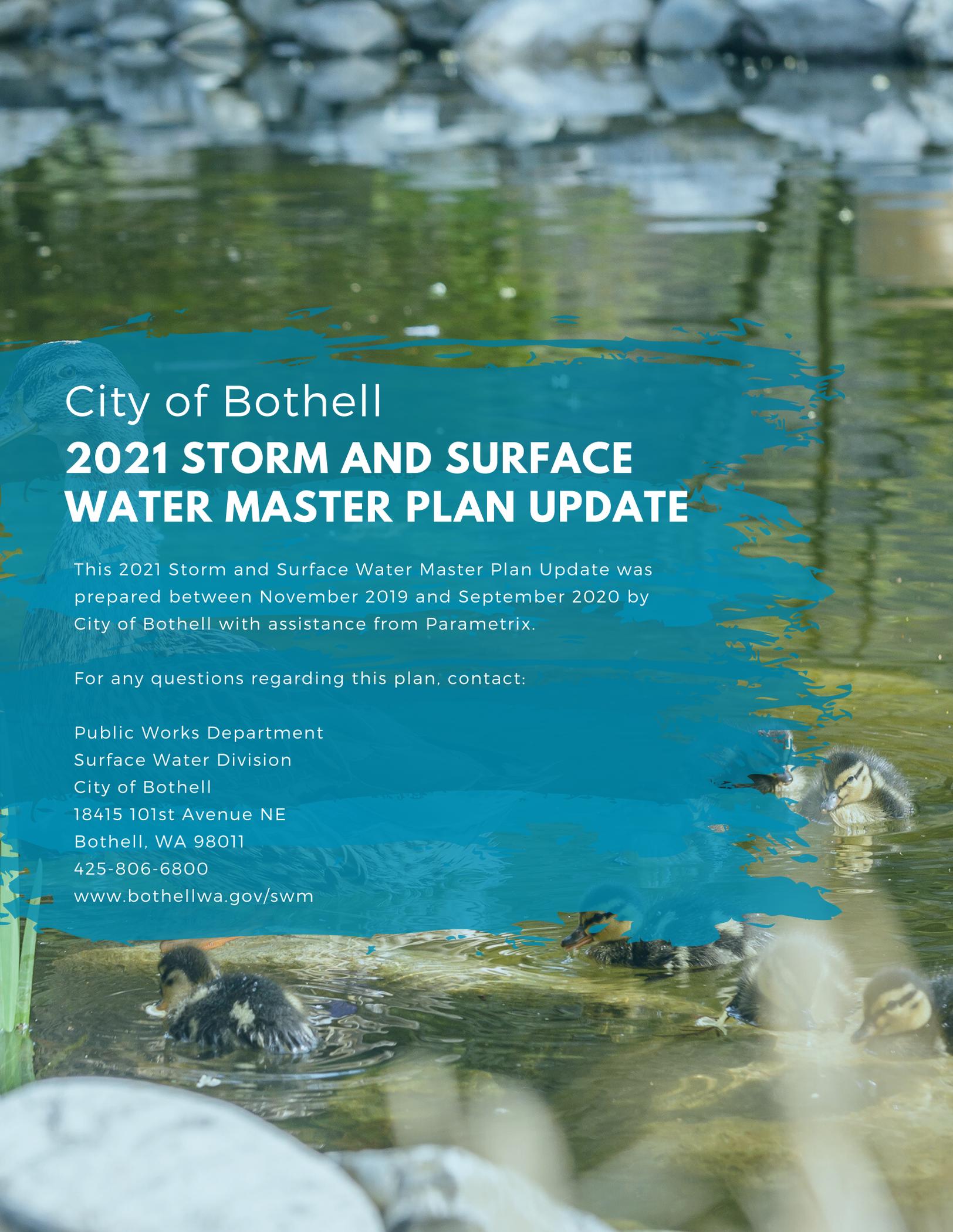


# City of Bothell

## 2021 STORM AND SURFACE WATER MASTER PLAN UPDATE

### **From Bothell Municipal Code, Section 18.10.170 B**

“Comprehensive Storm Water Master Plan: It is the finding of the city that storm water master plans are essential to establishing a comprehensive approach to a capital improvement program, maintenance of facilities and regulation of new developments. A plan should analyze the measures needed to control surface and storm water runoff which results from existing and anticipated development within the city. The measures investigated to control runoff should include land use regulation such as setback requirements or community plan revisions which revise land use densities as well as the use of drainage facilities. A plan also should recommend the quantity and water quality runoff control measures required to further the purposes set forth in the current city’s comprehensive plan, and community goals. The institutional requirements and regulations, including but not limited to land use management, funding needs, and incentives for preserving the natural surface water drainage system should be identified in the plan.”



# City of Bothell

## **2021 STORM AND SURFACE WATER MASTER PLAN UPDATE**

This 2021 Storm and Surface Water Master Plan Update was prepared between November 2019 and September 2020 by City of Bothell with assistance from Parametrix.

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## Acronyms and Abbreviations

BMC	Bothell Municipal Code
BMP	Best Management Practice
CFC	Capital Facilities Charge
CIP	Capital Improvement Program
City	City of Bothell (municipal organization where capitalized, city area where lowercase)
CWA	Clean Water Act
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FTE	Full-Time Equivalent (staff)
GIS	Geographic Information System
GMA	Growth Management Act
HOA	Home Owners Association
IDDE	Illicit Discharge Detection and Elimination
LF	linear feet
LID	Low Impact Development
LSC	Local Source Control
MS4	Municipal Separate Storm Sewer System
MUGA	Municipal Urban Growth Area
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PCHB	Pollution Control Hearings Board (State of Washington)
Phase II Permit	Western Washington Municipal Stormwater Permit
PSP	Puget Sound Partnership
PWTF	Public Works Trust Fund
QAPP	Quality Assurance Project Plan
RCW	Revised Code of Washington State
RSMP	Regional Stormwater Monitoring Program
ROW	Right-of-Way
SAM	Stormwater Action Monitoring
SEPA	State Environmental Policy Act
SCP	Stormwater Comprehensive Plan

SMAP	Stormwater Management Action Planning
SOP	Standard Operating Procedure
SQG	Small Quantity (Pollution) Generator
SR	State Route
STORM	Stormwater Outreach for Regional Municipalities
SWMA	Surface Water Management Area
SWMP	Stormwater Management Program
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TSS	total suspended solids
UGA	Urban Growth Area
UIC	Underground Injection Control
Utility	Bothell Storm and Surface Water Utility
WQIP	Water Quality Implementation Plan
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation

# Summary

## Overview

This is an update to the 2015-2020 Stormwater Master Plan.

Since 1994, the City of Bothell has grown in both population and land area through a combination of annexations and internal development. The 2014 annexation alone added over 6,000 citizens and about 1.6 square miles. The City now encompasses 13.7 square miles and contains over 48,400 residents.

Stormwater quality requirements under the Federal Water Pollution Control Act (commonly referred to as the Clean Water Act) have become increasingly complex and comprehensive.

Listings of several surface and stormwater affected species as endangered or threatened have placed an increased focus on water quality and the surface water environment.

Since the 1994 Plan, the City prepared a draft Surface Water & Drainage Master Plan in 2005. The draft reviewed the City's stormwater project plans, operations, and financial program. The 2005 draft Plan recommended updates to the program to address new federal Clean Water Act requirements and provided additional program background and history that was used in the development of the 2015-2020 Bothell Storm and Surface Water Master Plan Update. These plans provide consideration for updates to our Citywide Comprehensive Plan.

The City developed a Surface Water Quality Plan in 1996 and subsequently began a systematic assessment of the health of city's surface waters through water quality monitoring that began in 2010. The City monitors the status and trends of stream health through ambient monitoring at discrete locations, randomized watershed health monitoring, and project specific sampling. Historical data suggests that Bothell streams are consistently failing to meet State Water Quality standards for temperature, dissolved oxygen, and fecal coliform. All but one site sampled for in-stream biological health also found poor to very poor biotic communities of stream insects and fish populations.

City staff identified over 51 potential projects based on a comprehensive mapping of all utility repairs, replacements, and retrofits as well as transportation needs. These projects were overlaid onto a single map to help establish an appropriate timeline. Projects listed will cover the next 6-20 years for inclusion in future Capital Facility Planning (CFP) and utility rate studies.

This Plan Update helps define the Bothell Surface and Storm Water efforts for 2021 through 2025. It covers the incorporated city area as it exists in 2020.

The Plan Update is organized by the following sections:

Section 1	• Program Overview and Evaluation
Section 2	• Project Planning
Section 3	• Watershed Management
Section 4	• Financial Management
Section 5	• Recommended Actions

# Section 1

## Program Overview and Evaluation

Section 1 provides an overview and evaluation of the Utility's functions and recommends program actions where appropriate. Although compliance with federal regulations under the Clean Water Act - National Pollution Discharge Elimination System (NPDES) Permit is a significant driver for the Utility's program, this Plan Update recognizes that the Utility provides a broader range of services than simply complying with regulations. Focus areas for the program evaluation and summary overview include:

### Systems Operations and Management

- Inspecting, cleaning, and maintaining the City storm system
- Identifying and correcting deficiencies in the City-maintained system
- Requiring private system operators to maintain their systems
- Identifying and completing Natural Environment Projects

### Regulatory Compliance

- Tracking and responding to NPDES and other state and federal requirements

### Stormwater Pollution Control

- Spill response
- Illicit connection and discharge elimination
- Stream and system monitoring, evaluation, and testing
- Education and outreach targeting behavior change
- Technical assistance for business owners to repair and maintain their systems

### System Expansion (through Land Use and City Projects)

- Review and inspection of stormwater reports and designs
- Creation and updating of stormwater design standards
- Tracking and integrating new construction into inspections and asset management

### Financial Planning and Management

- Rate setting and billing
- Financial tracking
- Asset management funding

## Reporting and Record Keeping

- Internal records management
- Maintenance and Asset Management database

## Summary of Evaluation

No major overhaul or expansion of the Utility is planned during 2021-2025. The Utility is expected to raise rates slightly over time to meet its minimum long-term program needs.<sup>1</sup>

Significant effort will be necessary in the next two years to address the following items associated with the City's NPDES permit:

- Implement a community-based social marketing strategy (due March 31, 2021)
- Watershed delineation and prioritization (due December 31, 2021)
- Long-range comprehensive planning (due March 31, 2022)
- Implement source control program for existing development (due December 31, 2022)
- Development of a stormwater management action plan (due December 31, 2022)
- Low impact development code review (due December 31, 2023)
- Evaluate and report on behavior change for marketing strategy (due March 31, 2024)

## Staffing and Equipment Needs

Based on an assessment of its current program, the Utility-funded staffing and equipment levels are adequate to handle existing needs. However, some significant additions to the Utility are being considered through land use changes in the Canyon Park Business Park and future improvements by the City and private development. These additions will be assessed prior to completion of these planning efforts and additional staff and equipment may be included in subsequent rate studies.

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<sup>1</sup> A rates analysis was last presented to Council on October 20, 2020 and a 1% increase is recommended for 2021. A full rate study will be conducted in 2021 to determine any further increase needs.

Section 5 contains a complete list and description of action items that the Utility will consider.

## Section 2

### **Project Planning**

Section 2 identifies major drainage and natural environment, retrofit, replacement, and other projects that are appropriate and fundable within the 2021-2025 planning period.

#### Major Drainage and Natural Environment Projects

The 2021-2025 planning period begins with significant spending associated with other utility and transportation projects. A large portion of the funding for the projects is expected to come from City utility funds which will be offset by grants when available.

The full rate study scheduled in 2021 will provide a better financial understanding of what is needed to manage operating and capital expenditures in the long term. Assuming rates and expenses follow current expectations, the Utility is forecasting to invest a total of over \$14.9 million from 2021-2025 to address problems.

#### Facility Retrofit Projects

As of 2020, the Utility directly manages over 396 stormwater flow control and treatment facilities (mostly ponds and vaults). Many of these facilities were built to older design standards and do not provide the same performance as what is currently required.

These Utility-managed facilities represent a potential opportunity to improve surface water conditions because the facilities could be retrofitted with new designs that provide improved function. Although no detailed analysis of the costs to retrofit facilities has been performed, this Plan Update includes \$500,000 during 2021-2025 to fund facility retrofits. Facilities will be prioritized based on watershed management area needs, opportunities, and action planning.

#### System Replacement Projects

In addition to fixing problems and restoring natural surface water areas, the Utility accounts for replacement of aged infrastructure like pipes, catch basins, and stormwater vaults. The Utility annually expenses over \$400,000 for the depreciation of its infrastructure. From 2021-2025, this amounts to a total of over \$2 million that is to be

depreciated for system replacement. A portion of the capital projects in this Plan Update includes system replacement.

## Section 3

### **Watershed Management**

Section 3 of this Plan Update provides an overview of the Utility's watershed management efforts. This section identifies an additional approach to help focus these efforts.

The approach divides the Utility's service area into eleven sub-areas, termed surface water management areas (SWMAs). Bothell's SWMAs were altered from the previous Plan to meet Washington State Department of Ecology requirements under S5.C.1.d.i of the Western Washington Phase II Municipal Stormwater (MS4) Permit. SWMA sizes were defined to meet Ecology expectations, data gathering and reporting needs, and allow the City to reasonably measure or detect improvements in water quality from implemented projects and programs. When basin delineations are too small, the amount of data required throughout the city to prioritize between them is too great. When basins are too large, areas get unfairly biased from size requirements. Due to this, Bothell's SWMA basins focus on tributary drainage to reduce bias, meet size requirements, and focus on areas where the City can implement improvements with the potential to detect change through future monitoring.

Following this approach, Bothell's delineated SWMAs range from 0.7 to 6.7 square miles. Only one basin, Little Bear Creek, fell below the minimum size requirement of 1 square mile when measuring its tributary drainage, but including the entire basin (~15 square miles) would have caused it to exceed the maximum size requirement of 10 square miles. All other SWMAs fell between the required thresholds, with at least 10 percent of the total basin size within Bothell city limits for each basin. The SWMAs were created by combining smaller sub-basins in close proximity to achieve similarly sized basins while still adhering to water drainage patterns. Larger tributaries, such as Horse Creek and Perry Creek, were used to decide where to split larger basins (North Creek and the Sammamish River) due to their potential effect on receiving waterbodies. In order for a tributary's drainage area to be included in the total area calculation of its SWMA, some portion of the tributary's drainage basin had to intersect Bothell city limits. Each surface

water management area was then given an initial management strategy and a preliminary set of actions.

The delineated surface water management areas are:

- Horse Creek
- Juanita Creek
- Little Bear Creek
- Little Swamp Creek
- Lower North Creek
- Lower Sammamish River
- Parr Creek
- Perry Creek
- Swamp Creek
- Upper North Creek
- Upper Sammamish River

An action item of this Plan Update is to further develop the strategies and action plans for each of the new surface water management areas.

A complete discussion of these surface water management areas is found in Section 3.

## Section 4

### Financial Management

Section 4 includes a financial review of the Utility for 2021-2026 focusing on the following:

#### Financial performance and projected fund health

It is projected a gradual rate increase will be required over the next six years for the stormwater Utility fund's health. For 2020-2023, the Utility's cash flow is projected to be adequate to meet operations requirements and fund several projects; however, increased project costs due to fish passable requirements will require additional resources.

The current NPDES permit term ends in 2024. Additional resources to implement new requirements in the next permit cycle may be needed, but staff cannot predict at this time what those measures could be. For example, implementation of priority projects identified in the Stormwater Management Action Plan (SMAP) are likely, and new structural stormwater control (SSC) requirements are anticipated for NPDES Phase 2 communities based on past Ecology actions.

## Current billing structure

The Utility currently bills stormwater fees based upon a tiered rate structure that groups properties into categories based on ranges of impervious surface area. A full review of the billing structure is planned to be completed in 2021 with the projected rate study to ensure fair and equitable collection practices.

## Bill collection alternatives

Stormwater billing is currently administered through Snohomish and King County property tax billing services. This approach was evaluated in 2016 and determined to be the best alternative over direct Utility billing and third-party billing.

## Asset replacement

The Utility's expenses include over \$400,000 per year to depreciation of the stormwater system. This expense is intended to assure that the Utility has adequate resources to replace aged infrastructure.

The Plan Update identifies that over \$2 million dollars will be expensed between 2021 and 2025 toward depreciation.

# Section 5

## Recommended Actions

### Priority Actions

Section 5 of the Plan Update compiles actions identified in prior sections. It includes a discussion of potential costs, funding sources, and timelines for actions. Key priorities for the Utility include:

### Critical Actions

- C1: Long-range comprehensive planning
- C2: Low impact development (LID) code review
- C3: Watershed delineation and prioritization
- C4: Implement source control program for existing development
- C5: Implement and evaluate a community-based social marketing strategy

- C6: Complete planned drainage and environmental projects
- C7: Review and update Utility rates to keep them current

### High Actions

- H1: Evaluate implementation of private inspection program
- H2: Review and update maintenance standards for new facilities
- H3: Continue to map size and material for all known outfalls
- H4: Implement a progressive enforcement strategy for source control
- H5: Train all municipal staff to correctly identify and report spills
- H6: Evaluate construction site runoff ordinances and pre-con site inspections
- H7: Develop a Utility-operated facility retrofit plan
- H8: Clarify Utility's role in City critical areas management
- H9: Review Utility's Emergency Preparation planning
- H10: Develop Surface Water Management Area (SWMA)-based strategies and actions

### Medium Actions

- M1: Continue to coordinate with surrounding permittees with interconnected MS4
- M2: Continue oversight of North Creek Levee System maintenance
- M3: Evaluate project and program impacts from climate change
- M4: Evaluate project and programs for environmental justice
- M5: Prepare for 2024 NPDES Permit issuance
- M6: Prepare next Master Plan Update

More detailed descriptions of the priority actions are included in Section 5.

## Additional Considerations

### Internal Coordination

The City works to include pertinent divisions and departments in short and long-term planning efforts. Staff utilize existing teams to identify, coordinate, inform, influence, review, and approve planning recommendations and changes to our programs, policies, and procedures. These teams are sometimes required by regulations and include the Public Works Leadership Team, Development Leadership Team, Executive Leadership Team, and City Council.

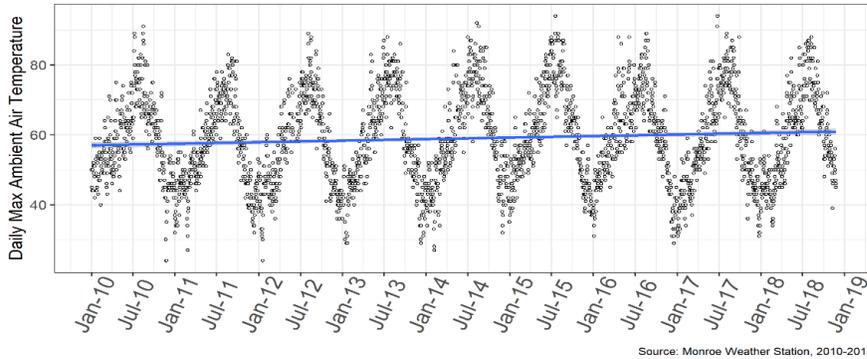
### Future Growth Beyond City Limits

This Plan Update covers the city limits as they exist in 2020. It does not include the City's Municipal Urban Growth Area (MUGA) beyond current city limits. As the City pursues future annexations into the MUGA, this Plan Update or future updates will need to be revised to address the impacts of added area on the Utility's Storm and Surface Water Program.

### Climate Change

Change in regional climate can have a dramatic impact on the Utility's program. For example, if storm intensity, duration, or frequency increases, the Utility's systems may become inadequate to address flooding. Also, if climate change causes extended warmer and drier periods, the city's creeks and natural systems may become increasingly affected by stormwater runoff due to higher concentration of pollutants.

Ambient temperature and dissolved oxygen monitoring also indicates negative climate driven impacts. Since ambient in-stream monitoring began in 2010, temperatures have risen while dissolved oxygen in streams have decreased. This is partly because of increasing ambient air temperatures and correlates with data from local weather stations. The figure on the next page shows the increase in air temperature.



*Ambient air temperatures in degrees Fahrenheit for Monroe, WA weather station. Blue line indicates trend.*

Currently, there is uncertainty about the potential effects associated with climate change for our region. Adaptation to changes is not included in the Utility’s current program assessment, but is an issue that is important to continue to watch and include in future planning.

### Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. City of Bothell achieves fair treatment by ensuring that no population bears a disproportionate share of negative environmental consequences resulting from industrial, municipal, and commercial operations or from the execution of federal, state, and local laws, regulations, and policies. City staff use local demographic and current census data to identify at-risk populations and geographic areas when planning projects and programs.

City of Bothell assures that no person shall, on the grounds of race, color, national origin, or gender, as provided by Title VI of the Civil Rights Act of 1964 and the Civil Rights Restoration Act of 1987, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity.

Furthermore, the City of Bothell assures that no person shall, on the grounds of age, ethnicity, disability, sexual orientation, income, or limited English proficiency, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity.

End of Summary

# Section 1: Program Overview and Evaluation

# Section 1: Program Overview and Evaluation

## Purpose of Utility

The intent of the Bothell Storm and Surface Water Utility (hereafter “Utility”) is addressed in the Bothell Municipal Code (BMC) as follows:

The city council finds that the ordinance codified in this chapter is necessary in order to minimize water quality degradation by preventing the siltation of the city’s creeks, streams, rivers, lakes, and other water bodies; to protect property owners adjacent to developing land from increased runoff rates which could cause flooding and erosion of abutting property; to promote sound development policies which respect and preserve the city’s watercourses; to ensure the safety of city roads and rights-of-way; and to decrease surface water damage to public and private property. Because the most cost effective and beneficial approach to surface and storm water management is through preventative actions and protection of the natural drainage system, the utility shall give priority to methods which provide protection or enhancement of the natural surface water drainage system over means which primarily involve construction of new drainage facilities or systems.

In short, the Utility manages, protects, and regulates the built (stormwater) and natural surface water systems in Bothell by:

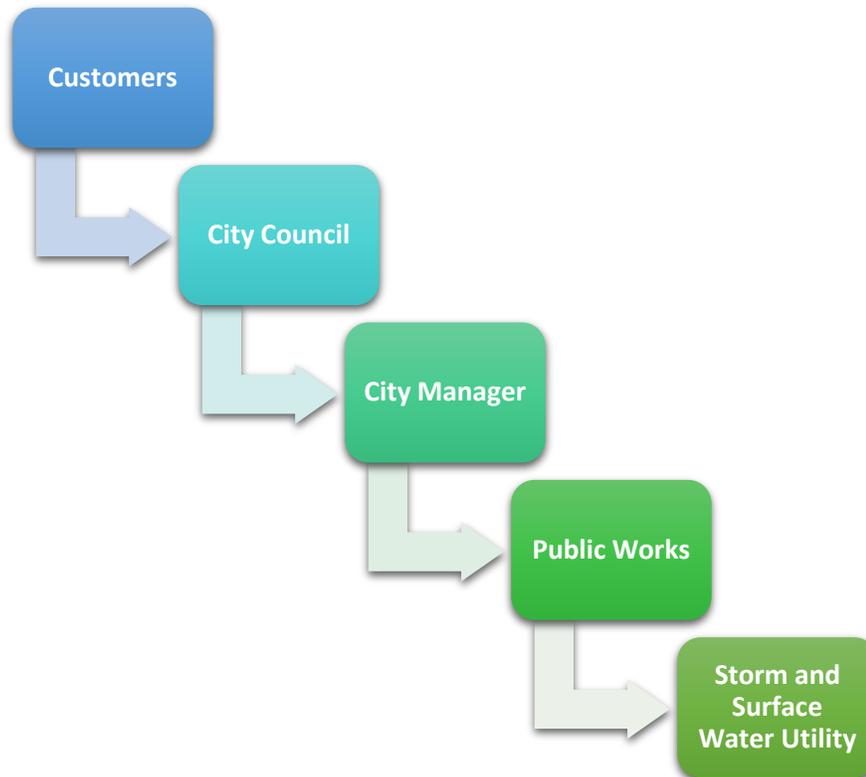
Actively participating in activities (land use, basin plans, and critical areas management) to protect and enhance the natural water system
Assuring that the drainage systems function well to minimize flooding impacts
Building and requiring new systems that protect or enhance the natural environment
Regulating and monitoring streams and the storm drainage system to minimize its impact on the natural systems
Educating and engaging the public to foster positive behavior for the natural environment
Managing the Utility’s efforts in a financially responsible way to achieve the Utility’s goals while minimizing the impacts on ratepayers

The Utility funds and maintains an expanding inventory of stormwater facilities and collection and conveyance systems and helps assure compliance with an increasingly complex regulation environment. The Utility works in concert with other City functions

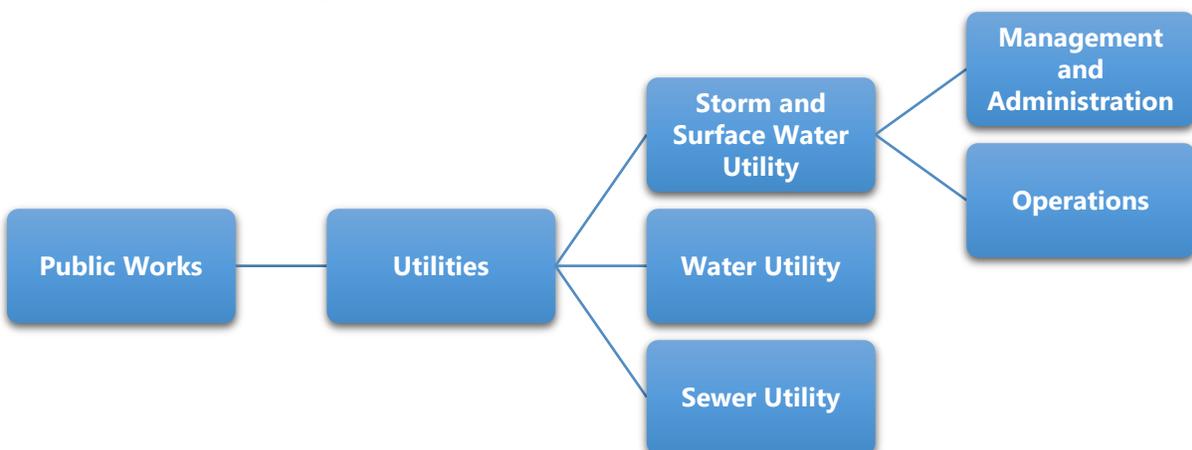
and Departments to manage, restore, and protect the city's surface water natural resources.

## Utility Structure

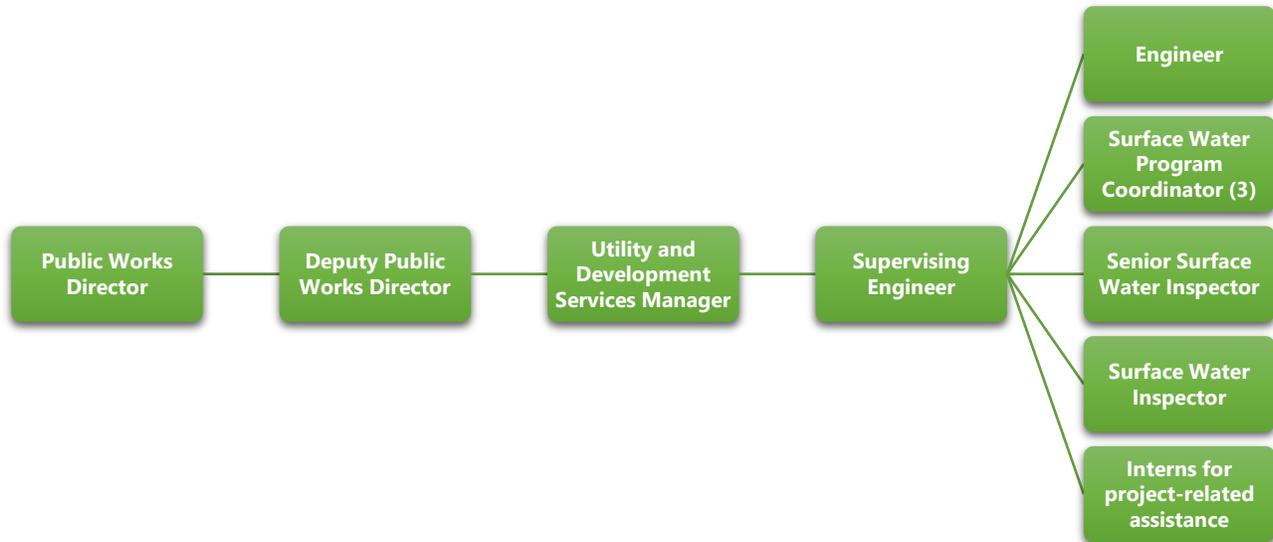
The Storm and Surface Water Utility operates under the general direction of the City Manager. The City Manager proposes and receives policy direction from the City Council who are elected by the residents and businesses of Bothell.



The Utility serves the existing city limits and is primarily funded by all developed properties within the city.



The Utility is included in the Public Works Department and is managed under the direction of the Public Works Director. The Director reports to the City Manager.



There are 17 full-time staff in the Utility. The Utility employs seasonal and intern staff for specific efforts and seasonal work as budget allows. The Utility partially funds additional Public Works staff, primarily in support or management roles, and uses consultant support where specific expertise or short-term capacity is needed.

Under the Director, the Utility's services are divided into two functional areas: Management and Administration, and Operations. These two functional staff groups are supported by other Public Works and City staff (e.g., Legal, Finance).

## Management and Administration

The Utility's Management and Administration team includes seven full-time positions who oversee the Utility's protection and enhancement actions, project planning, regulations, outreach and education, water quality monitoring, restoration, reporting, public and private facilities inspection, and financial aspects of the Utility.

The Management and Administration team is supervised by a Supervising Engineer and managed by the Utility and Development Services Manager, who reports to the Deputy Public Works Director.

The supervising engineer oversees six full-time and intern staff, including:

- Engineer
- Surface Water Program Coordinator (3)

- Senior Surface Water Inspector
- Surface Water Inspector
- Intern(s) to complete projects for compliance

## Operations

The Utility’s Operations team includes nine full-time positions who monitor and maintain the public storm and surface water system. The team maintains public stormwater flow control and water quality facilities, cleans and repairs catch basins, pipes, and ditches, sweeps streets for water quality, and responds to floods and spills. The operations team is supervised by a Storm Operations Manager and led by the Deputy Public Works Director – Operations, who reports to the Public Works Director.



The Storm Operations Manager oversees nine full-time staff, including:

- Lead Maintenance Worker
- Maintenance Specialist (2)
- Senior Maintenance Worker (3)
- Maintenance Worker (3)

Staff fully funded by Utility include the following (17 FTE) positions:

<b>Management and Administration</b>	<b>Operations</b>
Supervising Engineer	Storm Operations Manager
Engineer	Lead Maintenance Worker
Surface Water Program Coordinator (3)	Maintenance Specialist (2)
Senior Surface Water Inspector	Senior Maintenance Worker (3)
Surface Water Inspector	Maintenance Worker (3)

Staff partially funded by Utility include the following (3.2 FTE equivalent) positions:

<b>Staff</b>	<b>FTE</b>
Public Works Director	0.15 FTE
Deputy Public Works Director / City Engineer	0.25 FTE
Deputy Public Works Director – Operations	0.20 FTE
Capital Division Manager	0.05 FTE
Supervising Engineer – Capital Division	0.05 FTE
Utility and Development Services Manager	0.30 FTE
Associate Engineer	0.20 FTE
Code Compliance Officer	0.50 FTE
Sustainability and Engagement Coordinator	0.10 FTE
Lead Administrative Assistant – Operations	0.10 FTE
Administrative Assistant – Operations	0.25 FTE
Lead Administrative Assistant – Management and Administration	0.15 FTE
Administrative Assistant – Management and Administration	0.20 FTE
Public Records Specialist – Management and Administration	0.20 FTE
Senior Maintenance Worker – Utility Locator	0.50 FTE
<b>Total</b>	<b>3.20 FTE</b>

These partially funded positions provide management oversight, technical, and administrative services to the Utility.

### Additional Staff Support

In addition to dedicated staff, the Utility partially funds or relies on staffing and support throughout the City as needed for its operations.

#### *GIS and IT Services*

The Utility funds staff support for the development and management of the City's Geographic Information System (GIS) to track the storm infrastructure and

customer base (\$108,824 in 2019). The Utility funds Information Technology services related to computer-based maintenance, communications, security, and asset management systems.

#### *Financial and Human Resources Services*

The Utility funds support for financial services and human resources (\$129,806 in 2019). These services include fund tracking, investing, billing support, and human resources.

#### *Legal Services*

The Utility funds legal services that support and advise the Utility as needed (\$27,198 in 2019). The Utility pays directly for any needed outside legal services.

#### *Development Services*

The Utility coordinates with two Senior Civil Engineers and two Senior Construction Inspectors in Development Services, who provide stormwater design and construction review and administration through developer fees.

#### *Project Support Staff*

Large stormwater capital projects are often supported by the Public Work's Capital Division.

#### *City Management*

The Utility funds general management housed in the City Manager's office (\$85,186 in 2019). The City Manager provides the Utility's policy direction and authorization that is made by the City Council.

### Utility Contribution to General City Functions

The Utility contributes to general City functions through the transfer of funds to the following:

#### *Insurance*

The Utility pays a share of the City's cost for self-insurance (\$40,862 in 2019).

#### *Facilities*

The Utility pays for its share of the costs associated with City facilities (\$74,362 in 2019). The Utility will also begin paying for its share of the City Hall lease which has been calculated at an annual rate of \$253,894 beginning in 2020.

## Additional External Support

In addition to City staff and services, the Utility relies on services from vendors, private parties, and other agencies, including:

### *Consultant Services*

Engineering and administration often uses consulting services to assist the Utility with design and special studies.

### *Vendor Services*

Both the engineering/administration group and the maintenance/operations group use outside vendors to assist the Utility with specific efforts that require specialized equipment or staff.

### *Interagency Support*

The Utility is also supported by other public agencies and coalitions. These agencies provide services like utility billing, water quality monitoring, flood management, public outreach, and funding. Supporting agencies and coalitions include other cities, King and Snohomish County, King and Snohomish Conservation Districts, Washington Department of Ecology, Water Resource Inventory Area (WRIA) 8, Puget Sound Partnership, and Environmental Protection Agency (EPA).

## Systems the Utility Operates and Manages

The Utility manages the system of pipes, ponds, vaults and other built infrastructure that handles stormwater runoff throughout the Utility. The Utility also works in cooperation with other City divisions, property owners, local, regional, state and federal agencies to maintain, restore, and protect the natural surface water system throughout Bothell.

<b>Asset / Facility</b>	<b>Total amount</b>
Streams	49.55
Pipe (public and private) (miles)	329.64
Inlets (public and private)	16,012
Ditches (public) (miles)	40.30
Detention Pipes or Vaults (public and private)	691
Stormwater Ponds (public and private) (#/acres)	173/46.53
Outfalls	465

This storm and surface water system can be grouped into the following categories by function:

Category	Includes
Natural Surface Water Systems	Creeks, rivers, and other aquatic lands
Collection and Conveyance Systems	Inlets, catch basins, pipes, and ditches
Stormwater Flow Control and Treatment Facilities	Created ponds, detention pipes, vaults, and filters

These components of the system are detailed as follows:

## Natural Surface Water Systems

The Utility’s natural surface water systems include about 25 small drainage basins that flow into North Creek or the Sammamish River or flow out of the city into Swamp Creek or Juanita Creek. Bothell primarily regulates these natural systems through its Critical Areas and Utility ordinances. Bothell Municipal Code, Section 18.01.010 (20), defines surface waters, of which watercourses are a subset. The natural drainage system includes rivers, streams, watercourses, piped streams, lakes, and wetlands.

Bothell Municipal Code further defines watercourses as follows:

*“Watercourse” means any portion of a channel, bed, bank, or bottom waterward of the ordinary high-water line of waters of the state including areas in which fish may spawn, reside, or through which they may pass, and tributary waters with defined beds or banks, which influence the quality of fish habitat downstream. This definition includes watercourses that flow on an intermittent basis or which fluctuate in level during the year and applies to the entire bed of such watercourse whether or not the water is at peak level. This definition does not include irrigation ditches, canals, storm water run-off devices, or other entirely artificial watercourses, except where they exist in a natural watercourse that has been altered by humans.<sup>2</sup>*

The Utility helps private property owners and the City manage these natural systems by performing the following:

- Basin planning
- In-stream maintenance for flood control
- Protection, restoration, enhancement, and management through code enforcement and projects

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<sup>2</sup> Bothell Municipal Code 14.04.005

- Public outreach, education, and awareness
- Pollution control
- Water quality and stream health monitoring

## Collection and Conveyance Systems

The system of inlets, pipes and ditches throughout the city collects storm runoff and conveys it to streams and the Sammamish River. This system includes both public and private elements. The Utility funds the maintenance, repair, and replacement of the public portion of the collection and conveyance system. The majority of this system is located in city streets. Private property owners maintain the remainder of the system, generally located on private property.

### Public collection and conveyance system

- *Inlets:* The Utility maintains about 8,300 inlets that collect runoff and convey it to the piped system.
- *Public storm pipe:* The Utility maintains about 138 miles of storm pipe, ranging from eight inches to over 48 inches in diameter.
- *Ditches and channels:* The Utility maintains over 40 miles of built ditches and channels that collect and convey runoff.

### Private collection and conveyance system

- *Inlets:* Private property owners maintain about 6,900 inlets throughout the city. The Utility periodically observes these inlets for pollutants, blockage, and structural condition where they are connected to stormwater flow control and treatment facilities and notifies the owners when observations indicate that maintenance is needed. However, the private property owners are required to maintain these systems at least semi-annually per the Bothell Municipal Code.
- *Private storm pipe:* There are about 170 miles of private storm drain pipes the Utility has identified. Private owners are required to maintain these pipes. The Utility staff only observes the portion of the pipes that it can see from the inlets and does not assume responsibility for assuring that the system is in good condition and function.
- *Ditches and channels:* Private property owners also maintain ditches and channels that collect and convey stormwater in Bothell. The Utility periodically observes these private systems where they connect to flow control and treatment facilities.

## Stormwater Flow Control and Treatment Facilities

There are over 650 flow control and treatment facilities (facilities) throughout Bothell. These facilities have generally been constructed to manage the stormwater flow from developed property and city streets. The facilities may control the rate of release of stormwater to avoid overwhelming downstream systems. They may contain elements that collect, contain, and treat pollutants to protect downstream surface water.

The facilities usually consist of open ponds or underground vaults or large storage pipes with structures that control the outflow from the facility. In some cases, the facilities may include stormwater treatment swales (bioswales), filter vaults or rain gardens (bio-retention cells), or may infiltrate soils into the ground. As new properties develop and new City projects are completed, additional facilities will be added that may include increased infiltration and treatment methods that focus on low impact development standards.

Facilities that are often located on private property are either sited on separate tracts of land (typical in single family developments) or within the private parcels. Public facilities are often located within the street or on a separate private parcel with an easement to the City or a City-owned parcel.

### Public flow control and treatment facilities

- *Ponds:* There are 59 Utility-maintained ponds in the city. The Utility inspects these ponds every year and maintains them to the standards that they were built. This maintenance is performed by Utility Operations and includes clearing vegetation, debris, and sediment, and management of the control structure and outlet systems.
- *Detention vaults and pipes:* There are 188 Utility-maintained underground vaults or detention pipes in the city. These detention systems usually consist of concrete structures or large buried pipes and are often located under the city streets. Some vaults contain filters or systems to provide water quality treatment. The Utility inspects these vaults every year and maintains their function. Typical maintenance includes removal of sediment, maintenance of the control structure, and filter maintenance.
- *Bioswales, filters and other treatment:* There are 50 Utility-maintained water quality swales (bioswales) or other stormwater treatment facilities throughout the city. These water quality/treatment systems are inspected annually and receive

maintenance such as vegetation control, sediment removal, and filter treatment material replacement.

### Private flow control and treatment facilities

- *Ponds:* There are 77 privately-maintained stormwater ponds in the city. These ponds are maintained by both residential and non-residential property owners. Many of the ponds are located on separate tracts of land in residential subdivisions, but there are several ponds on non-residential properties. Typical maintenance includes removal of sediment, debris, and overgrown vegetation, and cleaning of the control structure.
- *Detention vaults and pipes:* There are 497 privately-maintained detention vaults and pipes in the city. These typically include buried concrete vaults or large diameter pipes with a flow control structure at the outlet. The primary purpose of these vaults and pipes is to control the rate of stormwater release from new development. The private property owners are responsible for maintaining these vaults and pipes. Typical maintenance includes cleaning and structural repairs.
- *Bioswales, filters and other treatment:* There are 157 privately-maintained water quality swales (bioswales) or other stormwater treatment facilities throughout the city.

The designation of a facility as public or private is not consistent throughout the city. Facilities that were permitted and built under Bothell regulations and serve private property are required to be maintained by the property owners. Facilities that were built under jurisdiction of either Snohomish or King County and added to the Utility through annexation may not have been maintained by property owners. For example, facilities in residential developments in unincorporated King County were maintained by King County, so the Utility has continued this practice for these developments. This inconsistency creates a potential inequity among private owners in the city.

Currently, all properties in the city pay a utility fee based on the percent of impervious area of their property. Private properties that have and maintain their own facilities pay the same fee rate as private properties where the Utility maintains the facilities. All stormwater facilities serve to protect the downstream systems and receiving waters of the city's streams and river, regardless of ownership or maintenance responsibility.

## Other Systems and Areas Not Directly Managed by the Storm and Surface Water Utility

The Utility works in cooperation with others to help manage many systems and areas that are associated with storm and surface water. The Utility's role is parallel with others in managing these systems or areas.

Most areas are covered under the City's Critical Areas Code, which is administered by the Directors of Community Development and Public Works. These areas include City-Defined Critical Areas, including:

- Designated Wetlands
- Critical Aquifer Recharge Areas
- Frequently Flooded Areas
- Geological Hazard Areas
  - Erosive Hazard Areas
  - Landslide Hazard Areas
  - Seismic Hazard Areas
  - Other Geologic Hazard Areas
- Fish and Wildlife Habitat Areas

### *Designated Wetlands*

The Storm and Surface Water Utility does not currently take an active role in monitoring or enforcing regulations of wetlands in Bothell. Wetland areas include both City and privately-owned property. Because wetlands receive, hold, and treat storm and surface water throughout the city, they are an important element in assuring clean water and providing runoff storage to reduce flooding. The Utility should, as appropriate, recommend, pursue, and fund projects to restore, enhance, or protect wetlands as part of its responsibilities.

### *Critical Aquifer Recharge Areas*

The Utility does not monitor or manage aquifer recharge in Bothell. However, as low impact development projects and efforts expand, the Utility may need to become involved in aquifer recharge management in the future.

### *Frequently Flooded Areas*

The Utility does not manage floodplains and floodways in the city. Bothell participates in the National Flood Insurance Program (NFIP), which requires Bothell to actively monitor and regulate its designated and mapped floodplains. Most of this management is performed by the Public Works Department through development services. The Public Works Director is the City's NFIP Floodplain Administrator. The

City's participation in the National Flood Insurance Program is funded through the City's General Fund and does not include Utility funds.

### *Geologic Hazard Areas*

The Utility does not directly regulate or oversee geologic hazard areas. However, the City's storm drainage code defines Geologically Hazardous Drainage Areas to limit activities that drain through geologically hazardous areas. These areas are often influenced by surface or stormwater, so the Utility often participates with other City and private parties to address specific issues in geologic hazard areas as they arise.

### *Groundwater*

Generally, groundwater collection and conveyance systems are not considered stormwater, and these systems are not directly managed by the Utility. Groundwater, however, does impact surface water and storm systems by adding flow. In some instances, this flow is beneficial as it adds cool, clear water to streams. In other cases, the surfacing of groundwater puts a burden on stormwater collection and conveyance systems.

Contaminated groundwater and soils are also not addressed by the Utility unless the contamination is tied to the Utility's storm system.

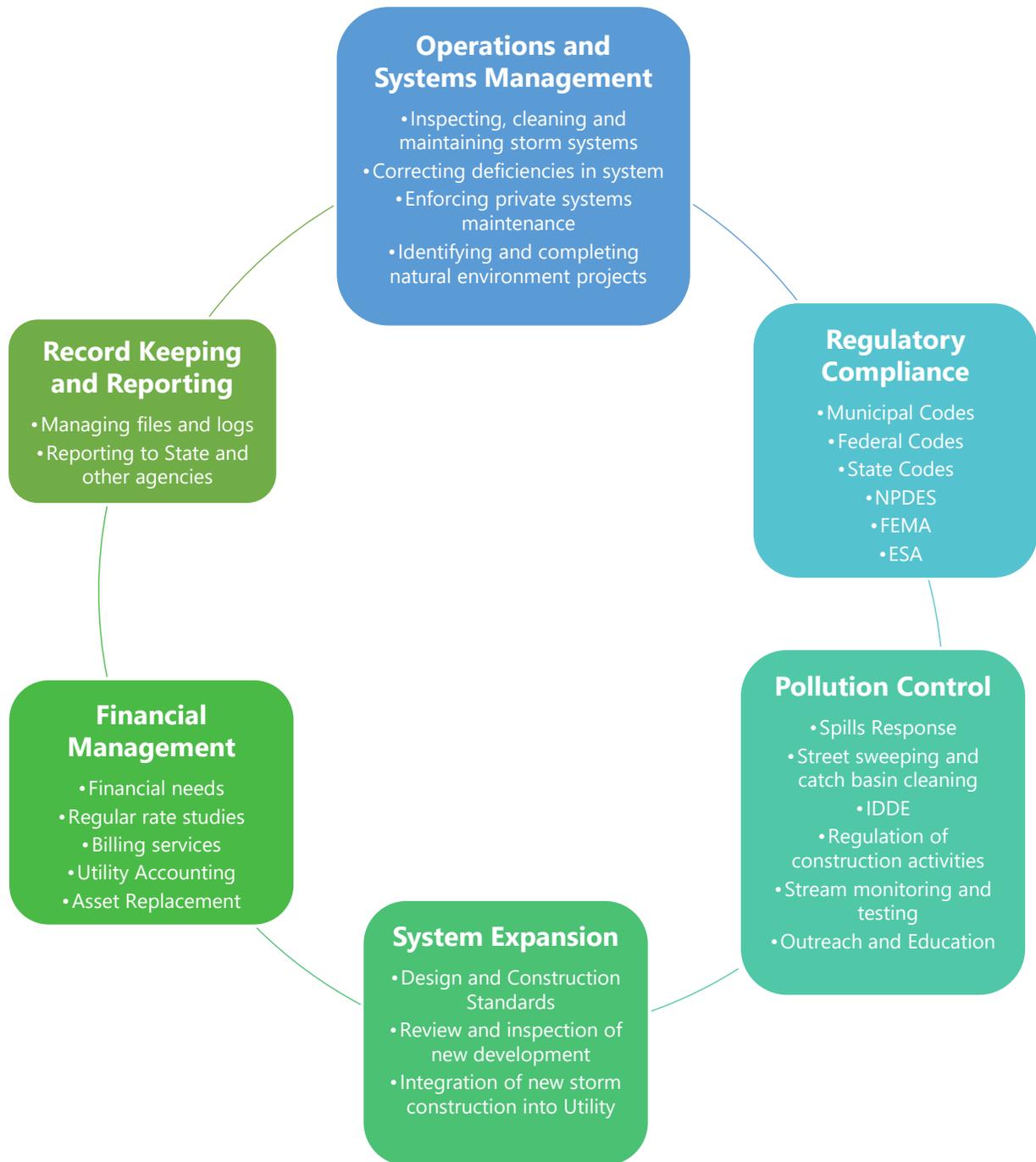
## Maintenance and Management of Surface Water Resource Areas

- *On Public Land:* As the Utility identifies and programs natural resource projects like Sammamish River restoration, the Utility will need to address the long-term maintenance and management of these areas. As the financial and management responsibility for these areas is included in the Utility, additional staffing and equipment (and associated funding) will need to be considered.
- *On Private Land:* Management of critical areas on private land can have a dramatic impact on surface water quality. The Utility often meets with property owners regarding issues of erosion, sedimentation, flooding, land movement, and other issues that are often connected to surface water. The Utility provides some limited guidance and assistance to property owners; however, oversight or assistance management of critical areas on private land is not a specifically-funded effort for the Utility.

This Plan Update does not include an analysis of the potential impacts of Utility maintenance and management of added surface water resource areas.

# Utility Functions and Program Evaluation

In 2020, the Utility functions are shown on next page's graphic:



These functions are detailed and evaluated as follows:

## Operations and Systems Management

A primary function of the Utility is to provide highly effective and efficient built and natural storm and surface water systems.<sup>3</sup> This effort includes keeping the existing systems clean and in good repair and health. It also involves planning and completing projects to correct deficiencies in the system.

The Utility addresses these efforts through four elements, with an emphasis on methods which provide protection or enhancement of the natural surface water drainage system over means which primarily involve construction of new drainage facilities or systems.

1. *Inspecting, cleaning, and maintaining the Utility's storm system*
  - Cleaning pipes and inlets
  - Dredging and controlling vegetation in ditches
  - Maintaining stormwater flow control and water quality facilities
  - Completing minor repairs of storm drains and facilities
2. *Identifying and correcting systems deficiencies*
  - Tracking customer complaints and flooding information
  - Conducting studies of portions of the system
  - Identifying and completing projects to correct deficiencies
3. *Enforcing Private Systems Maintenance*
  - Inspecting private facilities
  - Working collaboratively with property owners to keep facilities functional
  - Enforcing compliance with Bothell requirements for facility maintenance
  - Monitoring FEMA certification and management of the private North Creek levee
4. *Identifying and completing natural environment projects that restore/protect surface water related natural environment*

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<sup>3</sup> Built systems include the storm drainage collection, treatment, detention and conveyance system of inlets, pipes, ponds, vaults ditches and other constructed elements. Natural systems include the streams, wetlands, natural ponds, rivers, and lakes. The line between built and natural systems is sometimes blurred, as is the case for constructed wetlands and restored/daylighted streams.

## Assessment of Operations and Management Performance

The following overviews the adequacy of the Utility's performance of the four systems operation and management elements.

### 1. Inspecting, cleaning and maintaining the Utility's storm system

The efforts that the Utility puts into inspecting the public stormwater facilities are provided by a combination of Operations staff and inspectors in Management and Administration. Cleaning and maintaining the public storm conveyance system is managed by Public Works Operations staff.

The Utility's operations and systems management effectiveness has been evaluated as follows:

<b>A. Meeting NPDES Permit Requirements</b>
<b>B. Stormwater System Performance</b>
<b>C. Efficiency of Operation</b>

### A. Meeting NPDES Permit Requirements

The NPDES regulatory system put in place a minimum level of inspection, cleaning and maintenance of storm drain systems to address water quality. NPDES does not address maintenance associated with flood control management.

In 2019 and in prior years, the Utility operations met the minimum requirements of the previous NPDES permit. The 2019-2024 NPDES Permit as issued on September 1, 2019 continued and/or placed the following new requirements on the system maintenance and protection by the Utility:

- i. Implement maintenance standards that are as protective as the 2012 Stormwater Management Manual for Western Washington
- ii. Annually inspect all municipally owned or operated stormwater treatment and flow control facilities in accordance with adopted maintenance standards
- iii. Annually inspect and enforce adopted maintenance standards for all private stormwater treatment and flow control facilities approved after the 2009 Stormwater Management Manual for Western Washington
- iv. Spot check potentially damaged facilities after major storm events

- v. Inspect all catch basins and inlets owned or operated by the Permittee at least once by August 1, 2017 and every two years thereafter
- vi. Implement practices, policies and procedures to reduce stormwater impacts from lands owned or maintained by the City, including streets, parking lots, highways, buildings, parks, open space, road rights-of-way, maintenance yards, and stormwater treatment and flow control facilities
- vii. Train employees whose functions might affect stormwater quality about the importance, procedures, and ways to protect stormwater
- viii. Implement a Stormwater Pollution Prevention Plan for all heavy equipment maintenance or storage yards/facilities
- ix. Maintain records of inspections and maintenance or repair activities

Operations is anticipated to meet the requirements listed above within the existing 2021-2022 Utility budget and staffing levels.

## B. Stormwater System Performance

The ability of the existing stormwater system to handle stormwater is controlled by both adequate system design and maintenance of inlets, pipes, and facilities.

**Top 10 Wettest Days in Seattle,  
1948 – 2020**

Rank	Date	Precipitation (inches)
<b>1</b>	<b>Oct. 20, 2003</b>	<b>5.02</b>
<b>2</b>	<b>Dec. 3, 2007</b>	<b>3.77</b>
3	Nov. 20, 1959	3.41
<b>4</b>	<b>Nov. 6, 2006</b>	<b>3.29</b>
<b>5</b>	<b>Dec. 20, 2019</b>	<b>3.25</b>
6	Feb. 8, 1996	3.06
7	Nov. 25, 1998	3.04
8 (tie)	Jan. 18, 1986	2.98
8 (tie)	Feb. 9, 1951	2.98
10	Nov. 9, 1990	2.95

*Four of the top ten wettest days occurred from 2003 - present.*

Unlike sewer and water utilities, which receive a relatively steady demand, stormwater systems are highly affected by relatively unpredictable storm events. To account for these events, systems are generally designed to a certain level of storm. These system designs assume that the inlets, pipes and facilities are clean and fully functional during these design storm events.

One measure of the adequacy of the system is to look at its performance during actual major storm events. Such an event occurred on December 3, 2007.

This event, which followed two days of heavy rain, caused flooding at numerous locations throughout Bothell. Many of the known locations of flooding were evaluated and assessed as to whether the problem was related to the system capacity or a need for maintenance.

Following the 2007 storm event, numerous maintenance issues were addressed and Operations refined its program to check on specific problem areas and respond during storm events.

Since 2007, the Utility has not experienced another significant storm event of equal intensity to test its system. We have seen seasonal flooding due to consecutive rain events within a short period, such as February 2020, but there have not been significant tests of the systems by a big single storm event since 2007. For this reason, the Utility should not assume that the system is in adequate condition without continued investigation.

A thorough analysis of the adequacy of the Utility's storm system would typically include a detailed hydrology and hydraulic model study. This type of study would predict the amount of stormwater that each pipe in the system would need to handle. Although no comprehensive hydrology and hydraulic study of the Utility's storm systems has been performed, many local studies have been done as part of developments and design of repairs to known problem areas.

Absent a major storm test of the system, the Utility could perform a detailed hydrology (storm runoff) and hydraulic (pipe and system flow capacity) study to theoretically evaluate the system. These types of studies have been performed on portions of the system, but not on a systemwide basis.

Another way to assure system performance is to regularly inspect the system to make sure that it is free of issues that might affect its capacity. Utility staff currently inspect the system routinely and conduct spot-checks of the system after major storm events. The Utility worked in conjunction with Sewer and Water Utilities to establish a maintenance management system, Lucity, to assist in tracking and addressing maintenance needs for the system.

While performance of the storm system's ability to handle events has not been tested in the extreme since 2007, improvements have been completed and problem areas have been maintained. The system should regularly be evaluated to assure that it is reasonably adequate to handle storm events. Climate change modeling should also be

considered to determine additional flow and capacity needs for new and redevelopment.

### C. Efficiency of Operation

A third measure of the adequacy of the Utility's operations and management is an assessment of how efficiently it is performing. An analysis of efficiency could begin by benchmarking the Utility with comparable other stormwater utilities. It would then evaluate the efficiency of operations by looking at:

- Performance Measures
- Staffing Levels
- Equipment Needs
- Funding
- Recommendations

The Utility's system management efforts are analyzed and reaffirmed with each City budget approval process and each rate review. However, these reviews are generally based on the incremental changes that are anticipated each time the budget or rate reviews are presented. These analyses assume a fixed baseline of activities based on prior years.

The impacts of growth in the Utility-managed systems and impacts of regulation have generally been addressed by adding staff, equipment, and funds for outside services. These increases have been added to the Utility's baseline budget.

To assure that the Utility is operating efficiently, a thorough benchmarked review needs analysis should be performed. This analysis would compare staffing levels and efforts with other similar utilities and would assess the efficiencies of key Utility activities. This analysis will be performed with the next full rate assessment.

## 2. Identifying and Correcting Deficiencies in Utility-Maintained Stormwater System

Deficiencies in the Utility's systems, such as undersized pipes or inadequate inlets, can contribute to flooding of properties and damage to the natural environment. Finding and correcting deficiencies before damage occurs has been an ongoing challenge for the Utility. Past master planning and the 2007 flood event provide some measure of system performance. In addition, studies of North Creek and the Sammamish River and monitoring of small streams throughout the city provide indications of natural environment needs.

A current exercise to identify and prioritize storm and surface water projects was needed and has been conducted as part of this Plan Update. The effort relies on past master plan work, the 2008 Flood Action Plan, and staff and public input to identify potential standalone and combined projects with other utilities and transportation needs.

The majority of funding for correcting deficiencies is planned to come from Utility funds and private properties. Grants through organizations like King County Flood Control District, the Washington State Department of Ecology, and FEMA are additional potential sources that can help keep Utility rates down. The Utility should develop and use a system to track and manage potential grant opportunities.

The results of the project planning are contained in Section 2 of this Master Plan Update.

### 3. Enforcing Private Systems Maintenance

An important component of the Utility's storm and surface water system is the network of stormwater flow control and treatment facilities in the city. These facilities have generally been constructed to mitigate for development of property and roadways. Depending on where and when the facilities were installed, they might be managed and maintained by either the Utility or by private property owners.

Utility-managed facilities include about 59 ponds, 188 detention vaults/pipes, and 50 swales. These are included in the section on inspecting, cleaning and maintaining the Utility system. Privately-maintained facilities include about 77 ponds, 497 detention vaults/pipes, and 157 swales.

The Utility has an active program of inspecting all flow control and water quality facilities. The Utility employs two full-time storm inspectors, who visit over 1,000 Utility and private facilities and evaluate their conditions. Inspecting and enforcing maintenance of private systems is an active part of the current inspection program.

Enforcement was a challenge in the past. However, with the addition of a full-time code compliance officer within Public Works in 2019, the Utility is now in the process of implementing a new enforcement program to address facilities that are not in compliance with the inspector's correction notice. So far, private facility owners have been responsive to the program which is focused on assistance and support in order to achieve compliance.

## Evolving Requirements

Design requirements and purposes of stormwater facilities have evolved significantly since the City was formed. Older systems were built primarily to provide flow control and were designed using different storm design and performance metrics. Newer systems provide both flow control and water quality benefits. Engineering design continues to evolve as more is learned about modeling storms. As the climate changes, design standards will likely continue to be revised.

The Utility's inspection of privately-operated facilities currently considers the design standards with which the facility was built. The oldest developments in the city typically have no facilities to maintain. Where older facilities do exist, the maintenance requirements are often less stringent and expensive than newer systems. This inconsistency creates a perceived inequity among property owners. This perceived inequity is further exacerbated by the fact that the Utility maintains some facilities that service private properties.

## Limited Incentive Tools

When the Utility inspects private facilities and finds that maintenance or repair is needed, it issues a correction notice to the responsible party. The notice identifies the issue(s) and requires them to contact the City with a schedule to correct the issue(s). This correction notice can be followed up with further notices and fines for non-compliance, as enforced by the Utility's code compliance officer. If necessary, the Utility can enter the facility and correct the issues if they are deemed to create a public nuisance or hazard.

This system of inspection and enforcement sometimes creates a potentially adversarial situation for privately-maintained facilities. Facility owners/operators, especially those who manage residential facilities, are often not equipped to maintain the storm facilities and are not prepared for the cost of maintenance. Proactive education and compliance assistance for private facility owners will reduce long-term costs and environmental impacts.

## Credits and Fee Reductions

Utility fee credits can, when crafted and implemented well, provide a useful system of incentives and inequity correction tools for the Utility. When the Utility was established, it included rate reductions and credits for certain customers. Some of these reductions became outdated, were not universally accessed, or proved a challenge to effectively and fairly administer. Credits and reductions included:

- *Undeveloped Parcels* – Properties that have not been developed are exempt from rates and charges of the storm and surface water utility.
- *Non-Single Family Properties* – Non-single family properties could receive a reduction in their fee if they maintained drainage facilities that mitigated runoff contribution from their property. A 25 to 50 percent reduction in Utility charge was available for these properties. This credit was eliminated in 2014.
- *Senior/Disabled Low Income Discount* – Parcels owned by persons qualifying for senior or disabled property tax exemption are exempt from storm and surface water service charges.
- *Parcels Served by Privately-Maintained Facilities* – Parcel owners who maintained and operated retention/detention facilities could request a reduction in fees based on their costs to maintain and operate required retention/detention facilities. Non-residential properties could request a fee reduction under another section of the Bothell Municipal Code. This credit was eliminated in 2014.
- *School Districts* – School districts that provided education provisions were permitted a credit until January 1, 1997, when this credit opportunity sunsetted.

Beginning in 2014, the fee reductions and credits for maintenance of private systems were eliminated based on the idea that the operations and maintenance of these systems is now standard practice required by City and State requirements.<sup>4</sup> The Utility incurs substantial costs associated with inspecting and enforcing these operations and maintenance requirements. Elimination of the credit system simplified some stormwater bills, increased Utility revenues, and improved the equity of the fee system.

### Evaluation of Management Options for Private Facility Maintenance

The Utility previously considered alternatives to the requirement that private property owners maintain their systems. A differentiation is often made between facilities that are maintained by single family homeowners and other owners because non-single family properties often have professional maintenance systems in place to address storm facilities.

Many different approaches to private facilities maintenance are possible. Each option, in addition to the current configuration, involves issues associated with administration, cost recovery, consistency, and fairness.

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<sup>4</sup> The Credit system was modified by City Ordinance 2130.

The first option is a continuation of the existing private facility maintenance program. Under this option, all private facilities are inspected at the rate and frequency according to the standards in place at the time of development. Any deficiencies are sent to the private owner as an Order to Maintain and assistance is provided to achieve compliance.

A second option could include the Utility taking over all private facilities. This would involve the Utility assuming maintenance responsibility for the cleaning, repair, and function of the 731 systems on private property that are currently maintained by commercial and residential property owners. The cost to the Utility for this approach would be significant and would require an increase in Utility rates. This approach would allow the Utility to consistently maintain facilities throughout the city.

A third option would involve the Utility taking the responsibility only for private facilities that are currently being managed by single family residential properties and their associations. Facilities located on non-single family residential properties would continue to be maintained by the owners of these properties. This approach assumes that non-single family properties are more likely to have professional management systems in place to maintain their facilities. This option would not require as extensive a rate increase as taking over all the facilities in option two, but would result in increased annual inspection and maintenance frequencies and would not resolve fairness of costs to property owners without a system of credits.

### Monitoring of FEMA certification and management of the North Creek Levee System

The North Creek levee system is a privately installed and maintained levee system designed to protect the adjacent business park from flooding associated with the North Creek flood plain. The levee is one of only two FEMA-certified levee systems in King County (the other is associated with the Green River) and a unique private system that protects a significant economic and employment area of the city.

The Utility will take on the task of annually monitoring the private certification and management of this system as part of its flood management services to ensure functionality.

## 4. Identifying and Completing Natural Environment Projects

The Utility does not directly or solely manage the natural environment in the city, but works with other City divisions, private properties, and other agencies to protect, preserve and restore the environment related to storm and surface water.

The Utility should work in concert with the Community Development and Parks & Recreation Departments to identify, prioritize and seek funding for natural environment projects that address storm and surface waters in Bothell.

Natural environment projects address different needs than built storm systems projects. They may be pursued to restore habitat, improve water quality, address fish passage, or protect resources. These needs are typically prioritized differently from stormwater flooding issues. Funding for natural environment projects often relies heavily on grants because these projects often address regional resources. The Utility can be a source of matching funds for these grants.

For the development of this Plan Update, Utility staff reviewed existing watershed management documents, including:

- North Creek Watershed Management Plan, September 6, 1994, Snohomish County Public Works
- Surface Water Quality Plan, City of Bothell, 1996, CH2M-Hill
- North Creek Drainage Needs Study, December 2002, Snohomish County
- Sammamish River Corridor Action Plan, 2002, Tetra Tech
- Swamp Creek Drainage Needs Report, 2002, Snohomish County
- Restoration Plan for the City of Bothell Shorelines, May 2012, The Watershed Company
- Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan, 2017, WRIA 8
- Stream Health Assessment Reports, City of Bothell Staff, 2010 through 2020

Based on available information and input from staff, businesses, and residents, the Utility included identified projects into the previous and current Capital Facilities Plan.

The Utility has not developed a list of smaller natural environment projects, so a list will be created during this planning period.

## Overall Operations and Systems Management Recommendations

- Drainage and environmental project completion will continue to be a priority for the Utility. The lists of projects will be regularly reviewed and revised as appropriate.

- The Utility will perform a comprehensive assessment of its long-term staffing and equipment needs, including a benchmarking against similar utilities.
- The Utility will evaluate options to its current approach for private facilities maintenance.
- A list of small environmental projects will be developed and projects will be prioritized and completed as funding allows.

## Climate Change

The Utility must continually adapt to variations in storm intensity and duration to effectively manage the Utility's storm and surface water system. This presents an ongoing challenge because the storm events in and around Bothell are highly variable. Long-term trends for Bothell associated with regional and global climate change are uncertain. It is recommended that the City perform a sensitivity study of the impact of climate change to its surface water system.

A [report](#) by the University of Washington suggests that storm intensity and duration will increase, but there is some uncertainty as to how significant the change would be for Bothell.<sup>5</sup> Larger, more frequent storms may not be accommodated by portions of the Utility's storm infrastructure, causing flooding. We will need to consider adaptive management, which might include upgrading the infrastructure to accommodate larger storms, adding new infrastructure, and adjusting maintenance by season which will be a significant effort that is currently not planned by the Utility.

The report also indicates that stream flows and water quality (primary temperature) will be negatively affected, with summer flows declining and water temperature increasing. The Utility may need to adapt its approach to storm runoff management to address these changes. Adaptation could include increased use of infiltration, changes in stormwater detention and treatment, and modification to stream buffers and channels.

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<sup>5</sup> State of Knowledge Report – Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers (2013)

Stormwater Element	Predicted Response to Climate Change
<b>Storm intensity</b>	<ul style="list-style-type: none"> <li>• Increased magnitude and frequency of peak flows</li> </ul>
<b>Annual precipitation amount and seasonal distribution</b>	<ul style="list-style-type: none"> <li>• Moderate increase in winter precipitation</li> </ul>
	<ul style="list-style-type: none"> <li>• Moderate decrease in summer precipitation</li> </ul>
	<ul style="list-style-type: none"> <li>• Increased average runoff in winter and spring</li> </ul>
	<ul style="list-style-type: none"> <li>• Decreased summer base flow</li> </ul>
<b>Flood risk</b>	<ul style="list-style-type: none"> <li>• Increased flood risk from increased peak flow magnitudes</li> </ul>
	<ul style="list-style-type: none"> <li>• Increased flood risk from channel migration</li> </ul>
<b>Water quality</b>	<ul style="list-style-type: none"> <li>• Increased average and summer water temperature</li> </ul>
	<ul style="list-style-type: none"> <li>• Lower dissolved oxygen</li> </ul>
	<ul style="list-style-type: none"> <li>• Increased algal blooms</li> </ul>
<b>Water movement</b>	<ul style="list-style-type: none"> <li>• Increased evapotranspiration</li> </ul>
	<ul style="list-style-type: none"> <li>• Lower soil moisture</li> </ul>
	<ul style="list-style-type: none"> <li>• Reduced summer base flow in creeks</li> </ul>
	<ul style="list-style-type: none"> <li>• Reduced groundwater recharge</li> </ul>
	<ul style="list-style-type: none"> <li>• Wetland conversion from perennial to seasonal</li> </ul>

## Regulatory Compliance

The Utility seeks to assure that Bothell is compliant, to the extent feasible, with all local, state, and federal regulations and agreements related to storm and surface water management.

These regulations and requirements include:

- Federal Clean Water Act - NPDES Municipal Stormwater Permits and Section 410
- Endangered Species Act
- Washington State Regulations, including:
  - Washington State Water Pollution Control Act,
  - Water Quality Standards for Ground Waters,
  - Water Quality Standards for Surface Waters,
  - Sediment Management Standards,
  - Growth Management Act,
  - Shoreline Management Act,
  - Critical Areas requirements,
  - Comprehensive Environment Recovery and Compliance Act,
  - Boldt Decision
- City Comprehensive Plan
- Bothell Municipal Code
- FEMA flood management
- WRIA 8 interagency agreement

Much of the regulatory environment was established, in large part, to address deficiencies in the management of storm and surface water. These deficiencies have been identified as creating safety and public health problems and threatening the existence of native species.

## Assessment of Existing Regulatory Compliance Level of Effort

As of 2020, the Utility is currently compliant with local, state, and federal permit requirements.

Over the next few years some known specific additional efforts will be needed to stay compliant. These known requirements can be accommodated in the Utility's plan and projected rates.

Additional regulations related to storm and surface water may arise during the timeframe of this Plan. As additional regulations arise, the Utility may need to adjust

staffing and spending to accommodate changes. The Utility may recommend reprogramming existing activities within existing funding levels to accommodate unforeseen changes or it might seek to increase rates to expand its program.

## Regulatory Compliance Recommendation

The Utility should proactively review new regulations to assure that it stays compliant.

## Pollution Control

The Utility performs a wide range of activities focused on protecting Bothell's streams and river, and ultimately Puget Sound, from pollution.

Per the Clean Water Act:

*The term "pollutant" means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.*

Pollution control activities that the Utility performs include systems management and city practices as discussed earlier. In addition to these operations activities, the Utility performs the following activities specifically to address surface water pollution:

### ➤ Spill response

When a material spill happens in the city, Utility staff reviews the incident to determine if the spill may affect the Utility's managed storm and surface water system. Operations responds to spills with equipment and staff when the spills occur on public property. For private property spills, Management and Administration regulates and observes the private property owner's spill response efforts.

### ➤ Street sweeping

The Utility funds 100 percent of citywide street sweeping on the assumption that street sweeping provides water quality and flood reduction benefits. The sweeping is managed and performed by Operations staff.

### ➤ Detection and elimination of illicit connections to the storm system

Identification of illicit connections and discharges to the Utility's system is performed by both Operations and Management and Administration staff in conjunction with routine maintenance and inspection duties.

### ➤ Regulation of construction activities

The Utility manages the regulations that are applied to both City projects and private development to minimize surface water impacts during and after construction. These regulations include system design requirements, sediment and erosion control, and pollution prevention measures during construction.

Enforcement of the construction standards is provided by the City's Capital and Development Services personnel and is funded through project and developer funds.

➤ **Stream and system monitoring and testing**

Surface Water staff monitor ambient monitoring locations, randomized watershed health monitoring, and project specific sites throughout the city for pollution. The monitoring locations are based in a combination of staff understanding of potential problem areas and State-managed TMDL locations. Watershed health monitoring locations are derived from a probabilistic sampling design using R (statistics software) to develop random sites for more robust statistical analysis following EPA and Department of Ecology protocols. In addition to staff monitoring, the Utility contracts with other agencies for pollution source control tracking and monitoring. The Utility has chosen to participate in the NPDES Phase II permit required monitoring of effectiveness with option of paying into a general fund with other cities to fund a regional approach to monitoring.

➤ **Education and outreach**

Education and outreach staff in Management and Administration address non-point source pollution through awareness, engagement, and technical assistance to alter public perceptions and behaviors that cause or contribute to stormwater pollution. Staff focus on pollution-preventing activities like picking up pet waste, using a commercial car wash, fixing vehicle leaks, practicing natural yard care, and reporting spills. The Utility conducts education and outreach by using a combination of existing staff, volunteers, consultants, conservation districts, and regional partnerships.

➤ **Business Source Control**

Surface Water staff conduct inspections at publicly and privately owned commercial and industrial facilities that are considered high priority small quantity generators (SQGs) of dangerous waste. Staff are responsible for actively requiring best management practices and regulatory assistance for pollution generating sources on-site. The City also implements enforcement through local ordinances for facilities failing to meet standards.

### ➤ Local Source Control

Through a contract with Ecology, the Utility began a new program in 2012 called the Local Source Control (LSC) Program. In 2019, because of added requirements for Utility staff under the NPDES permit, the Utility transferred management and oversight of the LSC program to the City's Management and Administration staff. Outreach and technical assistance visits for this grant-funded program are now provided by a consultant, who focuses on best management practices specifically for indoor hazardous waste, storage, and disposal. The goal of these visits is to reduce negative impacts to the environment and to keep businesses in compliance through education and outreach rather than enforcement. The City is under contract on a biennial cycle with Ecology using grant funding from the EPA National Estuary Program.

Utility staff also provide regular education and outreach efforts directed at various target audiences such as businesses, residents, and the general public.

The next page shows a table of outreach and education activities planned during the current NPDES permit cycle:

## Residents

- Natural yard care
- Pet waste
- Septic system maintenance
- Hazardous chemical use, storage, and disposal
- Home maintenance (carpet cleaning, pressure washing, painting, construction, etc.)
- Vehicle maintenance (car washing, auto repair and maintenance)
- Low impact development principles and techniques

## Businesses

- Impacts from pollution on impervious surfaces
- How to prevent and report spills to minimize damage
- Impacts from pollution on local rivers, lakes, and streams
- Dumpster and equipment maintenance
- Dangerous waste requirements for SQGs
- Proper landscaping maintenance practices
- Low impact development principles and techniques
- How to properly inspect and maintain their stormwater facilities

## General Public

- Youth education on stormwater pollution prevention
- Impacts of stormwater on surface waters
- Impacts from impervious surfaces
- Hazardous chemical use, storage, and disposal
- Stewardship opportunities
- Impacts from outdoor spills and how to report them
- Low impact development principles and techniques
- City's plans to improve local water conditions

Further details about these activities are available in the Utility's annual Education and Outreach Summary at [www.bothellwa.gov/stormdocs](http://www.bothellwa.gov/stormdocs).

## Assessment of Existing Pollution Control Level of Effort

Measuring the adequacy of the Utility's pollution prevention effort is a challenge. The Utility is meeting its current NPDES Permit performance expectations regarding spill response, street sweeping, IDDE, education and outreach, and stream and system monitoring.

As is the case with many stormwater management approaches, the Utility's approach to effectiveness could assume that following and achieving compliance with certain practices like spill response and street sweeping will result in adequate pollution prevention.

Another approach to assessing the adequacy of the Utility's pollution protection efforts is to consider the results of testing and monitoring over time. The Utility staff have been

collecting data on Bothell watersheds and continue to assess this data. The data generally shows a decline in water quality within the basins. Whether this decline is attributable to inadequate pollution prevention efforts or other factors has not been conclusively determined due to multiple variables.

## Pollution Control Recommendation

The Utility should continue routinely evaluating the effectiveness of its programs based on their outcomes toward water quality. These evaluations, along with the Utility's stream monitoring data, should be used to inform actions within each Surface Water Management Area (see Section 3 of this Update).

## System Expansion

The Utility participates in both private development and City capital project oversight to assure that these projects have minimal reasonable impact on the surface water system and to assure that the Utility has adequate resources to address additions to the system.

This participation includes:

- **Design and Construction Standards**

Management and Administration assures that the Utility has current design standards for new construction and land use activities. Application of these design and construction standards is carried out by Development Services in collaboration with the Community Development Department.

- **Review and inspection of new developments and projects**

The City's Development Services and Utility staff assure that new developments follow appropriate and current design standards and construction practices and consults with Utility Management and Administration as needed, primarily to ensure downstream analyses include all relevant local drainage information.

- **Integrating newly constructed storm infrastructure into the Utility's system**

Management and Administration assures that newly completed storm and surface water infrastructure is integrated into the Utility's system for routine inspections, maintenance, and asset management. Operations plans for new additions to the system by reviewing and planning for the added workload.

## Assessment of System Expansion Level of Effort

### Surface Water Design Manual

The Utility's Surface Water Design Manual was last updated in January 2019. Another manual update is anticipated for Phase 2 jurisdictions in the next permit cycle.

### Interaction with Development Services

The Utility has some involvement in development review, stormwater system design review, and construction inspection. It provides clarification to questions regarding construction practices, drainage issues, and the Design Manual.

## Integrating Completed Infrastructure into the Utility

The process of integrating newly built infrastructure into the Utility's oversight, maintenance, and operations is currently relatively informal. This has resulted in gaps where Utility staff has not adjusted to the City's acceptance of developer or contractor-completed infrastructure.

## Increasing Capacity to Manage Added Infrastructure

Operations is particularly impacted by the addition of infrastructure, especially where the new infrastructure requires Utility maintenance and operation. This expansion in infrastructure can occur through annexations, new development, and Bothell's capital projects. The expansion often requires increased Operations efforts and equipment.

## System Expansion Recommendations

The Utility should:

- Regularly review the impacts on the Utility of expansion of infrastructure from both development and City projects.
- Periodically review staffing and equipment levels to assure that appropriate levels of resources are matched to the Utility's goals.

## Financial Management

The Utility tracks its financial needs, recommends rates, and manages Utility spending.

This effort involves:

### ➤ Financial Needs

Operations and Management and Administration separately track and manage their spending throughout the current budget cycles and recommend financial needs for upcoming budgets. These financial needs include regular expenses, capital project needs, and one-time needs. The Utility generally does not budget for extraordinary costs, such as natural disasters, spills, or major storms.

Capital project costs can create a challenge for the Utility, as demonstrated by the 35<sup>th</sup> Ave SE Drainage Improvement project. The cost of this project is significantly higher than was initially estimated due to the fish passable culvert requirement. This increase will have a significant impact on both Utility rates and short-term cash flow.

In addition to managing spending, the Utility predicts the receipt of developer-generated revenue (facilities charges). This revenue source is only to be used for capital projects that typically add system capacity necessary to accommodate growth or address system deficiencies.

The Utility also applies for and manages grants to fund projects and operations. These grants range from annual non-competitive grants that can be used for a wide range of efforts to competitive, project-related grants.

### ➤ Regular Rate Studies

Management and Administration prepares an annual review of Utility rates for Council consideration to assure that rate revenues are sufficient. This annual review is based on a combination of historical information and prediction of anticipated upcoming expenses and revenues.

The Utility prepares a rate model-based analysis every few years to help predict future rates. This model was last prepared in 2018 by FCS Group. The Utility plans to update this rate model in 2021.

### ➤ Billing Services

Management and Administration coordinates and performs billing services. Most property owners are currently billed by King or Snohomish County through the

property tax billing systems. These bills are based on rate structures that Bothell established when it created the Utility in 1994.

The Utility directly bills federal properties because these properties do not receive property tax statements from King or Snohomish County.

#### ➤ Utility Accounting

Management and Administration coordinates with Bothell's Finance Department to monitor the Utility's finances throughout the budget cycle. Utility Management and Operations staff track spending and revenues by using a worksheet that is updated from data received by the Finance Department.

#### ➤ Asset Replacement Funding

To assure that the Utility has adequate funding to maintain and operate its system, the Utility expenses funds each year for the system's depreciation. This depreciation expense, if not used for replacement, is to be rolled back into the Utility's total cash balance to be used for asset replacement in future years.

### Assessment of Existing Financial Management Level of Effort

Although current projects will burden the Utility's cash flow, it is expected to have adequate cash to cover expenses. The cash flow limitations are expected to peak in the beginning of 2024.

The Utility is diligent and thorough at managing its rates and financial accounting. Rate studies are consistently performed and presented to the City Council for consideration each year. In addition to annual rate analyses, the Utility periodically updates its rate model. The Utility's self-audit of billing improved accuracy and fairness of its fee collection.

The Utility has not formally evaluated its billing system and rate structure since the Utility was formed in 1994. The billing of Utility fees through the Counties' tax billing offers convenience, limited flexibility, and a potential lack of transparency. The Counties charge the Utility for billing and send bills to property owners twice per year. Since billing is included alongside property tax billings that are often paid through mortgage companies as part of escrow, many property owners are likely not aware of the stormwater bill.

The Utility's billing structure is based on a tiered system with increasing rates for each tier of impervious area. This tiered structure means that properties may be nearly

identical but fall into different tiers and therefore pay significantly different fees. This tiered structure was likely created for convenience in calculating fees at a time when accurate calculations of impervious area were difficult. The structure may have also been used to match what the Counties use for their calculations. Current Geographic Information System (GIS) tools make accurate calculations for each property possible and practical. Also, County billing systems may allow the Utility to use actual impervious area.

The Utility depreciates its infrastructure, but does not have a separate asset replacement fund and does not have a prioritized plan to replace aged assets. However, the Utility has performed several significant storm projects that have replaced aged assets. The asset replacement value of these projects is currently tracked in Bothell's financial management system.

## Financial Management Recommendations

- The Utility will review its billing and rate systems on a regular basis to assure fairness, adequacy, transparency, and efficiency. In 2021, the Utility is conducting an analysis of billing and revisions to its tiered rate structure.
- The Utility will continue to review its rates annually and update its rate model approximately every four years, with the next rate model update in 2021.

## Record Keeping and Reporting

The Utility creates and uses records to assist its decision-making, confirm its regulatory compliance, and inform the public of its activities.

This record keeping and reporting includes, but is not limited to:

- Annual Reports to Ecology
- Billing Files
- Communication Files
- Condition Assessments
- Customer Complaints
- Enforcement Files
- Equipment Logs
- Financial Files
- GIS Data Management
- Grants
- Inspection Reports
- Levee Files
- Maintenance Records
- Miscellaneous Files
- Monitoring Data
- Permit Files
- Personnel Files
- Project Files
- Reference Materials
- Spill Reports
- Studies and Report
- System Mapping
- Work Orders

Public Works created a Records Specialist position in 2019. This position assists Utility staff with proper access, management, and retention of Utility records.

## Section 2: Project Planning

## Section 2: Project Planning

### Introduction

An important function of the Storm and Surface Water program is to identify and support projects that address the function and condition of both the built stormwater and natural surface water systems in Bothell. Project planning allows the Utility to identify needed projects and schedule the projects based on a combination of priorities and expected available funding.

### Built System and Natural Environment Projects

This Plan Update groups its project needs into categories that reflect the purpose and potential funding sources for each type of project. Projects are grouped into Built and Natural categories to reflect the differences in how these types of projects are evaluated, funded, and managed. Typically, built system projects are fully the responsibility of the Utility (or private property owners). Natural environment projects often have a larger purpose and benefit and are funded through a combination of Utility revenues, grants, and other contributions.

#### 1. Built Drainage System Projects

- Major projects (requiring long-term planning and significant funding)
- Small projects (can be programmed as needs arise within an existing budget cycle)
- System expansion (additions to the built system, normally provided by development)
- Rehabilitation/Retrofit (not associated with an urgent flood issue)
- Replacement (replacing deteriorated parts of the system)

#### 2. Natural Surface Water Environment Projects

- Major projects (requires long-term planning and funding)
- Small projects (able to be programmed as needed within an existing budget cycle)

### Built Drainage System Projects

The built system generally includes the inlets, pipes, stormwater ponds, vaults, ditches, and other constructed stormwater features that are designed to collect, control, treat,

and convey stormwater from developed area to the natural surface water environment. It also includes culverts and constructed systems that convey creeks under roadways.

**Built projects are true “Capital Projects:”** Built system projects are capitalized. This means that the Utility recognizes that these improvements will age and will need to be replaced to continue to provide flood control and conveyance. Pipes, concrete structures, and similar improvements are investments that have a limited useful life. Good financial and management practice is to plan for the preservation and replacement of these “capital” assets.

**Built projects are mostly a local and a Utility expense:** Most of the built system projects are appropriately funded by local (generally citywide) sources because they usually affect and benefit the rate payers/property owners in the Utility. These projects mostly address the Utility’s system and operations. Funding typically comes from a combination of rate payer-generated revenue, developer contributions, and connection charges. To a lesser extent, regional stormwater and flood control grants are sometimes available to help fund these projects.

Built system projects would typically address either existing problems or long-term needs in the stormwater system. These projects might address:

## 1. Flood Control

Some parts of our existing drainage system are not adequate to handle storms without flooding. This normally include pipes or ditches that are too small or are regularly clogged by debris or sediment.

## 2. Expansion

The Utility’s built system needs to expand the drainage system to address growth through development and redevelopment. The projects associated with expansion of the system are typically needed to accommodate development, and most expansions are installed by developers.

In some cases, the Utility may take on a large system expansion project and create a mechanism for developers to repay the Utility for the project. An example of this is the Horse Creek project.<sup>6</sup>

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<sup>6</sup> The Horse Creek project addresses a variety of these issues. During the 2007 flood event, the capacity of the existing stormwater system was insufficient, resulting in downtown flooding.

### 3. Retrofit and Rehabilitation

The Utility performs some projects that restore or improve the function of existing systems, even though there is no associated flooding. This may be done to restore or improve the capacity of a pond to control the outflow and protect the downstream built and natural systems. It could also include improving the ability of a system to address water quality.

### 4. Replacement

The built system has a limited useful life and the Utility plans for replacement of deteriorated elements. To do this, the Utility assigns a certain portion of its revenues each year for system replacement based on a simple formula with some basic assumptions about useful life and replacement schedules for the Utility's built system.

The Utility worked in conjunction with the Sewer and Water Utilities to develop a more systematic approach to its replacement funding and project planning by putting in place an asset management system. This system tracks maintenance and useful life according to each asset.

## Natural Surface Water Environment Projects

Natural environment projects mostly include systems of stream enhancement, sediment management, fish access, and associated wetlands and flood plains restoration. Needs for these types of projects focus on protecting, restoring, and enhancing water quality, fish and wildlife habitat, and human-to-nature interface. The considerations for ranking natural projects normally focuses on the environmental benefit, in contrast to "Built Drainage System" projects that focus on flood control benefits such as life, safety, and protection of property use.

**Natural projects are not capitalized:** Natural environment projects do not age like inlets, pipes and vaults. The Utility does not put aside money or assume that most natural projects will need to be replaced in the future.

**Natural projects are often a regional expense:** Many natural environment projects support a regional ecosystem and the benefits and reasons for these projects extend beyond the Utility rate payers. For this reason, the majority of funding for most natural projects comes from regional sources, including grants managed by counties, WRIA 8, Puget Sound groups, and State and Federal agencies.

Natural systems projects typically include restoration, protection, or enhancement of the natural surface water system. This might include enhancing flow management in stream systems, installing or improving natural water quality systems, providing or correcting fish access, and addressing stream characteristics.

## Maintenance and Management of Natural Environment

Ongoing management of restored or enhanced surface water areas is not well-defined in Bothell. In part, this is because the Utility has performed very few restoration-related projects. As the number and extent of projects that the Utility takes on increases, the issue of managing and maintaining these areas will need to be addressed.

## Identifying and Selecting Projects

### Identification

Projects are initially identified by staff through routine maintenance, inspection, flood response, drainage requests, and development activities. These projects are mapped and put into the appropriate category for consideration. Staff then combine all utility and transportation project needs to determine whether projects can be combined for maximum efficiency. Project cost estimates are established and projects are placed on a timeline based on need, resources, and available funding. The projects are either bundled or created separately and placed on the Capital Facilities Plan for public consideration.

### Outreach

The City Council adopts an updated Capital Facilities Plan (CFP) every two years. Prior to adoption, the City asks for community feedback to help identify previously unidentified project needs. The CFP prioritizes how the City spends money on Facilities, Parks and Open Spaces, Transportation, Water Utility, Storm Utility, and Sewer Utility projects.

Storm and Surface Water staff update the City's Surface Water Management Plan (SWMP) annually, and request community feedback to help identify and rank program needs.

For this Plan Update, which occurred during the COVID-19 pandemic commencing in the first quarter of 2020, in-person engagement was not an option. However, staff requested the community's feedback through a number of other channels:

- Month-long virtual open house in September 2020
- Article in *The Bridge* fall 2020 quarterly publication

- Article in September 2020 e-news
- Social media announcements
- Council meeting announcement for public engagement opportunities

## A Pay-as-you-go Approach vs. Financing

Utilities often use a combination of cash and financing to build projects. Both methods have advantages and disadvantages.

With the exception of the Horse Creek and Downtown Revitalization projects, the Utility has generally built projects on a “pay-as-you-go” approach that uses accumulated unrestricted cash from rate revenues. This approach has the advantage of avoiding costs associated with financing.

This pay-as-you go method of funding projects means that the Utility has to schedule projects based on its cash flow. The pay-as-you-go option limits the Utility to construction of larger projects only when enough cash has accumulated. When several large projects are needed, this can mean the projects need to be delayed or rates need to be increased.

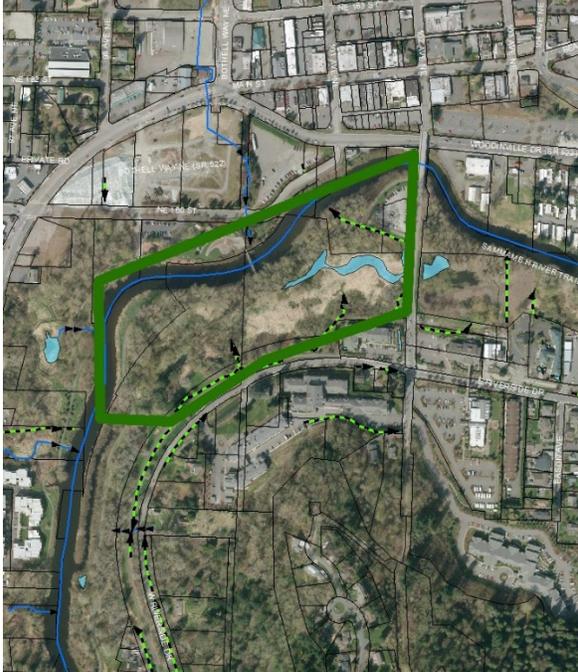
Financing (usually through the sale of revenue bonds or obtaining low interest loans) allows a utility to complete projects now and spread the cost out over time. This often improves the fairness to current and future rate payers who will benefit from the projects. Disadvantages of financing are the costs associated with interest and management of debt.

The approach assumed in this Master Plan is pay-as-you-go. The Utility could consider use of financing to spread out the cost of these projects over time.

## Projects Planned for 2021-2025

The following projects are planned for 2021-2025:

<b>Storm and Surface Water Projects 2021-2025</b>	<b>Total Project (Estimated) 2021-2025</b>	<b>Utility Funded (Estimated)</b>
<b>Combined Built/Natural Projects</b>		
Horse Creek	\$134,000	\$134,000
Blyth Creek Erosion Control	\$500,000	\$300,000
35 <sup>th</sup> Ave SE Drainage Improvements	\$4,000,000	\$4,000,000
<b>Built Drainage System Projects</b>		
Downtown Revitalization	\$520,000	\$520,000
Perry Creek Crossing near 19 <sup>th</sup>	\$10,000	\$10,000
Norway Hill – 104 <sup>th</sup> Ave NE from 16039 to 15949	\$330,000	\$330,000
Pioneer Hills and Pioneer Meadows	\$1,161,550	\$1,161,550
Transportation-Related Drainage Projects	\$7,408,000	\$7,408,000
<b>Natural Environment Surface Water Projects</b>		
Sammamish River Side Channel at 102 <sup>nd</sup> Ave NE	\$157,000	\$157,000
Sammamish River and Waynita Creek Restoration	\$1,300,000	\$500,000
<b>Retrofit Projects</b>		
Stormwater Pond Retrofits	\$500,000	\$500,000
<b>Other Projects</b>		
Master Planning	\$175,000	\$175,000
<b>Totals</b>	<b>\$16,195,550</b>	<b>\$15,195,550</b>

PROJECT LOCATION	TIMEFRAME	SWMA
Sammamish River Side Channel	2021-2027	Upper Sammamish
PROBLEM DESCRIPTION/IMPACTS	SITE MAP	
<p>This project enhanced and reconnected riparian wetlands and remnant side channels on the left bank of the Sammamish River adjacent to 102nd Ave Bridge. Wetland mitigation on this project will require monitoring and maintenance through 2027.</p> <p>This goal of this project was to restore highly valuable salmon habitat, improve water quality, increase habitat diversity for wildlife (amphibians, insects, birds and mammals), and reduce potential of downstream flooding by adding water storage capacity to the Sammamish River floodplain.</p>		
ACTIONS		
<p>Project is complete. Environmental permitting and grant reporting require monitoring and vegetative maintenance of stream creation and wetland restoration areas through 2027.</p>		
PLANNING LEVEL ESTIMATED COSTS		
<p>This project is currently identified in the City's 2021-2022 budget with an estimated cost of \$103,000.</p>		

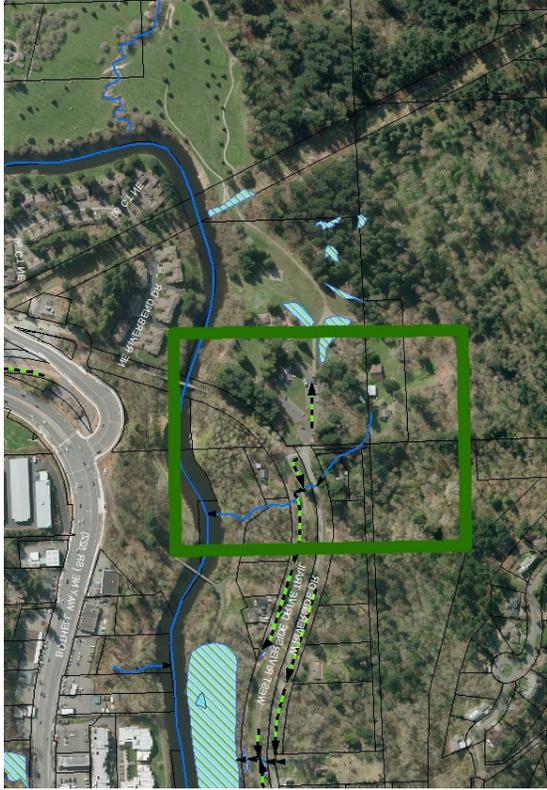
<b>PROJECT LOCATION</b>	<b>TIMEFRAME</b>	<b>SWMA</b>
<b>Horse Creek Improvements</b>	2021-2022	Lower Sammamish
<b>PROBLEM DESCRIPTION/IMPACTS</b>	<b>SITE MAP</b>	
<p>This project replaced the Horse Creek piped system with a hybrid open-channel/culvert system along 98th Ave NE. The system was designed to convey flows exceeding the 100-year storm event and meets the fish passage criteria established by the State Department of Fish and Wildlife. The project begins at NE 188th St, north of Pop Keeney Field, and extends along 98th Ave to the Sammamish River. The stream is within an open channel south of the realigned SR 522. The cost for the culvert beneath SR 522 was excluded from this project cost.</p> <p>The previous Horse Creek piped system through downtown did not adequately pass large storm event flows, which put downtown properties at risk for flooding.</p>		
<b>ACTIONS</b>		
<p>This project is complete. An environmental permit requires monitoring and vegetative maintenance of stream restoration areas through 2022.</p>		
<b>PLANNING LEVEL ESTIMATED COSTS</b>		
<p>This project is currently identified in the City's 2021-2022 budget with an estimated cost of \$67,000.</p>		

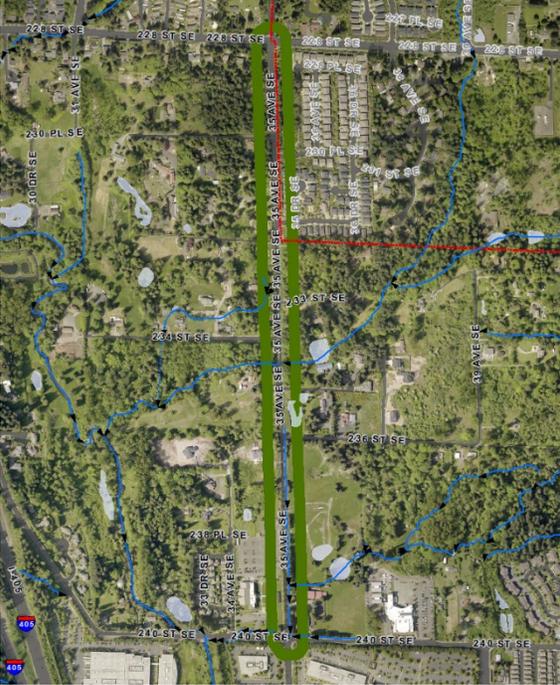
PROJECT LOCATION	TIMEFRAME	SWMA
<p align="center"><b>Downtown Revitalization Utility Improvements</b></p>	<p align="center">2021-2022</p>	<p align="center">Upper Sammamish</p>
PROBLEM DESCRIPTION/IMPACTS	SITE MAP	
<p>Capital projects to correct existing storm &amp; surface water deficiencies, prevent flooding, and replace aging infrastructure in the Downtown Revitalization Area. The projects are identified in the April 2011 Downtown Revitalization Utility Phasing, Cost partitioning, and Financing Study by Gray and Osborne, Inc. The Downtown Study identifies the City Utility portion/share of the Storm &amp; Surface Water System improvements (as well as identifying developer costs).</p> <p>These projects will reduce flooding and erosion and improve water quality, as well as maintain the integrity of the storm &amp; surface water infrastructure.</p>		
ACTIONS		
<p>Projects may be advanced to coincide with downtown developments' construction timing. The following projects are currently identified: NE 182nd St (96th Ave NE to 97th Ave NE), Ormbrek, and daylighting unnamed stream south of SR 522.</p>		
PLANNING LEVEL ESTIMATED COSTS		
<p>This project is currently identified in the City's 2021-2022 budget with an estimated cost of \$520,000.</p>		

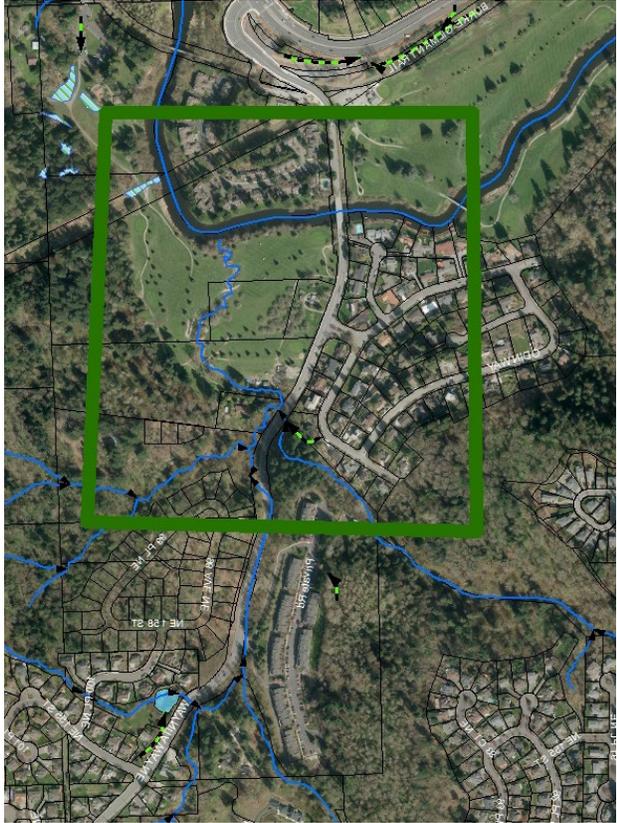
<p align="center"><b>PROJECT LOCATION</b></p>	<p align="center"><b>TIMEFRAME</b></p>	<p align="center"><b>SWMA</b></p>
<p align="center"><b>Perry Creek &amp; 228<sup>th</sup> Storm Improvements</b></p>	<p align="center">2021-2023</p>	<p align="center">Perry</p>
<p align="center"><b>PROBLEM DESCRIPTION/IMPACTS</b></p>	<p align="center"><b>SITE MAP</b></p>	
<p>This project involved removing an existing access road culvert and reworking the stream just east of the 19th Ave SE culvert</p> <p>While the 2009 culvert replacement under 19th Ave SE addressed most of the flooding issues in this location, a short culvert under a maintenance access road continued to provide a restriction. This project eliminated the restriction.</p>		
<p align="center"><b>ACTIONS</b></p>		
<p>The project is complete. An environmental permit requires monitoring and maintenance of plantings within the restoration areas through 2023.</p>		
<p align="center"><b>PLANNING LEVEL ESTIMATED COSTS</b></p>		
<p>This project is currently identified in the City's 2021-2022 budget with an estimated cost of \$10,000.</p>		

<b>PROJECT LOCATION</b>	<b>TIMEFRAME</b>	<b>SWMA</b>
Norway Hill - 104 <sup>th</sup> Ave NE	2024-2025	Lower Sammamish
<b>PROBLEM DESCRIPTION/IMPACTS</b>	<b>SITE MAP</b>	
<p>This project will improve roadside drainage flowing south along 104th Ave.</p> <p>This neighborhood has insufficient drainage causing a ditch to pond, overflow, and discharge onto private property. Drainage south along 104th is insufficient and outlets at the top of a landslide slope. In the past, King County would clear the ditch whenever it filled, but a more permanent solution to prevent flooding is needed to prevent water encroachment on the roadway and private property. Operations spent 24 overtime and regular hours at this location working to prevent flooding in 2019 and the first part of 2020.</p>		
<b>POSSIBLE ACTIONS</b>		
<p>Design could include a combination of improved ditch and pipe conveyance and a more appropriate discharge point to reduce potential erosion and sloughing.</p>		
<b>PLANNING LEVEL ESTIMATED COSTS</b>		
<p>This project is currently identified in the budget and slated to begin in 2024 with an estimated cost of \$330,000.</p>		

PROJECT LOCATION	TIMEFRAME	SWMA
Pioneer Hills	2023-2024	Parr
PROBLEM DESCRIPTION/IMPACTS	SITE MAP	
<p>This project will replace the existing corrugated metal pipe conveyance system in the Pioneer Hills neighborhood.</p> <p>The corrugated metal piping within the Pioneer Hills neighborhood has disintegrated to the point where stormwater is no longer being conveyed to the appropriate discharge point.</p>		
ACTIONS		
<p>Design will replace the existing pipe conveyance system to reduce potential flooding and erosion.</p>		
PLANNING LEVEL ESTIMATED COSTS		
<p>This project is currently identified in the City's budget with an estimated cost of \$1,161,550.</p>		

PROJECT LOCATION	TIMEFRAME	SWMA
Blyth Park Erosion Control	2021-2022	Lower Sammamish
PROBLEM DESCRIPTION/IMPACTS	SITE MAP	
<p>This project will reduce stream erosion in Blyth Creek by installing log structures and side slope stabilization and renovating the City-maintained sediment basin to improve capacity, reduce maintenance, and improve water quality of the Sammamish River.</p> <p>Stream erosion in Blyth Creek produces sediments which are captured in a downstream pond prior to discharge to the Sammamish River. The sediment overwhelms the pond and overflows into the Sammamish River despite the City's annual pond dredging. Citizens have voiced concern over the turbidity levels in the River and the enlarging sediment bar downstream of the confluence with the Sammamish River. The City identified sediment erosion as an issue in the Master Plan for Blyth Park in 2011.</p>		
ACTIONS		
<p>Complete sediment pond redesign and include slope stabilization just upstream of the pond. Repair and replace pipes as needed to the outfall.</p>		
<b>PLANNING LEVEL ESTIMATED COSTS</b> (SURFACE WATER UTILITY COSTS ONLY)		
<p>This project is currently identified in the City's 2021-2022 budget with remaining design and construction costs estimated at \$500,000.</p>		

<p align="center"><b>PROJECT LOCATION</b></p>	<p align="center"><b>TIMEFRAME</b></p>	<p align="center"><b>SWMA</b></p>
<p><b>35<sup>th</sup> Ave SE Drainage Improvements</b></p>	<p align="center">2021-2027</p>	<p align="center">Lower North Creek</p>
<p align="center"><b>PROBLEM DESCRIPTION/IMPACTS</b></p> <p>This project addresses an area-wide flooding issue along 35th Ave SE between Cole/Woods Creek and 240th St SE. Design will include a combination of a new fish-passage culvert for Cole/Woods Creek under 35th Ave SE and selected downstream conveyance improvements, such as culvert and pipe upgrades.</p> <p>Flooding occurred over multiple years at the creek crossing at 23600 block of 35th Ave SE and along 35th Ave SE corridor between 228th St SE and 240th St SE overflowing from the north down the ditch lines. Culverts and inlets were clogged with debris and the culverts are undersized. During the December 3, 2007 storm, the ditch overtopped 35th Ave SE and flowed into Monte Villa Business Park.</p>	<p align="center"><b>SITE MAP</b></p> 	
<p><b>ACTIONS</b></p>		
<p>The design calls for water to flow to its natural discharge location so this portion of the project seeks to restore Cole/Woods Creek to its channel. In addition, a couple of restriction points in the 35th Ave SE and 240th St SE stormwater conveyance system will be upsized to reduce the future potential of flooding.</p>		
<p align="center"><b>PLANNING LEVEL ESTIMATED COSTS</b> (SURFACE WATER UTILITY COSTS ONLY)</p>		
<p>This project is currently identified in the City's 2021-2022 budget with remaining design and construction costs estimated at \$4,000,000.</p>		

PROJECT LOCATION	TIMEFRAME	SWMA
Sammamish River – Waynita Creek	2021-2027	Lower Sammamish
PROBLEM DESCRIPTION/IMPACTS	SITE MAP	
<p>This project includes stream and wetland habitat restoration for the east side of the former Wayne Golf Course property. It includes 1,000 linear feet of the south bank of the Sammamish River along with the mouth and lower reach of Waynita Creek and reconnection with unnamed tributaries and wetlands in the confluence area to address fish refuge and water temperature.</p> <p>The Sammamish River channel has been modified from its historic conditions and the habitat suffers from a combination of fish passage issues, disconnected and degraded riparian habitat and side channels, and lack of cool-water refuge pools. Fish habitat and water quality are impacted by the current conditions. US EPA and the State Department of Ecology have identified concerns with water temperature and dissolved oxygen in the Sammamish River through Bothell.</p>		
POSSIBLE ACTIONS		
<p>Restoration and reconnection of wetlands and tributaries within the project area to address fish refuge and water temperature.</p>		
<p align="center"><b>PLANNING LEVEL ESTIMATED COSTS</b> (SURFACE WATER UTILITY COSTS ONLY)</p>		

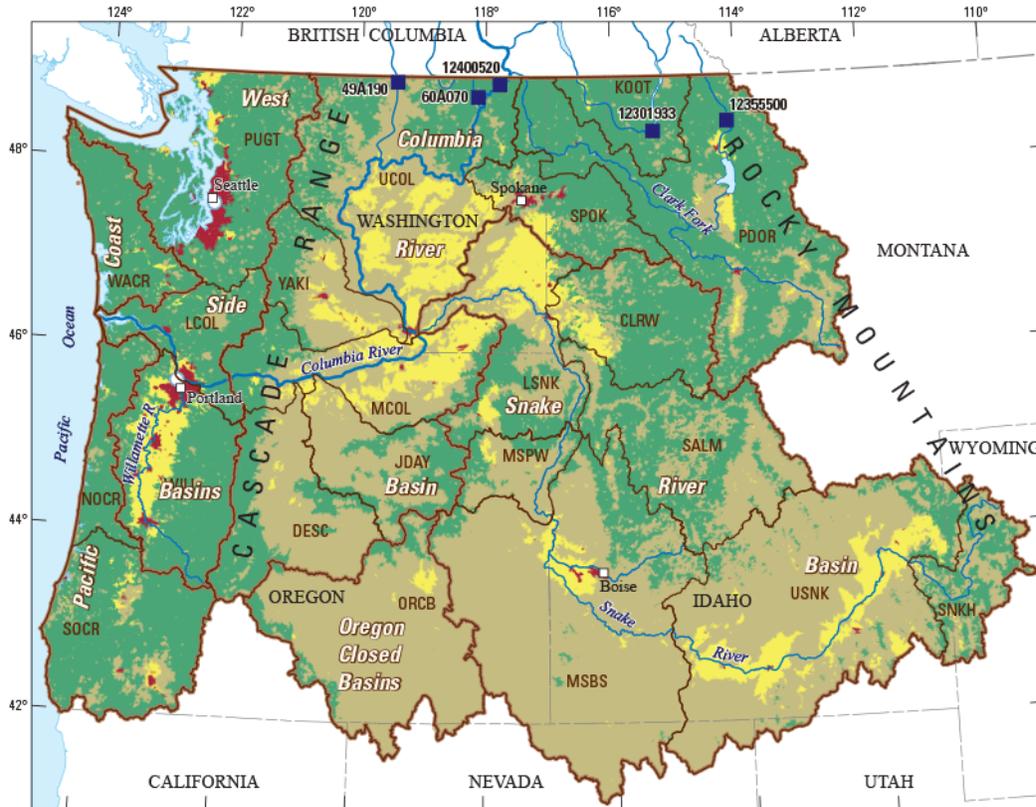
Costs for this project will be developed as part of the feasibility study. Project is currently estimated to cost \$1,300,000. This planning assumes that the majority of the project will be funded through grants and that the utility would provide \$500,000 in 2021-2022 as matching funds.

# Section 3: Watershed Management

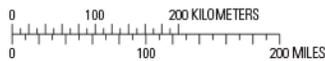
# Section 3: Watershed Management

## Bothell's Watershed Setting

Bothell is located in the Pacific Northwest area that drains to the Pacific Ocean, either directly or through the Columbia River system or Puget Sound.



Base map modified from USGS and other U.S. agency and Canadian national digital data sources at various scales. Projection: Albers, SP1: 29.5, SP2: 45.5, LO: 23.0, CM: -96.0, Datum: North American Datum of 1983.



### EXPLANATION

- UCOL HUC Level 6 watershed and name—full name in table 1.
- Basin Major drainage
- Boundary calibration station
- Primary land cover type: Scrub and grassland
- Forestland
- Agriculture
- Developed

Station No.	Station name	Agency
12301933	Kootenai River below Libby Dam near Libby, MT	USGS
12355500	N.F. Flathead River near Columbia Falls, MT	USGS
12400520	Columbia River at Northport, WA	USGS
60A070	Kettle River near Barstow, WA	WADOE
49A190	Okanogan River at Oroville, WA	WADOE

USGS = U.S. Geological Survey  
WADOE = Washington Department of Ecology



## Pacific Northwest

Bothell is located in the west side basins of the Pacific Northwest region, and is part of the Puget Sound watershed. This 2,138 square mile watershed contains unique marine and fresh water habitat. The Sound is also home to about 4.3 million people who rely on its resources for recreation, food, transportation, and other basic needs.

Basins in this watershed are part of the Western Washington stormwater management area, which has a distinctly different hydrology than basins on the Olympic Peninsula or east of the Cascade Range. This difference is evident in the Western Washington approach to drainage and stormwater management permitted by the Washington State Department of Ecology.

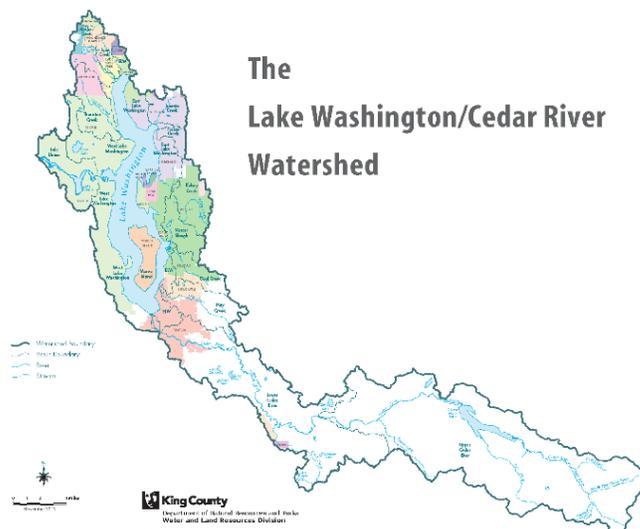
## WRIA 8

The City of Bothell is fully contained in the Lake Washington/Cedar River (known as Watershed Resource Inventory Area or WRIA 8) of Puget Sound.

This WRIA is considered the most densely populated, developed, and degraded watershed within Puget Sound Basin, yet is also home to some native populations of salmon and other

migratory and resident fish. About 55 percent of the watershed is within Urban Growth Areas, including 28 different municipalities. WRIA 8 supports a population expected to grow to 1.6 million people by 2022.

Most of the watershed character was originally influenced by glacial activity which created the hillsides, topography, and soil characteristics. The glacial soils in Bothell include widespread fine-grained glacial tills that are relatively impermeable, easily erodible, and relatively unstable. In addition to the glacial till, there are some areas of organic soils, including peat, that may influence water quality and sometimes affect flood management.



Lake Washington/Cedar River Basin, developed by King County

Development in WRIA 8 for human uses has dramatically altered aquatic habitat conditions and the processes that form and maintain them. The factors that limit salmon habitat are similar for the lakes, rivers, and creeks in the watershed, although the magnitude of impact varies by type of water body and specific watershed area. It is important to understand that the limiting factors interact with one another to worsen the habitat problems seen in the aquatic systems. The factors that limit habitat, degrade water quality, and increase local flooding include:

- Altered hydrology (e.g., low base flows, higher peak flows following storms, and increased 'flashiness,' which means more frequent and rapid responses when it rains)
- Loss of floodplain connectivity (e.g., reduced access to side-channels or off-channel areas due to bank armoring and development close to shorelines)
- Lack of riparian vegetation (e.g., from clearing and development)
- Disrupted sediment processes (e.g., too much fine sediment deposited in urban stream)
- Loss of channel and shoreline complexity (e.g., lack of woody debris and pools)
- Barriers to fish passage (e.g., from road crossings, weirs, and dams)
- Degraded water and sediment quality (e.g., pollutants and high temperatures)
- Loss or degradation of fish habitat
- Reduced summer base flows due to changed infiltration and groundwater recharge

Bothell represents less than two percent of the total area within WRIA 8.

## Sammamish River Basin

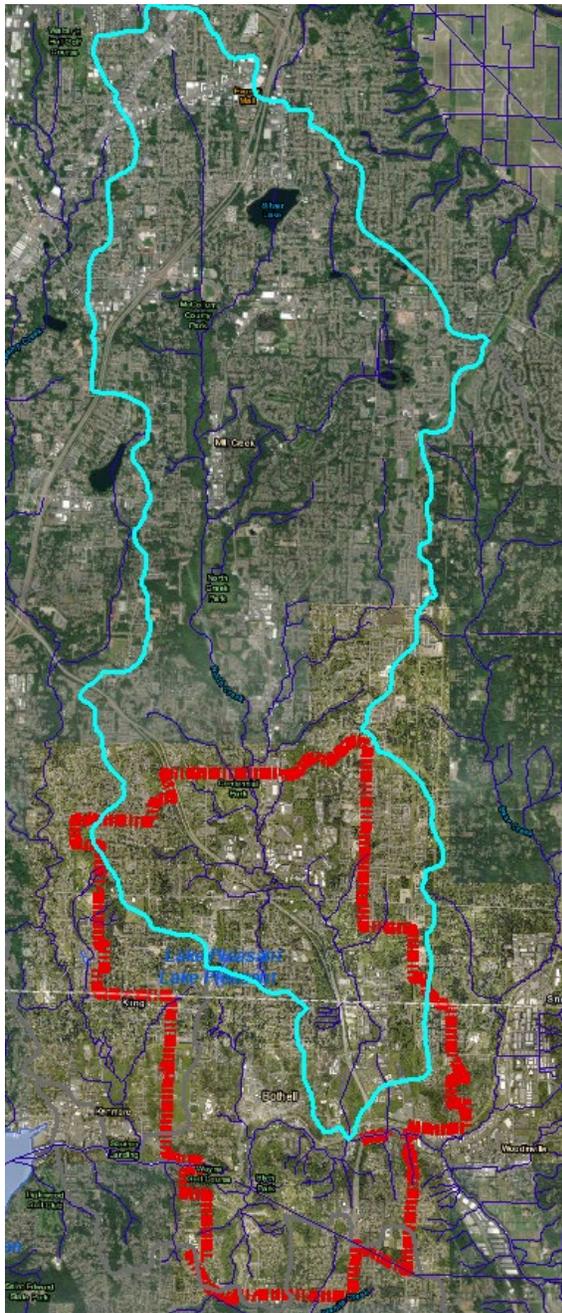
(Includes municipalities of Sammamish, Issaquah, Bellevue, Redmond, King County, Woodinville, Bothell, Lake Forest Park, Kenmore, Snohomish County)

The Sammamish watershed is part of the greater [Lake Washington - Cedar River drainage basin](#), encompassing the land area in which rainwater drains to [Lake Sammamish](#), the [Sammamish River](#) and out into [Lake Washington](#).

The majority (about 98%) of Bothell drains to the Sammamish River, either directly or through North, Swamp, Waynita, or Little Bear Creeks. A small portion (about 2%) of the



Bothell contains numerous small creeks and drainage basins that drain into North Creek, Swamp Creek, Little Bear Creek, Juanita Creek and the Sammamish River. These small areas sometimes support creeks and ecosystems that are important to the overall health of the larger environment. The condition of these individual basins varies greatly throughout the city depending on factors such as how developed the basin is or how protected the stream buffers and wetlands are.



## North Creek Basin

(Includes municipalities of Everett, Snohomish County, Mill Creek, and Bothell)

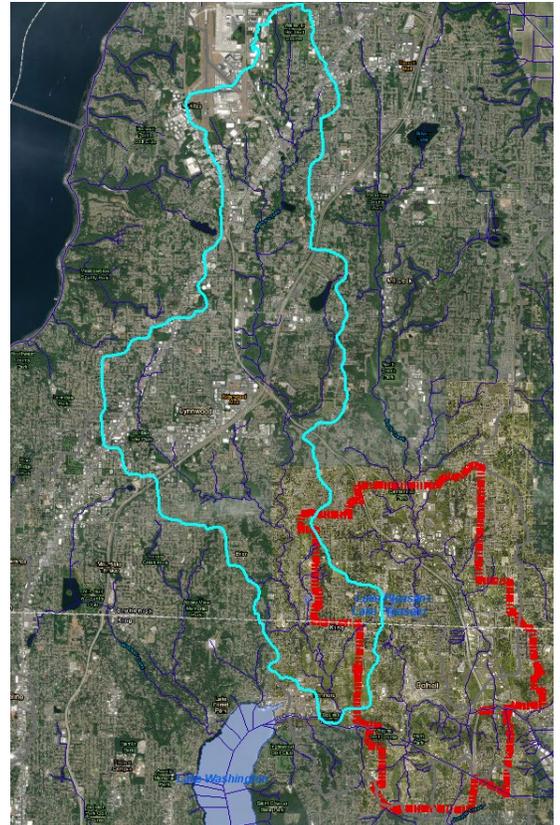
Bothell is located at the downstream end of North Creek where it converges with the Sammamish River. North Creek begins in highly-urbanized south Everett near the Everett Mall and then flows through unincorporated Snohomish County and Mill Creek before reaching Bothell. The North Creek watershed includes about 28.5 square miles, of which two-thirds are in unincorporated Snohomish County.

*North Creek Basin, developed in ArcGIS by Bothell staff.*

## Swamp Creek Basin

(Includes municipalities of Everett, Lynnwood, Snohomish County, Brier, Bothell, and Kenmore)

About 1.4 square miles (10%) of Bothell drains toward Swamp Creek on its way to the Sammamish River and Lake Washington in Kenmore. This amount represents about 6% of the overall Swamp Creek Basin.



Swamp Creek Basin, developed in ArcGIS by Bothell staff.



Little Bear Creek Basin, developed by Snohomish County, WA

## Little Bear Creek Basin

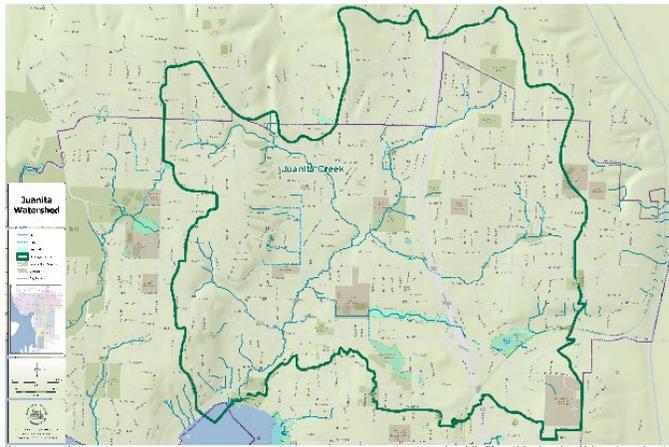
(Includes municipalities of Snohomish County, Woodinville, and Bothell)

About 0.2 square miles (1.4%) of Bothell drains to Little Bear Creek on its way to the Sammamish River in Woodinville. This represents about 1% of the total Little Bear Creek watershed.

## Juanita Creek Basin

(Includes municipalities of Bothell and Kirkland)

About 0.7 square miles (5%) of Bothell drains to Juanita Creek in Kirkland on its way to Lake Washington. This represents about 10% of the 4224-acre Juanita Creek Watershed. A detailed analysis of the watershed was performed in August 2012 (Stormwater Retrofit Analysis and [Recommendations for Juanita Creek Basin in the Lake Washington Watershed](#) were developed by King County, the City of Kirkland, Ecology and WSDOT).



*Juanita Creek Basin*

Surface Water staff monitors the health of these basins and periodically produces a Stream Health Assessment Report to help inform the public and policy makers on the condition of Bothell's streams. The latest report can be found on the City's website at <http://www.bothellwa.gov/stormdocs>.

## Watershed Management for Bothell: Utility-wide and Multi-Level Efforts

Surface watershed management in Bothell takes place at a wide range of levels, from individual inlets or catch basins to Utility-wide or regional management. Many design requirements, regulations, inspections, and education and outreach efforts are applied relatively equally throughout the Utility. Some situations call for a regional approach to watershed management, such as response to listing of Chinook salmon as endangered through the region's Watershed Resource Inventory Area or WRIA approach. Other situations call for a very specific response, such as the City's approach to managing and developing the Horse Creek basin.

This section of the Plan Update presents an added approach to managing storm and surface water efforts in Bothell. The approach includes dividing the city into Surface Water Management Areas (SWMAs), which are delineated watersheds to meet

Washington State Department of Ecology requirements under S5.C.1.d.i of the Western Washington Phase II Municipal Stormwater (MS4) Permit.

Some goals of the Utility's various watershed management approaches include:

- Protecting and improving health of the city's aquatic lands and surface waters
- Reducing stormwater impacts on developed properties by protecting and restoring natural surface water systems
- Meeting state and federal water quality requirements
- Efficiently deploying Utility resources

The Utility's watershed management planning includes:

### 1. Identifying watershed units to be managed

As mentioned, the city's watersheds are, and will continue to be, managed at a wide range of levels. This Plan Update introduces an intermediate management unit that subdivides the city into surface water management areas. This level of management can be used to focus much of the Utility's water quality, public outreach, and operations efforts.

### 2. Describing the conditions and attributed of watershed management units

Various watershed units in and surrounding the city have been described in past stormwater master plans, the City's Comprehensive Plan, and by several past reports, including:

- North Creek Watershed Management Plan, September 6, 1994, Snohomish County Public Works
- Surface Water Quality Plan, City of Bothell, 1996, CH2M-Hill
- North Creek Drainage Needs Study, December 2002, Snohomish County
- Sammamish River Corridor Action Plan, 2002, Tetra Tech
- Swamp Creek Drainage Needs Report, 2002, Snohomish County
- Restoration Plan for the City of Bothell Shorelines, May 2012, The Watershed Company
- Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan, 2017, WRIA 8
- Stream Health Assessment Reports, City of Bothell Staff, 2010 through 2020



This Plan Update also describes the characteristics of each SWMA by compiling GIS-based land use data, natural environment information, and stream monitoring reporting.

### 3. Identifying goals, expectations, strategies, and action plans for watershed management units

Watershed goals and action plans have been developed at various levels for Bothell watershed units:

- As part of the region’s salmon recovery plan, Bothell is a participant in watershed planning for the Cedar-Sammamish Watershed Resource Inventory Area 8 (WRIA-8).
- The City has participated in regional efforts with Snohomish County and surrounding jurisdictions to address management of North Creek. Efforts have

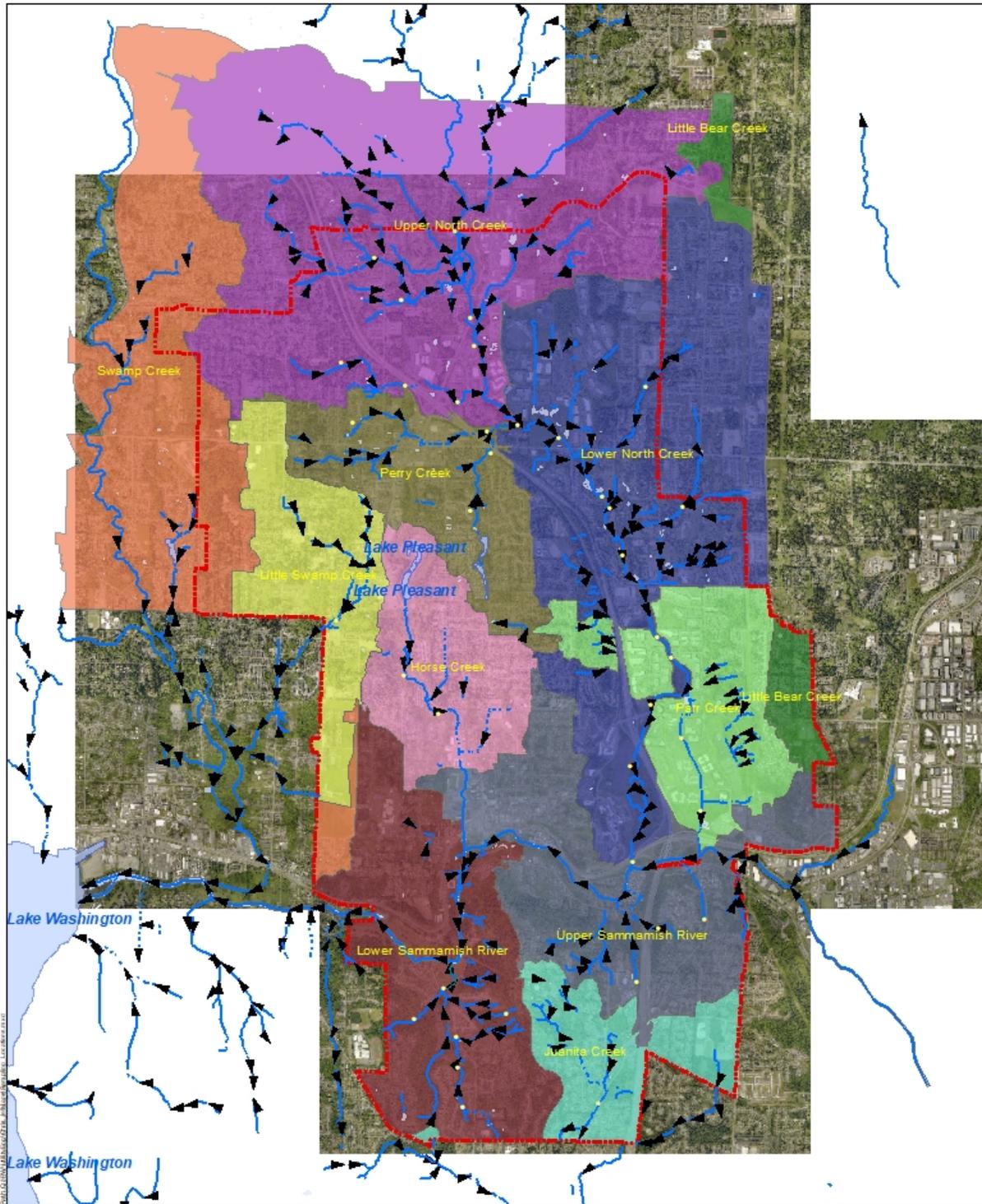
been made to identify goals and expectations for the Sammamish River, Juanita Creek, and Swamp Creek.

- The State, as part of water quality regulations, has established water quality plans for Swamp Creek, North Creek, and the Sammamish River.
- The City has prepared citywide efforts for watershed management as part of its critical areas planning. In addition, the City has prepared a North Creek Fish and Wildlife Critical Habitat Protection Area to address, in part, watershed goals for a roughly 1,220-acre area of the city.
- This Plan Update presents initial draft goals and expectations by Surface Water Management Area (SWMA).

Individual named Stormwater Management Areas identified by the Utility include:

- Horse Creek
- Juanita Creek
- Little Bear Creek
- Little Swamp Creek
- Lower North Creek
- Lower Sammamish River
- Parr Creek
- Perry Creek
- Swamp Creek
- Upper North Creek
- Upper Sammamish River

These SWMAs can be seen in the following map.



0 3,100 6,200 9,300  
Feet

Legend

 Bothell City Limit

The City of Bothell delivers this data map in an AS-IS condition. GIS data maps are produced by the City of Bothell for internal purposes. No representation or guarantee is made concerning the accuracy, currency or completeness of the information provided.  
Date: 02/7/2020



The characteristics of these SWMAs are described and potential management strategies are developed for each of the areas.

## Stormwater Management Action Plan (SMAP)

The Washington State Department of Ecology National Pollutant Discharge Elimination System (NPDES) Western Washington Phase II Municipal Stormwater Permit (Permit)<sup>7</sup> outlines requirements for a Comprehensive Stormwater Planning Process. This process includes development and implementation of a Stormwater Management Action Plan (SMAP) to address impacts on priority receiving waters from existing or planned development. As required by the Permit, the City has formed a SMAP interdisciplinary team across City departments. The mission of the interdisciplinary team is to coordinate permitting of the City's stormwater program and address water health through comprehensive planning. Also, as part of the SMAP, the City has evaluated all basins within Bothell and is developing an annual report for one high-priority basin that will identify tailored stormwater management actions, funding mechanisms, and adaptive management. Lower North Creek has been selected as the high-priority basin. The City will use the results of the SMAP process across all of Bothell to identify future Capital Improvement Projects, inform future Code, Standards, and Policy updates, and align with Growth-Management Comprehensive Plan updates.

## Next Steps

Utility staff will prepare plans for each SWMA. Public engagement will be included in the development of each plan. The steps for developing the plans for the SWMAs include:

- A. **Identifying watershed goals within each SWMA.** Examples of goals might include:
  - Specific water quality levels and stream health for monitoring stations/streams in an SWMA
  - Targeted amount and quality of aquatic habitat within an SWMA
  - Desired reduction/limit of impervious surface coverage within the SWMA

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<sup>7</sup> Ecology (Washington State Department of Ecology). 2019a. Western Washington Phase II Municipal Stormwater Permit – National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for discharges from Small Municipal Separate Storm Sewers in Western Washington. State of Washington Department of Ecology. Olympia, Washington. Issuance Date: July 1, 2019; Effective Date: August 1, 2019; Expiration Date: July 31, 2024.

- B. **Establishing measurements/indicators for each goal.** Examples might include:
- Stream health and water quality testing and observations
  - Wetland and stream buffer assessments
  - GIS-based land cover assessments
- C. **Defining management activities that may achieve goals.** Examples might include:
- Education and outreach programs targeted to specific pollution-generating activities or problems within the SWMA
  - Maintenance activities, such as street sweeping, catch basin cleaning, and facilities maintenance, focused on specific areas or issues where problems are identified
  - Retrofitting facilities and reducing existing impervious areas to minimize storm runoff
  - Increased focus on stormwater code enforcement in problem areas, including illicit discharge elimination
  - Development or refinement of specific land planning and development efforts to address the goals of each SWMA
  - Specific restoration projects to address SWMA issues
- D. **Estimating technical and financial needs and available resources to implement the plan for each SWMA.**
- This effort will likely require revisiting the goals and management activities for each SWMA to align with the Utility's financial and technical capacity.
- E. **Describing and defining interim, measurable milestones, and schedules for these milestones.**
- F. **Developing a monitoring and reporting plan for each SWMA.**
- G. **Implementing the watershed actions for each SWMA.**

# Surface Water Management Areas Descriptions

## Introduction

Surface Water Management Areas (SWMAs) and relevant data were developed using internal GIS datasets using ArcGIS. SWMA boundary development information can be found in the summary section of this report. The following data dictionary provides an overview of the datasets and how they were developed. For more detailed information, see the workflow guide at [www.bothellwa.gov/swmaworkflow](http://www.bothellwa.gov/swmaworkflow). Also, feel free to visit the City Maps and GIS webpage at <http://www.ci.bothell.wa.us/233/Maps-GIS> for additional information and contacts.

## Data Dictionary for the City of Bothell’s Watershed Analysis

This guide will describe the data values in the results spreadsheet of the City of Bothell’s watershed (monitoring basin) analysis. The goal is for this analysis to *assist in* prioritization of surface water infrastructure improvements among these monitoring basins. This guide briefly describes each value. For a more complete explanation of how each value was derived using ArcGIS Desktop 10.6.1 (advanced license), please refer to the workflow guide, which should accompany this guide.

It’s also important to note that this data dictionary is based on GIS data at coarse scale and is NOT intended to represent a scientific or survey-grade study of drainage or other phenomena and that:

GIS data (maps) are produced by the City of Bothell for internal purposes. No representation or guarantee is made concerning the accuracy, currency, or completeness of the information provided.

Data Value	Units	Description
<b>Area</b>		
<b>Total Area</b>	<b>sqmi</b>	The total area of the monitoring basin that is covered by the catchments of tributaries that intersect Bothell’s city limits (see PDF map).
<b>Bothell City Portion</b>	<b>sqmi</b>	The area of the monitoring basin that is within Bothell’s city limits.

<b>Data Value</b>	<b>Units</b>	<b>Description</b>
<b>Bothell City Portion</b>	%	The percentage of the monitoring basin that is within Bothell’s city limits.
<b>Land Use</b>		
<b>Single Family Residential</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by “Single Family Residential” land use. <u>Single Family Residential</u> : includes: houses, townhomes, mobile homes, & manufactured homes
<b>Multi-Family Residential</b>	%	The percentage of the monitoring basin within Bothell’s city limits that is covered by “Multi-Family Residential” land use. <u>Multifamily Residential</u> : includes apartments and condos where no commercial use on ground floor exists
<b>Total Residential</b>	%	<b>Sum of the above two percentages.</b>
<b>High Use Commercial</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by “High Use Commercial” land use. <u>High Use Commercial</u> : includes areas with oil water separators such as restaurants, gas stations, etc. Oil water separators are in storm site layers.
<b>General Use Commercial</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by “General Use Commercial” land use. <u>General Commercial</u> : includes office, retail, public facilities, schools, churches, etc.

Data Value	Units	Description
<b>Industrial</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by "Industrial" land use. <u>Industrial</u> : includes sites such as Romac, Philips Healthcare, Seattle Times Printing Plant, etc.
<b><i>Total Commercial</i></b>	%	<b><i>Sum of the above three percentages.</i></b>
<b>Mixed Use (Residential and Commercial)</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by "Mixed Use (Residential and Commercial)" land use. <u>Mixed Use</u> : Includes areas where residential buildings are on top of commercial such as SHAG.
<b>Active Use Parks</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by "Active Use Parks" land use. <u>Active Use</u> : Includes ballfields, areas with restrooms, playgrounds, etc.
<b>Passive Use Parks</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by "Passive Use Parks" land use. <u>Passive Use</u> : Areas of passive recreation
<b><i>Total Parks and Open Space</i></b>	%	<b><i>Sum of the above two percentages.</i></b>
<b>Natural Areas (Streams, wetlands, and buffers)</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by "Natural Areas (Streams, wetlands, and buffers)" land use. <u>Natural Areas</u> : Includes streams, wetlands, and buffers

Data Value	Units	Description
<b>Undeveloped</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by "Undeveloped" land use. <u>Undeveloped</u> : Use the vacant layer for this category to find areas with potential of future development
<b>Right-of-Way</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by "Right-of-Way" land use. <u>Right-of-Way</u> : As land use was defined at the parcel level, the "right-of-way" land use fills in the gaps between parcels within the Bothell city limits.
<b>Land Cover</b>		
<b>Impervious</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by an impervious surface. This includes all impervious surfaces of roadways (below), buildings, parking lots, driveways, walkways, patios, decks, and miscellaneous.
<b>Limited Access Roads</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by <i>impervious</i> road surface that is part of a limited access highway. This includes I-405, the eastern portion of SR 522, and all associated on-ramps and off-ramps.
<b>Arterial Roads</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by <i>impervious</i> road surface that is part of an arterial roadway. This includes all major, minor, and collector arterials that aren't classified as limited access highways.

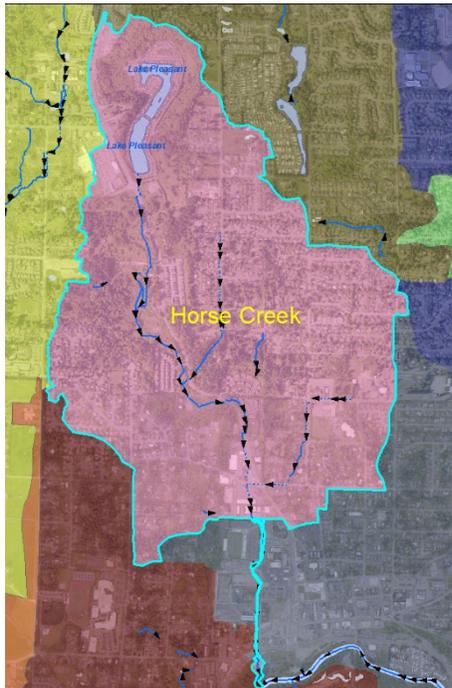
<b>Data Value</b>	<b>Units</b>	<b>Description</b>
<b>Local Roads</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by <i>impervious</i> road surface that is part of a local roadway. This includes every road that is not classified as either a limited access highway or arterial roadway.
<b>Total Road Surface</b>	%	<b>Sum of the above three percentages.</b>
<b>Tree Canopy</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by tree canopy. This may overlap with impervious surface in some areas.
<b>Physical Geography</b>		
<b>Very Severely Erosive Soils (Class V) on Slopes over 40%</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by "very severely erosive" soil (Class V) and is on a steep slope over 40%.
<b>Natural Areas</b>		
<b>Wetland Area</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by wetlands.
<b>Wetland Area + Buffers</b>	%	The percentage of the monitoring basin within Bothell city limits that is covered by wetlands or their associated buffers.
<b>Rivers and Streams</b>	<b>mi/sqmi</b>	The density of rivers and streams (including piped streams) within the portion of the monitoring basin within Bothell city limits.
<b>Storm Infrastructure</b>		

<b>Data Value</b>	<b>Units</b>	<b>Description</b>
<b>Pipes and Culverts</b>	<b>mi/sqmi</b>	The density of pipes and culverts (including piped streams and detention pipes, but not piped trenches) within the portion of the monitoring basin within Bothell city limits.
<b>Ditches</b>	<b>mi/sqmi</b>	The density of stormwater ditches (not bioswales) within the portion of the monitoring basin within Bothell city limits.
<b>BioSwales</b>	<b>mi/sqmi</b>	The density of bioswales within the portion of the monitoring basin within Bothell city limits.
<b>Trenches</b>	<b>mi/sqmi</b>	The density of trenches (including infiltration, dispersion, and interceptor trenches, and trenches with pipes) within the portion of the monitoring basin within Bothell city limits.
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b><i>Sum of the above four densities.</i></b>
<b>Catch Basins</b>	<b>#/sqmi</b>	The density of catch basins within the portion of the monitoring basin within Bothell city limits.
<b>Control Structures (some in vaults, detention ponds, etc.)</b>	<b>#/sqmi</b>	The density of control structures (including those in vaults, detention ponds, etc.) within the portion of the monitoring basin within Bothell city limits.
<b>Detention Pipes</b>	<b>#/sqmi</b>	The density of detention pipes within the portion of the monitoring basin within Bothell city limits.
<b>Detention Ponds</b>	<b>#/sqmi</b>	The density of detention ponds within the portion of the monitoring basin within Bothell city limits.
<b>Vaults</b>	<b>#/sqmi</b>	The density of vaults within the portion of the monitoring basin within Bothell city limits.

Data Value	Units	Description
<b>Filters</b>	<b>#/sqmi</b>	The density of filters (in catch basins, control structures, and vaults) within the portion of the monitoring basin within Bothell city limits. Filters include oil/water separators.
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>Sum of the above four densities.</b>
<b>Pervious Pavement</b>	<b>#/sqmi</b>	The density of pervious pavement installations within the portion of the monitoring basin within Bothell city limits.
<b>Bioretention</b>	<b>#/sqmi</b>	The density of bioretention (or rain garden) installations within the portion of the monitoring basin within Bothell city limits.
<b>Tree Boxes</b>	<b>#/sqmi</b>	The density of tree box (or Filterra) installations within the portion of the monitoring basin within Bothell city limits.
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>Sum of the above three densities.</b>
<b>Population</b>		
<b>Population Density</b>	<b>people/sqmi</b>	An <i>estimate</i> of population density within the portion of the monitoring basin within Bothell city limits. Washington State Office of Financial Management estimates of average household size based on the number of units within a building were combined with the City of Bothell's building and address layers to estimate the population on each address point. Address points that were likely residences were then intersected with the monitoring basins.



## Horse Creek Surface Water Management Area



**General and Physical Character.** The Horse Creek Surface Water Management Area encompasses 0.97 square miles and is 100% in City limits. The SWMA includes the downtown area in the west side of the city. General terrain is made up of moderate slopes from north to south.

Very severely erosive soils also classified on steep slopes (>40%) make up 6.48 percent of the SWMA. Compared to other SWMAs, 6.48 percent is the fifth highest.

**Land use and Development.** The prominent land use feature of this SWMA is residential with 63% of total parcel area with the second highest land use being commercial with 12% parcel area.

Thirty-two percent of the area is covered by impervious surfaces, making it one of the more developed SWMAs in the city. Of the impervious area, approximately one-fourth of the imperviousness is road surface.

**Natural Environment.** Horse Creek, the primary stream in the SWMA, flows for 3.3 miles from its headwaters at Lake Pleasant to its discharge point at the Sammamish River. Wetland and the associated buffers area is mapped as 9.88 percent of the basin.

The natural environment of Horse Creek is degraded. There are also two unnamed tributaries to horse creek entering on the East side of the stream. Though Horse Creek is not on Ecology's 303(d) list for water quality impairment, it is known to have low dissolved oxygen and high temperature. The benthic index of biotic integrity (B-IBI) score indicates extreme impairment and Horse Creek has the lowest B-IBI score among Bothell streams samples. Aquatic habitat diversity is also poor. The habitat, biological, and water quality data indicate Horse Creek is one of the most impaired water bodies in the city.

**Stormwater Infrastructure.** The amount of total conveyance (ditches, pipes, etc.) is 24.43 miles/square mile (23.7 miles total) with 1,018 total catch basins within the. The area has a significant number of detention pipes and bioswales relative to the impervious area in the western half of the SWMA. Residential areas to the east have inadequate stormwater conveyance capacity.

**Surface Water Management Strategies.** A large portion of this SWMA is redeveloping, but there is still significant area with older infrastructure. The majority of this area drains to the Sammamish River, so water quality treatment may be more important than flow control if conveyance systems are adequate.

**Possible efforts include:**

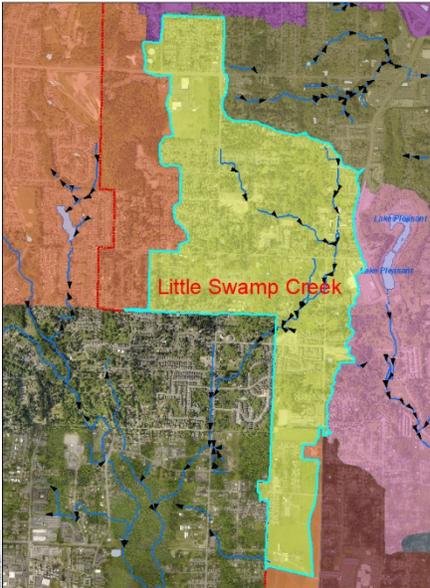
- Participating in design review of new systems as areas redevelop to address water quality
- Providing input into improved function of Horse Creek
- Assist the Capital group with downtown City street redevelopment
- IDDE focus on detecting possible cross-connections with sewer
- Outreach focus on IDDE, business operations, and protection of Horse Creek.

## Horse Creek SWMA Data Table

SWMA Statistics		Horse Creek
<b>Area</b>		
Total Area	sqmi	0.97
Bothell City Portion	sqmi	0.97
Bothell City Portion	%	100.00
<b>Land Use</b>		
Single Family Residential	%	58.35
Multi-Family Residential	%	4.93
<b>Total Residential</b>	<b>%</b>	<b>63.27</b>
High Use Commercial	%	1.25
General Use Commercial	%	10.98
Industrial	%	0.00
<b>Total Commercial</b>	<b>%</b>	<b>12.22</b>
Mixed Use (Residential and Commercial)	%	0.00
Active Use Parks	%	0.92
Passive Use Parks	%	2.38
<b>Total Parks and Open Space</b>	<b>%</b>	<b>3.30</b>
Natural Areas (Streams, wetlands, and buffers)	%	5.46
Undeveloped	%	2.73
Right-of-Way	%	12.99
<b>Land Cover</b>		
Impervious	%	32.40
Limited Access Roads	%	0.00
Arterial Roads	%	3.21
Local Roads	%	4.96
<b>Total Road Surface</b>	<b>%</b>	<b>8.18</b>
Tree Canopy	%	49.05
<b>Physical Geography</b>		
Very Severely Erosive Soils (Class V) on Slopes over 40%	%	6.48

<b>SWMA Statistics</b>		<b>Horse Creek</b>
<b>Natural Areas</b>		
Wetland Area	%	4.00
Wetland Area + Buffers	%	9.88
Rivers and Streams	mi/sqmi	3.44
<b>Storm Infrastructure</b>		
Pipes and Culverts	mi/sqmi	22.98
Ditches	mi/sqmi	0.93
Bioswales	mi/sqmi	0.25
Trenches	mi/sqmi	0.28
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>24.43</b>
Catch Basins	#/sqmi	1049.75
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	66.00
Detention Pipes	#/sqmi	68.06
Detention Ponds	#/sqmi	7.22
Vaults	#/sqmi	23.72
Filters	#/sqmi	7.22
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>106.21</b>
Pervious Pavement	#/sqmi	2.06
Bioretention	#/sqmi	3.09
Tree Boxes	#/sqmi	0.00
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>5.16</b>
<b>Population</b>		
Population Density	people/sqmi	4226.24

## Little Swamp Creek Surface Water Management Area



**General and Physical Character.** The Little Swamp Creek SWMA encompasses 1.68 square miles and a total of 59% (0.99 square miles) is in City limits.

Very severely erosive soils also classified on steep slopes (>40%) make up 0.08 percent of the SWMA. Compared to other SWMAs, 0.08 percent is the second lowest.

**Land Use and Development.** The prominent land use feature of this SWMA is residential with 64% of total parcel area with the second highest land use being commercial with 10% parcel area.

Thirty percent of the area is covered by impervious surfaces, making it one of the less developed SWMAs in the city. Of the impervious area, approximately one-fourth of the area is road surface (pollutant generating).

**Natural Environment.** The SWMA includes the upper reaches of Little Swamp Creek and smaller unnamed tributaries of Swamp Creek with a total combined length of 2.20 miles in City limits. Wetland and the associated buffers area is mapped as 6.48 percent of the basin.

Swamp Creek has high levels of fecal coliform bacteria and is on Ecology's 303(d) list for impaired water bodies. A Water Quality Improvement Report and Implementation Plan for Swamp Creek (Ecology) was produced in 2006 and includes actions each jurisdiction can take to reduce fecal coliform pollution. One possible source of bacteria is from the numerous septic systems in this area. Little Swamp Creek also has high in-stream temperatures and low dissolved oxygen during summer months failing to meet State Water Quality Standards.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 22.96 miles/square mile (22.73 miles total) with 885 total catch basins within the SWMA. The area has a limited number of flow control and water quality treatment facilities.

**Surface Water Management Strategies.** Since this mostly residential area drains out of the city to Swamp Creek, which is affected by high fecal coliform counts, management efforts focus on controlling water quality impacts due to septic systems, pet waste, and

animal attractants like waterfowl feeding. Management efforts will be coordinated with the City of Kenmore and other jurisdictions in the Swamp Creek basin.

**Possible efforts include:**

- Consider methods to reduce or eliminate impacts from septic systems, like possible regulations/enforcement, Local Improvement District, or other techniques
- IDDE might focus on sources of bacteria in this area
- Outreach might focus on septic system evaluation, maintenance, and conversion to sewer, pet waste management, and reducing concentrated waterfowl
- Inspections of drainage facilities in this area will be performed at the standard citywide baseline rate
- City Operations, including catch basin cleaning, street sweeping, vegetation control, and storm facility maintenance will be performed at the Utility's standard baseline rate.

## Little Swamp Creek SWMA Data Table

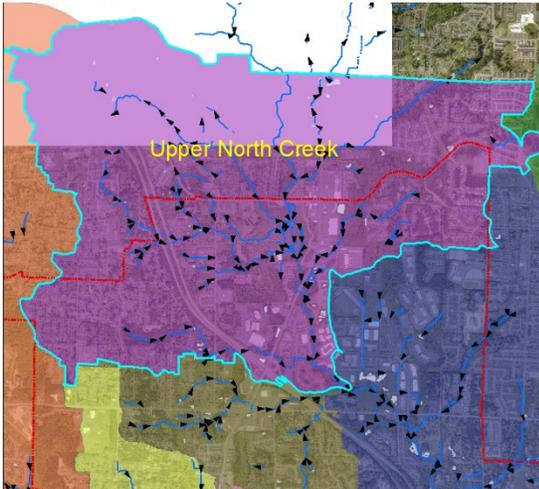
SWMA Statistics		Little Swamp Creek
<b>Area</b>		
Total Area	sqmi	1.68
Bothell City Portion	sqmi	0.99
Bothell City Portion	%	58.75
<b>Land Use</b>		
Single Family Residential	%	59.21
Multi-Family Residential	%	4.43
<b>Total Residential</b>	<b>%</b>	<b>63.64</b>
High Use Commercial	%	0.28
General Use Commercial	%	9.81
Industrial	%	0.00
<b>Total Commercial</b>	<b>%</b>	<b>10.10</b>
Mixed Use (Residential and Commercial)	%	0.00
Active Use Parks	%	1.28
Passive Use Parks	%	8.03
<b>Total Parks and Open Space</b>	<b>%</b>	<b>9.31</b>
Natural Areas (Streams, wetlands, and buffers)	%	3.28
Undeveloped	%	2.29
Right-of-Way	%	11.36
<b>Land Cover</b>		
Impervious	%	29.38
Limited Access Roads	%	0.00
Arterial Roads	%	2.00
Local Roads	%	5.33
<b>Total Road Surface</b>	<b>%</b>	<b>7.33</b>
Tree Canopy	%	39.93
<b>Physical Geography</b>		
Very Severely Erosive Soils (Class V) on Slopes over 40%	%	0.08

## SWMA Statistics

## Little Swamp Creek

<b>Natural Areas</b>		
Wetland Area	%	3.80
Wetland Area + Buffers	%	6.48
Rivers and Streams	mi/sqmi	2.23
<b>Storm Infrastructure</b>		
Pipes and Culverts	mi/sqmi	20.77
Ditches	mi/sqmi	1.62
Bioswales	mi/sqmi	0.14
Trenches	mi/sqmi	0.44
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>22.96</b>
Catch Basins	#/sqmi	894.74
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	44.59
Detention Pipes	#/sqmi	17.23
Detention Ponds	#/sqmi	9.12
Vaults	#/sqmi	24.32
Filters	#/sqmi	15.20
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>65.86</b>
Pervious Pavement	#/sqmi	0.00
Bioretention	#/sqmi	2.03
Tree Boxes	#/sqmi	0.00
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>2.03</b>
<b>Population</b>		
Population Density	people/sqmi	3495.50

## Upper North Creek Surface Water Management Area



**General and Physical Character.** The Upper North Creek Surface Water Management Area encompasses 3.28 square miles with a total of 59.7 percent (1.96 square miles) in City limits.

Very severely erosive soils also classified on steep slopes (>40%) make up 2.94 percent of the SWMA. Compared to other SWMAs, 2.94 percent is the fifth lowest.

**Land Use and Development.** The prominent land use feature of this SWMA is residential

with 41.8% of total parcel area with the second highest land use being commercial with 17.4% parcel area.

Thirty-three percent of the area is covered by impervious surfaces. Of the impervious area, approximately one-third of the area is road surface (pollutant generating).

**Natural Environment.** The SWMA includes the upper reaches of North Creek including a total combined length of 17.2 miles (5.2 miles/square mile). This SWMA includes Queensborough Creek, Filbert Creek, Royal Anne Creek, Crystal Creek, and many unnamed tributaries. Wetland and the associated buffers area is mapped as 23.19 percent of the basin.

Upper North Creek includes multiple sampling sites on North Creek and Queensborough Creek. In those sampling sites, temperature, dissolved oxygen, and fecal coliform fail to meet State Water Quality standards consistently. Queensborough Creek also has very poor stream insect scores according to B-IBI analysis.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 77.6 miles (23.65 miles/square mile) with 3,074 catch basins within the SWMA. The SWMA has 26 control structures per square mile and 136 water quality treatment facilities per square mile.

**Surface Water Management Strategies.** Since this mostly residential area drains to North Creek, which is affected by high fecal coliform counts, low B-IBI scores, high temperatures, and low dissolved oxygen management efforts should focus on controlling water quality impacts due to septic systems, pet waste, and animal attractants and protecting or restoring natural areas.

**Possible efforts include:**

- Consider methods to reduce or eliminate impacts from septic systems, like possible regulations/enforcement, Local Improvement District, or other techniques
- IDDE might focus on sources of bacteria in this area
- Outreach might focus on septic system evaluation, maintenance, and conversion to sewer, pet waste management, and reducing concentrated waterfowl
- Inspections of drainage facilities in this area will be performed at the standard citywide baseline rate
- City Operations, including catch basin cleaning, street sweeping, vegetation control, and storm facility maintenance will be performed at the Utility's standard baseline rate.

## Upper North Creek SWMA Data Table

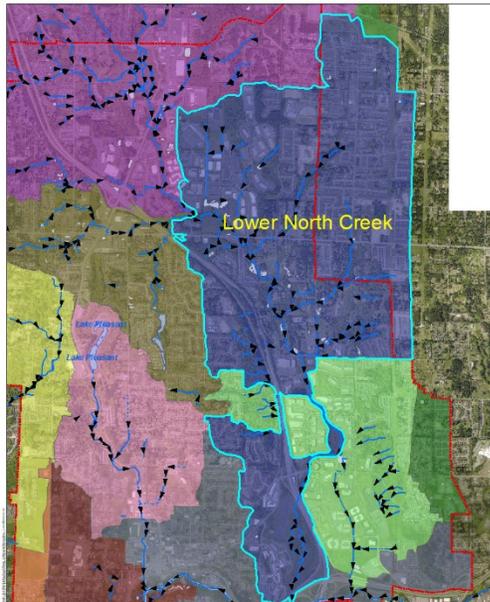
SWMA Statistics		Upper North Creek
<b>Area</b>		
Total Area	sqmi	3.28
Bothell City Portion	sqmi	1.96
Bothell City Portion	%	59.70
<b>Land Use</b>		
Single Family Residential	%	39.24
Multi-Family Residential	%	2.51
<b>Total Residential</b>	<b>%</b>	<b>41.76</b>
High Use Commercial	%	0.96
General Use Commercial	%	9.33
Industrial	%	7.06
<b>Total Commercial</b>	<b>%</b>	<b>17.36</b>
Mixed Use (Residential and Commercial)	%	0.00
Active Use Parks	%	0.00
Passive Use Parks	%	4.48
<b>Total Parks and Open Space</b>	<b>%</b>	<b>4.48</b>
Natural Areas (Streams, wetlands, and buffers)	%	14.79
Undeveloped	%	3.55
Right-of-Way	%	18.06
<b>Land Cover</b>		
Impervious	%	32.76
Limited Access Roads	%	2.11
Arterial Roads	%	3.21
Local Roads	%	4.70
<b>Total Road Surface</b>	<b>%</b>	<b>10.01</b>
Tree Canopy	%	48.12
<b>Physical Geography</b>		
Very Severely Erosive Soils (Class V) on Slopes over 40%	%	2.94

## SWMA Statistics

## Upper North Creek

<b>Natural Areas</b>		
Wetland Area	%	12.76
Wetland Area + Buffers	%	23.19
Rivers and Streams	mi/sqmi	5.20
<b>Storm Infrastructure</b>		
Pipes and Culverts	mi/sqmi	19.42
Ditches	mi/sqmi	3.71
Bioswales	mi/sqmi	0.33
Trenches	mi/sqmi	0.20
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>23.65</b>
Catch Basins	#/sqmi	937.31
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	26.06
Detention Pipes	#/sqmi	9.71
Detention Ponds	#/sqmi	16.87
Vaults	#/sqmi	17.38
Filters	#/sqmi	91.99
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>135.95</b>
Pervious Pavement	#/sqmi	0.51
Bioretention	#/sqmi	0.51
Tree Boxes	#/sqmi	2.56
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>3.58</b>
<b>Population</b>		
Population Density	people/sqmi	2734.05

## Lower North Creek Surface Water Management Area



**General and Physical Character.** The Lower North Creek SWMA makes up 3.64 square miles with 65.79 percent (2.40 square miles) within City limits.

Very severely erosive soils also classified on steep slopes (>40%) make up 2.53 percent of the SWMA. Compared to other SWMAs, 2.53 percent is the fourth lowest.

The City had a detailed study of this area performed in 2006, titled the North Creek Fish and Wildlife Critical Habitat Protection Area Study. This study delineated and assessed the importance of wetlands, streams, and other

critical areas and their contribution to the quality of cool groundwater inputs to North, Palm, and Woods/Cole Creeks.

**Land Use and Development.** The prominent land use feature of this SWMA is residential with 36.7% of total parcel area with the second highest land use being commercial with 26.6% parcel area.

Thirty-three percent of the area is covered by impervious surfaces. Of the impervious area, approximately one-fourth of the area is road surface (pollutant generating).

**Natural Environment.** The area includes two streams (Palm Creek and Woods/Cole Creek) and an area that drains directly to North Creek. The total stream length within the SWMA is 16.96 miles. Twenty-two percent of the SWMA is mapped as wetlands and associated buffers.

The City has assessed habitat and biologic conditions for Lower North Creek at Palm Creek and found it to have the least impaired biological community of all streams in the city, though the creeks are still severely to moderately impaired. All streams in the SWMA are known to have low dissolved oxygen levels and high temperatures and are on Ecology's 303(d) list for impaired water bodies for fecal coliform.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 107 miles (29.39 miles/square mile) with 4,009 catch basins within the SWMA. The SWMA has 26.7

control structures per square mile and 114.4 water quality treatment facilities per square mile.

**Surface Water Management Strategies.** This SWMA has some of the higher quality basins that support North Creek in Bothell. Staff has selected Lower North Creek as its SMAP high-priority basin. Surface Water efforts will focus on protecting and preserving stream buffers and enhancing stormwater controls to the relatively higher quality creeks in this area.

**Possible efforts include:**

- Address any flooding or fish passable issues
- Focus on protecting the area through development and restoration efforts in buffer areas
- Focus on monitoring of creeks frequently to assure early detection of issues
- Focus outreach on residential activities including pet waste, low impact development installation, and stream buffers and management
- Prioritize IDDE in this area to protect streams.

## Lower North Creek SWMA Data Table

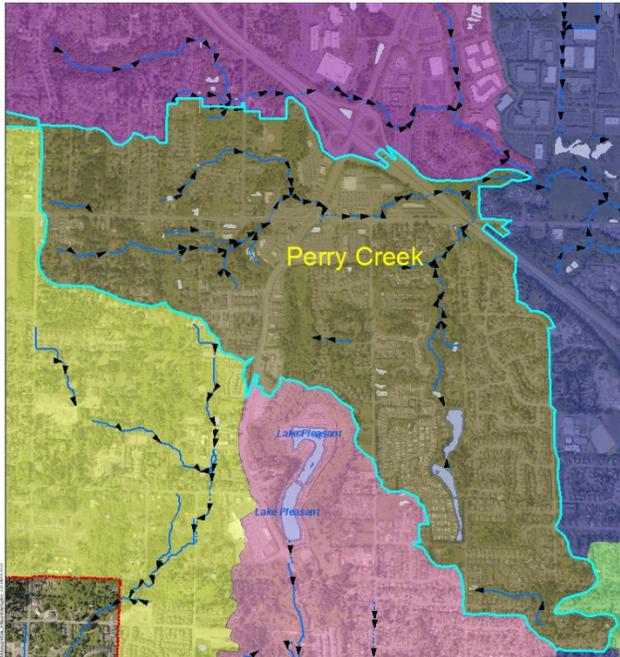
SWMA Statistics		Lower North Creek
<b>Area</b>		
Total Area	sqmi	3.64
Bothell City Portion	sqmi	2.40
Bothell City Portion	%	65.79
<b>Land Use</b>		
Single Family Residential	%	29.67
Multi-Family Residential	%	6.98
<b>Total Residential</b>	<b>%</b>	<b>36.65</b>
High Use Commercial	%	0.00
General Use Commercial	%	21.28
Industrial	%	5.32
<b>Total Commercial</b>	<b>%</b>	<b>26.60</b>
Mixed Use (Residential and Commercial)	%	0.23
Active Use Parks	%	0.00
Passive Use Parks	%	3.18
<b>Total Parks and Open Space</b>	<b>%</b>	<b>3.18</b>
Natural Areas (Streams, wetlands, and buffers)	%	16.13
Undeveloped	%	3.32
Right-of-Way	%	13.90
<b>Land Cover</b>		
Impervious	%	33.13
Limited Access Roads	%	3.16
Arterial Roads	%	1.99
Local Roads	%	3.66
<b>Total Road Surface</b>	<b>%</b>	<b>8.81</b>
Tree Canopy	%	46.53
<b>Physical Geography</b>		
Very Severely Erosive Soils (Class V) on Slopes over 40%	%	2.53

## SWMA Statistics

## Lower North Creek

<b>Natural Areas</b>		
Wetland Area	%	12.51
Wetland Area + Buffers	%	22.39
Rivers and Streams	mi/sqmi	4.66
<b>Storm Infrastructure</b>		
Pipes and Culverts	mi/sqmi	22.57
Ditches	mi/sqmi	5.80
Bioswales	mi/sqmi	0.49
Trenches	mi/sqmi	0.53
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>29.39</b>
Catch Basins	#/sqmi	1101.38
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	26.71
Detention Pipes	#/sqmi	9.60
Detention Ponds	#/sqmi	13.36
Vaults	#/sqmi	25.04
Filters	#/sqmi	66.36
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>114.35</b>
Pervious Pavement	#/sqmi	0.00
Bioretention	#/sqmi	1.25
Tree Boxes	#/sqmi	0.00
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>1.25</b>
<b>Population</b>		
Population Density	people/sqmi	2391.73

## Perry Creek Surface Water Management Area



**General and Physical Character.** The Perry Creek SWMA includes 1.10 square miles with 100 percent of the basin in City limits.

Very severely erosive soils also classified on steep slopes (>40%) make up 2.09 percent of the SWMA. Compared to other SWMAs, 2.09 percent is the third lowest.

**Land Use and Development.** The prominent land use feature of this SWMA is residential with 59% of total parcel area with the second highest land use being right-of-way with 17%

parcel area.

Thirty-nine percent of the area is covered by impervious surfaces. Of the impervious area, approximately one-fourth of the area is road surface (pollutant generating).

**Natural Environment.** The area includes Perry Creek, with several unnamed tributaries, and drains directly to North Creek. The total stream length within the SWMA is 4.4 miles. Approximately thirteen percent of the SWMA is mapped as wetlands and associated buffers.

The City has assessed habitat and biologic conditions for Perry Creek and found it to have poor to very poor biological quality. All streams in the SWMA are known to have low dissolved oxygen levels and high temperatures and are on Ecology's 303(d) list of impaired water bodies for fecal coliform. Of the sampling sites around the City, Perry Creek was also found to have higher than average turbidity.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 32 miles (29.17 miles/square mile) with 1,276 catch basins within the SWMA. The SWMA has 64.7 control structures per square mile and 186.7 water quality treatment facilities per square mile.

**Surface Water Management Strategies.** During its SMAP analysis, staff identified Perry Creek as a secondary-priority basin. This area contains a large public forested open space. Efforts focus on reducing erosion and protecting the open space through stormwater controls.

**Possible efforts include:**

- Evaluating the need for addition of stormwater flow and treatment controls
- Coordinate with WSDOT on stormwater efforts
- Monitor erosion related to stormwater runoff
- Focus outreach on awareness of existing upland forests and the value they provide.

## Perry Creek SWMA Data Table

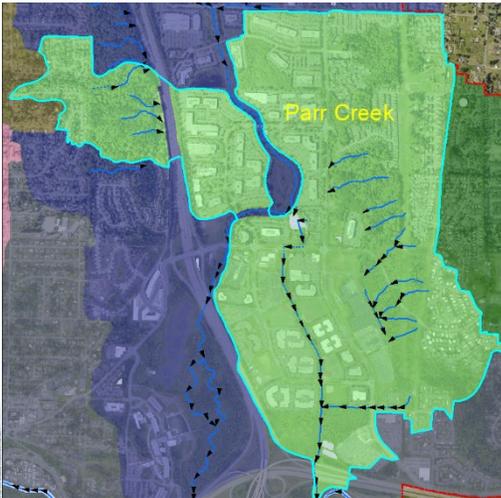
SWMA Statistics		Perry Creek
<b>Area</b>		
Total Area	sqmi	1.10
Bothell City Portion	sqmi	1.10
Bothell City Portion	%	100.00
<b>Land Use</b>		
Single Family Residential	%	55.64
Multi-Family Residential	%	3.77
<b>Total Residential</b>	<b>%</b>	<b>59.40</b>
High Use Commercial	%	3.67
General Use Commercial	%	6.35
Industrial	%	0.00
<b>Total Commercial</b>	<b>%</b>	<b>10.02</b>
Mixed Use (Residential and Commercial)	%	0.00
Active Use Parks	%	2.01
Passive Use Parks	%	0.11
<b>Total Parks and Open Space</b>	<b>%</b>	<b>2.12</b>
Natural Areas (Streams, wetlands, and buffers)	%	8.21
Undeveloped	%	2.83
Right-of-Way	%	17.41
<b>Land Cover</b>		
Impervious	%	39.02
Limited Access Roads	%	1.35
Arterial Roads	%	4.16
Local Roads	%	5.47
<b>Total Road Surface</b>	<b>%</b>	<b>10.98</b>
Tree Canopy	%	40.23
<b>Physical Geography</b>		
Very Severely Erosive Soils (Class V) on Slopes over 40%	%	2.09

## SWMA Statistics

Perry Creek

<b>Natural Areas</b>		
Wetland Area	%	8.02
Wetland Area + Buffers	%	13.18
Rivers and Streams	mi/sqmi	4.00
<b>Storm Infrastructure</b>		
Pipes and Culverts	mi/sqmi	24.84
Ditches	mi/sqmi	3.52
Bioswales	mi/sqmi	0.44
Trenches	mi/sqmi	0.36
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>29.17</b>
Catch Basins	#/sqmi	1160.45
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	64.67
Detention Pipes	#/sqmi	65.58
Detention Ponds	#/sqmi	20.95
Vaults	#/sqmi	29.15
Filters	#/sqmi	71.05
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>186.73</b>
Pervious Pavement	#/sqmi	0.00
Bioretention	#/sqmi	0.00
Tree Boxes	#/sqmi	0.91
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>0.91</b>
<b>Population</b>		
Population Density	people/sqmi	4021.44

## Parr Creek Surface Water Management Area



**General and Physical Character.** The Parr Creek Surface Water Management Area is 1.13 square miles with 99.7 percent of the basin in City limits.

Very severely erosive soils also classified on steep slopes (>40%) make up 7.26 percent of the SWMA. Compared to other SWMAs, 7.26 percent is the third highest.

**Land Use and Development.** The prominent land use feature of this SWMA is commercial with 43% of total parcel area with the second

highest land use being residential with 25.2% parcel area.

Forty-three percent of the area is covered by impervious surfaces. Of the impervious area, approximately one-fifth of the area is road surface (pollutant generating).

**Natural Environment.** The area includes Parr Creek and drains directly to North Creek. The total stream length within the SWMA is 3.7 miles. Approximately thirteen percent of the SWMA is mapped as wetlands and associated buffers.

The City has conducted ambient monitoring in the past for Parr Creek along with randomized sampling. In those sampling sites, temperature, dissolved oxygen, and fecal coliform fail to meet State Water Quality standards consistently. Parr Creek also has very poor stream insect scores according to B-IBI analysis. Of the sites sampled around the City, Parr Creek is more impaired than most other sites for temperature, dissolved oxygen, nutrients, fecal coliform, and stream insects.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 41.1 miles (36.4 miles/square mile) with 1,515 catch basins within the SWMA. The SWMA has 56.7 control structures per square mile and 83.3 water quality treatment facilities per square mile.

**Surface Water Management Strategies.** Efforts will focus on containing and restoring Parr Creek.

### Possible efforts include:

- Restore Parr Creek riparian area through invasive species removal and native plantings

- Maintain drainage systems to reduce flooding potential
- Address sediment transfer/erosion that impacts Parr Creek
- Focus IDDE efforts on business park activities that might be sources of spills or illicit connections
- Coordinate with WSDOT on stormwater efforts associated with I-405
- Outreach might focus on property maintenance, vehicle maintenance, and facility operations that might affect water quality. Habitat awareness for Parr Creek could be emphasized.
- Local Source Control – Determine Small Quantity Generators status for sites in the business park, possibly through a GIS assessment, and provide LSC to qualifying businesses.

## Parr Creek SWMA Data Table

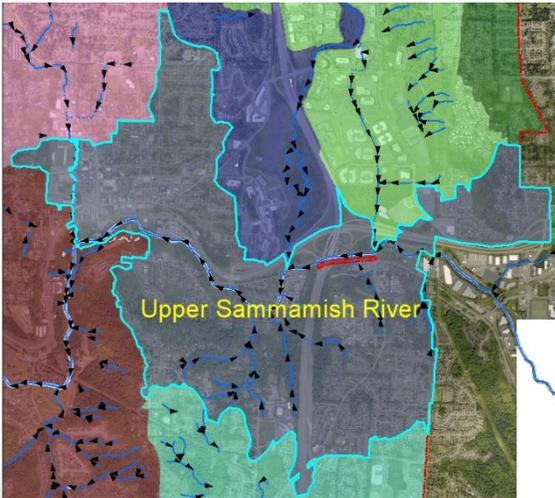
SWMA Statistics		Parr Creek
<b>Area</b>		
Total Area	sqmi	1.13
Bothell City Portion	sqmi	1.13
Bothell City Portion	%	99.65
<b>Land Use</b>		
Single Family Residential	%	19.29
Multi-Family Residential	%	5.86
<b>Total Residential</b>	<b>%</b>	<b>25.15</b>
High Use Commercial	%	0.00
General Use Commercial	%	37.30
Industrial	%	5.75
<b>Total Commercial</b>	<b>%</b>	<b>43.05</b>
Mixed Use (Residential and Commercial)	%	0.00
Active Use Parks	%	2.42
Passive Use Parks	%	7.60
<b>Total Parks and Open Space</b>	<b>%</b>	<b>10.01</b>
Natural Areas (Streams, wetlands, and buffers)	%	9.13
Undeveloped	%	1.14
Right-of-Way	%	11.50
<b>Land Cover</b>		
Impervious	%	42.50
Limited Access Roads	%	1.14
Arterial Roads	%	3.55
Local Roads	%	3.22
<b>Total Road Surface</b>	<b>%</b>	<b>7.91</b>
Tree Canopy	%	38.64
<b>Physical Geography</b>		
Very Severely Erosive Soils (Class V) on Slopes over 40%	%	7.26

## SWMA Statistics

Parr Creek

Natural Areas		
Wetland Area	%	5.52
Wetland Area + Buffers	%	12.89
Rivers and Streams	mi/sqmi	3.33
Storm Infrastructure		
Pipes and Culverts	mi/sqmi	31.72
Ditches	mi/sqmi	3.99
Bioswales	mi/sqmi	0.56
Trenches	mi/sqmi	0.13
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>36.40</b>
Catch Basins	#/sqmi	1340.95
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	56.68
Detention Pipes	#/sqmi	35.43
Detention Ponds	#/sqmi	11.51
Vaults	#/sqmi	13.29
Filters	#/sqmi	23.03
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>83.26</b>
Pervious Pavement	#/sqmi	0.00
Bioretention	#/sqmi	0.00
Tree Boxes	#/sqmi	0.00
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>0.00</b>
Population		
Population Density	people/sqmi	1974.07

## Upper Sammamish River Surface Water Management Area



**General and Physical Character.** The Upper Sammamish River Surface Water Management Area encompasses 1.96 square miles with 94.21 percent (1.85 square miles) within City limits. The area is characterized by numerous steep slopes and known landslides on the west, north, and east sides of Norway Hill.

Very severely erosive soils also classified on steep slopes (>40%) make up 8.93 percent of the SWMA. Compared to other SWMAs,

8.93 percent is the third highest.

**Land Use and Development.** The prominent land use feature of this SWMA is residential with 49.7% of total parcel area with the second highest land use being right-of-way with 23.3% parcel area.

Forty-one percent of the area is covered by impervious surfaces. Of the impervious area, approximately one-third of the area is road surface (pollutant generating).

**Natural Environment.** The area contains several unnamed tributaries and drains directly to the Sammamish River. The total stream length within the SWMA is 5.5 miles. Approximately two percent of the SWMA is mapped as wetlands and associated buffers.

The City has conducted ambient monitoring in the past for one tributary (BY-1). In those sampling sites, temperature and dissolved oxygen fail to meet State Water Quality standards consistently. Upper Sammamish River has not had historical monitoring for other parameters.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 67.86 miles (34.6 miles/square mile) with 2,878 catch basins within the SWMA. The SWMA has 46.6 control structures per square mile and 169.4 water quality treatment facilities per square mile.

**Surface Water Management Strategies.** During its SMAP analysis, staff identified Upper Sammamish River as a secondary-priority basin. Efforts focus on sediment issues caused by stormwater. WSDOT and upstream developers should be engaged to address downstream sediment problems. Roadway flooding should be reduced.

**Possible efforts include:**

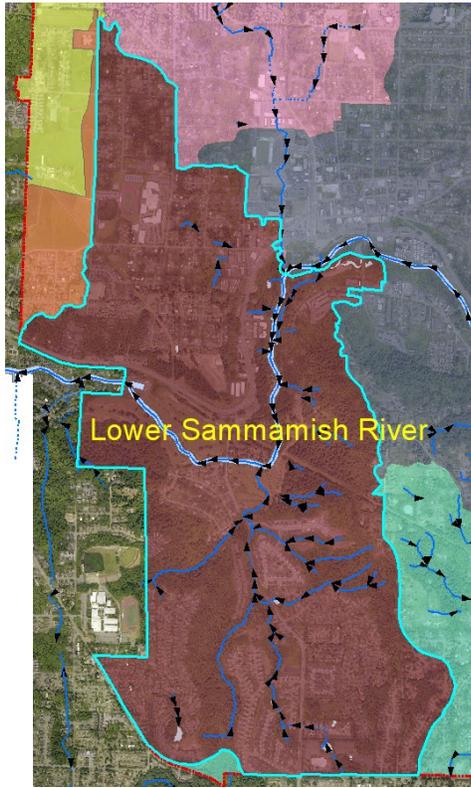
- Address sediment management with WSDOT and upstream properties
- Maintain storm system along East Riverside Drive to reduce flooding
- Outreach might focus on sediment and soils management, low impact development techniques appropriate for the area, and residential property management
- Inspections might be increased in the 160<sup>th</sup> area to address potential water quality impacts
- City Operations will continue to evaluate and improve or replace, if needed, its yard and decant facility on Brickyard Road
- Work with development review and Community Development to assess and develop, as needed, adequate stream protections on unstable hillsides

## Upper Sammamish River SWMA Data Table

SWMA Statistics		Upper Sammamish River
<b>Area</b>		
Total Area	sqmi	1.96
Bothell City Portion	sqmi	1.85
Bothell City Portion	%	94.21
<b>Land Use</b>		
Single Family Residential	%	37.48
Multi-Family Residential	%	12.18
<b>Total Residential</b>	<b>%</b>	<b>49.66</b>
High Use Commercial	%	0.86
General Use Commercial	%	10.80
Industrial	%	0.42
<b>Total Commercial</b>	<b>%</b>	<b>12.08</b>
Mixed Use (Residential and Commercial)	%	0.44
Active Use Parks	%	0.50
Passive Use Parks	%	8.52
<b>Total Parks and Open Space</b>	<b>%</b>	<b>9.02</b>
Natural Areas (Streams, wetlands, and buffers)	%	1.44
Undeveloped	%	4.03
Right-of-Way	%	23.32
<b>Land Cover</b>		
Impervious	%	40.68
Limited Access Roads	%	4.01
Arterial Roads	%	3.86
Local Roads	%	6.08
<b>Total Road Surface</b>	<b>%</b>	<b>13.95</b>
Tree Canopy	%	38.86
<b>Physical Geography</b>		

<b>SWMA Statistics</b>		<b>Upper Sammamish River</b>
<b>Very Severely Erosive Soils (Class V) on Slopes over 40%</b>	<b>%</b>	<b>8.93</b>
<b>Natural Areas</b>		
<b>Wetland Area</b>	<b>%</b>	<b>1.26</b>
<b>Wetland Area + Buffers</b>	<b>%</b>	<b>2.23</b>
<b>Rivers and Streams</b>	<b>mi/sqmi</b>	<b>2.81</b>
<b>Storm Infrastructure</b>		
<b>Pipes and Culverts</b>	<b>mi/sqmi</b>	<b>30.19</b>
<b>Ditches</b>	<b>mi/sqmi</b>	<b>3.41</b>
<b>Bioswales</b>	<b>mi/sqmi</b>	<b>0.71</b>
<b>Trenches</b>	<b>mi/sqmi</b>	<b>0.31</b>
<b><i>Total Conveyance</i></b>	<b><i>mi/sqmi</i></b>	<b><i>34.62</i></b>
<b>Catch Basins</b>	<b>#/sqmi</b>	<b>1468.56</b>
<b>Control Structures (some in vaults, detention ponds, etc.)</b>	<b>#/sqmi</b>	<b>46.55</b>
<b>Detention Pipes</b>	<b>#/sqmi</b>	<b>37.35</b>
<b>Detention Ponds</b>	<b>#/sqmi</b>	<b>9.20</b>
<b>Vaults</b>	<b>#/sqmi</b>	<b>30.31</b>
<b>Filters</b>	<b>#/sqmi</b>	<b>92.56</b>
<b><i>Total Number of Water Quality Treatment Facilities</i></b>	<b><i>#/sqmi</i></b>	<b><i>169.43</i></b>
<b>Pervious Pavement</b>	<b>#/sqmi</b>	<b>17.86</b>
<b>Bioretention</b>	<b>#/sqmi</b>	<b>9.74</b>
<b>Tree Boxes</b>	<b>#/sqmi</b>	<b>123.42</b>
<b><i>Total Number of LID Facilities</i></b>	<b><i>#/sqmi</i></b>	<b><i>151.02</i></b>
<b>Population</b>		
<b>Population Density</b>	<b>people/sqmi</b>	<b>5989.73</b>

## Lower Sammamish River Surface Water Management Area



**General and Physical.** The Lower Sammamish River Surface Water Management Area 2.08 square miles with 88.92 percent (1.85 square miles) within City limits. The area is characterized by numerous steep slopes and known landslides, but there are some moderately sloping areas to the south.

Very severely erosive soils also classified on steep slopes (>40%) make up 13.83 percent of the SWMA. Compared to other SWMAs, 13.83 percent is the highest.

**Land Use and Development.** The prominent land use feature of this SWMA is commercial with 49.7% of total parcel area with the second highest land use being right-of-way with 23.3% parcel area.

Forty-three percent of the area is covered by impervious surfaces. Of the impervious area, approximately one-fifth of the area is road surface (pollutant generating).

**Natural Environment.** Waynita Creek is the primary stream basin within the SWMA, with several unnamed tributaries, and includes approximately 8.34 miles of total stream length. The City has monitored the natural environment of Waynita Creek and found it to have one of the least impaired biological community of all streams in the city, though still considered in poor to very poor condition. Relative to other sites monitored around the City, Waynita Creek is less impaired for temperature, dissolved oxygen, stream insects, and fecal coliform. Waynita Creek does have relatively high turbidity when compared to other sites.

Approximately eight percent of the SWMA is covered by wetlands and associated buffers, most of which are in the Waynita Creek basin.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 56 miles (26.9 miles/square mile) with 2,181 catch basins within the SWMA. The SWMA has 40 control structures per square mile and 67.6 water quality treatment facilities per square mile.

**Surface Water Management Strategies.** Surface water efforts in this area will be focused on managing flow control for Waynita Creek and on working with the City and region in any efforts to preserve and protect the creek. Restoration of habitat and water quality features in the Sammamish River floodplain will also be pursued.

**Possible efforts include:**

- Evaluating the need for addition of stormwater flow and treatment controls
- Restore stream channel function and riparian habitat for salmon and water quality at the former Wayne Golf Course back nine.
- Monitor erosion related to stormwater runoff
- IDDE might be lower due to limited potential connections
- Outreach might focus on creek protection and sediment management, with new LID installation monitored and outreach provided to new property owners, and LID infiltration techniques will consider potential impacts on any landslide or liquefaction areas south of the Sammamish River
- Inspections will focus on working with property owners to develop proactive and effective facilities maintenance
- City Operations will focus on street sweeping and basin cleaning at a normal frequency
- Perform a sediment management plan in this area.

## Lower Sammamish River SWMA Data Table

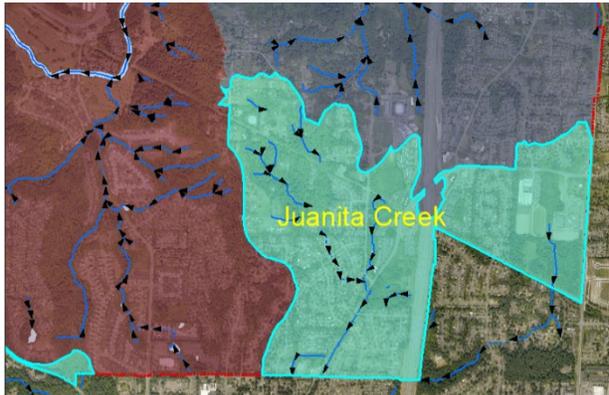
SWMA Statistics		Lower Sammamish River
<b>Area</b>		
Total Area	sqmi	2.08
Bothell City Portion	sqmi	1.85
Bothell City Portion	%	88.92
<b>Land Use</b>		
Single Family Residential	%	36.37
Multi-Family Residential	%	8.45
<b>Total Residential</b>	<b>%</b>	<b>44.81</b>
High Use Commercial	%	0.00
General Use Commercial	%	7.34
Industrial	%	0.00
<b>Total Commercial</b>	<b>%</b>	<b>7.34</b>
Mixed Use (Residential and Commercial)	%	0.00
Active Use Parks	%	1.05
Passive Use Parks	%	16.80
<b>Total Parks and Open Space</b>	<b>%</b>	<b>17.85</b>
Natural Areas (Streams, wetlands, and buffers)	%	13.00
Undeveloped	%	5.05
Right-of-Way	%	11.94
<b>Land Cover</b>		
Impervious	%	28.39
Limited Access Roads	%	0.00
Arterial Roads	%	2.39
Local Roads	%	4.96
<b>Total Road Surface</b>	<b>%</b>	<b>7.35</b>
Tree Canopy	%	52.35
<b>Physical Geography</b>		

## SWMA Statistics

### Lower Sammamish River

Very Severely Erosive Soils (Class V) on Slopes over 40%	%	13.83
<b>Natural Areas</b>		
Wetland Area	%	3.07
Wetland Area + Buffers	%	7.96
Rivers and Streams	mi/sqmi	4.01
<b>Storm Infrastructure</b>		
Pipes and Culverts	mi/sqmi	24.01
Ditches	mi/sqmi	2.31
Bioswales	mi/sqmi	0.39
Trenches	mi/sqmi	0.19
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>26.90</b>
Catch Basins	#/sqmi	1048.54
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	40.00
Detention Pipes	#/sqmi	22.16
Detention Ponds	#/sqmi	10.27
Vaults	#/sqmi	17.84
Filters	#/sqmi	17.30
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>67.56</b>
Pervious Pavement	#/sqmi	1.62
Bioretention	#/sqmi	13.51
Tree Boxes	#/sqmi	7.57
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>22.70</b>
<b>Population</b>		
Population Density	people/sqmi	3783.33

## Juanita Creek Surface Water Management Area



**General and Physical Character.** The Juanita Creek Surface Water Management Area is 6.67 square miles with 11.22 percent (0.75 square miles) within City limits. The SWMA is situated in the southeastern corner of the city and terrain slopes generally from east to west. The SWMA is divided roughly into thirds by I-405 (running from north to

south) and the Tolt Pipeline Trail (running from northwest to southeast). The entire watershed drains to Juanita Creek to the south in the city of Kirkland, and ultimately to Lake Washington.

Very severely erosive soils also classified on steep slopes (>40%) make up 4.02 percent of the SWMA. Compared to other SWMAs, 4.02 percent is the fifth highest.

**Land Use and Development.** The prominent land use feature of this SWMA is residential with 52% of total parcel area with the second highest land use being right of way with 17.3% parcel area.

Thirty-four percent of the area is covered by impervious surfaces. Of the impervious area, approximately one-third of the area is road surface (pollutant generating).

**Natural Environment.** The area contains several unnamed tributaries and drains directly to Juanita Creek to the south of the City limits. The total stream length within the SWMA is 23.5 miles with a majority of the streams outside City limits. Approximately twelve percent of the SWMA is mapped as wetlands and associated buffers.

The Juanita Creek SWMA has not had historical monitoring.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 148.2 miles (22.22 miles/square mile) with 6,495 catch basins within the SWMA. The SWMA has 45.4 control structures per square mile and 70.8 water quality treatment facilities per square mile. Most stormwater infrastructure for the SWMA is south of City limits.

**Surface Water Management Strategies.** Storm and surface water efforts in this area will be coordinated with the City of Kirkland to assist with addressing basin issues for Juanita Creek.

**Possible efforts include:**

- Focus on ongoing sediment issues
- Coordinate with WSDOT on stormwater efforts
- Inspections of drainage facilities in this area will be performed at the standard citywide baseline rate
- City Operations, including catch basin cleaning, street sweeping, vegetation control, and storm facility maintenance will be performed at the Utility's standard baseline rate
- Outreach and education will focus on youth education programs, residential practices, and multifamily hazardous waste use, handling, and storage.

## Juanita Creek SWMA Data Table

<b>SWMA Statistics</b>		<b>Juanita Creek</b>
<b>Area</b>		
<b>Total Area</b>	<b>sqmi</b>	6.67
<b>Bothell City Portion</b>	<b>sqmi</b>	0.75
<b>Bothell City Portion</b>	<b>%</b>	11.22
<b>Land Use</b>		
<b>Single Family Residential</b>	<b>%</b>	42.61
<b>Multi-Family Residential</b>	<b>%</b>	9.41
<b><i>Total Residential</i></b>	<b>%</b>	<b>52.02</b>
<b>High Use Commercial</b>	<b>%</b>	1.55
<b>General Use Commercial</b>	<b>%</b>	10.21
<b>Industrial</b>	<b>%</b>	0.00
<b><i>Total Commercial</i></b>	<b>%</b>	<b>11.76</b>
<b>Mixed Use (Residential and Commercial)</b>	<b>%</b>	0.00
<b>Active Use Parks</b>	<b>%</b>	0.00
<b>Passive Use Parks</b>	<b>%</b>	10.09
<b><i>Total Parks and Open Space</i></b>	<b>%</b>	<b>10.09</b>
<b>Natural Areas (Streams, wetlands, and buffers)</b>	<b>%</b>	7.16
<b>Undeveloped</b>	<b>%</b>	1.66
<b>Right-of-Way</b>	<b>%</b>	17.32
<b>Land Cover</b>		
<b>Impervious</b>	<b>%</b>	34.18
<b>Limited Access Roads</b>	<b>%</b>	3.10
<b>Arterial Roads</b>	<b>%</b>	2.34
<b>Local Roads</b>	<b>%</b>	6.69
<b><i>Total Road Surface</i></b>	<b>%</b>	<b>12.13</b>
<b>Tree Canopy</b>	<b>%</b>	47.71
<b>Physical Geography</b>		
<b>Very Severely Erosive Soils (Class V) on Slopes over 40%</b>	<b>%</b>	4.02

<b>SWMA Statistics</b>		<b>Juanita Creek</b>
<b>Natural Areas</b>		
Wetland Area	%	6.65
Wetland Area + Buffers	%	12.37
Rivers and Streams	mi/sqmi	3.53
<b>Storm Infrastructure</b>		
Pipes and Culverts	mi/sqmi	17.77
Ditches	mi/sqmi	3.32
Bioswales	mi/sqmi	0.98
Trenches	mi/sqmi	0.15
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>22.22</b>
Catch Basins	#/sqmi	973.84
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	45.42
Detention Pipes	#/sqmi	30.72
Detention Ponds	#/sqmi	16.03
Vaults	#/sqmi	14.69
Filters	#/sqmi	9.35
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>70.80</b>
Pervious Pavement	#/sqmi	1.34
Bioretention	#/sqmi	0.00
Tree Boxes	#/sqmi	0.00
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>1.34</b>
<b>Population</b>		
Population Density	people/sqmi	4213.45

## Little Bear Creek Surface Water Management Area



**General and Physical Character.** The Little Bear Creek Surface Water Management Area encompasses 0.72 square miles with 27.92 percent (0.20 square miles) of the SWMA within City limits. The SWMA is located on the east side of the city, and comprises only one percent of the total Little Bear Creek watershed.

Very severely erosive soils also classified on steep slopes (>40%) make up 0 percent of the SWMA. Compared to other SWMAs, 0 percent is the lowest.

**Land Use and Development.** The prominent land use feature of this SWMA is residential with 56.8% of total parcel area with the second highest land use being right of way with 19.2% parcel area.

Fifty percent of the area is covered by impervious surfaces. Of the impervious area, approximately one-fourth of the area is road surface (pollutant generating).

**Natural Environment.** The SWMA does not include any mapped stream channels but drains to Little Bear Creek.

Little Bear Creek has high levels of fecal coliform bacteria and is on Ecology's 303(d) list for impaired water bodies. A Water Cleanup Plan for Little Bear Creek (Ecology) was produced in 2005 and includes actions for the City of Woodinville and Snohomish County, but does not address Bothell, likely because the city represents such a small percentage of the Little Bear Creek drainage basin.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 18.69 miles (25.96 miles/square mile) with 1,076 catch basins within the SWMA. The SWMA has 59.8 control structures per square mile and 69.8 water quality treatment facilities per square mile. Most stormwater infrastructure for the SWMA is outside of City limits.

**Surface Water Management Strategies.** This small area drains away from the city toward Little Bear Creek. Snohomish County is leading a watershed planning area for its portion of Little Bear Creek. The City will follow and inform this planning effort.

**Possible efforts include:**

- Assist Snohomish County with watershed planning efforts and consider actions identified in the completed plan
- Outreach will include standard residential property management issues and information to property owners about the County's planning efforts
- Inspections of drainage facilities in this area will be performed at the standard citywide baseline rate
- City Operations, including catch basin cleaning, street sweeping, vegetation control, and storm facility maintenance will be performed at the Utility's standard baseline rate.

## Little Bear Creek SWMA Data Table

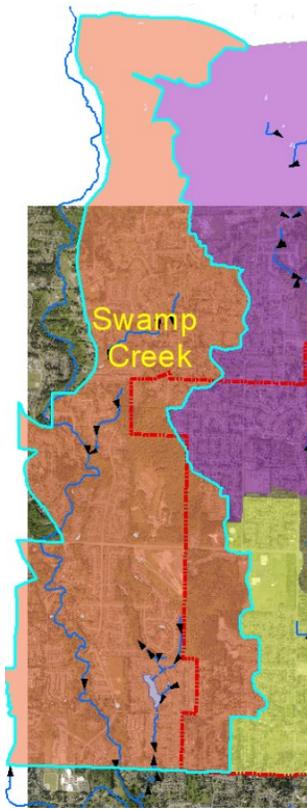
SWMA Statistics		Little Bear Creek
<b>Area</b>		
Total Area	sqmi	0.72
Bothell City Portion	sqmi	0.20
Bothell City Portion	%	27.92
<b>Land Use</b>		
Single Family Residential	%	56.77
Multi-Family Residential	%	0.00
<b>Total Residential</b>	<b>%</b>	<b>56.77</b>
High Use Commercial	%	0.00
General Use Commercial	%	9.56
Industrial	%	0.00
<b>Total Commercial</b>	<b>%</b>	<b>9.56</b>
Mixed Use (Residential and Commercial)	%	0.00
Active Use Parks	%	3.32
Passive Use Parks	%	9.02
<b>Total Parks and Open Space</b>	<b>%</b>	<b>12.35</b>
Natural Areas (Streams, wetlands, and buffers)	%	0.00
Undeveloped	%	2.06
Right-of-Way	%	19.24
<b>Land Cover</b>		
Impervious	%	49.87
Limited Access Roads	%	0.00
Arterial Roads	%	3.97
Local Roads	%	9.27
<b>Total Road Surface</b>	<b>%</b>	<b>13.24</b>
Tree Canopy	%	26.95
<b>Physical Geography</b>		
Very Severely Erosive Soils (Class V) on Slopes over 40%	%	0.00

## SWMA Statistics

## Little Bear Creek

<b>Natural Areas</b>		
Wetland Area	%	0.00
Wetland Area + Buffers	%	0.00
Rivers and Streams	mi/sqmi	0.00
<b>Storm Infrastructure</b>		
Pipes and Culverts	mi/sqmi	25.21
Ditches	mi/sqmi	0.74
Bioswales	mi/sqmi	0.00
Trenches	mi/sqmi	0.00
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>25.96</b>
Catch Basins	#/sqmi	1495.14
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	59.81
Detention Pipes	#/sqmi	29.90
Detention Ponds	#/sqmi	14.95
Vaults	#/sqmi	19.94
Filters	#/sqmi	4.98
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>69.77</b>
Pervious Pavement	#/sqmi	0.00
Bioretention	#/sqmi	0.00
Tree Boxes	#/sqmi	0.00
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>0.00</b>
<b>Population</b>		
Population Density	people/sqmi	6520.07

## Swamp Creek Surface Water Management Area



**General and Physical Character.** The Swamp Creek Surface Water Management Area encompasses 1.37 square miles with 36.1 percent (0.50 square miles) within City limits.

Very severely erosive soils also classified on steep slopes (>40%) make up 11.22 percent of the SWMA. Compared to other SWMAs, 11.22 percent is the second highest.

**Land Use and Development.** The prominent land use feature of this SWMA is residential with 46.5% of total parcel area with the second highest land use being parks and open space with 21.7% parcel area.

Approximately twenty-four percent of the area is covered by impervious surfaces. Of the impervious area, approximately one-fifth of the area is road surface (pollutant generating).

**Natural Environment.** The area contains several unnamed tributaries and drains directly to Swamp Creek to the West of the City limits. The SWMA has no stream channels in City limits.

**Stormwater Infrastructure.** The amount of total stormwater conveyance is 21.14 miles (15.43 miles/square mile) with 867 catch basins within the SWMA. The SWMA has 28.2 control structures per square mile and 38.3 water quality treatment facilities per square mile. Most stormwater infrastructure for the SWMA is outside of City limits.

**Surface Water Management Strategies.** This small area drains away from the city toward Swamp Creek. Other jurisdictions are leading a watershed planning effort for this area. The City will participate and inform their planning effort.

### **Possible efforts include:**

- Assist other jurisdictions with watershed planning efforts and consider actions identified in the completed plan
- Outreach will include standard residential property management issues and information to property owners about planning efforts
- Inspections of drainage facilities in this area will be performed at the standard citywide baseline rate

- City Operations, including catch basin cleaning, street sweeping, vegetation control, and storm facility maintenance will be performed at the Utility's standard baseline rate.

## Swamp Creek SWMA Data Table

SWMA Statistics		Swamp Creek
<b>Area</b>		
Total Area	sqmi	1.37
Bothell City Portion	sqmi	0.50
Bothell City Portion	%	36.10
<b>Land Use</b>		
Single Family Residential	%	46.45
Multi-Family Residential	%	0.00
<i>Total Residential</i>	%	<b>46.45</b>
High Use Commercial	%	0.00
General Use Commercial	%	11.82
Industrial	%	0.00
<i>Total Commercial</i>	%	<b>11.82</b>
Mixed Use (Residential and Commercial)	%	0.00
Active Use Parks	%	0.17
Passive Use Parks	%	21.56
<i>Total Parks and Open Space</i>	%	<b>21.73</b>
Natural Areas (Streams, wetlands, and buffers)	%	0.04
Undeveloped	%	8.41
Right-of-Way	%	11.53
<b>Land Cover</b>		
Impervious	%	24.49
Limited Access Roads	%	0.00
Arterial Roads	%	1.12
Local Roads	%	4.85
<i>Total Road Surface</i>	%	<b>5.97</b>
Tree Canopy	%	47.97
<b>Physical Geography</b>		
Very Severely Erosive Soils (Class V) on Slopes over 40%	%	11.22

## SWMA Statistics

Swamp Creek

Natural Areas		
Wetland Area	%	0.30
Wetland Area + Buffers	%	0.30
Rivers and Streams	mi/sqmi	0.00
Storm Infrastructure		
Pipes and Culverts	mi/sqmi	12.76
Ditches	mi/sqmi	2.53
Bioswales	mi/sqmi	0.11
Trenches	mi/sqmi	0.02
<b>Total Conveyance</b>	<b>mi/sqmi</b>	<b>15.43</b>
Catch Basins	#/sqmi	632.74
Control Structures (some in vaults, detention ponds, etc.)	#/sqmi	28.21
Detention Pipes	#/sqmi	12.09
Detention Ponds	#/sqmi	10.08
Vaults	#/sqmi	8.06
Filters	#/sqmi	8.06
<b>Total Number of Water Quality Treatment Facilities</b>	<b>#/sqmi</b>	<b>38.29</b>
Pervious Pavement	#/sqmi	0.00
Bioretention	#/sqmi	0.00
Tree Boxes	#/sqmi	0.00
<b>Total Number of LID Facilities</b>	<b>#/sqmi</b>	<b>0.00</b>
Population		
Population Density	people/sqmi	2856.77

For additional information City of Bothell's GIS data, please contact our GIS Division at [www.bothellwa.gov/maps](http://www.bothellwa.gov/maps).

# Section 4: Financial Management

## Section 4: Financial Management

### Financial Overview

This limited financial program review for the Plan Update focuses on the following:

- **An overview of the Utility's projected expenses and revenues**
- **Rate Path**
- **Financial Policies**
- **Financial Performance Expectations**

### Expenses

The Bothell Storm and Surface Water Utility funds most of the Utility's day-to-day storm and surface water activities as well as projects that support the built and natural storm and surface water systems. In addition to paying for operations and projects, the Utility pays back the cost of loans and bonds that are used to finance projects not appropriately funded by cash.

Like other City utilities, Storm and Surface Water pays excise tax.

In addition to paying for operations and projects, the Utility funds replacement of worn-out storm infrastructure. These funds are tracked as depreciation expenses and are currently added back into the Utility's year-end cash balance if they are not used to replace depreciated infrastructure.

### Revenues

**Rates:** The primary source of funds for the Utility come from rate payers, who pay an annual fee based on the extent that their property is developed. These revenues first go to annual operating expenses, taxes and debt repayment. Any rate revenues that exceed these annual expenses are available to fund projects. In 2019, the Utility collected \$5,380,995 in rate revenue. By 2021, based on assumed rate increases and growth, rate revenues are expected to be about \$5.34 million.

**Capital Facilities Charges:** In addition to rate revenue, the Utility collects stormwater capital facilities charges for new development to connect to the Utility storm drain system. Capital facilities charges are one-time revenues that are highly dependent on the market activity that affects development. These one-time revenues must be used only to fund capital projects that typically add system capacity necessary to accommodate growth and correct deficiencies.

Two facilities charges were established in 2011 – a citywide charge and a Downtown sub-basin charge. These charges fund a stormwater capital improvement fund. In 2019, the Utility collected \$381,146 in citywide charges and \$205,861 in Downtown sub-basin charges.

**Loans and Bonds:** When necessary to provide cash for large projects and to be fair to current and future rate payers, the Utility accesses loans or seeks revenue bond funds to finance projects. The cost of projects financed through these sources is then repaid by the Utility over time through its debt repayment expense. The Public Works Trust Fund administered by the State Public Works Board has been a past source of project financing for the Utility.

**Grants:** Grants are sought by the Utility to the extent practical to partially fund projects and programs. These grants may come from federal or state agencies such as the Environmental Protection Agency, Federal Emergency Management Agency, or State Department of Ecology (Ecology). The Utility also accesses grants from county districts like the King Conservation District and King County Flood Control District. In 2019, the Utility received \$118,673 in grant funds from Ecology and FEMA for local programs. It received \$32,176 from the King County Flood District.

**Other:** A small amount of funding is collected each year by the Utility for permits and fees. In 2019, this amounted to \$18,559. The City also received legal judgement and settlement funds in the amount of \$729,044.

## Rate Path

**1995-2007:** Beginning on January 1, 1995, the Utility imposed charges on all developed property in the city based on the extent that the property is covered by impervious surface. Since 1995, the rates have been subject to annual review by the City to assure that the revenue they generate is adequate to meet the Utility's needs. For the first 11 years, rates increased moderately.

**2008-2013:** In 2008, a significant (42%) rate increase was enacted to allow the Utility to meet new requirements under the federal Clean Water Act NPDES program. Rates were steady from 2008 until 2011, when a thorough rate analysis was performed. The 2011 rate analysis included development of a rate model that looked at operations and capital needs through 2018. The analysis recommended substantial increases in 2012 (15%) and 2013 (13.74%). Rates were raised by 8% in 2012 and 15% in 2013.

Addition of capital facilities charges in 2012 offset some of the need to use rate revenues to fund the Utility's capital needs. Since 2013, the Utility has only experienced periodic moderate increases as needed to remain solvent.

Two significant changes that reduced the projected need for rate increases include:

- *Billing Corrections:* In 2013, Utility staff reviewed impervious surface calculations for all customer bills and corrected inaccuracies for some properties. This is now conducted annually to ensure properties are calculated as development changes.
- *Elimination of Credits for Maintenance:* In 2014, the Utility eliminated reductions against rate charges for non-single family properties that maintain their stormwater detention facilities.

**Reduction in Revenue:** The City currently bills the City Street Fund in order to bill the Washington State Department of Transportation (WSDOT) for their impacts on the City related to the pollution, congestion, and maintenance from limited access highways including I-405 and portions of SR522. In 2019, Bill 5505 amended RCW 90.03.525 which gives local municipalities the ability to charge stormwater fees to WSDOT for state highway stormwater impacts.

Amendments to the RCW in the Bill included:

- Funding must be used directly for state highway runoff impacts.
- The City must develop a plan for each calendar year of expenditures and have this approved by WSDOT by December 31<sup>st</sup> of the prior year.
- The City must provide a progress report for the charges from the previous year and no charges will be paid until the plan and report have been submitted and approved by WSDOT.

State highways contribute a significant amount of increased runoff to our stormwater system, which contributes to our costs for basin planning, drainage facility construction and maintenance, spill response, staffing and equipment needs, and state/federal program requirements to reduce and eliminate pollution under the Clean Water Act.

These amendments require an additional level of work and reporting which must be approved, and delay payment of stormwater fees to the following year which impact City budget and the ability to complete necessary work in a timely manner. WSDOT has still not approved costs from the plan submitted in 2019 because they would like to see more proof to show direct impacts from the limited access highways.

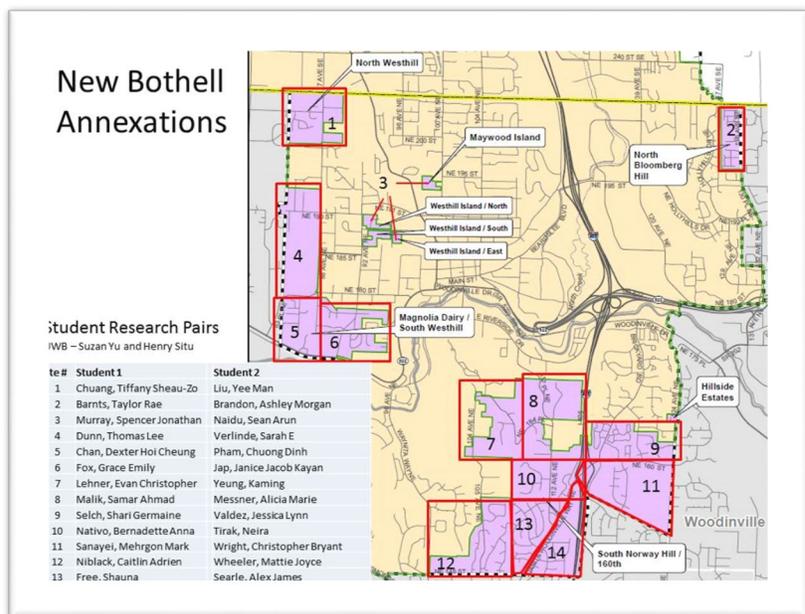
Staff are reviewing these impacts by drainage basin to determine whether this should continue in the future. The Utility received \$184,583 from WSDOT and \$465,830 from the City Street Fund in 2019.

### WSDOT Analysis

As part of the City’s overall stormwater management program, the City collects approximately \$190,000 per year in stormwater fees from WSDOT to specifically mitigate runoff from state highways I-405, SR 522, and SR 527 where WSDOT infrastructure drains to the City’s storm drain system. Evaluating the impacts and potential mitigation of this WSDOT drainage is outside of the scope of the Master Plan update. Therefore, the City is conducting a separate assessment of the impact of WSDOT runoff on stormwater assets and evaluating potential mitigation needs and opportunities. This work will include estimating the general share of WSDOT stormwater runoff contribution to the city’s receiving waters, identifying potential impacts to the City’s assets, and evaluating and mapping potential opportunities for mitigation in each Bothell watershed that receives runoff from state highways.

**Annexation:** On February 28, 2014, Bothell annexed 1,005 acres from unincorporated King County. The annexations increased the service area of the Utility and increased the rate revenues by about \$400,000 per year for the Utility.

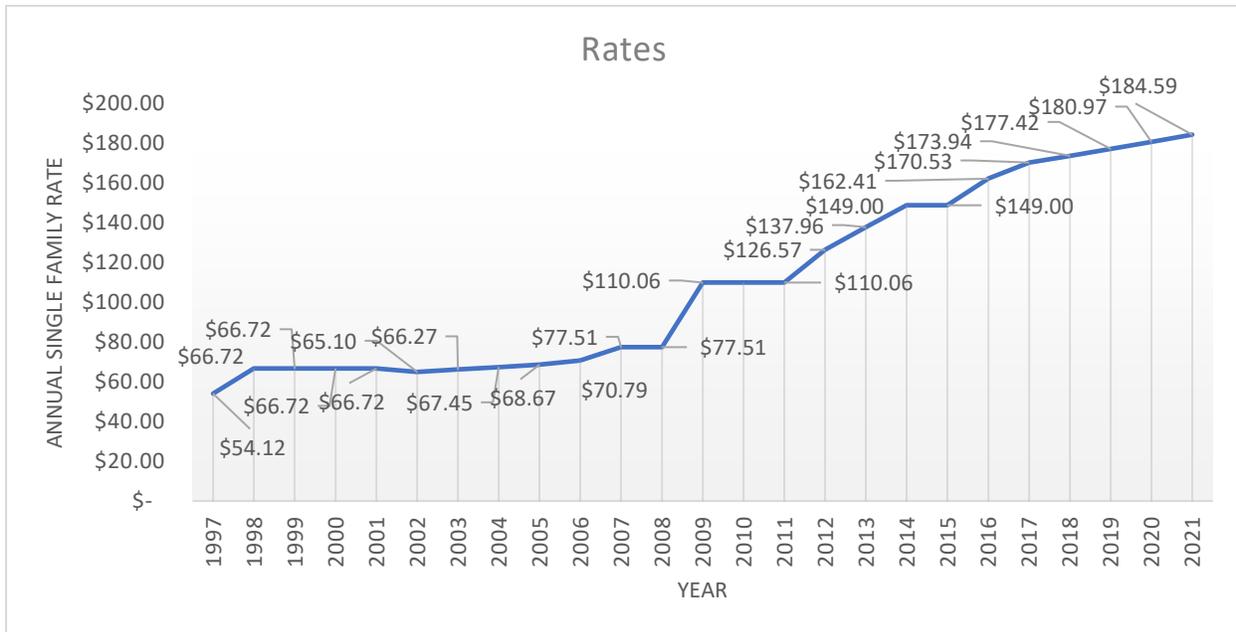
Internal review by Utility staff before and after the annexations indicate that the effects of the annexations were rate-neutral if no significant capital spending is needed in the annexed areas.



**Projected Rates 2021 – 2025:** The Utility is projecting an increase in rates for 2021. The projected rates assume that the Utility’s rate base will increase to compensate for additional internal charges. No annexations or other significant rate base additions are assumed in the rate projections. A full rate study is needed in 2021 to determine whether funding is sufficient to remain solvent into the future.

Other assumptions in the projected rate path for 2021-2025 might include:

- Salary costs increases
- Personnel benefits costs
- Service costs
- Operations costs for equipment and supplies
- Operations costs to accommodate system expansion



Class	Impervious Surface %	2020 Rate
Residential	N/A	\$180.03 per acre/year
Very Light	>0% to <10%	\$180.03 per acre/year
Light	10% to <20%	\$419.97 per acre/year
Moderate	20% to <45%	\$871.14 per acre/year
Moderate Heavy	45% to <65%	\$1,682.46 per acre/year
Heavy	65% to <85%	\$2,132.31 per acre/year
Very Heavy	85% to 100%	\$2,795.39 per acre/year
City Streets	N/A	Set in accordance with RCW <a href="#">90.03.525</a>
State Highways	N/A	Set in accordance with RCW <a href="#">90.03.525</a>
Undeveloped	0%	Exempt

## Financial Policies

The Utility's rates are controlled by fiscal policies that identify its financial needs. These policies help the Utility establish funding levels and manage uncertainty in cash flow, project costs, and potential revenue shortfalls.

**Revenue Requirements:** The Utility recommends rates to the City Council to assure that it remains self-sufficient. Its expenditures are controlled through the City's biennial budget, which currently covers 2019-2020. Revenue requirements are generally recommended by Utility staff to assure that the Utility maintains an adequate cash balance to cover its ongoing and project expenses. The Utility also assures that it has cash reserved to address fluctuations in customer bill payment, emergencies, unforeseen costs and long-term asset replacement needs. In 2019, the Utility's reserves totaled about \$1.4 million.

**Rates:** Each year, the Utility is obligated to present information to the City Council so that it may review the charges for sufficiency.

Bothell Municipal Code 18.10.110 D: Annual Review of Schedule. The city council will review the surface water management service charges annually to ensure the long-term fiscal viability of the program and to guarantee that debt covenants are met. The program shall use equitable and efficient methods to determine service charges.

The last rate review by City Council was on October 15, 2019. A three percent increase to the prior rates was recommended at that time.

**Reserves:** The following fiscal policies relating to reserves are included in the City's Capital Facilities Program and Comprehensive Financial Management Policies.

**Operating Reserve:** The Utility reserves cash to meet the short-term payment needs such as payroll. Because the Utility currently collects its primary revenues from rates through Snohomish and King County property tax billings, there is a considerable lag in receipt of these rate revenues throughout the year. To cover its cash operating needs, the Utility maintains a reserve of 120 days or 32 percent of annual budgeted operating expenditures. In 2019 this amounted to \$1,405,149.

**Capital Emergency Reserve:** The capital fund includes the balances from two accounts, the capital contingency reserve and the capital reserve. A capital emergency reserve is an amount of cash set aside for emergencies, should a piece of equipment or a portion of the Utility's infrastructure fail unexpectedly. The Capital Emergency Reserve is set at two percent of the value of the Utility's infrastructure and was \$349,722 in 2019.

**Capital Reserve:** In addition to the capital emergency reserve, the capital reserve is intended to provide an extra buffer for capital project cost overruns. For the Utility, the minimum target capital reserve fund balance is set at 10% of the two-year average capital cost (average between current year and the following year). In 2019, the capital reserve was \$321,500.

**Projects Funding:** The Utility has operated on a combination of debt financing and cash to fund projects. Most small to medium Utility projects have been paid through cash that the Utility has on hand from rates and grants.

For all other projects anticipated by the Utility in 2021-2025, this Plan uses a pay-as-you-go approach that pays for projects with cash and grants. Cash for these projects generally comes from rate revenues and anticipated facilities charges. Projects that rely on facilities charges and/or grants will not proceed if these charges or grants are not received.

**Asset Replacement:** The Utility funds the replacement of aging system facilities by establishing an annual expense for depreciation. Through 2019, the depreciation expense has been added back into the Utility as cash balance at the end of the year. This approach assumes that the projects completed by the Utility have contributed an amount at least equal to the annual depreciation towards the lifecycle value of the Utility's assets.

**Debt Coverage:** The City owns, operates and maintains a Combined Utility System (water, sewer, storm and surface water). The coverage requirement will be a function of the combined rate revenue compared with combined operating expenses and annual revenue bond debt service. Bond covenants typically establish a minimum debt coverage ratio as a means of protecting an agency against the risk of nonpayment. Bond payment and interest in 2019 was paid \$866,241 with additional trust fund payments totaling \$47,109. For any future bond issues, it is assumed that the stormwater utility would be required to meet the 1:25 revenue bond coverage ratio.

### Projected Financial Performance for 2021-2025

By the end of 2020 the Utility should have enough cash to cover its reserves after funding projects, their annual portion of the City Hall lease at \$253,894, and setting aside an accumulated asset replacement fund of \$1,271,548.

For 2021 through 2022, the Utility is expected to continue to generate sufficient revenues to cover its ongoing expenses, debt payments, and reserves. However, if rates are not increased in the next two years, by the end of 2024, the Utility will have a negative unrestricted fund balance. This leaves little to no unrestricted cash to deal with the following:

- Uncertainty in the cost associated with new NPDES regulations to be issued in 2024
- Variability in Project costs
- Unforeseen flood or other emergency events

If these or other unforeseen events occur, the Utility would need to consider reducing other expenses, delaying projects, or recommending additional rate increases. For this reason, it is recommended that the City complete the full rate analysis in 2021 to remain solvent.

# Section 5: Recommended Actions

## Section 5: Recommended Actions

This final section of the Master Plan Update presents prioritized action items for the Utility to address. The importance of the action items is prioritized as:

**“Critical”** – These items are essential to the ongoing mission of the Utility.

**“High”** – These actions are highly valuable for the Utility in pursuit of its mission.

**“Medium”** – These items generally help the Utility achieve its mission.

The following table provides additional information regarding the planned action items:

### Critical Actions

- C1:** Long-range comprehensive planning
- C2:** Low impact development (LID) code review
- C3:** Watershed delineation and prioritization
- C4:** Implement source control program for existing development
- C5:** Implement and evaluate a community-based social marketing strategy
- C6:** Complete planned drainage and environmental projects
- C7:** Review and update Utility rates to keep them current

### High Actions

- H1:** Evaluate implementation of private inspection program
- H2:** Review and update maintenance standards for new facilities
- H3:** Continue to map size and material for all known outfalls
- H4:** Implement a progressive enforcement strategy for source control
- H5:** Train all municipal staff to correctly identify and report spills
- H6:** Evaluate construction site runoff ordinances and pre-con site inspections
- H7:** Develop a Utility-operated facility retrofit plan
- H8:** Clarify Utility’s role in City critical areas management
- H9:** Review Utility’s Emergency Preparation planning

**H10:** Develop Surface Water Management Area (SWMA)-based strategies and actions

### Medium Actions

**M1:** Continue to coordinate with surrounding permittees with interconnected MS4

**M2:** Continue oversight of North Creek Levee System maintenance

**M3:** Evaluate project and program impacts from climate change

**M4:** Evaluate project and programs for environmental justice

**M5:** Prepare for 2024 NPDES Permit issuance

**M6:** Prepare next Master Plan Update

### Action Items Implementation Costs and Spending Schedule

#	Description	Due Date	Total Cost (in thousands of \$s)	2020 (Budgeted)	2021 (Budgeted)	2022 (Budgeted)	2023	2024	2025
<b>C1</b>	Long-range comprehensive planning	2022	<b>20</b>	<b>20</b>	-	-	*	*	*
<b>C2</b>	Low impact development (LID) code review	2023	<b>10</b>	<b>10</b>	-	-	*	*	*
<b>C3</b>	Watershed delineation and prioritization	2021	<b>50</b>	<b>50</b>	-	-	*	*	*
<b>C4</b>	Implement source control program for existing development	2022	<b>750*</b>	<b>125</b>	<b>125</b>	<b>125</b>	<b>125</b>	<b>125</b>	<b>125</b>
<b>C5</b>	Implement and evaluate a community-based social marketing strategy	2024	<b>150*</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>
<b>C6</b>	Complete planned drainage and environmental projects	Annual	<b>14,917*</b>	<b>2,735</b>	<b>1,816</b>	<b>5,247</b>	<b>2,494</b>	<b>1,541</b>	<b>1,084</b>
<b>C7</b>	Review and update Utility rates to keep them current	Annual	<b>180*</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>
<b>H1</b>	Evaluate implementation of private inspection program	2022	<b>0*</b>	-	-	-	*	*	*
<b>H2</b>	Review and update maintenance standards for new facilities	Annual	<b>0*</b>	-	-	-	*	*	*
<b>H3</b>	Continue to map size and material for all known outfalls	Annual	<b>0*</b>	-	-	-	*	*	*
<b>H4</b>	Implement a progressive enforcement strategy for source control	2024	<b>0*</b>	-	-	-	*	*	*
<b>H5</b>	Train all municipal staff to correctly identify and report spills	Annual	<b>0*</b>	-	-	-	*	*	*

#	Description	Due Date	Total Cost (in thousands of \$s)	2020 (Budgeted)	2021 (Budgeted)	2022 (Budgeted)	2023	2024	2025
H6	Evaluate construction site runoff ordinances and pre-con site inspections	2021	0*	-	-	-	*	*	*
H7	Develop a Utility-operated facility retrofit plan	2023	600*	100	100	100	100	100	100
H8	Clarify Utility's role in City critical areas management	2023	0*	-	-	-	*	*	*
H9	Review Utility's Emergency Preparation planning	2024	0*	-	-	-	*	*	*
H10	Develop Surface Water Management Area (SWMA)-based strategies and actions	2021	0*	-	-	-	*	*	*
M1	Coordinate with surrounding permittees with interconnected MS4	Annual	0*	-	-	-	-	-	-
M2	Continue oversight of private North Creek Levee System	Annual	0*	-	-	-	*	*	*
M3	Evaluate project and program impacts from climate change	2022	0*	-	-	-	-	-	-
M4	Evaluate projects and programs for environmental justice	2022	0*	-	-	-	*	*	*
M5	Prepare for 2024 NPDES Permit issuance	2024	0*	-	-	-	*	*	*
M6	Prepare next Master Plan Update	2024	175*	-	-	-	-	-	175
<b>TOTALS</b>			<b>16,852*</b>	<b>3,095</b>	<b>2,096</b>	<b>5,527</b>	<b>2,774</b>	<b>1,821</b>	<b>1,539</b>
<i>*Ongoing costs will depend on results of study, analysis, or plan to be developed</i>									

The following three tables provide details of the Action Items, including their objectives and potential impacts on the Utility’s program.

## Critical Priority Actions

Action	Description	Objective	Required by Regulation	Long-Term Implementation Impacts
<b>C1</b>	<b>Long-range comprehensive planning</b>	Align stormwater conditions with land use planning	Yes – NPDES	Improved stream health conditions from new and redevelopment through zoning and land use practices
<b>C2</b>	<b>Low impact development (LID) code review</b>	To ensure there are no barriers to LID implementation	Yes – NPDES	Improved water quality through stormwater infiltration
<b>C3</b>	<b>Watershed delineation and prioritization</b>	Understand stream health conditions for each sub-basin area	Yes – NPDES	Improved over stream health from program and project goals that align with existing sub basin conditions
<b>C4</b>	<b>Implement source control program for existing development</b>	Identify and correct pollution generating sources through best management practices	Yes – NPDES	Reduced stormwater pollution from existing development

Action	Description	Objective	Required by Regulation	Long-Term Implementation Impacts
C5	<b>Implement and evaluate a community-based social marketing strategy</b>	Determine what behaviors cause or contribute to stormwater pollution and provide alternative options that reduce or eliminate them	Yes – NPDES	Reduced or eliminated stormwater pollution from individual habits or practices
C6	<b>Complete planned drainage and environmental projects</b>	Properly maintain infrastructure through repair and replacement projects and identify opportunities to restore stream habitat	Yes – APWA	Reduced flooding of public and private property and improved stream health conditions through increased, habitat, tree cover, and erosion control
C7	<b>Review and update Utility rates to keep them current</b>	To ensure adequate funding for the utility	No	Well-functioning storm and surface water utility

## High Priority Actions

Action	Description	Objective	Required by Regulation	Long-Term Implementation Impacts
H1	Evaluate implementation of private inspection program	All private systems are inspected and maintained	No	All private systems are functioning as designed
H2	Review and update maintenance standards for new facilities	Ensure we have a maintenance standard for all new facility technology	Yes – NPDES	All systems are maintained according to the correct maintenance standard
H3	Continue to map size and material for all known outfalls	Continue to improve GIS data for all known outfalls	Yes – NPDES	Improved understanding of system for project planning, maintenance, and spill response
H4	Implement a progressive enforcement strategy for source control	Ensure appropriate best management practices are identified and followed	Yes – NPDES	Reduce or eliminate polluted stormwater runoff from existing development
H5	Train all municipal staff to correctly identify and report spills	All staff understand what constitute a spill and how to report them properly	Yes – NPDES	Reduced impacts to receiving waters through better spill reporting and response

Action	Description	Objective	Required by Regulation	Long-Term Implementation Impacts
H6	<b>Evaluate construction site runoff ordinances and pre-con site inspections</b>	All construction projects minimize polluted stormwater runoff to the maximum extent practical	Yes – NPDES	Reduction in polluted stormwater runoff from active construction sites
H7	<b>Develop a Utility-operated facility retrofit plan</b>	Ensure all publicly-maintained stormwater facilities have adequate flow control and water quality	No	Improved stormwater runoff from publicly owned or maintained stormwater facilities
H8	<b>Clarify Utility's role in City critical areas management</b>	Good communication, support, and coordination between Public Works and Community Development staff	No	Maximum efficiency for critical area protection
H9	<b>Review Utility's Emergency Preparation planning</b>	All staff understand their role in emergency situations	No	Efficient and effective response to emergencies
H10	<b>Develop Surface Water Management Area (SWMA)-based strategies and actions</b>	Each SWMA has specific strategies and actions to maintain or improve stream health conditions	Yes – NPDES	Improved stream health conditions

## Medium Priority Actions

Action	Description	Objective	Required by Regulation	Long-Term Implementation Impacts
<b>M1</b>	<b>Coordinate with surrounding permittees with interconnected MS4</b>	Surrounding permittees understand our program and feel Bothell communicates well with their staff	Yes – NPDES	Effective watershed planning and spill response coordination
<b>M2</b>	<b>Continue oversight of private North Creek Levee System</b>	North Creek Levee system is properly functioning	No	Reduced likelihood of flooding from breach in levee system
<b>M3</b>	<b>Evaluate project and program impacts from climate change</b>	Understanding of how climate change will impact projects and programs based on best available science	No	Reduced infrastructure and environmental impacts due to undersized systems
<b>M4</b>	<b>Evaluate projects and programs for environmental justice</b>	All Bothell customers are treated equally with regard to projects and program assistance	Yes – NPDES	Bothell customers feel understood and supported by the utility
<b>M5</b>	<b>Prepare for 2024 NPDES Permit issuance</b>	Staff understand what is needed and can properly plan and advocate for resources to meet permit requirements	Yes – NPDES	Minimize short term impacts to the Utility from increased regulations

Action	Description	Objective	Required by Regulation	Long-Term Implementation Impacts
<b>M6</b>	<b>Prepare next Master Plan Update</b>	Staff, Council, and Customers understand project and program goals for next five-year planning period	Yes – APWA	Effective and efficient program direction for utility planning

END