**Planning Commission Meeting**
**June 18, 2024 - 6:30 PM**
**City Hall Council Chambers**
**AGENDA**

## I. PUBLIC PARTICIPATION

A. Public Participation Information

The City of Auburn Planning Commission Meeting scheduled for Tuesday, June 18, 2024, at 6:30 p.m., will be held in person and virtually. To attend the meeting virtually, click one of the links below, or call in at one of the phone numbers below:

Join Zoom Meeting
https://us06web.zoom.us/j/7999102307
Meeting ID: 799 910 2307
One tap mobile
+12532158782,,7999102307# US (Tacoma)
+12532050468,,7999102307# US
Dial by your location
• +1 253 215 8782 US (Tacoma)
• +1 253 205 0468 US
• 888 475 4499 US Toll-free
• 877 853 5257 US Toll-free
Meeting ID: 799 910 2307
Find your local number: https://us06web.zoom.us/u/kbLsn6aJ7H

## II. CALL TO ORDER

### A. ROLL CALL/ESTABLISHMENT OF QUORUM

### B. PLEDGE OF ALLEGIANCE

## III. PUBLIC COMMENT

Comment from the audience on any proposal for action by the Commission. If the comment is related to an action subsequently listed here as a public hearing, the comment should be provided at the time of the public hearing.

## IV. APPROVAL OF MINUTES

A. May 21, 2024 Draft Minutes from the Special Planning Commission Meeting

## V. INTRODUCTION

A. Presentation Overview (Steiner)

Brief overview of upcoming Element Presentations and Public Hearing schedule.

## VI. PUBLIC HEARINGS

A. Stormwater Plan Element (Carlaw)

Staff presentation on the proposed changes to the Comprehensive Stormwater Plan.

## VII. OTHER BUSINESS

A. **Capital Facilities Element (Steiner)**

Staff Presentation of the proposed changes to the Capital Facilities Element.

B. **Comprehensive Plan DEIS (Steiner)**

Staff to provide update on Comprehensive Plan DEIS, public meetings, and EIS schedule.

## VIII. COMMUNITY DEVELOPMENT REPORT

## IX. ADJOURNMENT

*The City of Auburn Planning Commission is a seven member advisory body that provides recommendations to the Auburn City Council on the preparation of and amendments to land use plans and related codes such as zoning. Planning Commissioners are appointed by the Mayor and confirmed by the City Council.*

*Actions taken by the Planning Commission, other than approvals or amendments to the Planning Commission Rules of Procedure, are not final decisions; they are in the form of recommendations to the city council which must ultimately make the final decision.*

# AGENDA BILL APPROVAL FORM

| | | |
|---|---|---|
| **Agenda Subject:**<br>May 21, 2024 Draft Minutes from the Special Planning Commission Meeting | | **Date:**<br>June 10, 2024 |
| **Department:**<br>Community Development | **Attachments:**<br>[May 21, 2024 Draft Minutes] | **Budget Impact:**<br>Current Budget: $0<br>Proposed Revision: $0<br>Revised Budget: $0 |

**Administrative Recommendation:**

**Background for Motion:**

**Background Summary:**

**Reviewed by Council Committees:**

**Councilmember:**

**Staff:** Teague

**Meeting Date:** June 18, 2024

Item Number:

CITY OF AUBURN WASHINGTON

**Planning Commission Meeting**
**May 21, 2024 - 6:00 PM**
**Special Meeting - City Hall Council Chambers**
**MINUTES**

## I. PUBLIC PARTICIPATION

A. Public Participation Information

**The City of Auburn Planning Commission Meeting was held in person and virtually.**

## II. CALL TO ORDER

**Chair Judi Roland called the meeting to order at 6:00 p.m. in the Council Chambers of Auburn City Hall, 25 West Main Street.**

### A. ROLL CALL/ESTABLISHMENT OF QUORUM

**Commissioners present: Chair Judi Roland, Vice Chair Phillip Stephens, Julie Berry, Kent Sprague, William Stewart, Aaron Vanderpol, and Lynn Walters.**

**Staff members present: Acting Planning Services Manager Alexandrea Teague, Acting City Attorney Doug Ruth, Director of Public Works Ingrid Gaub, Utilities Engineering Manager Ryan Vondrak, Storm Drainage Utility Engineer Tim Carlaw, Sewer Utility Engineer Robert Elwell, Planner Gabriel Clark, and Deputy City Clerk Rebecca Wood-Pollock**

### B. PLEDGE OF ALLEGIANCE

**Chair Roland led those in attendance in the Pledge of Allegiance.**

## III. PUBLIC COMMENT

**There was no public comment.**

## IV. APPROVAL OF MINUTES

A. April 30, 2024 Draft Minutes from the Special Planning Commission Meeting

**Vice Chair Stephens moved and Commissioner Stewart seconded to approve the April 30, 2024 Planning Commission Meeting Minutes.**

**MOTION CARRIED UNANIMOUSLY. 7-0**

## V. OTHER BUSINESS

### A. Presentation Overview (Teague)

Staff will provide a brief overview of upcoming Element Presentations and Public Hearing schedule.

**Manager Teague provided the Commission with an update on the future Comprehensive Plan Element presentations and addressed updates to the Public Hearing schedule.**

### B. Sewer Plan Element (Elwell)

Staff presentation of the proposed changes to the Sewer Plan Element.

**Chair Roland opened the Public Hearing at 6:06 p.m.**

**Sewer Utility Engineer Elwell shared a presentation with the Commission on the Utilities Element and Sewer Plan Overview and Update, including progress with the Plan's development, an introduction on the Sanitary Sewer Utility process, an overview of the 2024 Sanitary Sewer Comprehensive Plan, and the next steps in the process.**

**The Commission discussed future expansion to accommodate for population growth, the new King County Waste Treatment Center, regulations on sewage treatment, Roegner Park sewer capacity improvements, inflow and infiltration analysis, rainfall predictions for 2024, pipe capacity, pipe lining and rehabilitation, the 2013 Muckleshoot Tribe Utility Services Agreement, the Capital Funding Plan, and sewer monitoring systems.**

**Vice Chair Stephens moved and Commissioner Vanderpol seconded to continue the Public Hearing to the next Planning Commission meeting on June 4, 2024.**

**MOTION CARRIED UNANIMOUSLY. 7-0**

## VI. ADJOURNMENT

**There being no further business to come before the Planning Commission, the meeting was adjourned at 6:45 p.m.**

**APPROVED this 18th day of June, 2024.**

**JUDI ROLAND, CHAIR**

**Rebecca Wood-Pollock,**
**Deputy City Clerk**

*The City of Auburn Planning Commission is a seven member advisory body that provides* *recommendations to the Auburn City Council on the preparation of and amendments to land use plans and related codes such as zoning. Planning Commissioners are appointed by the Mayor and confirmed by the City Council.*

*Actions taken by the Planning Commission, other than approvals or amendments to the Planning Commission Rules of Procedure, are not final decisions; they are in the form of recommendations to the city council which must ultimately make the final decision.*

# AGENDA BILL APPROVAL FORM

**Agenda Subject:**
Presentation Overview (Steiner)

**Date:**
June 11, 2024

**Department:**
Community Development

**Attachments:**
2024 Comp Plan Memorandum

**Budget Impact:**
Current Budget: $0
Proposed Revision: $0
Revised Budget: $0

**Administrative Recommendation:**

**Background for Motion:**

**Background Summary:**

See attached Memorandum.

**Reviewed by Council Committees:**

**Councilmember:**

**Staff:** Steiner

**Meeting Date:** June 18, 2024

Item Number:

CITY OF AUBURN WASHINGTON

# Memorandum

**To:** Judi Roland, Chair, Planning Commission
Planning Commission Members

**From:** Josh Steiner, Senior Long-Range Planner, Comm. Dev. Dept.
Tim Carlaw, Storm Drainage Utility Engineer, Public Works

**Date:** June 18, 2024

**Re:** **Special Meeting: 2024 Comprehensive Plan - Planning Commission**

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Each city and county in Washington state is required to conduct a periodic update of its comprehensive plan and development regulations per RCW 36.70A.130 (The Growth Management Act or GMA). In general, the purpose is to ensure consistency with the Puget Sound Regional Council Vision 2050, the Countywide Planning Policies (for Auburn this means both Pierce and King County), any changes in state laws over the intervening time, and to respond to changing conditions within the local community.

Tonight, a public hearing on the Stormwater Comprehensive Plan and a public meeting on the Capital Facilities Element will be conducted. This meeting is open to the public and has been advertised appropriately as a regular meeting. The table below illustrates current, past, and upcoming Planning Commission meetings for the Comprehensive Plan update, as well as subject.

| Subject | Public Meeting | Public Hearing | Deliberation and Action |
|---|---|---|---|
| **Land Use** | ✓ | ✓ | N/A |
| **Housing** | ✓ | ✓ | N/A |
| **Historic Preservation** | ✓ | ✓ | N/A |
| **Economic Development** | ✓ | ✓ | N/A |
| **Climate** | ✓ | ✓ | N/A |
| **Parks and Open Space** | ✓ | ✓ | N/A |
| **Sewer Plan** | ✓ | ✓ | September 17 |
| **Transportation** | ✓ | July 16 | July 16 |
| **PROS Plan** | ✓ | TBD | TBD |
| **Stormwater Plan** | ✓ | June 18 | If Needed |
| **Capital Facilities** | June 18 | July 2 | October 23 |
| **Water System Plan** | July 2 | July 16 | October 23 |
| **Utilities Element** | July 2 | July 16 | October 23 |

| | | | |
|---|---|---|---|
| **Planning Commission Comp Plan Action (Community Development/Parks)** | July 16 | | |

For reference, the current adopted Comprehensive Plan Elements can be found here.

Feel free to contact Josh Steiner, Senior Planner, at jsteiner@auburnwa.gov or 253-804-5064 with any questions.

**Included Attachments:**

Attachment A – Stormwater Planning Commission Presentation
Attachment B – V3 Draft Auburn Comp Storm Drainage Plan
Attachment C – Capital Facilities Element Planning Commission Presentation
Attachment D – V1 Draft 2024 Capital Facilities Element

Note: V1 = Currently adopted Plan showing staff edits
V2 = Clean version of V1 with staff edits incorporated
V3 = Clean version of V2 with edits incorporated, showing edits in response to public comments, Planning Commission comments, and/or agency comments. May include maps or other figures that have been amended by staff since V2 in response to comments.

If V1 is not available, please see currently adopted Element via link above.

CITY OF AUBURN WASHINGTON

# AGENDA BILL APPROVAL FORM

**Agenda Subject:**
Stormwater Plan Element (Carlaw)

**Date:**
June 11, 2024

**Department:**
Community Development

**Attachments:**
Attachment A - Stormwater Presentation
Attachment B - V3 Draft Auburn Comp Storm Drainage Plan

**Budget Impact:**
Current Budget: $0
Proposed Revision: $0
Revised Budget: $0

**Administrative Recommendation:**

**Background for Motion:**

**Background Summary:**

See Attachments

**Reviewed by Council Committees:**

**Councilmember:**

**Staff:** Carlaw

**Meeting Date:** June 18, 2024

Item Number: PH.1

ENGINEERING SERVICES

# 2024 COMPREHENSIVE STORM DRAINAGE PLAN PUBLIC HEARING OVERVIEW

## TIM CARLAW, STORM DRAINAGE UTILITY ENGINEER

PLANNING COMMISSION MEETING

JUNE 18, 2024

Public Works Department

Engineering Services • Airport Services • Maintenance & Operations Services

AUBURN VALUES

SERVICE

ENVIRONMENT

ECONOMY

CHARACTER

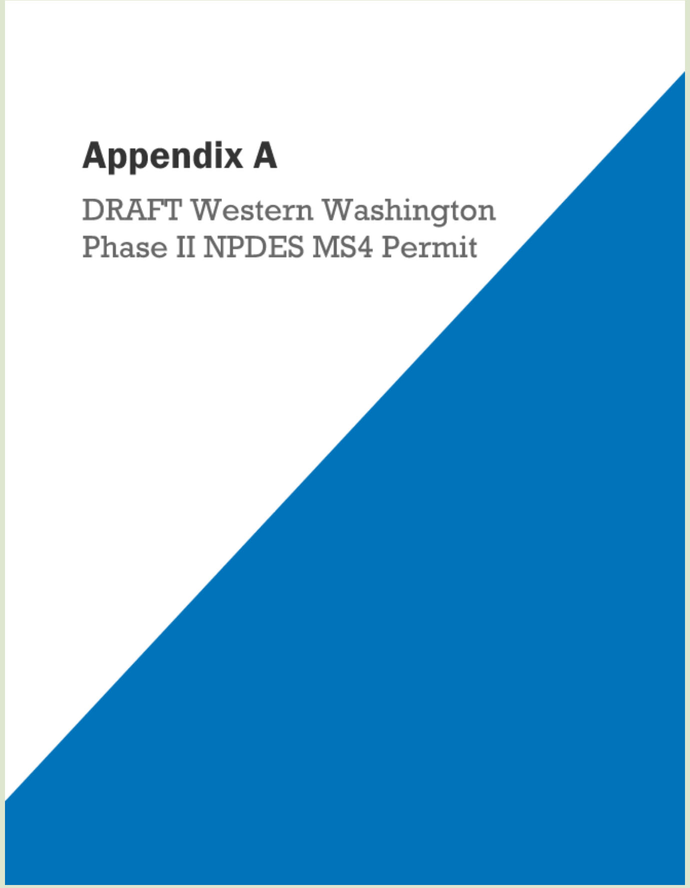
SUSTAINABILITY

WELLNESS

CELEBRATION

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

- 2024 Comprehensive Storm Drainage Plan overview and update was presented to the Planning Commission May 4, 2024.
- Storm Utility goals and policies were previously discussed with City Council May 2023.
- Plan now includes the appendices; no changes to the individual chapters have been made.

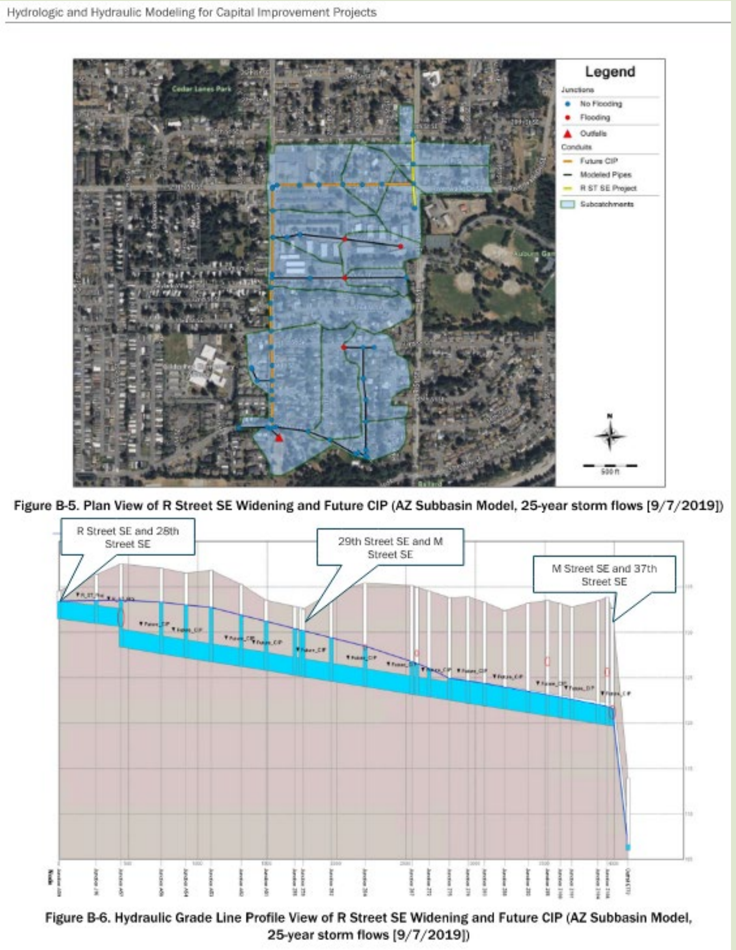


**Appendix A**

DRAFT Western Washington
Phase II NPDES MS4 Permit

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

- Appendices include:
  - A) The draft 2024-2029 NPDES Permit
  - B) Technical Memo on Hydrology and Hydraulic analysis
  - C) Evaluation of Asset Management system
  - D) Regulatory-Driven Improvements Assessment
  - E) Drainage Ditch Maintenance Program
  - F) SEPA Compliance Documentation



Hydrologic and Hydraulic Modeling for Capital Improvement Projects

Figure B-5. Plan View of R Street SE Widening and Future CIP (AZ Subbasin Model, 25-year storm flows [9/7/2019])

Figure B-6. Hydraulic Grade Line Profile View of R Street SE Widening and Future CIP (AZ Subbasin Model, 25-year storm flows [9/7/2019])

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

## Any Questions?

# ~Previously Presented Slides~

ENGINEERING SERVICES

# 2024 COMPREHENSIVE STORM DRAINAGE PLAN OVERVIEW AND UPDATE

TIM CARLAW, STORM DRAINAGE UTILITY ENGINEER
PLANNING COMMISSION MEETING
JUNE 4, 2024

Public Works Department
Engineering Services • Airport Services • Maintenance & Operations Services

AUBURN VALUES

SERVICE
ENVIRONMENT
ECONOMY
CHARACTER
SUSTAINABILITY
WELLNESS
CELEBRATION

# 2024 COMPREHENSIVE STORM PLAN IS PART OF THE CITY COMPREHENSIVE PLAN

- **Auburn Comprehensive Plan Elements**
  - Core Plan (Community Development)
  - Land Use Element (Community Development)
  - Housing Element (Community Development)
  - Historic Preservation (Community Development)
  - Climate Change – NEW (Community Development)
  - Economic Development (Community Development)
  - Capital Facilities Element (Public Works)
  - Transportation Element (Public Works)
  - **Utilities Element (Public Works)**
  - Parks and Recreation (Parks)

IMAGINE AUBURN
COMPREHENSIVE PLAN UPDATE 2024

**Citywide effort involving all departments coordinating together to create a cohesive, consistent, and forward-thinking Plan covering range of subject areas**

# PLAN DEVELOPMENT PROGRESS/MILESTONES

**Spring 2023 – Council review of goals and policies**

- Identify potential future Issues
- Gather potential project information
- Update asset management inventory

**Fall 2023 – Select projects for implementation**

- National Pollutant Discharge Elimination System (NPDES) requirements
- SMAP implementation
- Plan for future projects

**Spring 2024 - Planning Commission review**

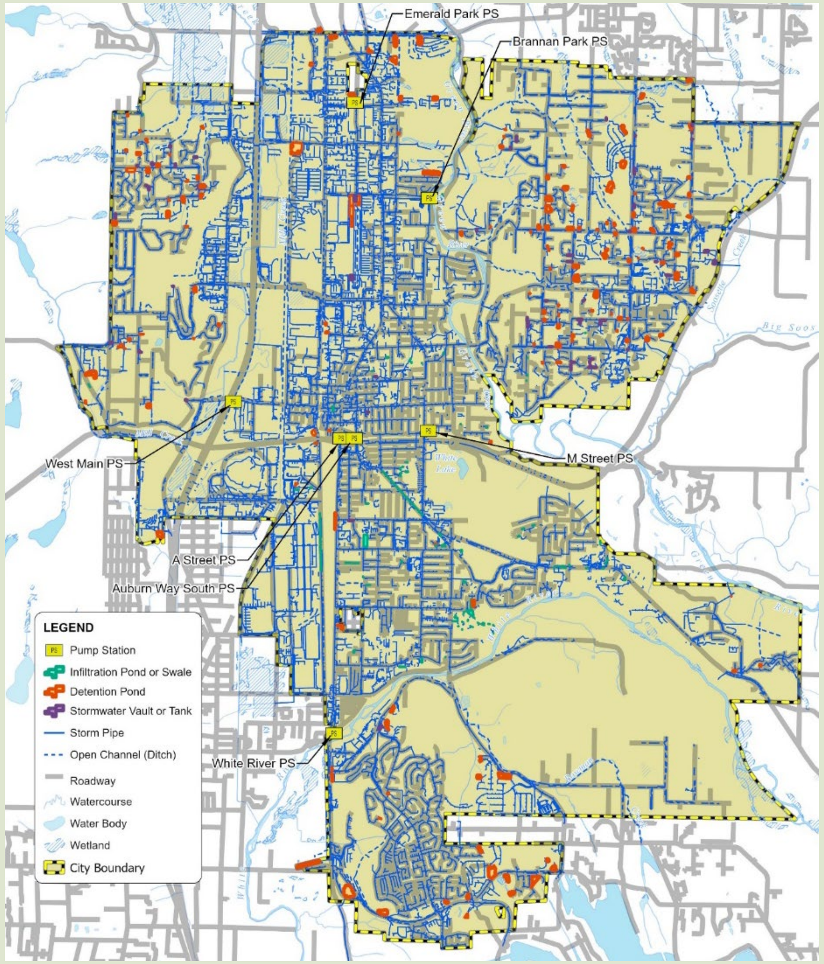
- NPDES permit issue
- Public input
- SEPA review

**Fall 2024 – City Council review and adoption**

# STORM DRAINAGE UTILITY INTRODUCTION

## Storm Drainage Utility Service Area = City Limits

- 240 miles pipe
- 40 miles of ditches
- 10,275 catch basins
- 3,025 manholes
- 167 stormwater ponds
- 7 pump stations



# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

## Chapter 1 - Introduction

- Purpose and objectives
- Approach and document organization

## Chapter 2 - Background

- Utility organization and funding
- Regulatory standards
  - National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Stormwater Permit
  - Storm Water Management Manual for Western Washington (SWMMWW)

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

## Chapter 3 – System Goals and Policies

- System planning
- Operations and maintenance
- Fiscal responsibility
- Environment and regional coordination

June 26, 2023

**Storm Drainage Policies - City Council Review & Discussion**

**Goals**

- Broad statements indicating a general aim or purpose to be achieved.

**Policies**

- Topic-specific statement providing guidelines for current and future decision-making.
- Indicates a clear commitment of the local legislative body.

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

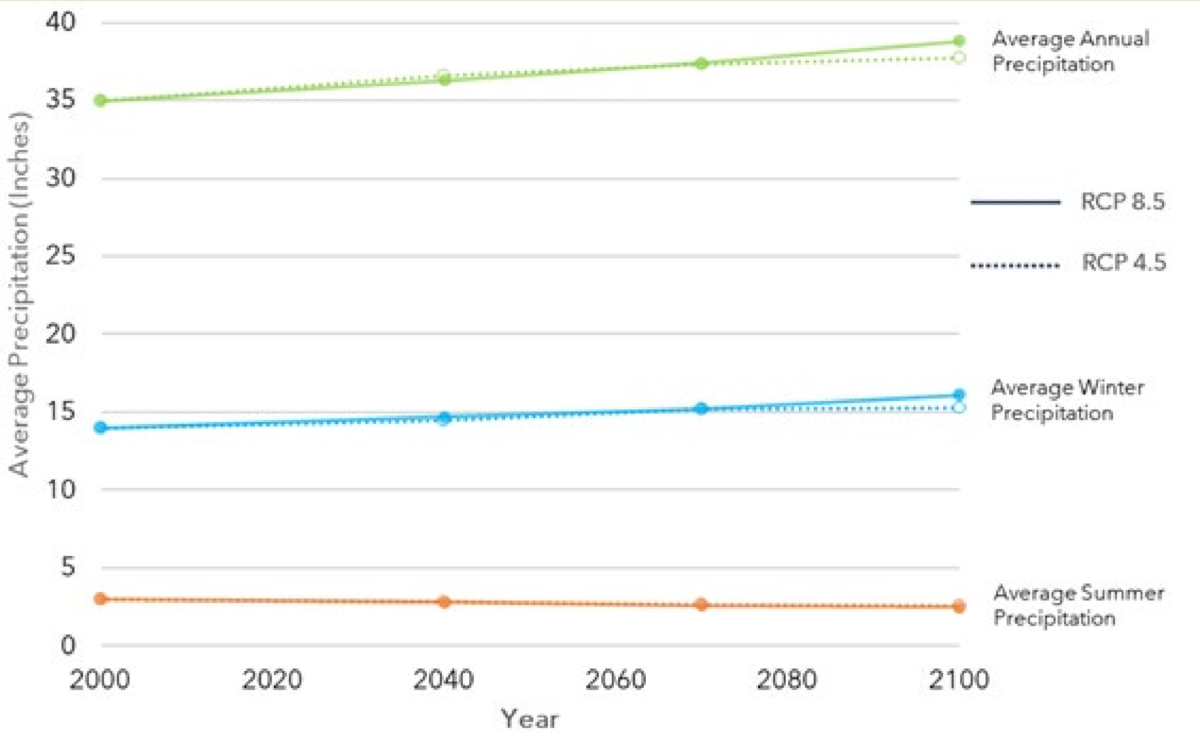
## Chapter 4 – Description of Existing System

- Natural drainage features of the area
  - Geology
  - Geography
  - Groundwater
- Land use and development
- Inventory of assets

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

## Chapter 4 – Description of Existing System

- Climate change analysis
  - Risk mitigation
  - Cost-Benefit of system resilience
- Ecology SWMMWW revisions
- Regional studies and models



Hegewisch, K.C., Abatzoglou, J.T., Chegwidden,O., and Nijssen, B. 2023. Climate Mapper web tool. Climate Toolbox.

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

## Chapter 5 - Storm Drainage Utility Analysis

- Hydraulic evaluation of known problem areas
- Asset management review
- Regulatory driven improvements

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

## Chapter 6 - Operations and Maintenance

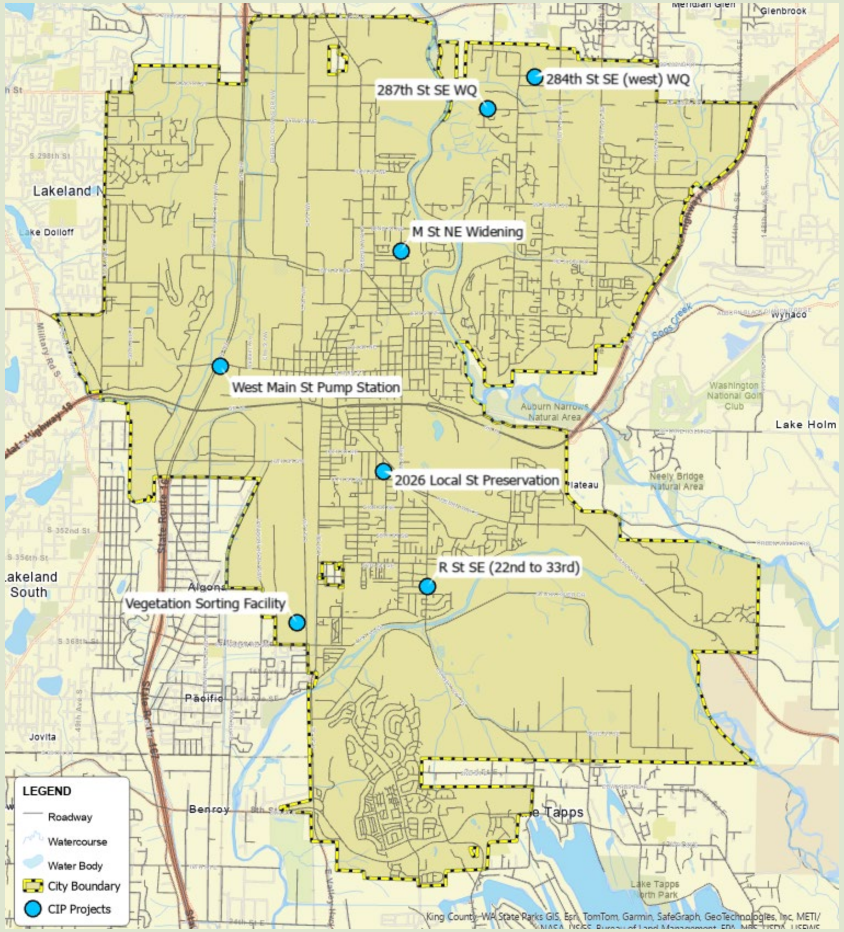
- Routine operations
- Non-Routine and emergency operations
- Record keeping
- Staffing requirements

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

## Chapter 7 - Capital Projects

### 6 Year CIP

- Vegetation Sorting Facility
- 287th St SE WQ Road Retrofit
- 2026 Local St Preservation
- R St SE (22nd St to 33rd St)
- Storm Pipeline Extension Program
- Street Utility Improvements
- Frame & Grate Replacement
- Storm Drainage R&R Program
- 284th St SE (West) WQ Road Retrofit
- West Main St Pump Station Upgrade
- M St NE Widening



# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

## Chapter 8 – Implementation

- 6-year CIP
- Programmatic measures for NPDES compliance
- Future staffing options
- Asset management expansion
- Additional recommendations
  - Climate change considerations
  - Ditch maintenance program

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

## Chapter 9 - Finance

- 6-year review
- Planned expenses → funding plan
- 10-year forecast
- Maintaining reserves
- Projected rates

# NEXT STEPS

**June 2024**

- Planning Commission Meeting - Tonight
- Public Hearing and Deliberation – June 18

**June-August 2024**

- SEPA and Agency Reviews

**August 2024**

- Draft Plan Discussion with Council

**December 2024**

- Resolution for Adoption

# 2024 STORM DRAINAGE COMPREHENSIVE PLAN

**Any Questions?**

# Draft
# Comprehensive Storm Drainage Plan Update

Prepared for

CITY OF AUBURN WASHINGTON

June 2024

Parametrix

# Draft Comprehensive Storm Drainage Plan Update

*Prepared for*

**City of Auburn**
25 W Main Street
Auburn, WA 98001

*Prepared by*

**Parametrix**
719 2nd Avenue, Suite 200
Seattle, WA 98104
T. 206.394.3700  F. 1.855.542.6353
www.parametrix.com

June 2024 | 553-1931-052

# Citation

Parametrix. 2024. Draft Comprehensive Storm
Drainage Plan Update.
Prepared for City of Auburn by Parametrix,
Seattle, Washington.
June 2024.

# Contents

# Contents (continued)

# Contents (continued)

# Contents (continued)

FIGURES

# Contents (continued)

TABLES

# Contents (continued)

APPENDICES

# Acronyms and Abbreviations

| | |
|---|---|
| ACC | Auburn City Code |
| BMP | best management practice |
| CCTV | closed-circuit television |
| CDR | critical drainage review |
| CEMP | City Emergency Management Plan |
| CFP | capital facilities plan |
| CIP | capital improvement project |
| CMMS | computerized maintenance management system |
| COA Supplement | City of Auburn Supplement |
| CWA | Clean Water Act |
| DEM | digital elevation model |
| Ecology | Washington State Department of Ecology |
| Engineering | City of Auburn Department of Engineering Services |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| ESU | equivalent service unit |
| FEMA | Federal Emergency Management Agency |
| FIRM | Flood Insurance Rate Map |
| FIS | Flood Insurance Study |
| FTE | full-time equivalent |
| GASB | Governmental Accounting Standards Board |
| GIS | geographic information system |
| GMA | Growth Management Act |
| G.O. | general obligation |
| H&H | hydrologic and hydraulic |

# Acronyms and Abbreviations (continued)

| | |
|---|---|
| HPA | Hydraulic Project Approval |
| IDDE | illicit discharge detection and elimination |
| KCFCD | King County Flood Control District |
| KCSWDM | King County Surface Water Design Manual |
| LID | low impact development |
| LOMR | Letters of Map Revision |
| LOS | level of service |
| MEP | maximum extent practicable |
| M&O | maintenance and operations |
| MS4 | municipal separate storm sewer system |
| NASSCO | National Association of Sewer Service Companies |
| NFIP | National Flood Insurance Program |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | Natural Resources Conservation Service |
| NSF | non-single family |
| OCI | Overall condition index |
| OCR | overall condition rating |
| PACP | Pipeline Assessment and Certification Program |
| PCB | polychlorinated biphenyl |
| PFAS | per- and polyfluoroalkyl substance |
| Plan | Comprehensive Storm Drainage Plan |
| RCP | Representation Concentration Pathway |
| RCW | Revised Code of Washington |
| ROW | right-of-way |
| R&R | repair and replacement |

# Acronyms and Abbreviations (continued)

| | |
|---|---|
| RSI | required supplementary information |
| SCIP | Source Control Inspection Program |
| SEPA | State Environmental Policy Act |
| SDC | system development charge |
| SFHA | Special Flood Hazard Areas |
| SMAP | Stormwater Management Action Plan |
| SR | State Route |
| SRP | soluble reactive phosphorus |
| SWMP | Stormwater Management Program |
| SWMMWW | Surface Water Management Manual for Western Washington |
| TAPE | Technology Assessment Protocol – Ecology |
| TMDL | total maximum daily load |
| UIC | underground injection control |
| ULID | utility local improvement district |
| USACE | U.S. Army Corps of Engineers |
| VRFA | Valley Regional Fire Authority |
| WAC | Washington Administrative Code |
| WSDOT | Washington State Department of Transportation |

# 1. Introduction

This Comprehensive Storm Drainage Plan (Plan) for the City of Auburn, Washington, updates the previous plan that was completed in December 2015. The 2015 Plan is being updated for several reasons:

- The Washington State Growth Management Act (GMA) requires planning documents to be reassessed and updated periodically.
- Current and future regulatory and permitting requirements, such as those associated with the National Pollutant Discharge Elimination System (NPDES), need to be addressed. Since adoption of the 2015 Plan, the NPDES permit was updated and reissued in 2019 and will be updated again in August 2024.
- New compliance elements, such as the Stormwater Management Action Plan (SMAP) and the Source Control Inspection Program (SCIP) require new activities and regulatory responsibilities.
- Continued growth and system expansion via development, in addition to the 2024 annexed development area from the City of Kent, requires new and revised evaluations of the storm drainage system maintenance responsibilities and expanded service area.
- The storm drainage system inventory has been updated and is needed to manage utility assets and to update the analyses used for condition assessments and replacement planning.
- The capital improvements identified in the 2015 Plan needed reevaluation to account for completed projects, new compliance elements, changes in system conditions, new problem areas identified, and new development, as well as to incorporate new financial information.

In addition, expectations and changes to the stormwater program mission are evolving, which may include increasing coordination with land use and watershed planning, identifying proactive actions to update and retrofit the system, improving the maintenance programs and record-keeping, providing area-wide or basin stormwater control systems, and considering long-term retrofitting.

This Plan contains time frames that are the intended framework for future funding decisions and within which future actions and decisions are intended to occur. However, these time frames are estimates and, depending on factors involved in the processing of applications and project work and the availability of funding, the timing may change from the included time frames. The framework does not represent actual commitments by the City of Auburn, which may depend on funding resources available.

## 1.1 Purpose and Objectives

The purpose of this Plan is to guide the City's Storm Drainage Utility with respect to future activities and improvements. The Plan's objectives are to:

- Evaluate environmental, social, and regulatory drivers to update the system goals for capital facility infrastructure development, operation, maintenance, and other key elements of utility management.
- Perform hydraulic modeling analysis to evaluate system capacity, focusing on known problems and areas where data are available for model development and calibration. Incorporate those updates into the hydraulic models used for analyzing the system.
- Develop capital improvements that meet system needs and effectively manage risks.

- Document maintenance and operations (M&O) activities and develop recommendations for improving the M&O program.
- Review and document the condition of existing stormwater system assets and develop a prioritization system for inspecting critical system elements.
- List and describe Capital Improvement Projects (CIPs) to prioritize 6- and 20-year funding frameworks.
- Provide future-looking suggestions based on potential changing climate factors.
- Incorporate information and activities from current and anticipated NPDES compliance planning.
- Identify additional staffing needed based on NPDES requirements and future maintenance and operation activities.
- Coordinate the capital and operations plans to meet the anticipated revenue stream.
- Develop programmatic recommendations to address utility needs.

## 1.2 Approach and Document Organization

This Plan is organized to focus on the actions the utility will take to implement the Plan. In most cases, supporting documentation and background information is included in appendices rather than chapters of the Plan. The Plan is organized into the following chapters:

| | |
|---|---|
| Chapter 1 | Introduction: Describes the reasons for developing an updated Plan and states the purpose and objectives of the Plan. |
| Chapter 2 | Background: Provides background information regarding the Storm Drainage Utility and regulatory drivers for developing system goals. |
| Chapter 3 | System Goals and Policies: Specifies the system goals used to develop capital improvements and future M&O activities. |
| Chapter 4 | Drainage System: Describes the existing conditions of the City's drainage system. |
| Chapter 5 | Evolution of the Storm Drainage Utility: Describes methodologies used to evaluate existing problems and develop CIPs. |
| Chapter 6 | Maintenance and Operations: Documents existing Storm Drainage Utility M&O activities. |
| Chapter 7 | Capital Improvements: Describes recommended capital improvement projects, including cost estimates and conceptual figures. |
| Chapter 8 | Implementation Plan: Prioritizes CIPs and lays out a future work plan. |
| Chapter 9 | Finance: Identifies the total cost of providing stormwater drainage services and provides a program for the utility to remain viable during execution of the CIP. |
| Chapter 10 | Limitations: Sets the limits of legal applications of this document. |
| Chapter 11 | References: Lists documents referenced throughout the Plan. |

# 2. Background

This chapter provides a brief description of the Storm Drainage Utility, organizational structure, and funding mechanisms, as well as an overview of the federal, state, and local regulations that can affect stormwater management in the City.

## 2.1 Storm Drainage Utility

### 2.1.1 Organizational Structure

The City's Storm Drainage Utility is organized under the larger umbrella of the Public Works Department (see Figure 2-1). The Public Works Department covers several areas of responsibility related to stormwater management:

- Utility Program.
- Transportation Program.
- M&O Program.
- Project Engineering.
- GIS (Asset Management).

Under these programs, the Public Works Department is responsible for the planning, design, construction, operations, and maintenance of the City's storm drainage. Management and construction of storm drainage CIPs is provided by Engineering Services, while maintenance of storm drainage facilities is provided by dedicated stormwater and vegetation divisions within M&O.

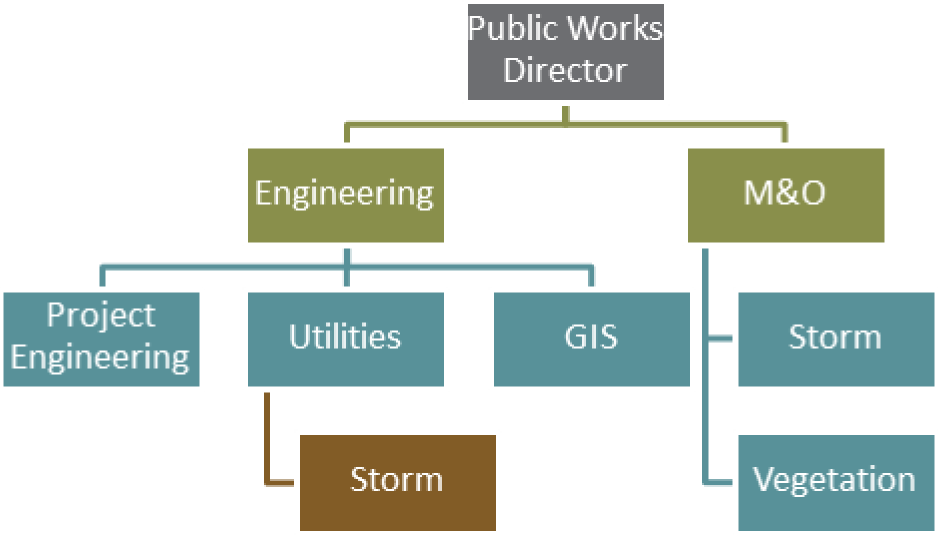


Figure 2-1. Public Works Department Staff Organizational Chart

## 2.1.2 Funding Mechanisms

The following section provides adapted text from Auburn City Code (ACC) Title 13: Water, Sewers and Public Utilities, Chapter 13.48, Storm Drainage Utility, §13.48.060, Authority to establish rates. Per the ACC, the City has established rate classifications, service charges, and various fees and charges to pay for the following costs:

- The development, adoption, and implementation of a Comprehensive Storm Drainage Plan.
- The debt service and related financing expenses of the design and construction of storm drainage and water quality facilities required for the management of stormwater and surface waters that benefit the service area.
- The operation, repair, maintenance, improvement, replacement, and reconstruction of storm drainage facilities that benefit the present service area (e.g., CIPs to increase system capacity in accordance with level of service [LOS] goals).
- The purchase of a fee or lesser interest, including easements, in land that may be necessary for the storm drainage system in the service area, including, but not limited to, land necessary for the installation and construction of storm drainage facilities and all other facilities that are reasonably required for proper and adequate management of stormwater for the benefit of the service area.
- The costs of monitoring, inspection, enforcement, and administration of the utility, including, but not limited to, water quality surveillance, private system maintenance inspection, construction inspection, and other activities that are reasonably required for the proper and adequate implementation of the City's stormwater and surface water policies and regulations.
- Preparing and implementing requirements for the City's municipal separated storm sewer system (MS4) permit.

### 2.1.2.1 Rates

The currently established rates for the storm drainage service are provided in Table 2-1 below, which lists rates for 2024 and 2025. Base rates are the monthly charge for service from the Storm Drainage Utility to recover costs incurred by the utility, such as administrative, billing, and collection. Equivalent service units (ESU) are used as a means for estimating the development or impervious surfaces[1] estimated to contribute an amount of runoff to the City's storm drainage system, which is approximately equal to that which is created by the average single-family residential parcel. Open, uncovered, retention/detention facilities shall not be considered as impervious surfaces for the purpose of ESU calculations. One ESU is equal to 2,600 square feet of impervious surface area or any portion thereof. Table 2-1 provides the current monthly charges, base rates, and ESU monthly rates for classifications used by the utility.

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[1] An impervious surface is a hard surface area that prevents the entry of water into the soil mantle (see ACC Chapter 13.41). Common impervious surfaces include, but are not limited to rooftops, walkways, patios, concrete, or asphalt paving.

Table 2-1. 2024 and 2025 Utility Rates for Storm Drainage Service

| | Effective as of January 1, 2024 | Effective as of January 1, 2025 |
|---|---|---|
| **Single-family parcel types** | Monthly charge, $ | Monthly charge, $ |
| Single-family residential parcels [a] | 18.09 | 19.31 |
| Two-family residential parcels [b] | 19.25 | 19.31 |
| **Non-single-family (NSF) parcels** | ESU rate per month, $ | ESU rate per month, $ |
| NSF [c] | 18.09 | 19.31 |
| NSF with detention [d] | 15.57 | 16.62 |
| NSF with retention [e] | 13.04 | 13.92 |
| NSF with water quality treatment [f] | 16.64 | 17.76 |
| NSF with detention and water quality treatment | 4.12 | 15.07 |
| NSF with retention and water quality treatment | 11.59 | 12.37 |

[a] Any parcel of land having on it a single detached dwelling unit that is designed for occupancy by one family or a similar group of people.

[b] A building designed exclusively for occupancy by two families living independently of each other and containing two dwelling units.

[c] Any parcel of developed land other than single-family or two-family (duplex) residential.

[d] Detention is the temporary storage of stormwater and surface water runoff, with provisions for the controlled offsite surface release of the stored water.

[e] Retention means the storage of stormwater and surface water runoff, with no provisions for off-site surface release of the stored water other than by evaporation and infiltration.

[f] Water quality treatment means an engineered and approved facility to remove contaminants in the existing flow regime of stormwater generated from a developed parcel pursuant to applicable design standards in place at the time of approval.

Storm Drainage Utility rates are billed monthly. Storm drainage charges start from the day a water meter servicing the property is installed by the City. In cases where the property does not receive water service from the City, storm drainage charges start from the day that the storm drainage permit is finalized by the City. Payments received for utility bills are applied to expenses in the following order of priority: late charges, additional fees, stormwater, garbage, sewer, and water. Payment for stormwater drainage service charges is due and payable to the Finance Department office 15 days after the billing date that appears on the bill. Utility charges are constituted as a lien and thus can be applied to a lien upon the property from which such charges are due, superior to all other liens and encumbrances whatsoever, except for general taxes and local special assessments.

### 2.1.2.2 Connection Fees

Connection fees are comprised of a connection permit fee and a system development charge (SDC). Connection permit fees are applied to cover the planning, review, inspection, record drawings, and processing of permit information for new connections to the public storm drainage system. Other permit fees are assessed for inspection and permit processing for various repair, retrofit, and demolition activities.

A utility SDC is a charge imposed on new customers, or existing customers revising use of their property, in recognition of the previous investment of the City and its customers in the utility systems. The purpose of an SDC is to recover a fair share of the costs of providing existing utility system infrastructure to serve new customers or revised uses of existing customers and provide for future improvements to serve new customers. As with Storm Drainage Utility rates, SDCs are based on the relative amount of impervious surface added to the system. In 2024, SDCs were estimated to be $1,759 per ESU.

## 2.2 Development Code and Design Standards Updates

In compliance with the previous NPDES MS4 permit, the City has conducted updates to its development regulations and design standards and adopted a stormwater manual as required by the permit. Specifically, the City adopted the Washington State Department of Ecology (Ecology) 2019 Surface Water Management Manual for Western Washington (SWMMWW), with a City of Auburn Supplement (COA Supplement). The COA Supplement has received minor updates as needed—generally annually—to include new technologies and regulations. Ecology has recently adopted an update to the 2024 SWMMWW. The City has formally updated the standards to the revised manual as a condition of the NPDES MS4 permit.

In August 2024, Ecology issued an updated NPDES MS4 permit to comply with requirements of the federal Clean Water Act (CWA) when the current permit expires. The new permit would be effective through July 31, 2029.

Development regulations related to stormwater and drainage design standards will also be reviewed for potential revision consistent with current policies and LOS goals.

See the following section for an overview of the City's Stormwater Management Program (SWMP) and Chapter 8 for specific steps needed to maintain compliance with updated NPDES MS4 permit requirements.

## 2.3 Regulatory and Policy Considerations

Numerous federal, state, and local regulations govern stormwater management in the City. Other plans and programs provide additional guidance. Applicable regulations and policy guidance are summarized in Table 2-2.

Table 2-2. Federal, State, and City Regulations, Guidance, and Programs Relevant to the Auburn Storm Drainage Utility

| Title | Regulation, Guidance, or Program | Application to the City |
|---|---|---|
| **Federal** | | |
| Clean Water Act (CWA): §402 NPDES | Regulation | The National Pollutant Discharge Elimination System (NPDES) permit includes several requirements that affect stormwater management in the City. See Section 2.3.2 below. |
| CWA: §303(d) Impaired Waters and Total Maximum Daily Load (TMDL) Program | Regulation | In addition to existing TMDLs, new TMDLs could lead to more stringent stormwater quality controls in future NPDES permits. |
| CWA: §404 Permit Program | Regulation | Some stormwater Capital Improvement Projects (CIPs) can affect wetlands or other "waters of the U.S." §404 permitting and mitigation can increase CIP costs and schedules. |
| Endangered Species Act (ESA) | Regulation | Stormwater CIPs that involve federal permitting or funding could require consultation with federal agencies under §7 of the ESA. ESA consultation could increase project timelines and costs. |

Table 2-2. Federal, State, and City Regulations, Guidance, and Programs Relevant to the Auburn Storm Drainage Utility (continued)

| Title | Regulation, Guidance, or Program | Application to the City |
|---|---|---|
| National Flood Insurance Program | Program | The Plan could affect the City's rating under the Community Rating System, which affects flood insurance rates. |
| Governmental Accounting Standards Board (GASB) Statement 34 | Program | Requires accurate inventory of City's stormwater infrastructure. See Section 2.3.3 below. |
| **State** | | |
| State Environmental Policy Act (SEPA) (Washington Administrative Code [WAC] 197-11) | Regulation | Each CIP would require SEPA review prior to implementation unless that project is categorically exempt. |
| Water quality standards (WAC 173-201A) | Regulation | The NPDES MS4 permit does not authorize discharges that would violate State water quality standards. The State may establish TMDLs for water bodies that violate the standards. As noted above, the TMDLs can become NPDES permit requirements. |
| §401 water quality certification | Regulation | Individual projects that require §404 or other federal permits would also require a §401 certification from Ecology. A §401 certification could include site-specific mitigation measures, which could affect CIP design and cost estimates. |
| Puget Sound Water Quality Management Plan | Guidance | Plan recommendations should be consistent with the Puget Sound Water Quality Management Plan. |
| Puget Sound Partnership | Guidance | In 2007, the Washington State Legislature created a State agency for the purpose of developing and overseeing the implementation of a 2014/2015 "Action Agenda" to clean up, restore, and protect Puget Sound by 2020. The partnership's "Action Agenda" identified three priorities, one of which is to prevent pollution from urban stormwater runoff. |
| Growth Management Act (GMA) and City Comprehensive Plan | Regulation | This Plan is required by the GMA. GMA is discussed in Section 2.3.1 below. |
| State Hydraulic Code (Revised Code of Washington 77.55, WAC 220-660) | Regulation | CIPs that involve work in waters of the State would require a Hydraulic Project Approval (HPA) permit. HPA permitting and mitigation measures could affect CIP costs. |
| Archaeological and cultural coordination | Regulation | If any CIPs are planned for areas with known or suspected archaeological sites, the City will need to coordinate with the Department of Archaeology and Historic Preservation, local Indian tribes, and King County Historic Preservation. |

Table 2-2. Federal, State, and City Regulations, Guidance, and Programs Relevant to the Auburn Storm Drainage Utility (continued)

| Title | Regulation, Guidance, or Program | Application to the City |
|---|---|---|
| **City** | | |
| Environmental review (Auburn City Code [ACC] Title 16.06) | Regulation | Each CIP would be subject to environmental review prior to permitting and construction as prescribed in ACC 16.06. This chapter of the ACC was adopted under the authority of SEPA. |
| Critical areas ordinance (ACC Title 16.10) | Regulation | The Plan should avoid CIPs in critical areas (e.g., wetlands, groundwater protection zones, or wildlife habitat). If a CIP must be sited in a critical area, the cost estimate should include costs for mitigation and permitting as prescribed in ACC 16.10. |
| Development regulations (ACC Title 18) | Regulation | The City's development regulations must be consistent with NPDES MS4 permit requirements. |
| Shoreline Master Program (ACC Title 16.08) | Regulation | Future projects should be located and designed to be consistent with the City shoreline regulations (ACC 16.08). Projects within designated shorelines could require permits and mitigation, which could affect project costs and schedules. |

Most of the regulations listed in Table 2-2 primarily affect the implementation of specific measures recommended in the Plan. For example, CIPs that could affect wetlands would need to comply with City critical areas regulations and possibly federal CWA Section 404 regulations. However, three of the regulations listed in Table 2-2—the GMA, Ecology's Phase II NPDES Stormwater permit, and federal Governmental Accounting Standards Board (GASB) Statement 34—directly affect the LOS for this Plan.

These regulations are discussed in greater detail in Sections 2.3.1 through 2.3.3 below.

### 2.3.1 Growth Management Act

The Washington State Legislature enacted the GMA in 1990 in response to rapid population growth and concerns with suburban sprawl, environmental protection, quality of life, and related issues. The GMA is codified primarily in Revised Code of Washington (RCW) Chapter 36.70A.

The GMA provides a framework for regional coordination, and counties planning under the GMA are required to adopt countywide planning policies to guide plan adoption within the county and to establish urban growth areas. Local comprehensive plans must include the following elements: land use, housing, capital facilities, utilities, transportation, economic development, parks and recreation, and, for counties, a rural element. This Plan serves as a component of the utilities element for City-owned storm drainage assets.

### 2.3.2 Phase II Municipal Stormwater Permit

The NPDES MS4 permit program is a requirement of the federal CWA, which is intended to protect and restore waters for "fishable, swimmable" uses. The federal Environmental Protection Agency (EPA) has delegated permit authority to state environmental agencies, and these agencies can set permit conditions in accordance with and in addition to the minimum federal requirements. In Washington, Ecology is the NPDES-delegated permit authority.

Phase I of the stormwater NPDES regulation applies to cities and counties that operate MS4s and had populations of 100,000 people or more according to the 1990 census. Phase II of the stormwater NPDES regulation applies to municipalities that operate MS4s and have populations of fewer than 100,000 people according to the 1990 census. Auburn is a Phase II permittee.

Ecology issued the current Western Washington Phase II Municipal Stormwater permit (the NPDES MS4 permit) in July 2024, with an effective date of August 2024. The NPDES MS4 permit term will last until July 2029.

The NPDES MS4 permit requires the City to submit a SWMP Plan by March 31 of each year, in which the City identifies activities to be completed in compliance with the permit requirements. The permit also requires submittal of an annual report that looks back on SWMP activities for the prior year. The NPDES MS4 permit and associated requirements are described in detail in the City's current SWMP Plan, which is available on the City's website.

The NPDES MS4 permit allows municipalities to discharge stormwater runoff from their municipal drainage systems into the state's water bodies (e.g., streams, rivers, lakes, and wetlands) as long as municipalities implement programs to protect water quality by reducing the discharge of "nonpoint source" pollutants to the "maximum extent practicable" (MEP) through application of permit-specified "best management practices" (BMPs). The stormwater management activities specified in the NPDES MS4 permit are collectively referred to as the SWMP and grouped under the following program components:

- SWMP administration.
- Public education and outreach.
- Public involvement and participation.
- Illicit discharge detection and elimination (IDDE).
- Control of runoff from new development, redevelopment, and construction sites.
- Municipal operations and maintenance.
- Monitoring and assessment.

The NPDES MS4 permit also requires compliance with established total maximum daily loads (TMDLs).[2] The current NPDES MS4 permit requires the City to monitor discharges to the White River, in association with the Puyallup River watershed fecal coliform TMDL. Additional actions required by the City to ensure compliance with TMDLs are listed in Appendix 2 of the NPDES MS4 permit (Appendix A of this Plan). Ecology has identified several other water bodies in the vicinity of Auburn that do not appear to meet the water quality standards, and additional TMDL requirements are possible in future permits.

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[2] A total maximum daily load (TMDL) is a calculated maximum pollutant loading a water body can receive while still meeting water quality standards. Once a TMDL is established, the State determines how much each source must reduce its discharges of the pollutant in order to bring the water body back into compliance with the water quality standards. The federal CWA requires that TMDLs be established for all water bodies that do not meet water quality standards, and that TMDL requirements be included in the NPDES permits for dischargers into the affected water bodies.

### 2.3.3 Governmental Accounting Standards Board

Financial reporting by public utilities must adhere to requirements set by the GASB, the agency responsible for developing standards of state and local governmental accounting and financial reporting. Most prominent is GASB Statement 34, "Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments," which was issued in June 1999. The main objective of Statement 34's requirements is to have financial reports that are more comprehensive and are easier to understand by the public. Statement 34 consists of several components, which can be seen in full in paragraphs 3 to 166 of the GASB publications. In summary, Statement 34 requires that the basic financial statements and required supplementary information (RSI) for general purpose governments should consist of the following:

- Management's discussion and analysis. In sum, this requirement states that prior to the basic financial statements, a discussion providing an analytical overview of the government's financial activities is necessary.
- Basic financial statements, which should include:
  - Government-wide financial statements that include information on net assets (e.g., storm drainage infrastructure) and a statement of activities.
  - Fund financial statements that focus on information about the government's major governmental and enterprise funds (e.g., the City's Storm Drainage Utility), including its blended component units.
  - Notes to the financial statements that will enable users to understand the basic financial statements.
- Required supplementary information. Budgetary comparison schedules should be presented as RSI along with other types of data, as required by previous GASB pronouncements.

Consequently, the City needs an accurate inventory of its stormwater infrastructure in order to comply with the GASB 34 requirements.

# 3. System Goals and Policies

This chapter describes a set of overarching goals for the City's Storm Drainage Utility and policies for complying with these goals.

## 3.1 City Comprehensive Plan Consistency

The City Comprehensive Plan is the City's growth management plan and contains policies for protecting critical areas and natural resource lands, designating urban growth areas, preparing comprehensive utility plans, and implementing them through capital investments and development regulations. Therefore, the City Comprehensive Plan provides a framework of policies for development, expansion, and maintenance of the Storm Drainage Utility reflected in this Storm Drainage Comprehensive Plan.

## 3.2 Storm Drainage Comprehensive Plan Policy Goals

The City's Storm Drainage Utility policies are grouped within goal statements that are headlined under the following categories:

- System Planning.
- Operations and Maintenance.
- Fiscal Responsibility.
- Environment and Regional Coordination.

Taken together with the City Comprehensive Plan and ACC these goals define how the Storm Drainage Utility shall be operated and maintained. Several policies have been developed within each goal, many of which are also based on the Washington Department of Ecology SWMMWW and the City's Phase II NPDES MS4 permit.

### 3.2.1 System Planning

Goal 1: Employ recognized best business practices resulting in creating a sustainable, efficient, and cost-effective operation of the Storm Drainage Utility.

POLICY 1.1 Incorporate the Comprehensive Storm Drainage Plan as an Element of the City's Comprehensive Plan.

POLICY 1.2 The City shall seek to manage stormwater runoff within the public Right Of Way (ROW):

- to provide access to and functionality of critical services.
- to preserve mobility on major transportation routes (i.e., arterial roads) and residential roads.
- to protect real property structures (e.g., residences and businesses).

POLICY 1.3 The City shall seek to provide pump redundancy and backup power generators or dual power feeds at City-owned and -operated drainage pump stations.

POLICY 1.4 The City shall routinely assess the performance of pumped systems with a focus on capacity and vulnerability. This review aims to ensure that these systems operate efficiently, meet their intended capacity, and remain resilient against potential risks.

POLICY 1.5 The City shall require the separation of sanitary and storm sewer facilities wherever combined sewers may be discovered.

POLICY 1.6 Establish, maintain, and update an asset database to be used in prioritizing asset maintenance and repair and replacement activities. The database will include asset age and material information and will be validated and updated through inspections, records review, and other available information.

POLICY 1.7 Review complaints/citizen reports and claims made against the City and create a list of operational and capital improvements to be implemented by the Plan.

POLICY 1.8 The City shall use the outcomes of future rainfall intensity data updates for informing the design of its stormwater systems. Specifically, the same design storms—such as the 25-year event for pipe capacity and the 100-year event for storage facilities—shall be employed using projected rainfall statistics. The City shall draw upon relevant studies, including those mentioned in the King County Surface Water Design Manual (KCSWDM) or other ongoing regional research once the results become available (King County DNR 2021).

### 3.2.2 Operations and Maintenance

Goal 2: Maintain existing infrastructure and ensure facilities are reliable and operational now and into the future.

POLICY 2.1 The City shall maintain or seek access to all City-owned facilities for necessary maintenance and operation. [ACC 13.48.440B]

POLICY 2.2 The City's Storm Drainage Utility shall be responsible for implementation, maintenance, and operation of the City's public storm drainage system. Storm systems serving City-owned properties managed by other departments and/or divisions of the City that are not part of the public storm drainage serving the public ROW (e.g., Parks, Arts & Recreation; Administration – Facilities; Public Works – Airport) shall be responsible for their own maintenance and upkeep.

POLICY 2.3 Drainage facilities constructed to serve private property shall be owned and maintained by the property owner. Drainage facilities constructed to serve public ROW shall be owned and maintained by the City.

POLICY 2.4 The City shall seek to maintain storm drainage infrastructure to ensure proper function of drainage facilities by performing scheduled maintenance in accordance with the NPDES permit. [ACC 13.48.180]

POLICY 2.5 The City shall seek to seasonally maintain storm drain inlets, conveyance, and outfalls to preserve design conveyance capacity.

POLICY 2.6 Employee safety will be a primary consideration in the design, construction, operation, and maintenance of storm drainage infrastructure.

POLICY 2.7 Investigate all customer service calls within 24 hours and record results in the computerized maintenance management system (CMMS.)

### 3.2.3 Fiscal Responsibility

Goal 3: Responsibly manage funds, employ best business practices, and operate the utility in a cost-effective manner.

POLICY 3.1 Appropriate rates and system development charges shall be assessed and periodically updated to fund the ongoing maintenance, operation, and capital expenditures of the utility. [ACC 13.48.060]

POLICY 3.2 Manage the Storm Drainage Utility funds and resources in a professional manner in compliance with applicable laws, regulations, and City financial policies, which requires ongoing monitoring of revenues and expenses in order to make prudent business decisions, and report to City officials, as needed, regarding the status of utility operations.

POLICY 3.3 The City shall require that developers evaluate off-site storm drainage systems, consider improvements needed to serve new development, and construct identified improvements prior to or simultaneously with such development.

POLICY 3.4 The City shall continue to prioritize asset management as a business practice and use it to plan for preventative maintenance, predict system depreciation and replacement costs, prioritize inspections for condition status to inform system risk, and prepare to minimize the occurrence and impact of system failures.

POLICY 3.5 The City will monitor capital project implementation by tracking schedule, budget accuracy, and overall efficiency.

POLICY 3.6 Consider replacing or upgrading storm facilities to current standards in the ROW whenever a street is to be substantially reconstructed or other significant utility work is to be completed, especially when storm improvements are specifically identified in the Plan. In addition, consider street and other utility improvement needs when replacing or upgrading storm facilities.

POLICY 3.7 Pursue opportunities to secure grants and other revenue partnerships to fund storm drainage program needs.

POLICY 3.8 The utility will not accept nonstandard, powered, or private facilities for ownership, operation, or maintenance by the utility.

### 3.2.4 Environment and Regional Coordination

Goal 4: Work to protect the natural environment within the City and contribute to the preservation of natural resources throughout the region.

POLICY 4.1 The Storm Drainage Utility shall work with other jurisdictions and agencies to address regional water quality issues.

POLICY 4.2 The City shall comply with all federal, state, and local regulations pertaining to stormwater management, facility maintenance, and pollution control.

POLICY 4.3 The City shall promote policies that preserve existing native vegetation and natural drainage courses while maintaining their conveyance capacity.

POLICY 4.4 Environmental issues, such as water quality and fish habitat protection, shall be considered in all new development applications and new storm drainage improvements. This policy includes consideration of new and emerging concerns, such as the chemical 6PPD-quinone in street runoff and the effects of climate change on stream temperatures.

| | |
|---|---|
| POLICY 4.5 | The City shall seek to minimize impacts to natural river systems by encouraging pretreatment of surface flows from new development and reintroduction into groundwater, where feasible. |
| POLICY 4.6 | The City shall seek opportunities, where feasible, to reintroduce treated urban runoff back into the groundwater system as new development and redevelopment occurs in order to minimize urbanization impacts to the hydrology of natural river systems. |
| POLICY 4.7 | The City shall evaluate the feasibility of improving the water quality of its existing discharges into river systems. |
| POLICY 4.8 | The City shall seek to comply with all federal, state, and local regulations to reduce runoff volumes and pollutant loads associated with new development and redevelopment. |
| POLICY 4.9 | The City shall seek to prevent erosion and landslides related to construction, operation, and maintenance of the publicly owned drainage system. |

# 4. Drainage System

Chapter 4 develops a future work plan to collect and organize information describing the current conditions of the storm drainage system, which provides the basis for investigations (Chapter 5) designed to evaluate the Storm Drainage Utility performance relative to the system goals. This chapter provides an overview of the City's drainage system, including both natural (Section 4.1) and constructed (Section 4.2) drainage elements. It also summarizes key factors related to the storm drainage system, namely critical facilities (Section 4.3) and water quality (Section 4.4), and existing issues facing the Storm Drainage Utility (Section 4.5).

Figures presented in this chapter consist of several maps of the Storm Drainage Utility service, drainage and surrounding areas.

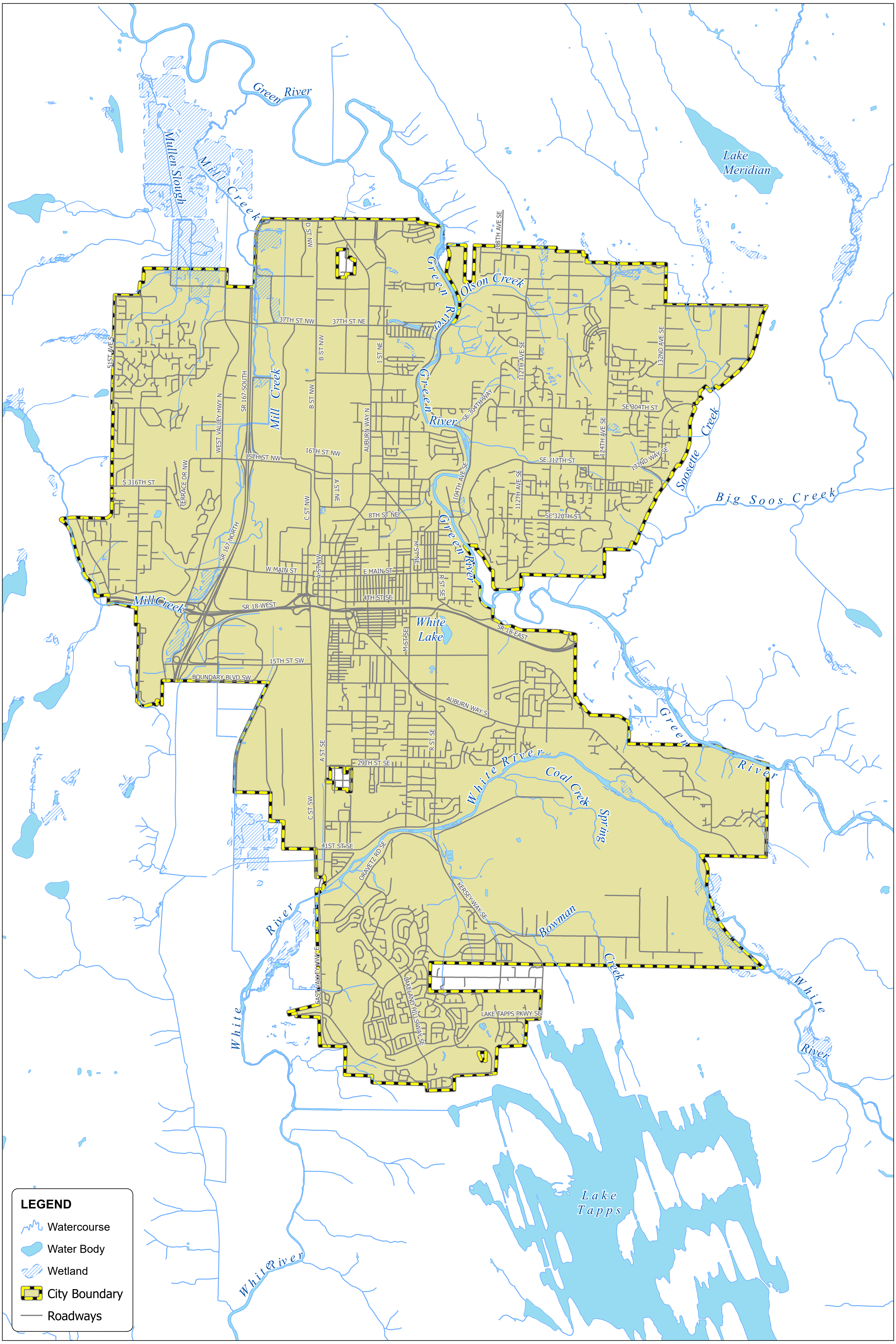
## 4.1 Natural Drainage

The City of Auburn encompasses approximately 30 square miles; the central portion of the City lies along the bottom of a valley, while the outer edges of the City extend into the surrounding hills (see Figure 4-1). In general, stormwater runoff from the City flows to one of three major receiving waters: the Green River, the White River, and Mill Creek. Other notable water features in the Auburn area include the following:

- Big Soos Creek, which drains southeast into the Green River.
- Soosette Creek (also known as Little Soos Creek), which drains south into Big Soos Creek.
- Mullen Slough, which drains along the northwest side of Mill Creek toward the Green River.
- Bowman Creek, which drains north into the White River.
- Olson Creek, which drains west into the Green River.
- Lake Tapps, which is located just south of the City.
- White Lake, which is located southeast of R Street SE and State Route (SR) 18.
- Coal Creek Springs, which drains north to the White River.

The City contains nearly 30 miles of rivers and streams and more than 1,000 acres of floodplain area associated with these water features. There are over 1,500 acres of wetlands, including forested/shrub and freshwater emergent wetlands.

The following section provides additional information on each of the three major receiving waters.



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COMPREHENSIVE STORM DRAINAGE PLAN
May 2024

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CITY OF AUBURN WASHINGTON

**Figure 4-1**
**Natural Drainage Features**
**of the City of Auburn**

## 4.1.1 Receiving Waters

### 4.1.1.1 Green River

The Green River flows over 93 miles, beginning on the west slope of the Cascade mountains and ending in the Duwamish Waterway, meandering through the northeast portion of Auburn along the east valley wall. Throughout the last century, the Green River was altered for the purpose of flood control, including the construction of levees and bank revetments and the diversion of the White River in the early 1900s. In 1962, the Howard A. Hanson Dam was built on the Green River to control flooding in the valley.

From 1960 to 2007, the City of Auburn participated in Green River flood management activities as part of the Green River Flood Control District. In 2007, the Green River Flood Control District was phased out because flood control and management efforts for the Green River are now included in the King County Flood Control District (KCFCD), which was established in 2007. These efforts are reflected in the 2006 King County Flood Hazard Management Plan. The KCFCD goals and objectives include maintaining and repairing levees and revetments and acquiring at-risk floodplain properties. Auburn elected officials and staff serve on advisory committees for the KCFCD.

### 4.1.1.2 White River

The White River originates on the slopes of Mount Rainier and flows generally northward and westward into the Puget Sound lowlands. Near Auburn, the White River flows north and then west through the southern portions of the City before it curves southward toward the Puyallup River. The White River is a very dynamic, sediment-laden river, which has led to changing channel morphology.

Prior to 1900, the White River flowed into the Green-Duwamish River; however, floodwaters from the White River drained to both the Green-Duwamish River and the Puyallup River. A flood in 1906 caused the White River to shift and flow into the old Stuck River channel, which leads to the Puyallup River. In 1907, a diversion wall was constructed in Game Farm Park to permanently direct the White River flow into the Puyallup River (USACE 2009a).

The shifting of floodwaters from the White River caused inter-jurisdictional conflicts between King and Pierce Counties. After attempts by the two counties to control flooding along the White River met with limited success, the U.S. Army Corps of Engineers (USACE) was engaged for help. In 1948, the USACE finished construction of the Mud Mountain Dam to control floods on the White River.

At the time Mud Mountain Dam was finished, White River channel capacity in Auburn was estimated to be 20,000 cubic feet per second. Since then, vegetation encroachment and sediment accumulation have reduced channel capacity (USACE 2009a). Reduced channel capacity causes higher river levels during large storm events, which can impact the City’s gravity drainage outfalls along the White River.

### 4.1.1.3 Mill Creek

Mill Creek flows out of the hills on the west side of the valley near SR 18 and then turns northward along the western portion of the City, running adjacent to SR 167. It crosses under SR 167 several times as it flows through the valley floor. Approximately 1 mile north of the City boundary, Mill Creek discharges into the Green River.

Historically, Mill Creek served as vital habitat for migrating salmon and provided ideal conditions for rearing and storm refuge. However, increasing development has altered the natural flow pattern of Mill Creek, including the installation of diversions and culverts, channel straightening, degradation of water quality, and aggradation from increased stormwater inflows with high sediment loads. In many areas the stream is straight and shallow and exhibits a lack of quality riparian habitat for Endangered Species Act (ESA)-listed species such as Chinook salmon and bull trout (USACE 2009b). Aggradation along Mill Creek has also contributed to flooding and drainage problems in the City. The City's drainage outfalls to Mill Creek can become submerged, thereby reducing the hydraulic capacity of the system.

### 4.1.2 Drainage Areas

The City's drainage can be described by dividing the City into six general subareas and their discharge location (Figure 4-2):

- Lea Hill lies northeast of the Green River. Most of the Lea Hill area drains west into the Green River. However, the eastern edge drains south and east out of the City into Soosette Creek and Big Soos Creek.
- West Hill lies west of Mill Creek. The West Hill area drains into several small tributaries to Mill Creek. The northern portion of West Hill drains to the northeast into steep ravines that discharge to Mullen Slough and other wetland areas on the valley floor.
- The southern portion of the City drains to the White River. The area west of Bowman Creek consists largely of single family residential developments, which drain to the White River to the west and north and Bowman Creek to the east, with a small portion draining south toward Lake Tapps. The area east of Bowman Creek consists of rural residential development. This area drains to Bowman Creek on the southwest and the White River on the northeast side.
- The southeast portion of the City lies along a narrow plateau between the Green and White Rivers. Runoff from this area drains to the Green River along the north side and the White River along the south side.
- The north central portion of the City lies along the valley floor and is located north of 27th Street SE. This is part of the central and most developed area of the City. The topography in this area is so flat that roadways and storm drainage infrastructure largely determine the receiving water to which runoff is diverted. Runoff from this area is generally split between Mill Creek and the Green River.
- The south central portion of the City also lies along the valley floor and is located south of 27th Street SE. This area is also part of the most developed area of the City. The topography in this area is so flat that roadways and storm drainage infrastructure largely determine the receiving water to which runoff is directed. This area features extensive infiltration into groundwater, but otherwise drains toward the White River.

The above-described areas can be divided into smaller drainage subbasins. The City maintains a mapping of the storm drainage basins and subbasins, with a total of 59 drainage subbasins. Each subbasin is identified by a series of one, two, or three letters (Figure 4-2).

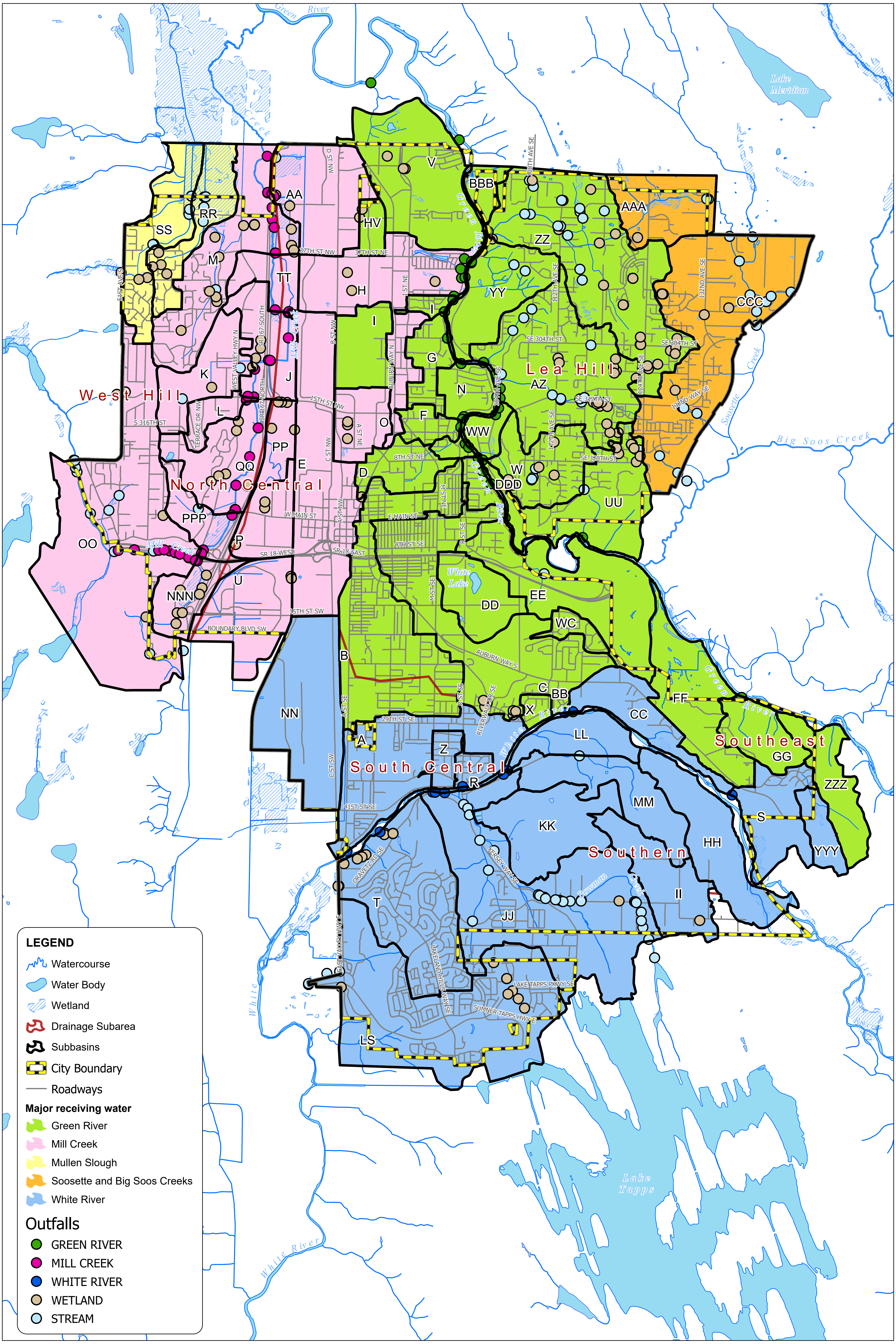

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**Figure 4-2**
**Drainage Subareas for the City of Auburn Storm Drainage Utility**

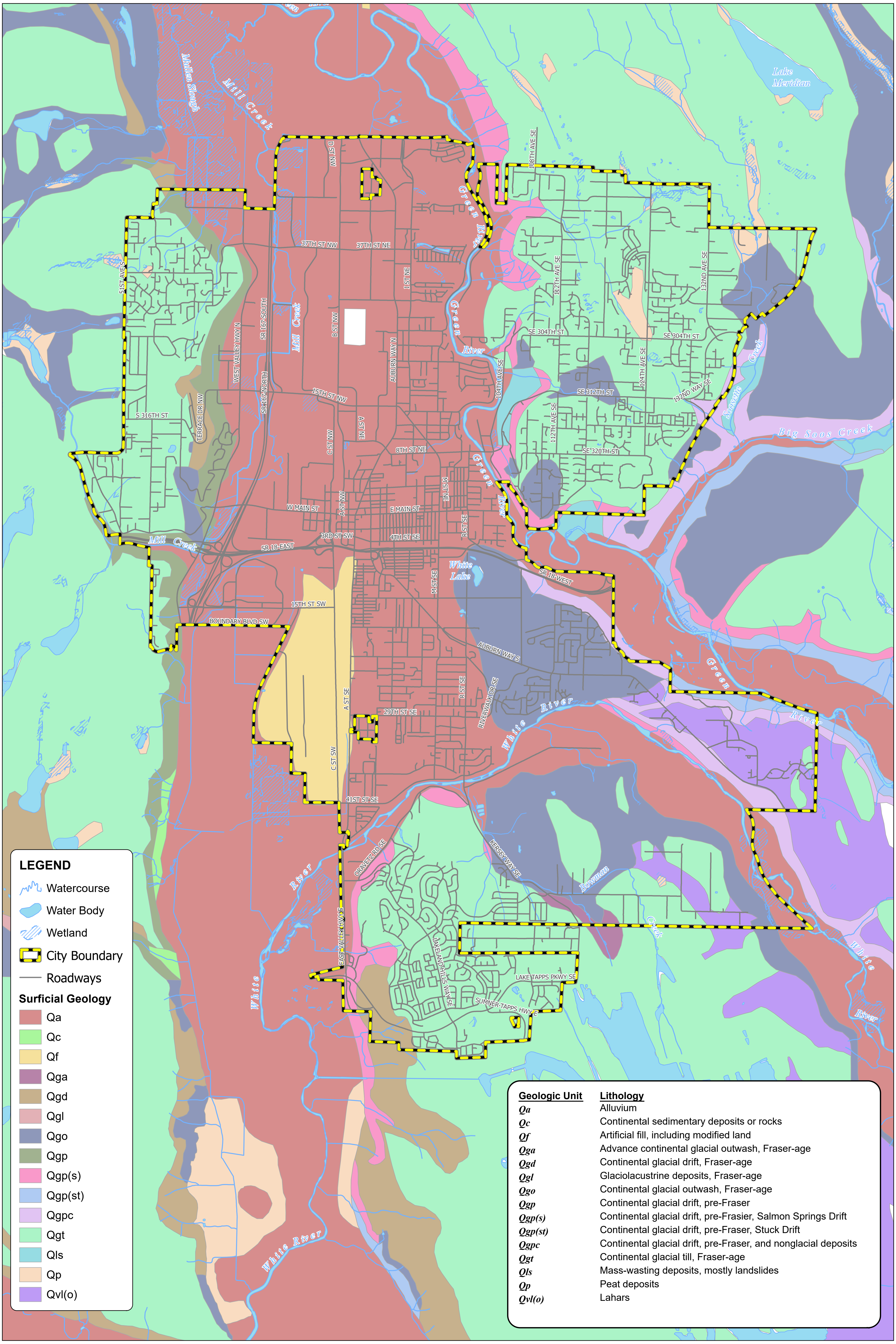
### 4.1.3 Geology and Groundwater

Topography and geology in the Auburn region has been influenced largely by millions of years of advancing and retreating glaciers, most recently with the Vashon glaciation occurring approximately 12,000 to 18,000 years ago (Booth 1991). Following the retreat of the glacier, interglacial processes, such as landslides, mudflows, erosion, and alluvial deposition, have continued to shape the region. In general, the upland hills around the City's periphery comprise glacial and interglacial deposits, while the valley is filled with more recent deposits overlying glacial and older interglacial deposits.

Major geologic units of the White and Green River valley include undifferentiated glacial and interglacial deposits, Vashon recessional deltaic deposits, undifferentiated alluvium, Osceola mudflow, and White River alluvium. The undifferentiated glacial and interglacial deposits form the lowest layer in the valley consist of materials deposited during the glacial periods. As the glacier retreated, meltwater flowed into a water-filled embayment then occupying the present White and Green River valley area. This meltwater deposited sand and gravel known as the Vashon recessional deltaic deposits. After the end of the glacial period, the Green River deposited undifferentiated alluvium in the valley because of erosion of upland glacial deposits. Approximately 5,700 years ago, a massive volcanic mudflow from Mount Rainier, known as the Osceola mudflow, flowed down into the valley (Troost and Booth 2008). White River alluvium is the geologic unit nearest the surface and consists of alluvial deposits from the White and Green Rivers.

Bedrock is found approximately 1,280 feet beneath the valley floor. Surficial geologic mapping of the Auburn region is shown in Figure 4-3.

In general, groundwater flow systems in the Auburn area are characterized by upland recharge flowing toward the valley. The two major aquifers in the White and Green River valley are the modern alluvium aquifer and a deep deltaic valley aquifer; the latter is used for Auburn's water supply. The modern alluvium aquifer is the shallowest aquifer in the Auburn-Kent Valley, often lying 10 to 15 feet below the ground surface. Groundwater in the deep deltaic valley generally flows in a pattern parallel to the direction of the Green River in the north and the White River in the south.



| Geologic Unit | Lithology |
|---|---|
| *Qa* | Alluvium |
| *Qc* | Continental sedimentary deposits or rocks |
| *Qf* | Artificial fill, including modified land |
| *Qga* | Advance continental glacial outwash, Fraser-age |
| *Qgd* | Continental glacial drift, Fraser-age |
| *Qgl* | Glaciolacustrine deposits, Fraser-age |
| *Qgo* | Continental glacial outwash, Fraser-age |
| *Qgp* | Continental glacial drift, pre-Fraser |
| *Qgp(s)* | Continental glacial drift, pre-Frasier, Salmon Springs Drift |
| *Qgp(st)* | Continental glacial drift, pre-Fraser, Stuck Drift |
| *Qgpc* | Continental glacial drift, pre-Fraser, and nonglacial deposits |
| *Qgt* | Continental glacial till, Fraser-age |
| *Qls* | Mass-wasting deposits, mostly landslides |
| *Qp* | Peat deposits |
| *Qvl(o)* | Lahars |

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### Figure 4-3
### Surface Geology in the Vicinity of the City of Auburn

## 4.1.4 Soils and Runoff Potential

Surface soils are classified by the Natural Resources Conservation Service (NRCS) into four hydrologic soil groups based on the soil's runoff potential: A, B, C, and D. Group A soils generally have the lowest runoff potential while Group D soils have the highest. Hydrologic soil groups are defined by NRCS (1986) as follows:

- Group A is sand, loamy sand, or sandy loam types of soils. It has low runoff potential and high infiltration rates, even when thoroughly wetted. It consists chiefly of deep, well- to excessively drained sands or gravels and has a high rate of water transmission.
- Group B is silt loam or loam. It has a moderate infiltration rate when thoroughly wetted and consists chiefly of moderately deep to deep, moderately well- to well-drained soils with moderately fine to moderately coarse textures.
- Group C is sandy clay loam. It has low infiltration rates when thoroughly wetted and consists chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure.
- Group D is clay loam, silty clay loam, sandy clay, silty clay, or clay. It has very low infiltration rates when thoroughly wetted and consists chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material.

Areas in the valley floor is mostly Group D soils, which typically have very low infiltration rates and high runoff potential. The West Hill, Lea Hill, and Lakeland Hills areas are predominantly Group C soils, which have low infiltration rates and moderate to high runoff potential. The Southeast area, Bowman Creek area, and valley area located generally between SR 18 and the White River have Group A soils, which are characterized by high infiltration rates and low runoff potential. See the NRCS maps (http://www.nrcs.usda.gov/) for mapped soils within the City.

## 4.1.5 Land Use and Development

Land use and the intensity of development have considerable effects on the quality and quantity of stormwater runoff flowing into the drainage system and ultimately discharging to receiving waters. As the population of the City increases, new areas of the City are developed or existing areas are redeveloped at a higher density. These changes can result in increased stormwater runoff and greater water quality impacts to water bodies. However, development regulations and drainage design standards imposed by the City are intended to mitigate these impacts. The following sections describe expected growth and how development regulations and design standards are being updated to reduce impacts to stormwater runoff.

### 4.1.5.1 Recent Growth

Auburn's population has steadily increased since the 1950s. Auburn's population increased by an average of 8% per year from 1960 to 1980, then slowed to approximately 1.7% per year from 1980 to 1994. Auburn's population growth rate began to increase in 1998 and continued as the City annexed new areas, known locally as the Lea Hill, West Hill, and Lakeland Hills areas. The larger Lea Hill area annexations began in 2000 and continued to 2024. The West Hill area was annexed in 2007, while the Lakeland Hills area annexations occurred between 1998 and 2005. As of 2010, the population of Auburn increased to 70,180 and increased to 86,340 by 2020. The Washington State Office of Financial Management indicates that Auburn's population in 2023 was approximately 88,820 (approximately 78,760 in King County and 10,060 in Pierce County).

#### 4.1.5.2 Future Growth

The City's goals, objectives, and policies for growth and development are described in detail in the 2025 Comprehensive Plan. These goals, objectives, and policies are applied to different areas of the City through land use designations (see Figure 4-4). The City also has developed special land use plans for certain areas of the City where specific land use goals have been identified. An important example is the City's downtown area; one of the goals described in the Comprehensive Plan is to encourage development and redevelopment in the downtown area to serve as an urban center for the community.

#### 4.1.5.3 Development Regulations and Drainage Design Standards

The City implements state and federal stormwater regulations through the stormwater code, the COA Supplement, and related stormwater management programs and policies. City stormwater regulations contain specific requirements for managing stormwater quality and quantity in areas subject to new development and redevelopment. For example, the SWMMWW provides guidance for implementing low impact development (LID) measures that are designed both to improve water quality and to control peak flows and durations of runoff. The City reviews and updates its local development regulations and design standards as necessary to meet the NPDES MS4 permit requirements. The COA Supplement was last updated in 2022.

City stormwater regulations and development standards are intended to avoid substantial increases in stormwater discharges to the existing drainage system through the implementation of on-site stormwater controls. This would keep stormwater conveyance demands at or near existing levels.

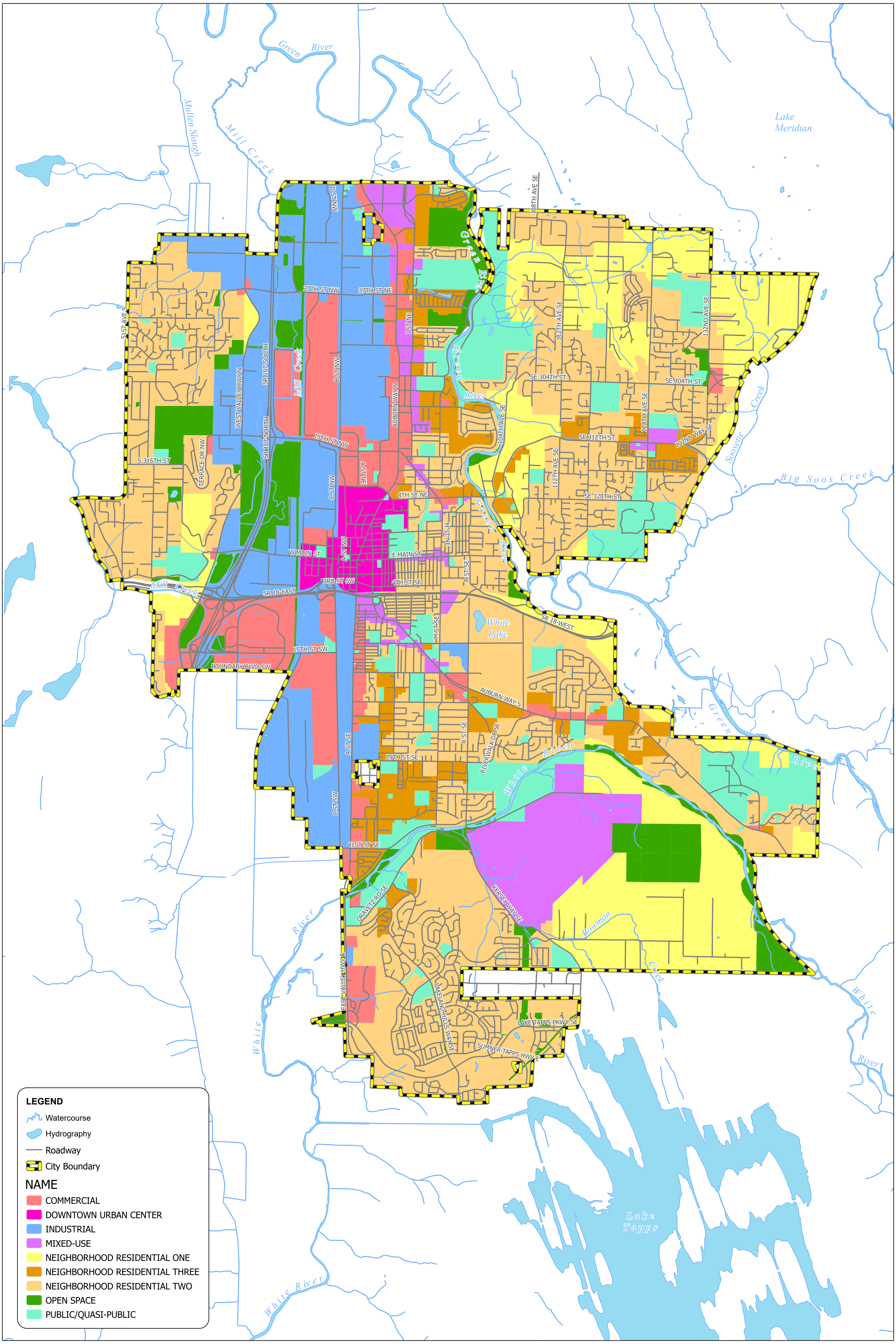

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**Figure 4-4**
**Land Use Designations for the City of Auburn**

### 4.1.6 Flood Hazard Mapping

The City of Auburn is a participant in the National Flood Insurance Program (NFIP) administered through the Federal Emergency Management Agency (FEMA) to enable property owners to purchase insurance protection from the government against losses from flooding. Participation in the NFIP is based on an agreement between the City and the federal government, stating that if the City adopts and enforces a floodplain management ordinance to reduce future flood risks to new construction in areas designated as Special Flood Hazard Areas (SFHA), the federal government will make flood insurance available within the community as a financial protection against flood losses. The SFHAs and other risk premium zones applicable to each participating community are depicted on Flood Insurance Rate Maps (FIRMs).

FEMA established flood hazard zones from a Flood Insurance Study (FIS) for King County conducted in 2013, which examined flooding along several major rivers. Although the primary purpose of the FIS was to establish flood insurance rates, the flood mapping resulting from these studies is also used for floodplain management and flood hazard mitigation planning. Updates to the flood hazard zones are continually being made at local levels (King County and Pierce County) and represented in Preliminary FIRMs or Letters of Map Revision (LOMR). Preliminary FIRMs for all of King County were reissued on August 19, 2020. The most recent flood hazard mapping for Pierce County is presented in its Rivers Flood Hazard Management Plan adopted in 2023 and also in LOMR files located on the FEMA Map Service Center Web page (Pierce County 2023). Table 4-1 lists the FIRMs developed for areas within the City of Auburn.

Table 4-1. Federal Emergency Management Agency Flood Insurance Rate Maps Applicable to Auburn

| | | | |
|---|---|---|---|
| 53033CIND1B | 53033CIND2B | 53033C1232G | 53033C1235G |
| 53033C1242G | 53033C1251G | 53033C1252G | 53033C1253G |
| 53033C1254G | 53033C1257G | 53033C1259G | 53033C1261G |
| 53033C1262G | 53033C1263G | 53033C1264G | 53033C1266G |
| 53033C1267G | 53033C1268G | 53033C1269G | 53033C1476F |
| 53033C1477F | | | |

### 4.1.7 Recent Climate and Precipitation Trends

Auburn's climate is typical of that in the Puget Sound lowlands of Western Washington, where the summers are cool and comparatively dry, while the winters are mild, wet, and cloudy (WRCC 2014). Mean annual precipitation in the Puget Sound lowlands varies from 32 inches (north Seattle) to approximately 47 inches (near Centralia, Washington).

The precipitation gauge at Auburn City Hall has been recording data since 1995. The mean annual precipitation recorded at that gauge (with missing data filled in from the nearby King County Lakeland Hills gauge) from 2015 to 2022 was approximately 39 inches. This is very similar to the mean annual precipitation recorded at the two nearest long-term gauges:

- Seattle-Tacoma Airport, which is part of the National Oceanic and Atmospheric Administration (NOAA) Cooperative Network (Station 457473), has a mean annual precipitation of approximately 38 inches based on 74 years of recorded data (WRCC 2014b). The Seattle-Tacoma Airport gauge is located approximately 8 miles northwest of Auburn.
- Kent, Washington (NOAA Co-op Station 454169) has a mean annual precipitation of approximately 39 inches based on 57 years of recorded data (WRCC 2014c). The Kent gauge is located approximately 7 miles north of Auburn.

Precipitation-frequency data for Washington are compiled in Volume 9 of NOAA Atlas 2 (Miller et al. 1973); precipitation-frequency estimates for Auburn, Washington, are listed in Table 4-2.

Table 4-2. Precipitation Frequency Data for Auburn, Washington, from NOAA Atlas 2

| Frequency, duration | Precipitation (inches) |
|---|---|
| 2-year, 6-hour | 0.95 |
| 2-year, 24-hour | 1.75 |
| 100-year, 6-hour | 1.90 |
| 100-year, 24-hour | 3.80 |

### 4.1.8 Anticipated Changes in Climate

Changing climate will continue to be a key factor in the performance, operation, maintenance, and design of the City's stormwater system. According to the publication, *Climate Change Impacts and Adaptation in Washington State*, the state is projected to experience decreases in snowpack, increases in stream temperatures, changes in stream base flow, increased frequency of high rainfall intensity and magnitude, and changes in peak stormwater runoff, streamflow, and flooding frequency (Snover et al. 2013). This section provides an assessment and strategy for the City to address future changes and effects to the storm sewer and flood management systems while considering the range of uncertain climate projections.

The available information on future climate conditions will help guide decisions and investments, avert impending impacts on stormwater programs from climate change, and enhance the effectiveness and resilience of stormwater systems in the face of environmental uncertainties. Assessing future climate impact magnitude, risk, and uncertainty are critical to making appropriate decisions about physical attributes (size, location, elevation, capacity) and performance (service levels, acceptable impacts, failure scenarios) for stormwater programs.

The following future climate conditions are potentially impactful to the City's stormwater programs:

- **Precipitation:** Projected changes in precipitation show evidence for increased frequency of intense, large, or persistent rains in the future, mostly in the winter storm season. These increases could exceed the existing level of performance in the City's stormwater system.
- **System performance and flooding:** Increased frequency of larger or more intense storms could lead to increased stormwater runoff and thus more frequent flooding of existing storm drainage systems in the City. Pumped or other operated systems are typically more vulnerable to changing storms.
- **River and stream flooding:** Increased frequency of larger and longer duration storms could lead to increased local stream and river flooding, increased stages over known or mapped floodplains, and different flood control operations on the White and Green River dams.
- **Groundwater:** More frequent storms of higher magnitude have the potential for increased infiltration and thus rising groundwater table. This should be a consideration in infiltration facility design, subsurface excavations, and installation of stormwater structures such as vaults.
- **High temperature:** Average and extreme high temperatures in Auburn are expected to be higher in the future, causing effects like higher summer surface water temperatures that can be harmful to aquatic life and fisheries.

### 4.1.8.1 Uncertainty and Risk Management

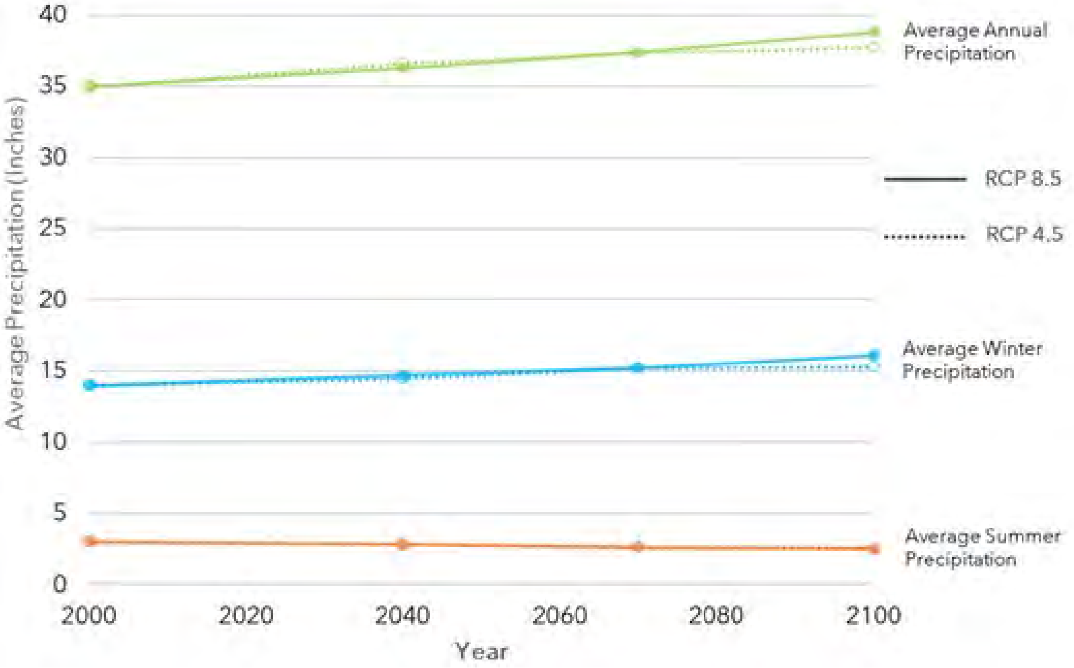
Addressing uncertainty in climate projections is an important aspect of climate research. Since future outcomes in climate conditions heavily rely on human activities and the Earth's climate system is extraordinarily complex, global climate models have an amount of uncertainty. All future climactic conditions are projections, not predictions. Ongoing research aims to reduce uncertainties by improving climate models, refining data collection methods, and enhancing our understanding of the Earth's climate system and its interactions with human activities.

When possible, this section uses locally refined, dynamic data to inform potential future climate scenarios. Because uncertainty is inherent in projections of climate change, the likelihood of a range of possibilities are presented.

Stormwater management is a risk-based practice, which means that standards are typically based on the likelihood or probability that an event will occur, and the level of protection needed is related to that possibility. Consequently, the approaches to applying recommendations in part consider the coincident events (e.g., sea level rise ranges plus event probability) with expected performance. No "reasonable" or applicable stormwater standards can apply to all possible events or outcomes, and extremes can exceed system capacity. An important consideration that is a core practice when establishing storm system criteria is to consider the consequences of failure, because all systems (unless designed for the probable maximum flood) can fail in any year.

### 4.1.8.2 Precipitation Projections

According to climate models, the region's average precipitation is expected to undergo minimal changes (Hegewisch et al. 2023). Figure 4-5 illustrates the projected alterations in average precipitation for two climate scenarios: Representation Concentration Pathway (RCP) 4.5 (low end) and RCP 8.5 (high end). When examining individual seasons, we observe a slight increase in total precipitation during the winter, an almost negligible loss of precipitation in the summer, a slight increase in precipitation in the fall, and a slight decrease in precipitation in the spring.



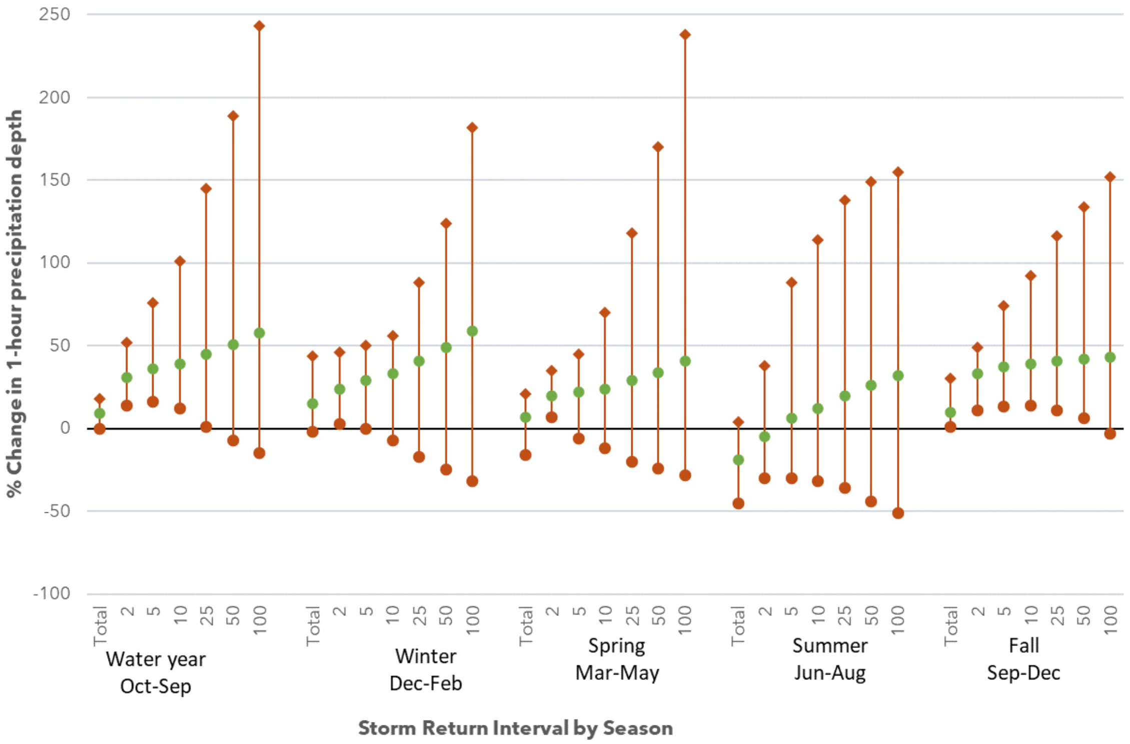
Modified from Hegewisch et al. 2023.

Figure 4-5. Projected Change in Average Precipitation for Seattle, Washington.

Although the City is not predicted to see a significant increase in overall precipitation, climate models predict an increase in the intensity of precipitation, specifically during the winter months. Heavy rain events in the Pacific Northwest are often caused by atmospheric rivers, where long, narrow regions of concentrated moisture are carried from lower latitudes (Morgan et al. 2021). Intensification of atmospheric rivers is projected to cause an increase in extreme winter precipitation frequency.

Figure 4-6 outlines the anticipated percentage change in extreme heavy rain events in SeaTac, Washington. The figure shows predicted changes in short duration storms (1 hour) across different return frequencies (ranging from 2 to 100 years) during the entire water year, as well as individual seasons (winter, spring, summer, and fall) for the 2080s (spanning from 2070 to 2099) relative to 1970 to 1999. Key details are summarized below:

- **Projection scope:** The total projection includes all precipitation occurring in a season or water year.
- **Return frequencies:** The 2- to 100-year return frequency projections represent the high- and low-end extremes, estimated based on only the largest value in each year.
- **Measurement:** All 2080 projections are expressed as the percent change in 1-hour precipitation depth relative to the climate normal period from 1970 to 1999, following the convention established by NOAA.
- **Climate scenarios:** The results are based on two greenhouse gas scenarios: RCP 8.5 (high end) and RCP 4.5 (low end).
- **Data presentation:** The data is organized by water year, season, total annual precipitation, and extremity.



*Green circles indicate model average, red diamonds represent the high model results,red circles represent the low model

Modified from Mauger et al. 2019

Figure 4-6. Projected Changes in 1-Hour Precipitation Statistics for the 2080s vs. 1970–1999

#### 4.1.8.3 Implications

The increase in precipitation intensity will have several key implications or risks to the stormwater system. More frequent and intense winter storms are likely to exceed the capacity of the stormwater system more often than current conditions.

Impact

Stormwater structures are sized to meet system LOS objectives, considering the anticipated frequency of storm events. Historical rainfall data are collected and characterized by intensity (e.g., inches of rain per minute or hour) or magnitude over a certain time period (e.g., X-inches in 24 hours). The design storms are usually described in the likelihood of exceeding a certain depth. For instance, a 4% chance of occurrence may also be described by the “average” frequency of occurrence for that duration, such as a 25-year, 24-hour event (for a 4% exceedance event).

Future rainfall patterns are predicted to deviate from historic norms. Note that storms are not “increasing in size” (larger storms are possible any time without climate change), but rather the *frequency* of larger events is greater. For example, if a 3-inch, 24-hour storm has occurred every 25 years in the recent past, climate change can cause a 3-inch storm to occur more frequently in the future. The new 25-year, 24-hour storm could be 3.5 inches of rain or more at the same potential frequency. Storm intensity (the rate of rainfall depth per unit of time) follows the same pattern—the same extreme rates are more frequent.

For example, when a storm system is designed to convey water away from a roadway for a 25-year, 24-hour event, we assume that the system may fail, on average, once every 25 years. We accept this failure level because the impact may be modest and the cost of providing additional protection is high. However, with more frequent events of the same size, flooding could happen every 10 to 15 years, which may not be tolerable for safety, system disruption, or property damage. Consequently, returning to the same LOS would require a new drainage system to provide the same frequency of performance. However, floods could still occur that exceed that LOS. If a higher LOS is desired, careful consideration of a new, future design storm becomes necessary.

## 4.2 Stormwater Drainage Infrastructure

As part of the implementation of the City’s NPDES MS4 permit, the City embarked on a substantial effort to update its inventory of drainage system infrastructure owned or operated by the Storm Drainage Utility. The citywide inventory is completed, but continued maintenance and new features will be ongoing. An up-to-date system inventory will assist the City in the following objectives:

- Help to meet regulatory requirements.
- Provide input for hydraulic models to analyze system conveyance capacity.
- Serve as a basis for an asset criticality database used to prioritize repair and replacement (R&R) activities.
- Support the City’s M&O activities through the CMMS.

Table 4-3 provides a summary of stormwater infrastructure inventory.

Table 4-3. Stormwater Drainage Infrastructure Summary

| Infrastructure element | Quantity [a] | Unit |
|---|---|---|
| Pipes, all sizes | 1,310,937 | Linear feet |
| Pipes, all sizes (excluding force mains) | 15,259 | Count |
| 6–10 in. diameter | 3,361 | Count |
| | 215,900 | Linear feet |
| 12–15 in. diameter | 8,822 | Count |
| | 698,000 | Linear feet |
| 16–18 in. diameter | 1,480 | Count |
| | 165,600 | Linear feet |
| 21–24 in. diameter | 858 | Count |
| | 106,500 | Linear feet |
| 27–36 in. diameter | 548 | Count |
| | 85,200 | Linear feet |
| 42–48 in. diameter | 173 | Count |
| | 37,200 | Linear feet |
| 54–72 in. diameter | 17 | Count |
| | 2,300 | Linear feet |
| Force mains | 35 | Count |
| | 4,400 | Linear feet |
| Open channels | 222,000 [b] | Linear feet |
| Culverts | 1,164 | Count |
| Manholes | 3,172 | Count |
| Catch basins | 10,800 | Count |
| Control structures | 223 | Count |
| Outfalls (to water courses, ditches, etc.) | 124 | Count |
| Detention ponds | 156 | Count |
| Infiltration ponds | 14 | Count |
| Vaults | 8 | Count |
| Pump stations | 7 | Count |

[a] Quantities are based on current inventory and have not yet been finalized.

[b] Length has been approximated based on available data.

Most storm drainage infrastructure is in the City's core between Mill Creek and the Green River, where development densities are highest. Figure 4-7 shows an overview of the City's stormwater drainage infrastructure.

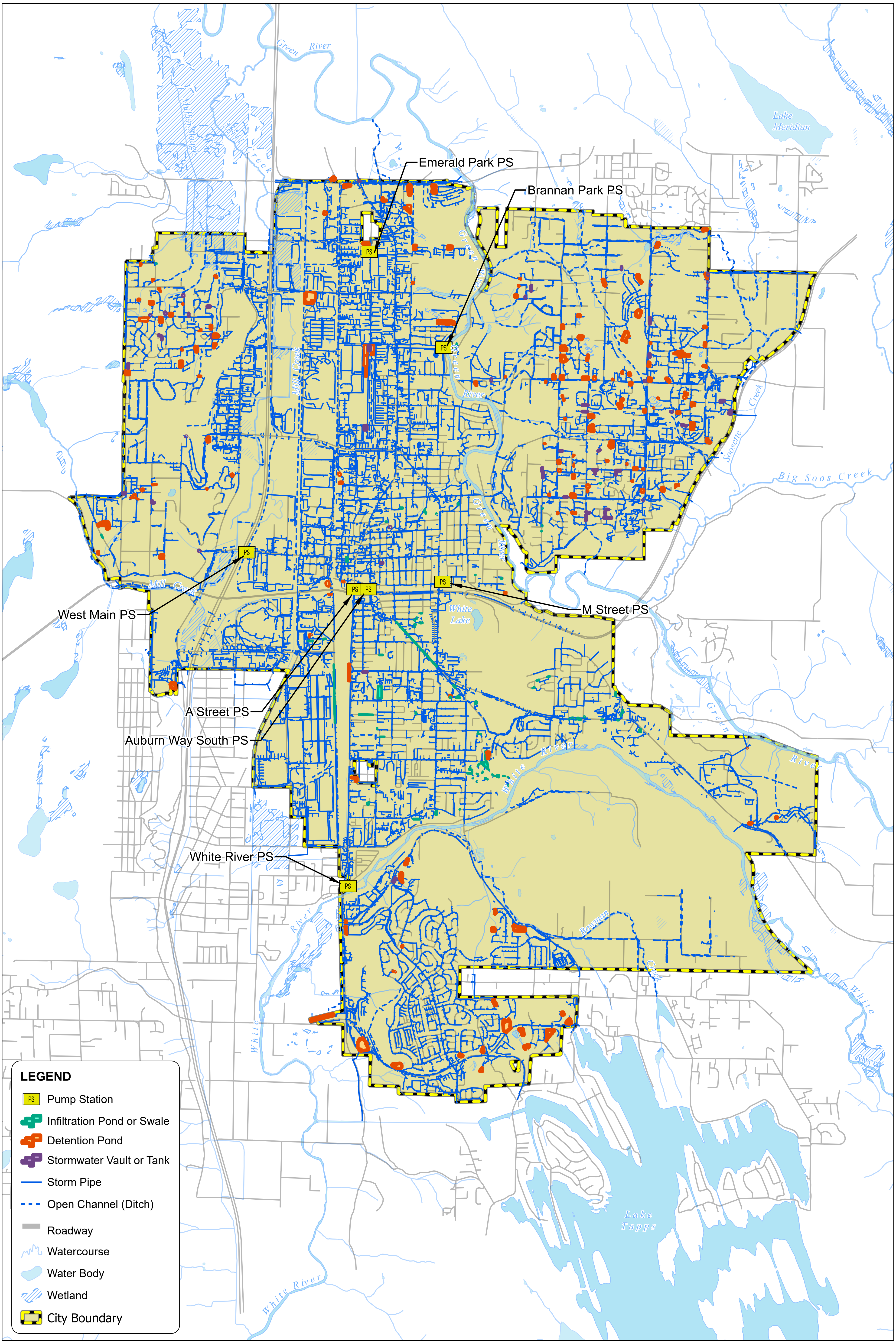


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**Figure 4-7**
**Drainage Infrastructure for the City of Auburn Storm Drainage Utility**

## 4.3 Critical Facilities

Policies and system goals for managing the City's critical facilities and critical stormwater assets are described in Chapter 3, Section 3.2. Two groups of system goals and policies in particular focus on criticality. The first applies to critical facilities, stating that the City will manage stormwater runoff within the public ROW in the vicinity of critical facilities to allow access and ensure function of these facilities at all times (Policy 1.2). Ten critical facilities have been identified and included in Table 4-4.

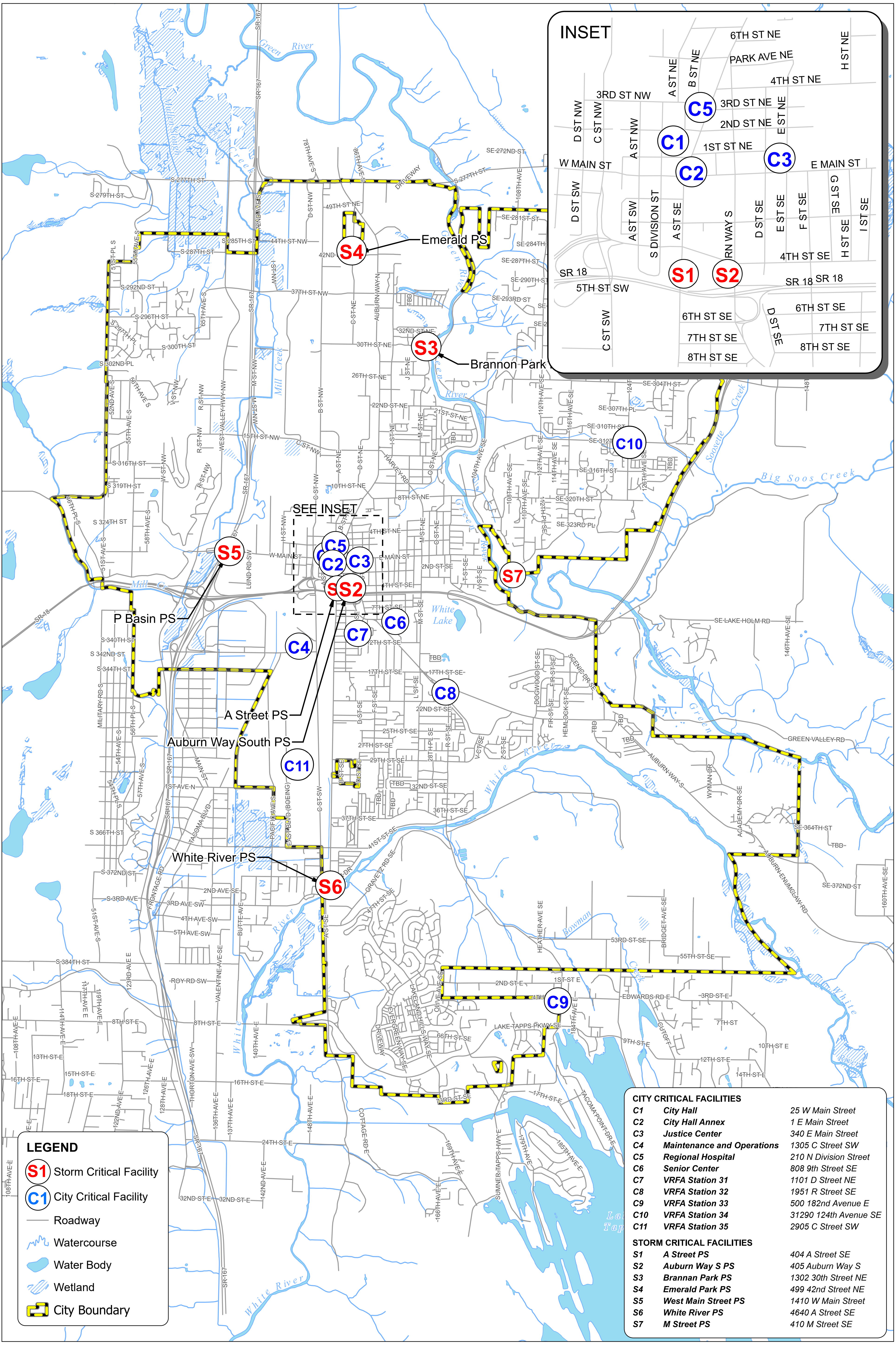
The second group of policies relates to the management of the City's critical stormwater assets (Policies 1.4, 1.6, 2.4, 2.5, and 3.4). The City will modify its inspection and maintenance practices to prioritize active management of facilities with the highest combined risk and likelihood of failure (i.e., a criticality based maintenance program). Factors that impact likelihood of failure include the age of the asset, inspection or repair history of the asset, and condition of the asset. The consequences of a system failure impacting a hospital or school are considered more serious than one affecting a residence or unoccupied property and are thus assigned as critical assets. The City has identified 10 City facilities (Table 4-4) and seven stormwater pump stations (Table 4-5) as critical assets. The list of critical stormwater assets may expand as the City refines its criticality database by adding information (e.g., inspection and repair logs, asset age; see Policy 1.6). The locations of these critical facilities are shown in Figure 4-8.

Table 4-4. Critical City Facilities

| Facility | Address |
|---|---|
| City Hall | 25 W Main Street |
| City Hall Annex | 1 E Main Street |
| Justice Center | 340 E Main Street |
| Maintenance and Operation Facility | 1305 C Street SW |
| Regional Hospital | 201 N Division Street |
| Valley Regional Fire Authority (VRFA) Station 31 | 1101 D Street NE |
| VRFA Station 32 | 1951 R Street SE |
| VRFA Station 33 | 500 182nd Avenue E |
| VRFA Station 34 | 31290 124th Avenue SE |
| VRFA Station 35 | 2905 C Street SW |

Table 4-5. Critical Stormwater Facilities

| Storm drainage facility | Year constructed | Address |
|---|---|---|
| A Street Pump Station | 1973 | 404 A Street SE |
| Auburn Way S Pump Station | 1994 | 405 Auburn Way S |
| Brannan Park Pump Station | 2001 | 1302 30th Street NE |
| Emerald Park Pump Station | 1999 | 499 42nd Street NE |
| M Street Pump Station | 2014 | 410 M Street SE |
| West Main Street Pump Station | 2008 | 1410 W Main Street |
| White River Pump Station | 2012 | 4640 A Street SE |



| | | |
|---|---|---|
| **CITY CRITICAL FACILITIES** | | |
| *C1* | ***City Hall*** | *25 W Main Street* |
| *C2* | ***City Hall Annex*** | *1 E Main Street* |
| *C3* | ***Justice Center*** | *340 E Main Street* |
| *C4* | ***Maintenance and Operations*** | *1305 C Street SW* |
| *C5* | ***Regional Hospital*** | *210 N Division Street* |
| *C6* | ***Senior Center*** | *808 9th Street SE* |
| *C7* | ***VRFA Station 31*** | *1101 D Street NE* |
| *C8* | ***VRFA Station 32*** | *1951 R Street SE* |
| *C9* | ***VRFA Station 33*** | *500 182nd Avenue E* |
| *C10* | ***VRFA Station 34*** | *31290 124th Avenue SE* |
| *C11* | ***VRFA Station 35*** | *2905 C Street SW* |
| **STORM CRITICAL FACILITIES** | | |
| *S1* | ***A Street PS*** | *404 A Street SE* |
| *S2* | ***Auburn Way S PS*** | *405 Auburn Way S* |
| *S3* | ***Brannan Park PS*** | *1302 30th Street NE* |
| *S4* | ***Emerald Park PS*** | *499 42nd Street NE* |
| *S5* | ***West Main Street PS*** | *1410 W Main Street* |
| *S6* | ***White River PS*** | *4640 A Street SE* |
| *S7* | ***M Street PS*** | *410 M Street SE* |

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May 2024

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**Figure 4-8**
**City and Storm Drainage Critical Facilities for the City of Auburn**

## 4.4 Water Quality

This section describes the existing water quality and regulatory conditions that affect surface water quality in Auburn and describes processes that are required to maintain compliance with the City's NPDES MS4 permit.

### 4.4.1 Existing Conditions

According to water resource inventories by Ecology, the main water bodies within the City's administrative boundaries include the Green River, Mill Creek, White Lake, White River, Bowman Creek, and Soosette Creek. Municipal storm sewers that discharge runoff to surface waters are not authorized to violate state water quality standards.

Appendix 2 of the NPDES MS4 permit (Appendix A of this Plan) describes water bodies that are impaired and have additional requirements based on established TMDLs. A fecal coliform TMDL for the Puyallup River watershed is included in the current NPDES MS4 permit. As part of the TMDL, Ecology has designated the basin as a high-priority basin for IDDE screenings. Details of the required activities are included in Appendix 2 to the NPDES MS4 permit.

The Green River has a TMDL for temperature that was approved by EPA in 2011. The TMDL report indicated a cumulative waste load allocation was developed for all the municipal stormwater permittees. However, the TMDL did not contain any additional TMDL-related actions for stormwater permittees (Ecology 2011).

Other TMDLs under development include the lower White River pH TMDL and the Soos Creek subbasin multiparameter (temperature, dissolved oxygen, bacteria, and fine sediment) TMDL, described in the following paragraphs.

The lower White River pH TMDL was approved by EPA on January 13, 2023, and additional stormwater actions are listed in the public comment draft of the 2024–2029 NPDES MS4 permit. These include outfall and tributary conveyance mapping, monthly IDDE screening for flow in the critical period of May 1 to October 31, soluble reactive phosphorus (SRP) testing of flow from outfalls in the watershed during the critical period under certain sampling conditions (preceding precipitation, stormwater flow, and river flow), and source control tracing for any flow with SRP values that exceed the specified limits. Phosphorus treatment BMPs for new development and redevelopment will be required in the watershed no later than June 30, 2027.

The Soos Creek TMDL is not expected to be complete in time for the 2024–2029 Municipal Stormwater Permit. The temperature, dissolved oxygen, and bacteria TMDL is expected to be finalized in 2026. The fine sediment portion has become a separate TMDL and development of the draft implementation plan began in 2023. The impairments in this TMDL have been identified as fine sediment, high peak flows during storm events, and issues related to habitat degradation.

Other waterbodies listed as impaired on the Ecology water quality map include Mill Creek for bacteria (fecal coliform and e. coli), dissolved oxygen, pH, and benthic macro invertebrates; Bowman Creek for dissolved oxygen, temperature, and fecal coliform; and Olson Creek for benthic macroinvertebrates. These impairments will be addressed through future TMDLs.

### 4.4.2 Regulatory Compliance

The City has a well-developed MS4 M&O program that employs and provides training on numerous processes and procedures to minimize water quality impacts from municipal operations. The City also actively implements stormwater management BMPs in its municipal activities. BMPs include activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices that prevent or reduce the release of pollutants and other adverse impacts to waters of Washington State.

The current NPDES MS4 permit includes provisions for monitoring and assessment of water quality. Permittees have the option of paying annual fees to participate in statewide monitoring programs or developing individual monitoring programs to meet the requirement. The City notified Ecology in 2013 that it intends to participate in the statewide monitoring programs and has continued contributing the required funds every year since.

The City is in full compliance with its NPDES MS4 permit, with programs, codes, processes, and procedures that meet all of the requirements currently in effect. The City's SWMP Plan contains a summary of the NPDES MS4 permit requirements and descriptions of the City's current and planned activities for permit compliance.

The City will continue to make sundry changes to comply with updated requirements of the NPDES MS4 permit that phase in during the permit term. The City is conducting a process to identify and implement needed updates to codes, standards, and programs by the relevant due dates.

A schedule of relevant due dates to comply with updated NPDES MS4 permit requirements is provided in Chapter 8, Figure 8-2.

## 4.5 Existing Drainage Problems

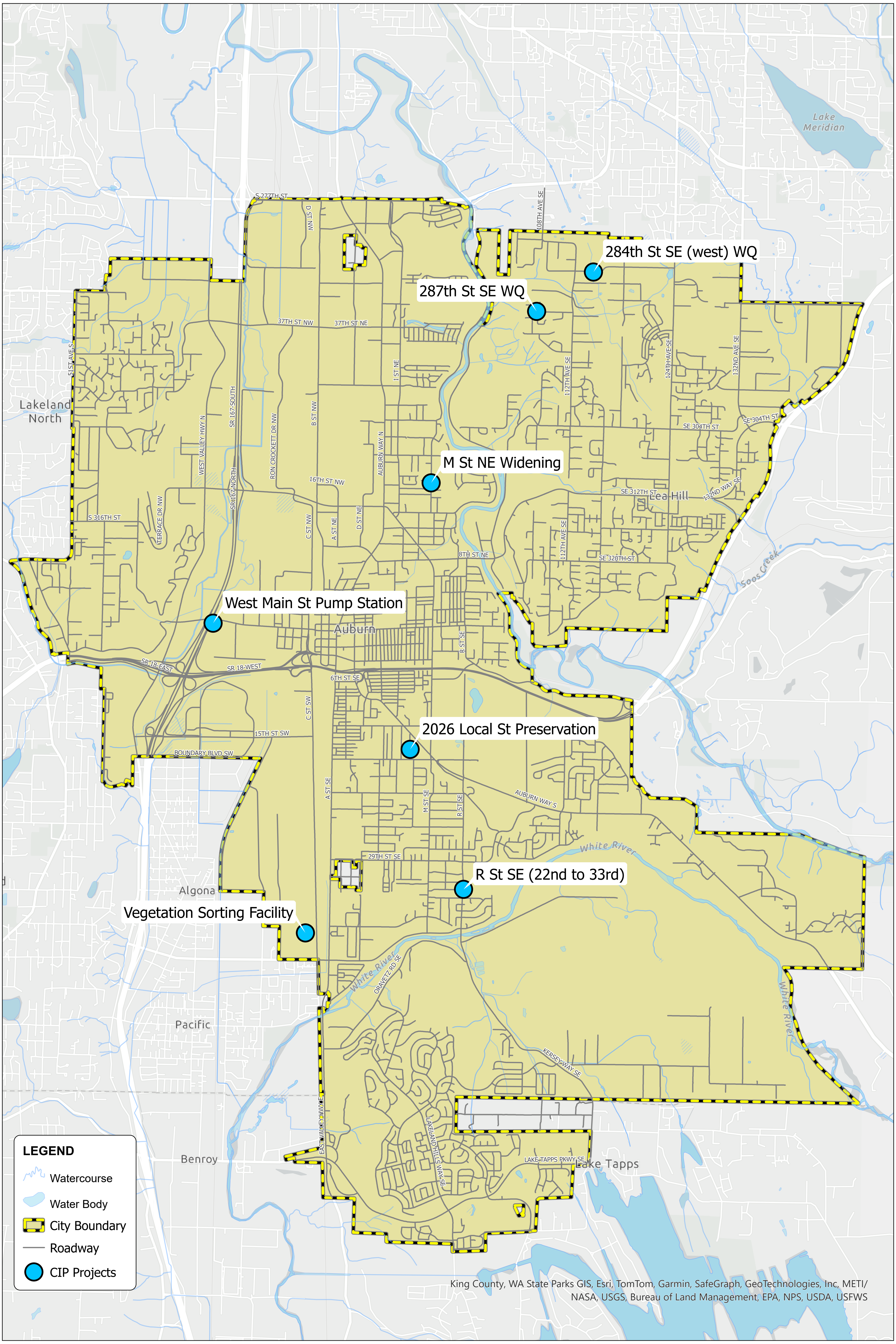
Members of the City staff working within the Storm Drainage Utility are experienced and familiar with the condition of the drainage system. Existing drainage problems have been observed by the staff and are known to cause frequent flooding of roadways. The most apparent problems were identified for analysis (see Hydraulic Evaluation, Section 5.1). Existing drainage problems are described in Table 4-6 and locations are mapped in Figure 4-9. Problems were evaluated for potential inclusion in the capital improvement plan. CIPs developed to address these problems are described in Chapter 7.

Table 4-6. Existing Drainage Problems

| No. | Priority | Location | Description | Approximate frequency or last noted occurrence |
|---|---|---|---|---|
| 1 | 1 | West Main Street dead end near SR 167 | The dead-end portion of Old West Main Street near State Route (SR) 167 has a history of observed flooding. The City installed a temporary pump station to dewater the gravity pipe flowing on the south side of Old West Main Street in an effort to protect local businesses from flooding. Since its installation in 2008, the pump station has eliminated flooding at the observed location. The pump station, however, does not meet the City's level of service guidelines regarding pump redundancy and may be insufficient to convey the 25-year flow rate.<br>The City's gravity pipe on the north side of Old West Main Street experiences flooding at one catch basin approximately once per year. High water persists even in summer months.<br>The pump station and gravity pipe discharge to a Washington State Department of Transportation ditch along the east side of SR 167. | Catch basin flooding once per year and system surcharging |
| 2 | 2 | Auburn Way South | Auburn Way South/SR 18 Underpass – minor roadway flooding causes disruptions to traffic during periods of intense rainfall. | Every few years |

Table 4-6. Existing Drainage Problems (continued)

| No. | Priority | Location | Description | Approximate frequency or last noted occurrence |
|---|---|---|---|---|
| 3 | 3 | I St NE | The area between 33rd Street NE and 35th Street NE on the east side of I Street NE has reoccurring flooding when the river level is high. | Every few years |
| 4 | 2 | Auburn Way South and A Street Pump Stations | Two existing stormwater pumping stations are reliant on portable emergency power, increasing workflow and reducing system reliability at time of need. | |
| 5 | 3 | Storm Pipeline Extension | There are areas within the City not served by the public storm system, such as paved alleys and residential streets where roadwork is not anticipated. | |



King County, WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

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COMPREHENSIVE STORM DRAINAGE PLAN
May 2024

CITY OF AUBURN WASHINGTON

**Figure 4-9**
**Drainage Problem Locations for the Storm Drainage Utility**

# 5. Evaluation of the Storm Drainage Utility

This chapter presents analyses conducted to evaluate the Storm Drainage Utility and identify gaps between existing service levels and the system goals described in Section 3.2. The following types of evaluations were completed to identify Storm Drainage Utility future activities to address the range of system goals:

- Existing system deficiency and future service area expansion: Identified existing system deficiencies and future service areas in Chapter 4 and considered them in developing the capital improvement plan (Chapter 7). Did not evaluate improvements to address existing deficiencies and future expansion relative to policy and system goals as a part of this Plan.
- Hydraulic: Gathered system data, updated or developed computer models, assessed hydraulic performance, and developed CIPs with respect to associated system design criteria.
- Asset management: Reviewed existing asset system for data gaps, analyzed the adequacy of the condition assessment data being collected, established criteria for preparing criticality and risk analyses, developed the prioritization system to inspect critical system elements, developed the system requirements specification for integrating pipe criticality into the City's CMMS, estimated the funds needed for future asset repair and replacement, and included those estimates in the resource planning assessment (Chapter 6).
- Regulatory-driven improvements: Determined differences between the 2024–2029 permit and the previous NPDES MS4 permit and evaluated how the differences could affect City regulations, infrastructure, and activities; estimated the time and costs for NPDES MS4 permit compliance.
- Climate change analysis: Conducted a climate change analysis by reviewing the projected alterations in climate outlined in Chapter 4 and offered recommendations for effective mitigation measures.
- Maintenance and operations: Assessed process performance, equipment, and personnel with respect to service levels for M&O (covered in Chapter 6).

These evaluations were conducted to develop capital improvements for the 6- and 20-year horizons, as well as to identify future M&O needs. The following sections summarize the hydraulic, asset management, regulatory-driven improvements, and climate change evaluations. The existing system deficiency and future service area expansion are described in Chapter 4, and the M&O evaluations are described in Chapter 6.

## 5.1 Hydraulic Evaluation

As described in Chapter 4, the City of Auburn owns and operates a large system of stormwater drainage infrastructure to collect and convey stormwater runoff to nearby receiving waters.

Hydraulic modeling efforts for the 2024 Plan focused on updating models covering locations of proposed capital projects. The model updates were based on recent geographic information system (GIS) data, design drawings, and record drawings.

The City reviewed the remaining CIPs listed in the 2015 Plan and the recent proposed stormwater CIPs. Six projects are located within existing subbasins represented by hydrologic and hydraulic (H&H) subbasin models. Two of the projects were evaluated with associated H&H subbasins models and were included in this Plan's CIP program. Appendix B provides a detailed description of the H&H model updates and CIP evaluation results.

The following sections describe the steps used to update existing models or develop new models.

### 5.1.1 Updating Existing Models

The hydraulic components of existing models were updated with recent GIS data. The following model data were verified against the GIS data:

- Pipe size.
- Pipe invert elevations.
- Pipe material (for estimating pipe roughness).
- Node rim elevation.
- System connectivity.

Where the GIS data did not accurately describe the existing system, technical reports, record drawings, or construction drawings were used to update the model. Where data were available, models were given more detail with respect to pump and storage facility information.

For model hydrology, subcatchment delineations within problem areas were reviewed and revised based on recent GIS data, topographic data, and 2024 aerial photography. For subbasins with significant changes in basin delineation, total impervious area was updated with the City's impervious area coverage. No existing models were calibrated or uncalibrated. If new and significant large infiltration facilities were constructed since the 2015 Plan, the percent impervious area was reduced based on an assumed contributing area by visual inspection of aerial photography.

### 5.1.2 Creating New Models

The following is a general description of steps followed to develop new Personal Computer Stormwater Management Models (PCSWMM)[3].

1. Infrastructure data from existing GIS databases were used to build drainage networks in problem areas. Drainage network models consist of catch basins, manholes, pipes, junctions, ditches, control structures, vaults, storage ponds, pump stations, and outfalls. GIS data were validated and augmented as necessary based on record drawings and City-conducted field investigations.
2. The drainage network was developed to a level of detail that is sufficient for analyzing conveyance on a subbasin-wide or problem-specific scale. In general, pipes 1 foot in diameter or greater were included. Smaller-diameter pipes and pipes that were part of private systems were generally not included in the model unless they provided an important link within the system.
3. Subbasin areas were divided into smaller drainage area delineations called subcatchments, which in the model are linked into the drainage network at specific nodes. Hydrologic parameters, such as area, slope, and percent impervious area, are developed for each subcatchment. Subcatchment slope was estimated as the average slope based on a digital elevation model (DEM). Total impervious area was estimated with the City's impervious area coverage.

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[3] PCSWMM is a GIS-based hydraulic and hydrologic modeling platform developed by Computational Hydraulics International (CHI). The software fully supports the EPA SWMM5 hydrology and hydraulics engine, thus providing comparable computation between EPA SWMM and PCSWMM models. Information about PCSWMM software can be found at http://www.chiwater.com/Software/PCSWMM/index.asp.

For the purposes of this plan, there was no requirement to develop new models. Rather, the existing H&H models from the 2015 Plan underwent refinement and updates. Further information on these specific modifications is available in Appendix B.

### 5.1.3 Updating Precipitation Record and Flow Frequency

Auburn's H&H models use historical meteorological data to estimate stormwater flows and storage within the City's storm drainage system. The data consist of monthly evaporation and 15-minute precipitation volumes. As part of the Plan, the 15-minute precipitation record was extended to September 30, 2022, creating an approximate 74-year precipitation record.

Long-term simulations were performed using the extended precipitation record to determine the 2% and 4% exceedance storms (one in 50-year and one in 25-year flows, respectively) for the updated models. These storms were used as design storms to size capital improvements, which meet the water treatment standards and LOS (see Chapter 7 for a description of proposed capital improvements).

## 5.2 Asset Management Review

All utilities manage their assets in one way or another through maintenance practices, CIPs, and repair and replacement (R&R) activities. However, the ability to make an informed decision regarding where and how to direct limited resources is dependent on the quality of the utility's asset management. A comprehensive asset management framework includes building a thorough asset inventory, using that inventory to prioritize and document maintenance and inspection tasks, and tracking annual management expenses. An asset management framework developed in this way will demonstrate both the extent of the existing system, as well as aid in forecasting its useful life and the future costs of maintenance, reparation, and replacement.

Stormwater system assets fall into this framework but also exhibit unique characteristics regarding their service levels, failure risk and consequences, and asset response approaches. For example, the consequence of failure for a stormwater pipe is less significant than it would be for a water pipe, and this distinction is reflected in the asset management approach. The asset management plan for the City's stormwater system accounts for these considerations along with the current inventory and condition information while adopting a responsible approach to resource management of the assets.

### 5.2.1 Best Practices

The best practices for asset management involve methodically basing choices on an understanding of asset condition and performance, risks, and costs in the long term. Asset management best practices include the following:

- Establishing and maintaining a sustainable LOS that balances the performance goals of the utility, regulatory requirements, and consumer demand.
- Preparing and regularly updating an inventory and map of the system.
- Understanding the risk associated with managing a given asset (i.e., defining the asset's likelihood and consequence of failure).
- Implementing a prioritization process for work based on condition assessments and taking a life cycle approach to asset management planning.
- Establishing funding levels and rates to provide reliable, cost-effective service, and support ongoing infrastructure rehabilitation or replacement projects.

These best practices were followed in evaluating the management of the City's assets, as described below. System goals for the City's Storm Drainage Utility were established in Chapter 3 of this Plan.

## 5.2.2 Evaluation

For the Plan, the preliminary focus of the asset management evaluation was on the City's stormwater collection pipe network, the results of which may be used to inform the management plan for the other categories of assets within the City's Storm Drainage Utility system. The City uses Cartegraph as its CMMS to store and map its asset inventory, so all evaluations were performed on data exported from this source.

### Data Gaps Analysis & Condition Assessment

The first step in the evaluation involved assessing the comprehensiveness of the asset inventory. To do so, a data gaps analysis and condition assessment was necessary to understand the completeness of the asset inventory and the availability of feature data for developing criticality and risk analyses. The results of these analyses demonstrated a pipe inventory that was incomplete. Several pipes were missing attribute data—namely installation date and material—critical for estimating risk of failure in the next step in the evaluation. See Figure 5-1 and Figure 5-2 for the availability of pipe attribute data relative to the total length of pipe in the system for reference.

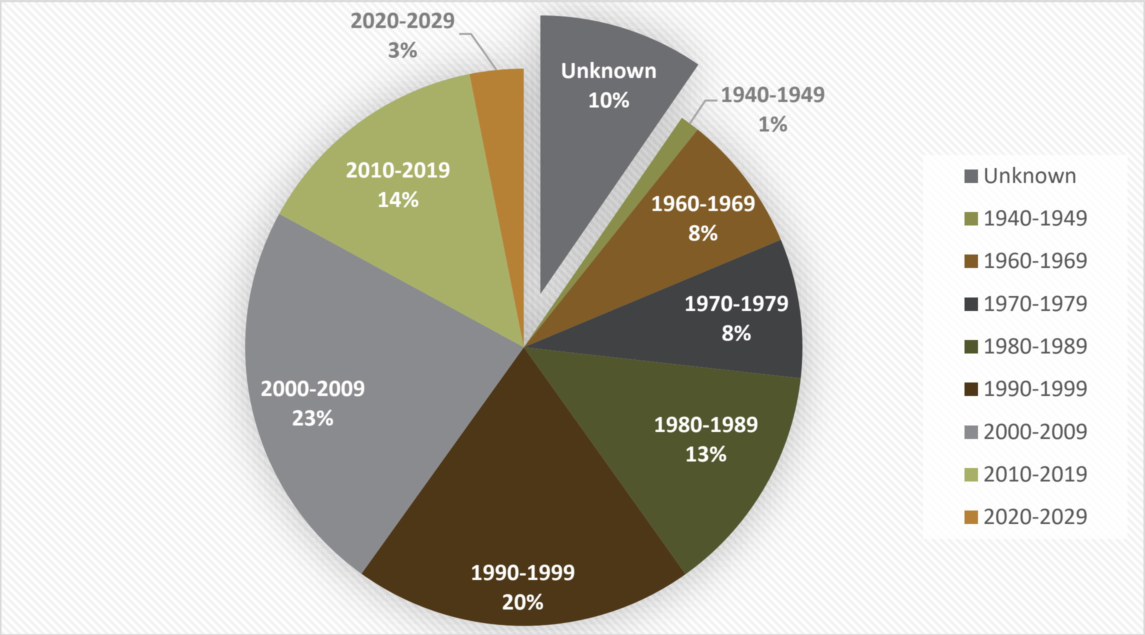


Figure 5-1. Pipe Installation Date Relative to Total Linear Feet of Pipe

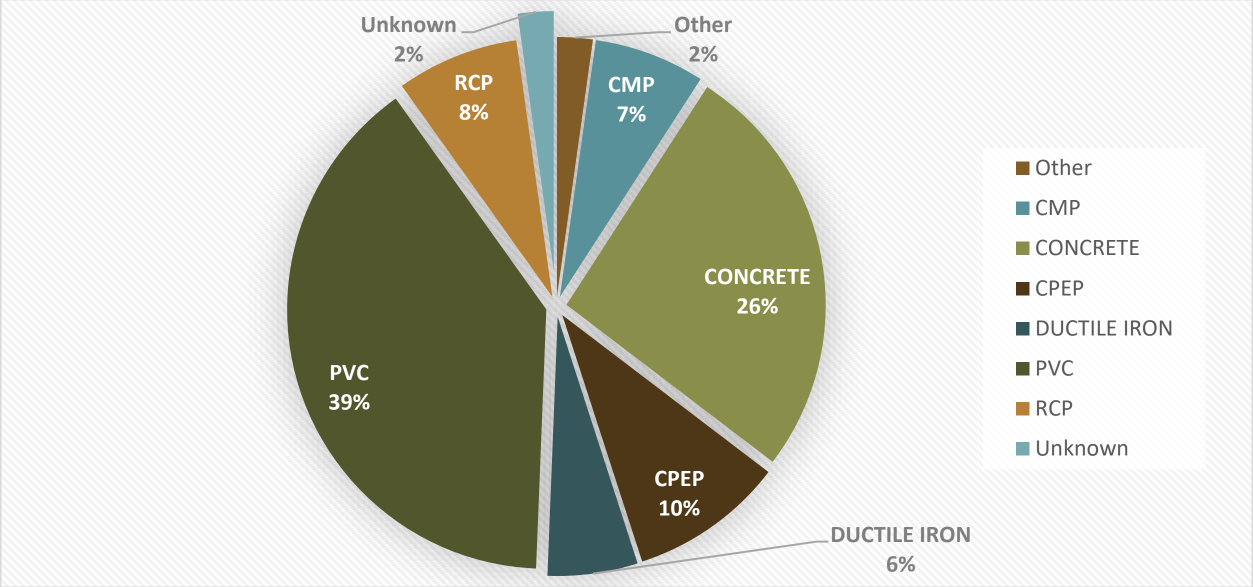


Figure 5-2. Pipe Material Relative to Total Linear Feet of Pipe

For the purposes of the risk evaluation, professional estimates were made to serve as placeholders for missing attribute data. A preliminary GIS-based assessment was performed to provide an estimate installation date based on adjacent infrastructure, parcel build-out years, and historical imagery as needed. Estimated inputs were added to a copy of the installation date attribute to ensure estimates could be distinguished from the original dataset. Further detail regarding the steps taken in the data gaps analysis and condition assessment is provided in Appendix C. There were critical data gaps in other stormwater asset inventories, namely culverts. Thus it could be beneficial to do a similar GIS-based assessment for other asset types to have a comprehensive starting point for prioritization of work. It is recommended that critical data gaps be addressed as part of the asset management program, as summarized in the following paragraphs.

### Risk Determination

The next step in the evaluation involves determining the risk associated with managing each of the City's storm drainage assets. The exported pipe data from the City's Cartegraph database was used to build a risk assessment spreadsheet. The spreadsheet evaluates specified criteria to generate a score for likelihood of failure and criticality of failure for each asset. Within the spreadsheet, likelihood of failure is largely dependent on critical attributes specific to the feature, while criticality of failure is dependent on location-based factors.

For the City's pipe network, the attributes used to develop the likelihood of failure score include installation data and material. The installation date provides the age of the pipe, while the installation material is used to estimate the expected useful life. Combining these characteristics provides an estimate for the pipe's remaining useful life, which is the basis for the likelihood of failure score. In general, if a pipe had a negative remaining useful life, it had a high likelihood of failure (the highest score being 5), whereas if it had a positive remaining useful life, it had a low likelihood of failure (the lowest score possible is 1).

The criticality of failure score was developed by evaluating a pipe's proximity to critical facilities, high-priority roadways, and high-trafficked roadways. If a pipe is in close proximity to one of the aforementioned factors, this results in a higher criticality of failure score (the highest score being 5). Conversely, a pipe not in close proximity to any evaluated factors results in a low criticality of failure score (the lowest score being 1).

While the spreadsheet was developed solely for the City’s pipe system, a similar process may be followed for the other asset types within the stormwater inventory. See Appendix C for the critical attributes recommended to use in determining the risk for the other types of stormwater assets.

### Work Prioritization

The resulting failure scores allow for the City to rank different assets both on likelihood and criticality of failure. It is recommended to use this ranking strategy to develop an inspection program where inspections of different types of assets are prioritized based on their rank. The asset inspection program will serve to fill data gaps, update the likelihood of failure score based on field verification, and identify asset features requiring repair or replacement. After inspection data are input for an asset feature, the results of the inspection will supersede the use of estimated remaining useful life and installation date (where applicable) in calculating a likelihood of failure score. Using this system to prioritize maintenance allows resources to be used more efficiently and fills in data gaps resulting in a more robust asset inventory.

For the City’s pipe system, the recommended program would prioritize inspection based on likelihood of failure and then criticality of failure. In this way, pipes with likelihood of failure scores greater than or equal to 4 (or a negative useful life estimate) will be inspected first. The next tier of inspections should address pipes with likelihood of failure scores equal to 3 and pipes with unknown installation dates. After pipes are inspected, they should be assigned a condition score, which will supersede the installation date and useful life expectancy in determining the likelihood of failure. The likelihood of failure for a pipe will increase over time, and this prioritization method will take this into account while integrating field inspection data. Since storm catch basins and storm manholes are related to pipes, it is recommended to inspect these at the same time as adjacent pipes.

The same inspection prioritization method is recommended for culverts as the failure consequences are similar. For storm pumps, it is recommended to closely evaluate their condition as their useful life nears the end (e.g., 5 or fewer years) and upgrade or replace them before probable failure. Stormwater control facilities should be routinely inspected and prioritized for inspection when critical feature data are unavailable. As mentioned previously, critical feature data for each asset type are listed in Appendix C. More detail regarding the inspection frequency and schedule for each type of stormwater asset is included in Chapter 6.

### Life Cycle Estimation

A life cycle analysis was performed for pipes to demonstrate the expected depreciation rate of each asset and provide background for the recommended maintenance frequency of the entire system. To do so, the remaining useful life estimate for the City’s pipe database was analyzed over time. This analysis was used to identify any spikes in development (and accordingly when spikes in R&R would be expected) and estimate the total linear feet of pipe “lost” (or whose projected remaining useful life becomes negative) per year. This rate of pipe loss may be used as a point of comparison for basing the resource planning recommendations in Chapter 6. A similar life cycle analysis could be beneficial for culverts.

As features are updated with field-verified data (during inspection or maintenance), the results of this life cycle analysis are expected to change. For this reason, the pipe depreciation analysis may be reconducted to evaluate the effect on the projected rate of pipe loss. The results of the pipe depreciation analysis can be found in Appendix C.

### Cost Projection

A brief review of costs were included in the asset management evaluation for consideration in setting the R&R budget and resource planning goals in Chapter 6. Two options were contemplated in setting the R&R budget: investigating the prior use or need and evaluating the results of the life cycle estimation. The City's R&R spending in previous years was compiled to investigate the prior use. To evaluate the results of the life cycle estimation, the cost of replacing pipes based on the rate of depreciation was projected. The useful life of the system was also varied to observe the change in budgetary needs.

A comprehensive cost estimate was prepared for both pipe replacement and the replacement of catch basins and manholes within the City. Notably, the cost estimate for pipe replacement serves as a generic assessment for the City of Auburn rather than being tied to any specific project or geographical area. The primary calculations for cost estimation assume the replacement of 5,000 linear feet of pipe along with the associated conveyance structures, such as manholes and catch basins. To simplify these calculations, certain generalizations were made—including the assumption that all pipes are of uniform size, material, and depth—based on GIS averages for the City.

Furthermore, various scenarios were explored to assess how the cost of pipe replacement might vary based on location (downtown versus rural) and quantity (5,000 versus 10,000 linear feet). The resulting cost opinion is intentionally conservative, approximately $1,500 per linear foot, to account for the wide range of generalizations and assumptions inherent in the process. Notably, the analysis indicated that pipe replacement in rural areas is expected to be less costly than in the City center. Additionally, replacing a larger quantity of pipe is only marginally more cost-effective.

For detailed estimates and further information regarding the cost projection, please refer to Appendix C.

As a prudent practice, it is recommended to diligently track the costs associated with installation, repair, and replacement of asset features on an annual basis. This data serve as valuable reference information for future asset replacement budget planning. As additional data are collected, cost opinions can be updated to enhance accuracy.

## 5.2.3 Recommendations

Evaluations completed for this Plan consisted of developing a system requirements specification for implementing risk assessment using the data in the City's asset management system, Cartegraph. The spreadsheet's scoring methods may be integrated into Cartegraph so that, as the pipe inventory is updated, likelihood of failure and criticality of failure scores can be used to inform future R&R priorities. Currently, the spreadsheet only includes collection system piping scores. However, there is an opportunity to expand the scoring methods to include other asset features, as described in Appendix C.

The following are recommended to implement the asset management strategy:

- Train staff in asset inventory needs, capability, data collection, data quality objectives, and maintenance of system.
- Implement the likelihood of failure and criticality of failure scoring methods into Cartegraph.
- Implement the prioritized inspection and asset information update process to fill data gaps in the asset data and provide observation-based condition assessments.

- Develop a process for reviewing the asset inventory and a routine for updating when changes and inspections occur.
- Expand scoring methods to include asset types other than collection system piping and implement them similarly into Cartegraph and inspection prioritization techniques.
- Consider reconducting pipe depreciation analysis every 5 years to evaluate the effect of implementing the prioritization practice.
- Assess the inspection process in 5 years to assess the efficiency of the program and identify areas for improvement.

## 5.3 Regulatory-Driven Improvements Investigation

The federal Clean Water Act requires municipalities to help maintain fishable/swimmable waters through the NPDES MS4 permit program (see Section 2.3.2 and Appendix A), which requires municipalities to reduce the discharge of pollutants from their stormwater systems to the MEP by implementing municipal stormwater management programs. The City has an established municipal SWMP that complies with all NPDES MS4 permit requirements currently in effect. Updates to the City's codes, programs, and standards are being developed to comply with the requirements of the updated 2024 NPDES MS4 permit.

The City's SWMP plan identifies activities that will be implemented by the City to comply with NDPES MS4 permit requirements. The SWMP plan is updated annually to reflect new requirements that phase in during each year, including one-time and new ongoing activities. An updated SWMP is submitted to Ecology in March of each year. The City's current SWMP plan is accessible on the City website.

To plan for upcoming requirements of the new NPDES MS4 permit, the City formed a project team consisting of staff from the City Public Works department and Parametrix.

The project team reviewed Auburn's citywide stormwater management programs, codes, standards, processes, and documentation protocols in order to identify potential actions to comply with the NPDES MS4 permit conditions over the 5-year permit period. From these sources, the project team created a document cataloging responsible City departments/entities, reference documents, and potential requirements for each updated section of the permit. Interviews were then conducted with appropriate staff (e.g., stormwater M&O staff) to discuss the potential implications of permit changes for existing City codes, programs, and standards. The information on existing City practices and programs was then compared to the updated permit requirements to identify potential compliance needs. Some policy issues and potential compliance strategies were also identified. A technical memorandum summarizing the current and anticipated NPDES requirements and infrastructure changes was developed and is included in Appendix D. Recommended future activities are summarized below and included in the implementation plan in Chapter 8.

### 5.3.1 New Permit Requirements and Recommendations

Table 5-1 summarizes the recommended actions to address regulatory driven stormwater program responsibilities.

Table 5-1. Recommended Actions Regarding New Permit Requirements

| Permit Section | New Requirement | Recommended Action(s) |
|---|---|---|
| S2.B | Develop a management plan for per- and polyfluoroalkyl substances (PFAS). | Coordinate with firefighting agencies/departments to implement specific protocols regarding PFAS discharges into stormwater. |
| S5.C.1.c.iii | Adopt and implement tree canopy goals and policies to support stormwater management and water quality improvement in receiving waters. | Prepare an assessment of existing conditions.<br>Draft a list of potential policies.<br>Select and adopt policies. |
| S5.C.1.d.i | Complete a stormwater management action plan (SMAP) for at least one new high-priority catchment area or additional actions for the existing SMAP. | Identify a preferred catchment area for inclusion or enhancement.<br>Prepare a new SMAP or update the existing SMAP. |
| S5.C.1.d.i.(a) | Consider implementing projects that address transportation-related runoff, such as projects that address tire wear runoff. | Review the road system plan.<br>Review high-priority roadways.<br>Determine candidate sites for retrofitting using SMAPs, capital improvement projects, or other relevant plans.<br>Select projects and include in capital improvement plan. |
| S5.C.2.a.i.(b) | Provide public education regarding source control best management practices (BMPs) for building materials to reduce pollution to stormwater, including stormwater pollution from materials containing polychlorinated biphenyls (PCBs). | Provide public education regarding source control BMPs for building materials. |
| S5.C.4.b.ii | Develop a map of discharge points that have stormwater treatment and flow control BMPs/facilities. | Develop a methodology to map tributary basins to outfalls.<br>Identify facilities to be mapped.<br>Use a geographic information system (GIS) to prepare a map of catchment areas. |
| S5.C.4.b.iii | Map permittee-owned or operated properties with tree canopy. | Begin mapping of permittee-owned or operated properties with tree canopy based on available, existing data. |
| S5.C.7.b | Fully fund, start construction, or completely implement project(s) that meet the City's assigned equivalent acreage of 8.9 acres. | Prioritize projects developed in the SMAP that together meet the City's assigned 8.9 acres. |
| S5.C.9.e | Develop and implement a municipal street sweeping program to target high-priority areas. | Review and revise the existing sweeping program as needed. |

## 5.4 Climate Change Analysis

Section 4.1.8 reviewed the projected climate changes specific to the City. This section focuses on potential strategies to mitigate these changes and provides recommendations for effective implementation. By comprehending expected shifts in the environment, the City can proactively adapt its practices and policies to safeguard the community.

### 5.4.1 Discussion of Proposed Approaches

Although the City is not predicted to see a significant increase in overall precipitation, climate models predict an increase in the frequency of intense precipitation, specifically during the winter months (see Figure 4-5). Increased winter storm intensity frequency is most likely to push the stormwater system past the accepted LOS over time up to the projected time frame of the reported climate models.

Storm intensity (rate of rainfall for a unit of time, usually in inches per minute) tends to affect storm drainage systems differently than prolonged, atmospheric river systems. Storm sewers and local conveyance systems are generally designed for the peak runoff intensity (within a short or long event), whereas larger conveyance systems, streams and floodplains, and stormwater control facilities are designed using hydrographs for longer duration events. This would suggest, based on the predictions regarding total rainfall versus intense rainfall, that storm sewers, conveyance systems, and culverts will be more vulnerable to capacity exceedance and subsequent flooding.

One approach to addressing this potential service deficiency is to design with future projected storm patterns or to apply a larger design storm. This would address the greater flood frequency risk. However, it would not “prevent” flooding. This would increase the costs of all projects for both public and private development and would also impact the cost of housing impacting the affordability of future housing developments. Stormwater conveyance systems are designed to manage a specific LOS, usually the peak runoff rate from a 25-year, 24-hour storm. Performance is typically evaluated by hydraulic metrics, such as minimum freeboard in a channel, headwater depth on a culvert, or surcharging in a storm sewer that keeps water in the system and away from property. While a stormwater system may not be performing according to design, the impacts may not be flooding or property damage. In addition, storms larger than the design storm can and will occur, with adverse consequences.

It has generally been deemed to not meet cost-benefit metrics to build systems to address every likely storm outcome. An event exceeding the design capacity of a system could occur at any time; the “average” number of times it occurs is likely to increase with increased storm intensity frequency due to climate change. Another approach would be to address the *consequences* of the projected change on a site-by-site basis rather than a blanket change in service levels for future rainfall.

Stormwater flow control facilities are designed to manage changes to the landscape and resultant runoff to existing or predeveloped levels. The analyses use a historical rainfall record and projections of that record over an extended time period, all based on past rainfall patterns. The stormwater control standards require runoff changes to be matched to land conditions prior to development or existing conditions, typically a forested condition. One approach to new stormwater standards to address flow control under a changed climate with more frequent intense rains is to use projected rainfall patterns that are modified to add climate change projections. In addition, flow control evaluations are comparative, which means they evaluate the hydrologic changes due to development. This is different than considering the changes in hydrology from the site today with a site under future climate conditions (in addition to restoring existing hydrology to predevelopment conditions). The comparative change (future climate to compare existing and future site development) may not be significant.

River and stream flooding could increase in frequency due to climate change. According to the stream flow projections shown in the publication, Effect of Climate Change on Flooding in King County Rivers, winter flow volumes are expected to rise due to an increase in the proportion of precipitation falling as rain over the course of the 21st century (Lee et al. 2018). This increase is anticipated despite the modest long-term projections for average annual rainfall shown in Figure 4-5. Smaller, local stream systems (e.g., Olson Creek, Mill Creek, Bowman Creek) are expected to have more frequent flooding (i.e., flow overflowing its confined banks), and extreme events are more likely to occur (i.e., the current 1% probability flood would have a higher percentage chance of occurring in the future). Storm drainage infrastructure that interfaces with these natural drainages should be reevaluated to consider negative consequences and resiliency (the ability to safely withstand critical service disruption).

### 5.4.2 Recommendations

Stormwater design guidelines will need to consider the possible changes in storms that are *informed* by future climate scenarios. The strategy aligns with the guidance for stormwater design and sizing recommended and approved by the Water and Land Resources Division of the King County Department of Natural Resources (King County DNR 2021). For example, the guidance provides direction for the design of new pipe systems with sufficient capacity to convey and contain (at minimum) the future predicted 25-year peak flow. Pipe system structures may overtop during runoff events that exceed the 25-year design capacity. However, this is permissible as long as the overflow resulting from a larger event (e.g., a 100-year runoff event) does not lead to severe flooding or erosion issues. Additional design guidelines for new flow control standards, conveyance standards, culverts, ditches, and canals are also included.

The recommended approach to mitigate effects due to climate change is described as follows.

**Drainage System Performance.** Because of likely changes in the frequency of intense rainfall, the following recommendations should be considered in the design of conveyance systems:

- Review and revise the hydraulic performance metrics related to freeboard, headwater depth, and surcharging. Evaluate the financial implications associated with enforcing strict hydraulic performance standards.
- Prepare a critical drainage review (CDR) process (as identified as a work order in Section 8) to evaluate the consequences of storm events exceeding the design parameters. Establish clear policies regarding safety, property protection, service continuity, and mitigation of nuisance flooding to make systems more resilient to infrequent but probable flooding. Ensure that the level of protection aligns with the associated costs and risk factors.
- Prioritize effective hydraulic performance and resilience measures for critical facilities during severe storm events that go beyond the intended design limits.

**River and Stream Flooding.** River and stream flooding frequency is expected to increase. The vulnerability of existing infrastructure in or near streams or floodplains has not been assessed in this Plan.

# 6. Maintenance and Operations

An evaluation of existing Storm Drainage Utility M&O activities was conducted in support of this Plan. This chapter documents existing Storm Drainage Utility M&O activities with the primary purpose of establishing a baseline understanding of the proactive and responsive maintenance procedures performed by City Storm Drainage Utility M&O staff. This baseline understanding is used herein to evaluate utility staffing, data collection and computerized record-keeping needs, and other utility needs necessary to continue to meet system goals.

The information provided in this chapter is a summary of information collected during City Storm Drainage Utility staff interviews, review of computerized records, and existing utility forms/checklists.

## 6.1 Utility Responsibility and Authority

This section provides an overview of the Storm Drainage Utility organization and basic information related to utility staffing, training, and education.

### 6.1.1 Organizational Structure

The City Storm Drainage Utility is operated as a utility enterprise under the direction of the director of public works. The Public Works Department is responsible for planning, design, construction, operation, maintenance, quality control, and management of the storm drainage system. The City has a mayor-council form of government; therefore, the director of public works reports to the mayor, with input from council through council study sessions and meetings. The mayor provides oversight for the implementation of policies, planning, and management for the Storm Drainage Utility. The City Council provides direction on policy and budget considerations.

The Engineering Services Department is the lead group for comprehensive storm drainage system planning, development of a CIP, and the design, construction, and inspection of projects related to the storm drainage system.

M&O Services is the lead group responsible for the day-to-day maintenance and operation of the storm drainage system. The storm drainage/sanitary sewer manager reports to the M&O Services general manager and oversees 11 total storm drainage employees (1 field supervisor and 10 maintenance workers, as shown in Table 6-1). The Vegetation Maintenance Division is responsible for mowing, tree trimming, and weed control of City ROW and storm facilities.

The overall Public Works Department organizational structure is shown in Figure 2-1.

### 6.1.2 Staffing Level

The Storm Drainage Utility currently includes 10 full-time M&O field staff, plus a field supervisor and a manager, who perform administrative duties. This chapter does not include an evaluation of utility management, which includes regulatory compliance, planning, and coordination with other City departments. Position titles and the primary functions of the M&O staff working within the Storm Drainage Utility are shown in Table 6-1.

Table 6-1. Storm Drainage Utility M&O Personnel

| Position | Primary function(s) |
|---|---|
| Storm drainage/sanitary sewer manager | Management of sanitary sewer and storm drainage M&O staff |
| Storm field supervisor | Supervision of field staff |
| Maintenance worker | Ten full-time staff dedicated to field inspection and maintenance |

M&O = Maintenance and Operations

In addition to the M&O field staff identified in Table 6-1, secondary staff support the following Storm Drainage Utility functions:

- Management and administration: A full-time manager performs administrative duties for both the Sanitary Sewer and Storm Divisions. Management and administrative tasks include general oversight of the Sanitary Sewer and Storm Drainage Utility M&O staff, regulatory compliance, planning, and coordination with other City departments. Field work is supervised by a full-time field supervisor.
- Vegetation maintenance: The Vegetation Maintenance Division consists of 10 full-time staff, a field supervisor, and a manager. These staff primarily support the Storm Drainage Utility M&O field staff (approximately 60% of total staff effort) with pond vegetative control, weed control and herbicide spraying, ROW and ditch mowing, tree trimming and removal, and leaf removal.
- Contracted services: The Storm Drainage Utility uses other City departments or external contractors for some services, as discussed in Section 6.3.

M&O activities routinely performed by Storm Drainage Utility staff are discussed in Section 6.2. The staffing plan presented in Section 6.6 considers M&O activities performed by Storm Drainage Utility and Vegetation Maintenance staff.

### 6.1.3 Level of Service

The Storm Drainage Utility operates in accordance with the system goals and policies outlined in Chapter 3 and internally adopted objectives integral to meeting those goals. These objectives are generally based on the current staffing level and tasks deemed most critical to the City and its residents. However, the existing staffing requirements discussed in Section 6.6 herein include near-term goals that may not be met by existing staff.

### 6.1.4 Training and Education

The City recognizes the value of having a knowledgeable and well-trained staff operating the storm drainage system and encourages employees to obtain the highest level of training available. At this time, the State of Washington does not require certification for stormwater maintenance operators, but the City would support any effort to establish certification for these positions. Seminars, conferences, and college coursework have become tools to advance knowledge for maintenance staff.

Many M&O staff are specialized in specific job functions, which can promote expertise through specialization but also has the potential to limit the ability of the utility to absorb absences due to vacation, sickness, retirement, resignation, and termination. To mitigate this limitation, the City has broadened the scope of the Storm Drainage Utility's education system by conducting cross-training programs.

## 6.2 Routine Operations Provided by the Storm Drainage Utility

This section discusses routine operations provided by the Storm Drainage Utility M&O staff shown in Table 6-1. Each subsection provides a brief description of the M&O activity, City goals with respect to proactive maintenance, and the estimated Storm Drainage Utility staff effort to achieve the proactive maintenance goal.

### 6.2.1 Catch Basin and Manhole Inspection, Cleaning, and Repair

The storm drainage system includes approximately 10,800 catch basins and 3,172 manholes. Catch basin and manhole maintenance includes initial inspection and potential follow-up cleaning and/or repair. Inspection is performed by a two-person crew using utility mapping to locate the targeted facilities. M&O staff use condition categories from the CMMS asset management system to identify which facilities require further cleaning or repair. The condition categories consider items such as observation of trash, debris, sediment, or vegetation blocking or within the catch basin/manhole; structural damage; evidence of contamination or pollution; and the integrity of catch basin grates, manhole covers, and ladders. Follow-up cleaning and maintenance work orders are generated based upon the results of initial inspection and typically include a two-person crew. Based upon recent maintenance history, approximately one in five catch basin and manhole inspections leads to further cleaning. The City assumes that a total of 5% of catch basins and manholes per year require an additional visit post inspection for some level of maintenance or repair. Catch basins and manholes requiring only minor maintenance tasks that can be performed during inspection are not included in this total.

Catch basin inspection is required as part of the City's NPDES MS4 permit, per the most recent permit, 2024–2029 issuance. The City is required to inspect and maintain all catch basin facilities every 2 years, with each 2-year cycle ending on December 31. To achieve this permit requirement, the City goal is to inspect 40 catch basins per day. Manhole inspection frequency is not mandated by the permit, but the City's goal is to complete inspection of all City manholes on a 4-year rotating schedule.

The City will use the CMMS software (see Section 6.5) to record and track results of catch basin inspection, cleaning, and maintenance efforts. In the future, if catch basin inspection records demonstrate that catch basins generally comply with maintenance standards and do not require inspection every 2 years, the City may be able to justify and suggest a less frequent inspection schedule for compliance with the Permit.

### 6.2.2 Stormwater Pipeline Cleaning

The storm drainage system includes approximately 250 miles of collection system piping. The City currently cleans its stormwater pipelines on an as-needed basis. Cleaning of the storm drainage system is performed using a City-owned Vactor/jet truck. Cleaning is typically performed from structure to structure (e.g., catch basin or manhole) by a two-person crew.

Jetting of stormwater pipelines is the principal means of removing debris or obstructions from the storm drainage system. A hose with a special end fitting is inserted into a pipe and high-pressure water (up to 2,500 pounds per square inch) is sent through the hose. The high-pressure water exits the small hole at the tip of the nozzle, breaking down and/or scouring obstructions. Debris is then removed via suction by the Vactor truck equipment at each manhole.

The City expects to clean 4% of its stormwater pipeline system per year. On average, a two-person crew can clean approximately 1,500 feet of pipe per day and inspect approximately 500 feet of pipe per day.

### 6.2.3 Stormwater Outfall Inspection, Cleaning, and Maintenance

The storm drainage system includes 124 outfalls or discharges from localized collection systems to the Green River, White River, or Mill Creek. Outfall maintenance includes initial inspection and potential follow-up corrective actions. Outfall inspections are performed to identify the following: excessive vegetative growth that could obstruct flow, outfall erosion protection, structural damage to the conveyance system itself, and abnormal discharge that might be indicative of contamination (as demonstrated by a color, sheen, or odor). Cleaning and minor maintenance tasks are performed during inspection. Necessary follow-up repairs or more intensive maintenance work orders are generated based upon the results of the initial inspection. The City goal is to inspect, clean, and perform minor maintenance tasks at each outfall twice per year. The City assumes that 5% of outfall inspections per year require an additional visit post-inspection for some level of maintenance/repair. For a two-person crew, it is anticipated that inspection, cleaning, and minor maintenance requires 2 hours per outfall, while follow-up maintenance or repairs requires 0.5 hour per outfall.

### 6.2.4 Drainage Ditch Maintenance and Restoration

The storm drainage system includes approximately 42 miles of drainage ditches (as shown in Figure 6-1). Drainage ditch maintenance is required to preserve the original line and grade, hydraulic capacity, and purpose of the ditch. Routine maintenance activities include regrading and removal of sediment; nuisance vegetation; and isolated obstructions, such as trash, trees, and accumulated debris. Because vegetation is important for erosion control, the City strives to minimize the removal of beneficial vegetation.

Up to six M&O staff are required for a single ditch maintenance crew to operate the City-owned excavator, control traffic (as necessary), and manually regrade or remove obstructions. On average, these crews can complete 200 feet of ditch maintenance per hour. This rate does not include mobilization and demobilization, equipment repair and other downtime, waste disposal, and administrative tasks, such as training and record keeping. Currently the ditch inventory is maintained on an as-needed basis, however the City has a target to maintain all ditches within the system on a 5-year cycle.

### 6.2.5 Stormwater Facility Inspection, Maintenance, and Restoration

Inspection of the approximate 300 City stormwater facilities is performed by a one-person crew using an inspection checklist to identify conditions that require correction. Facilities include stormwater ponds, swales, vaults, tanks, UIC, LID, and manufactured treatment devices. The checklist includes items such as observation of trash, debris, sediment, and animal or insect infestation that could impact function or future maintenance; structural damage or erosion; evidence of contamination or pollution; and the integrity and/or function of emergency overflow spillways (as applicable). The City goal is to inspect each facility once per year. On average, inspection activities require 0.75 hours for a one-person crew per location. This rate does not include mobilization and demobilization, equipment repair and other downtime, waste disposal, and administrative tasks, such as training and record keeping.

Maintenance and restoration of each facility type varies. The City has a goal of maintaining permeable pavement twice per year. On average, a four-person crew can maintain 0.3 miles of permeable pavement per hour. The maintenance of vaults, tanks, and underground injection control (UIC) wells are all accounted for under general facility maintenance in Section 6.2.9, Manufactured treatment devices are maintained by an outside contractor and included in Section 6.3.3.

Maintenance of ponds and swales (of which there are approximately 184) are performed as necessary, with the expectation of maintaining or restoring 20% of the system each year. A six-person stormwater pond crew is required for pond maintenance, while swales require a four-person crew. For the purposes of the full-time equivalent (FTE) calculation, the expected maintenance of ponds and swales have been combined (as there are only two swales within the system). Follow-up maintenance and restoration is scheduled during the summer months. The City assigns a six-person stormwater pond/swale crew approximately 21 days per year (3 days per week for 3 out of 4 months in the summer).

After significant storms, it is recommended that some stormwater facilities be inspected to verify proper function and identify damage, if any. It is recommended that the City develop a list of facilities that should be inspected following these larger storm events.

### 6.2.6 Culvert Inspection and Cleaning

Culvert maintenance includes inspection and cleaning of the approximately 1,164 culverts within the storm drainage system. Culverts are typically inspected by a two-person crew, with corrective actions and cleaning performed during the inspection when possible. On average, inspection and cleaning activities require 1 hour per culvert for a two-person crew. Culvert inspection focuses on the assessment of free flow within the culvert and identifying any structural defects. Any debris that cannot be removed during the initial inspection or any noted structural concerns result in a work order for corrective action. The City goal is to inspect (and clean as necessary) each culvert once per year.

### 6.2.7 General Facility Maintenance and Other Field Tasks

Storm Drainage Utility M&O staff perform a number of field tasks that do not readily fall into the categories previously listed and often support other City departments. Examples of these additional storm drainage tasks include the following:

- General facility maintenance: Maintenance may include detention vault and tank cleaning and sediment removal, weir cleaning, filter inspection and cleaning, and maintenance of oil/water separators and UIC.
- Engineering support: Storm Drainage Utility M&O staff often provide facility inspection services for engineering projects and support Engineering through visual observation in the field. M&O staff also make small repairs such as replacing catch basins or failed culverts or minor drainage pipe replacement. See Section 6.7 for recommendations related to documenting M&O repair projects.

Identifying the FTE for each task identified above was not considered as a part of this Plan. Instead, the FTE for the above tasks have been combined into one group summarizing the general inspection and field tasks performed by the Storm Drainage Utility staff. The City may choose to identify the expected FTE for each task at a later date, if desired. FTE assumptions are summarized in Section 6.6.

### 6.2.8 Storm Drainage Utility Overhead

The Storm Drainage Utility is responsible for ensuring routine operations are carried out as described above. To do so, several tasks not readily assigned to any one of the routine operation categories must be performed. Examples of these tasks are listed below:

- Training: Staff must be trained in routine field operations as well as the general order of processes required before and after field operations
- Record keeping and map maintenance: The utility ensures the results of routine operations are recorded and updated with condition assessments and mapped appropriately. The utility also notes any other field observations that may require further investigation. Additional details regarding this topic are given in Section 6.5.

- Equipment repair: Staff must address equipment malfunctions and necessary repairs, as needed.
- Preparation: Time is needed to prepare for routine operations

These tasks are expected for each routine operation previously described, but they have not been allocated to the specific tasks. For the purposes of resource planning, overhead is expected to account for 10% of the available staffing time.

## 6.3 Routine Operations Provided to the Storm Drainage Utility

This section discusses routine operations performed by other City staff or by contracted services in support of the Storm Drainage Utility. Each subsection provides a brief description of the M&O activity. FTE efforts for these activities are funded by the Storm Drainage Utility. Because Vegetation Maintenance staff primarily support the Storm Drainage Utility (approximately 60% of total staff effort), these staff are included in the existing staffing requirements discussed in Section 6.6.

### 6.3.1 Vegetation Maintenance

Vegetation maintenance is performed by Vegetation Maintenance Division full-time and seasonal staff that support City Storm Drainage Utility M&O staff. Vegetation maintenance includes mowing, herbicide application, seeding and replanting, and removal of nuisance vegetation or vegetation that impairs the function of storm drainage facilities. In the fall, vegetation maintenance also includes removal of leaves that can accumulate and block flow to catch basins (performed as needed).

Full-time Storm Drainage Utility staff may also perform limited vegetation maintenance as part of the routine operations discussed in Section 6.2.

### 6.3.2 Stormwater Pump Station Maintenance

Maintenance of the seven pump stations within the City storm drainage system is performed by Sanitary Sewer Utility staff because they have pump specialists who perform all pump station maintenance. Sanitary ewer Utility staff perform scheduled weekly and monthly maintenance inspections, as described in the City of Auburn Sewer Comprehensive Plan Update and summarized below.

Pump station maintenance activities include both weekly and monthly inspections and include checking lubrication, seals, valves, and general cleanliness of pump stations, as well as cleaning out sumps and trash racks.

### 6.3.3 Manufactured Treatment Device Maintenance

As described in Section 6.2.5, manufactured treatment devices are inspected by city staff annually to identify conditions that require additional, unscheduled maintenance. Such conditions could include excess sediment accumulation, damaged piping, or vault and access cover damage. Manufactured treatment devices are serviced by City staff, as noted in the inspections. Some proprietary media or filter units are maintained by a private contractor, as needed.

## 6.4 Non-Routine and Emergency Operations

The intent of the routine inspection and maintenance activities discussed in Sections 6.2 and 6.3 is to minimize, through proactive management of the stormwater facilities, the potential for conditions that could lead to emergencies. This section discusses unscheduled activities performed by Storm Drainage Utility M&O staff and describes a response plan for emergency conditions.

### 6.4.1 Customer Service Requests

Customer service requests, typically related to a local drainage complaint, trigger creation of a work order to inspect the affected area or stormwater facility and identify potential solutions. In some cases, relatively simple solutions, such as removal of blockages, can alleviate the issue. However, other cases require coordination with Engineering or other City departments. On average, City Storm Drainage Utility staff respond to approximately five customer service/complaint-related work orders per week. The effort required to resolve these complaints varies considerably.

Good recordkeeping helps in complaint resolution by ensuring that all relevant data are gathered and by serving as a reminder to resolve the complaint and notify the complainant. When a complaint is received, the following information is recorded to the extent possible:

- Name and contact information of the person making the complaint.
- Brief description of the nature of the complaint.
- Time and date the complaint was received.
- Storm Drainage Utility staff assigned to respond.

Following initial response, the complaint record gets updated to include the results of inspections and any corrective actions taken. If the complaint cannot be resolved internally within the Storm Drainage Utility, the complaint record will be forwarded to Engineering for further investigation.

Notification of any system investigation and/or action is provided to the customer making the complaint.

### 6.4.2 Emergency Response Program

The Storm Drainage Utility, in conjunction with the other utility divisions, has prepared an Emergency Binder as a guide on how to handle emergency situations. While the guide is by no means all-inclusive for every type of disaster, it is a valuable tool for dealing with many of the emergency situations that municipalities face. Copies of the Emergency Binder are available at the M&O Building, and at City Hall Annex with the Director.

The primary objectives of the Utilities response is ensuring public safety, restoring essential services as quickly as possible, and providing assistance to other areas as required. There is also a master response program for the entire City, as documented in the City's Comprehensive Emergency Management Plan (CEMP). The material in the CEMP provides guidance for mitigation, preparedness, responsibilities, recovery operations, training, and community education activities. Copies of the CEMP are located in each City department, the M&O Building, and the VRFA.

The utility has implemented a standby program whereby one on-call employee is designated to be the first to receive after-hours emergency calls. Most storm drainage system problems that occur outside of normal working hours are reported through the City's 911 emergency response system or a non- emergency response number. An emergency callout list is provided to the emergency operator in order to contact utility staff in case of an emergency. The primary responder to those after-hours calls is the on-call employee. Storm Drainage Utility M&O staff have been trained to respond to system emergencies. The contacted staff assesses the situation, contacts additional staff as necessary, and then responds in accordance with established emergency response procedures.

### 6.4.3 Source Control Inspection Program

Per the NPDES MS4 permit, the City must implement a program to prevent pollutant-laden runoff from existing development to its MS4. A source control inventory of publicly and privately owned institutional, commercial, and industrial sites with the potential to contribute pollutants to the MS4 was developed in 2022 and must be updated once every 5 years. The City is required to annually inspect 20% of the sites listed in its source control inventory to assess compliance with source control requirements, evaluate the effectiveness of existing BMPs (and provide recommendations), and ensure required BMPs and actions are enacted through enforcement (as needed).

The City has hired a full-time employee to handle the SCIP. As the program is only in its second year, the required time and resources are still being evaluated. It is recommended that the City document these aspects and evaluate after 5 years. This will allow the City to develop a more accurate estimate of the required FTE for implementation of the SCIP.

## 6.5 Data Collection and Record-Keeping

Data collection and record-keeping functions for the Storm Drainage Utility are performed using a CMMS system called Cartegraph, a web-based commercial software package provided by Cartegraph Inc. Cartegraph integrates GIS data with utility M&O records, providing managers with overview information about system and operational performance and field crews with information related to the condition and failure history of specific stormwater facilities. The City currently uses Cartegraph to plan field staff activities (work orders), record results of both routine and non-routine maintenance, and compare actual maintenance efforts to City goals. The City recently upgraded its Cartegraph system and plans to transition toward the use of Cartegraph as an asset management tool, through which the City would optimize staffing and capital resource planning.

In recent years, the City has made considerable progress in adding asset information to Cartegraph, specifically GIS data, physical information related to size and material, and installation dates. However, to fully utilize the asset management function of Cartegraph, additional information related to risk, asset criticality, and condition is also necessary. To assist the City’s transition to an asset management program, as described in Chapter 5, the attributes listed below should be used within Cartegraph to define each of the City stormwater assets (catch basin, pipe segment, stormwater pond, etc.).

Asset-specific attributes. The following asset-specific attributes are related to the asset and remain relatively unchanged over time.

- Asset ID: The unique asset number that is used by all business systems to identify an asset.
- Location: Where the asset is located (GIS).
- Installation date: The date the asset was installed.
- In-service date: The date the asset was placed into service.
- Material: The material making up the composition of the asset’s structure.
- Asset class: A group of assets that share the same characteristics (e.g., ponds, pipe segments). Asset class is used to estimate replacement costs and useful life of groups of assets.
- Nameplate information and asset specifications: Important information that is used to uniquely describe an asset, such as the manufacturer name, type of asset, serial number, size, material, etc. This information is used for asset identification, replacement, and repair.

Operation-specific attributes: The following attributes are related to routine operations (inspection and repair or replacement) for each asset and must be updated afterwards accordingly.

- Replacement cost: The cost to replace the asset.
- Replacement year: The year the replacement cost data were calculated.
- Inspection date: The date the asset was inspected.
- Overall condition rating (OCR): The condition rating of the asset assigned as a result of the inspection.
- Overall condition index (OCI): A numeric score describing the condition of the asset, assigned as a result of the inspection (related to OCR).

Post-processing attributes. The attributes listed below are generated using asset-specific and operation-specific attributes data for each asset. These attributes are not manually entered. They are calculated to determine the risk associated with each asset and prioritize future work accordingly (as previously described in Chapter 5, and detailed in Appendix C).

- Useful life: The average life expectancy of the asset (life expectancy estimates for the different asset types can be found in Appendix C).
- Remaining useful life: The age of the asset (installation year – current year) subtracted from its useful life.
- Asset criticality: A value assigned to each asset that indicates how essential it is to maintain a defined LOS. Typically it is defined as a combined score based on the consequence of failure and the likelihood of failure.
  - → Criticality of failure: A score assigned to an asset on the scale of 1 to 5 that communicates the social and economic cost if the asset fails, where a score of 1 would represent an asset not expected to have extreme consequences after failure, and a score of 5 would represent an asset that may have detrimental consequences after failure. This score will not be entered manually into Cartegraph; it is determined largely based on location-based factors and will be assigned using a GIS-based spatial analysis.
  - → Likelihood of failure (condition): A score assigned to an asset on a scale of 1 to 5 that communicates the estimated time until the asset fails, where a score of 1 would represent an asset in excellent condition, and a score of 5 would represent an asset on the brink of failure. This score will not be entered manually into Cartegraph. It is initially calculated based on critical attributes (as defined in Appendix C), but after the inspection date becomes available, the results of the inspection (OCI and OCR) will supersede the estimated rank based on critical attributes in assigning a likelihood of failure score.

M&O attributes. The following M&O attributes are captured as part of the operations, maintenance, and repair history associated with each asset:

- Asset ID: The unique asset number that is used by all business systems to identify an asset. Work orders should be associated with one or more assets.
- Issue, cause, action: These codes are used to classify historical M&O activities associated with corrective actions or unplanned maintenance.
  - → Issue: What is the problem observed in the field?
  - → Cause: What is the underlying cause of the problem?
  - → Action: What was done to address the cause?

- Target hours and actual hours: Recording the estimated hours and actual hours to complete a work order can help in determining efficiency, planning workloads, and assessing repair costs.
- Target start and stop dates and actual dates: Recording the estimated and actual start and stop dates for a work order can help in determining efficiency, planning workloads, and assessing repair costs.
- Work order costs: Work order costs include labor, parts, materials, and equipment and should be accurately recorded for each work order.
- Work order type: Work order types are used to group and compare different types of work activities. Typical work order types are as follows:
    - Capital improvement: Work associated with a CIP.
    - Corrective maintenance: Work associated with an unplanned repair.
    - Preventive maintenance: Work associated with a planned preventive maintenance activity (or inspection).
    - Predictive maintenance: Work associated with predictive measures (usually for critical assets).
- Warranty information: Helps to determine assets that are under warranty and the warranty maintenance requirements.

## 6.6 M&O Staffing Requirements

This section outlines existing and future staffing requirements for M&O staff.

### 6.6.1 Existing Staffing Requirements

Existing staffing requirements for M&O activities discussed in this chapter were compiled and evaluated to determine the M&O staffing level needed to efficiently operate, maintain, repair the storm drainage system and collect and report the information necessary to properly operate system. Table 6-2 and Table 6-3 evaluate Storm Drainage Utility and Vegetation Maintenance Division staff, respectively. Each table evaluates the estimated time to conduct storm drainage system M&O tasks in the manner currently performed. Calculated days for each M&O activity are for a single person performed over an 8-hour “day.” Therefore, an activity that is performed quarterly and that requires 4 hours and two M&O staff to complete would result in an annual requirement of 4 days.

Table 6-2. Existing Storm Drainage System Maintenance and Staffing Requirements

| Work activity | FTE days required annually | Assumptions/City goal |
|---|---|---|
| Catch basin and manhole inspection, cleaning, and repair | | |
| Catch basin inspection | 270 | Inspect once every 2 years, total of 10,800 catch basins. Perform 40 inspections per day with 2-person crew. |
| Manhole inspection | 79 | Inspect once every 4 years, total of 3,172 manholes. Perform 20 inspections per day with 2-person crew. |
| Catch basin cleaning | 68 | 1 cleaning is required for every 10 inspections.<br>2-person crew, 0.25 hour each. |

Table 6-2. Existing Storm Drainage System Maintenance and Staffing Requirements (continued)

| Work activity | FTE days required annually | Assumptions/City goal |
|---|---|---|
| Manhole cleaning | 32 | 1 cleaning is required for every 10 inspections.<br>2-person crew, 0.4 hour each. |
| Catch basin/manhole repair | 155 | 310 repairs (approximately 5% of all inspected) per year.<br>2-person crew, 0.5 hours each. |
| Stormwater pipeline cleaning | | |
| Pipeline cleaning | 67 | City expects 50,688 ft per year (entire system in 25 years).<br>2-person crew can clean 1,500 ft of pipe per day. |
| Stormwater outfall inspection, cleaning, and maintenance | | |
| Inspection/Cleaning | 124 | City goal is 2 times per year (124 total outfalls).<br>2-person crew, 2 hours each. |
| Maintenance | 2 | City expects 10% of annual outfall inspections to require an additional maintenance visit.<br>2-person crew, 0.5 hours each. |
| Maintenance and restoration of drainage ditches, stormwater ponds/swales, and permeable pavement | | |
| Drainage ditch maintenance and restoration | 166 | City's goal is once every 5 years.<br>6-person crew, 200 ft per hour. |
| Stormwater pond and swale maintenance and restoration | 28 | 6-person crew expected to maintain/restore 20% of the ponds and swales within the system per year. |
| Permeable pavement maintenance and restoration | 9 | City's goal is 2 times per year (approximately 89,000 square feet).<br>4-person crew, 0.3 miles per hour. |
| Stormwater facility inspection | | |
| Stormwater facility inspection | 28 | City goal is once per year for each facility (approximately 300 total). Includes ponds, swales, vaults, tanks, UIC, LID, and manufactured treatment devices"<br>1-person crew, 0.75 hours each. |
| Culvert inspection and cleaning | | |
| Culvert inspection and cleaning | 291 | City goal of once per year for each of 1,164 culverts.<br>2-person crew, 1 hour each. |
| Other stormwater M&O activities | | |
| General facility maintenance and other field tasks | 26 | 1 day per week.<br>2-person crew, 2 hours each. |
| Customer service requests/complaints | 65 | 5 requests per week.[a]<br>2-person crew, 1 hour each. |
| Utility overhead for routine operations | | |
| FTE total for Routine Operations | 1410 | |
| Overhead | 141 | Assumed 10% of FTE total. |
| Data entry | 130 | 20 hours per week total (8 people at 0.5 hours per day). |

### Table 6-2. Existing Storm Drainage System Maintenance and Staffing Requirements (continued)

| Work activity | FTE days required annually | Assumptions/City goal |
|---|---|---|
| SCIP | | |
| Implementation of SCIP | 260 | FTE reflects the full-time employee who will be implementing the SCIP. 1 person, 52 weeks per year, 40 hours per week. |
| Subtotal | 1,941 | |
| Total | 2,135 | Assumes 10% unquantified work |
| Total number of working days available per FTE | 221 | 365 minus weekends (104), holidays (12), vacation (15), sick (12) and training (1). |
| Number of FTEs required | 9.7 | 2,135 days required divided by 221 days per FTE year. |
| Current funded FTEs | 10.0 | 10 full-time staff dedicated to field inspection and maintenance. |

Note: FTE = full-time equivalent. FTE days are defined as 8 hours.

a. Many customer service requests are related to maintenance needs for privately owned drainage systems.

### Table 6-3. Existing Vegetation Maintenance and Staffing Requirements

| Work activity | FTE days required annually | Assumptions/City goal |
|---|---|---|
| Pond/Vegetation Management | | |
| Mowing | 683 | 6-person crew, 40 hours per week for 7 months |
| Weeding/Spraying | 152 | 4-person crew, 20 hours per week for 7 months |
| Weed Control/Herbicide Spraying | | |
| Weed Control/Herbicide Spraying | 59 | 2-person crew, 3 days per week for 6 months |
| ROW and Ditch Mowing | | |
| Staff 1 | 137 | 40 hours per week for 9 months |
| Staff 2 | 49 | 2 days per week for 8 months |
| Tree Trimming and Removal | | |
| Tree Trimming and Removal | 173 | 4-person crew, 40 hours per week for 4 months |
| Leaf Removal | | |
| Leaf Removal | 390 | 2-person crew, 40 hours per week for 12 months |
| Total | 1,641 | |
| Total number of working days available per FTE | 221 | 365 minus weekends (104), holidays (12), vacation (15), sick (12), and training (1). |
| Number of FTEs required | 7.4 | 1,641 days required divided by 221 days per FTE year |
| Current funded FTEs | 7.6 | 6.6 FTE<br>3 seasonal staff |

Note: FTE = full-time equivalent. FTE days are defined as 8 hours.

Table 6-2 shows that the Storm Drainage Utility meets the base level of staffing required with respect to meeting current City proactive goals for M&O activities. Additional staffing needs required to implement future regulatory requirements and recommended management activities are discussed in Section 6.6.2. Table 6-3 shows that there is adequate staffing to meet current vegetation maintenance needs of the Storm Drainage Utility.

### 6.6.2 Future Staffing Requirements and Equipment Needs

The M&O activities discussed in Section 6.2 and summarized in Table 6-2 are current efforts and do not include additional activities that will be required as part of the revised NPDES MS4 permit. In order to implement newly recommended asset management tasks with respect to drainage ditches and pipe inspection (see Table 6-4), additional staffing may be required. Future staffing requirements are summarized in the sections below.

#### 6.6.2.1 Drainage Ditch Maintenance Program

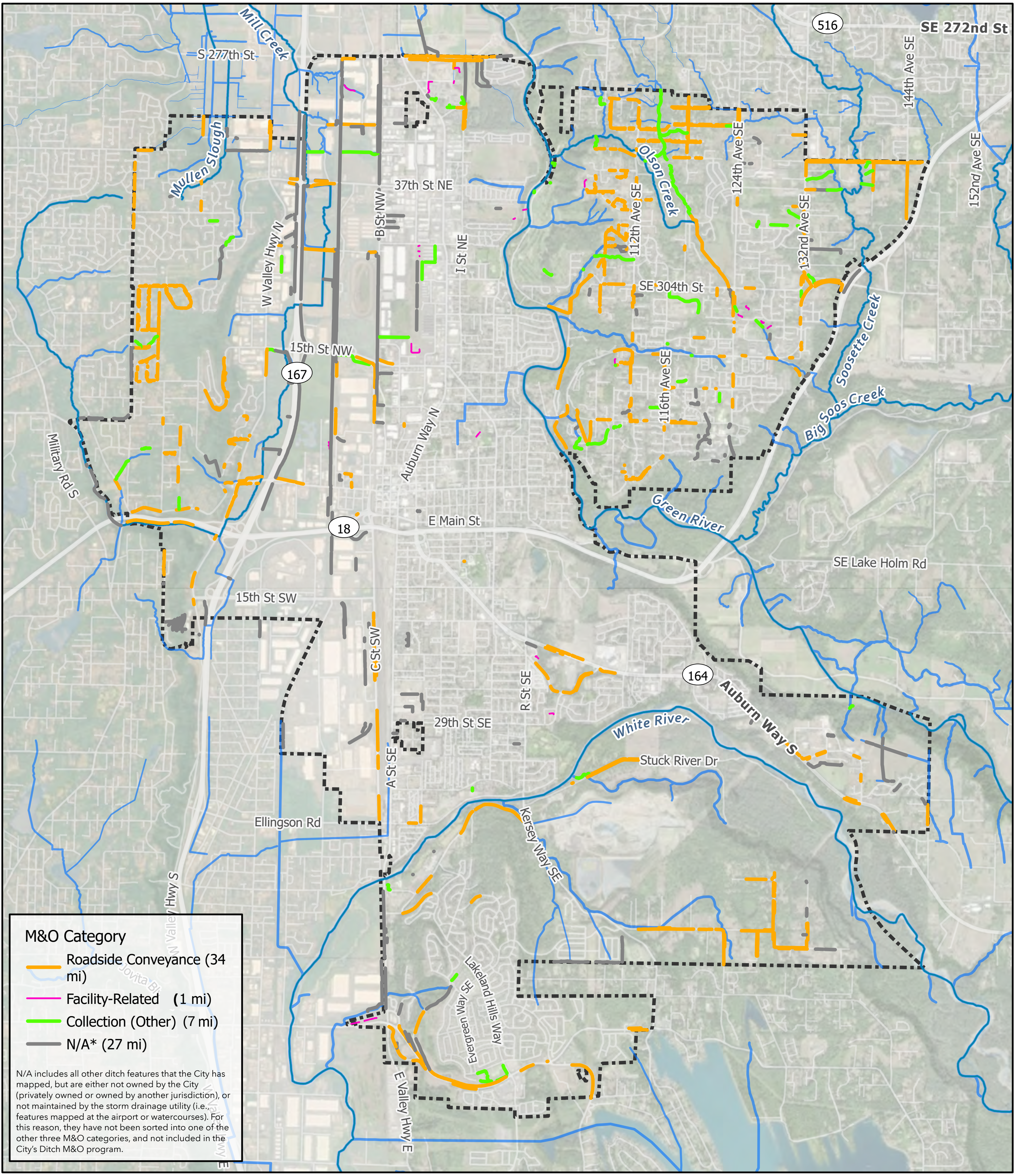
The City's ditch maintenance program was reviewed by Parametrix on behalf of this Plan to determine if additional controls and resources are required to meet needs and address potential liabilities. As a result of the review, it is recommended that the City categorize ditches according to the anticipated M&O needs (roadside ditch, facility-related, and collection [other]) and incorporate inspection as a new aspect in the ditch maintenance program. Figure 6-1 shows the extent of the City's ditch inventory and the recommended categorization according to M&O needs.

Roadside ditches are expected to require constant maintenance. Additional or enhanced actions are not anticipated at this time but could be an outcome of an enhanced maintenance program that could be proposed or required under the NPDES MS4 permit. The collection ditches will require additional routine maintenance, such as annual mowing and sediment removal. Facility-related ditches are recommended to be maintained and inspected with the facilities they are related to. This will require adjusting the City's goal of maintenance frequency.

Inspection will involve field verifying the condition, updating the asset inventory with findings, and generating a work order (as needed). Work orders will ensure the appropriate staff are aware of the issue (M&O, vegetation, office staff, etc.). Features in need of action are prioritized, and that work is scheduled appropriately. The following items will require consideration in incorporating the proposed ditch maintenance program.

- How does inspection turn into a work order?
- How often should ditches be inspected?
- What are the thresholds for action?

Because the inspection process is new, it is expected to take time to understand the staff and time needed as well as to set an achievable goal for inspection of the entire system. To begin to understand the expectation of M&O staff, starting estimates were developed for consideration. For the purposes of this Plan, inspection is anticipated to require a one-person crew to inspect 500 feet of ditch per hour, and it is recommended to inspect all ditches within the program annually. Further, the frequency and resources needed for this program should be evaluated every 5 years.



N/A includes all other ditch features that the City has mapped, but are either not owned by the City (privately owned or owned by another jurisdiction), or not maintained by the storm drainage utility (i.e., features mapped at the airport or watercourses). For this reason, they have not been sorted into one of the other three M&O categories, and not included in the City's Ditch M&O program.

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Date: 5/10/2024
Sources: City of Auburn, King County, Pierce County, WA Ecology, WA DNR, USGS, ESRI
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Auburn City Limits
Watercourse

**Figure 6-1**
City Drainage Ditch Inventory
Maintenance & Operations (M&O) Categorization
Stormwater Drainage Utility
Comprehensive Storm Drainage Plan

0 ¼ ½ 1
Miles

Parametrix
AUBURN WASHINGTON

For the near-term future ditch program, additional analysis and resource streams have been identified. The proposed ditch inspection program and recordkeeping will be initiated. New protocols for finding, adding, mapping, and classifying ditches in the system are needed and should primarily focus on collector and facility ditches. Newly added ditches will require ownership and responsibility research and subsequent easements or purchase. The ditch inspections may reveal system failures that require minor capitol repairs or replacement. The projects should be added as a programmatic CIP. In addition, an assessment to consider ditch improvements for water quality improvement will be prepared, focused on roadside ditches.

The findings and recommendations of the drainage ditch maintenance program have been discussed in further detail in Appendix E.

Taking this into consideration, the City will need to increase the expectation of overall Storm Drainage Utility staffing in order to dedicate more staff to drainage ditch maintenance and restoration (see Table 6-4). It is recommended that the City consider adjusting from the current levels to a regulated biannual basis for maintaining the its ditch inventory. In addition, it would be recommended to inspect the ditch inventory annually to prioritize ditches for maintenance. In order to meet this goal, approximately 363 FTE days (with a six-person crew), or 1.6 FTE per year would be needed (see Table 6-4).

#### 6.6.2.2 Stormwater Pipe Inspection

As explained in Chapter 5.2, the City has a goal to implement an inspection prioritization program for its stormwater pipe system. The program will prioritize inspection for pipes with the highest likelihood of failure scores, which are generally those that are older, have little to no critical attribute data on record, or have no recorded history inspection. As part of the inspection process, feature attributes will be added/updated to the CMMS system, resulting in a robust pipe inventory and a more efficient use of resources. In the beginning of the program, there will be a greater number of pipes with high likelihood of failure scores (approximately 52,000 feet of pipe) since there is a large amount of missing feature data, and approximately 15,000 feet of the City's pipe system per year is expected to have surpassed its expected useful life (see Appendix C).

They City will slowly expand its pipe inspection program as time and finances allow, beginning with periodic use of the Sanitary Sewer Utility's closed-circuit television (CCTV) equipment on an as-needed basis. Since the CCTV equipment will be used as-needed, it is not anticipated to require additional FTE days at this time and has not been included in Table 6-4. Dedicated equipment for the storm utility will be investigated and worked into future budget cycles.

"Lamping" inspections, where the camera is inserted into the manhole or catch basin but not advanced through the pipe system, are typically performed as a first step of the CCTV process. Although the visual range is limited, lamping can identify structures and piping that are in very good condition. In these cases, no additional CCTV inspection would be necessary. Lamping can be utilized in many areas to get a baseline and can be done with current equipment. It is not a full substitute for CCTV inspections but will help get the program going before additional equipment can be purchased.

#### 6.6.2.3 Other M&O Activities

The NPDES MS4 permit requires the City to implement a municipal street sweeping program to target high-priority areas (see Section 5.3). The City will need to review the existing street sweeping program and ensure the permit requirements are addressed or revised, as necessary. The new requirements are not anticipated to require additional FTE days for sweeping crews.

Table 6-4. Future Storm Drainage System Maintenance and Staffing Requirements

| Work activity | FTE days required annually | Assumptions/City goal |
|---|---|---|
| Drainage ditch maintenance program | | |
| Drainage ditch inspection | 55 | 1-person crew, 500 ft per hour. Inspection of the entire system (~220,000 ft) annually. |
| Roadside ditch maintenance and restoration | 327 | 6-person crew, 200 ft per hour. Expect to maintain the entire category (79% of drainage ditch inventory) every 2 years. |
| Collector-ditch maintenance and restoration | 79 | 6-person crew, 200 ft per hour. Expect to maintain the entire category (20% of drainage ditch inventory) every 2 years. |
| Facility-related ditch maintenance and restoration | 20 | 6-person crew, 200 ft per hour. Expect to maintain (1% of drainage ditch inventory) at the same time as maintenance occurs for the related facility (annually). |
| Total | 530 | Assumes 10% unquantified work |
| Additional FTE required for ditch maintenance and restoration | 363 | Subtracting the existing staffing goal (166 FTE days) to understand the additional need. |
| Total number of working days available per FTE | 221 | 365 minus weekends (104), holidays (12), vacation (15), sick (12), and training (1). |
| Number of FTEs required | 1.6 | 363 days required divided by 221 days per FTE year. |

Note: FTE = full-time equivalent

### 6.6.2.4 Equipment Considerations

The Storm Drainage Utility utilizes the Sanitary Sewer Utility's reallocated CCTV inspection equipment and truck. New equipment would allow for increased efficiency and inspection frequency. It is recommended that the City consider the benefit of acquiring a CCTV for the Storm Drainage Utility after the pipe inspection program has been in effect for 5 years.

## 6.7 Potential Improvement Opportunities and Capital Needs

The Storm Drainage Utility has a positive track record for M&O, as evidenced by the limited need for non-routine maintenance and few customer service complaints about the City's drainage system. Routine facility cleaning, regular inspections, experienced staff, and a well-planned storm drainage system contribute to that success. Additionally, significant increases to the drainage ditch maintenance and pipeline inspection program could be addressed by the City by adding to the current Storm Drainage Utility M&O staff. An additional 1.6 FTEs are required to achieve proactive City M&O goals (Table 6-4).

Based upon discussions with City staff and analysis of M&O activities discussed in this chapter, the following improvement opportunities are available to the Storm Drainage Utility. These opportunities are based on improving existing services, regulatory compliance, and improving work productivity:

- Continue to integrate asset management with existing utility management software (Cartegraph and GIS).
  - → Continue to add GIS attributes to known Storm Drainage Utility assets.
  - → Perform and document condition assessments. Use defined criteria (such as leaks/cracks observed, cleanliness, and other specific measures), and provide staff training to ensure assessment consistency.
  - → Use results of condition assessments to move toward risk-based maintenance to best utilize staff resources. For example, consistently high assessment scores would result in a lower risk or need for maintenance, allowing M&O staff to be diverted to more essential activities.
  - → Over time, demonstrate (through maintenance records) that a subset of City catch basins do not require inspection, cleaning, and maintenance every 2 years per the NPDES MS4 permit.
- Reevaluate the inspection frequency and expected effort for the pipe inspection and ditch maintenance programs to adjust as needed.
- Consider obtaining a CCTV inspection equipment for pipe inspection the following utility equipment to improve M&O efficiency.
- Consider aligning catch basin cleaning with stormwater pipeline cleaning and CCTV to ensure efficient use of available resources.
- All M&O repair projects should be constructed to established City engineering standards. It is recommended that the City develop a more formal procedure for tracking M&O repair projects to ensure that as-built and GIS records are updated when repairs are completed.
- Develop a list of facilities that should be inspected following major design storms and inspect accordingly to verify proper function and identify damage, if any.
- Document the time and resources required on behalf of the SCIP program. Evaluate the resource need of the program after 5 years. This will allow the City to develop a more accurate estimate of the required FTE for implementation of the SCIP.
- Continue to develop the ditch maintenance program as broken down in the steps below.
  - → Ditch mapping and classification: Develop protocols for finding, adding, mapping, and classifying ditches within the system. Focus primarily on collector and facility ditches. Accurate mapping and classification will help prioritize maintenance efforts.
  - → Adding new ditches: Consider the steps required when adding new ditches to the system. Elements to address include determining ownership, responsibility, and any necessary easements or land purchases. Having a clear plan in place ensures smooth integration of new ditches.
  - → System failures and CIP: Use the results of regular ditch inspections to identify system failures. System failures may include erosion, blockages, or other issues that require capital repair or replacement. Add a program to the CIP to address ditches with these system failures.

  - → Water quality improvements: Implement a program that focuses on retrofitting ditches with water quality enhancements. Specifically target roadside ditches, which play a crucial role in managing runoff and pollutant removal.
- Coordinate with the Street division to review and revise the City’s street sweeping plan, as needed.

# 7. Capital Improvements

This chapter describes the recommended capital improvement plan for the City of Auburn Storm Drainage Utility. Of the 12 CIPs described in this chapter, 4 are included in the 6-year plan (2025–2030) and 8 are included in the 20-year plan (2031–2044). The 6-year plan includes the highest priority CIPs that address existing drainage problems, address an ongoing waste disposal issue, and ensure compliance with NPDES MS4 permit deadlines. The 20-year plan addresses longer-term capital goals (see Chapter 8). This Plan contains timeframes that are the intended framework for future funding decisions and within which future actions and decisions are intended to occur. However, these time frames are estimates and, depending on factors involved in the processing of applications and project work and the availability of funding, the timing may change. The framework, which may depend on available funding resources, does not represent actual commitments by the City of Auburn.

In general, CIPs are modifications to stormwater drainage infrastructure designed to improve the condition and function of the drainage system so that it can meet the LOS goals established for the City's Storm Drainage Utility (see Chapter 3). CIPs may also be developed to ensure the utility is able to carry out routine operations and ensure compliance with permit requirements.

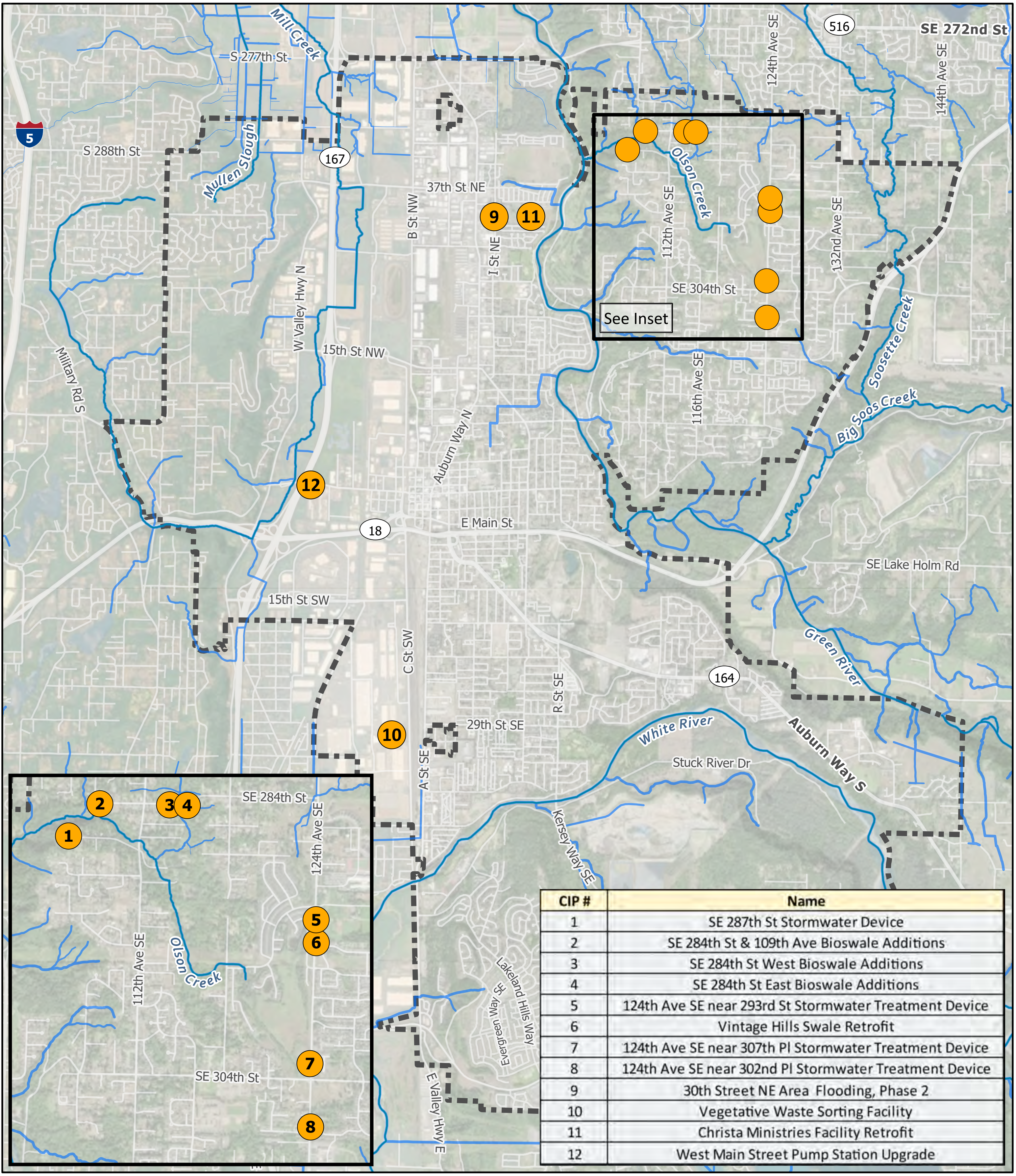
The CIPs presented in this chapter were identified and developed through focused investigations and by working collaboratively with City staff. This focused and collaborative approach was based on the practical consideration that the quantity and delivery of CIPs the City can implement is limited by existing revenue streams and staff availability. The intent is to produce an economical capital improvement plan that addresses the most salient issues in the near term, while still planning for the long-term ability of the Storm Drainage Utility to meet LOS goals. The following steps were used to develop the CIPs.

A list of potential projects was developed for further investigation. The list was developed by working closely with City staff to identify the delayed projects from the 2015 Plan that were still necessary or beneficial to the Utility, locate and characterize existing problems based on direct staff observations, recognize potential opportunities for enhancement, and address needs of the utility. Projects that were generated on behalf of the SMAP for Olsen Creek were also included in this list. Such observations are a valuable supplement to modeling analyses and, in this case, were used in conjunction with modeling activities to assist with model development.

For the potential projects that required H&H analyses, modeling was completed using PCSWMM, a software package that uses GIS technology to import and export data, allowing a seamless transition between the system inventories and modeling input files. Models used the historical event that most closely produced a once per 25-year flow rate (the specific event varied by basin). Results from historical events were used to assess the extent and severity of the drainage problem. Results from the design event were used to understand the feasibility of the potential project in mitigating the drainage problem.

Potential projects were developed and discussed with members of the City staff to identify the most viable alternative/solution. Potential projects were then evaluated based on their potential benefit and feasibility, and a final list was developed. Once the projects were defined, the project team developed concept-level cost estimates.

An overview of project locations is shown in Figure 7-1. Section 7.1 describes a tiered method for establishing project priorities. Section 7.2 presents detailed descriptions of CIPs. Section 7.3 describes programmatic drainage projects.



| CIP # | Name |
|---|---|
| 1 | SE 287th St Stormwater Device |
| 2 | SE 284th St & 109th Ave Bioswale Additions |
| 3 | SE 284th St West Bioswale Additions |
| 4 | SE 284th St East Bioswale Additions |
| 5 | 124th Ave SE near 293rd St Stormwater Treatment Device |
| 6 | Vintage Hills Swale Retrofit |
| 7 | 124th Ave SE near 307th Pl Stormwater Treatment Device |
| 8 | 124th Ave SE near 302nd Pl Stormwater Treatment Device |
| 9 | 30th Street NE Area Flooding, Phase 2 |
| 10 | Vegetative Waste Sorting Facility |
| 11 | Christa Ministries Facility Retrofit |
| 12 | West Main Street Pump Station Upgrade |

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Date: 5/9/2024
Sources: City of Auburn, King County, Pierce County, WA Ecology, WA DNR, USGS, ESRI
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

▬ ▬ Auburn City Limits
— Watercourse
● CIP Location

**Figure 7-1**
Capital Improvement Project (CIP) Locations
Stormwater Drainage Utility
Comprehensive Storm Drainage Plan

0 ¼ ½ 1
Miles

## 7.1 Project Prioritization

Storm Drainage Utility staff prioritized CIPs by grouping them into one of three tiers. Projects in the top tier, or highest priority, are classified as tier 1. Projects with medium priority are classified as tier 2. And projects with lowest priority relative to the other projects are considered tier 3.

The following items were considered when prioritizing the CIPs:

- The magnitude of the LOS gap that would be addressed by a CIP. For example, a project that rectifies an annual flooding problem would rank higher than a project in a different area that eliminates less frequent flooding.
- The reduction in risk and reduction in consequences associated with a CIP. For example, the consequence of flooding that occurs near critical facilities (e.g., hospital or fire station) or along major arterial streets may be larger than flooding along residential streets. A CIP that addresses a larger consequence would rank higher.
- The opportunity for coordination with ongoing City of Auburn street improvements or other utility or transportation projects. Coordinated projects that reduce the overall cost of a CIP would rank higher.
- The capital funding capacity of the Storm Drainage Utility. The overall list of project priorities attempts to balance the need for action with the funding and implementation capacity of the Storm Drainage Utility.
- The action deadlines necessary for compliance with the NPDES MS4 permit.
- Other considerations with the potential to improve water quality, reductions in maintenance, and increased reliability of the system.

Priorities for each project are included in each project description in the following sections. Project priority and budgetary constraints were considered together in developing the year-by-year schedules for project implementation in the 6- and 20-year capital improvement plans (see Chapter 8).

## 7.2 Proposed Capital Improvement Projects

CIPs described in this section were developed as part of this Plan and are described in sufficient detail to allow the City to proceed with budgeting and design. Project descriptions are organized into summaries containing the following information:

- Project number: CIP numbers generally assigned to align with the number given in the SMAP (as applicable) for consistency.
- Project name: A short, descriptive name assigned to each project.
- Project type: A brief description of the specific type of project being undertaken, used to categorize and identify the purpose or focus of the project.
- Location: A simple description of the project location, such as the cross streets.
- Existing and proposed use: A summary of the existing and proposed site conditions.
- Drainage basin: The receiving water drainage basin where the project is situated.
- Tributary drainage area: Area (in acres) that drains to the project (as applicable).
- Total cost: The estimated cost of the project, based on the attached opinion (estimate) of probable cost.

- Project description: A description of the proposed project, including major project elements and sizes.
- Site opportunities: The anticipated opportunities and benefits of the project.
- Site challenges: The anticipated challenges in undertaking the project.
- Opinion (estimate) of probable cost: A list of estimated costs, including construction costs, engineering and administrative costs, taxes, and contingency costs. The estimate was developed based on the conceptual design, preliminary quantity take-offs, and estimated unit costs. Estimated unit costs were based on bids from the WSDOT Unit Bid Tab, vendor quotes, and escalated project costs from recent projects with similar components.
- Vicinity map: A figure showing the location of the project relative to the City of Auburn.
- Proposed conditions figures: Figures showing the conceptual design and location of project elements.

CIP summaries and cost opinions are presented on the following pages.

Parametrix

# CIP 1 – SE 287th Street Stormwater Device

## 6-Year Capital Improvement Plan (Priority 1)

**RETROFIT TYPE**
Road retrofit
Manufactured treatment device

**LOCATION**
At the end of SE 287th Street

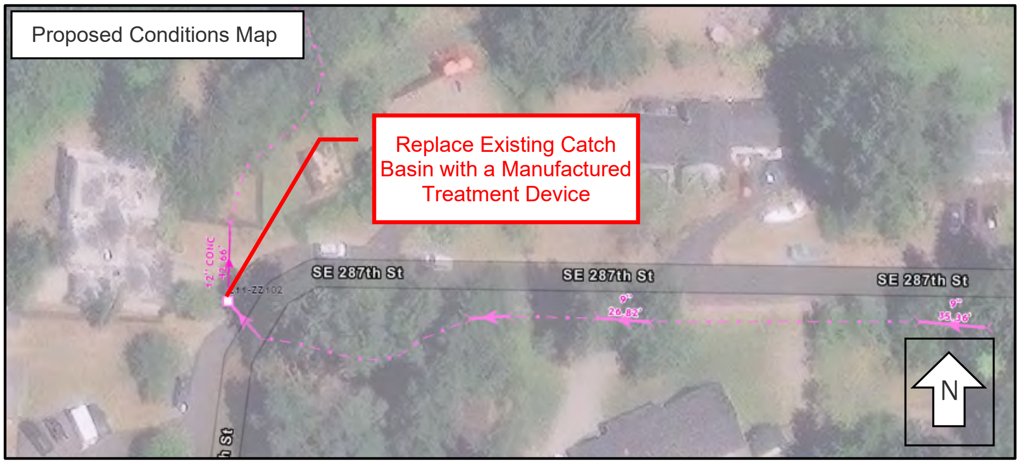
**EXISTING USE**
ROW

**PROPOSED USE**
ROW with enhanced runoff treatment

**DRAINAGE BASIN**
Olson Creek

**TRIBUTARY DRAINAGE AREA**
7.3 acres total
2.0 acres impervious

**TOTAL COST (2024 DOLLARS)**
$427,000



## Project Description

This project is proposing to replace the existing Type 1 catch basin with a stormwater treatment technology reviewed and certified by the Washington state Technology Assessment Protocol – Ecology (TAPE) program to provide 7.3 acres with enhanced water quality treatment. This project would provide treatment for approximately 700 linear feet of roadway. The catch basin replacement will likely be low complexity since there is existing infrastructure in place and traffic control needs will be low. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

## Site Opportunities

- Low traffic control requirements.

## Site Challenges

- Water quality only, no flow control.
- Need site survey to confirm catch basin is located within City ROW.

# Opinion (Estimate) of Probable Cost

**Project Name** CIP 1 - SE 287th Street Stormwater Device

**Location** At the end of SE 287th Street (Near 10624 SE 287th Street, Auburn, WA 98092)

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| **SITE PREP AND TESC** | | | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 5-13 | | $14,442 |
| 2 | | CONTRACTOR PROVIDED SURVEY (3%) | 3% | % of lines 5-13 | | $4,332 |
| 3 | | TESC (5%) | 5% | % of lines 5-13 | | $7,221 |
| 4 | | DEWATERING (2%) | 2% | % of lines 5-13 | | $2,888 |
| | | | | | **Lines 1 - 4 Subtotal** | **$28,883** |
| **MATERIALS** | | | | | | |
| 5 | | SAWCUTTING | 56 | LF | $31 | $1,715 |
| 6 | | PAVEMENT REMOVAL/RESTORATION | 11 | SY | $220 | $2,347 |
| 7 | | ENHANCED MEDIA FILTER SYSTEM 6X8 | 2 | EA | $60,000 | $120,000 |
| 8 | | CONNECTION TO DRAINAGE STRUCTURE | 4 | EA | $3,415 | $13,661 |
| 9 | | STRUCTURE EXCAVATION CLASS A INCL. HAUL | 44 | CY | $41 | $1,824 |
| 10 | | SHORING OR EXTRA EXCAVATION CLASS B | 1 | LS | $1,000 | $1,000 |
| 11 | | STRUCTURE EX AND SHORING LABOR (50% OF EACH) | 50 | % of lines 9-10 | | $1,412 |
| 12 | | CRUSHED SURFACING BASE COURSE | 3 | TN | $54 | $176 |
| 13 | | RECORD DRAWINGS | 1 | LS | $2,280 | $2,280 |
| | | | | | **Lines 5 - 13 Subtotal** | **$144,416** |
| | | | | | **Subtotal Line-Item Costs** | **$173,299** |
| | | | | **Design Contigency** | **50%** | **$86,649** |
| | | | | **Permitting** | **5%** | **$8,665** |
| | | | | **Design** | **25%** | **$43,325** |
| | | | | **City Project Mgmt. Admin.** | **5%** | **$8,665** |
| | | | | **Construction Management** | **25%** | **$43,325** |
| | | | | **Management Reserve** | **10%** | **$17,330** |
| | | | | | **TOTAL PROJECT COST** | **$382,000** |

Parametrix

# CIP 2 – SE 284th Street & 109th Avenue SE Bioswale Additions

## 20-Year Capital Improvement Plan (Priority 3)

**RETROFIT TYPE**
Road retrofit
New bioswales

**LOCATION**
SE 284th Street and 109th Avenue SE

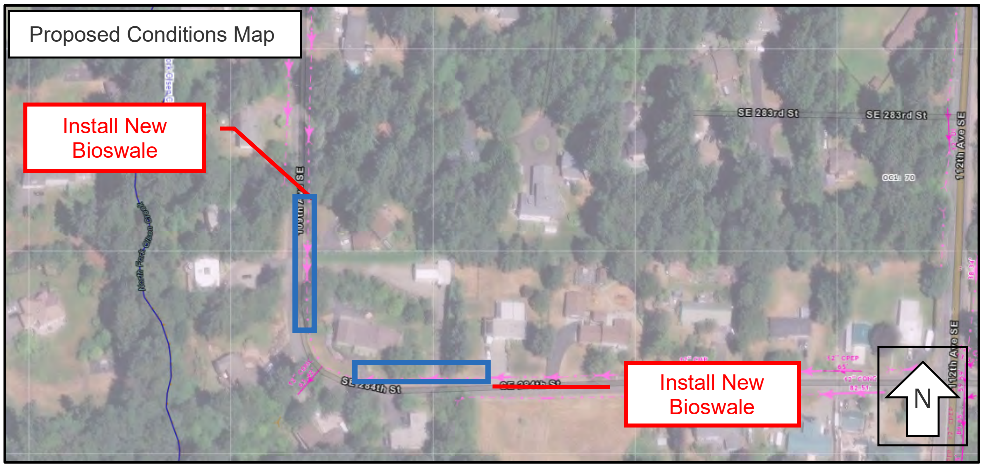
**EXISTING USE**
ROW (vegetated and gravel driveway)

**PROPOSED USE**
ROW with basic runoff treatment

**DRAINAGE BASIN**
Olson Creek

**TRIBUTARY DRAINAGE AREA**
20.6 acres total
3.0 acres impervious

**TOTAL COST (2024 DOLLARS)**
$143,000



# Project Description

This project will retrofit a section of SE 284th Street by adding two bioswale ditch enhancements. The bioswales will provide basic water quality treatment to 20.6 acres, including approximately 2,300 linear feet of roadway. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

# Site Opportunities

- Treatment can be situated within ROW.
- Provides some flow control.

# Site Challenges

- Clearing and grubbing required.

# Opinion (Estimate) of Probable Cost

**Project Name** CIP 2 - SE 284th Street & 109th Avenue Bioswale Additions

**Location** SE 284th Street and 109th Avenue SE

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| | | **SITE PREP AND TESC** | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 5-9 | | $5,390 |
| 2 | | CONTRACTOR PROVIDED SURVEY (3%) | 3% | % of lines 5-9 | | $1,617 |
| 3 | | TESC (5%) | 5% | % of lines 5-9 | | $2,695 |
| 4 | | DEWATERING (2%) | 2% | % of lines 5-9 | | $1,078 |
| | | | | | **Lines 1 - 4 Subtotal** | **$10,781** |
| | | **MATERIALS** | | | | |
| 5 | | CLEARING AND GRUBBING | 0.1 | ACRE | $10,000 | $1,045 |
| 6 | | CHANNEL EXCAVATION INCL. HAUL | 169 | CY | $40 | $6,724 |
| 7 | | TOPSOIL TYPE A | 253 | SY | $66 | $16,599 |
| 8 | | COMPOST BLANKET | 42 | SY | $8 | $337 |
| 9 | | SEEDING, FERTILIZING, AND MULCHING | 506 | SY | $58 | $29,200 |
| | | | | | **Lines 5 - 9 Subtotal** | **$53,904** |
| | | | | | **Subtotal Line-Item Costs** | **$64,685** |
| | | | | **Design Contigency** | **50%** | **$32,343** |
| | | | | **Permitting** | **5%** | **$3,234** |
| | | | | **Design** | **25%** | **$16,171** |
| | | | | **City Project Mgmt. Admin.** | **5%** | **$3,234** |
| | | | | **Construction Management** | **25%** | **$16,171** |
| | | | | **Management Reserve** | **10%** | **$6,469** |
| | | | | | **TOTAL PROJECT COST** | **$143,000** |

Parametrix

# CIP 3 – SE 284th Street West Bioswale Additions

## 6-Year Capital Improvement Plan (Priority 1)

**RETROFIT TYPE**
Road retrofit
New bioswales

**LOCATION**
Along SE 284th Street

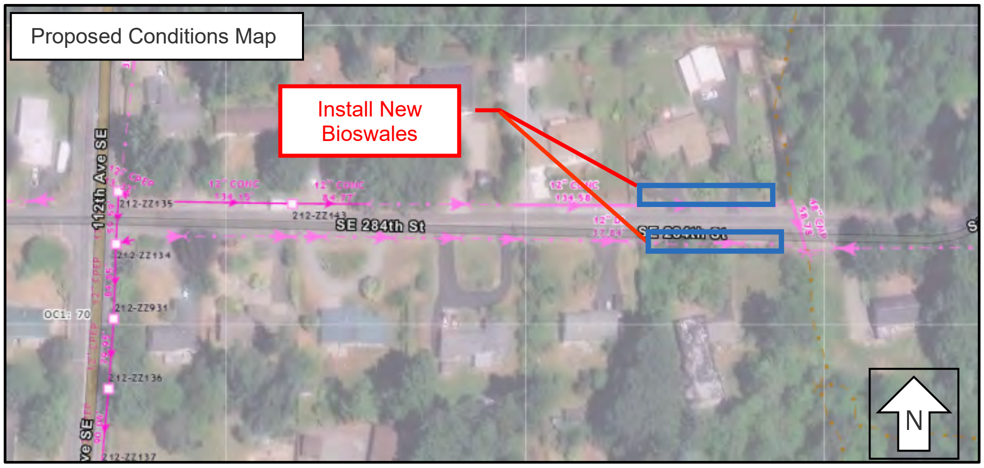
**EXISTING USE**
ROW

**PROPOSED USE**
ROW with basic runoff treatment

**DRAINAGE BASIN**
Olson Creek

**TRIBUTARY DRAINAGE AREA**
2.2 acres total
1.1 acres impervious

**TOTAL COST (2024 DOLLARS)**
$52,000



## Project Description

This project will retrofit a section of SE 284th Street by adding two bioswale ditch enhancements to the side of the road. The bioswales will provide basic water quality treatment to 3.3 acres, including approximately 700 linear feet of roadway. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

## Site Opportunities

- Treatment can be situated within ROW.
- Provides some flow control.

## Site Challenges

- Clearing and grubbing required.

# Opinion (Estimate) of Probable Cost

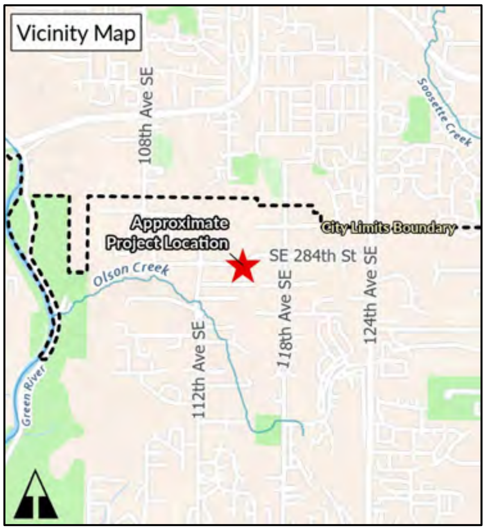
**Project Name** CIP 3 - SE 284th Street West Bioswale Additions

**Location** Along SE 284th Street (Near 11429 SE 284th Street, Auburn, WA 98082)

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| | | **SITE PREP AND TESC** | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 6-10 | | $1,719 |
| 2 | | CONTRACTOR PROVIDED SURVEY (3%) | 3% | % of lines 6-10 | | $516 |
| 3 | | TESC (5%) | 5% | % of lines 6-10 | | $860 |
| 4 | | DEWATERING (2%) | 2% | % of lines 6-10 | | $344 |
| 5 | | PROJECT TEMPORARY TRAFFIC CONTROL (15%) | 15% | % of lines 6-10 | | $2,579 |
| | | | | | **Lines 1 - 5 Subtotal** | **$6,017** |
| | | **MATERIALS** | | | | |
| 6 | | CLEARING AND GRUBBING | 0.04 | ACRE | $10,000 | $419 |
| 7 | | CHANNEL EXCAVATION INCL. HAUL | 68 | CY | $40 | $2,698 |
| 8 | | TOPSOIL TYPE A | 34 | SY | $66 | $2,221 |
| 9 | | COMPOST BLANKET | 17 | SY | $8 | $135 |
| 10 | | SEEDING, FERTILIZING, AND MULCHING | 203 | SY | $58 | $11,718 |
| | | | | | **Lines 6 - 10 Subtotal** | **$17,192** |
| | | | | | **Subtotal Line-Item Costs** | **$23,209** |
| | | | | **Design Contigency** | **50%** | **$11,604** |
| | | | | **Permitting** | **5%** | **$1,160** |
| | | | | **Design** | **25%** | **$5,802** |
| | | | | **City Project Mgmt. Admin.** | **5%** | **$1,160** |
| | | | | **Construction Management** | **25%** | **$5,802** |
| | | | | **Management Reserve** | **10%** | **$2,321** |
| | | | | | **TOTAL PROJECT COST** | **$52,000** |

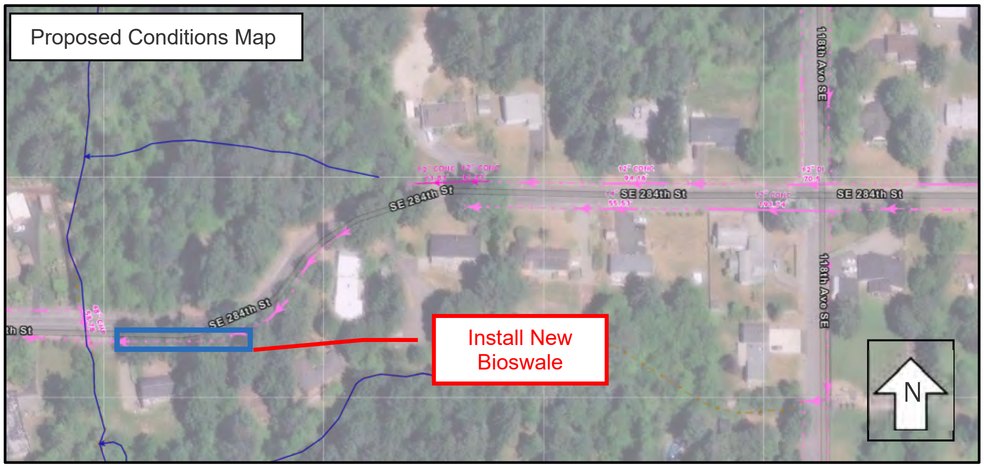
# CIP 4 – SE 284th Street East Bioswale Additions

## 20-Year Capital Improvement Plan (Priority 3)



Existing Site Conditions Looking South from SE 284th Street

| | |
|---|---|
| RETROFIT TYPE | Road retrofit<br>New bioswale |
| LOCATION | Along SE 284th Street |
| EXISTING USE | Roadside ditch |
| PROPOSED USE | Roadside bioswale |
| DRAINAGE BASIN | Olson Creek |
| TRIBUTARY DRAINAGE AREA | 1.8 acres total<br>0.8 acres impervious |
| TOTAL COST (2024 DOLLARS) | $28,000 |



## Project Description

This project will retrofit a section of SE 284th Street by adding a bioswale ditch enhancement to the side of the road. This bioswale will provide basic water quality treatment to 2.6 acres, including approximately 1,600 linear feet of roadway. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

## Site Opportunities

- Treatment can be situated within ROW.
- Provides some flow control.

## Site Challenges

- Clearing and grubbing required.

# Opinion (Estimate) of Probable Cost

**Project Name** CIP 4 - SE 284th Street East Bioswale Additions

**Location** Along SE 284th Street (Near 11619 SE 284th Street, Auburn, WA 98082)

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| | | **SITE PREP AND TESC** | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 6-10 | | $932 |
| 2 | | CONTRACTOR PROVIDED SURVEY (3%) | 3% | % of lines 6-10 | | $280 |
| 3 | | TESC (5%) | 5% | % of lines 6-10 | | $466 |
| 4 | | DEWATERING (2%) | 2% | % of lines 6-10 | | $186 |
| 5 | | PROJECT TEMPORARY TRAFFIC CONTROL (15%) | 15% | % of lines 6-10 | | $1,398 |
| | | | | | **Lines 1 - 5 Subtotal** | **$3,262** |
| | | **MATERIALS** | | | | |
| 6 | | CLEARING AND GRUBBING | 0.02 | ACRE | $10,000 | $227 |
| 7 | | CHANNEL EXCAVATION INCL. HAUL | 37 | CY | $40 | $1,463 |
| 8 | | TOPSOIL TYPE A | 18 | SY | $66 | $1,204 |
| 9 | | COMPOST BLANKET | 9 | SY | $8 | $73 |
| 10 | | SEEDING, FERTILIZING, AND MULCHING | 110 | SY | $58 | $6,353 |
| | | | | | **Lines 6 - 10 Subtotal** | **$9,321** |
| | | | | | **Subtotal Line-Item Costs** | **$12,583** |
| | | | | **Design Contigency** | **50%** | **$6,292** |
| | | | | **Permitting** | **5%** | **$629** |
| | | | | **Design** | **25%** | **$3,146** |
| | | | | **City Project Mgmt. Admin.** | **5%** | **$629** |
| | | | | **Construction Management** | **25%** | **$3,146** |
| | | | | **Management Reserve** | **10%** | **$1,258** |
| | | | | | **TOTAL PROJECT COST** | **$28,000** |

Parametrix

# CIP 5 – 124th Avenue SE near 293rd Street Stormwater Treatment Device

## 20 Capital Improvement Plan (Priority 2)

**RETROFIT TYPE**
Road retrofit
Manufactured treatment device

**LOCATION**
124th Avenue SE near 293rd Street

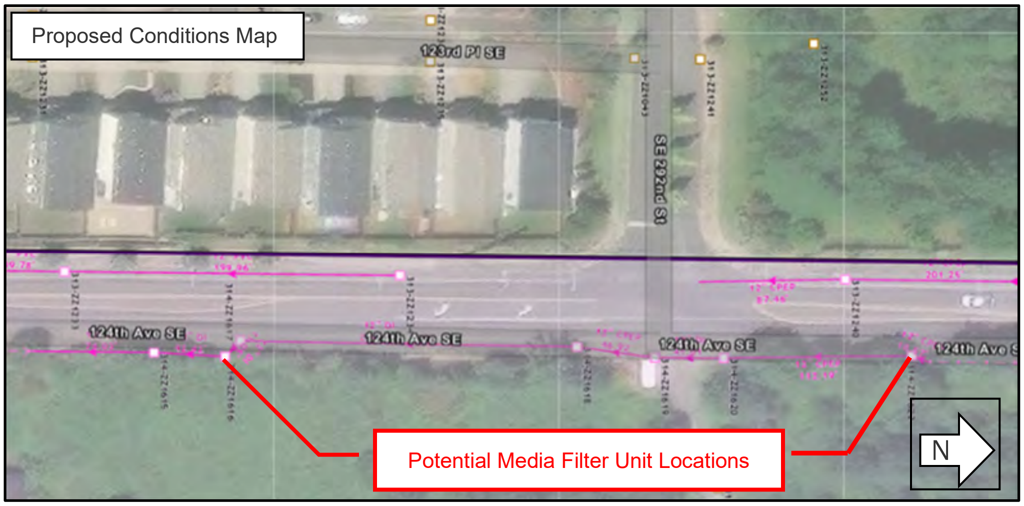
**EXISTING USE**
Untreated ROW

**PROPOSED USE**
ROW with enhanced runoff treatment

**DRAINAGE BASIN**
Olson Creek

**TRIBUTARY DRAINAGE AREA**
14.1 acres total
2.4 acres impervious

**TOTAL COST (2024 DOLLARS)**
$581,000



# Project Description

This project will retrofit a section of 124th Avenue SE by replacing existing Type 1 catch basins with TAPE-approved manufactured treatment devices. The manufactured treatment devices will provide enhanced water quality treatment to 14.1 acres, including approximately 800 linear feet of roadway. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

# Site Opportunities

- Provides enhanced stormwater treatment for a high traffic roadway.

# Site Challenges

- May be constrained by outlet height.
- Coordination with other utilities.

# Opinion (Estimate) of Probable Cost

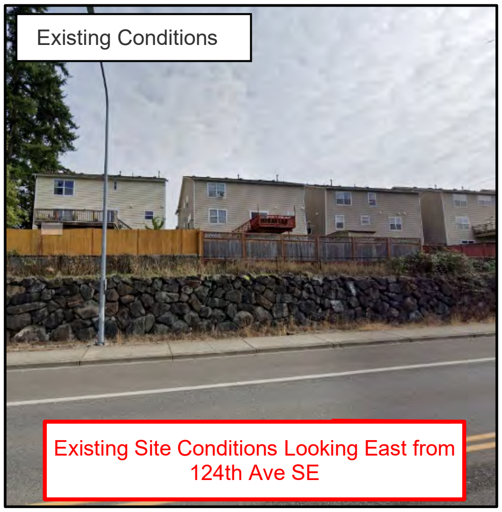
**Project Name** CIP 5 - 124th Avenue SE near 293rd Street Stormwater Treatment Device

**Location** Along 124th Avenue SE near 293rd Street

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| | | **SITE PREP AND TESC** | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 6-16 | | $19,562 |
| 2 | | CONTRACTOR PROVIDED SURVEY (3%) | 3% | % of lines 6-16 | | $5,868 |
| 3 | | TESC (5%) | 5% | % of lines 6-16 | | $9,781 |
| 4 | | DEWATERING (2%) | 2% | % of lines 6-16 | | $3,912 |
| 5 | | PROJECT TEMPORARY TRAFFIC CONTROL (15%) | 15% | % of lines 6-16 | | $29,342 |
| | | | | | **Lines 1 - 5 Subtotal** | **$68,466** |
| | | **MATERIALS** | | | | |
| 6 | | UTILITY RELOCATION (SMALL) | 1 | LS | $15,000 | $15,000 |
| 7 | | PAVEMENT REMOVAL/RESTORATION | 52 | SY | $220 | $11,489 |
| 8 | | REMOVE CEMENT CONCRETE CURB AND GUTTER | 20 | LF | $14 | $274 |
| 9 | | ENHANCED MEDIA FILTER SYSTEM 6X10 | 2 | EA | $68,000 | $136,000 |
| 10 | | CONNECTION TO DRAINAGE STRUCTURE | 4 | EA | $3,415 | $13,661 |
| 11 | | STRUCTURE EXCAVATION CLASS A INCL. HAUL | 52 | CY | $41.04 | $2,128 |
| 12 | | SHORING OR EXTRA EXCAVATION CLASS B | 1 | LS | $1,000 | $1,000 |
| 13 | | STRUCTURE EX AND SHORING LABOR (50% OF EACH) | 50 | % of lines 11-12 | | $1,564 |
| 14 | | CRUSHED SURFACING BASE COURSE | 4 | TN | $54 | $220 |
| 15 | | SCHEDULE A STORM SEWER PIPE 12 IN. DIAM. | 100 | LF | $120 | $12,000 |
| 16 | | RECORD DRAWINGS | 1 | LS | $2,280 | $2,280 |
| | | | | | **Lines 6 - 16 Subtotal** | **$195,616** |
| | | | | | **Subtotal Line-Item Costs** | **$264,082** |
| | | | | **Design Contigency** | **50%** | **$132,041** |
| | | | | **Permitting** | **5%** | **$13,204** |
| | | | | **Design** | **25%** | **$66,020** |
| | | | | **City Project Mgmt. Admin.** | **5%** | **$13,204** |
| | | | | **Construction Management** | **25%** | **$66,020** |
| | | | | **Management Reserve** | **10%** | **$26,408** |
| | | | | | **TOTAL PROJECT COST** | **$581,000** |

# CIP 6 – Vintage Hills Swale Retrofit

## 20-Year Capital Improvement Plan (Priority 1)



Existing Site Conditions Looking East from 124th Ave SE

**RETROFIT TYPE**
Existing facility retrofit
Swale soil amendment

**LOCATION**
Along 124th Avenue SE

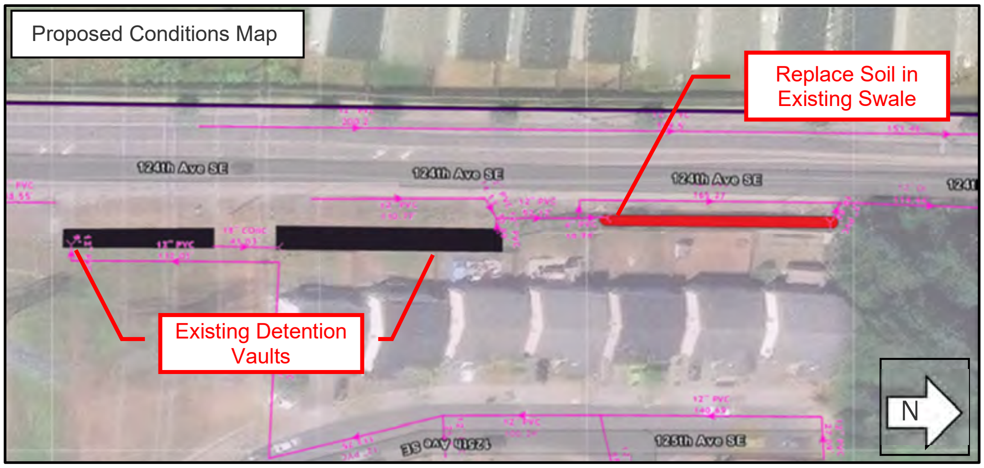
**EXISTING USE**
Bioswale

**PROPOSED USE**
Bioretention swale with enhanced treatment

**DRAINAGE BASIN**
Olson Creek

**TRIBUTARY DRAINAGE AREA**
5.0 acres total
1.1 acres impervious

**TOTAL COST (2024 DOLLARS)**
$264,000



## Project Description

This project is proposing to amend the soil in the existing Vintage Hills swale. The soil will be replaced from conventional soil to bioretention soil to provide enhanced treatment for 5.0 acres. Rock check dams may be required throughout the length of the swale to ensure infiltration occurs to provide treatment. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

## Site Opportunities

- Upgrading vintage basic treatment to enhanced treatment.

## Site Challenges

- Water quality only, no flow control (though flow control is provided by the detention vaults).

# Opinion (Estimate) of Probable Cost

**Project Name** CIP 6 - Vintage Hills Swale Retrofit

**Location** Along 124th Avenue SE (Near 29501 125th Avenue SE, Auburn, WA 98082)

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| | | **SITE PREP AND TESC** | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 6-13 | | $10,458 |
| 2 | | CONTRACTOR PROVIDED SURVEY (3%) | 3% | % of lines 6-13 | | $3,137 |
| 3 | | TESC (5%) | 5% | % of lines 6-13 | | $5,229 |
| 4 | | DEWATERING (2%) | 2% | % of lines 6-13 | | $2,092 |
| 5 | | PROJECT TEMPORARY TRAFFIC CONTROL (15%) | 15% | % of lines 6-13 | | $15,687 |
| | | | | | **Lines 1 - 5 Subtotal** | **$20,915** |
| | | **MATERIALS** | | | | |
| 6 | | CHANNEL EXCAVATION INCL. HAUL | 151 | CY | $40 | $6,012 |
| 7 | | EROSION CONTROL BLANKET | 75 | SY | $9 | $687 |
| 8 | | 18" BIORETENTION SOIL | 750 | SF | $120 | $90,000 |
| 9 | | COMPOST BLANKET | 75 | SY | $8 | $603 |
| 10 | | QUARRY SPALLS | 6 | TN | $70 | $424 |
| 11 | | TRASH RACK | 1 | EA | $500 | $500 |
| 12 | | SEEDING, FERTILIZING, AND MULCHING | 75 | SY | $58 | $4,351 |
| 13 | | RECORD DRAWINGS | 1 | LS | $2,000 | $2,000 |
| | | | | | **Lines 6 - 13 Subtotal** | **$104,577** |
| | | | | | **Subtotal Line-Item Costs** | **$125,492** |
| | | | | **Design Contigency** | **50%** | **$62,746** |
| | | | | **Permitting** | **5%** | **$6,275** |
| | | | | **Design** | **15%** | **$18,824** |
| | | | | **City Project Mgmt. Admin.** | **5%** | **$6,275** |
| | | | | **Construction Management** | **25%** | **$31,373** |
| | | | | **Management Reserve** | **10%** | **$12,549** |
| | | | | | **TOTAL PROJECT COST** | **$264,000** |

# CIP 7 – 124th Avenue SE near 307th Place Stormwater Treatment Device

## 20-Year Capital Improvement Plan (Priority 2)

**RETROFIT TYPE**
Road retrofit
Manufactured treatment device

**LOCATION**
124th Avenue SE near 307th Place

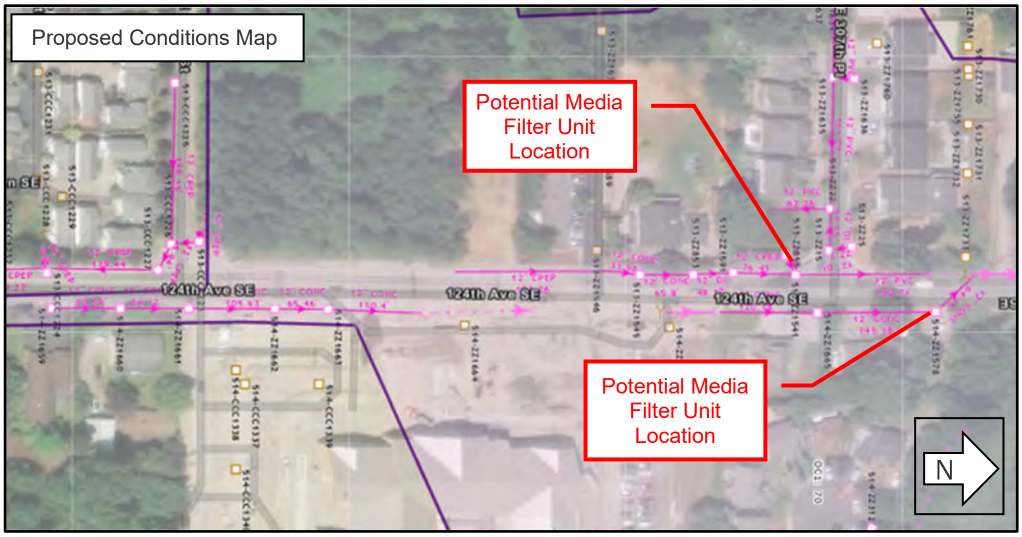
**EXISTING USE**
Untreated ROW

**PROPOSED USE**
ROW with enhanced runoff treatment

**DRAINAGE BASIN**
Olson Creek

**TRIBUTARY DRAINAGE AREA**
5.9 acres total
1.4 acres impervious

**TOTAL COST (2024 DOLLARS)**
$531,000



## Project Description

This project will retrofit a section of 124th Avenue SE by replacing existing Type 1 catch basins with TAPE-approved manufactured treatment devices. The manufactured treatment devices will provide enhanced water quality treatment to 5.9 acres, including approximately 1,200 linear feet of roadway. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

## Site Opportunities

- Provides enhanced stormwater treatment for a high traffic roadway.

## Site Challenges

- May be constrained by outlet height.
- Coordination with other utilities.
- Traffic control requirements.

# Opinion (Estimate) of Probable Cost

**Project Name** CIP 7 - 124th Avenue SE near 307th Place Stormwater Treatment Device

**Location** 124th Avenue near 302nd Place

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| **SITE PREP AND TESC** | | | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 6-16 | | $17,847 |
| 2 | | CONTRACTOR PROVIDED SURVEY (3%) | 3% | % of lines 6-16 | | $5,354 |
| 3 | | TESC (5%) | 5% | % of lines 6-16 | | $8,924 |
| 4 | | DEWATERING (2%) | 2% | % of lines 6-16 | | $3,569 |
| 5 | | PROJECT TEMPORARY TRAFFIC CONTROL (15%) | 15% | % of lines 6-16 | | $26,771 |
| **Lines 1 - 5 Subtotal** | | | | | | **$62,466** |
| **MATERIALS** | | | | | | |
| 6 | | UTILITY RELOCATION (SMALL) | 1 | LS | $15,000 | $15,000 |
| 7 | | PAVEMENT REMOVAL/RESTORATION | 50 | SY | $220 | $10,902 |
| 8 | | REMOVE CEMENT CONCRETE CURB AND GUTTER | 16 | LF | $14 | $219 |
| 9 | | ENHANCED MEDIA FILTER SYSTEM 6X8 | 2 | EA | $60,000 | $120,000 |
| 10 | | CONNECTION TO DRAINAGE STRUCTURE | 4 | EA | $3,415 | $13,661 |
| 11 | | STRUCTURE EXCAVATION CLASS A INCL. HAUL | 44 | CY | $41.04 | $1,824 |
| 12 | | SHORING OR EXTRA EXCAVATION CLASS B | 1 | LS | $1,000 | $1,000 |
| 13 | | STRUCTURE EX AND SHORING LABOR (50% OF EACH) | 50 | % of lines 11-12 | | $1,412 |
| 14 | | CRUSHED SURFACING BASE COURSE | 3 | TN | $54 | $176 |
| 15 | | SCHEDULE A STORM SEWER PIPE 12 IN. DIAM. | 100 | LF | $120 | $12,000 |
| 16 | | RECORD DRAWINGS | 1 | LS | $2,280 | $2,280 |
| | | | **Lines 6 - 16 Subtotal** | | | **$178,475** |
| | | | **Subtotal Project Cost** | | | **$240,941** |
| | | | **Design Contigency** | | **50%** | **$120,470** |
| | | | **Permitting** | | **5%** | **$12,047** |
| | | | **Design** | | **25%** | **$60,235** |
| | | | **City Project Mgmt. Admin.** | | **5%** | **$12,047** |
| | | | **Construction Management** | | **25%** | **$60,235** |
| | | | **Management Reserve** | | **10%** | **$24,094** |
| | | | **TOTAL PROJECT COST** | | | **$531,000** |

Parametrix

# CIP 8 – 124th Avenue SE near 302nd Place Stormwater Treatment Device

## 20-Year Capital Improvement Plan (Priority 2)

**RETRIEVAL TYPE**

**RETROFIT TYPE**
Road retrofit
Manufactured treatment device

**LOCATION**
124th Avenue SE near 302nd Place

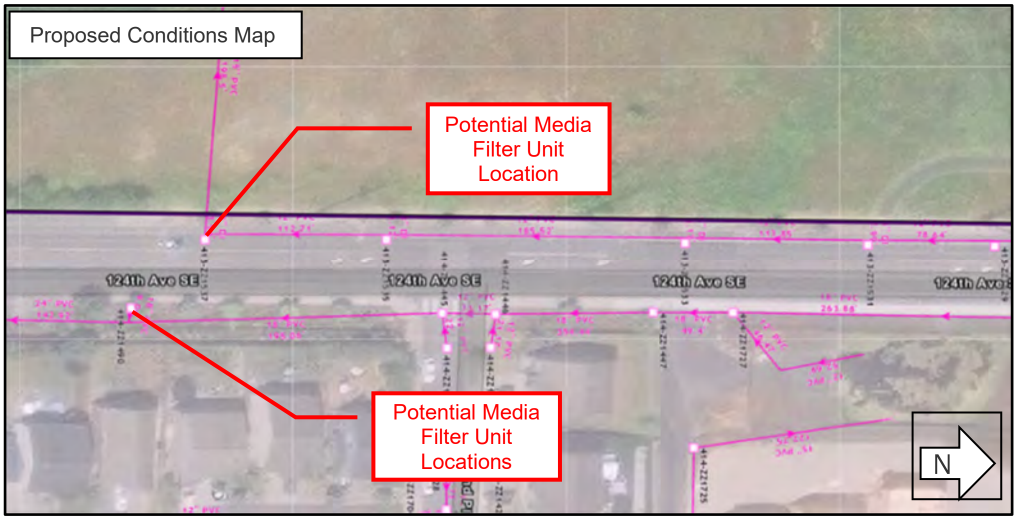
**EXISTING USE**
Untreated ROW

**PROPOSED USE**
ROW with enhanced runoff treatment

**DRAINAGE BASIN**
Olson Creek

**TRIBUTARY DRAINAGE AREA**
2.9 acres total
1.3 acres impervious

**TOTAL COST (2024 DOLLARS)**
$531,000



## Project Description

This project will retrofit a section of 124th Avenue SE by replacing existing Type 1 catch basins with a TAPE-approved manufactured treatment devices. The manufactured treatment devices will provide enhanced water quality treatment to 2.9 acres, including approximately 1,600 linear feet of roadway. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

## Site Opportunities

- Provides enhanced stormwater treatment for a high traffic roadway.

## Site Challenges

- May be constrained by outlet height.
- Coordination with other utilities.
- Traffic control requirements.

# Opinion (Estimate) of Probable Cost

**Project Name** CIP 8 - 124th Avenue SE near 302nd Place Stormwater Treatment Device

**Location** 124th Avenue near 307th Place

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| | | **SITE PREP AND TESC** | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 6-16 | | $17,847 |
| 2 | | CONTRACTOR PROVIDED SURVEY (3%) | 3% | % of lines 6-16 | | $5,354 |
| 3 | | TESC (5%) | 5% | % of lines 6-16 | | $8,924 |
| 4 | | DEWATERING (2%) | 2% | % of lines 6-16 | | $3,569 |
| 5 | | PROJECT TEMPORARY TRAFFIC CONTROL (15%) | 15% | % of lines 6-16 | | $26,771 |
| | | | | | **Lines 1 - 5 Subtotal** | **$62,466** |
| | | **MATERIALS** | | | | |
| 6 | | UTILITY RELOCATION (SMALL) | 1 | LS | $15,000 | $15,000 |
| 7 | | PAVEMENT REMOVAL/RESTORATION | 50 | SY | $220 | $10,902 |
| 8 | | REMOVE CEMENT CONCRETE CURB AND GUTTER | 16 | LF | $14 | $219 |
| 9 | | ENHANCED MEDIA FILTER SYSTEM 6X8 | 2 | EA | $60,000 | $120,000 |
| 10 | | CONNECTION TO DRAINAGE STRUCTURE | 4 | EA | $3,415 | $13,661 |
| 11 | | STRUCTURE EXCAVATION CLASS A INCL. HAUL | 44 | CY | $41.04 | $1,824 |
| 12 | | SHORING OR EXTRA EXCAVATION CLASS B | 1 | LS | $1,000 | $1,000 |
| 13 | | STRUCTURE EX AND SHORING LABOR (50% OF EACH) | 50 | % of lines 11-12 | | $1,412 |
| 14 | | CRUSHED SURFACING BASE COURSE | 3 | TN | $54 | $176 |
| 15 | | SCHEDULE A STORM SEWER PIPE 12 IN. DIAM. | 100 | LF | $120 | $12,000 |
| 16 | | RECORD DRAWINGS | 1 | LS | $2,280 | $2,280 |
| | | | | | **Lines 6 - 16 Subtotal** | **$178,475** |
| | | | | | **Subtotal Line-Item Costs** | **$240,941** |
| | | | | **Design Contigency** | **50%** | **$120,470** |
| | | | | **Permitting** | **5%** | **$12,047** |
| | | | | **Design** | **25%** | **$60,235** |
| | | | | **City Project Mgmt. Admin.** | **5%** | **$12,047** |
| | | | | **Construction Management** | **25%** | **$60,235** |
| | | | | **Management Reserve** | **10%** | **$24,094** |
| | | | | | **TOTAL PROJECT COST** | **$531,000** |

Parametrix

# CIP 9 – 30th Street NE Area Flooding, Phase 2

## 20-Year Capital Improvement Plan (Priority 3)

**RETROFIT TYPE**
Road retrofit
Upgraded conveyance system

**LOCATION**
East of I Street NE between 32nd Street NE and 35th Street NE

**EXISTING USE**
Conveyance system

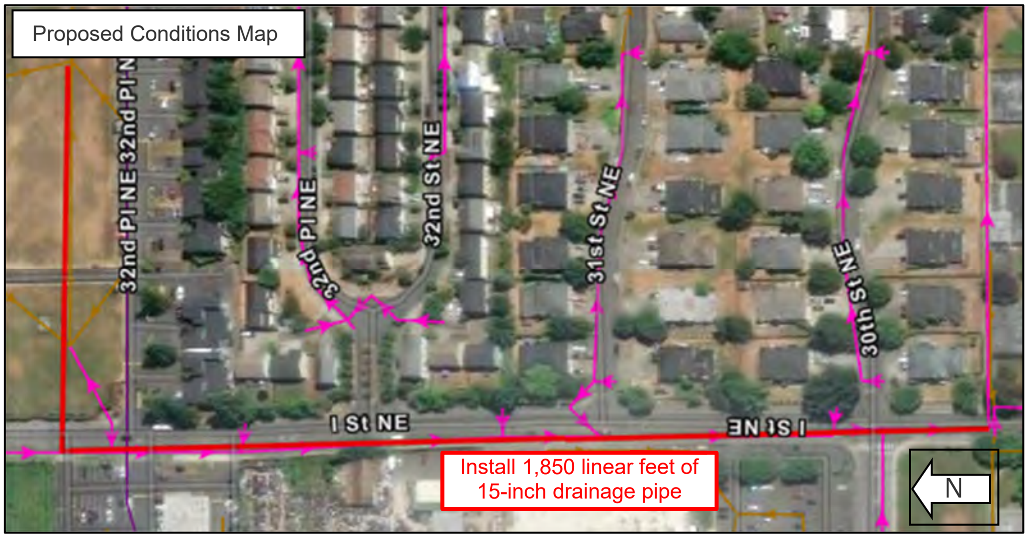
**PROPOSED USE**
New conveyance system and upgraded pipe

**DRAINAGE BASIN**
Mill Creek and Green River

**TRIBUTARY DRAINAGE AREA**
Unknown

**TOTAL COST (2024 DOLLARS)**
$1,186,000

**NOTES**
Cost, design, figures, and description completed by Brown & Caldwell in 2015. Cost and description updated by Parametrix per City comments



## Project Description

The north-central area of Auburn has a history of surface flooding with street flooding occurring once every few years. The residential development east of I Street NE between 32nd Street NE and 35th Street NE discharges flows into a City-owned infiltration area. The infiltration area commonly experiences prolonged periods of standing water due to high groundwater from extended high flows in the Green River, which is adjacent to the infiltration area. The drainage system on I Street NE currently lacks infrastructure to collect and convey stormwater away from the infiltration area, as well as residential roadways and parking area. Ponding occurs within the parking areas of the developments and presents a nuisance and potential hazard to local residents.

This project is Phase 2 of a three-phased capital improvement project (Relieve 30th Street NE Area Flooding) from the 2015 Comprehensive Stormwater Drainage Plan. The goal of the 2015 CIP was to increase the capacity of the 30th Street NE system to reduce flooding along 30th Street NE and to provide capacity to connect other flooding drainage systems (C Street NE and I Street NE). The implementation of this CIP is occurring in phases, as funding, staff availability, and priorities allow. The first phase (30th Street NE Area Flooding, Phase 1) was scheduled for construction in 2015/2016. The next phase, referred to as CIP 9 in this Plan, is scheduled for the 2031–2044 timeframe.

This project would address the flooding adjacent to I Street NE. This project would locate a storm drain line to capture stormwater from the two residential developments currently discharging stormwater to the City's infiltration area. In addition, this project would construct a new storm drain within I Street NE southward to connect into the 42-inch-diameter storm drain (constructed as part of the 30th Street NE Area Flooding project, Phase I, from the 2015 Plan) near the intersection of I Street NE and 30th Street NE. The 42-inch-diameter line will have sufficient available capacity to convey the I Street NE flows.

## Site Opportunities

- Public drainage infrastructure will be designed and maintained so that the annual chance of a flooding disruption that inundates the city roadways to an impassable level occurs no more than once every 25 years.
- Public drainage infrastructure will be designed and maintained so that the annual chance of occurrence of flooding (surface water from ROW runoff entering premises and damaging building structures) will occur no more than once every 50 years.

# Opinion (Estimate) of Probable Cost

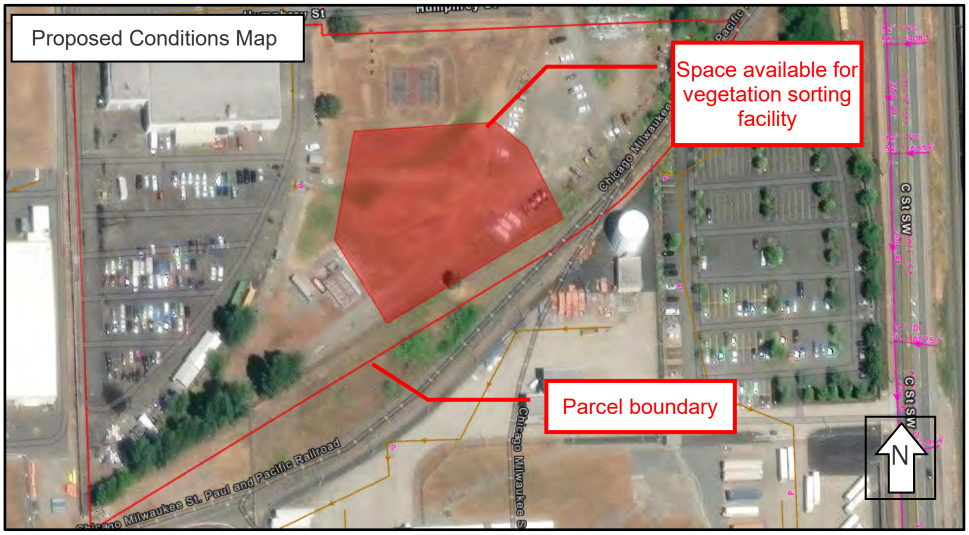
**Project Name** CIP 9 - 30th Street NE Area Flooding, Phase 2

**Location** 30th Street NE and I Street NE

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| | | **SITE PREP AND TESC** | | | | |
| 1 | | CONTRACTOR OVERHEAD, PROFIT, AND MOBILIZATION | 18% | % of lines 2-2 | | $115,380 |
| | | | | | **Lines 1 - 1 Subtotal** | **$115,380** |
| | | **MATERIALS** | | | | |
| 2 | | 2015 PROJECT (4A) 1,850 LF OF 15-IN DRAINAGE PIPE | 1 | LS | $641,000 | $641,000 |
| | | | | | **Lines 2 - 2 Subtotal** | **$641,000** |
| | | | | | **Subtotal Line-Item Costs** | **$756,380** |
| | | | | **Construction Contingency** | **20%** | **$151,276** |
| | | | | **Sales Tax (all above costs)** | **9%** | **$79,874** |
| | | | | | **Subtotal Construction Costs** | **$987,530** |
| | | | | **Permitting, design, management, and administration** | **20%** | **$197,506** |
| | | | | | **TOTAL PROJECT COST** | **$1,186,000** |

# CIP 10 – Vegetative Waste Sorting Facility

## 6-Year Capital Improvement Plan (Priority 3)



| | |
|---|---|
| RETROFIT TYPE | New waste sorting facility |
| LOCATION | GSA site |
| EXISTING USE | Shared open space |
| PROPOSED USE | Waste sorting facility for plant/organic material pulled from conveyance and treatment systems and facilities |
| DRAINAGE BASIN | White River |
| TRIBUTARY DRAINAGE AREA | N/A |
| TOTAL COST (2024 DOLLARS) | $200,000 |
| NOTES | Cost, design, figures, and description completed by Brown & Caldwell. Cost and description updated by Parametrix per City comments. |

## Project Description

The Storm Drainage Utility is responsible for the M&O of the storm drainage system. Pond and drainage ditch maintenance and rehabilitation involves removal of plant material and sediments, which are considered non-hazardous and are suitable for recycling. During fall and winter, debris from storm cleanups also yield materials suitable for recycling. The Storm Drainage Utility currently uses the City-owned Jacobson Tree Farm property for storing and drying of these materials prior to hauling off-site for recycling. The property is owned by the Parks Department and is scheduled to be repurposed, precluding its use for ongoing M&O activities.

This project addresses the need for a new site to sort, dry, and store materials removed from drainage ditches, swales, and ponds during maintenance and restoration activities necessary to maintain the storm drainage system. The project property is being sourced from existing land owned by the City. The cost to develop the property and purchase equipment are represented in the project cost.

## Site Opportunities

- The City shall seek to maintain storm drainage infrastructure to ensure proper function of drainage facilities in accordance with Ecology requirements.

## Site Challenges

- Coordination with other users of the site.

# Opinion (Estimate) of Probable Cost

**Project Name** CIP 10 - Vegetative Waste Sorting Facility

**Location** GSA Site

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| **SITE PREP AND TESC** | | | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 5-5 | | $10,000 |
| 2 | | CONTRACTOR PROVIDED SURVEY (5%) | 5% | % of lines 5-5 | | $5,000 |
| 3 | | TESC (5%) | 5% | % of lines 5-5 | | $5,000 |
| 4 | | PROJECT TEMPORARY TRAFFIC CONTROL (5%) | 5% | % of lines 5-5 | | $5,000 |
| | | | | | **Lines 1 - 4 Subtotal** | **$25,000** |
| **MATERIALS** | | | | | | |
| 5 | | 2015 PROJECT (10) DEVELOP PROPERTY AND PURCHASE EQUIPMENT | 1 | LS | $100,000 | $100,000 |
| | | | | | **Lines 5 - 5 Subtotal** | **$100,000** |
| | | | | | **Subtotal Line-Item Costs** | **$125,000** |
| | | | | **Construction Cost Contigency** | **20%** | **$25,000** |
| | | | | **Permitting** | **5%** | **$6,250** |
| | | | | **Design** | **10%** | **$12,500** |
| | | | | **City Project Mgmt. Admin.** | **5%** | **$6,250** |
| | | | | **Construction Management** | **10%** | **$12,500** |
| | | | | **Management Reserve** | **10%** | **$12,500** |
| | | | | | **TOTAL PROJECT COST** | **$200,000** |

# CIP 11 – Christa Ministries Facility Retrofit

## 20-Year Capital Improvement Plan (Priority 3)

**RETROFIT TYPE**
Existing facility retrofit
New water quality pond

**LOCATION**
Christa Ministries property

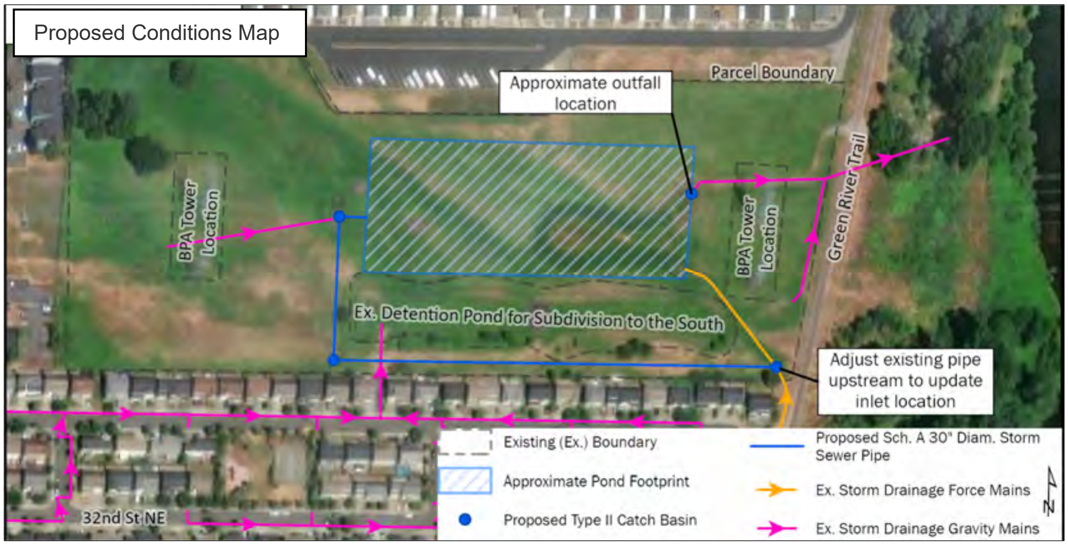
**EXISTING USE**
Bioswale

**PROPOSED USE**
Enhanced water quality treatment pond

**DRAINAGE BASIN**
Green River

**TRIBUTARY DRAINAGE AREA**
377 acres total
242 acres impervious

**TOTAL COST (2024 DOLLARS)**
$2,906,000



## Project Description

This project proposes retrofitting an existing stormwater swale to an enhanced water qualtiy treatment pond. The pond would be sized based on current enhanced treatment standards for 366 acres of contributing area before discharging into the Green River. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

## Site Opportunities

- The location may be suited to provide educational signage due to surrounding residential areas and the Green River Trail to the east.
- Provides enhanced water quality treatment of stormwater from large contributing drainage area based on current standards.

## Site Challenges

- Adjacent utilities will likely require coordination (sewer, water, gas, and communications) and may constrain placement locations of the treatment systems.
- Field verification of stormwater infrastructure will be necessary to ensure project feasibility.
- Verification of inlet and outlet pipe elevations will need to be verified to determine feasibility.
- Coordination with BPA easement will be needed.
- A condition assessment of the existing storm pipe at the proposed outfall will be required to evaluate whether repair or replacement will be necessary.
- A wetland impact mitigation analysis will be needed.

# Opinion (Estimate) of Probable Cost

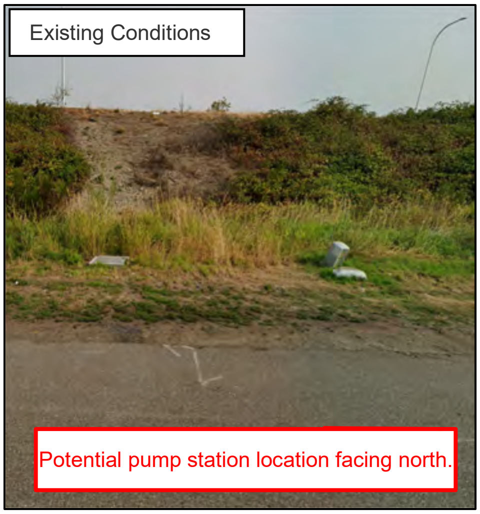
**Project Name** CIP11 - Christa Ministries Facility Retrofit

**Location** Christa Ministries Property (Southeast in 35th St NE & I St NE intersection)

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| **SITE PREP AND TESC** | | | | | | |
| 1 | | MOBILIZATION (10%) | 10% | % of lines 1-4 | | $107,010 |
| 2 | | CONTRACTOR PROVIDED SURVEY (6%) | 6% | % of lines 1-4 | | $64,206 |
| 3 | | TESC (5%) | 5% | % of lines 1-4 | | $53,505 |
| 4 | | PROJECT TEMPORARY TRAFFIC CONTROL (3%) | 3% | % of lines 1-4 | | $32,103 |
| | | | | | **Lines 1 - 4 Subtotal** | **$256,825** |
| **MATERIALS** | | | | | | |
| 5 | | CLEARING AND GRUBBING | 4 | ACRE | $45,471 | $175,703 |
| 6 | | CHANNEL EXCAVATION INCL. HAUL | 7,065 | CY | $39 | $275,535 |
| 7 | | COMMON BORROW INCL. HAUL | 1,445 | CY | $30 | $43,350 |
| 8 | | EMBANKMENT COMPACTION | 1,445 | CY | $9 | $13,005 |
| 9 | | SCHEDULE A STORM SEWER PIPE 30 IN. DIAM. | 1,190 | LF | $311 | $370,090 |
| 10 | | CATCH BASIN TYPE 2 60 IN. DIAM. | 3 | EACH | $9,978 | $29,934 |
| 11 | | CONNECTION TO DRAINAGE STRUCTURE | 2 | EACH | $3,535 | $7,070 |
| 12 | | QUARRY SPALLS | 18 | TON | $68 | $1,224 |
| 13 | | GRAVEL MAINTENANCE ROAD | 3,028 | SY | $32 | $96,882 |
| 14 | | CATCH BASIN TYPE 2 72 IN. DIAM. | 1 | EACH | $11,877 | $11,877 |
| 15 | | SEEDING, FERTILIZING, AND MULCHING (BY ACRE) | 4 | ACRE | $10,205 | $39,433 |
| 16 | | RECORD DRAWINGS | 1 | LS | $6,000.00 | $6,000 |
| | | | | | **Lines 5 - 16 Subtotal** | **$1,070,103** |
| | | | | | **Subtotal Line-Item Costs** | **$1,326,927** |
| | | | | **Construction Cost Contingency** | **30%** | **$398,078** |
| | | | | **Permitting** | **9%** | **$119,423** |
| | | | | **Design (Including Contingency)** | **40%** | **$530,771** |
| | | | | **City Project Mgmt. Admin.** | **10%** | **$132,693** |
| | | | | **Construction Management** | **20%** | **$265,385** |
| | | | | **Management Reserve** | **10%** | **$132,693** |
| | | | | | **TOTAL PROJECT COST** | **$2,906,000** |

# CIP 12 – West Main Street Pump Station Upgrade

## 6-Year Capital Improvement Plan (Priority 1)



Potential pump station location facing north.

**RETROFIT TYPE**

Existing facility retrofit
Pump station upgrade

**LOCATION**

South of West Main Street, east of the SR 167 overpass

**EXISTING USE**

Pump station

**PROPOSED USE**

Upgraded pump station

**DRAINAGE BASIN**

Mill Creek

**TRIBUTARY DRAINAGE AREA**

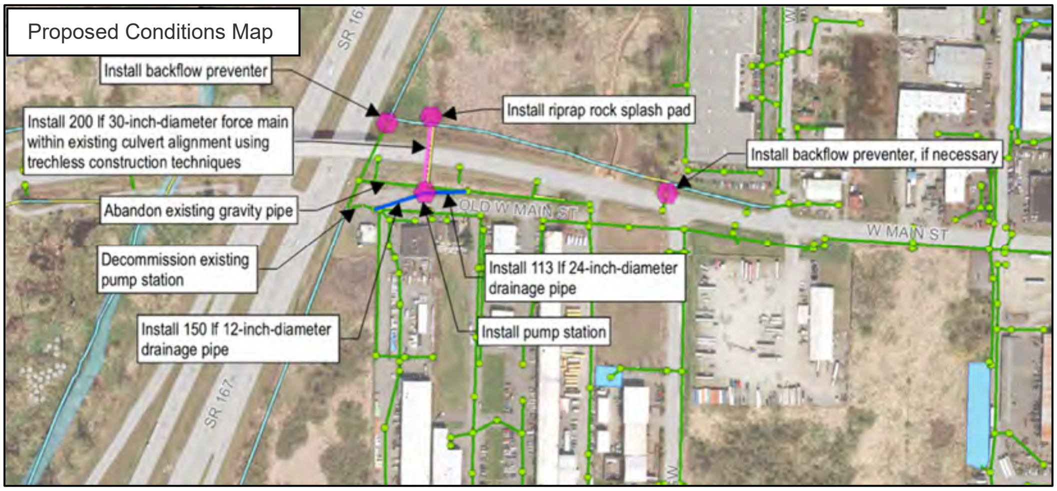
N/A

**TOTAL COST (2024 DOLLARS)**

$3,929,000

**NOTES**

Cost, design, figures, and description completed by Brown & Caldwell. Cost and description updated by Parametrix per City comments.



## Site Opportunities

This project consists of building a new pump station sized to convey the peak 25-year flow rate with multiple pumps to meet the pump redundancy LOS. The new pump station would convey all flows from the gravity pipe on the north and south sides of Old West Main Street. The pump station and its associated area pipes will be reassessed for overall function and purpose. A new design for the pump station will be created that will allow for adequate pumping capacity and a new discharge location that will alleviate backflow flooding from Mill Creek and its drainage ditches.

## Site Opportunities

- Meet pump redundancy LOS goal.
- Address history of local flooding.

## Site Challenges

- May require post-construction monitoring to determine whether an additional backflow preventer is warranted.
- Discharges to WSDOT ditch may require additional coordination with WSDOT.

# Opinion (Estimate) of Probable Cost

**Project Name** CIP 12 -West Main Street Pump Station Upgrade

**Location** South of West Main Street east of the SR 167 overpass

| ITEM NO. | SPEC SECTION | DESCRIPTION | QTY | UNIT | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|---|
| | | **SITE PREP AND TESC** | | | | |
| 1 | | WETLAND PERMITTING AND MITIGATION | 20% | % of construction subtotal | | $302,000 |
| 2 | | CONTRACTOR OVERHEAD, PROFIT, AND MOBILIZATION | 18% | % of construction subtotal | | $271,800 |
| | | | | | **Lines 1 - 2 Subtotal** | **$573,800** |
| | | **MATERIALS** | | | | |
| 3 | | 2015 PROJECT (1) STORMWATER PUMP STATION WITH SCADA/TELEMETRY | 1 | LS | $999,000 | $999,000 |
| 4 | | 2015 PROJECT (1) GRAVITY PIPING: 150 FT OF 12-INCH-DIAMETER PIPE AND 113 FT OF 24-INCH-DIAMETER PIPE | 1 | LS | $114,000 | $114,000 |
| 5 | | 2015 PROJECT (1) FORCE MAIN: 200 FT OF 30-INCH-DIAMETER FORCE MAIN, ABANDON CULVERT, RIPRAP ROCK SPLASH PAD AT CULVERT OUTFALL | 1 | LS | $343,000 | $343,000 |
| 6 | | 2015 PROJECT (1) ANCILLARY IMPROVEMENTS: DECOMMISION EXISTING STATION, INSTALL BACKFLOW PREVENTER ON WSDOT CULVERT | 1 | LS | $54,000 | $54,000 |
| | | | | | **Lines 3 - 6 Subtotal** | **$1,510,000** |
| | | | | | **Subtotal Line-Item Costs** | **$2,083,800** |
| | | | | **Construction Contingency** | **30%** | **$625,140** |
| | | | | **Sales Tax (all above costs)** | **9%** | **$238,387** |
| | | | | | **Subtotal Construction Costs** | **$2,947,327** |
| | | | | **Permitting, Design, Management, Administration, Contingency** | **33.3%** | **$981,460** |
| | | | | | **TOTAL PROJECT COST** | **$3,929,000** |

## 7.3 Programmatic Drainage Projects

To ensure an adequate level of utility funding in the future, the City must consider longer-range programmatic efforts to maintain and/or improve storm drainage service. Table 7-1 lists programmatic projects that should be included in the Storm Drainage Utility budget. These projects are not linked to any specific problem or location, but are included for budgetary purposes. By itemizing these activities, the Storm Drainage Utility can track actual costs to compare with budgeted costs and specifically track how these expenditures address the LOS goals listed in Chapter 3. The items listed in the table below are distributed between the 6- and 20-year CIPs in Chapter 8.

Table 7-1. Summary Programmatic Drainage Projects

| Project Number | Program Name | Description | Priority | Total Project Cost (2024 dollars) |
|---|---|---|---|---|
| 13 | Street Utility Improvements | The Storm Drainage Utility will seek opportunities to incorporate drainage improvements into transportation and pavement projects on City roads. A significant portion of storm drainage costs related to projects make improvements to the street network are incurred by the City's Transportation Program. | 2 | $5,200,000 |
| 14 | Frame & Grate Replacement | As manholes and catch basins age and their condition deteriorates, frame and grates can become loose and/or misoriented or, due to age, are no longer meeting standards. This annual project will replace approximately 50 storm manhole and catch basin frame and grates to maintain access to the storm system and decrease the likelihood of the manholes becoming road hazards. In some years, this replacement will be a stand-alone project, and in some years, many of these replacements will be in conjunction with other City projects. | 2 | $1,700,000 |
| 15 | Storm Drainage Infrastructure Repair & Replacement Program | This program addresses the need to repair or replace storm drainage infrastructure, such as individual pipes, pump station repair and maintenance, and pond improvements. The long-term priorities for R&R should be developed by adhering to the City's system goals regarding the maintenance of a criticality database and the prioritized assessment of critical infrastructure. | 1 | $14,400,000 |
| 16 | Storm Pipeline Extension Program | Program to extend stormwater infrastructure into areas lacking infrastructure or where known stormwater issues occur. | 3 | $7,450,000 |

Note: All costs are in 2024 dollars.

# 8. Implementation Plan

This chapter presents the implementation plan, which brings together information from the preceding chapters of this 2024 Comprehensive Storm Drainage Plan to form a work plan of future activities for the Storm Drainage Utility. The information in this chapter serves as a road map to the Storm Drainage Utility staff. This road map outlines the critical elements of plan implementation (e.g., capital improvement plan implementation, NPDES MS4 permit compliance, future staffing, asset management, drainage ditch maintenance program, climate change, etc.) and links them into a schedule of utility activities.

The implementation plan is divided into five main sections:

- Section 8.1 presents the capital improvement plan for both 6-year and 20-year time frames.
- Section 8.2 contains a summary of activities for NPDES MS4 permit compliance.
- Section 8.3 presents recommendations for future staffing and M&O activities.
- Section 8.4 summarizes the recommendations for continuing the implementation of best practices for asset management.
- Section 8.5 lists recommendations for additional activities that help the Storm Drainage Utility achieve the system goals.

The foldout chart (Figure 8-3) at the conclusion of this chapter shows the proposed implementation timeline. Appendix F provides the SEPA determination for the implementation plan.

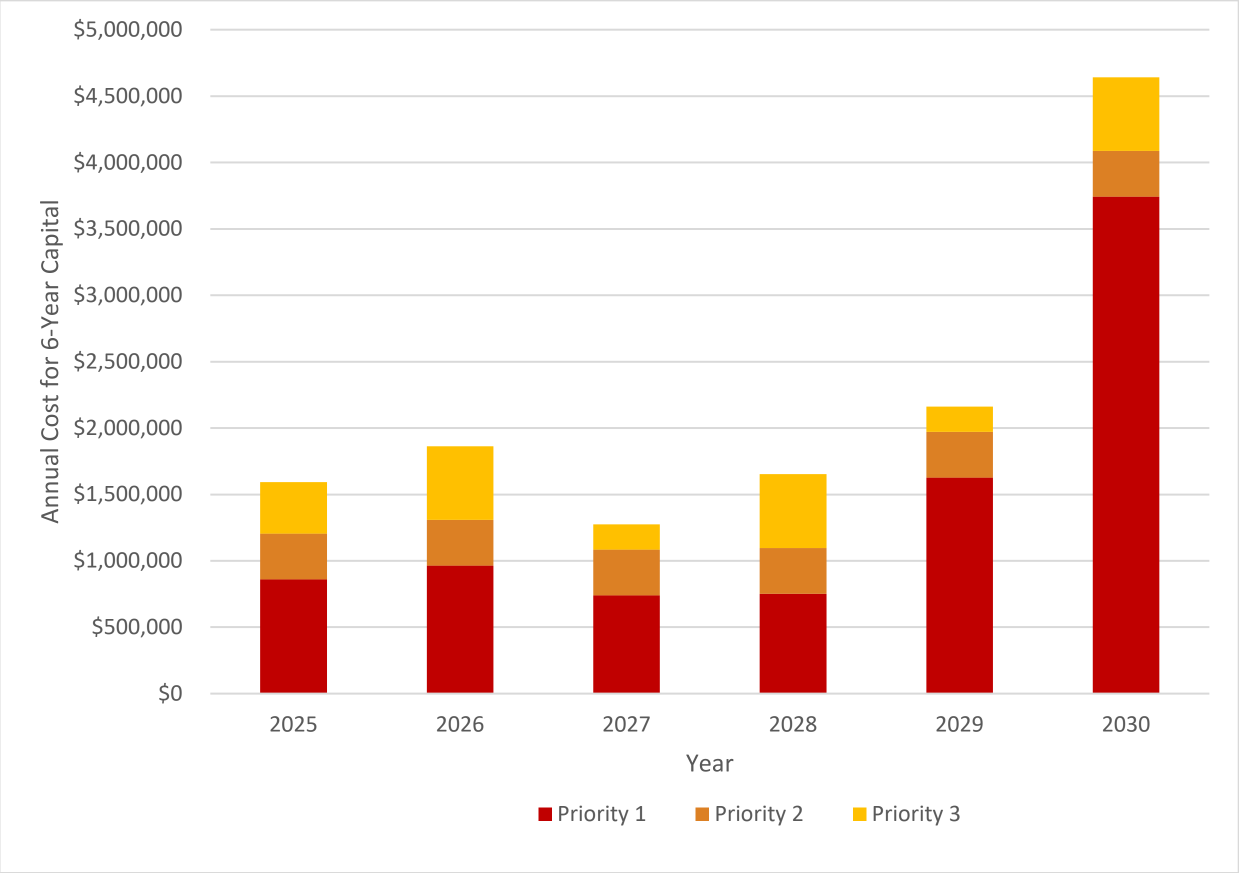
## 8.1 6-Year and 20-Year Capital Improvement Program

The 6-year CIP contains near-term capital improvement projects focused on mitigating critical existing drainage problems that have been observed and are well understood by the City's staff, addressing an ongoing waste disposal issue and ensuring compliance with NPDES MS4 permit requirements. These projects are described in detail in Chapter 7. In addition to site-specific projects, the 6-year CIP contains ongoing programmatic efforts, such as the Storm Drainage Utility's participation in the Street Utility Improvement program, which is a program designed to complete storm repairs and replacements in conjunction with transportation projects. Table 8-1 lists the short-term capital improvement projects and programs described in Chapter 7 and lays out annual expenditures for the 6-year capital improvement time frame. Project timing is based on project priorities weighed with likely budgetary constraints such that costs are distributed somewhat evenly from year to year (see Table 8-1 and Figure 8-1).

## Table 8-1. Annual Cost Summary for 6-Year Capital Improvement Plan

| Project Number | Project Name | Priority | Repair/ Replacement | Upgrade/ Expansion | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 6-Year Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SE 287th Street Stormwater Device | 1 | 0% | 100% | $139,000 | $243,000 | $0 | $0 | $0 | $0 | $382,000 |
| 3 | SE 284th Street West Bioswale Additions | 1 | 0% | 100% | $0 | $0 | $20,000 | $32,000 | $0 | $0 | $52,000 |
| 10 | Vegetative Waste Sorting Facility | 3 | 90% | 10% | $200,000 | $0 | $0 | $0 | $0 | $0 | $200,000 |
| 12 | West Main Street Pump Station Upgrade | 1 | 25% | 75% | $0 | $0 | $0 | $0 | $907,000 | $3,022,000 | $3,929,000 |
| 13 | Street Utility Improvements | 2 | 100% | 0% | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $1,560,000 |
| 14 | Frame & Grate Replacement | 2 | 100% | 0% | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $510,000 |
| 15 | Storm Drainage Infrastructure Repair & Replacement Program | 1 | 100% | 0% | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $4,320,000 |
| 16 | Storm Pipeline Extension Program | 3 | 0% | 100% | $190,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $2,235,000 |
| | Total 6-year CIP cost for priority 1 projects/programs: | | | | $859,000 | $963,000 | $740,000 | $752,000 | $1,627,000 | $3,742,000 | $8,683,000 |
| | Total 6-year CIP cost for priority 2 projects/programs: | | | | $345,000 | $345,000 | $345,000 | $345,000 | $345,000 | $345,000 | $2,070,000 |
| | Total 6-year CIP cost for priority 3 projects/programs: | | | | $390,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $2,435,000 |
| | Total 6-year cost: | | | | $1,594,000 | $1,863,000 | $1,275,000 | $1,652,000 | $2,162,000 | $4,642,000 | $13,188,000 |

Note: All costs are in 2024 dollars.



Note: All costs are in 2024 dollars.

Figure 8-1. Annual Costs for 6-Year Capital Improvement Plan

After high-priority drainage problems are addressed, the City will be able to focus on the remaining projects described in Chapter 7. In addition, the City will continue to emphasize the management of existing storm drainage assets to ensure that LOS goals are continuously met. Table 8-2 summarizes the program expenditures and forecasts total capital improvement costs for the years 2031 to 2044.

In addition to the identified projects and programs, the Storm Drainage Utility will be involved in several ongoing system updates and capital facilities plan (CFP) projects that will require the utility's time and expenditures. Additional detail regarding these items are provided in Section 8.5.

## Table 8-2. Capital Improvement Cost Summary for 2031–2044

| Project Number | Project Name | Priority | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | Cost for 2031–2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | SE 284th Street & 109th Avenue Bioswale Additions | 3 | | | | | | | | | | | | | $55,000 | $88,000 | $143,000 |
| 4 | SE 284th Street East Bioswale Additions | 3 | | | | | | | | | | | | | $11,000 | $17,000 | $28,000 |
| 5 | 124th Avenue SE near 293rd Street Stormwater Treatment Device | 2 | | | | | | | | | $225,000 | $356,000 | | | | | $581,000 |
| 6 | Vintage Hills Swale Retrofit | 1 | $95,000 | $169,000 | | | | | | | | | | | | | $264,000 |
| 7 | 124th Avenue SE near 307th Place Stormwater Treatment Device | 2 | | | | | $205,000 | $326,000 | | | | | | | | | $531,000 |
| 8 | 124th Avenue SE near 302nd Place Stormwater Treatment Device | 2 | | | | | | | $205,000 | $326,000 | | | | | | | $531,000 |
| 9 | 30th Street NE Area Flooding, Phase 2 | 3 | | | | | | | | | | | $198,000 | $988,000 | | | $1,186,000 |
| 11 | Christa Ministries Facility Retrofit | 1 | | | $774,000 | $2,132,000 | | | | | | | | | | | $2,906,000 |
| 13 | Street Utility Improvements | 2 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $260,000 | $3,640,000 |
| 14 | Frame & Grate Replacement | 2 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $85,000 | $1,190,000 |
| 15 | Storm Drainage Infrastructure Repair & Replacement Program | 1 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $10,080,000 |
| 16 | Storm Pipeline Extension Program | 3 | $190,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $5,215,000 |
| Total 2031–2044 cost for priority 1 projects/programs: | | | $815,000 | $889,000 | $1,494,000 | $2,852,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $720,000 | $13,250,000 |
| Total 2031–2044 cost for priority 2 projects/programs: | | | $345,000 | $345,000 | $345,000 | $345,000 | $550,000 | $671,000 | $550,000 | $671,000 | $570,000 | $701,000 | $345,000 | $345,000 | $345,000 | $345,000 | $6,473,000 |
| Total 2031–2044 cost for priority 3 projects/programs: | | | $190,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $190,000 | $555,000 | $388,000 | $1,543,000 | $256,000 | $660,000 | $6,572,000 |
| Total 2031–2044 cost for projects/programs: | | | $1,350,000 | $1,789,000 | $2,029,000 | $3,752,000 | $1,460,000 | $1,946,000 | $1,460,000 | $1,946,000 | $1,480,000 | $1,976,000 | $1,453,000 | $2,608,000 | $1,321,000 | $1,725,000 | $26,295,000 |

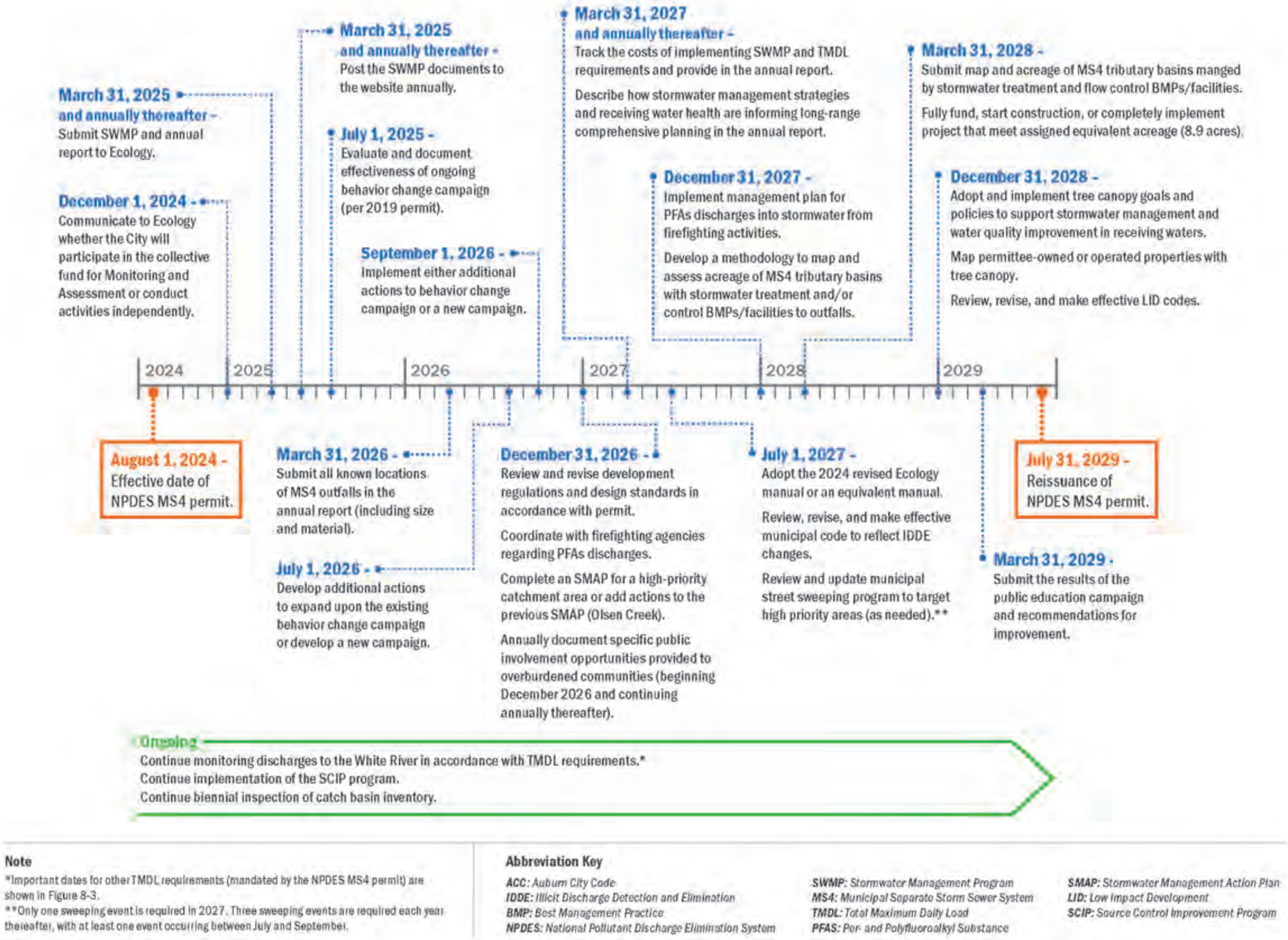
Note: All costs are in 2024 dollars.

## 8.2 Programmatic Measures for NPDES Compliance

The City of Auburn is covered by the Western Washington Phase II Municipal Stormwater permit. The permit regulates stormwater discharges from the City's MS4 (see Section 2.3.2). The current version of the NPDES MS4 permit was issued in August 2024 and will remain in effect through July 2029, when a new version is due to be issued. A regulatory-driven improvements investigation was performed on behalf of this Plan and was discussed in Chapter 5.3. The recommended actions on behalf of this investigation have been summarized below.

- Update local development regulations and drainage standards in accordance with updated NPDES MS4 permit requirements.
- Review and revise municipal code to reflect IDDE changes, specifically concerning routine washdowns of structures likely to have PCB-containing materials.
- Carry out permit-required activities related to TMDLs (identified in Chapter 4.4.1).
- Develop and implement protocols with firefighting agencies regarding PFAS discharges into stormwater.
- Develop and implement tree canopy goals to support stormwater management and improve receiving water quality.
- Prepare an SMAP for a new high-priority catchment area or enhance the existing one for Olson Creek.
- Ensure the existing street sweeping plan covers the permit requirements.
- Reflect on the ongoing public outreach campaign and consider adding new actions or developing a new campaign.
- Map piped MS4 outfalls with flow control or stormwater treatment upstream to determine the amount of treated/untreated area within the MS4.
- Continue implementing the SCIP.

These actions have been further detailed and organized on a timeline in Figure 8-3. Additionally, the compliance-specific schedule for key requirements under the current NPDES MS4 permit is shown in Figure 8-2.



**August 1, 2024 -** Effective date of NPDES MS4 permit.

**December 1, 2024 -** Communicate to Ecology whether the City will participate in the collective fund for Monitoring and Assessment or conduct activities independently.

**March 31, 2025 and annually thereafter -** Submit SWMP and annual report to Ecology.

**March 31, 2025 and annually thereafter -** Post the SWMP documents to the website annually.

**July 1, 2025 -** Evaluate and document effectiveness of ongoing behavior change campaign (per 2019 permit).

**March 31, 2026 -** Submit all known locations of MS4 outfalls in the annual report (including size and material).

**July 1, 2026 -** Develop additional actions to expand upon the existing behavior change campaign or develop a new campaign.

**September 1, 2026 -** Implement either additional actions to behavior change campaign or a new campaign.

**December 31, 2026 -** Review and revise development regulations and design standards in accordance with permit.

Coordinate with firefighting agencies regarding PFAs discharges.

Complete an SMAP for a high-priority catchment area or add actions to the previous SMAP (Olsen Creek).

Annually document specific public involvement opportunities provided to overburdened communities (beginning December 2026 and continuing annually thereafter).

**March 31, 2027 and annually thereafter -** Track the costs of implementing SWMP and TMDL requirements and provide in the annual report.

Describe how stormwater management strategies and receiving water health are informing long-range comprehensive planning in the annual report.

**July 1, 2027 -** Adopt the 2024 revised Ecology manual or an equivalent manual.

Review, revise, and make effective municipal code to reflect IDDE changes.

Review and update municipal street sweeping program to target high priority areas (as needed).**

**December 31, 2027 -** Implement management plan for PFAs discharges into stormwater from firefighting activities.

Develop a methodology to map and assess acreage of MS4 tributary basins with stormwater treatment and/or control BMPs/facilities to outfalls.

**March 31, 2028 -** Submit map and acreage of MS4 tributary basins manged by stormwater treatment and flow control BMPs/facilities.

Fully fund, start construction, or completely implement project that meet assigned equivalent acreage (8.9 acres).

**December 31, 2028 -** Adopt and implement tree canopy goals and policies to support stormwater management and water quality improvement in receiving waters.

Map permittee-owned or operated properties with tree canopy.

Review, revise, and make effective LID codes.

**March 31, 2029 -** Submit the results of the public education campaign and recommendations for improvement.

**July 31, 2029 -** Reissuance of NPDES MS4 permit.

**Ongoing**
Continue monitoring discharges to the White River in accordance with TMDL requirements.*
Continue implementation of the SCIP program.
Continue biennial inspection of catch basin inventory.

**Note**

*Important dates for other TMDL requirements (mandated by the NPDES MS4 permit) are shown in Figure 8-3.

**Only one sweeping event is required in 2027. Three sweeping events are required each year thereafter, with at least one event occurring between July and September.

**Abbreviation Key**

***ACC:*** *Auburn City Code*
***IDDE:*** *Illicit Discharge Detection and Elimination*
***BMP:*** *Best Management Practice*
***NPDES:*** *National Pollutant Discharge Elimination System*
***SWMP:*** *Stormwater Management Program*
***MS4:*** *Municipal Separate Storm Sewer System*
***TMDL:*** *Total Maximum Daily Load*
***PFAS:*** *Per- and Polyfluoroalkyl Substance*
***SMAP:*** *Stormwater Management Action Plan*
***LID:*** *Low Impact Development*
***SCIP:*** *Source Control Improvement Program*

Figure 8-2. NPDES Compliance Schedule

## 8.3 Future Staffing and Equipment Needs

During this planning effort, current Engineering and M&O staffing were considered in light of future activities that will need to be performed to maintain compliance with the NPDES MS4 permit. M&O staffing and equipment were also reviewed, taking into account existing maintenance goals and future, additional M&O responsibilities. The following sections summarize the additional staffing, staffing responsibilities, and equipment needs for the Storm Drainage Utility.

### 8.3.1 Engineering Services

As part of this Plan, the City evaluated engineering staffing responsibilities required to address the revised NPDES MS4 permit and other storm drainage system deficiencies. The recommended actions in Figure 8-3 are expected to be managed by engineering staff.

### 8.3.2 Maintenance and Operation Services

The evaluation of M&O staffing for managing, operating, and maintaining the storm drainage system in Chapter 6 revealed that the Storm Drainage Utility is adequately staffed to meet current proactive City goals. However, additional staff and equipment may be necessary to fulfill NPDES MS4 permit requirements and anticipated future work (as outlined in Section 6.6.2). Although no immediate staffing additions are planned, ongoing monitoring of staffing levels will assess the need.

Support from M&O staff will be needed in the following actions (identified in Chapter 6 and summarized below):

- Asset management recommendations (Section 8.4):
    - → Prioritizing work using risk-based scoring methods.
    - → Documenting condition assessments and work orders in Cartegraph.
- Street Sweeping Plan (NPDES MS4 permit):
    - → Coordinating with the Street Division (as needed) to implement the required street sweeping plan.
- Ditch Maintenance Program (Section 8.5):
    - → Carrying out the recommended needs from the ditch maintenance program.

Additionally, based on discussions with City staff and analysis of M&O activities, the Storm Drainage Utility will consider obtaining CCTV inspection equipment for pipe inspection within five years.

## 8.4 Continue Implementation of Best Practices for Asset Management

As an integral part of this comprehensive plan, the City conducted a thorough review of its existing asset inventory and management practices, as discussed in Chapter 5.2. The recommended actions have been summarized below.

- System inventory:
    - → Continuously update the inventory with additional data collected during maintenance activities (e.g., condition assessment and frequency of maintenance).

  - → Train staff on asset inventory needs, capability, data collection, data quality objectives, and maintenance processes.
  - → Develop a process for reviewing and updating the asset inventory when changes and inspections occur (see Section 5.2.3).
  - → Implement the prioritized inspection and asset information update process to address data gaps and provide observation-based condition assessments.
- Risk-based scoring in Cartegraph:
  - → Integrate scoring methods into Cartegraph.
  - → Populate critical feature attributes (used in risk calculations).
  - → Add scoring fields to calculate likelihood of failure and criticality of failure scores for each pipe in Cartegraph.
- Risk-based scoring improvements:
  - → Expand scoring methods to include asset types beyond collection system piping.
  - → Implement these improvements into Cartegraph and inspection prioritization techniques (see Appendix C for recommended attributes for other stormwater assets).
- Maintenance and R&R prioritization:
  - → Prioritize maintenance activities for assets with the highest risk.
  - → Assess the inspection process every 5 years to evaluate efficiency and identify areas for improvement.
  - → Consider reconducting pipe depreciation analysis periodically to assess the impact of prioritization practices.

## 8.5 Recommendations for Additional Activities

The following sections summarize recommendations for additional activities discussed during this Plan for the Storm Drainage Utility. Section 8.5 is divided into the following three sub-sections:

- Section 8.5.1 summarizes recommendations discussed in Section 5.4.2.
- Section 8.5.2 summarizes recommendations discussed in Section 6.6.2.1.
- Section 8.5.3 presents the ongoing system updates carried out by the Storm Drainage Utility and the CFP projects that will require coordination from the Utility.

### 8.5.1 Climate Change

As discussed in Chapter 5.4, climate change will need to be considered in developing and implementing stormwater design guidelines for future scenarios. The actions recommended on behalf of climate change are summarized below.

- Review and revise the hydraulic performance metrics related to freeboard, headwater depth, and surcharging. Evaluate the financial implications associated with enforcing strict hydraulic performance standards.
- Prepare a CDR process to evaluate the consequences of storm events exceeding the design parameters. Establish clear policies regarding safety, property protection, service continuity, and mitigation of nuisance flooding to make systems more resilient to infrequent but

probable flooding. Ensure that the level of protection aligns with the associated costs and risk factors.

- Prioritize effective hydraulic performance and resilience measures for critical facilities during severe storm events that go beyond the intended design limits.

### 8.5.2 Ditch Maintenance Program

A drainage ditch maintenance program was developed as a part of this Plan. See Chapter 6.6.2.1 for more details. The previously discussed recommendations have been summarized below.

- Develop protocols for finding, adding, mapping, and classifying ditches within the system.
- Consider the steps required when adding new ditches to the system.
- Use the results of regular ditch inspections to identify system failures.
- Implement a program that focuses on retrofitting ditches with water quality enhancements.

### 8.5.3 Ongoing System Updates and Capital Facilities Plan Projects

The City will be involved in several ongoing system updates throughout the period of 2031–2044. These updates and their projected costs and timelines have been listed in Table 8-3 below.

Table 8-3. Ongoing System Updates

| Name | Description | 2031–2044 Cost |
|---|---|---|
| Pump Station Level of Service Review | Program to review all pump stations for level of service. Specifically focus on A Street SE and Auburn Way S as an existing drainage issue has been identified there (see Section 4.5). | $400,000 |
| Pump Station Update | Program to update the pump stations according to the results of the level of service review. | $2,000,000 |
| Underground Injection Wells Retrofit Program | Retrofit program to map underground injection wells in the City with water quality treatment. | $975,000 |
| | Total 2031–2044 cost: | $3,375,000 |

Note: All costs are in 2024 dollars.

In addition, there are several CFP projects that will require coordination from the Storm Drainage Utility from 2024–2026. These projects are listed in Table 8-4 below.

Table 8-4. Capital Facilities Plan Project Schedule 2024–2026

| Name | 2024 Cost | 2025 Cost | 2026 Cost | Cost for 2024–2026 |
|---|---|---|---|---|
| R Street SE Widening - 22nd Street SE to 33rd Street SE | | $303,850 | $938,897 | $1,242,747 |
| Regional Growth Center Improvements | $100,000 | | | $100,000 |
| R Street SE Preservation | $320,000 | | | $320,000 |
| 12th Street SE Water Main Improvements | $16,000 | | | $16,000 |
| Arterial Preservation | $215,000 | | | $215,000 |
| Jornada Park Access Improvements | $100,000 | | | $100,000 |
| C Street SW Preservation (W Main to GSA signal) | $50,000 | | | $50,000 |
| M Street NE Widening | | $824,000 | | $824,000 |
| Total project cost for 2024–2026: | $801,000 | $1,127,850 | $938,897 | $2,867,747 |

Note: Costs shown in this table have been escalated as described in Section 9.

## 8.6 Implementation Plan

The recommended actions within this Plan have been organized in a timeline, as depicted in Figure 8-3. This timeline serves as a guide for implementing the actions in a structured manner.

## Implementation Plan Activities Timeline

|  |  | 2024 | 2025 |  |  |  | 2026 |  |  |  | 2027 |  |  |  | 2028 |  |  |  | 2029 |  |  |  | 2030 |  |  |  | 2031- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chapter | Action | Q1-Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | 2044 |
| CIP |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 | 1. SE 287th Street Stormwater Device |  | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 | 2. SE 284th Street & 109th Avenue Bioswale Additions |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 🟦 |
| 7 | 3. SE 284th Street West Bioswale Additions |  |  |  |  |  |  |  |  |  | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 |  |  |  |  |  |  |  |  |  |
| 7 | 4. SE 284th Street East Bioswale Additions |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 🟦 |
| 7 | 5. 124th Avenue SE near 293rd Street Stormwater Treatment Device |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 | 6. Vintage Hills Swale Retrofit |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 🟦 |
| 7 | 7. 124th Avenue SE near 307th Place Stormwater Treatment Device |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 🟦 |
| 7 | 8. 124th Avenue SE near 302nd Place Stormwater Treatment Device |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 🟦 |
| 7 | 9. 30th Street NE Area Flooding, Phase 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 🟦 |
| 7 | 10. Vegetative Waste Sorting Facility |  | 🟦 | 🟪 | 🟪 | 🟥 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 | 11. Christa Ministries Facility Retrofit |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 🟦 |
| 7 | 12. West Main Street Pump Station Upgrade |  | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 | 13. Street Utility Improvements | 🟩 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 |
| 7 | 14. Frame & Grate Replacement | 🟩 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 |
| 7 | 15. Storm Drainage Infrastructure Repair & Replacement Program | 🟩 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 |
| 7 | 16. Storm Pipeline Extension Program | 🟩 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 |
| System Goals and Policies |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Review and update inventory of existing capital facilities. | 🟩 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Forecast capital facility needs for planning period. Consider reducing LOS or increasing revenue as needed. | 🟩 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Identify the proposed locations and capacity of expanded/new facilities. | 🟩 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Update the 6-year plan biennially. | 🟩 |  |  |  |  |  | 🟧 |  |  |  |  |  |  |  | 🟧 |  |  |  |  |  |  |  | 🟧 |  |  |  |
| 3 | Routinely assess performance of pumped systems. | 🟩 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 🟦 | 🟪 | 🟪 | 🟥 |  |  |  |  |  |
| 3 | Consider using future rainfall intensity data for designing stormwater systems. |  |  |  |  |  |  |  |  |  |  |  |  |  | 🟥 |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | Address the existing drainage problems through capital or otherwise. | 🟩 | 🟦 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 |
| NPDES MS4 permit Compliance |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Review development regulations from new permit to ensure consistency with policies and LOS goals. |  |  |  | 🟦 |  |  |  | 🟪 | 🟥 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Adopt the revised manual as required by NPDES MS4 permit. |  |  |  |  |  |  |  |  | 🟦 | 🟪 | 🟥 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Review and revise municipal code to reflect IDDE changes. |  |  |  |  |  |  |  |  | 🟦 | 🟪 | 🟥 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Submit a SWMP plan to Ecology every year. |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  |  |
| 2 | Submit an annual report to Ecology by March 31 every year. |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  |  |
| 2 | Track the costs of implementing SWMP and TMDL requirements and provide in annual report by March 2027. |  |  |  |  |  |  |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  |  |
| 2 | By March 31, 2027, describe how stormwater management strategies and receiving water health are informing long-range comprehensive planning in the annual report. |  |  |  |  |  |  |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  | 🟧 |  |  |  |  |
| 2 | Monitor discharges to the White River in association with the Puyallup River Watershed Fecal Coliform TMDL. | 🟩 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 |
| 2 | Routinely update and review asset inventory for accuracy. | 🟩 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 |
| 4 | Update development regulations and design standards in accordance with NPDES MS4 permit requirements. |  |  |  | 🟦 |  |  |  | 🟪 | 🟥 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | Map all known piped MS4 outfalls to the Lower White River. |  |  |  |  |  |  |  |  |  |  |  | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 |  |  |  |  |  |  |  |  |
| 4 | Screen all known piped MS4 outfalls to the Lower White River for illicit discharges. |  |  |  |  |  |  |  |  |  |  | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 |  |  |  |  |  |  |  |  |  |

**Legend**
🟩 Completed
🟦 Recommended Start
🟪 Midway Point (Anticipated Duration)
🟥 Deadline
🟧 Repeated Action
🟨 Ongoing Action

**Figure 8-3.**
**Implementation Plan Activities Timeline**
**(1 of 3)**

## Implementation Plan Activities Timeline

| Chapter | Action | 2024 | 2025 | | | | 2026 | | | | 2027 | | | | 2028 | | | | 2029 | | | | 2030 | | | | 2031-2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1-Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | |
| 4 | Require phosphorus treatment BMPs for all new and redevelopment projects in the Lower White River implementation area. | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | |
| 4 | Continue ongoing inspection programs and reinspect facilities found to have bacteria source potential. | 🟩 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟥 | | | | | | | |
| 4 | Enact public education and outreach activities to increase awareness of bacterial pollution problems. | 🟩 | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 4 | Maintain pet waste collection stations at Permittee-owned or -operated lands, as needed. | 🟩 | | | | | 🟦 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟥 | | | | | | | |
| 4 | Review expected activities for Soos Creek TMDL when it becomes available and implement activities as necessary. | | | | | | | | | | 🟦 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟥 |
| 4 | Develop process to identify and implement needed updates to codes, standards, and programs by relevant due dates. | | | | 🟦 | | | | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 5 | Coordinate with firefighting agencies/departments to implement specific protocols regarding PFAS discharges into stormwater. | | 🟦 | | | | | | | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |
| 5 | Prepare an assessment of existing conditions. | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | |
| 5 | Draft a list of potential policies. | | | | | | | | | | | | 🟦 | | | 🟪 | 🟪 | 🟥 | | | | | | | | | |
| 5 | Select and adopt policies. | | | | | | | | | | | | | | | | | 🟥 | | | | | | | | | |
| 5 | Identify a preferred catchment area for inclusion or enhancement. | | 🟦 | 🟥 | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Prepare a new SMAP or update the existing SMAP. | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 5 | Review the road system plan. | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | |
| 5 | Review high-priority roadways. | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | |
| 5 | Determine candidate sites for retrofitting using SMAPs, capital improvement projects, or other relevant plans. | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 5 | Select projects and include in capital improvement plan. | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 5 | Document the effectiveness of the behavior change campaign required under the 2019 NPDES MS4 permit. | | 🟦 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Develop a public education campaign. Consider source control BMPs for building materials as the focus. | | 🟦 | | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | |
| 5 | Submit results of public education campaign and recommended strategies for improvement. | | | | | | | | | | | | | | | | 🟦 | 🟪 | 🟥 | | | | | | | | |
| 5 | Document public involvement opportunities to overburdened communities. | | | | | | | | | 🟧 | | | | 🟧 | | | | 🟧 | | | | 🟧 | | | | 🟧 | |
| 5 | Identify facilities to be mapped. | | 🟦 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | |
| 5 | Develop a methodology for mapping outfalls. | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |
| 5 | Use a geographic information system (GIS) to prepare a map of catchment areas. | | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | |
| 5 | Begin mapping of permittee-owned or operated properties with tree canopy based on available data. | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 5 | Prioritize projects developed in the SMAP that together meet the City's assigned 8.9 acres. | | | | | | | | | | | | | | 🟥 | | | | | | | | | | | | |
| 5 | Review and revise the existing sweeping program. | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | |
| 5 | Enact the modified sweeping program. | | | | | | | | | | | | 🟦 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 | 🟨 |
| 5 | Review, revise, and make effective LID codes | | | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | |
| 6 | Evaluate the resource need of the SCIP program and update accordingly. | 🟩 | | | | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | |
| 6 | Coordinate with the Street utility to review and revise the City's street sweeping plan, as needed. | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | |
| **Asset Management** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Implement asset management program. | 🟩 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Train staff on asset inventory needs, data collection and quality objectives, and system maintenance. | | | | 🟦 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | |
| 5 | Implement the likelihood of failure and criticality of failure scoring methods into Cartegraph. | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 5 | Establish and conduct the practice for prioritization of inspection and other work based on scoring methods. | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |
| 5 | Develop and conduct process for reviewing the asset inventory and a routine for updating when changes and inspections occur. | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |

**Legend**

🟩 Completed

🟦 Recommended Start

🟪 Midway Point (Anticipated Duration)

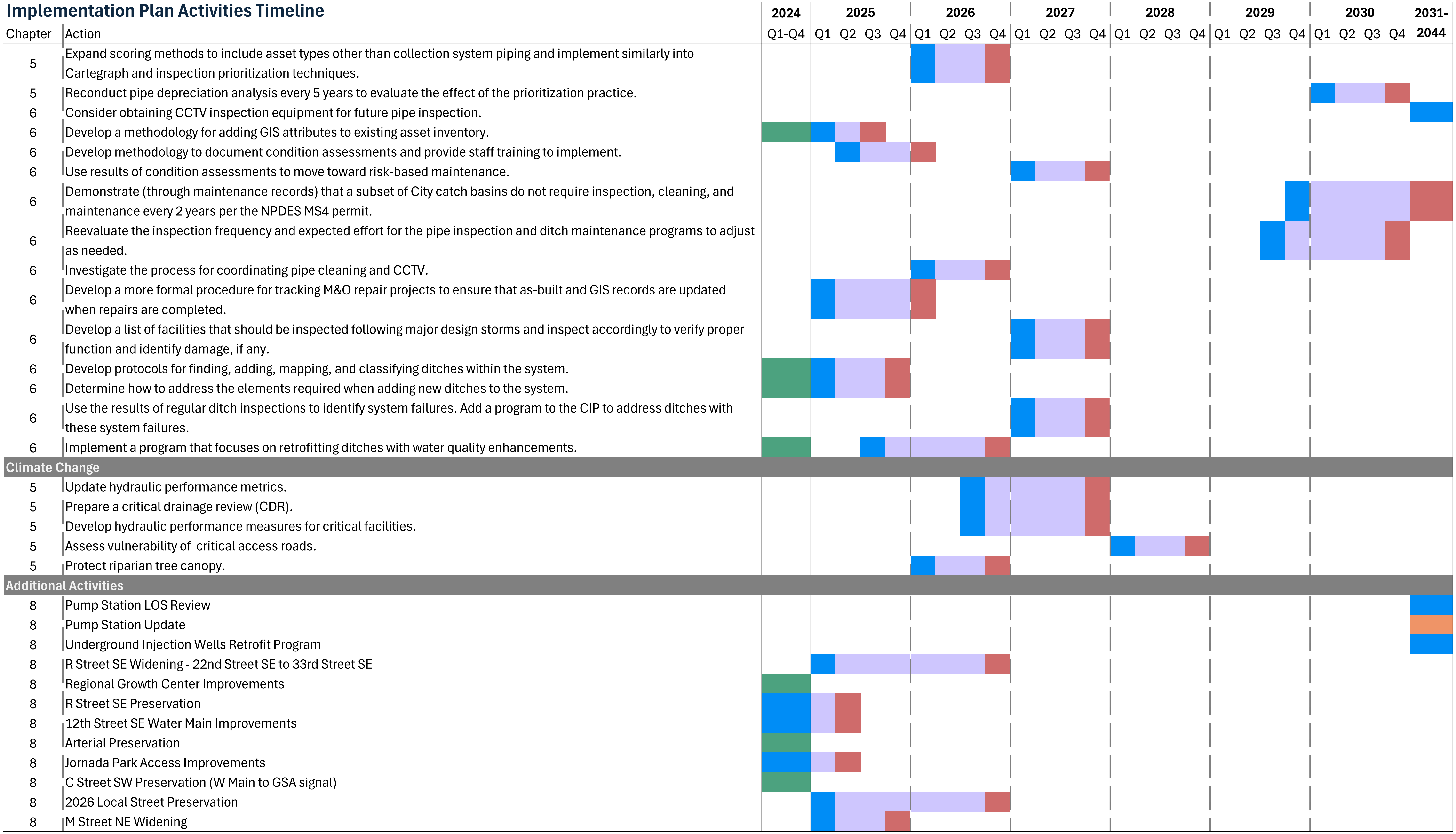
🟥 Deadline

🟧 Repeated Action

🟨 Ongoing Action

**Figure 8-3.**
**Implementation Plan Activities Timeline**
**(2 of 3)**

## Implementation Plan Activities Timeline



| Chapter | Action | 2024 | 2025 | | | | 2026 | | | | 2027 | | | | 2028 | | | | 2029 | | | | 2030 | | | | 2031-2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1-Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | |
| 5 | Expand scoring methods to include asset types other than collection system piping and implement similarly into Cartegraph and inspection prioritization techniques. | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 5 | Reconduct pipe depreciation analysis every 5 years to evaluate the effect of the prioritization practice. | | | | | | | | | | | | | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | |
| 6 | Consider obtaining CCTV inspection equipment for future pipe inspection. | | | | | | | | | | | | | | | | | | | | | | | | | | 🟦 |
| 6 | Develop a methodology for adding GIS attributes to existing asset inventory. | 🟩 | 🟦 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Develop methodology to document condition assessments and provide staff training to implement. | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | |
| 6 | Use results of condition assessments to move toward risk-based maintenance. | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |
| 6 | Demonstrate (through maintenance records) that a subset of City catch basins do not require inspection, cleaning, and maintenance every 2 years per the NPDES MS4 permit. | | | | | | | | | | | | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 |
| 6 | Reevaluate the inspection frequency and expected effort for the pipe inspection and ditch maintenance programs to adjust as needed. | | | | | | | | | | | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | |
| 6 | Investigate the process for coordinating pipe cleaning and CCTV. | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 6 | Develop a more formal procedure for tracking M&O repair projects to ensure that as-built and GIS records are updated when repairs are completed. | | 🟦 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | |
| 6 | Develop a list of facilities that should be inspected following major design storms and inspect accordingly to verify proper function and identify damage, if any. | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |
| 6 | Develop protocols for finding, adding, mapping, and classifying ditches within the system. | 🟩 | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | |
| 6 | Determine how to address the elements required when adding new ditches to the system. | 🟩 | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | |
| 6 | Use the results of regular ditch inspections to identify system failures. Add a program to the CIP to address ditches with these system failures. | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |
| 6 | Implement a program that focuses on retrofitting ditches with water quality enhancements. | 🟩 | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| **Climate Change** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Update hydraulic performance metrics. | | | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |
| 5 | Prepare a critical drainage review (CDR). | | | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |
| 5 | Develop hydraulic performance measures for critical facilities. | | | | | | | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | |
| 5 | Assess vulnerability of critical access roads. | | | | | | | | | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | |
| 5 | Protect riparian tree canopy. | | | | | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| **Additional Activities** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Pump Station LOS Review | | | | | | | | | | | | | | | | | | | | | | | | | | 🟦 |
| 8 | Pump Station Update | | | | | | | | | | | | | | | | | | | | | | | | | | 🟧 |
| 8 | Underground Injection Wells Retrofit Program | | | | | | | | | | | | | | | | | | | | | | | | | | 🟦 |
| 8 | R Street SE Widening - 22nd Street SE to 33rd Street SE | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 8 | Regional Growth Center Improvements | 🟩 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | R Street SE Preservation | 🟦 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 12th Street SE Water Main Improvements | 🟦 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Arterial Preservation | 🟩 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Jornada Park Access Improvements | 🟦 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | C Street SW Preservation (W Main to GSA signal) | 🟩 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 2026 Local Street Preservation | | 🟦 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | |
| 8 | M Street NE Widening | | 🟦 | 🟪 | 🟪 | 🟥 | | | | | | | | | | | | | | | | | | | | | |

**Legend**

🟩 Completed
🟦 Recommended Start
🟪 Midway Point (Anticipated Duration)
🟥 Deadline
🟧 Repeated Action
🟨 Ongoing Action

**Figure 8-3.**
**Implementation Plan Activities Timeline**
**(3 of 3)**

# 9. Financial Plan

## 9.1 Introduction

This chapter was prepared by FCS Group to provide a financial program that allows the City of Auburn Storm Drainage Utility to remain financially viable during the planning period. This financial viability analysis considers the historical financial condition, current and identified future financial goals and policy obligations, M&O needs, and the financial impacts of the capital projects identified in this Comprehensive Storm Drainage Plan. Furthermore, this chapter provides a review of the Storm Drainage Utility's current rate structure with respect to rate adequacy and customer affordability.

## 9.2 Past Financial Performance

This section includes a historical summary of financial performance as reported by the City, including fund resources and uses arising from cash transactions.

### 9.2.1 Comparative Financial Statements

The City legally owns and operates the Auburn Storm Drainage Utility. Table 9-1 shows a summary of storm drainage fund resources and uses arising from cash transactions for the previous six years (2017 through 2022). The 2023 financial statements were not available at the time this chapter was developed. Table 9-2 shows a summary of assets and liabilities, with the difference between the two reported as "net position." Increases and decreases in net position are useful indicators of the financial position of the City's utility. Noteworthy findings and trends for the historical performance and condition of the City's Storm Drainage Utility are then discussed.

Table 9-1. Summary of Historical Fund Resources and Uses Arising from Cash Transactions

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| OPERATING REVENUES | | | | | | |
| Charges for Service | $ 9,778,102 | $ 9,809,840 | $ 10,110,490 | $ 10,301,049 | $ 10,591,890 | $ 10,985,794 |
| Other Operating Revenue | - | - | - | - | - | - |
| Total Operating Revenues | $ 9,778,102 | $ 9,809,840 | $ 10,110,490 | $ 10,301,049 | $ 10,591,890 | $ 10,985,794 |
| OPERATING EXPENSES | | | | | | |
| Operations and Maintenance | $ 3,379,046 | $ 3,568,600 | $ 3,509,728 | $ 3,360,404 | $ 4,150,264 | $ 4,135,306 |
| Administration | 3,372,935 | 3,326,599 | 3,230,505 | 3,144,182 | 3,109,673 | 3,835,875 |
| Depreciation and Amortization | 1,885,931 | 2,067,030 | 2,092,443 | 2,120,788 | 2,133,233 | 1,837,459 |
| Other Operating Expenses | 13,085 | - | - | - | - | - |
| Total Operating Expenses | $ 8,650,997 | $ 8,962,229 | $ 8,832,676 | $ 8,625,374 | $ 9,393,170 | $ 9,808,640 |
| Operating Income (Loss) | $ 1,127,105 | $ 847,611 | $ 1,277,814 | $ 1,675,675 | $ 1,198,720 | $ 1,177,154 |
| NONOPERATING REVENUES (EXPENSES) | | | | | | |
| Interest Revenue | $ 151,733 | $ 327,884 | $ 518,073 | $ 162,516 | $ (34,640) | $ 300,426 |
| Other Non-Operating Revenue | 78,397 | 165,136 | 81,307 | 125,963 | 102,214 | 132,440 |
| Gain (Loss) on Sale of Capital Assets | - | - | - | - | - | - |
| Interest Expense | (328,972) | (310,816) | (293,420) | (129,471) | (152,526) | (133,330) |
| Other Non-Operating Expense | - | (101,328) | - | (26,022) | - | (428,759) |
| Total Non-Operating Revenues (Expenses) | $ (98,842) | $ 80,876 | $ 305,960 | $ 132,986 | $ (84,952) | $ (129,223) |
| Income (Loss) before Contributions and Transfers | $ 1,028,263 | $ 928,487 | $ 1,583,774 | $ 1,808,661 | $ 1,113,768 | $ 1,047,931 |
| Capital Contributions | $ 2,313,033 | $ 995,853 | $ 1,021,824 | $ 1,546,772 | $ 5,364,962 | $ 1,408,167 |
| Transfers In | 300,000 | 125,000 | - | - | - | - |
| Transfers Out | (672,122) | (332,589) | (138,357) | (137,399) | (155,972) | (133,555) |
| Change in Net Position | $ 2,969,174 | $ 1,716,751 | $ 2,467,241 | $ 3,218,034 | $ 6,322,758 | $ 2,322,543 |
| Net Position, January 1 | $ 64,010,652 | $ 66,979,826 | $ 68,696,577 | $ 71,163,818 | $ 74,381,852 | $ 80,704,610 |
| Net Position, December 31 | $ 66,979,826 | $ 68,696,577 | $ 71,163,818 | $ 74,381,852 | $ 80,704,610 | $ 83,027,153 |
| O&M Coverage Ratio | 113.0% | 109.5% | 114.5% | 119.4% | 112.8% | 112.0% |
| Net Operating Income as a % of Operating Revenue | 11.5% | 8.6% | 12.6% | 16.3% | 11.3% | 10.7% |
| Debt Service Coverage Ratio | 3.75 | 3.63 | 4.21 | 5.59 | 4.92 | 4.46 |

### 9.2.1.1 Findings and Trends

- The City's storm drainage charges for services increased from $9.8 million in 2017 to $11.0 million in 2022. The average annual increase was approximately 2.4% per year, with a total increase of 12.4% from 2017 to 2022. Operating expenditures increased by $1.2million across the 6 years with an average annual increase of 2.5%. While operating expenditures increased across the 6 years, they fell in 2019 and 2020 before increasing by 8.9% in 2021. With growth in total operating revenues slightly below growth in operating expenses, operating income has remained positive in all years.
- The M&O coverage ratio (total operating revenues divided by total operating expenses) was 113% in 2017. With relatively balanced revenues and expenses, this metric has maintained its stability, ending 2022 at 112.0%. A ratio of 100% or greater shows that operating revenue will successfully cover operating expenses, and the utility has remained above this ratio for the past 6 years.
- Net operating income as a percentage of operating revenue was 11.5% in 2017, decreasing to 8.6% in 2018, before recovering back to 10.7% by 2022. Similar to the M&O coverage ratio, these trends show how successfully operating revenue actually covered operating expenses, with higher positive numbers being the best and negative numbers showing a need for improvement. In addition, these trends demonstrate the ability of the utility to invest in capital, whether through direct cash transfers or the issuance and servicing of debt.

- The debt service coverage ratio measures the amount of cash flow available to meet principal and interest payments. Typically, revenue bond debt service coverage requires a minimum factor of 1.25 during the life of the loans. This ratio is calculated by dividing cash or net operating income (operating revenues minus operating expenses) by annual revenue bond debt service. The debt service coverage ratio for all outstanding revenue bond debt ended 2017 at 3.8, decreasing to 3.6 in 2018, before increasing to 4.5 by 2022. The fact that this ratio has sustained levels higher than the minimum target of 1.25 indicates a stable capacity for new debt and will likely result in favorable terms when entering the bond market.

## Table 9-2. Summary of Historical Comparative Statements of Net Position

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| CURRENT ASSETS | | | | | | |
| Cash and Cash Equivalents | $ 14,545,114 | $ 10,644,121 | $ 12,738,639 | $ 17,124,762 | $ 16,904,318 | $ 16,689,485 |
| Investments | - | 4,781,224 | 4,389,043 | 2,729,581 | 4,951,200 | 4,566,850 |
| Restricted Cash: | | | | | | |
| Bond Payments | 804,480 | 803,251 | 800,093 | 679,184 | 657,541 | 658,088 |
| Customer Deposits | 3,422 | 3,422 | 3,422 | 3,422 | 3,422 | 3,422 |
| Other (Reserve for Bonds and Rate Stabilization) | 1,195,817 | 1,203,670 | 1,211,285 | 1,081,961 | 1,082,389 | 1,088,818 |
| Customer Accounts | 1,066,124 | 1,105,972 | 1,631,660 | 1,712,774 | 1,611,351 | 1,796,825 |
| Other Receivables | - | 14,757 | 14,757 | - | 7,104 | 7,104 |
| Due From Other Governmental Units | 70,124 | 103,343 | - | 72,123 | 109,161 | 122,276 |
| Inventories | 7,390 | 4,795 | 9,099 | 8,745 | 9,597 | 10,414 |
| Total Current Assets | $ 17,692,471 | $ 18,664,555 | $ 20,797,998 | $ 23,412,552 | $ 25,336,083 | $ 24,943,282 |
| NONCURRENT ASSETS | | | | | | |
| Long-Term Contracts, Leases and Notes | $ - | $ - | $ - | $ - | $ - | $ - |
| Net Pension Asset | - | - | - | - | 2,040,168 | 751,962 |
| Capital Assets Not Being Depreciated: | | | | | | |
| Land | 5,937,014 | 5,937,014 | 5,937,014 | 5,937,014 | 5,937,014 | 5,937,014 |
| Intangible - Water Rights | - | - | - | - | - | - |
| Construction In Progress | 459,310 | 153,082 | 648,531 | 342,126 | 980,569 | 1,135,843 |
| Capital Assets: | | | | | | |
| Buildings and Equipment | 290,575 | 290,575 | 290,575 | 282,111 | 282,111 | 282,111 |
| Improvements Other Than Buildings | 79,177,949 | 81,449,103 | 82,903,631 | 84,749,193 | 89,739,833 | 93,201,563 |
| Right of Use (Leases) | | - | - | - | - | - |
| Less Accumulated Depreciation | (26,325,396) | (28,392,426) | (30,484,869) | (32,587,697) | (34,720,930) | (36,558,389) |
| Total Noncurrent Assets Net of Accumulated Depreciation | $ 59,539,452 | $ 59,437,348 | $ 59,294,882 | $ 58,722,747 | $ 64,258,765 | $ 64,750,104 |
| TOTAL ASSETS | $ 77,231,923 | $ 78,101,903 | $ 80,092,880 | $ 82,135,299 | $ 89,594,848 | $ 89,693,386 |
| DEFFERED OUTFLOWS OF RESOURCES | | | | | | |
| Deferred Outflow from Bond Refunding | $ - | $ - | $ - | $ 29,232 | $ 29,232 | $ 29,232 |
| Deferred Outflow related to Pensions | 292,611 | 254,676 | 274,851 | 309,222 | 286,842 | 820,313 |
| Total Deferred Outflows of Resources | 292,611 | 254,676 | 274,851 | 338,454 | 316,074 | $ 849,545 |
| CURRENT LIABILITIES | | | | | | |
| Current Payables | $ 391,180 | $ 308,381 | $ 578,689 | $ 305,576 | $ 626,924 | $ 496,608 |
| Claims Payable | - | - | - | - | - | - |
| Loans Payable - Current | - | - | - | - | - | - |
| Employee Leave Benefits - Current | 173,857 | 156,429 | 154,609 | 156,429 | 199,603 | 246,831 |
| Leases Payable - Current | - | - | - | - | - | - |
| Revenue Bonds Payable - Current | 425,578 | 437,948 | 452,418 | 411,430 | 426,973 | 446,716 |
| Payable From Restricted Assets: | | | | | | |
| Accrued Interest | 377,766 | 365,303 | 347,675 | 267,753 | 249,914 | 229,124 |
| Deposits | 3,422 | 3,422 | 3,422 | 3,422 | 3,422 | 3,422 |
| Other Liabilities Payable | 469 | | | | | |
| Total Current Liabilities | $ 1,372,272 | $ 1,271,483 | $ 1,536,813 | $ 1,144,610 | $ 1,506,836 | $ 1,422,701 |
| NONCURRENT LIABILITIES | | | | | | |
| Employee Leave Benefits | $ 52,506 | $ 56,590 | $ 41,091 | $ 56,590 | $ 86,394 | $ 94,689 |
| Loans Payable | - | - | - | - | - | - |
| Leases Payable | - | - | - | - | - | - |
| Revenue Bonds Payable | 7,495,862 | 7,030,496 | 6,550,661 | 6,069,633 | 5,564,619 | 5,039,861 |
| Net Pension Liability | 1,339,843 | 805,573 | 527,198 | 509,014 | (122,090) | 128,697 |
| Total Non Current Liabilities | $ 8,888,211 | $ 7,892,659 | $ 7,118,950 | $ 6,635,237 | $ 5,528,923 | $ 5,263,247 |
| TOTAL LIABILITIES | $ 10,260,483 | $ 9,164,142 | $ 8,655,763 | $ 7,779,847 | $ 7,035,759 | $ 6,685,948 |
| DEFERRED INFLOWS OF RESOURCES | | | | | | |
| Deferred Inflow Related to Leases | $ - | $ - | $ - | $ - | $ - | $ - |
| Deferred Inflow Related to Pensions | 284,225 | 495,860 | 548,150 | 312,054 | 2,170,553 | 829,830 |
| Total Deferred Inflows of Resources | $ 284,225 | $ 495,860 | $ 548,150 | $ 312,054 | $ 2,170,553 | $ 829,830 |
| NET POSITION | | | | | | |
| Net Investment in Capital Assets | $ 52,422,492 | $ 52,772,155 | $ 53,091,896 | $ 52,920,868 | $ 56,884,546 | $ 58,512,575 |
| Restricted For: | | | | | | |
| Debt Service | 398,648 | 411,110 | 426,793 | 375,725 | 393,992 | 1,078,288 |
| Rate Stabilization | 419,403 | 427,257 | 436,817 | 438,483 | 438,483 | 438,483 |
| Pension Asset | | - | - | - | - | 751,962 |
| Unrestricted | 13,739,283 | 15,086,055 | 17,208,312 | 20,646,776 | 22,987,589 | 22,245,845 |
| TOTAL NET POSITION | $ 66,979,826 | $ 68,696,577 | $ 71,163,818 | $ 74,381,852 | $ 80,704,610 | $ 83,027,153 |
| Current Ratio | 12.9 | 14.7 | 13.5 | 20.5 | 16.8 | 17.5 |
| Debt to Net Position Ratio | 0.12 | 0.11 | 0.10 | 0.09 | 0.08 | 0.07 |
| Debt to Noncurrent Capital Assets Ratio | 0.14 | 0.13 | 0.12 | 0.11 | 0.10 | 0.09 |

#### 9.2.1.2 Findings and Trends

- The current ratio is calculated by dividing unrestricted current assets by current liabilities and measures an entity's ability to pay short-term obligations. This ratio ranges from a low of 12.9 in 2017, reaching a high of 20.5 in 2020, before ending at 17.5 in 2022. Anything above 2.0 for this liquidity ratio is good.
- The debt-to-net-position ratio compares total debt to total net position, which is the difference between current assets and liabilities. This ratio begins at 0.12 or 12% debt in 2017 and decreases to 0.07 or 7% by 2022. These results indicate the utility has ample borrowing capacity to address future capital improvement needs. For utilities, a ratio of 40% to 60% helps to moderate rate impacts by spreading costs over a longer period. Based on these results, the City may consider utilizing debt service for future capital investments, especially if it benefits system expansion.
- The debt-to-noncurrent-capital-asset ratio compares total debt to noncurrent capital assets, which are also known as property, plant, and equipment. This ratio begins at 0.14 or 14% debt to 86% noncurrent assets in 2017. Noncurrent capital assets increase by $5.2 million throughout the 6-year history, while debt decreases $2.5 million, and the ratio decreases to 0.09 or 9% by 2022. Similar to the debt-to-net position ratio, these results indicate the utility has ample borrowing capacity and may consider utilizing debt service for future capital investments, especially if it benefits system expansion. A ratio of 40% debt to 60% equity or below is a general industry target.

## 9.3 Financial Plan

The Storm Drainage Utility is responsible for generating sufficient revenue to meet all of its costs. The primary source of funding is derived from ongoing monthly service charges, with additional revenue coming from late fees, storm applications and investment interest. The City controls the level of user charges and, with City Council approval, can adjust user charges as needed to meet financial objectives.

The financial plan can only confirm financial feasibility if it considers the total system costs of providing storm drainage services, both operating and capital. To meet these objectives, the following elements have been completed.

1. **Capital Funding Plan.** Identifies the total capital improvement plan obligations of the planning period. The plan defines a strategy for funding the capital improvement plan, including an analysis of available resources from rate revenues, existing reserves, system development charges, debt financing, and any special resources that may be readily available (e.g., grants, developer contributions). The capital funding plan impacts the financial plan through the use of debt financing (resulting in annual debt service) and the assumed rate revenue made available for capital funding.
2. **Financial Forecast.** Identifies future annual non-capital costs associated with the operation, maintenance, and administration of the storm drainage system. Included in the financial plan is a reserve analysis that forecasts cash flow and fund balance activity, along with testing for satisfaction of actual or recommended minimum fund balance policies. The financial plan ultimately evaluates the sufficiency of utility revenues in meeting all obligations, including cash uses such as operating expenses, debt service, capital outlays, and reserve contributions, as well as any coverage requirements associated with long-term debt. The plan also identifies the future adjustments required to fully fund all utility obligations in the planning period.

#### 9.3.1.1 Capital Funding Plan

To properly evaluate future capital funding needs, capital costs were escalated by 3% annually to the year of planned spending. The capital improvement plan developed for this Plan identifies $26.5 million in escalated project costs over the 10-year planning horizon from 2024 to 2033. The 20-year period through 2043 includes $61.7 million in total escalated project costs.

A summary of the 10-year and 20-year capital improvement plans are shown in Table 9-3. As shown, each year has varied capital cost obligations depending on construction schedules and infrastructure planning needs.

Table 9-3. 10-Year and 20-Year Capital Improvement Plans

| Year | Unescalated $ | Escalated $ |
|---|---|---|
| 2024 | $ 2,531,000 | $ 2,531,000 |
| 2025 | 3,498,220 | 3,603,167 |
| 2026 | 6,257,780 | 6,638,879 |
| 2027 | 1,282,000 | 1,400,876 |
| 2028 | 1,659,000 | 1,867,219 |
| 2029 | 1,255,000 | 1,454,889 |
| 2030 | 1,620,000 | 1,934,365 |
| 2031 | 1,352,000 | 1,662,789 |
| 2032 | 2,065,000 | 2,615,880 |
| 2033 | 2,104,000 | 2,745,243 |
| 10-Year Total | $ 23,624,000 | $ 26,454,307 |
| 2034 - 2043 | 23,073,000 | 35,209,528 |
| 20-Year Total | $ 46,697,000 | $ 61,663,835 |

Table 9-4 provides more detail for the 10-year capital improvement plan.

Table 9-4. 10-Year Capital Improvement Plan (Escalated $)

| Project | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
|---|---|---|---|---|---|---|---|---|---|---|
| Vegetative Waste Sorting Facility | | $206,000 | | | | | | | | |
| SE 287th Street Stormwater Device | | 158,332 | 289,923 | | | | | | | |
| 2026 Local Street Preservation | | 157,075 | 485,362 | | | | | | | |
| R Street SE Widening - 22nd Street SE to 33rd Street SE | | 303,850 | 938,897 | | | | | | | |
| Storm Pipeline Extension Program | | 195,700 | 588,800 | 207,618 | 624,657 | 220,262 | 662,699 | 233,676 | 703,057 | 247,907 |
| Street Utility Improvements | 260,000 | 267,800 | 275,834 | 284,109 | 292,632 | 301,411 | 310,454 | 319,767 | 329,360 | 339,241 |
| Frame & Grate Replacement | 85,000 | 87,550 | 90,177 | 92,882 | 95,668 | 98,538 | 101,494 | 104,539 | 107,675 | 110,906 |
| Storm Drainage Infrastructure Repair & Replacement Program | 720,000 | 741,600 | 763,848 | 786,763 | 810,366 | 834,677 | 859,718 | 885,509 | 912,074 | 939,437 |
| SE 284th Street West Bioswale Additions | | | | 29,504 | 43,895 | | | | | |
| West Main Street Pump Station Upgrade | 265,000 | 661,260 | 3,206,040 | | | | | | | |
| Pump Station Level of Service Review | | | | | | | | | 253,354 | |
| Vintage Hills Swale Retrofit | | | | | | | | 119,298 | 215,351 | |
| Storm Comprehensive Plan Update | 400,000 | | | | | | | | | |
| Underground Injection Wells Retrofit Program | | | | | | | | | 95,008 | 97,858 |
| Christa Ministries Facility Retrofit | | | | | | | | | | 1,009,894 |
| Regional Growth Center Improvements | 100,000 | | | | | | | | | |
| R Street SE Preservation | 320,000 | | | | | | | | | |
| 12th Street SE Water Main Improvements | 16,000 | | | | | | | | | |
| Arterial Preservation | 215,000 | | | | | | | | | |
| Jornada Park Access Improvements | 100,000 | | | | | | | | | |
| C Street SW Preservation (W Main to GSA signal) | 50,000 | | | | | | | | | |
| M Street NE Widening | | 824,000 | | | | | | | | |
| Total | $2,531,000 | $3,603,167 | $6,638,879 | $1,400,876 | $1,867,219 | $1,454,889 | $1,934,365 | $1,662,789 | $2,615,880 | $2,745,243 |

## 9.4 Available Funding Assistance and Financing Resources

Feasible long-term capital funding strategies must be defined to ensure that adequate resources are available to fund the capital improvement plan identified in this Plan. In addition to the City's resources, such as accumulated cash reserves, capital revenues, and rate revenues designated for capital purposes, capital needs can be met from outside sources, such as grants, low-interest loans, and bond financing. The following is a summary of the City's internal and external resources.

### 9.4.1 City Resources

Resources appropriate for funding capital needs include accumulated cash in the capital fund, rate revenues designated for capital spending purposes, developer contributions, and capital-related charges such as system development charges. The first two resources will be discussed in the Fiscal Policies section of the Financial Forecast. Capital-related charges are discussed below.

#### 9.4.1.1 System Development Charges

A connection charge, such as the City's SDC, refers to a one-time charge imposed on new customers as a condition of connecting to the storm drainage system. The purpose of the SDC is two-fold: (1) to promote equity between new and existing customers and (2) to provide a source of revenue to fund capital projects necessary for meeting growth. This revenue can only be used to fund utility capital projects or to pay debt service incurred to finance those projects. In the absence of a connection charge, growth-related capital costs would be borne in large part by existing customers. In 2024, the City charged all new customers an SDC of $1,759 per ESU, which is defined as 2,600 square feet of impervious surface area.

#### 9.4.1.2 Local Facilities Charge

A utility local improvement district (ULID) is another mechanism for funding infrastructure that assesses benefited properties based on the special benefit received by the construction of specific facilities. Most often used for local facilities, some ULIDs also recover related general facilities costs. Substantial legal and procedural requirements can make this a relatively expensive process, and there are mechanisms by which a ULID can be rejected.

### 9.4.2 Outside Resources

This section outlines various grant, loan, and bond opportunities available to the City through federal and state agencies to fund the capital improvement plan identified in the Plan.

#### 9.4.2.1 Grants and Low-Cost Loans

Historically, federal and state grant programs were available to local utilities for capital funding assistance. However, these assistance programs have been mostly eliminated, substantially reduced in scope and amount, or replaced by loan programs. Remaining grant programs are generally lightly funded and heavily subscribed. Nonetheless, the benefit of low-interest loans makes the effort of applying worthwhile.

The State of Washington's Department of Commerce maintains a document currently entitled "Funding Programs for Drinking Water and Wastewater Projects; Updated 3-5-2024," which contains details on government programs, eligibility requirements, and contact information, should the City wish to inquire about program offerings and eligibility requirements.

#### 9.4.2.2 Bond Financing

**General Obligation Bonds** – General obligation (G.O.) bonds are bonds secured by the full faith and credit of the issuing agency, committing all available tax and revenue resources to debt repayment. With this high level of commitment, G.O. bonds have relatively low interest rates and few financial restrictions. However, the authority to issue G.O. bonds is restricted in terms of the amount and use of the funds, as defined by the Washington constitution and statute. Specifically, the amount of debt that can be issued is linked to assessed valuation.

RCW 39.36.020 states:

> *(2)(a)(ii) Counties, cities, and towns are limited to an indebtedness amount not exceeding one and one-half percent of the value of the taxable property in such counties, cities, or towns without the assent of three-fifths of the voters therein voting at an election held for that purpose.*
>
> *(b) In cases requiring such assent counties, cities, towns, and public hospital districts are limited to a total indebtedness of two and one-half percent of the value of the taxable property therein.*

While bonding capacity can limit the availability of G.O. bonds for utility purposes, these can sometimes play a valuable role in project financing. A utility rate savings may be realized through two avenues: the lower interest rate and related bond costs and the extension of repayment obligation to all tax-paying properties (not just developed properties) through the authorization of an ad valorem property tax levy.

**Revenue Bonds** – Revenue bonds are commonly used to fund utility capital improvements. The debt is secured by the revenues of the issuing utility. With this limited commitment, revenue bonds typically bear higher interest rates than G.O. bonds and require security conditions related to the maintenance of dedicated reserves (a bond reserve) and financial performance (added bond debt service coverage). The City agrees to satisfy these requirements by resolution as a condition of bond sale.

Revenue bonds can be issued in Washington without a public vote. There is no bonding limit, except perhaps the practical limit of the utility’s ability to generate sufficient revenue to repay the debt and provide coverage. In some cases, poor credit might make issuing revenue bonds problematic.

### 9.4.3 Capital Financing Strategy

An ideal capital financing strategy would include the use of grants and low-cost loans when debt issuance is required. However, these resources are very limited and competitive in nature and do not provide a reliable source of funding for planning purposes. It is recommended that the City pursue these funding avenues but assume revenue bond financing to meet the needs that can’t be met by available cash resources. The capital financing strategy developed to fund the capital improvement plan identified in this Plan assumes the following funding resources:

- Accumulated cash reserves.
- Transfers of excess cash (over minimum balance targets) from the operating fund.
- System development charge revenues.
- King County Opportunity Fund grant revenues.
- Interest earned on capital fund balances.

The majority, 83%, of projects are funded through cash resources. The remaining 17% are funded through a combination of system development charges and grants. No new debt is anticipated in the next 10-year or 20-year planning periods. Table 9-5 presents the 10-year and 20-year capital financing strategy.

Table 9-5. 10-Year and 20-Year Capital Financing Strategy

| Year | Capital Expenditures Escalated | System Development Charge Revenue | Grant Funding | Cash / Reserve Funding | Total Financial Resources |
|---|---|---|---|---|---|
| 2024 | $ 2,531,000 | $ 375,000 | $ - | $ 2,156,000 | $ 2,531,000 |
| 2025 | 3,603,167 | 362,335 | - | 3,240,832 | 3,603,167 |
| 2026 | 6,638,879 | 374,698 | 500,000 | 5,764,181 | 6,638,879 |
| 2027 | 1,400,876 | 387,482 | - | 1,013,394 | 1,400,876 |
| 2028 | 1,867,219 | 400,703 | - | 1,466,516 | 1,867,219 |
| 2029 | 1,454,889 | 414,375 | - | 1,040,514 | 1,454,889 |
| 2030 | 1,934,365 | 428,514 | - | 1,505,851 | 1,934,365 |
| 2031 | 1,662,789 | 443,135 | - | 1,219,655 | 1,662,789 |
| 2032 | 2,615,880 | 458,255 | - | 2,157,626 | 2,615,880 |
| 2033 | 2,745,243 | 473,890 | - | 2,271,353 | 2,745,243 |
| Subtotal | $ 26,454,307 | $ 4,118,387 | $ 500,000 | $ 21,835,920 | $ 26,454,307 |
| 2034 - 2043 | 35,209,528 | 5,725,752 | - | 29,483,776 | 35,209,528 |
| Total | $ 61,663,835 | $ 9,844,139 | $ 500,000 | $ 51,319,696 | $ 61,663,835 |

## 9.5 Financial Forecast

The financial forecast, or revenue requirement analysis, forecasts the amount of annual revenue that needs to be generated by storm drainage service rates. The analysis incorporates operating revenues, M&O expenses, debt service payments, rate-funded capital needs, and any other identified revenues or expenses related to operations. The objective of the financial forecast is to evaluate the sufficiency of the current level of rates. In addition to annual operating costs, the revenue needs also include debt covenant requirements and specific fiscal policies and financial goals of the City.

For this analysis, two revenue sufficiency tests have been developed to reflect the financial goals and constraints of the City—cash needs must be met, and debt coverage requirements must be realized. In order to operate successfully with respect to these goals, both tests of revenue sufficiency must be met.

**Cash Test** – The cash flow test identifies all known cash requirements for the City in each year of the planning period. Typically, these include M&O expenses, debt service payments, rate-funded system reinvestment funding or directly funded capital outlays, and any additions to specified reserve balances. The total annual cash needs of the City are then compared to projected cash revenues using the current rate structure. Any projected revenue shortfalls are identified, and the rate increases necessary to make up the shortfalls are established.

**Coverage Test** – The coverage test is based on a commitment made by the City when issuing revenue bonds and some other forms of long-term debt. For the purposes of this analysis, revenue bond debt is assumed for any needed debt issuance. As a security condition of issuance, the City would be required per covenant to agree that the revenue bond debt would have a higher priority for payment (a senior lien) compared to most other expenditures; the only outlays with a higher lien are M&O expenses. Debt service coverage is expressed as a multiplier of the annual revenue bond debt service payment. For example, a 1.00 coverage factor would imply that no additional cushion is required. A 1.25 coverage factor means revenue must be sufficient to pay M&O expenses, annual revenue bond debt service payments, and an additional 25% of annual revenue bond debt service payments. The excess cash flow derived from the added coverage, if any, can be used for any purpose, including funding capital projects. Targeting a higher coverage factor can help the City achieve a better credit rating and provide lower interest rates for future debt issues.

In determining the annual revenue requirement, both the cash and coverage sufficiency tests must be met, and the test with the greatest deficiency drives the level of needed rate increase in any given year.

## 9.5.1 Current Financial Structure

The City maintains a fund structure and implements financial policies that target management of a financially viable and fiscally responsible storm drainage system.

### 9.5.1.1 Fiscal Policies

A summary of the key financial policies employed by the City, as well as those recommended and incorporated in the financial program, are discussed below.

**Operating Fund** – Operating reserves are designed to provide a liquidity cushion to ensure that adequate cash working capital will be maintained to deal with significant cash balance fluctuations, such as seasonal fluctuations in billings and receipts, unanticipated cash expenses, or lower than expected revenue collections. Like other types of reserves, operating reserves also serve another purpose: they help smooth rate increases over time. Target funding levels for an operating reserve are generally expressed as a certain number of days of M&O expenses, with the minimum requirement varying with the expected revenue volatility. Industry practice for utility operating reserves ranges from 30 days (8%) to 120 days (33%) of M&O expenses, with the lower end more appropriate for utilities with stable revenue streams and the higher end more appropriate for utilities with significant seasonal or consumption-based fluctuations.

This financial plan targets a minimum balance in the Storm Drainage Utility operating fund equal to 60 days of M&O expenses.

**Capital Fund** – A utility capital contingency reserve is an amount of cash set aside in case of an emergency should a piece of equipment or a portion of the utility's infrastructure fail unexpectedly. The reserve could also be used for other unanticipated capital needs, including capital project cost overruns. Industry practices range from maintaining a balance equal to 1% to 2% of fixed assets, an amount equal to a 5-year rolling average of capital improvement plan costs, or an amount determined sufficient to fund equipment failure (other than catastrophic failure). The final target level should balance industry standards with the risk level of the City.

This financial plan targets a minimum balance in the Storm Drainage Utility capital fund equal to 1% of fixed assets.

**Rate Stabilization Fund** - A rate stabilization reserve is a restricted fund balance intended to be available to offset specific variations in revenues or expenses. For rate modeling, planned deposits into the fund would appear as an expense, and use of the reserve would rarely appear in rate planning (only when analyzing adverse conditions). The reserve is established with specific rules and restrictions regarding contributions, withdrawals, and replenishment. These rules are generally constructed to minimize or mitigate rate impacts.

The City currently maintains a rate stabilization reserve for the Storm Drainage Utility but does not have a formal rate stabilization reserve policy. For modeling purposes, the study does not assume additional reserves are funded. Rather, the City will maintain the reserve at its current level.

**System Reinvestment** – System reinvestment funding promotes system integrity through ongoing repair and replacement of system infrastructure. Ideally, a detailed asset management plan would guide the level of rate funded system reinvestment. However, in absence of this level of effort, annual depreciation expense is commonly used as a measure of the decline in asset value associated with routine use of the system. Particularly for utilities that do not already have an explicit system reinvestment policy in place, implementing a funding level based on full depreciation expense could significantly impact rates. An alternative benchmark is annual depreciation expense net of debt principal payments on outstanding debt. This approach recognizes that customers are still paying for certain assets through the debt component of their rate and intends to avoid simultaneously charging customers for an asset and its future replacement. The specific benchmark used to set system reinvestment funding targets is a matter of policy that must balance various objectives, including managing rate impacts, keeping long-term costs down, and promoting “generational equity” (i.e., not excessively burdening current customers with paying for facilities that will serve a larger group of customers in the future).

The City is currently phasing in system reinvestment funding and is forecast to reach 67% of annual depreciation levels by 2033. With this phase-in strategy in place, the City is forecast to fund an average of $1.1 million in capital costs annually through rate revenues within the 10-year forecast period.

**Debt Management** – It is prudent to consider policies related to debt management as part of a broader utility financial policy structure. Debt management policies should be evaluated and formalized, including the level of acceptable outstanding debt, debt repayment, bond coverage, and total debt coverage targets. The City has two outstanding storm drainage revenue bonds, one of which will be fully repaid in 2030, with the second fully repaid by 2032. This forecast meets or exceeds the required revenue bond debt service coverage of 1.25.

### 9.5.2 Financial Forecast

The financial forecast is primarily based upon the City’s budget through 2024 and takes into consideration other key factors and assumptions needed to develop a complete portrait of the City’s annual Storm Drainage Utility financial obligations. The following is a list of the key revenue and expense factors and assumptions used to develop the financial forecast.

- **Growth** – Rate revenue is escalated utilizing a 0.4% growth rate developed based on actual historical trends within the City.
- **Revenue** – The City has two general revenue sources: (1) storm drainage service charges (rate revenue) and (2) miscellaneous (non-rate) revenue. In the event of a forecasted annual shortfall, rate revenue can be increased to meet the annual revenue requirement. For the purpose of this financial forecast, rate revenues are forecasted to increase with customer growth. Non-rate revenues are held constant throughout the forecast period, with the exception of interest earnings, which are calculated based on projected balances, assumed investment rates, and senior rebates, which increase with customer growth assumptions.

- **System Development Charge Revenue** – The existing system development charges are applied to the projected new connections to forecast revenue. Connection charges are forecasted to generate an average of $412,000 annually from 2024 through 2033. This equates to an average of 204 new ESUs per year. Connection charge revenue is directed towards annual capital needs.
- **Expenses** – M&O expense projections are based on the City's budget through 2024 with general cost inflation increases of 3%, labor cost inflation of 5% for 2025 and 2026, decreasing to 3% thereafter and benefit cost inflation increases of 12.5% for 2025 and 2026, decreasing to 5.5% per year thereafter. Budget figures were used for taxes through 2024. Future taxes are calculated based on forecasted revenues and prevailing tax rates.
- **Facilities GO Bond** - In order to construct a new facility for M&O for the City, the Storm Drainage Utility will fund part of a G.O. bond totaling approximately $38 million. Beginning in 2025, the Storm Drainage Utility's proportionate share of the bond is forecasted at $333,000 annually for the remainder of the 20-year forecast.
- **Existing Debt** – The Storm Drainage Utility has two outstanding revenue bond debt issues. The 2020 refunding bond has annual payments of $314,000 that end after 2030, with the 2013 revenue bond carrying payments of $343,000 annually, ending after 2032. The total annual existing debt service obligations begin 2024 at $659,000 and are completely repaid by 2033.
- **Future Debt** – No new debt is anticipated in the 10-year and 20-year forecast periods.
- **Transfers to Capital** – Operating fund balance above the minimum requirement is assumed to be available to fund capital projects and projected to be transferred to the capital fund each year, if needed. In total, the utility is forecast to fund $13 million in capital projects from excess operating fund cash within the 10-year forecast period.

Although the financial plan is completed through 2043, the rate strategy focuses on the shorter-term planning period of 2024 through 2033. It is recommended that the City revisit the proposed rates every 2 to 3 years to ensure that the rate projections developed remain adequate. Any significant changes should be incorporated into the financial plan and future rates should be adjusted as needed.

Table 9-6 summarizes the annual revenue requirements based on the forecast of revenues, expenditures, fund balances, and fiscal policies.

## Table 9-6. 10-Year Financial Forecast

| Revenue Requirement | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
|---|---|---|---|---|---|---|---|---|---|---|
| Revenues | | | | | | | | | | |
| Rate Revenues Under Existing Rates | $ 12,458,782 | $ 12,508,618 | $ 12,558,652 | $ 12,608,887 | $ 12,659,322 | $ 12,709,959 | $ 12,760,799 | $ 12,811,843 | $ 12,863,090 | $ 12,914,542 |
| Non-Rate Revenues | 262,900 | 291,876 | 206,130 | 181,367 | 181,869 | 182,399 | 182,953 | 183,531 | 184,135 | 184,766 |
| Total Revenues | $ 12,721,682 | $ 12,800,494 | $ 12,764,782 | $ 12,790,254 | $ 12,841,191 | $ 12,892,359 | $ 12,943,752 | $ 12,995,373 | $ 13,047,225 | $ 13,099,308 |
| Expenses | | | | | | | | | | |
| Cash Operating Expenses | $ 10,828,608 | $ 11,812,282 | $ 12,353,297 | $ 12,714,570 | $ 13,093,018 | $ 13,485,879 | $ 13,893,762 | $ 14,317,305 | $ 14,757,174 | $ 15,214,068 |
| Existing Debt Service | 659,447 | 659,311 | 657,169 | 657,253 | 658,401 | 656,328 | 655,274 | 342,972 | 342,888 | - |
| New Debt Service | - | - | - | - | - | - | - | - | - | - |
| Rate Funded System Reinvestment | 1,000,000 | 903,142 | 717,190 | 782,323 | 838,652 | 899,000 | 958,051 | 1,330,768 | 1,388,178 | 1,790,229 |
| Total Expenses | $ 12,488,055 | $ 13,374,736 | $ 13,727,656 | $ 14,154,146 | $ 14,590,070 | $ 15,041,207 | $ 15,507,087 | $ 15,991,045 | $ 16,488,240 | $ 17,004,297 |
| Total Surplus (Deficiency) | $ 233,628 | $ (574,242) | $ (962,874) | $ (1,363,891) | $ (1,748,878) | $ (2,148,849) | $ (2,563,335) | $ (2,995,672) | $ (3,441,016) | $ (3,904,990) |
| Annual Rate Adjustment | | 6.75% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% |
| Cumulative Annual Rate Adjustment | | 6.75% | 9.95% | 13.25% | 16.65% | 20.15% | 23.75% | 27.47% | 31.29% | 35.23% |
| Rate Revenues After Rate Increase | $ 12,458,782 | $ 13,352,949 | $ 13,808,552 | $ 14,279,700 | $ 14,766,923 | $ 15,270,770 | $ 15,791,809 | $ 16,330,626 | $ 16,887,827 | $ 17,464,039 |
| Additional Taxes from Rate Increase | - | 97,098 | 143,738 | 192,143 | 242,374 | 294,493 | 348,566 | 404,660 | 462,845 | 523,192 |
| Net Cash Flow After Rate Increase | $ 233,628 | $ 172,992 | $ 143,288 | $ 114,778 | $ 116,348 | $ 117,469 | $ 119,109 | $ 118,451 | $ 120,876 | $ 121,315 |
| Coverage After Rate Increases | 4.84 | 5.87 | 5.21 | 4.90 | 4.99 | 5.11 | 5.22 | 10.15 | 10.36 | n/a |

The financial forecast indicates that at existing rate levels the utility will become deficient in 2025 as growth in expenses outpaces growth in revenues and the utility phases in rate funded system reinvestment levels, reaching 67% of annual depreciation by 2033. The City has adopted a 6.75% increase for 2025, in order to resolve the remaining projected deficiency, rates will need to increase by 3% annually from 2026 through 2033.

### 9.5.2.1 City Funds and Reserves

Table 9-7 shows a summary of the projected operating fund and capital fund ending balances through 2033 based on the rate forecasts presented above. The operating fund is maintained at a minimum of 60 days of M&O expenses, and the capital fund balance continues to meet or exceed the minimum target of 1% of fixed assets in every year of the forecast.

Table 9-7. Ending Cash Balance Summary

| Ending Fund Balances | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
|---|---|---|---|---|---|---|---|---|---|---|
| Operating Fund | $ 1,804,768 | $ 1,968,714 | $ 2,058,883 | $ 2,119,095 | $ 2,182,170 | $ 2,247,646 | $ 2,315,627 | $ 2,386,218 | $ 2,459,529 | $ 2,535,678 |
| Capital Fund | 20,694,062 | 18,986,240 | 14,372,092 | 14,339,309 | 13,908,111 | 13,957,671 | 13,600,577 | 13,895,557 | 13,312,629 | 13,009,799 |
| Total | $ 22,498,830 | $ 20,954,954 | $ 16,430,975 | $ 16,458,404 | $ 16,090,281 | $ 16,205,318 | $ 15,916,204 | $ 16,281,774 | $ 15,772,158 | $ 15,545,477 |

## 9.6 Current and Projected Rates

### 9.6.1 Current Rates

The existing storm drainage rate is a monthly flat rate that is charged to each customer per ESU. Each single-family customer is considered one ESU. All non-single-family customers are charged based on the total amount of impervious surface area on-site. The average single family residential lot has 2,600 square feet of impervious surface area, so the total impervious surface area for a non-residential lot is divided by 2,600 to calculate the number of ESUs for that site. Table 9-8 shows the existing City of Auburn storm drainage rate schedule.

Table 9-8. Existing Schedule of Rates

| Description | 2024 Existing |
|---|---|
| Per ESU Rate | |
| Single Family | $ 18.09 |
| Non-Single Family (NSF) | 18.09 |
| NSF w/Detention | 15.57 |
| NSF w/Retention | 13.04 |
| NSF w/Water Quality | 16.64 |
| NSF w/Detention & Water Quality | 14.12 |
| NSF w/Retention & Water Quality | 11.59 |

### 9.6.2 Projected Rates

The financial forecast discussed above indicates the need for annual rate adjustments in order to satisfy all forecasted financial obligations. The City has adopted a 6.75% rate increase for 2025, with annual 3% increases forecasted from 2026 through 2033. Table 9-9 shows the projected rates with increases applied uniformly to all storm drainage classes.

Table 9-9. Proposed Storm Drainage Rates

| Description | Existing | Proposed | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
| Per ESU Rate | | | | | | | | | | |
| Single Family | $ 18.09 | $ 19.31 | $ 19.89 | $ 20.49 | $ 21.10 | $ 21.73 | $ 22.38 | $ 23.05 | $ 23.74 | $ 24.45 |
| Non-Single Family (NSF) | 18.09 | 19.31 | 19.89 | 20.49 | 21.10 | 21.73 | 22.38 | 23.05 | 23.74 | 24.45 |
| NSF w/Detention | 15.57 | 16.62 | 17.12 | 17.63 | 18.16 | 18.70 | 19.26 | 19.84 | 20.44 | 21.05 |
| NSF w/Retention | 13.04 | 13.92 | 14.34 | 14.77 | 15.21 | 15.67 | 16.14 | 16.62 | 17.12 | 17.63 |
| NSF w/Water Quality | 16.64 | 17.76 | 18.29 | 18.84 | 19.41 | 19.99 | 20.59 | 21.21 | 21.85 | 22.51 |
| NSF w/Detention & Water Quality | 14.12 | 15.07 | 15.52 | 15.99 | 16.47 | 16.96 | 17.47 | 17.99 | 18.53 | 19.09 |
| NSF w/Retention & Water Quality | 11.59 | 12.37 | 12.74 | 13.12 | 13.51 | 13.92 | 14.34 | 14.77 | 15.21 | 15.67 |

### 9.6.3 Affordability

A common affordability metric used by the EPA to measure the relative financial impact storm drainage rates have on a community as a whole considers whether rates exceed 2.5% of a community's median household income. The average median household income for the City was $87,406 between 2018 and 2022 according to the U.S. Census Bureau. The 2022 value is escalated based on the actual rate of inflation in 2023 of 4.31% and the 3% inflation rate used in the financial forecast to project the median household income in future years. Table 9-10 presents the City's monthly storm drainage bill, projected to 2033 and tested against the 2.5% monthly affordability threshold.

Table 9-10. Community Affordability Test

| Year | Inflation | Median HH Income | 2.5% Monthly Threshold | Projected Monthly Bill | % of Median HH Income |
|---|---|---|---|---|---|
| 2022 | | $ 87,406 | | | |
| 2023 | 4.31% | 91,173 | | | |
| 2024 | 3.00% | 93,908 | $ 195.64 | $ 18.09 | 0.23% |
| 2025 | 3.00% | 96,726 | 201.51 | 19.31 | 0.24% |
| 2026 | 3.00% | 99,627 | 207.56 | 19.89 | 0.24% |
| 2027 | 3.00% | 102,616 | 213.78 | 20.49 | 0.24% |
| 2028 | 3.00% | 105,695 | 220.20 | 21.10 | 0.24% |
| 2029 | 3.00% | 108,866 | 226.80 | 21.73 | 0.24% |
| 2030 | 3.00% | 112,132 | 233.61 | 22.38 | 0.24% |
| 2031 | 3.00% | 115,495 | 240.62 | 23.05 | 0.24% |
| 2032 | 3.00% | 118,960 | 247.83 | 23.74 | 0.24% |
| 2033 | 3.00% | 122,529 | 255.27 | 24.45 | 0.24% |

Applying the 2.50% test, the City's rates are forecasted to remain within the indicated affordability range through 2033.

## 9.7 Conclusion

The results of this analysis indicate that at existing rate levels the utility will be deficient beginning in 2025. To keep pace with expenses and continue to phase in rate-funded system reinvestment towards depreciation levels, the City has adopted a 6.75% rate increase in 2025. Forecasting into the future, a 3% annual rate increase will be required from 2026 through 2033. It is recommended that the City regularly review and update the key underlying assumptions that compose the multiyear financial plan to ensure that adequate revenues are collected to meet the City's total financial obligations.

# 10. Limitations

This document was prepared solely for the City of Auburn in accordance with professional standards at the time the services were performed and in accordance with the contract between City of Auburn and Parametrix dated March 16, 2022. This document is governed by the specific scope of work authorized by the City of Auburn; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by the City of Auburn and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

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# Appendix A

## DRAFT Western Washington Phase II NPDES MS4 Permit

Issuance Date: July 1, 2024
Effective Date: August 1, 2024
Expiration Date: July 31, 2029

# DRAFT WESTERN WASHINGTON PHASE II MUNICIPAL STORMWATER PERMIT

National Pollutant Discharge Elimination System and
State Waste Discharge General Permit for discharges from
Small Municipal Separate Storm Sewer Systems
In Western Washington

**State of Washington**
**Department of Ecology**
Olympia, WA 98504-7600

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1251 *et seq*.

Until this Permit expires, is modified, or revoked, Permittees that have properly obtained coverage under this Permit are authorized to discharge to waters of the State in accordance with the special and general conditions which follow.

____________________________________
Vincent McGowan, PE
Water Quality Program Manager
Department of Ecology

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# TABLE OF CONTENTS

## LIST OF APPENDICES

# ADA Accessibility

The Department of Ecology is committed to providing people with disabilities access to information and services by meeting or exceeding the requirements of the Americans with Disabilities Act (ADA), Section 504 and 508 of the Rehabilitation Act, and Washington State Policy #188.

To request ADA Accommodation, contact Water Quality Reception at 360-407-6600. For Washington Relay Service or TTY call 711 or 877-833-6341. Visit Ecology's accessibility webpage[1] for more information.

For document translation services, call Water Quality Reception at 360-407-6600.

Por publicaciones en espanol, por favor llame Water Quality Reception al 360-407-6600.

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[1] https://ecology.wa.gov/About-us/Accessibility-equity/Accessibility/

# SPECIAL CONDITIONS

## S1. PERMIT COVERAGE AREA AND PERMITTEES

### A. Geographic Area of Permit Coverage

This Permit is applicable to owners or operators of regulated small Municipal Separate Storm Sewer Systems (MS4s) located west of the eastern boundaries of the following counties: Whatcom, Skagit, Snohomish, King, Pierce, Lewis, and Skamania.

1. For all cities required to obtain coverage under this Permit, the geographic area of coverage is the entire incorporated area of the city.
2. For all counties required to have coverage under this Permit, the geographic area of coverage is the urban areas and urban growth areas associated with permitted cities under the jurisdictional control of the county. The geographic area of coverage also includes any urban growth area contiguous to permitted urban areas under the jurisdictional control of the county.
3. For Whatcom County, the geographic area of coverage also includes the unincorporated Birch Bay urban growth area.

   For Thurston County, the geographic area of coverage also includes the unincorporated Yelm urban growth area.
4. For Secondary Permittees required to obtain coverage under this Permit, the minimum geographic area of coverage is all areas identified under S1.A.1 and S1.A.2. At the time of permit coverage, the Washington State Department of Ecology (Ecology) may establish a geographic area of coverage specific to an individual Secondary Permittee.
5. All regulated small MS4s owned or operated by the Permittees named in S1.D.2.a(i), and (ii), and S1.D.2.b and located in another city or county area requiring coverage under this Permit, or the *Phase I Municipal Stormwater Permit* or the *Eastern Washington Phase II Municipal Stormwater Permit*, are also covered under this Permit.

### B. Regulated Small Municipal Separate Storm Sewer Systems (MS4s)

All operators of regulated small MS4s are required to apply for and obtain coverage under this Permit or be permitted under a separate individual permit, unless waived or exempted in accordance with condition S1.C.

**1.** A regulated small MS4:

   a. Is a "Small MS4" as defined in the *Definitions and Acronyms* section at the end of this Permit; and

   b. Is located within, or partially located within, an urban area as defined by the latest decennial census conducted by the U.S. Census Bureau, or designated by Ecology pursuant to 40 CFR 123.35(b) or 40 CFR 122.26(f); and

   c. Discharges stormwater from the MS4 to a surface water of Washington State; and

   d. Is not eligible for a waiver or exemption under S1.C, below.

**2.** All other operators of MS4s, including special purpose districts, which meet the criteria for a regulated small MS4 shall obtain coverage under this Permit. Other operators of small MS4s may include, but are not limited to: flood control, or diking and drainage districts; schools, including universities; and correctional facilities that own or operate a small MS4 serving non-agricultural land uses.

**3.** Any other operators of small MS4s may be required by Ecology to obtain coverage under this Permit or an alternative NPDES permit if Ecology determines the small MS4 is a significant source of pollution to surface waters of the State. Notification of Ecology's determination that permit coverage is required will be through the issuance of an Administrative Order issued in accordance with Chapter 90.48 RCW.

**4.** The owner or operator of a regulated small MS4 may obtain coverage under this Permit as a Permittee, Co-Permittee, or Secondary Permittee as defined in S1.D.1, below.

**5.** Pursuant to 40 CFR 122.26(f), any person or organization may petition Ecology to require that additional small MS4s obtain coverage under this Permit. The process for petitioning Ecology is:

   a. The person or organization shall submit a complete petition in writing to Ecology. A complete petition shall address each of the relevant factors for petitions outlined on Ecology's website.

   b. In making its determination on the petition, Ecology may request additional information from either the petitioner or the entity that is the subject of the petition.

   c. Ecology will make a final determination on a complete petition within 180 days of receipt of the petition and inform both the petitioner and the MS4 of the decision, in writing.

d. If Ecology's final determination is that the candidate MS4 will be regulated, Ecology will issue an order to the operator of the MS4 requiring them to obtain coverage under this Permit. The order will specify:

   i. The geographic area of permit coverage for the MS4;

   ii. Any modified dates or deadlines for developing and implementing this Permit, as appropriate to the MS4, and for submitting their first annual report; and

   iii. A deadline for the operator of the MS4 to submit a complete Notice of Intent (NOI, provided on Ecology's website) to Ecology.

## C. Permit Waivers

Owners and operators of an otherwise regulated small MS4 are not required to obtain coverage under this Permit if:

**1.** The small MS4 is operated by:

   a. A federal entity, including any department, agency, or instrumentality of the executive, legislative, and judicial branches of the Federal government of the United States.

   b. Federally recognized Indian Tribes located within Indian Country, including all trust or restricted lands within the 1873 Survey Area of the Puyallup Tribe of Indians.

   c. The Washington State Department of Transportation.

***Or***

**2.** The portions of the small MS4 located within the census defined urban area(s) serve a total population of less than 1000 people and a, b, and c, below ***all*** apply:

   a. The small MS4 is not contributing substantially to the pollutant loadings of a physically interconnected MS4 that is regulated by the NPDES stormwater program.

   b. The discharge of pollutants from the small MS4 has not been identified as a cause of impairment of any water body to which the MS4 discharges.

   c. In areas where an EPA approved TMDL has been completed, stormwater controls on the MS4 have not been identified as necessary to meet wasteload allocations established in the TMDL that address the pollutant(s) of concern.

In determining the total population served, both resident and commuter populations shall be included. For example:

- For publicly operated school complexes including universities and colleges, the total population served would include the sum of the average annual student enrollment plus staff.
- For flood control, diking, and drainage districts, the total population served would include residential population and any non-residents regularly employed in the areas served by the small MS4.

## D. Obtaining Coverage Under this Permit

All operators of regulated small MS4s are required to apply for and obtain coverage in accordance with this Section, unless waived or exempted, in accordance with S1.C.

**1.** Unless otherwise noted, the term "Permittee" shall include a city, town, or county Permittee, New Permittee, Co-Permittee, Secondary Permittee, and New Secondary Permittee as defined below:

   a. "Permittee" is a city, town, or county owning or operating a regulated small MS4 applying and receiving a permit as a single entity.

   b. "New Permittee" is a city, town, or county that is subject to *the Western Washington Phase II Municipal Stormwater General Permit* and was not subject to the Permit prior to August 1, 2024.

   c. "Co-Permittee" is any owner or operator of a regulated small MS4 that is applying in a cooperative agreement with at least one other applicant for coverage under this Permit. Co-Permittees own or operate a regulated small MS4 located within or in proximity to another regulated small MS4.

   d. A "Secondary Permittee" is an operator of a regulated small MS4 that is not a city, town, or county. Secondary Permittees include special purpose districts and other MS4s that meet the criteria for a regulated small MS4 in S1.B, above.

   e. "New Secondary Permittee" is a Secondary Permittee that is covered under a Municipal Stormwater General Permit and was not covered by the Permit prior to August 1, 2024.

**2.** Operators of regulated small MS4s have submitted, or shall submit, to Ecology either a Notice of Intent (NOI) for Coverage under National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater General Permit or a Duty to Reapply - NOI provided on Ecology's website.

a. The following Permittees and Secondary Permittees submitted a Duty to Reapply - NOI to Ecology prior to February 1, 2024:

   i. **Cities and towns:** Aberdeen, Algona, Anacortes, Arlington, Auburn, Bainbridge Island, Battle Ground, Bellevue, Bellingham, Black Diamond, Bonney Lake, Bothell, Bremerton, Brier, Buckley, Burien, Burlington, Camas, Centralia, Clyde Hill, Covington, Des Moines, DuPont, Duvall, Edgewood, Edmonds, Enumclaw, Everett, Federal Way, Ferndale, Fife, Fircrest, Gig Harbor, Granite Falls, Issaquah, Kelso, Kenmore, Kent, Kirkland, Lacey, Lake Forest Park, Lake Stevens, Lakewood, Longview, Lynden, Lynnwood, Maple Valley, Marysville, Medina, Mercer Island, Mill Creek, Milton, Monroe, Mountlake Terrace, Mount Vernon, Mukilteo, Newcastle, Normandy Park, Oak Harbor, Olympia, Orting, Pacific, Port Orchard, Port Angeles, Poulsbo, Puyallup, Redmond, Renton, Sammamish, SeaTac, Sedro-Woolley, Shelton, Shoreline, Snohomish, Snoqualmie, Steilacoom, Sumner, Tukwila, Tumwater, University Place, Vancouver, Washougal, and Woodinville.

   ii. **Counties:** Cowlitz, Kitsap, Thurston, Skagit, and Whatcom.

   iii. **Secondary Permittees:** Bainbridge Island School District #303, Bellingham School District, Bellingham Technical College, Cascadia College, Central Kitsap School District, Centralia College, Clark College, Consolidated Diking Improvement District #1 of Cowlitz County, Edmonds Community College, Evergreen College, Highline Community College, Kelso School District, Kent School District, Longview School District, Lower Columbia College, Port of Anacortes, Port of Bellingham, Port of Everett, Port of Olympia, Port of Skagit County, Port of Vancouver, Skagit County Drainage District #19, Skagit Valley College, University of Washington Bothell, Washington State University Vancouver, Washington State Department of Enterprise Services (Capitol Campus), Washington Department of Corrections (Larch Corrections Center, Monroe Correctional Complex, Washington Corrections Center for Women, and Washington State Penitentiary), Western Washington University, and Whatcom Community College.

b. Operators of regulated small MS4s have submitted or shall submit to Ecology a “Notice of Intent (NOI) for Coverage under National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater General Permit” provided on Ecology’s website before the effective date of this Permit, with the following exceptions:

   i. Operators of regulated small MS4s located in the Cities of Ridgefield and Yelm, and Sound Transit a shall submit a NOI or application to Ecology no later than 30 days after the effective date of this Permit.

   ii. Operators of regulated small MS4s listed in S1.D.2.a do not need to submit a new application to be covered under this Permit.

c. For operators of regulated small MS4s listed in S1.D.2.a, coverage under this Permit is automatic and begins on the effective date of this Permit, unless the operator chooses to opt out of this General Permit. Any operator of a regulated small MS4 that is opting out of this Permit shall submit an application for an individual MS4 permit in accordance with 40 CFR 122.33(b)(2)(ii) no later than the effective date of this Permit.

d. Operators of regulated small MS4s which want to be covered under this Permit as Co-Permittees shall each submit a NOI to Ecology.

e. Operators of regulated small MS4s which are relying on another entity to satisfy all of their permit obligations shall submit a NOI to Ecology.

f. Operators of small MS4s designated by Ecology pursuant to S1.B.3 of this Permit shall submit a NOI to Ecology within 120 days of receiving notification from Ecology that permit coverage is required.

**3.** Application Requirements

a. For NOIs submitted after the issuance date of this Permit, the applicant shall include a certification that the public notification requirements of Chapter 173-226-130(5) WAC have been satisfied. Ecology will notify applicants in writing of their status concerning coverage under this Permit within 90 days of Ecology's receipt of a complete NOI.

b. Each Permittee applying as a Co-Permittee shall submit a NOI provided on Ecology's website. The NOI shall clearly identify the areas of the MS4 for which the Co-Permittee is responsible.

c. Permittees relying on another entity or entities to satisfy one or more of their permit obligations shall notify Ecology in writing. The notification shall include a summary of the permit obligations that will be carried out by another entity. The summary shall identify the other entity or entities and shall be signed by the other entity or entities. During the term of the Permit, Permittees may terminate or amend shared responsibility arrangements by notifying Ecology, provided this does not alter implementation deadlines.

d. Secondary Permittees required to obtain coverage under this Permit, and the *Phase I Municipal Stormwater Permit* or the *Eastern Washington Phase II Municipal Stormwater Permit*, may obtain coverage by submitting a single NOI.

## S2. AUTHORIZED DISCHARGES

### A. Stormwater Discharges

This Permit authorizes the discharge of stormwater to surface waters and to groundwaters of the State from MS4s owned or operated by each Permittee covered under this Permit, in the geographic area covered pursuant to S1.A. These discharges are subject to the following limitations:

1. Discharges to groundwaters of the State through facilities regulated under the Underground Injection Control (UIC) program, Chapter 173-218 WAC, are not authorized under this Permit.
2. Discharges to groundwaters not subject to regulation under the federal *Clean Water Act* are authorized in this Permit only under state authorities, Chapter 90.48 RCW, the *Water Pollution Control Act*.

### B. Non-Stormwater Discharges

This Permit authorizes discharges of non-stormwater flows to surface waters and to groundwaters of the State from MS4s owned or operated by each Permittee covered under this Permit, in the geographic area covered pursuant to S1.A, only under one or more of the following conditions:

1. The discharge is authorized by a separate NPDES or State Waste Discharge permit.
2. The discharge is from emergency firefighting activities and does not involve PFAS-containing aqueous film-forming foams (AFFFs). After the emergency has ceased, non-stormwater discharges (e.g., discharges associated with cleanup) to the MS4 are prohibited. Determination of cessation of the emergency is at the discretion of the emergency on-scene coordinator.
3. The discharge is from emergency firefighting activities and involves PFAS-containing AFFFs, the following conditions apply:
    a. No later than December 31, 2026, the Permittee shall coordinate with firefighting agencies/departments that serve the areas that drain to the MS4 to develop a PFAS management plan which will implement measures to minimize discharges of PFAS via the MS4 during emergency firefighting activities. The Permittee is not expected to deploy control measures during an emergency. The Permittee shall implement the PFAS management plan to minimize discharges of PFAS via the MS4 during post-emergency activities, including immediate clean-up in all situations where AFFFs have been used, diversions, and other measures that prevent discharges via the MS4.

   b. No later than December 31, 2027, the Permittee shall implement specific protocols for minimizing the resuspension, conveyance, and discharge of PFAS already in the MS4, both during normal operations and during all maintenance.

4. The discharge is from another illicit or non-stormwater discharge that is managed by the Permittee as provided in S5.C.5 or S6.D.3.

These discharges are also subject to the limitations in S2.A.1 and S2.A.2, above.

### C. Responsibilities and Liabilities

This Permit does not relieve entities that cause illicit discharges, including spills of oil or hazardous substances, from responsibilities and liabilities under state and federal laws and regulations pertaining to those discharges.

### D. Compliance with State and Local Authorizations

Discharges from MS4s constructed after the effective date of this Permit shall receive all applicable state and local permits and use authorizations, including compliance with Chapter 43.21C RCW (the *State Environmental Policy Act*).

### E. Indian Country

This Permit does not authorize discharges of stormwater to waters within Indian Country as defined in 18 U.S.C. §1151, or to waters subject to water quality standards of Indian Tribes, including portions of the Puyallup River and other waters on trust or restricted lands within the 1873 Survey Area of the Puyallup Tribe of Indians Reservation, except where authority has been specifically delegated to Ecology by the U.S. Environmental Protection Agency. The exclusion of such discharges from this Permit does not waive any rights the State may have with respect to the regulation of the discharges. Indian Country includes:

1. All land within any Indian Reservation notwithstanding the issuance of any patent, and including rights-of-way running through the reservation. This includes all federal, tribal, and Indian and non-Indian privately owned land within the reservation.
2. All off-reservation Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.
3. All off-reservation federal trust lands held for Native American Tribes. Puyallup Exception: Following the "*Puyallup Tribes of Indians Land Settlement Act of 1989*," 25 USC §1773; the permit does apply to land within the Puyallup Reservation except for discharges to surface water on land held in trust by the federal government.

## S3. RESPONSIBILITIES OF PERMITTEES

### A. Compliance with Conditions

Each Permittee covered under this Permit is responsible for compliance with the terms of this Permit for the regulated small MS4s that they own or operate. Compliance with (1) or (2) below is required as applicable to each Permittee, whether the Permittee has applied for coverage as a Permittee, Co-Permittee, or Secondary Permittee.

1. All city, town, and county Permittees are required to comply with all conditions of this Permit, including any appendices referenced therein, except for S6 – *Stormwater Management Program for Secondary Permittees*.
2. All Secondary Permittees are required to comply with all conditions of this Permit, including any appendices referenced therein, except for S5 – *Stormwater Management Program for Cities, Towns, and Counties* and S8 – *Monitoring and Assessment*.

### B. Reliance on Another Entity

Permittees may rely on another entity to satisfy one or more of the requirements of this Permit. Permittees that are relying on another entity to satisfy one or more of their permit obligations remain responsible for permit compliance if the other entity fails to implement permit conditions. Permittees may rely on another entity provided all the requirements of 40 CFR 122.35(a) are satisfied including, but not limited to:

1. The other entity, in fact, implements the Permit requirements.
2. The other entity agrees to take on responsibility for implementation of the Permit requirement(s) on the Permittee’s behalf. This shall be indicated on the NOI or Annual Report.

## S4. COMPLIANCE WITH STANDARDS

### A. Prohibition of Discharge of Toxicants

In accordance with Chapter 90.48.520 RCW, the discharge of toxicants to waters of the State of Washington which would violate any water quality standard, including toxicant standards, sediment criteria, and dilution zone criteria is prohibited. The required response to such discharges is defined in S4.F, below.

### B. Compliance with Standards

This Permit does not authorize a discharge which would be a violation of Washington State *Surface Water Quality Standards* (Chapter 173-201A WAC), *Groundwater Quality Standards* (Chapter 173-200 WAC), *Sediment Management Standards* (Chapter 173-204 WAC), or human health-based criteria in the *National Toxics Rule* (40 CFR 131.45). The required response to such discharges is defined in S4.F, below.

### C. MEP Standard

The Permittee shall reduce the discharge of pollutants to the Maximum Extent Practicable (MEP).

### D. AKART Standard

The Permittee shall use All Known, Available, and Reasonable methods of prevention, control, and Treatment (AKART) to prevent and control pollution of waters of the State of Washington.

### E. Responsibilities of Permittees

In order to meet the goals of the *Clean Water Act*, and comply with S4.A, S4.B, S4.C, and S4.D, each Permittee shall comply with all of the applicable requirements of this Permit as identified in S3 – *Responsibilities of Permittees*.

### F. Violations of Water Quality Standards and Adaptive Management

A Permittee remains in compliance with S4 despite any discharges prohibited by S4.A or S4.B, when the Permittee undertakes the following response toward long-term water quality improvement:

**1.** A Permittee shall notify Ecology in writing within 30 days of becoming aware, based on credible site-specific information that a discharge from the MS4 owned or operated by the Permittee is causing or contributing to a known or likely violation of Water Quality Standards in the receiving water. Written notification provided under this subsection shall, at a minimum, identify the source of the site-specific information, describe the nature and extent of the known or likely violation in the receiving water, and explain the reasons why the MS4 discharge is believed to be causing or contributing to the problem. For ongoing or continuing violations, a single written notification to Ecology will fulfill this requirement.

**2.** In the event that Ecology determines, based on a notification provided under S4.F.1 or through any other means, that a discharge from an MS4 owned or operated by the Permittee is causing or contributing to a violation of Water Quality Standards in a receiving water, Ecology will notify the Permittee in writing that an adaptive management response, outlined in S4.F.3, below, is required, unless:

   a. Ecology also determines that the violation of Water Quality Standards is already being addressed by a Total Maximum Daily Load (TMDL) or other enforceable water quality cleanup plan; or

   b. Ecology concludes the MS4 contribution to the violation will be eliminated through implementation of other permit requirements.

**3.** Adaptive Management Response

   a. Within 60 days of receiving a notification under S4.F.2, or by an alternative date established by Ecology, the Permittee shall review its Stormwater Management Program (SWMP) and submit a report to Ecology. The report shall include:

      i. A description of the operational and/or structural BMPs that are currently being implemented to prevent or reduce any pollutants that are causing or contributing to the violation of Water Quality Standards, including a qualitative assessment of the effectiveness of each Best Management Practice (BMP).

      ii. A description of potential additional operational and/or structural BMPs that will or may be implemented in order to apply AKART on a site-specific basis to prevent or reduce any pollutants that are causing or contributing to the violation of Water Quality Standards.

   iii. A description of the potential monitoring or other assessment and evaluation efforts that will or may be implemented to monitor, assess, or evaluate the effectiveness of the additional BMPs.

   iv. A schedule for implementing the additional BMPs including, as appropriate: funding, training, purchasing, construction, monitoring, and other assessment and evaluation components of implementation.

b. Ecology will, in writing, acknowledge receipt of the report within a reasonable time and notify the Permittee when it expects to complete its review of the report. Ecology will either approve the additional BMPs and implementation schedule or require the Permittee to modify the report as needed to meet AKART on a site-specific basis. If modifications are required, Ecology will specify a reasonable time frame in which the Permittee shall submit, and Ecology will review the revised report.

c. The Permittee shall implement the additional BMPs, pursuant to the schedule approved by Ecology, beginning immediately upon receipt of written notification of approval.

d. The Permittee shall include with each subsequent annual report a summary of the status of implementation and the results of any monitoring, assessment or evaluation efforts conducted during the reporting period. If, based on the information provided under this subsection, Ecology determines that modification of the BMPs or implementation schedule is necessary to meet AKART on a site-specific basis, the Permittee shall make such modifications as Ecology directs. In the event there are ongoing violations of water quality standards despite the implementation of the BMP approach of this Section, the Permittee may be subject to compliance schedules to eliminate the violation under Chapter 173-201A-510(4) WAC and Chapter 173-226-180 WAC or other enforcement orders as Ecology deems appropriate during the term of this Permit.

e. A TMDL or other enforceable water quality cleanup plan that has been approved and is being implemented to address the MS4's contribution to the Water Quality Standards violation supersedes and terminates the S4.F.3 implementation plan.

f. Provided the Permittee is implementing the approved adaptive management response under this Section, the Permittee remains in compliance with S4, despite any on-going violations of Water Quality Standards identified under S4.A or B, above.

g. The adaptive management process provided under S4.F is not intended to create a shield for the Permittee from any liability it may face under 42 U.S.C. 9601 et seq. or Chapter 70.105D RCW.

## G. Revoke and Reissue Permit

Ecology may modify or revoke and reissue this General Permit in accordance with G14 – *General Permit Modification and Revocation*, if Ecology becomes aware of additional control measures, management practices, or other actions beyond what is required in this Permit that are necessary to:

**1.** Reduce the discharge of pollutants to the MEP;

**2.** Comply with the state AKART requirements; or

**3.** Control the discharge of toxicants to waters of the State of Washington.

# S5. STORMWATER MANAGEMENT PROGRAM FOR CITIES, TOWNS, AND COUNTIES

## A. Stormwater Management Program General Requirements

Each Permittee shall develop and implement a Stormwater Management Program (SWMP). A SWMP is a set of actions and activities comprising the components listed in S5 and any additional actions necessary to meet the requirements of applicable TMDLs pursuant to S7 – *Compliance with Total Maximum Daily Load Requirements* and S8 – *Monitoring and Assessment*. This Section applies to all cities, towns, and counties covered under this Permit (termed as "Permittee," including cities, towns, and counties that are Co-Permittees).

New Permittees subject to this Permit, as described in S1.D.1.b, shall fully meet the requirements in S5 as modified in footnotes below or as specified in an alternate schedule as a condition of coverage by Ecology. Permittees obtaining coverage after the issuance date of this Permit shall fully meet the requirements in S5 as specified in an alternate schedule as a condition of coverage by Ecology.

**1.** At a minimum, the Permittee's SWMP shall be implemented throughout the geographic area subject to this Permit as described in S1.A.[2]

**2.** Each Permittee shall prepare written documentation of the SWMP, called the SWMP Plan. The SWMP Plan shall be organized according to the program components in S5.C or a format approved by Ecology and shall be updated at least annually for submittal with the Permittee's annual reports to Ecology (see S9 – *Reporting Requirements*). The SWMP Plan shall be written to inform the public of the planned SWMP activities for the upcoming calendar year, and shall include a description of:

   a. Planned activities for each of the program components included in S5.C;

   b. Any additional planned actions to meet the requirements of applicable TMDLs pursuant to S7– *Compliance with Total Maximum Daily Load Requirements*; and

   c. Any additional planned actions to meet the requirements of S8 – *Monitoring and Assessment*.

**3.** The SWMP shall include an ongoing program for gathering, tracking, maintaining, and using information to evaluate SWMP development, implementation, permit compliance and to set priorities.

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[2] New Permittees shall fully develop and implement the SWMP in accordance with the schedules contained in this Section no later than March 31, 2029.

   a. Each Permittee shall track the cost or estimated cost of development and implementation of each component of the SWMP. This information shall be provided with the Annual Report due no later than March 31, 2027. Permittees shall provide annual average costs (or estimates) to implement the SWMP and TMDL requirements.[3]

   b. Each Permittee shall track the number of inspections, follow-up actions because of inspections, official enforcement actions, and types of public education activities as required by the respective program component. This information shall be included in the annual report.

**4.** Permittees shall continue implementation of existing stormwater management programs until they begin implementation of the updated stormwater management program in accordance with the terms of this Permit, including implementation schedules.

**5.** Coordination among Permittees

   a. Coordination among entities covered under municipal stormwater NPDES permits may be necessary to comply with certain conditions of the SWMP. The SWMP shall include, when needed, coordination mechanisms among entities covered under a municipal stormwater NPDES permit to encourage coordinated stormwater-related policies, programs, and projects within adjoining or shared areas, including:

      i. Coordination mechanisms clarifying roles and responsibilities for the control of pollutants between physically interconnected MS4s covered by a municipal stormwater permit; and

      ii. Coordinating stormwater management activities for shared water bodies, or watersheds among Permittees to avoid conflicting plans, policies, and regulations.

   b. The SWMP shall include coordination mechanisms among departments within each jurisdiction to eliminate barriers to compliance with the terms of this Permit. Permittees shall include a written description of internal coordination mechanisms in the Annual Report due no later than March 31, 2026.

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[3] New Permittees shall begin cost tracking as required in S5.A.3.a, no later than January 1, 2026.

## B. Stormwater Management Program Standards

The SWMP shall be designed to reduce the discharge of pollutants from regulated small MS4s to the MEP, meet state AKART requirements, and protect water quality.

## C. Stormwater Management Program Components

The SWMP shall include the components listed below. To the extent allowable under state or federal law, all components are mandatory for city, town, or county Permittees covered under this Permit.

### 1. Stormwater Planning

Each Permittee shall implement a Stormwater Planning program to inform and assist in the development of policies and strategies as water quality management tools to protect receiving waters.

***The minimum performance measures are:***

a. Each Permittee shall continue to convene an inter-disciplinary team to inform and assist in the development, progress, and influence of this program.[4]

b. Coordination with long-range plan updates.

   i. Each Permittee shall describe how stormwater management needs and protection/improvement of receiving water health are (or are not) informing the long-range or comprehensive planning update processes and influencing policies and implementation strategies in their jurisdiction in the Annual Report due March 31, 2027. The report shall describe the water quality and watershed protection policies, strategies, codes, and other measures intended to protect and improve local receiving water health through planning, considering stormwater management needs or limitations.

c. Low Impact Development (LID) code-related requirements.

   i. Permittees shall continue to require LID Principles and LID BMPs when updating, revising, and developing new local development-related codes, rules, standards, or other enforceable documents, as needed.

   The intent shall be to make LID the preferred and commonly used approach to site development. The local development-related codes, rules, standards, or other enforceable documents shall be designed to

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[4] New Permittees shall convene an interdisciplinary team no later than August 1, 2025.

minimize impervious surfaces, native vegetation loss, and stormwater runoff in all types of development situations, where feasible.

(a) Annually, each Permittee shall assess and document any newly identified administrative or regulatory barriers to implementation of LID Principles or LID BMPs since local codes were updated in accordance with the 2013 Permit, and the measures developed to address the barriers. If applicable, the report shall describe mechanisms adopted to encourage or require implementation of LID principles or LID BMPs.

ii. By December 31, 2028, New Permittees shall review, revise, and make effective their local development-related codes, rules, standards, or other enforceable documents to incorporate and require LID principles and LID BMPs. New Permittees shall conduct a similar review and revision process, and consider the range of issues, outlined in the following document: *Integrating LID into Local Codes: A Guidebook for Local Governments* (Puget Sound Partnership, 2012).

New Permittees shall submit a summary of the results of the review and revision process with the annual report due no later than March 31, 2029. This summary shall be in the required format described in Appendix 5 and include, at a minimum, a list of the participants (job title, brief job description, and department represented), the codes, rules, standards, and other enforceable documents reviewed, and the revisions made to those documents which incorporate and require LID principles and LID BMPs. The summary shall include existing requirements for LID principles and LID BMPs in development-related codes. The summary shall be organized as follows:

(a) Measures to minimize impervious surfaces;

(b) Measures to minimize loss of native vegetation; and

(c) Other measures to minimize stormwater runoff.

iii. No later than December 31, 2028, Permittees shall adopt and implement tree canopy goals and policies to support stormwater management and water quality improvement in receiving waters.

d. Stormwater Management Action Planning (SMAP).[5] Permittees shall conduct a similar process and consider the range of issues outlined in the *Stormwater*

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[5] New Permittees are exempt from S5.C.1.d. for this permit term.

*Management Action Planning Guidance* (Ecology, 2019; Publication no. 19-10-010) for one new priority catchment.[6]

i. Stormwater Management Action Plan (SMAP). No later than December 31, 2026, Permittees shall complete a SMAP for at least one new high priority catchment area, or additional actions for an existing SMAP, that identifies all of the following:

   (a) A description of the stormwater facility retrofits needed for the area, including the BMP types and preferred locations. Include projects that address transportation-related runoff, such as projects that address tire wear runoff.

   (b) Land management/development strategies and/or actions identified for water quality management.

   (c) Targeted, enhanced, or customized implementation of stormwater management actions related to permit sections within S5, including:

   - IDDE field screening;
   - Prioritization of Source Control inspections;
   - O&M inspections or enhanced maintenance; or
   - Public Education and Outreach behavior change programs.

   Identified actions shall support other specifically identified stormwater management strategies and actions for the basin overall, or for the catchment area in particular.

   (d) If applicable, identification of changes needed to local long-range plans to address SMAP priorities.

   (e) A proposed implementation schedule and budget sources for:

   - Short-term actions (i.e., actions to be accomplished within six years); and
   - Long-term actions (i.e., actions to be accomplished within seven to 20 years).

   (f) A process and schedule to provide future assessment and feedback to improve the planning process and implementation of procedures or projects.

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[6] City of Shelton shall follow the SMAP requirements outlined in Appendix 14.

### 2. Public Education and Outreach

The SWMP shall include an education and outreach program designed to:

- Build general awareness about methods to address and reduce impacts from stormwater runoff;
- Effect behavior change to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts; and
- Create stewardship opportunities that encourages community engagement in addressing the impacts from stormwater runoff.

Permittees may choose to meet these requirements individually or as a member of a regional group. Regional collaboration on general awareness or behavior change programs, or both, includes Permittees developing a consistent message, determining best methods for communicating the message, and when appropriate, creating strategies to effect behavior change. If a Permittee chooses to adopt one or more elements of a regional program, the Permittee should participate in the regional group and shall implement the adopted element(s) of the regional program in the local jurisdiction.

***The minimum performance measures are:***

a. Each Permittee shall implement an education and outreach program. The program design shall be based on local or regional (or both) water quality information and priority audience characteristics to identify high priority audiences, subject areas, and/or BMPs. Based on the priority audience's demographic, the Permittee shall consider delivering its selected messages in language(s) other than English, as appropriate to the priority audience.[7]

   i. ***General awareness.*** To build general awareness, Permittees shall annually select, at a minimum, one priority audience and one subject area from either (a) or (b):

      (a) *Priority audiences:* General public (including overburdened communities, school age children, college/university, or trade students) or businesses (including home-based, or mobile businesses). Subject areas:

         - General impacts of stormwater on surface waters, including impacts from impervious surfaces; or
         - Low impact development (LID) principles and LID BMPs.

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[7] New Permittees shall begin implementing the requirements of S5.C.2.a no later than August 1, 2027.

(b) *Priority audiences:* Engineers, contractors, developers, property owners/managers, or land use planners. Subject areas:

- Technical standards for stormwater site and erosion control plans;
- LID principles and LID BMPs;
- Stormwater treatment and flow control BMPs/facilities; or
- Source control BMPs for building materials to reduce pollution to stormwater, including but not limited to stormwater pollution from PCB-containing materials.

(c) Permittees shall provide subject area information to the priority audience on an ongoing or strategic schedule.

ii. ***Behavior change.*** To affect behavior change, Permittees shall select, at a minimum, one priority audience and one BMP.

(a) *Priority Audiences:* Residents, landscapers, property managers/owners, developers, school age children, college/university, or trade students, or businesses (including home-based or mobile businesses).

BMPs:

- Use and storage of: pesticides, fertilizers, and/or other household chemicals;
- Use and storage of: automotive chemicals, hazardous cleaning supplies, carwash soaps, and/or other hazardous materials;
- Prevention of illicit discharges;
- Yard care techniques protective of water quality;
- Carpet cleaning;
- Repair and maintenance BMPs for: vehicles, equipment, and/or home/buildings;
- Pet waste management and disposal;
- LID Principles and LID BMPs;
- Stormwater facility maintenance, including LID facilities;
- Dumpster and trash compactor maintenance;

- Litter and debris prevention;
- Sediment and erosion control;
- (Audience specific) Source control BMPs (refer to S5.C.8); or
- (Audience specific) Locally important, municipal stormwater-related subject area.

(b) No later than July 1, 2025, each Permittee shall evaluate the effectiveness of an ongoing behavior change campaign (required under S5.C.2.a.ii of the 2019 Permit). Permittees shall document lessons learned and recommendations for which option to select from S5.C.2.a.ii(c), below.

Permittees that select option S5.C.2.a.ii(c)3, below, may forgo this evaluation if it will not add value to the overall behavior change program.

(c) Based on the recommendation from S5.C.2.a.ii(b), by July 1, 2026, each Permittee shall follow social marketing practices and methods and develop a campaign that is tailored to the community, including development of a program evaluation plan. Each Permittee shall:[8]

1. Develop a strategy and schedule to more effectively implement the existing campaign;
2. Develop a strategy and schedule to expand the existing campaign to a new priority audience or BMPs; or
3. Develop a strategy and schedule for a new priority audience and BMP behavior change campaign.

(d) No later than September 1, 2026, begin to implement the strategy developed in S5.C.2.a.ii.(c).[9]

(e) No later than March 31, 2029, evaluate and submit report on:

1. The changes in understanding and adoption of targeted behaviors resulting from the implementation of the strategy; and

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[8] No later than August 1, 2025, New Permittees shall follow social marketing practices and methods to develop a behavior change program that is tailored to the community per S5.C.2.a.ii(c).

[9] No later than October 1, 2025, New Permittees shall begin to implement the strategy developed in S5.C.2.a.ii(d).

2. Any planned or recommended changes to the campaign to be more effective; describe the strategies and process to achieve the results.

(f) Permittees shall use results of the evaluation to continue to direct effective methods and implementation of the ongoing behavior change program.

iii. ***Stewardship.*** Each Permittee shall partner or promote (or both) stewardship opportunities to encourage residents or businesses to participate in activities or events planned and organized within the community, such as: stream teams, storm drain marking, volunteer monitoring, and riparian plantings. Permittees may partner or promote (or both) stewardship opportunities created or organized by existing organizations (including non-permittees).[10]

### 3. Public Involvement and Participation

Permittees shall provide ongoing opportunities for public involvement and participation through advisory councils, public hearings, watershed committees, participation in developing rate-structures or other similar activities. Each Permittee shall comply with applicable state and local public notice requirements when developing elements of the SWMP and SMAP.

***The minimum performance measures are:***

a. Permittees shall create opportunities for the public, including overburdened communities, to participate in the decision-making processes involving the development, implementation, and update of the Permittee's SMAP and SWMP.[11]

   i. Annually, Permittees shall document specific public involvement opportunities provided to overburdened communities.

   ii. No later than December 31, 2026, document methods used to identify overburdened communities.

b. Each Permittee shall post on their website their SWMP Plan and the Annual Report, required under S9.A, no later than May 31 each year. All other submittals shall be available to the public upon request.

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[10] New Permittees shall implement the stewardship requirements according to S5.C.2.a.iii no later than August 1, 2027.

[11] New Permittees shall develop and begin to implement requirements according to S5.C.3.a no later than August 1, 2025. New Permittees are exempt from SMAP this permit term.

## 4. MS4 Mapping and Documentation

The SWMP shall include an ongoing program for mapping and documenting the MS4.[12]

***The minimum performance measures are:***

a. *Ongoing Mapping:* Each Permittee shall maintain mapping data for the features listed below:

   i. Known MS4 outfalls and known MS4 discharge points:

      a. Map outfall size and material, where known;

   ii. Receiving waters, other than groundwater;

   iii. Stormwater treatment and flow control BMPs/facilities owned or operated by the Permittee;

   iv. Geographic areas served by the Permittee's MS4 that do not discharge stormwater to surface waters;

   v. Tributary conveyances to all known outfalls and discharge points with a 24-inch nominal diameter or larger, or an equivalent cross-sectional area for non-pipe systems. The following features or attributes (or both) shall be mapped:

      (a) Tributary conveyance type, material, and size where known;

      (b) Associated drainage areas; and

      (c) Land use.

   vi. Connections between the MS4 owned or operated by the Permittee and other municipalities or public entities;

   vii. All connections to the MS4 authorized or allowed by the Permittee after February 16, 2007;[13,14] and

   viii. All known connections from the MS4 to a privately owned stormwater system.

b. *New Mapping:* Each Permittee shall:

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[12] New Permittees shall meet the requirements to map the MS4 according to S5.C.4 no later than March 31, 2029, except where otherwise noted in this Section.

[13] New Permittees shall meet the requirements of S5.C.4.a.vii after August 1, 2024, for all connections to the MS4 authorized after August 1, 2024.

[14] Permittees do not need to map the following residential connections: individual driveways, sump pumps, or roof downspouts.

  - i. No later than March 31, 2026, Permittees shall submit locations of all known MS4 outfalls according to the standard templates and format provided in the Annual Report. This reporting shall include the size and material of the outfalls.
  - ii. No later than December 31, 2027, develop a methodology to map and assess acreage of MS4 tributary basins to outfalls or discharge points that have stormwater treatment and flow control BMPs/facilities owned or operated by the Permittee. Submit with the Annual Report a map and breakdown of acres managed or unmanaged by stormwater treatment and flow control BMPs/facilities.
  - iii. No later than December 31, 2028, begin mapping of Permittee-owned or operated properties with tree canopy based on available, existing data.

c. The required format for mapping is electronic (e.g. Geographic Information System, CAD drawings, or other software that can map and store points, lines, polygons, and associated attributes), with fully described mapping standards.

d. To the extent consistent with national security laws and directives, each Permittee shall make available to Ecology, upon request, available maps depicting the information required in S5.C.4.a through c, above.

e. Upon request, and to the extent appropriate, Permittees shall provide mapping information to federally recognized Indian Tribes, municipalities, and other Permittees. This Permit does not preclude Permittees from recovering reasonable costs associated with fulfilling mapping information requests by federally recognized Indian Tribes, municipalities, and other Permittees.

### 5. Illicit Discharge Detection and Elimination

The SWMP shall include an ongoing program designed to prohibit non-stormwater discharges into the MS4, prevent, detect, characterize, trace, and eliminate illicit connections and illicit discharges into the MS4.[15]

***The minimum performance measures are:***

a. The program shall include procedures for reporting and correcting or removing illicit connections, spills, and other illicit discharges when they are suspected or identified. The program shall also include procedures for

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[15] New Permittees shall meet the requirements of S5.C.5 no later than August 1, 2026 except where otherwise noted in this Section.

addressing pollutants entering the MS4 from an interconnected, adjoining MS4.

Illicit connections and illicit discharges shall be identified through, but not limited to, field screening, inspections, complaints/reports, construction inspections, maintenance inspections, source control inspections, and/or monitoring information, as appropriate.

b. Permittees shall inform public employees, businesses, and the general public of hazards associated with illicit discharges and improper disposal of waste.

c. Each Permittee shall implement an ordinance or other regulatory mechanism to effectively prohibit non-stormwater, illicit discharges, including spills, into the Permittee's MS4 to the maximum extent allowable under state and federal law. The Permittee's ordinance or other regulatory mechanism in effect as of the effective date of this Permit shall be revised, if necessary, to meet the requirements of this Section no later than July 1, 2027.

   i. *Allowable Discharges:* The regulatory mechanism does not need to prohibit the following categories of non-stormwater discharges:

      (a) Diverted stream flows;

      (b) Rising groundwaters;

      (c) Uncontaminated groundwater infiltration (as defined at 40 CFR 35.2005(b)(20));

      (d) Uncontaminated pumped groundwater;

      (e) Foundation drains;

      (f) Air conditioning condensation;

      (g) Irrigation water from agricultural sources that is commingled with urban stormwater;

      (h) Springs;

      (i) Uncontaminated water from crawl space pumps;

      (j) Footing drains;

      (k) Flows from riparian habitats and wetlands;

      (l) Non-stormwater discharges authorized by another NPDES or State Waste Discharge permit; and

      (m) Non-stormwater discharges from emergency firefighting activities in accordance with S2 Authorized Discharges. After the emergency has ceased, non-stormwater discharges (e.g., discharges associated with cleanup) to the MS4 are prohibited.

ii. *Conditionally allowable discharges:* The regulatory mechanism may allow the following categories of non-stormwater discharges only if the stated conditions are met:

(a) Discharges from potable water sources, including but not limited to water line flushing, hyperchlorinated water line flushing, fire hydrant system flushing, and pipeline hydrostatic test water. Planned discharges shall be dechlorinated to a total residual chlorine concentration of 0.1 ppm or less, pH-adjusted, if necessary, and volumetrically and velocity controlled to prevent re-suspension of sediments in the MS4.

(b) Discharges from lawn watering and other irrigation runoff. These discharges shall be minimized through, at a minimum, public education activities and water conservation efforts.

(c) Discharges from swimming pool, spa, and hot tub. The discharges shall be dechlorinated to a total residual chlorine concentration of 0.1 ppm or less; pH-adjusted; reoxygenated, if necessary; and volumetrically and velocity controlled to prevent re-suspension of sediments in the MS4. Discharges shall be thermally controlled to prevent an increase in temperature of the receiving water. Swimming pool cleaning wastewater and filter backwash shall not be discharged to the MS4.

(d) Street and sidewalk wash water and water used to control dust that does not use detergents. The Permittee shall reduce these discharges through, at a minimum, public education activities and/or water conservation efforts. To avoid washing pollutants into the MS4 Permittees shall minimize the amount of street wash and dust control water used.

(e) Routine external building washdown that does not use detergents for buildings built or renovated before 1950 and after 1980. The Permittee shall reduce these discharges through, at minimum, public education activities or water conservation efforts, or both. To avoid washing pollutants into the MS4 Permittees shall minimize the amount of wash water used.

Commercial, industrial, and multi-story residential structures constructed or remodeled between the years 1950 and 1980 (i.e.

those most likely to have PCB containing building materials), shall be assessed for PCB-containing materials consistent with *How to find and address PCBs in building materials* (Ecology, October 2022, Publication No. 22-04-024) prior to routine building washdown. Structures confirmed or suspected to have PCB-containing materials shall not discharge washdown to the MS4. Single-family residential buildings are exempt from PCB assessment. Structures built or renovated between 1950-1980 and determined to be without PCB-containing materials may conduct routine building washdown (without detergents) as described above.

(f) Other non-stormwater discharges. The discharges shall be in compliance with the requirements of a pollution prevention plan reviewed by the Permittee which addresses control of such discharges.

iii. The Permittee shall further address any category of discharges in (i) or (ii), above if the discharges are identified as significant sources of pollutants to waters of the State.

iv. The ordinance or other regulatory mechanism shall include escalating enforcement procedures and actions.

d. Each Permittee shall implement an ongoing program designed to detect and identify non-stormwater discharges and illicit connections into the Permittee's MS4.[16] The program shall include the following components:

i. Procedures for conducting investigations of the Permittee's MS4, including field screening and methods for identifying potential sources. These procedures may also include source control inspections.

The Permittee shall implement a field screening methodology appropriate to the characteristics of the MS4 and water quality concerns. Screening for illicit connections may be conducted using *Illicit Connection and Illicit Discharge Field Screening and Source Tracing Guidance Manual* (Herrera Environmental Consultants, Inc.; May 2020), or another methodology of comparable or improved effectiveness. The Permittee shall document the field screening methodology in the Annual Report.

(a) All Permittees shall complete field screening for an average of 12% of the MS4 each year.[17]

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[16] New Permittees shall fully implement the requirements of S5.C.5.d no later than August 1, 2028.

[17] New Permittees shall complete S5.C.5.d.i requirements for field screening covering at least 40% of the MS4 within the Permittee's coverage area no later than December 31, 2028, and on average 12% each year thereafter.

ii. A publicly listed and publicized hotline or other telephone number for public reporting of spills and other illicit discharges.

iii. An ongoing training program for all municipal field staff who, as part of their normal job responsibilities, might come into contact with or otherwise observe an illicit discharge and/or illicit connection to the MS4, on the identification of an illicit discharge and/or connection, and on the proper procedures for reporting and responding to the illicit discharge and/or connection. Follow-up training shall be provided, as needed, to address changes in procedures, techniques, requirements, or staffing. Permittees shall document and maintain records of the trainings provided and the staff trained.[18]

e. Each Permittee shall implement an ongoing program designed to address illicit discharges, including spills and illicit connections, into the Permittee's MS4.[19] The program shall include:

   i. Procedures for characterizing the nature of, and potential public or environmental threat posed by, any illicit discharges found by or reported to the Permittee. Procedures shall address the evaluation of whether the discharge must be immediately contained and steps to be taken for containment of the discharge.

   ii. Procedures for tracing the source of an illicit discharge; including visual inspections and, when necessary, opening manholes, using mobile cameras, collecting and analyzing water samples, and/or other detailed inspection procedures.

   iii. Procedures for eliminating the discharge including notification of appropriate authorities (including owners or operators of interconnected MS4s), notification of the property owner, technical assistance, follow-up inspections, and use of the compliance strategy developed pursuant to S5.C.5.c.iv, including escalating enforcement and legal actions if the discharge is not eliminated.

   iv. Compliance with the provisions in (i), (ii), and (iii), above, shall be achieved by meeting the following timelines:

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[18] New Permittees shall develop and begin implementing the ongoing training program described in S5.C.5.d.iii no later than March 31, 2026.

[19] New Permittees shall fully develop and implement the requirements of S5.C.5.e no later than August 1, 2028.

(a) Immediately respond to all illicit discharges, including spills, which are determined to constitute a threat to human health, welfare, or the environment, consistent with General Condition G3.

(b) Investigate (or refer to the appropriate agency with the authority to act) within 7 days, on average, any complaints, reports, or monitoring information that indicates a potential illicit discharge.

(c) Initiate an investigation within 21 days of any report or discovery of a suspected illicit connection to determine the source of the connection, the nature and volume of discharge through the connection, and the party responsible for the connection.

(d) Upon confirmation of an illicit connection, use the compliance strategy in a documented effort to eliminate the illicit connection within 6 months. All known illicit connections to the MS4 shall be eliminated.

f. Permittees shall train staff who are responsible for identification, investigation, termination, cleanup, and reporting of illicit discharges, including spills, and illicit connections, to conduct these activities. Follow-up training shall be provided as needed to address changes in procedures, techniques, requirements, or staffing. Permittees shall document and maintain records of the training provided and the staff trained.[20]

g. Recordkeeping: Each Permittee shall track and maintain records of the activities conducted to meet the requirements of this Section. In the Annual Report each Permittee shall submit data for the illicit discharges, spills, and illicit connections including those that were found by, reported to, or investigated by the Permittee during the previous calendar year. The data shall include the information and format specified in Appendix 13 and WQWebIDDE. Each Permittee may either use their own system or WQWebIDDE for recording this data.

## 6. Controlling Runoff from New Development, Redevelopment, and Construction Sites

Each Permittee shall implement and enforce a program to reduce pollutants in stormwater runoff to a regulated small MS4 from new development, redevelopment, and construction site activities. The program shall apply to

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[20] New Permittees shall meet the requirements of S5.C.5.f no later than March 31, 2026.

private and public development, including transportation projects.[21]The minimum performance measures are:

a. Implement an ordinance or other enforceable mechanism that addresses runoff from new development, redevelopment, and construction site projects.

   No later than June 30, 2027, each Permittee shall adopt and make effective a local program, that meets the requirements of S5.C.6.b(i) through (iii), below, and shall apply to all applications[22] submitted:

   i. On or after July 1, 2027;

   ii. Prior to January 1, 2017, that have not started construction[23] by July 1, 2022;[24]

   iii. Prior to July 1, 2022, that have not started construction by July 1, 2027; and

   iv. Prior to July 1, 2027, that have not started construction by July 1, 2032.

b. The ordinance or other enforceable mechanism shall include, at a minimum:

   i. The Minimum Requirements, thresholds, and definitions in Appendix 1, or the 2019 Appendix 1 amended to include the changes identified in Appendix 10, or Phase I program approved by Ecology and amended to include Appendix 10, for new development, redevelopment, and construction sites. Adjustment and variance criteria equivalent to those in Appendix 1 shall be included. More stringent requirements may be used, and/or certain requirements may be tailored to local circumstances through the use of Ecology-approved basin plans or other similar water quality and quantity planning efforts. Such local requirements and

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[21] For continuing Permittees, this means continuing to implement existing programs developed under previous permits until updates are made to meet the schedules defined. *New Permittees shall meet the requirements of S5.C.6 no later than June 30, 2027, except where otherwise specified in this Section.*

[22] In this context, "application" means, at a minimum a complete project description, site plan, and, if applicable, SEPA checklist. Permittees may establish additional elements of a completed application.

[23] In this context "started construction" means the site work associated with, and directly related to the approved project has begun. For example: grading the project site to final grade or utility installation. Simply clearing the project site does not constitute the start of construction. Permittees may establish additional requirements related to the start of construction.

[24] **For Lynden, Snoqualmie S5.C.6.a.ii is replaced with these dates**: Prior to January 1, 2018, that have not started construction by January 1, 2023. **For Aberdeen S5.C.6.a.ii is replaced with these dates**: Prior to July 1, 2018, that have not started construction by June 30, 2023. **Shelton S5.C.6.a.ii and iii is replaced with these dates:** Prior to January 1, 2023, which have not started construction by January 1, 2028.

thresholds shall provide equal protection of receiving waters and equal levels of pollutant control to those provided in Appendix 1.

ii. The local requirements shall include the following requirements, limitations, and criteria that, when used to implement the minimum requirements in Appendix 1 (or program approved by Ecology under the 2024 Phase I Permit), will protect water quality, reduce the discharge of pollutants to the MEP, and satisfy the State requirement under Chapter 90.48 RCW to apply AKART prior to discharge:

(a) Site planning requirements;

(b) BMP selection criteria;

(c) BMP design criteria;

(d) BMP infeasibility criteria;

(e) LID competing needs criteria; and

(f) BMP limitations.

Permittees shall document how the criteria and requirements will protect water quality, reduce the discharge of pollutants to the MEP, and satisfy the state AKART requirements.

Permittees who choose to use the requirements, limitations, and criteria above in the *Stormwater Management Manual for Western Washington*, or a Phase I program approved by Ecology, may cite this choice as their sole documentation to meet this requirement.

iii. The legal authority, through the approval process for new development and redevelopment, to inspect and enforce maintenance standards for private stormwater facilities approved under the provisions of this Section that discharge to the Permittee's MS4.

c. The program shall include a permitting process with site plan review, inspection, and enforcement capability to meet the standards listed in (i) through (iv) below, for both private and public projects, using qualified personnel (as defined in *Definitions and Acronyms*). At a minimum, this program shall be applied to all sites that meet the minimum thresholds adopted pursuant to S5.C.6.b.i, above.

i. Review of all stormwater site plans for proposed development activities.

ii. Inspect, prior to clearing and construction, all permitted development sites that have a high potential for sediment transport as determined through plan review based on definitions and requirements in Appendix 7 – *Determining Construction Site Sediment Damage Potential*. As an alternative to evaluating each site according to Appendix 7, Permittees may choose to inspect all construction sites that meet the minimum thresholds adopted pursuant to S5.C.6.b.i, above.

iii. Inspect all permitted development sites during construction to verify proper installation and maintenance of required erosion and sediment controls. Enforce, as necessary, based on the inspection.

iv. Each Permittee shall manage maintenance activities to inspect all stormwater treatment and flow control BMPs/facilities, and catch basins, in new residential developments every six months, until 90% of the lots are constructed (or when construction has stopped and the site is fully stabilized), to identify maintenance needs and enforce compliance with maintenance standards as needed.

v. Inspect all permitted development sites upon completion of construction and prior to final approval or occupancy to ensure proper installation of permanent stormwater facilities. Verify that a maintenance plan is completed and responsibility for maintenance is assigned for stormwater treatment and flow control BMPs/facilities. Enforce, as necessary, based on the inspection.

vi. Compliance with the inspection requirements in (ii) through (v), above, shall be determined by the presence and records of an established inspection program designed to inspect all sites. Compliance shall be determined by achieving at least 80% of required inspections annually. The inspections may be combined with other inspections provided they are performed using qualified personnel.

vii. The program shall include a procedure for keeping records of inspections and enforcement actions by staff including inspection reports, warning letters, notices of violations, and other enforcement records. Records of maintenance inspections and maintenance activities shall be maintained.

viii. An enforcement strategy shall be implemented to respond to issues of non-compliance.

d. The program shall make available to representatives of proposed new development and redevelopment, as applicable: the link to the online *Construction Stormwater General Permit* Notice of Intent (NOI) form for construction activity, a link to the online *Industrial Stormwater General Permit* NOI form for industrial activity, and a link to the online registration requirements for Underground Injection Control (UIC) wells. Permittees shall continue to enforce local ordinances controlling runoff from sites that are also covered by stormwater permits issued by Ecology.[25]

e. Each Permittee shall ensure that all staff whose primary job duties are implementing the program to *Control Stormwater Runoff from New Development, Redevelopment, and Construction Sites*, including permitting, plan review, construction site inspections, and enforcement, are trained to conduct these activities. Follow-up training shall be provided as needed to address changes in procedures, techniques, or staffing. Permittees shall document and maintain records of the training provided and the staff trained.[26]

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[25] New Permittees shall meet the requirements of S5.C.6.d beginning no later than August 1, 2024.

[26] New Permittees shall meet the requirements of S5.C.6.e no later than December 31, 2027.

## 7. Stormwater Management for Existing Development

Each Permittee shall implement a Program to control or reduce stormwater discharges to waters of the State from areas of existing development.[27] The Program shall aim to focus on strategic stormwater investments over longer planning timeframes.

***Minimum performance measures:***

a. Permittees shall implement stormwater facility retrofits, or tailored SWMP actions that meet the criteria described in Appendix 12, using one or a combination of the following:
   i. Strategic stormwater investments identified in Stormwater Management Action Plan(s) (SMAPs, S5.C.1.d.), or similar stormwater planning process; and/or
   ii. Opportunistic stormwater investments identified by leveraging projects outside of SMAP areas to improve stormwater management and infrastructure.

b. No later than March 31, 2028, Permittees shall fully fund, start construction, or completely implement project(s) that meet the assigned equivalent acreage and submit documentation with the Annual Report as described in Appendix 12.[28]
   i. Projects that started construction on or after January 1, 2023, may be included towards achieving the acres required.
   ii. Permittees may contribute to meeting an overall regional goal to satisfy this permit requirement as described in S5.C.7.c.
   iii. Permittees that complete projects by the expiration date of this permit that will exceed the area required for this permit term may use the excess as a credit to be used for the 2029 Permit term, not to exceed 50% of the next Permit's requirement.

c. Permittees may collaborate to meet a regional goal.
   iv. Each Permittee is required to manage at least 0.3 acres within their own jurisdiction but may receive acreage credit for contributing to meeting an overall regional goal outside their defined MS4 Permit coverage area. For Permittees assigned 0.3 acres, participation and in-kind services to

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[27] New Permittees are exempt from this permit section.

[28] In this context, "fully fund" means stormwater facility retrofits are at or beyond 60% design and there is a documented source of funding and commitment to complete the project during the next permit cycle.

regional collaboration projects may count as the contribution for this permit term if there is regional agreement on the strategy.

v. Permittees may contribute to a regional goal, that is the sum of Phase II partners assigned acreage from Appendix 12. Projects may be implemented outside of permit coverage areas to meet their individual requirement as part of a regional goal where benefits to receiving waters within the permit coverage are identified and anticipated.

d. Permittees shall develop a method and report the amount of estimated or projected equivalent acres managed by stormwater facility retrofits and SMAP project costs for the 2029 permit term. This report shall be submitted to Ecology no later than March 31, 2028.

## 8. Source Control Program for Existing Development

The Permittee shall implement a program to prevent and reduce pollutants in runoff from areas of existing development that discharge to the MS4. The program shall include application of source control BMPs, inspections, and enforcement.

***The minimum performance measures are:***

a. Permittees shall enforce ordinance(s), or other enforceable documents, requiring the application of source control BMPs for pollutant generating sources associated with existing land uses and activities (see Appendix 8 to identify pollutant generating sources). [29]

   The requirements of this subsection are met by using the source control BMPs in the SWMMWW, or a Phase I Program approved by Ecology. In cases where the manual(s) lack guidance for a specific source of pollutants, the Permittee shall work with the owner/operator to implement or adapt BMPs based on the best professional judgement of the Permittee.

   Applicable operational source control BMPs shall be required for all pollutant generating sources. Structural source control BMPs, or treatment BMPs/facilities, or both, shall be required for pollutant generating sources if operational source control BMPs do not prevent illicit discharges or violations of surface water, groundwater, or sediment management standards because of inadequate stormwater controls. Implementation of source control requirements may be done through education and technical assistance programs, provided that formal enforcement authority is available to the Permittee and is used as determined necessary by the Permittee, in accordance with S5.C.8.a.iii, below.

b. Permittees shall implement a program to identify publicly and privately owned institutional, commercial, and industrial sites which have the potential to generate pollutants to the MS4.[30] Permittees shall update the inventory at least once every 5 years. The inventory shall include:

   i. Businesses and/or sites identified based on the presence of activities that are pollutant generating (refer to Appendix 8); and

   ii. Other pollutant generating sources, based on complaint response, such as: home-based businesses and multi-family sites.

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[29] No later than August 1, 2026, New Permittees shall adopt and make effective ordinance(s), or other enforceable documents, requiring the application of source control BMPs for pollutant generating sources associated with existing land uses and activities (see Appendix 8 to identify pollutant generating sources).

[30] No later than August 1, 2027, New Permittees shall establish an inventory that follows this permit section.

c. Permittees shall implement an inspection program, performed by qualified personnel, for sites identified pursuant to S5.C.8.a.i, above.[31]

   i. All identified sites with a business address shall be provided information about activities that may generate pollutants and the source control requirements applicable to those activities. This information shall be provided by mail, telephone, electronic communications, or in person. This information may be provided all at one time or spread out over the permit term to allow for tailoring and distribution of the information during site inspections.

   ii. The Permittee shall annually complete the number of inspections equal to 20% of the businesses and/or sites listed in their source control inventory to assess BMP effectiveness and compliance with source control requirements. The Permittee may count follow-up compliance inspections at the same site toward the 20% inspection rate. The Permittee may select which sites to inspect each year and is not required to inspect 100% of sites over a 5-year period. Sites may be prioritized for inspection based on their land use category, potential for pollution generation, proximity to receiving waters, or to address an identified pollution problem within a specific geographic area or sub-basin.

   iii. Each Permittee shall inspect 100% of sites identified through credible complaints.

   iv. Permittees may count inspections conducted based on complaints, or when the property owner denies entry, to the 20% inspection rate.

   v. Annual Reporting of inspections shall be organized by business type or activities with potential to generate pollutants to the MS4. Standard Industrial Code (SIC), Major Group, and NAICS numbers may be provided for reference as noted in Appendix 8.

d. Permittees shall implement a progressive enforcement policy that requires sites to comply with stormwater requirements within a reasonable time period as specified below[32]:

   i. If the Permittee determines, through inspections or otherwise, that a site has failed to adequately implement required BMPs, the Permittee shall take appropriate follow-up action(s), which may include phone calls, reminder letters, emails, or follow-up inspections.

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[31] No later than January 1, 2028, New Permittees shall implement an inspection program for sites identified.

[32] No later than January 1, 2028, New Permittees shall implement a progressive enforcement policy as described in this permit section.

   ii. When a Permittee determines that a site has failed to adequately implement BMPs after a follow-up inspection(s) the Permittee shall take enforcement action as established through authority in its municipal codes or ordinances, or through the judicial system.

   iii. Each Permittee shall maintain records including documentation of each site visit, inspection reports, warning letters, notices of violations, and other enforcement records demonstrating an effort to bring sites into compliance. Each Permittee shall also maintain records of sites that are not inspected because the property owner denies entry.

   iv. A Permittee may refer non-emergency violations of local ordinances to Ecology provided the Permittee also makes a documented effort of progressive enforcement. At a minimum, a Permittee's enforcement effort shall include documentation of inspections and warning letters or notices of violation.

   v. Application and enforcement of local ordinances at sites identified pursuant to S5.C.8.a.i including sites with discharges authorized by a separate NPDES permit. Permittees that are in compliance with the terms of this Permit will not be held liable by Ecology for water quality standard violations or receiving water impacts caused by industries and other Permittees covered, or which should be covered, under an NPDES permit issued by Ecology.

e. Permittees shall train staff who are responsible for implementing the source control program to conduct these activities.[33] The ongoing training program shall cover the legal authority for source control, source control BMPs and their proper application, inspection protocols, lessons learned, typical cases, and enforcement procedures. Follow-up training shall be provided as needed to address changes in procedures, techniques, requirements, or staff. Permittees shall document and maintain records of the training provided and the staff trained.

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[33] New Permittees shall develop and implement a training program no later than December 31, 2027.

## 9. Operations and Maintenance

Each Permittee shall implement and document a program to regulate maintenance activities and to conduct maintenance activities by the Permittee to prevent or reduce stormwater impacts.[34]

***The minimum performance measures are:***

a. Each Permittee shall implement maintenance standards that are as protective, or more protective, of facility function than those specified in the *Stormwater Management Manual for Western Washington,* or a Phase I program approved by Ecology. For facilities which do not have maintenance standards, the Permittee shall develop a maintenance standard. No later than June 30, 2027, Permittees shall update their maintenance standards as necessary to meet the requirements of this Section.

   i. The purpose of the maintenance standard is to determine if maintenance is required. The maintenance standard is not a measure of the facility's required condition at all times between inspections. Exceeding the maintenance standard between inspections and/or maintenance is not a permit violation.

   ii. Unless there are circumstances beyond the Permittee's control, when an inspection identifies an exceedance of the maintenance standard, maintenance shall be performed:

      - Within 1 year for typical maintenance of facilities, except catch basins;
      - Within 6 months for catch basins; and
      - Within 2 years for maintenance that requires capital construction of less than $25,000.

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

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[34] New Permittees shall develop and implement the requirements of S5.C.9 no later than June 30, 2027 except where otherwise noted in this Section.

b. Maintenance of stormwater treatment and flow control BMPs/facilities regulated by the Permittee:

  i. The program shall include provisions to verify adequate long-term O&M of stormwater treatment and flow control BMPs/facilities that are permitted and constructed pursuant to S.5.C.6.c and shall be maintained in accordance with S5.C.9.a.

  The provisions shall include:

  (a) Implementation of an ordinance or other enforceable mechanism that:

  - Clearly identifies the party responsible for maintenance in accordance with maintenance standards established under S5.C.9.a.
  - Requires inspection of facilities in accordance with the requirements in (b), below.
  - Establishes enforcement procedures.

  (b) Annual inspections, by qualified personnel, of all stormwater treatment and flow control BMPs/facilities that discharge to the MS4 and were permitted by the Permittee according to S5.C.6.c, including those permitted in accordance with requirements adopted pursuant to the 2007-2024 Ecology municipal stormwater permits, unless there are maintenance records to justify a different frequency.

  Permittees may reduce the inspection frequency based on maintenance records of double the length of time of the proposed inspection frequency. In the absence of maintenance records, the Permittee may substitute written statements to document a specific less frequent inspection schedule. Written statements shall be based on actual inspection and maintenance experience and shall be certified in accordance with G19 – *Certification and Signature*.

  ii. Compliance with the inspection requirements in (b), above, shall be determined by the presence and records of an established inspection program designed to inspect all facilities, and achieving at least 80% of required inspections annually.

   iii. If deemed necessary for post-construction access, the ordinance or other regulatory mechanism may, in lieu of requiring that continued access be granted to the Permittee's staff or qualified personnel, instead require private property owners to provide annual certification by a qualified third party that adequate maintenance has been performed and the facilities are operating as designed to protect water quality.

   iv. The program shall include a procedure for keeping records of inspections and enforcement actions by staff, including inspection reports, warning letters, notices of violations, and other enforcement records. Records of maintenance inspections and maintenance activities shall be maintained.

c. Maintenance of stormwater facilities owned or operated by the Permittee:

   i. Each Permittee shall implement a program to annually inspect all municipally owned or operated stormwater treatment and flow control BMPs/facilities. Permittees shall implement appropriate maintenance action(s) in accordance with the adopted maintenance standards. The inspection program shall be implemented by qualified personnel.

   Permittees may reduce the inspection frequency based on maintenance records of double the length of time of the proposed inspection frequency. In the absence of maintenance records, the Permittee may substitute written statements to document a specific less frequent inspection schedule. Written statements shall be based on actual inspection and maintenance experience and shall be certified in accordance with G19 – *Certification and Signature*.

   ii. Each Permittee shall spot check potentially damaged stormwater treatment and flow control BMPs/facilities after major storm events (24-hour storm event with a 10 year or greater recurrence interval). If spot checks indicate widespread damage/maintenance needs, inspect all stormwater treatment and flow control BMPs/facilities that may be affected. Conduct repairs or take appropriate maintenance action in accordance with maintenance standards established above, based on the results of the inspections.

iii. Each Permittee shall continue to inspect all catch basins and inlets owned or operated by the Permittee every two years by December 31.[35,36] Clean catch basins if the inspection indicates cleaning is needed to comply with maintenance standards established in the *Stormwater Management Manual for Western Washington.* Decant water shall be disposed of in accordance with Appendix 6 – *Street Waste Disposal*.

The following alternatives to the standard approach of inspecting all catch basins every two years may be applied to all or portions of the system:

(a) The catch basin inspection schedule of every two years may be changed as appropriate to meet the maintenance standards based on maintenance records of double the length of time of the proposed inspection frequency. In the absence of maintenance records for catch basins, the Permittee may substitute written statements to document a specific, less frequent inspection schedule. Written statements shall be based on actual inspection and maintenance experiences and shall be certified in accordance with G19 – *Certification and Signature*.

(b) Inspections every two years may be conducted on a "circuit basis" whereby 25% of catch basins and inlets within each circuit are inspected to identify maintenance needs. Include an inspection of the catch basin immediately upstream of any MS4 outfall, discharge point, or connections to public or private storm systems, if applicable. Clean all catch basins within a given circuit for which the inspection indicates cleaning is needed to comply with maintenance standards established under S5.C.7.a, above.

(c) The Permittee may clean all pipes, ditches, and catch basins and inlets within a circuit once during the permit term. Circuits selected for this alternative must drain to a single point.

iv. Compliance with the inspection requirements in S5.C.7.c.i-iii, above, shall be determined by the presence of an established inspection program achieving at least 95% of required inspections.

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[35] Continuing Permittees shall implement the two-year schedule established under previous permits, except inspections shall be completed by December 31.

[36] New Permittees shall inspect and, if needed, clean all catch basins and inlets owned or operated by the Permittee in accordance with the requirements of S5.C.7.c once during the permit term, to be completed no later than December 31, 2028.

d. Implement practices, policies, and procedures to reduce stormwater impacts associated with runoff from all lands owned or maintained by the Permittee, and road maintenance activities under the functional control of the Permittee. No later than December 31, 2027, document the practices, policies, and procedures. Lands owned or maintained by the Permittee include but are not limited to: streets; parking lots; roads; highways; buildings; parks; open space; road rights-of-way; maintenance yards; and stormwater treatment and flow control BMPs/facilities.

   The following activities shall be addressed:

   i. Pipe cleaning;

   ii. Cleaning of culverts that convey stormwater in ditch systems;

   iii. Ditch maintenance;

   iv. Street cleaning;

   v. Road repair and resurfacing, including pavement grinding;

   vi. Snow and ice control;

   vii. Utility installation;

   viii. Pavement striping maintenance;

   ix. Maintaining roadside areas, including vegetation management;

   x. Dust control;

   xi. Application of fertilizers, pesticides, and herbicides according to the instructions for their use including reducing nutrients and pesticides using alternatives that minimize environmental impacts;

   xii. Sediment and erosion control;

   xiii. Landscape maintenance and vegetation disposal;

   xiv. Trash and pet waste management;

   xv. Building exterior cleaning and maintenance; and

      (a) For Permittee-owned buildings built or renovated between 1950-1980, update policies, practices, or procedures to include Source Control BMPs to minimize PCBs from entering the MS4. Permittees shall not discharge washdown water to the MS4 if the building is confirmed or suspected to have PCB-containing materials.

xvi. Preparing Permittee-owned buildings for renovation or demolition.

  (a) Update policies, practices, or procedures to include Source Control BMPs for building materials to prevent PCBs from entering the MS4 in preparation for and during demolition and renovations.

e. No later than July 1, 2027, develop and implement a municipal street sweeping program to target high priority areas and times during the year that would reasonably be expected to result in the maximum water quality benefits to receiving waters. The following program elements shall be included:

  i. Apply street sweeping program to publicly owned roads in MS4 drainage areas that discharge to outfalls. Within those areas, sweep the following high priority areas, where applicable:

    (a) High traffic roads, such as arterials;

    (b) Accessible curb and gutter streets - permittees may need to implement parking restrictions or other effective methods to optimize pollutant removal;

    (c) Areas with significant tire wear, e.g. roundabouts, high traffic intersections, municipal-operated parking lots;

    (d) Areas with significant tree canopy with seasonal leaf litter drop;

    (e) Municipal roads that serve commercial or industrial land use areas; and

    (f) MS4 basins that discharge to surface receiving waters that support salmonids.

  ii. Sweep high priority areas at least once between July and September each year and two additional times a year as determined by the Permittee to provide additional water quality benefits. For calendar year 2027, only one sweeping event is required.

    a. Permittees may document reasoning for alternative sweeping timing and frequency based on local conditions (e.g., climate) and estimated pollutant deposition quantities. Documentation shall also be based on actual maintenance experience and be certified in accordance with G19 – *Certification and Signature*.

b. If a Permittees' existing overall street sweeping program provides equivalent or greater street sweeping frequency relative to the requirements above, the Permittee may continue to implement its existing street sweeping program. Documentation shall be certified in accordance with G19 – *Certification and Signature*.

iii. Annually sweep at least 90% of high priority areas within the MS4 drainage areas.

iv. Follow equipment design performance specifications to ensure that street sweeping equipment is operated at the proper design speed with appropriate verification, and that it is properly maintained.

v. Permittee shall dispose of sweeper waste material in accordance with Appendix 6- *Street Waste Disposal*.

vi. Document the road type and level of traffic served (e.g. AADT or estimated # of vehicles served) of roads swept, frequency, type of sweeper, lane miles, a map of the areas and land uses swept, and approximation of street waste removed. Begin reporting with the Annual Report March 31, 2029.

f. Implement a Stormwater Pollution Prevention Plan (SWPPP) for all heavy equipment maintenance or storage yards and material storage facilities owned or operated by the Permittee in areas subject to this Permit that are not required to have coverage under the Industrial Stormwater General Permit or another NPDES permit that authorizes stormwater discharges associated with the activity. SWPPPs shall include the following information, at a minimum:

i. A detailed description of the operational and structural BMPs in use at the facility and a schedule for implementation of additional BMPs when needed. BMPs selected shall be consistent with the *Stormwater Management Manual for Western Washington*, or a Phase I program approved by Ecology. The SWPPP shall be updated as needed to maintain relevancy with the facility.

ii. At minimum, annual inspections of the facility, including visual observations of discharges, to evaluate the effectiveness of the BMPs, identify maintenance needs, and determine if additional or different BMPs are needed. The results of these inspections shall be documented in an inspection report or check list.

   iii. An inventory of the materials and equipment stored on-site, and the activities conducted at the facility which may be exposed to precipitation or runoff and could result in stormwater pollution.

   iv. A site map showing the facility's stormwater drainage, discharge points, and areas of potential pollutant exposure.

   v. A plan for preventing and responding to spills at the facility which could result in an illicit discharge.

g. Implement an ongoing training program for employees of the Permittee whose primary construction, operations, or maintenance job functions may impact stormwater quality. The training program shall address the importance of protecting water quality, operation and maintenance standards, inspection procedures, relevant SWPPPs, selecting appropriate BMPs, street sweeper operation, ways to perform their job activities to prevent or minimize impacts to water quality, and procedures for reporting water quality concerns. Follow-up training shall be provided as needed to address changes in procedures, techniques, requirements, or staffing. Permittees shall document and maintain records of training provided. The staff training records to be kept include dates, activities or course descriptions, and names and positions of staff in attendance.

h. Maintain records of the activities conducted to meet the requirements of this Section.

## S6. STORMWATER MANAGEMENT PROGRAM FOR SECONDARY PERMITTEES

### A. Secondary Permittees and New Secondary Permittees Coverage

This Section applies to all Secondary Permittees and all New Secondary Permittees, whether coverage under this Permit is obtained individually or as a Co-Permittee with a city, town, county, or another Secondary Permittee.

New Secondary Permittees subject to this Permit shall fully meet the requirements of this Section as modified in the footnotes in S6.D below, or as established as a condition of coverage by Ecology.

1. To the extent allowable under state, federal or local law, all components are mandatory for each Secondary Permittee covered under this Permit, whether covered as an individual Permittee or as a Co-Permittee.
2. Each Secondary Permittee shall develop and implement a Stormwater Management Program (SWMP). A SWMP is a set of actions and activities comprising the components listed in S6 and any additional actions necessary to meet the requirements of applicable TMDLs pursuant to S7 – *Compliance with Total Maximum Daily Load Requirements*. The SWMP shall be designed to reduce the discharge of pollutants from regulated small MS4s to the MEP and protect water quality.
3. Unless an alternate implementation schedule is established by Ecology as a condition of permit coverage, the SWMP shall be developed and implemented in accordance with the schedules contained in this Section and shall be fully developed and implemented no later than four and one-half years from the initial permit coverage date. Secondary Permittees that are already implementing some or all of the required SWMP components shall continue implementation of those components.
4. Secondary Permittees may implement parts of their SWMP in accordance with the schedule for cities, towns, and counties in S5, provided they have signed a memorandum of understanding or other agreement to jointly implement the activity or activities with one or more jurisdictions listed in S1.D.2.a or S1.D.2.b and submitted a copy of the agreement to Ecology.
5. Each Secondary Permittee shall prepare written documentation of the SWMP, called the SWMP Plan. The SWMP Plan shall be updated annually to include a description of program activities for the upcoming calendar year, and shall be submitted with the Annual Report.

## B. Coordination

Secondary Permittees shall coordinate stormwater-related policies, programs, and projects within a watershed and interconnected MS4s. Where relevant and appropriate, the SWMP shall coordinate among departments of the Secondary Permittee to ensure compliance with the terms of this Permit.

## C. Legal Authority

To the extent allowable under state law and federal law, each Secondary Permittee shall be able to demonstrate that they can operate pursuant to legal authority which authorizes or enables the Secondary Permittee to control discharges to and from MS4s owned or operated by the Secondary Permittee.

This legal authority may be a combination of statutes, ordinances, permits, contracts, orders, interagency agreements, or similar instruments.

## D. Stormwater Management Program for Secondary Permittees

The SWMP for Secondary Permittees shall include the following components:

### 1. Public Education and Outreach

Each Secondary Permittee shall implement the following stormwater education strategies:

a. Storm drain inlets owned or operated by the Secondary Permittee that are located in maintenance yards, in parking lots, along sidewalks, and at pedestrian access points shall be clearly labeled with a message similar to "Dump no waste – Drains to waterbody."[37]

   As identified during visual inspection and regular maintenance of storm drain inlets per the requirements of S6.D.3.d and S6.D.6.a.i, below, or as otherwise reported to the Secondary Permittee, any inlet having a label that is no longer clearly visible and/or easily readable shall be re-labeled within 90 days.

b. Each year beginning no later than three years from the initial date of permit coverage, public ports, colleges, and universities shall distribute educational information to tenants and residents on the impact of stormwater discharges on receiving waters, and steps that can be taken to reduce pollutants in stormwater runoff. Distribution may be by hard copy or electronic means. Appropriate topics may include:

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[37] New Secondary Permittees shall label all inlets as described in S6.D.1.a no later than four years from the initial date of permit coverage.

i. How stormwater runoff affects local water bodies;

ii. Proper use and application of pesticides and fertilizers;

iii. Benefits of using well-adapted vegetation;

iv. Alternative equipment washing practices, including cars and trucks that minimize pollutants in stormwater;

v. Benefits of proper vehicle maintenance and alternative transportation choices; proper handling and disposal of vehicle wastes, including the location of hazardous waste collection facilities in the area;

vi. Hazards associated with illicit connections and illicit discharges;

vii. Benefits of litter control of pet waste; and

viii. Source control BMPs for building materials to reduce pollution to stormwater, including but not limited to, stormwater pollution from PCB-containing materials.

2. **Public Involvement and Participation**

Each year, no later than May 31, each Secondary Permittee shall:

a. Make the annual report available on the Permittee's website; and

b. Make available on the Permittee's website, the latest updated version of the SWMP Plan.

3. **Illicit Discharge Detection and Elimination**

Each Secondary Permittee shall:

a. From the initial date of permit coverage, comply with all relevant ordinances, rules, and regulations of the local jurisdiction(s) in which the Secondary Permittee is located that govern non-stormwater discharges.

b. Implement appropriate policies prohibiting illicit discharges,[38] and an enforcement plan to ensure compliance with illicit discharge policies.[39] These policies shall address, at a minimum: illicit connections, non-stormwater discharges, including spills of hazardous materials, and improper disposal of pet waste and litter.

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[38] New Secondary Permittees shall develop and implement appropriate policies prohibiting illicit discharges and identify possible enforcement mechanisms as described in S6.D.3.b no later than one year from the initial date of permit coverage.

[39] New Secondary Permittees shall develop and implement an enforcement plan as described in S6.D.3.b no later than 18 months from the initial date of permit coverage.

i. *Allowable discharges*: The policies do not need to prohibit the following categories of non-stormwater discharges:

(a) Diverted stream flows;

(b) Rising groundwaters;

(c) Uncontaminated groundwater infiltration (as defined at 40 CFR 35.2005(b)(20));

(d) Uncontaminated pumped groundwater;

(e) Foundation drains;

(f) Air conditioning condensation;

(g) Irrigation water from agricultural sources that is commingled with urban stormwater;

(h) Springs;

(i) Uncontaminated water from crawl space pumps;

(j) Footing drains;

(k) Flows from riparian habitats and wetlands;

(l) Discharges from emergency firefighting activities in accordance with S2 – *Authorized Discharges*; and

(m) Non-stormwater discharges authorized by another NPDES or State Waste Discharge permit.

ii. *Conditionally allowable discharges*: The policies may allow the following categories of non-stormwater discharges only if the stated conditions are met and such discharges are allowed by local codes:

(a) Discharges from potable water sources, including but not limited to water line flushing, hyperchlorinated water line flushing.

(b) Fire hydrant system flushing, and pipeline hydrostatic test water. Planned discharges shall be dechlorinated to a total residual chlorine concentration of 0.1 ppm or less, pH-adjusted if necessary, and volumetrically and velocity controlled to prevent resuspension of sediments in the MS4.

(c) Discharges from lawn watering and other irrigation runoff. These discharges shall be minimized through, at a minimum, public education activities and water conservation efforts conducted by the Secondary Permittee and/or the local jurisdiction.

(d) Discharges from swimming pools, spas, and hot tubs. The discharges shall be dechlorinated to a total residual chlorine concentration of 0.1 ppm or less, pH-adjusted and reoxygenated if necessary, and volumetrically and velocity controlled to prevent resuspension of sediments in the MS4. Discharges shall be thermally controlled to prevent an increase in temperature of the receiving water. Swimming pool cleaning wastewater and filter backwash shall not be discharged to the MS4.

(e) Street and sidewalk wash water, water used to control dust that does not use detergents. The Secondary Permittee shall reduce these discharges through, at a minimum, public education activities and/or water conservation efforts conducted by the Secondary Permittee and/or the local jurisdiction. To avoid washing pollutants into the MS4, the Secondary Permittee shall minimize the amount of street wash and dust control water used.

(f) Routine external building washdown that does not use detergents for buildings built before 1950 and after 1980. The Permittee shall reduce these discharges through, at minimum, public education activities or water conservation efforts, or both. To avoid washing pollutants into the MS4, Permittees shall minimize the amount of wash water used.

Commercial, public, institutional, and industrial structures constructed or remodeled between the years 1950 and 1980 (i.e. those most likely to have PCB containing building materials), shall be assessed for PCB-containing materials consistent with *How to Find PCBs in Building Materials* guidance (Ecology, 2022; Publication No. 22-040-024) prior to routine building washdown. Structures confirmed or suspected to have PCB-containing materials shall not discharge washdown water to the MS4. Structures built between 1950-1980, without PCB-containing materials, may proceed with routine building washdown (without detergents) as described above.

(g) Other non-stormwater discharges shall be in compliance with the requirements of a pollution prevention plan reviewed by the Permittee which addresses control of such discharges.

iii. The Secondary Permittee shall address any category of discharges in (i) or (ii), above, if the discharge is identified as a significant source of pollutants to waters of the State.

c. Maintain a storm sewer system map showing the locations of all known MS4 outfalls and discharge points, labeling the receiving waters (other than groundwater) and delineating the areas contributing runoff to each outfall and discharge point. Make the map (or completed portions of the map) available on request to Ecology and to the extent appropriate to other Permittees.

   i. No later than December 31, 2026, the required format for mapping is an electronic format with fully described mapping standards.[40]

   ii. No later than March 31, 2027, Permittees shall submit locations of all known MS4 outfalls according to the standard templates and format provided in the Annual Report. This reporting shall include the size and material of the outfalls.

d. Conduct field inspections and visually inspect for illicit discharges at all known MS4 outfalls and discharge points. Visually inspect at least one third (on average) of all known outfalls and discharge points each year beginning no later than two years from the initial date of permit coverage. Implement procedures to identify and remove any illicit discharges. Keep records of inspections and follow-up activities.

e. Implement a spill response plan that includes coordination with a qualified spill responder.[41]

f. No later than two years from initial date of permit coverage, provide staff training or coordinate with existing training efforts to educate staff on proper BMPs for preventing illicit discharges, including spills. Train all Secondary Permittee staff who, as part of their normal job responsibilities, have a role in preventing such illicit discharges.

**4. Construction Site Stormwater Runoff Control**

From the initial date of permit coverage, each Secondary Permittee shall:

a. Comply with all relevant ordinances, rules, and regulations of the local jurisdiction(s) in which the Secondary Permittee is located that govern construction phase stormwater pollution prevention measures.

b. Ensure that all construction projects under the functional control of the Secondary Permittee which require a construction stormwater permit obtain coverage under the NPDES *Construction Stormwater General Permit* or an

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[40] New Secondary Permittees shall meet the requirements of S6.D.3.c no later than four and one-half years from the initial date of permit coverage.

[41] New Secondary Permittees shall develop and implement a spill response plan as described in S6.D.3.e no later than four and one-half years from the initial date of permit coverage.

individual NPDES permit prior to discharging construction related stormwater.

c. Coordinate with the local jurisdiction regarding projects owned or operated by other entities which discharge into the Secondary Permittee's MS4, to assist the local jurisdiction with achieving compliance with all relevant ordinances, rules, and regulations of the local jurisdiction(s).

d. Provide training or coordinate with existing training efforts to educate relevant staff in erosion and sediment control BMPs and requirements or hire trained contractors to perform the work.

e. Coordinate, as requested, with Ecology or the local jurisdiction to provide access for inspection of construction sites or other land disturbances which are under the functional control of the Secondary Permittee during land disturbing activities and/or construction period.

### 5. Post-Construction Stormwater Management for New Development and Redevelopment

From the initial date of permit coverage, each Secondary Permittee shall:

a. Comply with all relevant ordinances, rules, and regulations of the local jurisdiction(s) in which the Secondary Permittee is located that govern post-construction stormwater pollution prevention measures.

b. Coordinate with the local jurisdiction regarding projects owned or operated by other entities which discharge into the Secondary Permittee's MS4 to assist the local jurisdiction with achieving compliance with all relevant ordinances, rules, and regulations of the local jurisdiction(s).

### 6. Pollution Prevention and Good Housekeeping for Municipal Operations

Each Secondary Permittee shall:

a. Implement a municipal operation and maintenance (O&M) plan to minimize stormwater pollution from activities conducted by the Secondary Permittee. The O&M Plan shall include appropriate pollution prevention and good housekeeping procedures for all the following operations, activities, and/or types of facilities that are present within the Secondary Permittee's boundaries and under the functional control of the Secondary Permittee.[42] The O&M Plan Shall be updated, as needed, no later than July 1, 2027.

   i. *Stormwater collection and conveyance systems* including catch basins, stormwater pipes, open channels, culverts, and stormwater treatment

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[42] New Secondary Permittees shall develop and implement the operation and maintenance plan described in S6.D.6.a no later than three years from initial date of permit coverage.

and flow control BMPs/facilities. The O&M Plan shall address, at a minimum: scheduled inspections and maintenance activities including cleaning and proper disposal of waste removed from the system. Secondary Permittees shall properly maintain stormwater collection and conveyance systems owned or operated by the Secondary Permittee and annually inspect and maintain all stormwater facilities to ensure facility function.

Secondary Permittees shall establish maintenance standards that are as protective or more protective of facility function than those specified in the *Stormwater Management Manual for Western Washington*. Secondary Permittees shall review their maintenance standards to ensure they are consistent with the requirements of this Section.

Secondary Permittees shall conduct spot checks of potentially damaged permanent stormwater treatment and flow control BMPs/facilities following major storm events (24-hour storm event with a 10-year or greater recurrence interval).

ii. *Roads, highways, and parking lots*. The O&M Plan shall address, at a minimum: deicing, anti-icing, and snow removal practices; snow disposal areas; material (e.g., salt, sand, or other chemical) storage areas; and all-season BMPs to reduce road and parking lot debris and other pollutants from entering the MS4.

iii. *Vehicle fleets*. The O&M Plan shall address, at a minimum: storage, washing, and maintenance of Secondary Permittee vehicle fleets; and fueling facilities. Secondary Permittees shall conduct all vehicle and equipment washing and maintenance in a self-contained covered building or in designated wash and/or maintenance areas.

iv. *External building maintenance*. The O&M Plan shall address, at a minimum: building exterior cleaning and maintenance including cleaning, washing, painting; maintenance and management of dumpsters; and other maintenance activities. For buildings owned by the Secondary Permittee and built between 1950 and 1980, the O&M Plan shall include building material assessment for PCBs consistent with *How to Find and Address PCBs in Building Materials* guidance (Ecology, 2022; Publication No. 22-040-024) prior to exterior building washdown. Structures confirmed or suspected to have PCB-containing materials shall not discharge washdown water to the MS4.

v. *Preparing Permittee-owned buildings for renovation or demolition.* The O&M Plan shall address Source Control BMPs for building materials to prevent PCBs from entering the MS4 in preparation for and during demolition and renovations.

vi. *Parks and open space*. The O&M Plan shall address, at a minimum: proper application of fertilizer, pesticides, and herbicides; sediment and erosion control; BMPs for landscape maintenance and vegetation disposal; and trash and pet waste management.

vii. *Material storage facilities and heavy equipment maintenance or storage yards*. Secondary Permittees shall develop and implement a Stormwater Pollution Prevention Plan to protect water quality at each of these facilities owned or operated by the Secondary Permittee and not covered under the *Industrial Stormwater General Permit* or under another NPDES permit that authorizes stormwater discharges associated with the activity.

viii. *Other facilities* that would reasonably be expected to discharge contaminated runoff. The O&M Plan shall address proper stormwater pollution prevention practices for each facility.

b. From the initial date of permit coverage, Secondary Permittees shall also have permit coverage for all facilities operated by the Secondary Permittee that are required to be covered under the Industrial Stormwater General Permit or another NPDES permit that authorizes discharges associated with the activity.

c. The O&M Plan shall include sufficient documentation and records as necessary to demonstrate compliance with the O&M Plan requirements in S6.D.6.a(i) through (vii), above.

d. No later than three years from the initial date of permit coverage, Secondary Permittees shall implement a program designed to train all employees whose primary construction, operations, or maintenance job functions may impact stormwater quality. The training shall address:

   i. The importance of protecting water quality;

   ii. The requirements of this Permit;

   iii. Operation and maintenance requirements;

   iv. Inspection procedures;

   v. Ways to perform their job activities to prevent or minimize impacts to water quality; and

vi. Procedures for reporting water quality concerns, including potential illicit discharges (including spills).

## S7. COMPLIANCE WITH TOTAL MAXIMUM DAILY LOAD REQUIREMENTS

The following requirements apply if an applicable TMDL is approved for stormwater discharges from MS4s owned or operated by the Permittee. Applicable TMDLs are TMDLs which have been approved by EPA on or before the issuance date of this Permit or prior to the date that Ecology issues coverage under this Permit, whichever is later.

### A. TMDL Specific Requirements

1. For applicable TMDLs listed in Appendix 2, affected Permittees shall comply with the specific requirements identified in Appendix 2. Each Permittee shall keep records of all actions required by this Permit that are relevant to applicable TMDLs within their jurisdiction. The status of the TMDL implementation shall be included as part of the annual report submitted to Ecology. Each annual report shall include a summary of relevant SWMP and Appendix 2 activities conducted in the TMDL area to address the applicable TMDL parameter(s).
2. For applicable TMDLs not listed in Appendix 2, compliance with this Permit shall constitute compliance with those TMDLs.

## S8. MONITORING AND ASSESSMENT

### A. Regional Status and Trends Monitoring

1. All Permittees that chose S8.A.2 Regional Status and Trends Monitoring Option in the *Phase II Western Washington Municipal Stormwater Permit*, August 1, 2019 – July 31, 2024, shall make a one-time payment into the Stormwater Action Monitoring (SAM) collective fund to implement regional small streams and marine nearshore areas status and trends monitoring in Puget Sound or, urban streams in the Lower Columbia River basin. This payment is due on or before December 1, 2024. Submit payment according to S8.D, below.
2. All City and County Permittees covered under the *Phase II Western Washington Municipal Stormwater Permit*, August 1, 2019 – July 31, 2024, except the Cities of Aberdeen and Centralia, shall notify Ecology in writing which of the following two options for regional status and trends monitoring (S8.A.2.a or S8.A.2.b) the Permittee chooses to carry out during this permit term. The written notification with G19 signature is due to Ecology no later than December 1, 2024. Either option will fully satisfy the Permittee’s obligations under this Section (S8.A.2). Each Permittee shall select a single option for this permit term.

a. Make annual payments into a Stormwater Action Monitoring (SAM) collective fund to implement regional receiving water status and trends monitoring of either: small streams and marine nearshore areas in Puget Sound, or urban streams in Clark and Cowlitz Counties in the Lower Columbia River basin, depending on the Permittee's location. The annual payments into the collective fund are due on or before August 15 each year beginning in 2025. Submit payments according to S8.D, below.

***Or***

b. Conduct stormwater discharge monitoring per the requirements in S8.C.

## B. Stormwater Management Program (SWMP) Effectiveness and Source Identification Studies

**1.** All Permittees that chose S8.B Effectiveness Studies Option in the *Phase II Western Washington Municipal Stormwater Permit,* August 1, 2019 – July 31, 2024, shall make a one-time payment into the collective fund for Stormwater Action Monitoring (SAM) to implement effectiveness studies and source identification studies. The payment is due on or before December 1, 2024. Submit payment according to S8.D, below.

**2.** All City and County Permittees covered under the *Phase II Western Washington Municipal Stormwater Permit*, August 1, 2019 – July 31, 2024, shall notify Ecology in writing which of the following two options (S8.B.2.a or S8.B.2.b) for effectiveness and source identification studies the Permittee chooses to carry out during this permit term. The written notification with G19 signature is due to Ecology no later than December 1, 2024. Either option will fully satisfy the Permittee's obligations under this Section (S8.B.2). Each Permittee shall select a single option for this permit term.

a. Make annual payments into a SAM collective fund to implement effectiveness and source identification studies. The annual payments into the collective fund are due on or before August 15 each year beginning in 2025. Submit payments according to S8.D, below.

***Or***

b. Conduct stormwater discharge monitoring per the requirements in S8.C.

3. All Permittees shall provide information as requested for effectiveness and source identification studies that are under contract with Ecology as active Stormwater Action Monitoring (SAM) projects. These requests will be limited to records of SWMP activities and associated data tracked and/or maintained in accordance with S5 – *Stormwater Management Program for Cities, Towns, and Counties* and/or S9 – *Reporting Requirements*. A maximum of three requests during the permit term from the SAM Coordinator will be transmitted to the Permittee's permit coordinator via Ecology's regional permit manager. The Permittee shall have 90 days to provide the requested information.

**C. Stormwater discharge monitoring.**

1. This Section applies only to Permittees who choose to conduct stormwater discharge monitoring per S8.A.2.b and/or S8.B.2.b in lieu of participation in the regional status and trends monitoring and/or effectiveness and source identification studies. These Permittees shall conduct monitoring in accordance with Appendix 9 and an Ecology-approved Quality Assurance Project Plan (QAPP) as follows:

   a. Permittees who choose the option to conduct stormwater discharge monitoring for either S8.A.2 or S8.B.2 shall monitor three independent discharge locations.

      Permittees who choose the option to conduct stormwater discharge monitoring for both S8.A.2 and S8.B.2 shall conduct this monitoring at a total of six locations; at least four locations shall be independent (one location may be nested in another basin).

   b. No later than February 1, 2025, each Permittee shall submit to Ecology a draft stormwater discharge monitoring QAPP for review and approval. The QAPP shall be prepared in accordance with the requirements in Appendix 9. The final QAPP shall be submitted to Ecology for approval as soon as possible following finalization, and before August 15, 2025 or within 60 days of receiving Ecology's comments on the draft QAPP (whichever is later).

   c. Flow monitoring shall begin no later than October 1, 2025, or within 30 days of receiving Ecology's approval of the final QAPP (whichever is later). Stormwater discharge monitoring shall be fully implemented no later than October 1, 2026.

   d. Data and analyses shall be reported annually in accordance with the Ecology-approved QAPP. Each Permittee shall enter into the Department's Environmental Information Management (EIM) database all water and solids concentration data collected pursuant to Appendix 9.

vii. Within 60 days of completing the study, or no later than March 31, 2029, publish a final report with the results of the study and recommended future actions based on findings, include a summary of results.

## D. Payments into the Stormwater Action Monitoring Collective Fund.

**1.** This Section applies to all Permittees who choose to make annual payments into the SAM collective funds for S8.A *Regional Status and Trends Monitoring* and/or S8.B *Effectiveness and Source Identification Studies*.

**2.** Each Permittee's S8.A and S8.B payment amounts are listed in Appendix 11 and in the invoices that will be sent to the Permittee approximately three months in advance of each payment due date. Mail payments according to the instructions in the invoice.

## S9. REPORTING & RECORDKEEPING REQUIREMENTS

### A. Annual Report Submittal

1. No later than March 31 of each year beginning in 2025, each Permittee shall submit an Annual Report. The reporting period for the first Annual Report will be from January 1, 2024, through December 31, 2024. The reporting period for all subsequent Annual Reports will be the previous calendar year unless otherwise specified.
2. Permittees shall submit Annual Reports electronically using Ecology's Water Quality Permitting Portal (WQWebPortal) available on Ecology's website.
3. Permittees unable to submit electronically through Ecology's WQWebPortal shall contact Ecology to request a waiver and obtain instructions on how to submit an annual report in an alternative format.

### B. Records Retention

Each Permittee is required to keep all records related to this Permit and the SWMP for at least five years after the expiration date of this Permit.

### C. Records Available to the Public

Each Permittee shall make all records related to this Permit and the Permittee's SWMP available to the public at reasonable times during business hours. The Permittee will provide a copy of the most recent annual report to any individual or entity, upon request.

1. A reasonable charge may be assessed by the Permittee for making photocopies of records.
2. The Permittee may require reasonable advance notice of intent to review records related to this Permit.

### D. Annual Report for Cities, Towns, and Counties

Each annual report shall include the following:

1. A copy of the Permittee's current Stormwater Management Program Plan (SWMP Plan), as required by S5.A.2.
2. Submittal of the annual report form as provided by Ecology pursuant to S9.A, describing the status of implementation of the requirements of this Permit during the reporting period.

3. Attachments to the annual report form including summaries, descriptions, reports, and other information as required, or as applicable, to meet the requirements of this Permit during the reporting period, or as a required submittal. Refer to Appendix 3 for annual report questions.[43]
4. If applicable, notice that the MS4 is relying on another entity to satisfy any of the obligations under this Permit.
5. Certification and signature pursuant to G19.D, and notification of any changes to authorization pursuant to G19.C.
6. A notification of any annexations, incorporations or jurisdictional boundary changes resulting in an increase or decrease in the Permittee's geographic area of permit coverage during the reporting period.

### E. Annual Report for Secondary Permittees

Each annual report shall include the following:

1. A copy of the Permittee's current Stormwater Management Program Plan (SWMP Plan), as required by S6.A.2.
2. Submittal of the annual report form as provided by Ecology pursuant to S9.A, describing the status of implementation of the requirements of this Permit during the reporting period.
3. Attachments to the annual report form including summaries, descriptions, reports, and other information as required, or as applicable, to meet the requirements of this Permit during the reporting period. Refer to Appendix 4 for annual report questions.
4. If applicable, notice that the MS4 is relying on another entity to satisfy any of the obligations under this Permit.
5. Certification and Signature pursuant to G19.D, and notification of any changes to authorization pursuant to G19.C.
6. A notification of any jurisdictional boundary changes resulting in an increase or decrease in the Secondary Permittee's geographic area of permit coverage during the reporting period.

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[43] New Permittees refer to Appendix 5 for annual report questions.

# GENERAL CONDITIONS

## G1. DISCHARGE VIOLATIONS

All discharges and activities authorized by this Permit shall be consistent with the terms and conditions of this Permit.

## G2. PROPER OPERATION AND MAINTENANCE

The Permittee shall, at all times, properly operate and maintain all facilities and systems of collection, treatment, and control (and related appurtenances) which are installed or used by the Permittee for pollution control to achieve compliance with the terms and conditions of this Permit.

## G3. NOTIFICATION OF DISCHARGE, INCLUDING SPILLS

If a Permittee has knowledge of a discharge, including spills, into or from a MS4 which could constitute a threat to human health, welfare, or the environment, the Permittee shall:

**A.** Take appropriate action to correct or minimize the threat to human health, welfare and/or the environment;

**B.** Notify the Ecology regional office and other appropriate spill response authorities immediately but in no case later than within 24 hours of obtaining that knowledge;

**C.** Immediately report spills or other discharges which might cause bacterial contamination of marine waters, such as discharges resulting from broken sewer lines and failing onsite septic systems, to the Ecology regional office and to the Department of Health, Shellfish Program; and

**D.** Immediately report spills or discharges of oils or hazardous substances to the Ecology regional office and to the Washington Emergency Management Division at 1-800-258-5990.

## G4. BYPASS PROHIBITED

The intentional bypass of stormwater from all or any portion of a stormwater treatment BMP whenever the design capacity of the treatment BMP is not exceeded, is prohibited unless the following conditions are met:

**A.** Bypass is: (1) unavoidable to prevent loss of life, personal injury, or severe property damage; or (2) necessary to perform construction or maintenance-related activities essential to meet the requirements of the *Clean Water Act* (CWA); and

**B.** There are no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated stormwater, or maintenance during normal dry periods.

"Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

## G5. RIGHT OF ENTRY

The Permittee shall allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law at reasonable times:

**A.** To enter upon the Permittee's premises where a discharge is located or where any records shall be kept under the terms and conditions of this Permit;

**B.** To have access to, and copy at reasonable cost and at reasonable times, any records that shall be kept under the terms of the Permit;

**C.** To inspect at reasonable times any monitoring equipment or method of monitoring required in the Permit;

**D.** To inspect at reasonable times any collection, treatment, pollution management, or discharge facilities; and

**E.** To sample at reasonable times any discharge of pollutants.

## G6. DUTY TO MITIGATE

The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this Permit which has a reasonable likelihood of adversely affecting human health or the environment.

## G7. PROPERTY RIGHTS

This Permit does not convey any property rights of any sort, or any exclusive privilege.

## G8. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in the Permit shall be construed as excusing the Permittee from compliance with any other applicable federal, state, or local statutes, ordinances, or regulations.

## G9. MONITORING

### A. Representative Sampling

Samples and measurements taken to meet the requirements of this Permit shall be representative of the volume and nature of the monitored discharge, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets, and maintenance-related conditions affecting effluent quality.

### B. Records Retention

The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this Permit, and records of all data used to complete the application for this Permit, for a period of at least five years. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the Ecology. On request, monitoring data and analysis shall be provided to Ecology.

### C. Recording of Results

For each measurement or sample taken, the Permittee shall record the following information: (1) the date, exact place and time of sampling; (2) the individual who performed the sampling or measurement; (3) the dates the analyses were performed; (4) who performed the analyses; (5) the analytical techniques or methods used; and (6) the results of all analyses.

### D. Test Procedures

All sampling and analytical methods used to meet the monitoring requirements in this Permit shall conform to the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136, unless otherwise specified in this Permit or approved in writing by Ecology.

### E. Flow Measurement

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to ensure that the accuracy of the measurements is consistent with the accepted industry standard for that type of device. Frequency of calibration shall be in conformance with manufacturer's recommendations or at a minimum frequency of at least one calibration per year. Calibration records should be maintained for a minimum of three years.

### F. Lab Accreditation

All monitoring data, except for flow, temperature, conductivity, pH, total residual chlorine, and other exceptions approved by Ecology, shall be prepared by a laboratory registered or accredited under the provisions of, *Accreditation of Environmental Laboratories*, Chapter 173-50 WAC. Soils and hazardous waste data are exempted from this requirement pending accreditation of laboratories for analysis of these media by Ecology. Quick methods of field detection of pollutants including nutrients, surfactants, salinity, and other parameters are exempted from this requirement when the purpose of the sampling is identification and removal of a suspected illicit discharge.

### G. Additional Monitoring

Ecology may establish specific monitoring requirements in addition to those contained in this Permit by administrative order or permit modification.

## G10. REMOVED SUBSTANCES

With the exception of decant from street waste vehicles, the Permittee shall not allow collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of stormwater to be resuspended or reintroduced to the MS4 or to waters of the State. Decant from street waste vehicles resulting from cleaning stormwater facilities may be reintroduced only when other practical means are not available and only in accordance with the *Street Waste Disposal* guidelines in Appendix 6. Solids generated from maintenance of the MS4 may be reclaimed, recycled, or reused when allowed by local codes and ordinances. Soils that are identified as contaminated pursuant to Chapter 173-350 WAC shall be disposed at a qualified solid waste disposal facility (see Appendix 6).

## G11. SEVERABILITY

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Permit shall not be affected thereby.

## G12. REVOCATION OF COVERAGE

The director may terminate coverage under this General Permit in accordance with Chapter 43.21B RCW and Chapter 173-226 WAC. Cases where coverage may be terminated include, but are not limited to the following:

**A.** Violation of any term or condition of this General Permit;

**B.** Obtaining coverage under this General Permit by misrepresentation or failure to disclose fully all relevant facts;

**C.** A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge;

**D.** A determination that the permitted activity endangers human health or the environment, or contributes significantly to water quality standards violations;

**E.** Failure or refusal of the Permittee to allow entry as required in Chapter 90.48.090 RCW; and

**F.** Nonpayment of permit fees assessed pursuant to Chapter 90.48.465 RCW.

Revocation of coverage under this General Permit may be initiated by Ecology or requested by any interested person.

## G13. TRANSFER OF COVERAGE

The director may require any discharger authorized by this General Permit to apply for and obtain an individual permit in accordance with Chapter 43.21B RCW and Chapter 173-226 WAC.

## G14. GENERAL PERMIT MODIFICATION AND REVOCATION

This General Permit may be modified, revoked and reissued, or terminated in accordance with the provisions of Chapter 173-226-230 WAC. Grounds for modification, revocation and reissuance, or termination include, but are not limited to, the following:

**A.** A change occurs in the technology or practices for control or abatement of pollutants applicable to the category of dischargers covered under this General Permit;

**B.** Effluent limitation guidelines or standards are promulgated pursuant to the CWA or Chapter 90.48 RCW, for the category of dischargers covered under this General Permit;

**C.** A water quality management plan containing requirements applicable to the category of dischargers covered under this General Permit is approved;

**D.** Information is obtained which indicates that cumulative effects on the environment from dischargers covered under this General Permit are unacceptable; or

**E.** Changes in state law that reference this Permit.

## G15. REPORTING A CAUSE FOR MODIFICATION OR REVOCATION

A Permittee who knows or has reason to believe that any activity has occurred, or will occur, which would constitute cause for modification or revocation and reissuance under General Condition G12, G14, or 40 CFR 122.62 shall report such plans, or such information, to Ecology so that a decision can be made on whether action to modify, or revoke and reissue, this Permit will be required. Ecology may then require submission of a new or amended application. Submission of such application does not relieve the Permittee of the duty to comply with this Permit until it is modified or reissued.

## G16. APPEALS

**A.** The terms and conditions of this General Permit, as they apply to the appropriate class of dischargers, are subject to appeal within thirty days of issuance of this General Permit in accordance with Chapter 43.21B RCW, and Chapter 173-226 WAC.

**B.** The terms and conditions of this General Permit, as they apply to an individual discharger, are appealable in accordance with Chapter 43.21B RCW within thirty days of the effective date of coverage of that discharger. Consideration of an appeal of General Permit coverage of an individual discharger is limited to the General Permit's applicability or non-applicability to that individual discharger.

**C.** The appeal of General Permit coverage of an individual discharger does not affect any other dischargers covered under this General Permit. If the terms and conditions of this General Permit are found to be inapplicable to any individual discharger(s), the matter shall be remanded to Ecology for consideration of issuance of an individual permit or permits.

**D.** Modifications of this Permit are appealable in accordance with Chapter 43.21B RCW and Chapter 173-226 WAC.

## G17. PENALTIES

40 CFR 122.41(a)(2) and (3), 40 CFR 122.41(j)(5), and 40 CFR 122.41(k)(2) are hereby incorporated into this Permit by reference.

## G18. DUTY TO REAPPLY

The Permittee shall apply for permit renewal at least 180 days prior to the specified expiration date of this Permit.

## G19. Certification and Signature

All formal submittals to Ecology shall be signed and certified.

**A.** All permit applications shall be signed by either a principal executive officer or ranking elected official.

**B.** All formal submittals required by this Permit shall be signed by a person described, above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described, above, and submitted to Ecology; and
2. The authorization specifies either an individual or a position having responsibility for the overall development and implementation of the stormwater management program. A duly authorized representative may thus be either a named individual or any individual occupying a named position.

**C.** Changes to authorization. If an authorization under condition G19.B.2 is no longer accurate because a different individual or position has responsibility for the overall development and implementation of the stormwater management program, a new authorization satisfying the requirements of condition G19.B.2 shall be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

**D.** Certification. Any person signing a formal submittal under this Permit shall make the following certification:

> "I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that Qualified Personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for willful violations."

## G20. Non-compliance notification

In the event a Permittee is unable to comply with any of the terms and conditions of this Permit, the Permittee shall:

**A.** Notify Ecology of the failure to comply with the permit terms and conditions in writing within 30 days of becoming aware that the non-compliance has occurred. The written notification shall include all of the following:

1. A description of the non-compliance, including dates;
2. Beginning and end dates of the non-compliance, and if the compliance has not been corrected, the anticipated date of correction; and
3. Steps taken or planned to reduce, eliminate, or prevent reoccurrence of the non-compliance.

**B.** Take appropriate action to stop or correct the condition of non-compliance.

## G21. UPSETS

Permittees shall meet the conditions of 40 CFR 122.41(n) regarding "Upsets." The conditions are as follows:

**A.** *Definition*. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

**B.** *Effect of an upset*. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph (C) of this condition are met. Any determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, will not constitute final administrative action subject to judicial review.

**C.** *Conditions necessary for demonstration of upset*. A Permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

1. An upset occurred and that the Permittee can identify the cause(s) of the upset;
2. The permitted facility was at the time being properly operated;
3. The Permittee submitted notice of the upset as required in 40 CFR 122.41(l)(6)(ii)(B) (24-hour notice of noncompliance); and
4. The Permittee complied with any remedial measures required under 40 CFR 122.41(d) (Duty to Mitigate).

**D.** *Burden of proof*. In any enforcement proceeding the Permittee seeking to establish the occurrence of an upset has the burden of proof.

# DEFINITIONS AND ACRONYMS

This Section includes definitions for terms used in the body of the Permit and in all the appendices except Appendix 1. Terms defined in Appendix 1 are necessary to implement requirements related to Appendix 1.

**40 CFR** means Title 40 of the Code of Federal Regulations, which is the codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government.

**AKART** means All Known, Available, and Reasonable methods of prevention, control, and Treatment. See also state *Water Pollution Control Act*, Chapters 90.48.010 and 90.48.520 RCW.

**All Known, Available and Reasonable Methods of Prevention, Control and Treatment (AKART)** refers to the state *Water Pollution Control Act*, Chapters 90.48.010 and 90.48.520 RCW.

**Applicable TMDL** means a TMDL which has been approved by EPA on or before the issuance date of this Permit, or prior to the date that Ecology issues coverage under this Permit, whichever is later.

**Arterial Road –** means a road or street intended to move high volumes of traffic over long distances at high speed, with partial control of access, having some intersections at grade. A major arterial connects an interstate highway to cities and counties. A minor arterial connects major arterials to collectors. A collector connects an arterial to a neighborhood (a collector is not an arterial). A local access road connects individual residences to a collector.

**Beneficial Uses** means uses of waters of the State which include, but are not limited to: use for domestic, stock watering, industrial, commercial, agricultural, irrigation, mining, fish and wildlife maintenance and enhancement, recreation, generation of electric power and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the State.

**Best Management Practices** are the schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices approved by Ecology that, when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington State.

**BMP** means Best Management Practice.

**Bypass** means the diversion of stormwater from any portion of a stormwater treatment facility.

**Circuit** means a portion of a MS4 discharging to a single point or serving a discrete area determined by traffic volumes, land use, topography, or the configuration of the MS4.

**Component** or **Program Component** means an element of the Stormwater Management Program listed in S5 - *Stormwater Management Program for Cities, Towns, and Counties*, S6 – *Stormwater Management Program for Secondary Permittees*, S7 – *Compliance with Total Maximum Daily Load Requirements*, or S8 – *Monitoring and Assessment*, of this Permit.

**Conveyance System** means that portion of the municipal separate storm sewer system designed or used for conveying stormwater.

**Co-Permittee** means an owner or operator of an MS4 which is in a cooperative agreement with at least one other applicant for coverage under this Permit. A Co-Permittee is an owner or operator of a regulated MS4 located within or in proximity to another regulated MS4. A Co-Permittee is only responsible for permit conditions relating to discharges from the MS4 the Co-Permittee owns or operates. See also 40 CFR 122.26(b)(1).

**CWA** means the federal *Clean Water Act* (formerly referred to as the federal *Water Pollution Control Act* or federal *Water Pollution Control Act Amendments of 1972*) Pub.L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. (6-483 and Pub. L. 97-117, 33 U.S.C. 1251 et seq.).

**Director** means the Director of the Washington State Department of Ecology, or an authorized representative.

**Discharge Point** means the location where a discharge leaves the Permittee's MS4 through the Permittee's MS4 facilities/BMPs designed to infiltrate.

**Entity** means a governmental body, or a public or private organization.

**EPA** means the U.S. Environmental Protection Agency.

**Fully Stabilized** means the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as riprap, gabions, or geotextiles) which prevents erosion.

**General Permit** means a permit which covers multiple dischargers of a point source category within a designated geographical area, in lieu of individual permits being issued to each discharger.

**Groundwater** means water in a saturated zone or stratum beneath the surface of the land or below a surface water body. Refer to Chapter 173-200 WAC.

**Hazardous Substance** means any liquid, solid, gas, or sludge, including any material, substance, product, commodity, or waste, regardless of quantity, that exhibits any of the physical, chemical, or biological properties described in Chapter 173-303-090 WAC or Chapter 173-303-100 WAC.

**Heavy Equipment Maintenance or Storage Yard** means an uncovered area where any heavy equipment, such as mowing equipment, excavators, dump trucks, backhoes, or bulldozers are washed or maintained, or where at least five pieces of heavy equipment are stored on a long-term basis.

**Highway** means a main public road connecting towns and cities.

**Hydraulically Near** means runoff from the site discharges to the sensitive feature without significant natural attenuation of flows that allows for suspended solids removal. See Appendix 7- *Determining Construction Site Sediment Damage Potential* for a more detailed definition.

**Hyperchlorinated** means water that contains more than 10 mg/Liter chlorine.

**Illicit Connection** means any infrastructure connection to the MS4 that is not intended, permitted or used for collecting and conveying stormwater or non-stormwater discharges allowed as specified in this Permit (S5.C.5 and S6.D.3). Examples include sanitary sewer connections, floor drains, channels, pipelines, conduits, inlets, or outlets that are connected directly to the MS4.

**Illicit Discharge** means any discharge to a MS4 that is not composed entirely of stormwater or of non-stormwater discharges allowed as specified in this Permit (S5.C.5 and S6.D.3).

**Impervious Surface** means a non-vegetated surface area that either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development. A non-vegetated surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or stormwater areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam or other surfaces which similarly impede the natural infiltration of stormwater.

**Land Disturbing Activity** means any activity that results in a change in the existing soil cover (both vegetative and non-vegetative) and/or the existing soil topography. Land disturbing activities include, but are not limited to clearing, grading, filling and excavation. Compaction that is associated with stabilization of structures and road construction shall also be considered land disturbing activity. Vegetation maintenance practices, including landscape maintenance and gardening, are not considered land disturbing activity. Stormwater facility maintenance is not considered land disturbing activity if conducted according to established standards and procedures.

**LID** means Low Impact Development.

**LID BMP** means Low Impact Development Best Management Practices.

**LID Principles** means land use management strategies that emphasize conservation, use of on-site natural features, and site planning to minimize impervious surfaces, native vegetation loss, and stormwater runoff.

**Low Impact Development (LID)** means a stormwater and land use management strategy that strives to mimic pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design.

**Low Impact Development Best Management Practices (LID BMP)** means distributed stormwater management practices, integrated into a project design, that emphasize pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation and transpiration. LID BMPs include, but are not limited to, bioretention, rain gardens, permeable pavements, roof downspout controls, dispersion, soil quality and depth, vegetated roofs, minimum excavation foundations, and water re-use.

**Material Storage Facilities** means an uncovered area where bulk materials (liquid, solid, granular, etc.) are stored in piles, barrels, tanks, bins, crates, or other means.

**Maximum Extent Practicable** refers to paragraph 402(p)(3)(B)(iii) of the federal *Clean Water Act* which reads as follows: Permits for discharges from municipal storm sewers shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques, and system, design, and engineering methods, and other such provisions as the Administrator or the State determines appropriate for the control of such pollutants.

**MEP** means Maximum Extent Practicable.

**MS4** means Municipal Separate Storm Sewer System.

**Municipal Separate Storm Sewer System** means a conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

1. Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the CWA that discharges to waters of Washington State;
2. Designed or used for collecting or conveying stormwater;
3. Which is not a combined sewer;

4. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.; and
5. Which is defined as “large” or “medium” or “small” or otherwise designated by Ecology pursuant to 40 CFR 122.26.

**National Pollutant Discharge Elimination System** means the national program for issuing, modifying, revoking, and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of the federal *Clean Water Act*, for the discharge of pollutants to surface waters of the State from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington State Department of Ecology.

**Native Vegetation** means vegetation comprised of plant species, other than noxious weeds, that are indigenous to the coastal region of the Pacific Northwest, and which reasonably could have been expected to naturally occur on the site. Examples include trees such as Douglas Fir, western hemlock, western red cedar, alder, big-leaf maple; shrubs such as willow, elderberry, salmonberry, and salal; and herbaceous plants such as sword fern, foam flower, and fireweed.

**New Development** means land disturbing activities, including Class IV General Forest Practices that are conversions from timber land to other uses; structural development, including construction or installation of a building or other structure; creation of hard surfaces; and subdivision, short subdivision and binding site plans, as defined and applied in Chapter 58.17 RCW. Projects meeting the definition of redevelopment shall not be considered new development. Refer to Appendix 1 for a definition of hard surfaces.

**New Permittee** means a city, town, or county that is subject to the Western Washington Municipal Stormwater General Permit and was not subject to the permit prior to July 1, 2024.

**New Secondary Permittee** means a Secondary Permittee that is covered under a Municipal Stormwater General Permit and was not covered by the permit prior to July 1, 2024.

**NOI** means Notice of Intent.

**Notice of Intent (NOI)** means the application for, or a request for coverage under, a General Permit pursuant to Chapter 173-226-200 WAC.

**Notice of Intent for Construction Activity** means the application form for coverage under the *Construction Stormwater General Permit*.

**Notice of Intent for Industrial Activity** means the application form for coverage under the *Industrial Stormwater General Permit*.

**NPDES** means National Pollutant Discharge Elimination System.

**Outfall** means a point source as defined by 40 CFR 122.2 at the point where a discharge leaves the Permittee's MS4 and enters a surface receiving waterbody or surface receiving waters. Outfall does not include pipes, tunnels, or other conveyances which connect segments of the same stream or other surface waters and are used to convey primarily surface waters (i.e., culverts).

**Overburdened Community** means a geographic area where vulnerable populations face combined, multiple environmental harms and health impacts, and includes, but is not limited to, highly impacted communities.

> "Vulnerable populations" means population groups that are more likely to be at higher risk for poor health outcomes in response to environmental harms, due to:
>
> (i) Adverse socioeconomic factors, such as unemployment, high housing and transportation costs relative to income, limited access to nutritious food and adequate health care, linguistic isolation, and other factors that negatively affect health outcomes and increase vulnerability to the effects of environmental harms; and
>
> (ii) Sensitivity factors, such as low birth weight and higher rates of hospitalization.
>
> "Vulnerable populations" includes, but is not limited to:
>
> - Racial or ethnic minorities;
> - Low-income populations;
> - Populations disproportionately impacted by environmental harms; and
> - Populations of workers experiencing environmental harms.
>
> "Highly impacted community" means a community designated by the Department of Health based on cumulative impact analyses or a community located in census tracts that are fully or partially on "Indian country" as defined in 18 U.S.C. Sec. 1151.

**PCBs** means Polychlorinated biphenyls.

**Permittee** unless otherwise noted, the term "Permittee" includes city, town, or county Permittee, Co-Permittee, New Permittee, Secondary Permittee, and New Secondary Permittee.

**PFAS** means Per and Polyfluorinated Substances

**Physically Interconnected** means that one MS4 is connected to another storm sewer system in such a way that it allows for direct discharges to the second system. For example, the roads with drainage systems and municipal streets of one entity are physically connected directly to a storm sewer system belonging to another entity.

**Project site** means that portion of a property, properties, or rights-of-way subject to land disturbing activities, new hard surfaces, or replaced hard surfaces. Refer to Appendix 1 for a definition of hard surfaces.

**QAPP** means Quality Assurance Project Plan.

**Qualified Personnel** means someone who has had professional training in the aspects of stormwater management for which they are responsible and are under the functional control of the Permittee. Qualified Personnel may be staff members, contractors, or trained volunteers with professional certification. Permittees may train and certify volunteers.

**Qualified Third Party** means someone who has had professional training in the aspects of stormwater management for which they are responsible but are hired by private entities and not under the functional control of the Permittee. Qualified Third Parties may be contractors, or consultants.

**Quality Assurance Project Plan** means a document that describes the objectives of an environmental study and the procedures to be followed to achieve those objectives.

**RCW** means the Revised Code of Washington State.

**Receiving Waterbody** or **Receiving Waters** means naturally and/or reconstructed naturally occurring surface water bodies, such as creeks, streams, rivers, lakes, wetlands, estuaries, and marine waters, or groundwater, to which a MS4 discharges.

**Redevelopment** means, on a site that is already substantially developed (i.e., has 35% or more of existing hard surface coverage), the creation or addition of hard surfaces; the expansion of a building footprint or addition or replacement of a structure; structural development including construction, installation or expansion of a building or other structure; replacement of hard surface that is not part of a routine maintenance activity; and land disturbing activities. Refer to Appendix 1 for a definition of hard surfaces.

**Regulated Small Municipal Separate Storm Sewer System** means a Municipal Separate Storm Sewer System which is automatically designated for inclusion in the Phase II stormwater permitting program by its location within an Urban Area, or by designation by Ecology and is not eligible for a waiver or exemption under S1.C.

**Runoff** is water that travels across the land surface and discharges to water bodies either directly or through a collection and conveyance system. See also "**Stormwater**."

**SAM** means Stormwater Action Monitoring

**Secondary Permittee** is an operator of a regulated small MS4 which is not a city, town or county. Secondary Permittees include special purpose districts and other public entities that meet the criteria in S1.B.

**Sediment/Erosion-Sensitive Feature** means an area subject to significant degradation due to the effects of construction runoff, or areas requiring special protection to prevent erosion. See Appendix 7 *Determining Construction Site Sediment Damage Potential* for a more detailed definition.

**Shared Water Bodies** means water bodies, including downstream segments, lakes and estuaries that receive discharges from more than one Permittee.

**Significant Contributor** means a discharge that contributes a loading of pollutants considered to be sufficient to cause or exacerbate the deterioration of receiving water quality or instream habitat conditions.

**Small Municipal Separate Storm Sewer System** means an MS4 that is not defined as “large” or “medium” pursuant to 40 CFR 122.26(b)(4) & (7) or designated under 40 CFR 122.26 (a)(1)(v).

**Source Control BMP** means a structure or operation that is intended to prevent pollutants from coming into contact with stormwater through physical separation of areas or careful management of activities that are sources of pollutants. The SWMMWW separates source control BMPs into two types. Structural Source Control BMPs are physical, structural, or mechanical devices, or facilities, that are intended to prevent pollutants from entering stormwater. Operational BMPs are non-structural practices that prevent or reduce pollutants from entering stormwater.

**Stormwater** means runoff during and following precipitation and snowmelt events, including surface runoff, drainage or interflow.

**Stormwater Action Monitoring (SAM)** is the regional stormwater monitoring program for Washington State. This means a stormwater-focused monitoring and assessment program consisting of these components: status and trends monitoring in small streams and marine nearshore areas, stormwater management program effectiveness studies, and source identification projects. The priorities and scope for SAM are set by a formal stakeholder group that selects the studies and oversees the program’s administration.

**Stormwater Associated with Industrial and Construction Activity** means the discharge from any conveyance which is used for collecting and conveying stormwater, which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant, or associated with clearing, grading and/or excavation, and is required to have an NPDES permit in accordance with 40 CFR 122.26.

**Stormwater Facility Retrofits** means both: projects that retrofit existing treatment and/or flow control facilities; and new flow control or treatment facilities or BMPs that will address impacts from existing development.

**Stormwater Management Program (SWMP)** means a set of actions and activities designed to reduce the discharge of pollutants from the MS4 to the MEP and to protect water quality, and comprising the components listed in S5 (for cities, towns, and counties) or S6 (for Secondary Permittees) of this Permit and any additional actions necessary to meet the requirements of applicable TMDLs pursuant to S7 –*Compliance with TMDL Requirements*, and S8– *Monitoring and Assessment*.

**Stormwater Treatment and Flow Control BMPs/Facilities** means detention facilities, permanent treatment BMPs/facilities; and bioretention, vegetated roofs, and permeable pavements that help meet Appendix 1 Minimum Requirements #6 (treatment), #7 (flow control), or both.

**Surface Waters** includes lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the jurisdiction of the State of Washington.

**SWMMWW** or ***Stormwater Management Manual for Western Washington*** means the technical manual published by the Department of Ecology in 2024 (Publication No. 19-10-021) *(2024).*

**SWMP** means Stormwater Management Program.

**TMDL** means Total Maximum Daily Load.

**Total Maximum Daily Load (TMDL)** means a water cleanup plan. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The calculation must include a margin of safety to ensure that the water body can be used for the purposes the state has designated. The calculation must also account for seasonable variation in water quality. Water quality standards are set by states, territories, and tribes. They identify the uses for each water body, for example, drinking water supply, contact recreation (swimming), and aquatic life support (fishing), and the scientific criteria to support that use. The *Clean Water Act*, Section 303, establishes the water quality standards and TMDL programs.

**Tributary Conveyance** means pipes, ditches, catch basins, and inlets owned or operated by the Permittee and designed or used for collecting and conveying stormwater.

**UGA** means Urban Growth Area.

**Urban Growth Area (UGA)** means those areas designated by a county pursuant to Chapter 36.70A.110 RCW.

**Urban Area** means urban areas with a population of 50,000 or more people. Urban Areas are designated by the U.S. Census Bureau based on the most recent decennial census.

**Vehicle Maintenance or Storage Facility** means an uncovered area where any vehicles are regularly washed or maintained, or where at least 10 vehicles are stored.

**Water Quality Standards** means *Surface Water Quality Standards*, Chapter 173-201A WAC, *Groundwater Quality Standards*, Chapter 173-200 WAC, and *Sediment Management Standards*, Chapter 173-204 WAC.

**Waters of the State** includes those waters as defined as "waters of the United States" in 40 CFR Subpart 122.2 within the geographic boundaries of Washington State and "waters of the State" as defined in Chapter 90.48 RCW which includes lakes, rivers, ponds, streams, inland waters, underground waters, salt waters and all other surface waters and water courses within the jurisdiction of the State of Washington.

**Waters of the United States** refers to the definition in 40 CFR 122.2.

# Appendix B

## Hydrologic and Hydraulic Modeling Analysis

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# Draft Technical Memorandum

Prepared for: Parametrix

Project Title: 2024 Comprehensive Storm Drainage Plan

Project No.: 158561

**Draft Technical Memorandum**

Subject: Hydrologic and Hydraulic Modeling for Capital Improvement Projects

Date: March 26, 2024

To: Paul Fendt, PE

Alex Van Kirk, EIT

From: Margaret Ales, PE

Copy to: Madison Thompson, EIT

Prepared by: ______________________________
Margaret Ales, PE

Reviewed by: ______________________________
Mike Milne

*Limitations:*

*This is a draft memorandum and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report.*

*This document was prepared solely for Parametrix, Inc. in accordance with professional standards at the time the services were performed and in accordance with the contract between Parametrix, Inc. and Brown and Caldwell dated 5/23/2022. This document is governed by the specific scope of work authorized by Parametrix, Inc.; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by Parametrix, Inc. and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.*

# Table of Contents

# List of Figures

## List of Tables

# Section 1: Introduction

As part of the City of Auburn (City) 2024 Comprehensive Storm Drainage Plan (Plan) update, Brown and Caldwell (BC) performed hydrologic and hydraulic (H&H) modeling analysis to evaluate existing drainage problems and capital solutions. BC performed the analysis with updated existing models and an extended meteorological time series.

The City initiated an extensive drainage system data inventory and H&H modeling effort to support the 2009 and 2015 Comprehensive Storm Drainage Plans (2009 Plan and 2015 Plan, respectively). After the 2009 and 2015 Plans, the City refined and developed new H&H models. As a result, 16 storm drainage system models have been created or refined for areas throughout the City. Each model is identified by the lettered subbasin drainage area(s) covered with the model extent. For example, the GHI model covers three subbasins: G, H, and I. Two of the 16 models (BCDF and GHI) were calibrated as part of the 2015 Plan and then updated after the 2015 Plan with new stormwater infrastructure, refined subbasin delineations, and refined calibration with monitored flow data.

The City reviewed the projects from the 2015 Plan and other more recent potential projects considered on behalf of this Plan. Of these, six potential projects were chosen for H&H modeling to evaluate whether they should be included as capital improvement projects (CIP) in the 2024 Plan.

Table B-1 summarizes the potential projects modeled as part of the 2024 Plan.

**Table B-1. 2024 Plan Potential Project Modeling Summary**

| 2024 Project ID[1] | Project Name | Subbasin Model Name | Project Description and Status |
|---|---|---|---|
| CP2116 | R Street SE Widening - 22nd Street SE to 33rd Street SE | BCDF, AZ, and R | Stormwater capacity project evaluated as part of a comprehensive roadway improvement project. Currently at 60% design. |
| 9 | 30th Street NE Area Flooding, Phase 2 | GHI | Stormwater capacity capital improvement project (CIP) identified in the 2015 Plan (2015 Plan CIP ID is 4A).<br>Minor piping improvements in 2018 may have reduced flooding problem. |
| - | 30th Street NE Area Flooding, Phase 3 | GHI | Stormwater capacity CIP previously identified in the 2015 Plan (2015 Plan CIP ID is 4B). |
| - | West Hills Drainage Improvements near S 314th Street & 54th Avenue S | No model | Relocate stormwater flows to public conveyance. CIP was previously identified in 2015 Drainage Plan (2015 Plan CIP ID is 5B). |
| 11 | Christa Ministries Facility Retrofit | GHI | New water quality improvement CIP identified as part of the 2024 Plan. |
| - | 17th Street Pond Capacity | BCDF | New stormwater system capacity improvement project identified as part of the 2024 Plan. |

[1] If the project was selected to carry forward as one of the capital improvement projects (CIP) within the 2024 Plan, it was given a numerical ID ranging from 1 to 16. Projects that were included within the City's capital facilities plan (CFP) follow the format of CPXXXX for their project IDs, where the Xs represent numeric placeholders. Line items with neither a CIP ID on behalf of the 2024 Plan, nor a CFP ID were evaluated as part of the modeling effort but were not chosen to carry forward as a 2024 CIP or within the CFP.

# Section 2: Input Data and Model Updates

This section describes updates to the precipitation record and H&H models used to evaluate the potential projects listed in Table B-1.

## 2.1 Precipitation Record Extension

Auburn's H&H models use historical meteorological data to estimate stormwater flows and storage within the City's storm drainage system. The data consists of monthly evaporation and 15-minute precipitation depths. As part of the 2024 Plan, BC extended the 15-minute precipitation record to September 30, 2022, creating a 75-year precipitation record.

The Auburn precipitation record used for modeling is a composite from several rain gauges. The preferred rain gauge is located at Auburn City Hall and is maintained and operated by King County (King County 2022). Rainfall is used from other gauges when the City Hall gauged data is not available. Table B-2 summarizes the data sources for the composite precipitation record.

**Table B-2. Auburn Composite Precipitation Record Summary**

| Source | Period | Notes |
|---|---|---|
| SeaTac Rainfall from WWHM2012 | 10/01/1948 00:00 to 11/30/2007 23:45 | |
| Lakeland Hills | 12/01/2007 00:00 to 12/06/2007 23:45 | SeaTac 15-minute data not representative of Auburn hourly data. |
| SeaTac Rainfall from WWHM2012 | 12/07/2007 00:00 to 12/31/2009 23:45 | |
| City of Auburn 15-minute rainfall | 01/01/2010 00:00 to 12/31/2010 23:45 | |
| City of Auburn aggregated 5-minute | 01/01/2011 00:00 to 11/14/2012 | |
| Lakeland Hills | 11/14/2012 to 12/05/2012 | City Hall rain gauge error (rain gauge top blew off). |
| City of Auburn aggregated 5-minute | 12/05/2011 00:00 to 09/30/2022 23:45 | |

WWHM2012 = Western Washington Hydrology Model

## 2.2 Model Refinement

Auburn's H&H models have been updated and refined since the calibration efforts performed on behalf of the 2015 Plan. Updates include refining basin delineation and adding storm drainage features (conveyance and structures) from recently constructed projects. Four subbasin models were updated as part of the 2024 Plan or under a separate modeling contract, GHI, BCDF, AZ, and R. The model updates are described below. Figure B-1 shows the four subbasin models updated as part of the 2024 Plan relative to the City extent.

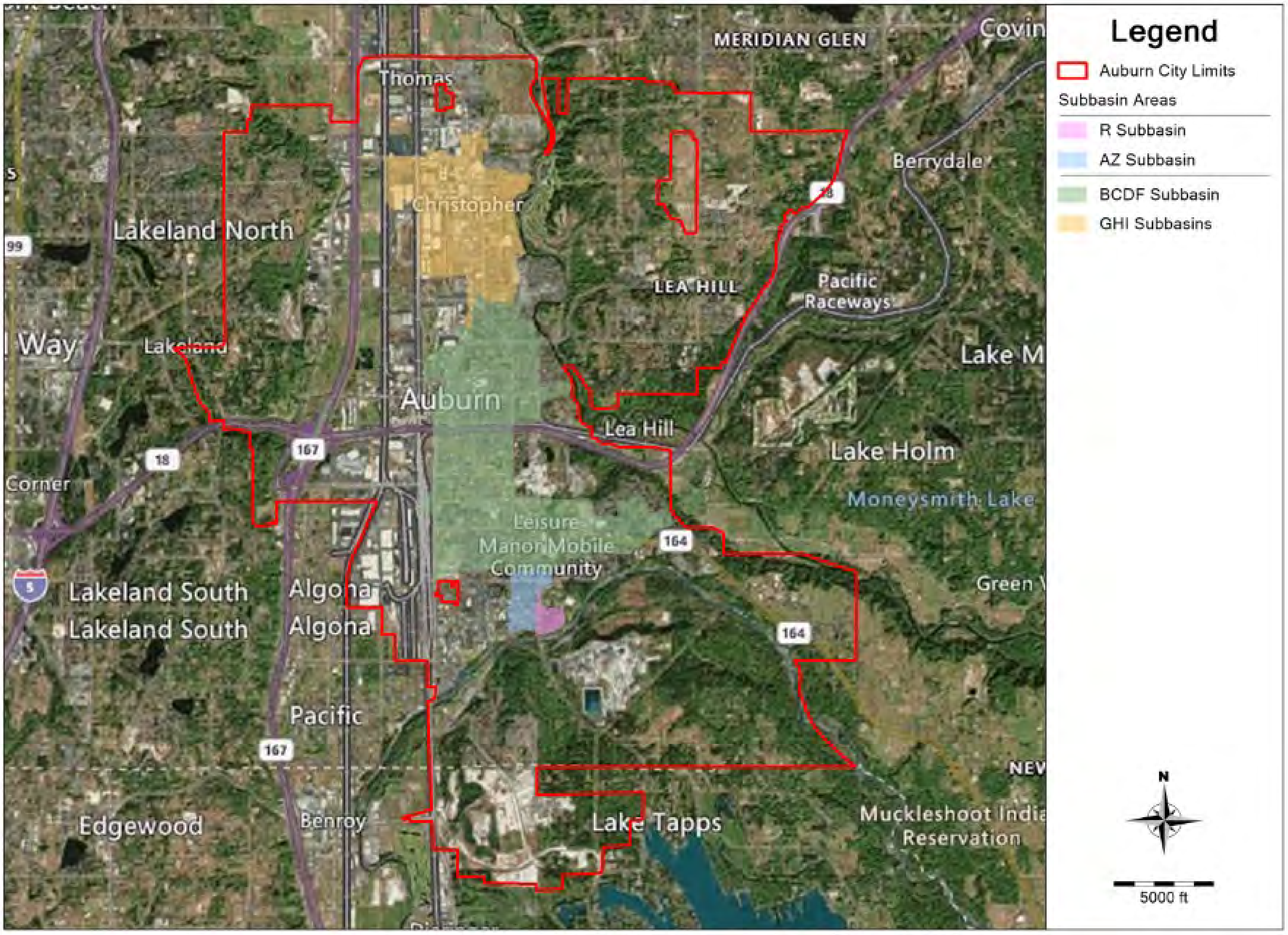

Figure B-1. Subbasin Models Updated on Behalf of Auburn's 2024 Comprehensive Storm Drainage Plan

### 2.2.1 GHI Subbasin Model

Since the 2015 Plan, BC has updated the calibrated GHI subbasin model with new stormwater projects at the City of Auburn Airport and used updated geographic information system (GIS) data to refine subbasin boundaries in the vicinity of the Brannan Park pump station.

**Airport Area Updates.** Model updates at the airport include those associated with CP1516 Runway 16-34 Extension and Change Order #2 and CP2118 North Airport Stormwater Improvements Phase 2. Key model updates from these projects included:

- Adding new impervious area, refining subbasin boundaries, and adding ChamberMaxx stormwater detention for the 16-34 runway extension.
- Isolating Pond I and the low elevation area (north hangar area) on airport property from the stormwater system in 30th Street NE so that high flows in the 30th Street NE system do not backwater to the pond and flood the low north hangar area.
- Making better use of storage in Pond I by reconfiguring connecting airport property stormwater pipes.
- Filling in Pond F and routing the Corporate Park Pump Station flows to Pond G.

**Brannan Park Pump Station Area Updates.** BC refined the GHI model in the vicinity of Brannan Park Pump Station. Upstream of the pump station near I Street NE and 32nd Place NE, new storm pipe was added that routes roadway runoff to the main trunk line in 30th Street NE. Downstream of the pump station, the model was updated from a simplified outfall to a force main connection to the outfall at Reddington wet biofiltration swale.

### 2.2.2 BCDF Subbasin Model

BC updated the calibrated BCDF model to reflect recent or imminent stormwater conveyance projects.

- **CP1726–2019 Local Street Reconstruction As-Builts** (M Street between 25th Street SE and 29th Street SE, and 28th Street SE between M Street SE and T Street SE). This project was part of a street improvement project that helped improve conveyance capacity. The project included new pipe alignments and changes to the drainage basin delineation adding 7 acres to the B subbasin from the adjacent AZ subbasin.
- **CP1614–2017 Local Street Reconstruction and Preservation As-Builts** (R Street from 28th Street SE to 25th Street SE, 28th Street SE from R Street SE to T Street SE and portions of T Street SE, U Street SE, 27th Street SE and 26th Street SE). This project was part of a street improvement project that helped improve conveyance capacity. The project resulted in a new pipe alignment and changes to the drainage basin delineation. In addition, approximately 1.9 acres of the CIP1614 project is routed to infiltration facilities. The effective impervious area of the model was reduced by the amount of area routed to infiltration pipes and facilities.
- **CP2125–D Street SE and 23rd Street SE Storm Improvements 90% Submittal**. This project, identified as Project 7 and Project 8 in the 2015 Plan, will improve system capacity by constructing new conveyance in D Street SE (Project 7) from 27th Street SE to 21st Street SE, in 21st Street SE near D Street SE and in 25th Street SE near D Street SE. Improvements in 23rd Street SE and K Street SE (Project 8) were included in the plan set but may not be included in the imminent bid set. However, Project 8 improvements were included in the model update to reflect ultimate post-project conditions. These include conveyance improvements in 23rd Street SE near F Street SE and in K Street SE between 23rd Street SE and 21st Street SE.

### 2.2.3 AZ Subbasin Model

BC updated the uncalibrated AZ model to reflect recent improvements associated with CP1726 and CP1614 projects described above.

### 2.2.4 R Subbasin Model

BC updated the uncalibrated R basin model conveyance, hydrologic parameters, and basin delineation to be current with other adjacent models (AZ subbasin model). The City has not used the R Basin for any existing or proposed condition evaluations since the subbasin model was developed as part of the 2009 Plan.

## 2.3 Flow Frequency and Design Storms

After the basin models were updated to reflect existing and imminent CIP conditions, a frequency analysis was completed for each model by performing a long-term simulation (from 1948 to 2022). The long-term flow timeseries were then used to determine the 2% and 4% exceedance storms (one-in-50-year and one-in-25-year flows, respectively) per subbasin model. These storms are used as design storms to evaluate the potential projects listed in Table B-1.

For the long-term simulations, the hydraulic networks of the models were modified so that there were no restrictions to flow and there was free discharge at outfalls. As a result, all simulated runoff could be conveyed without substantial system storage and attenuation.

The event peak flows from the simulations were selected in PCSWMM[1] using two event-based criteria: Minimum inter-event time (time between peak storms) of 12 hours and a flow threshold (varies by subbasin). The peak flows were ranked, and the flow frequencies were established with estimators derived from Cunnane plotting position formulae. The events associated with the 25-year peak flows were used to size storm drainage conveyance to meet the relevant level of service. The results of the flow frequency analysis for the GHI, BCDF, AZ, and R subbasin models are provided in Tables B-3, B-4, B-5, and B-6, respectively. Table B-7 lists the storms that generated the 100-, 50-, and 25-year flows for the subbasin models.

Flow frequencies are unique to each subbasin because of the different hydrologic and hydraulic characteristics of each subbasin. As a result, the storms associated with the return periods are different for each basin.

**Table B-3. GHI Subbasin Frequency Analysis Summary**

| Peak flow rank | Event start date/time | Peak event flow (cubic feet per second) [a] | Return period (year) |
|---|---|---|---|
| 1 | 10/20/2003 4:30 | 105.0 | 123.7 |
| 2 | 9/18/2021 15:25 | 88.6 | 46.4 |
| 3 | 11/6/2006 0:20 | 88.5 | 28.5 |
| 4 | 1/9/1990 4:35 | 87.4 | 20.6 |
| 5 | 11/18/2003 10:25 | 86.0 | 16.1 |
| 6 | 11/4/2006 15:15 | 84.4 | 13.3 |
| 7 | 11/24/1990 4:50 | 80.1 | 11.2 |
| 8 | 10/5/1981 23:20 | 76.4 | 9.8 |

*a. Peak flow measured at inflow to Brannan Park pump station.*

**Table B-4. BCDF Subbasin Frequency Analysis Summary**

| Peak flow rank | Event start date/time | Peak event flow (cubic feet per second) [a] | Return period (year) |
|---|---|---|---|
| 1 | 10/20/2003 4:15 | 109.6 | 125.3 |
| 2 | 11/6/2006 0:20 | 94.5 | 47.0 |
| 3 | 1/9/1990 4:30 | 73.8 | 28.9 |
| 4 | 10/5/1981 23:15 | 61.3 | 20.9 |
| 5 | 11/4/1998 19:30 | 45.5 | 16.3 |
| 6 | 11/4/2006 16:05 | 44.6 | 13.4 |
| 7 | 11/18/2003 10:25 | 39.9 | 11.4 |
| 8 | 11/24/1990 4:45 | 39.5 | 9.9 |

*a. Peak flow measured at inflow to 17th Street Pond.*

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[1] PCSWMM is a GIS-based hydraulic and hydrologic modeling platform developed by Computational Hydraulics International (CHI). The software fully supports the Environmental Protection Agency (EPA) SWMM5 hydrology and hydraulics engine, thus providing comparable computation between EPA SWMM and PCSWMM models. Information about PCSWMM software can be found at http://www.chiwater.com/Software/PCSWMM/index.asp.

| Table B-5. AZ Subbasin Frequency Analysis Summary | | | |
|---|---|---|---|
| Peak flow rank | Event start date/time | Peak event flow (cubic feet per second) [a] | Return period (year) |
| 1 | 9/18/2021 15:20 | 35.8 | 125.3 |
| 2 | 10/20/2003 4:25 | 33.1 | 47.0 |
| 3 | 9/7/2019 20:40 | 32.7 | 28.9 |
| 4 | 9/12/2004 1:20 | 32.3 | 20.9 |
| 5 | 11/4/1998 19:20 | 32.2 | 16.3 |
| 6 | 11/4/2006 15:15 | 31.15 | 13.4 |
| 7 | 1/9/1990 4:45 | 31.08 | 11.4 |
| 8 | 12/14/1979 21:05 | 31.07 | 9.9 |

*a. Peak flow measured at inflow to 36th Street Pond at M Street.*

| Table B-6. R Subbasin Frequency Analysis Summary | | | |
|---|---|---|---|
| Peak flow rank | Event start date/time | Peak event flow (cubic feet per second) [a] | Return period (year) |
| 1 | 9/18/2021 15:15 | 27.7 | 125.3 |
| 2 | 9/7/2019 20:35 | 26.3 | 47.0 |
| 3 | 10/20/2003 9:20 | 25.5 | 28.9 |
| 4 | 9/12/2004 1:15 | 25.0 | 20.9 |
| 5 | 12/14/1979 21:00 | 23.7 | 16.3 |
| 6 | 7/6/2018 18:30 | 23.1 | 13.4 |
| 7 | 11/4/2006 15:10 | 23.0 | 11.4 |
| 8 | 1/9/1990 5:00 | 22.8 | 9.9 |

*a. Peak flow measured at outfall to White River at R Street and 37th.*

| Table B-7. Design Storms by Subbasin Summary | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 100-year | | 50-year | | 25-year | | |
| Basin | Start Date | Peak Flow Duration (hour) | Start Date | Peak Flow Duration (hour) | Start Date | Peak Flow Duration (hour) | Flow Measurement Location |
| GHI | 10/20/2003 | 32 | 9/18/2021 | 1 | 11/6/2006 | 38 | Inflow to Brannan Park Pump Station |
| BCDF | 10/20/2003 | 20 | 11/6/2006 | 17 | 1/9/1990 | 8 | Inflow to 17th Street Pond |
| AZ | 9/18/2021 | 1 | 10/20/2003 | 16 | 9/7/2019 | 1 | Inflow to 36th Street Pond |
| R | 9/18/2021 | 1 | 9/7/2019 | 1 | 10/20/2003 | 11 | Outfall to White River at R Street |

## 2.4 Potential Project Evaluations

Of the six projects considered for inclusion in the 2024 Plan (see Table B-1), two were evaluated with the updated subbasin models and considered viable projects. Another two were evaluated but considered not viable because the proposed project would provide little improvement to capacity or reduce conveyance capacity. The City initially decided to defer the remaining two projects to the next planning period, so BC did not evaluate them. However, after reevaluation, the City decided to include one of these two projects, the 30th Street NE Area Flooding, Phase 2 project, as a CIP in the 2024 Plan.

Table B-8 lists the potential projects, associated model(s), and status.

**Table B-8. 2024 Plan Potential Projects and Evaluation Status**

| 2024 Project ID[1] | Project Name | Associated Model Name | Project Evaluation Status |
|---|---|---|---|
| CP2116 | R Street SE Widening - 22nd Street SE to 33rd Street SE | BCDF, AZ, and R | Evaluated and included in 2024 Plan. |
| 11 | Christa Ministries Facility Retrofit | GHI | |
| - | 30th Street NE Area Flooding, Phase 3 | GHI | Evaluated and not included in 2024 Plan. |
| - | 17th Street Pond Capacity | BCDF | |
| - | West Hills Drainage Improvements near S 314th Street & 54th Avenue S | No model | Not evaluated. Deferred to later planning period. |
| 9 | 30th Street NE Area Flooding, Phase 2 | GHI | Not evaluated but included in 2024 Plan. |

[1] If the project was selected to carry forward as one of the capital improvement projects (CIP) within the 2024 Plan, it was given a numerical ID ranging from 1-16. Projects that were included within the City's capital facilities plan (CFP) follow the format of CPXXXX for their project IDs, where the Xs represent numeric placeholders. Line items with neither a CIP ID on behalf of the 2024 Plan, nor a CFP ID were evaluated as part of the modeling effort but were not chosen to carry forward as a 2024 CIP or within the CFP.

## 2.4.1 Included Projects

### 2.4.1.1 CP2116–R Street SE Widening - 22nd Street SE to 33rd Street SE

The R Street SE Widening project CP2116 is currently in design and estimated to begin construction in 2025. The project will improve the R Street SE/29th Street SE intersection, add a new southbound lane from 22nd Street NE to 33rd Street NE, and provide new roadway surface from 22nd Street SE to the White River bridge. As part of the project, the City is improving underground utilities as needed, including storm drainage, sewer pipe, and water lines.

The project lies within three drainage subbasins (B, A, and R subbasins) and, as a result, is represented in three of the City's subbasin models (BCDF, AZ, and R). Figure B-2 shows the project extent and the modeled subbasin delineation.

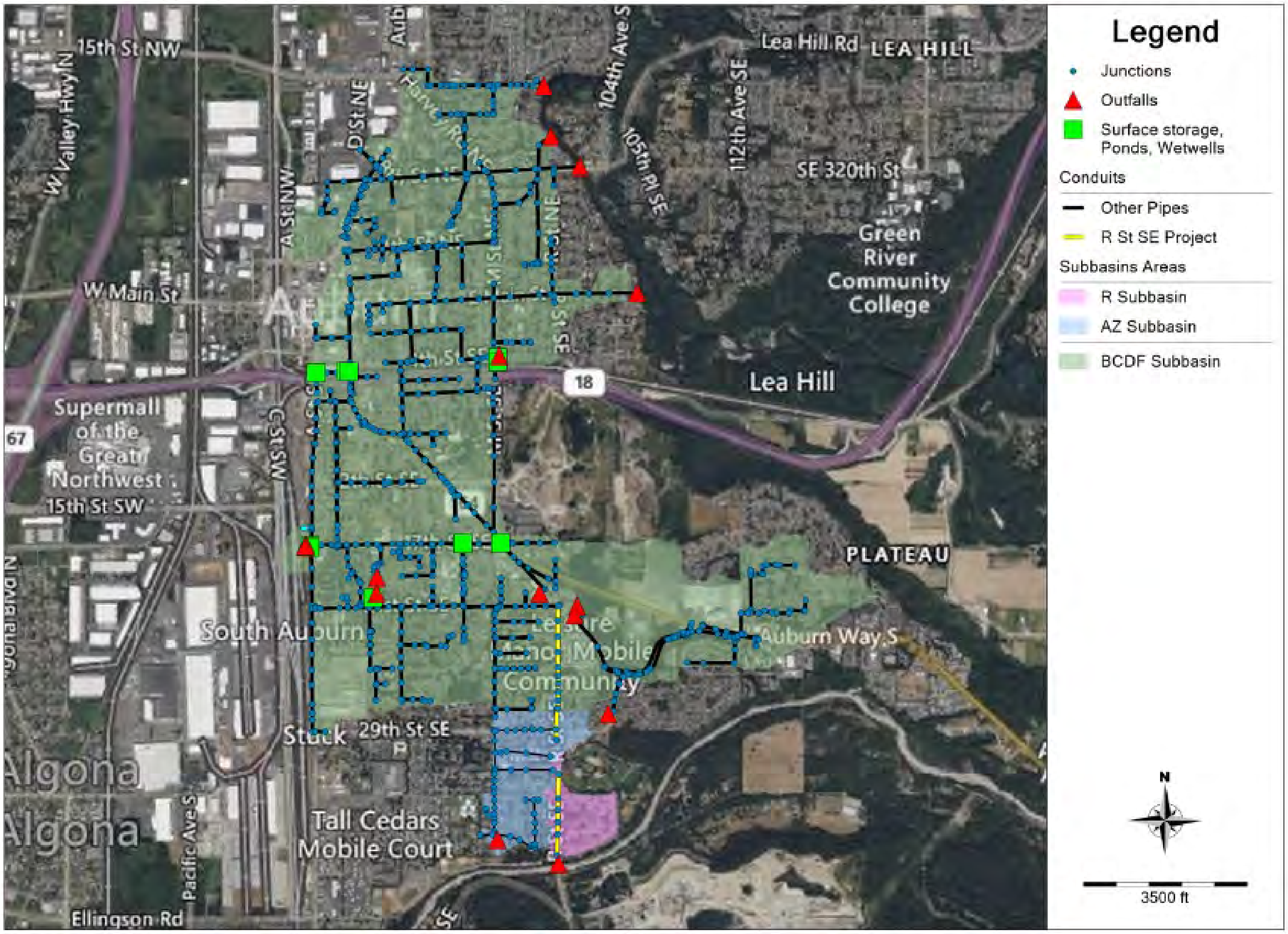

Figure B-2. R Street SE Widening Project Subbasins

BC evaluated the project at the 60% design phase with the 25-year storm flows developed for the BCDF, AZ, and R subbasin models. For all three model evaluations, the design storm simulation showed flooding within the project area resulting from downstream backwater. City staff recommended sizing the R Street SE project pipes assuming downstream impacts are alleviated as part of a future CIP. This evaluation resulted in increased pipe sizes for the R Street SE Project and the identification of the need for a future downstream CIP.

Figures B-3 through B-8 show the plan and profile for the 25-year design storm of the R Street SE Widening project and the future CIP needed to alleviate flooding in the project area from backwater. Table B-9 summarizes the recommended pipe sizes for the R Street SE Widening project and the future CIP.

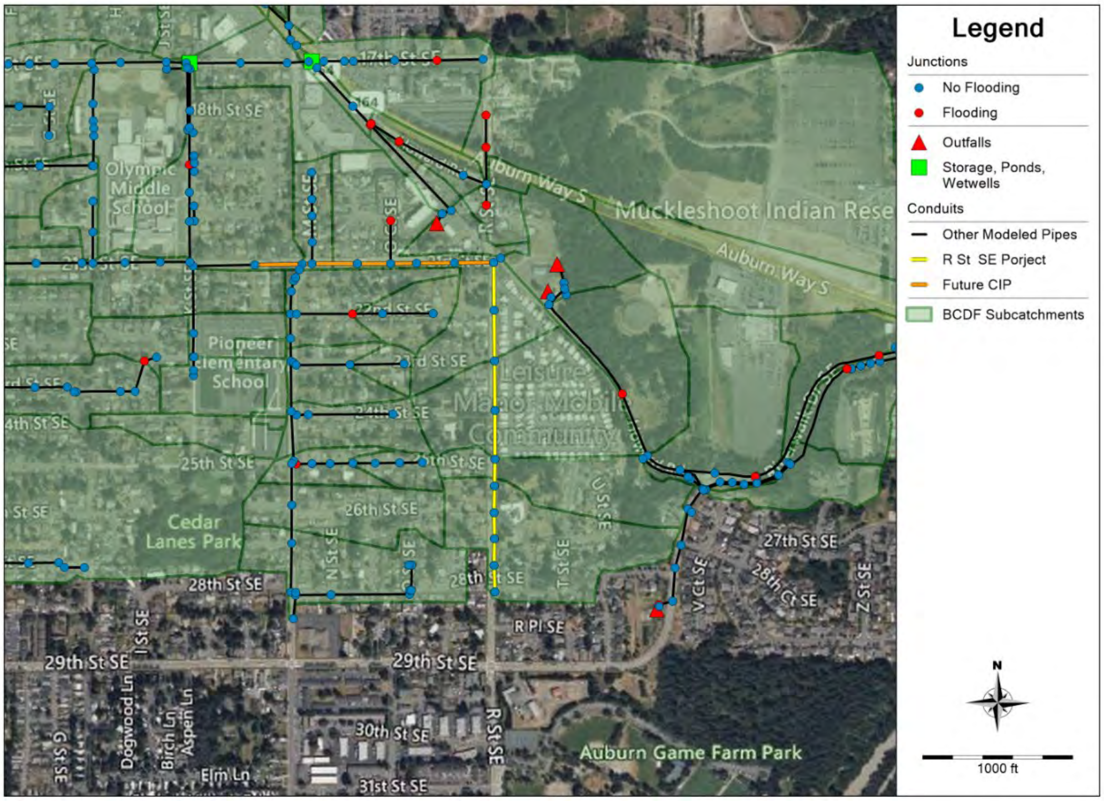

Figure B-3. Plan View of R Street SE Widening and Future CIP (BCDF Subbasin Model, 25-year storm flows [1/9/1990])

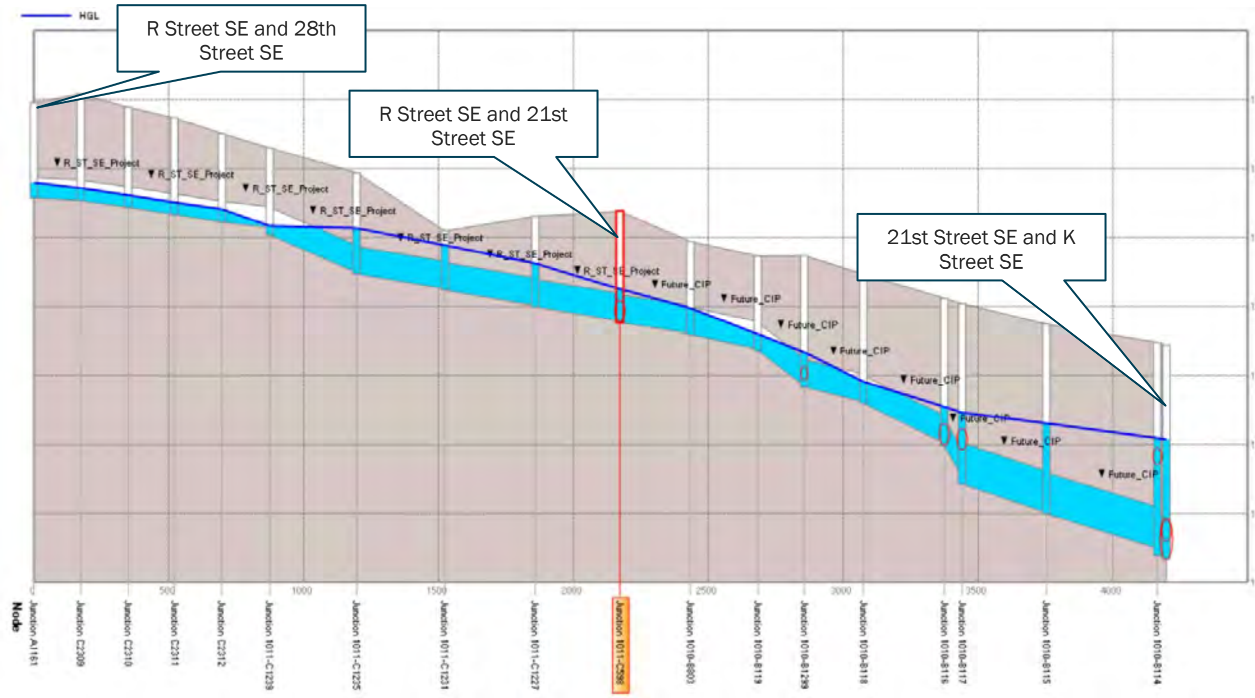

Figure B-4. Hydraulic Grade Line Profile View of R Street SE Widening and Future CIP (BCDF Subbasin Model, 25-year storm flows [1/9/1990])

Brown AND Caldwell

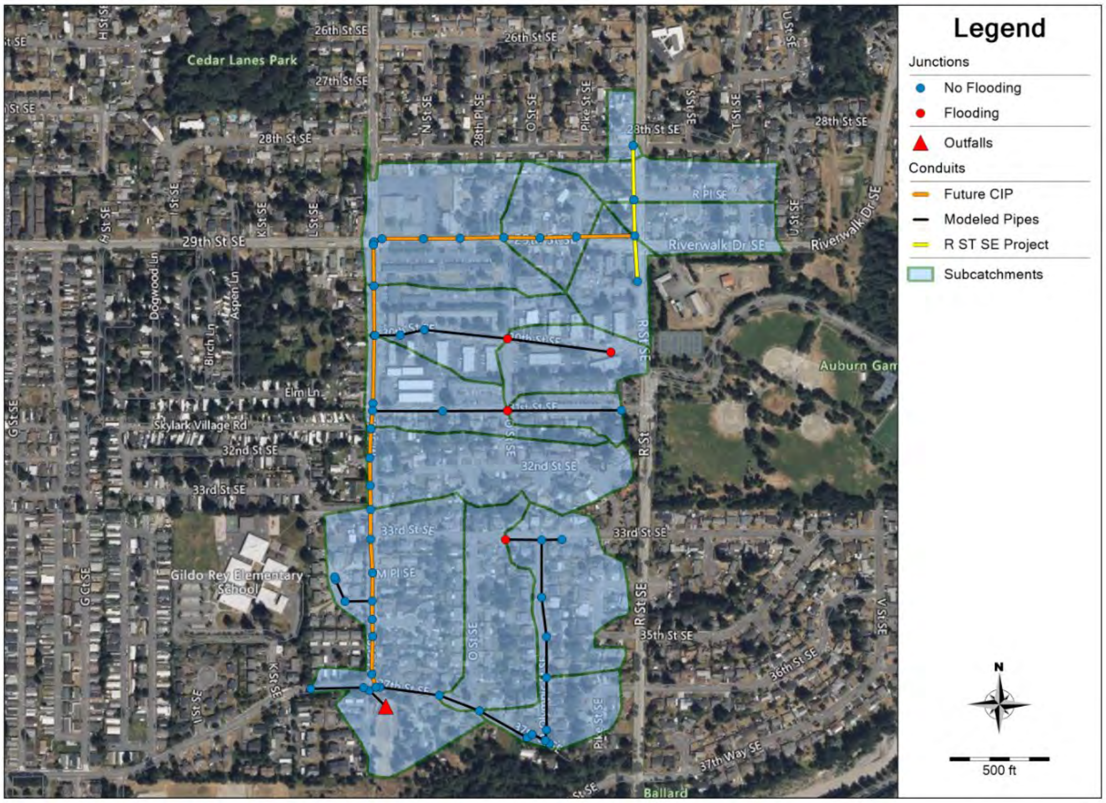

Figure B-5. Plan View of R Street SE Widening and Future CIP (AZ Subbasin Model, 25-year storm flows [9/7/2019])

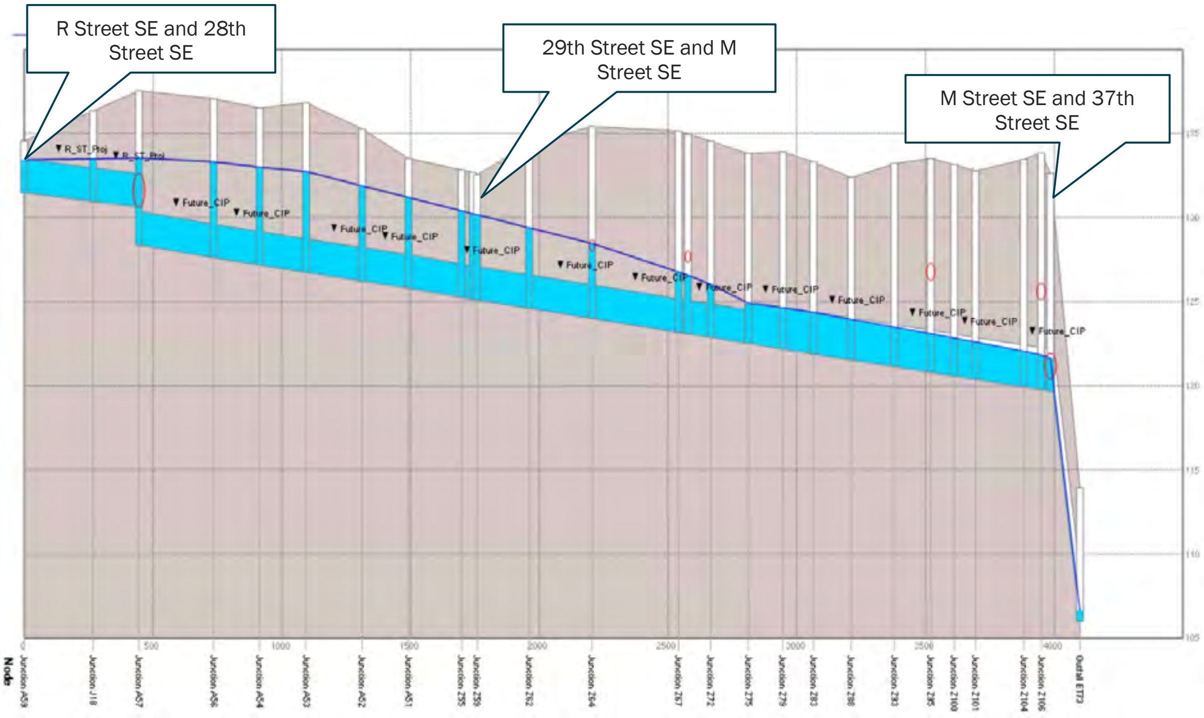

Figure B-6. Hydraulic Grade Line Profile View of R Street SE Widening and Future CIP (AZ Subbasin Model, 25-year storm flows [9/7/2019])

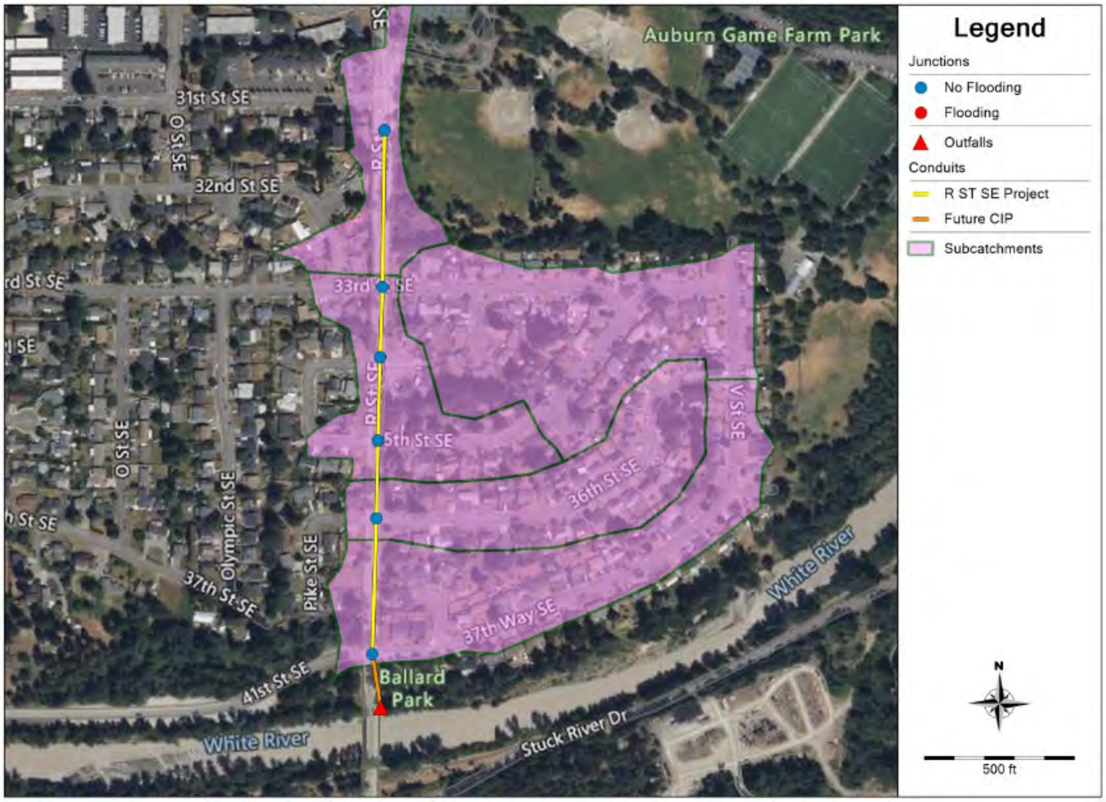

Figure B-7. Plan View of R Street SE Widening and Future CIP (R Subbasin Model, 25-year storm flows [10/20/2003])

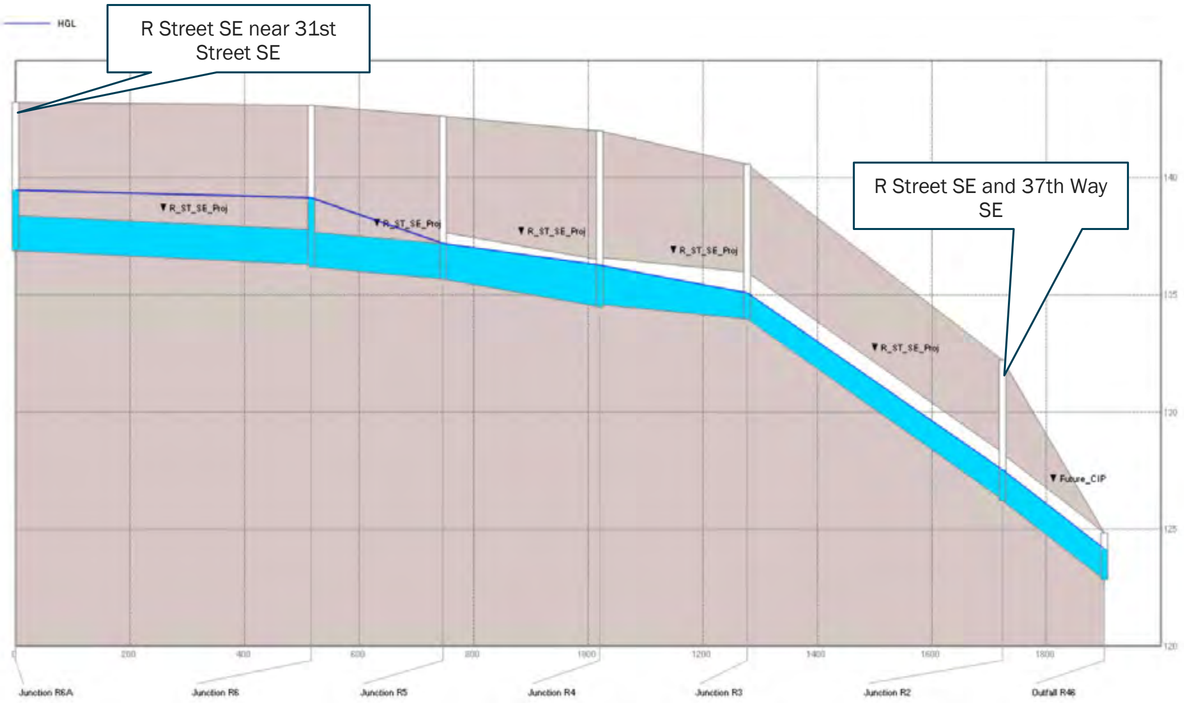

Figure B-8. Hydraulic Grade Line Profile View of R Street SE Widening and Future CIP (R Subbasin Model, 25-year storm flows [10/20/2003])

**Table B-9. R Street SE Widening Project and Future CIP Recommendations**

| Street Location | Subbasin Model Name | 25-year Design Storm Start Date | 2024 CIP Recommendations | Future CIP Recommendations |
|---|---|---|---|---|
| R Street SE from 28th Street SE to 25th Street SE<br>R Street SE from 25th Street SE to 22nd Street SE | BCDF | 1/9/1990 | Upgrade pipe from 12-inch diameter to 18-inch diameter in R Street SE from 28th Street SE to 25th Street SE<br>Upgrade pipe from 18-inch diameter to 24-inch diameter in 1st Street SE | Upgrade pipe from 18-inch diameter to 24-inch diameter in 21st Street SE from R Street SE to M Street SE<br>Upgrade pipe from 24-inch diameter to 36-inch diameter in 21st Street SE from M Street SE to K Street SE |
| R Street SE from 28th Street SE to 29th Street SE | AZ | 9/7/2019 | Upgrade pipe from 10-inch diameter to 24-inch diameter in R Street SE from 28th Street SE south to approximately 225 ft of 29th Street SE | Upgrade pipe from 10-inch diameter to 24-inch diameter in 29th Street SE from R Street SE to M Street SE<br>Upgrade pipe from 18-inch diameter to 24-inch diameter in M Street SE from 29th Street SE to 32nd Street SE<br>Upgrade pipe from 24-inch diameter to 30-inch diameter in M Street SE from 32nd Street SE to 37th Street SE |
| 33rd Street SE to White River Outfall | R | 10/20/2003 | Upgrade pipe from 10-inch/12-inch diameter to 18-inch diameter in R Street SE from 31st Street SE to 34th Street SE<br>Upgrade pipe from 12-inch diameter to 24-inch diameter in R Street SE from 34th Street SE to 37th Way SE | Upgrade pipe from 18-inch diameter to 24-inch diameter south of 37th Way SE to the White River outfall |

#### 2.4.1.2 CIP 11 - Christa Ministries Facility Retrofit

The Christa Ministries Facility Retrofit project is a retrofit of an existing swale resized to meet the water quality flow volume for flows discharging from the Brannan Park pump station. Currently, the swale is part of a wetland and detention pond system on a City-owned parcel.

Modeling efforts for the project consisted of estimating the water quality flow volume discharged from the Brannan Park pump station force main using the Continuous Simulation Method from the 2019 Stormwater Management Manual for Western Washington (2019 SWMMWW) (Ecology 2019). The 2019 SWMMWW describes the methodology as “Using an approved continuous runoff model, the water quality design volume shall be the simulated daily volume that represents the upper limit range of daily volumes that accounts for 91% of the entire runoff volume over a multi-decade period of record.”

BC ran the existing conditions GHI model for the 1949 to 2022 period of record to generate daily flow volumes from the Brannan Park pump station. To determine the 91% flow volume, BC removed the days without flow from the daily record and then used the Excel function PERCENTRANK.EXC to determine the rank percentile for each day’s flow volume (100 to 0). The Excel formula PERCENTILE.INC was then used to return the flow volume associated with the 91% rank. The resulting water quality flow volume is 375,448 cubic feet or 8.6 acre-feet.

### 2.4.2 Excluded Projects

Two potential projects were evaluated with H&H models and determined to be not viable because the proposed changes did not provide sufficient benefit or exacerbated simulated downstream flooding conditions during design storms.

#### 2.4.2.1 30th Street NE Area Flooding, Phase 3 (2015 Plan CIP ID 4B)

The 30th Street NE Area Flooding, Phase 3 project was identified in the 2009 and 2015 Plans to reduce flooding along C Street NE between 30th Street NE and 37th Street NE in the GHI subbasin. The area experienced significant flooding during the December 3, 2007, storm and previous model results indicate the system's capacity may be limited by low pipe gradient and shallow inverts. The proposed project would collect stormwater from C Street NE in a new larger and higher gradient pipe and then pump flows to the 42-inch-diameter trunk line in 30th Street NE. The force main connection to the 30th Street NE pipe is also where the airport stormwater system connects to the 42-inch-diameter trunk line.

BC evaluated the impact of this project on the hydraulic grade line (HGL) in the 30th Street NE trunk with the updated GHI subbasin model (update described in Section 2.2) for the 25-year design storm (11/6/2006). The project raised the simulated HGL in the 30th Street NE trunkline by approximately 1 foot, which resulted in flooding at the airport property's lowest inlet rim (409-I51) near the north hangar. In addition, Figure B-9 shows the airport property flooding that resulted from the project. Figure B-10 compares the HGL in the 30th Street NE trunkline with and without this project.

Because of the simulated flooding during the design storm and the lack of reports of flooding on C Street NE since the December 2007 storm, the City opted to remove the 30th Street NE Area Flooding, Phase 3 project from consideration in the 2024 Plan.

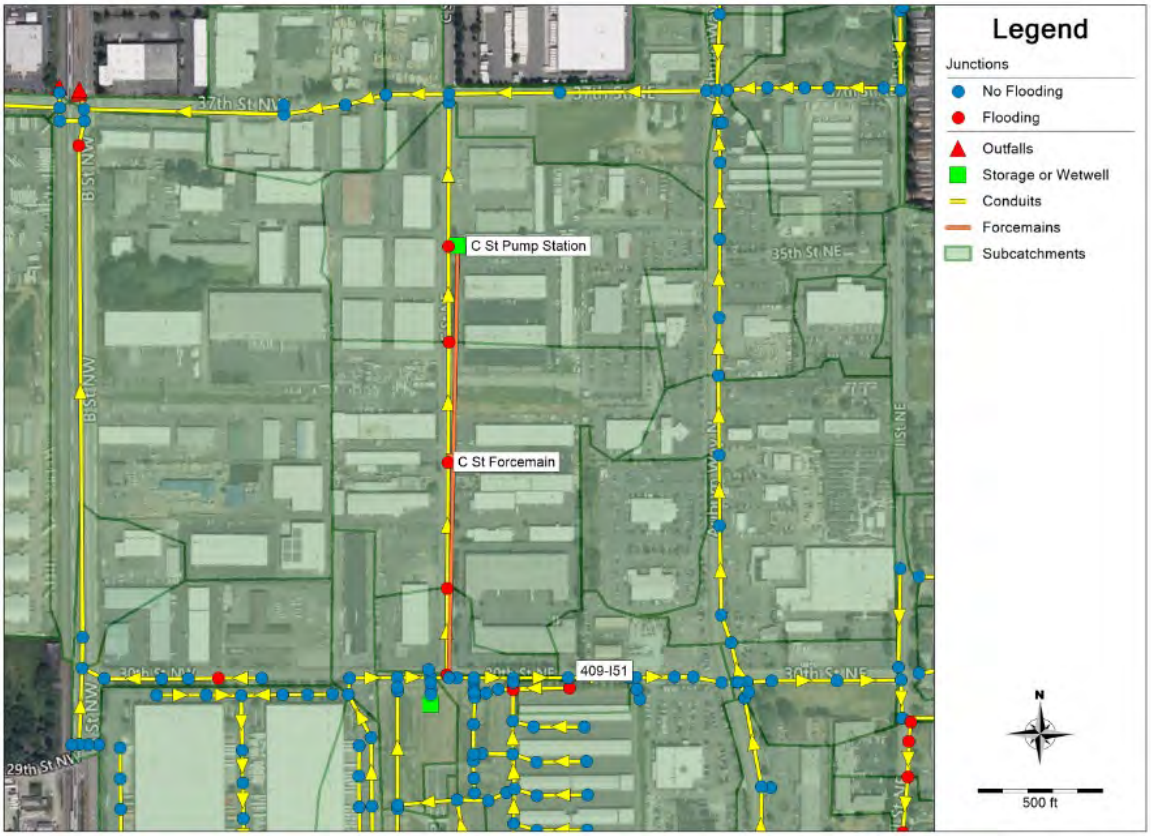

Figure B-9. Flooding impacts of 30th Street NE Area Flooding, Phase 3 Project at the Airport Property Low Area (catch basin 409-I51)

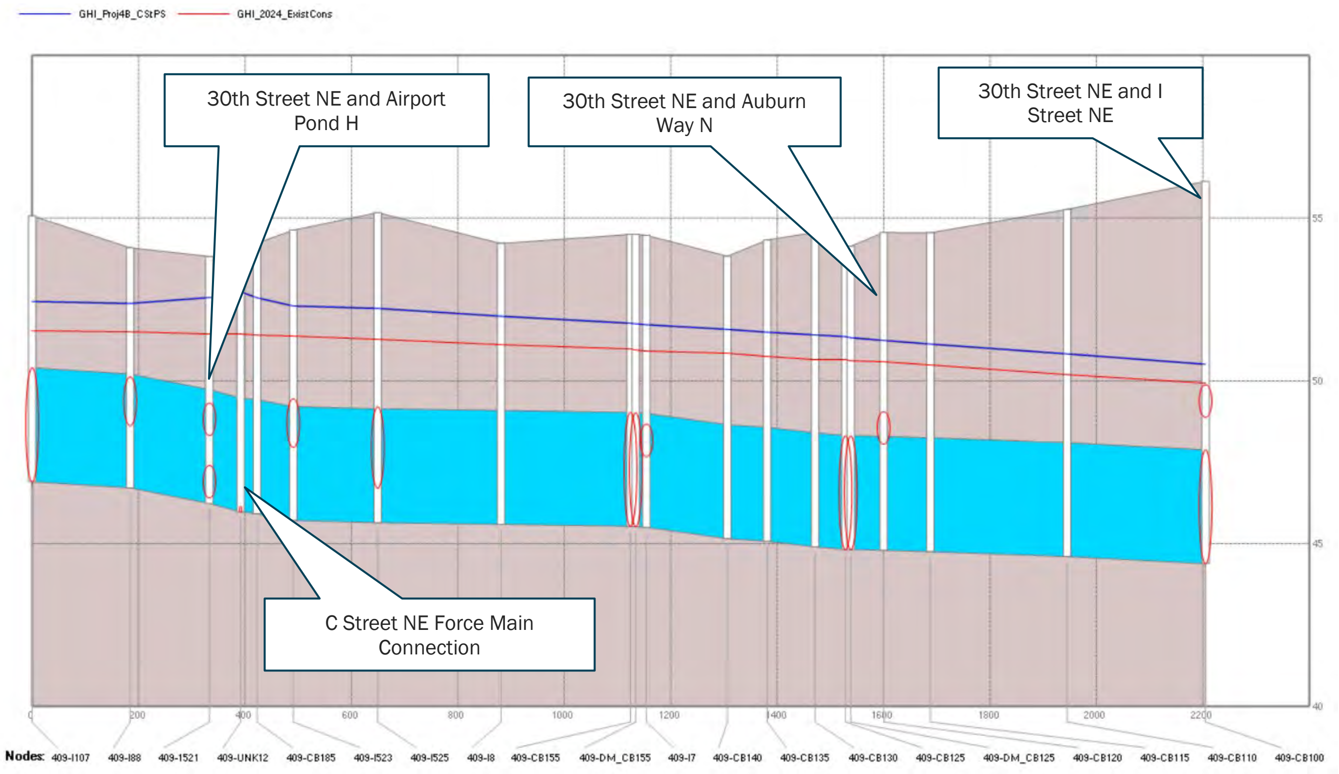

**Figure B-10. Hydraulic Grade Line in 30th Street NE (from the Airport Property to I Street NE)
Comparison of Existing Conditions and Proposed Conditions from the 30th Street NE Area Flooding, Phase 3 Project**

### 2.4.2.2 17th Street Pond Improvements Project

The 17th Street Pond is one of several infiltration ponds in the BCDF subbasin. Currently, the control structure manhole for the 17th Street Pond is in the right-of-way (ROW) downstream of the pond outlet pipe. The standpipe portion of the control structure is dislodged, allowing stored water to discharge from the pond without control. Also, without the standpipe, model simulations show that downstream capacity limitations during large events cause water to back up in the system and into the ponds, allowing the pond to act as backwater storage. Prior to repairing the pond control, the City asked BC to review several scenarios to optimize the storage and operation of the 17th Street Pond to help reduce flooding in the downstream system, specifically at the low area near the intersection of Auburn Way S and the State Route (SR) 18 overpass. To help compare existing and proposed conditions, BC modeled several 17th Street Pond configurations:

1) Scenario 1: Outlet control as designed (control structure in ROW).
2) Scenario 2: Outlet control under current conditions (no control structure).
    a) Scenario 2a: Scenario 2 plus an increase in pond volume.
    b) Scenario 2b: Scenario 2 plus double the pond volume (as a sensitivity test only, does not represent space available to expand pond).
3) Scenario 3: Outlet control moved inside pond.
    a) Scenario 3a: Scenario 3 plus an increase in pond volume by replacing sloped sides with walls around the entire pond perimeter.

Figure B-11 shows the HGL in Auburn Way South at the SR 18 westbound offramp for the various scenarios. The HGL varies slightly between the scenarios. Figure B-12 shows the flooding rate and volume during the 25-year storm for the scenarios at the low area. The difference in the amount of flooding between the scenarios is minimal.

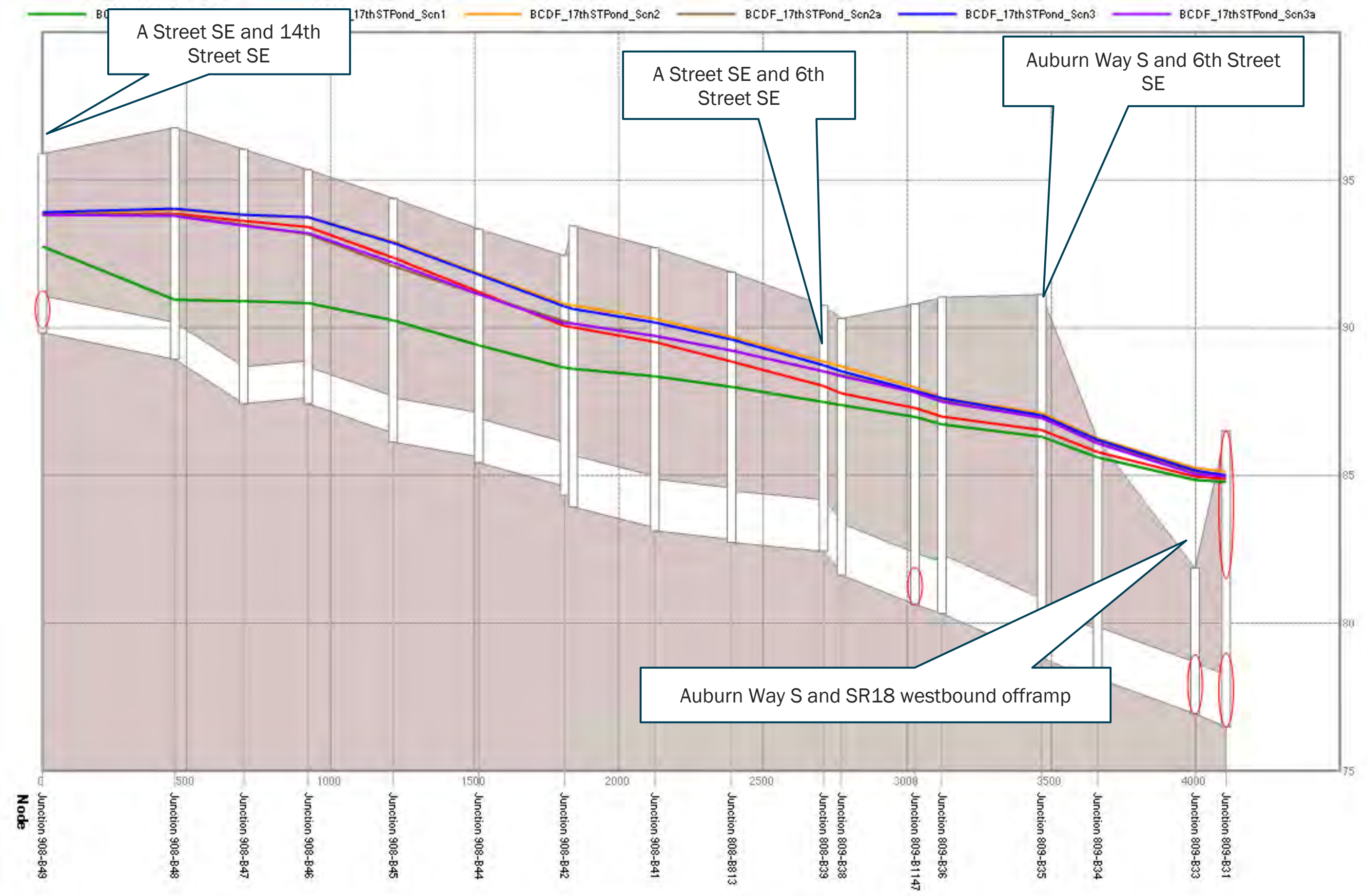

Figure B-11. Comparison of Hydraulic Grade Line in Vicinity of Auburn Way South and SR 18 Westbound Off-Ramp Intersection for Evaluation Scenarios

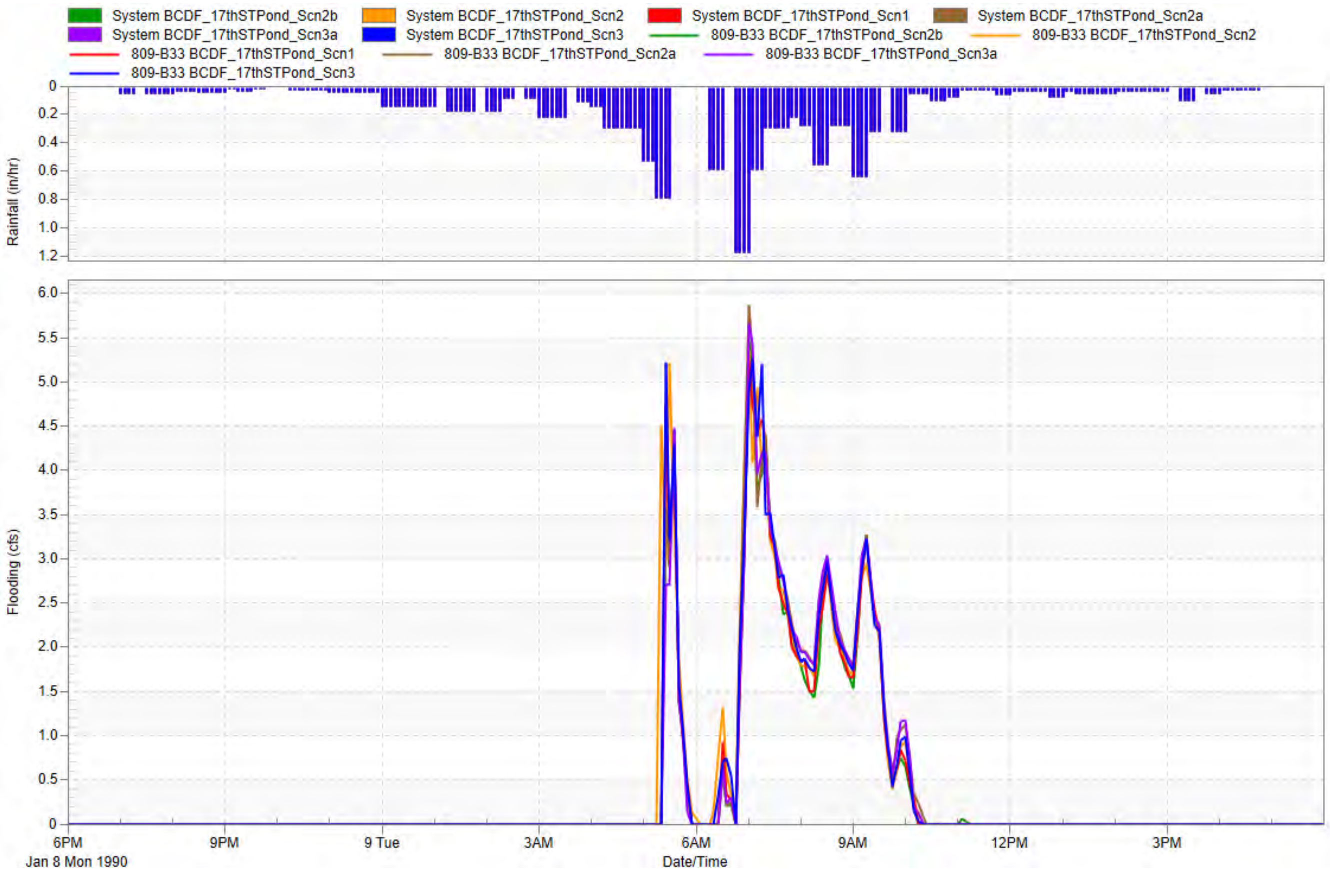

Figure B-12. Flooding at Low Inlet (809-B33) near Auburn Way South and SR 18 Westbound Offramp Intersection for Evaluation Scenarios

# References

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# Appendix C

## Asset Management Evaluation

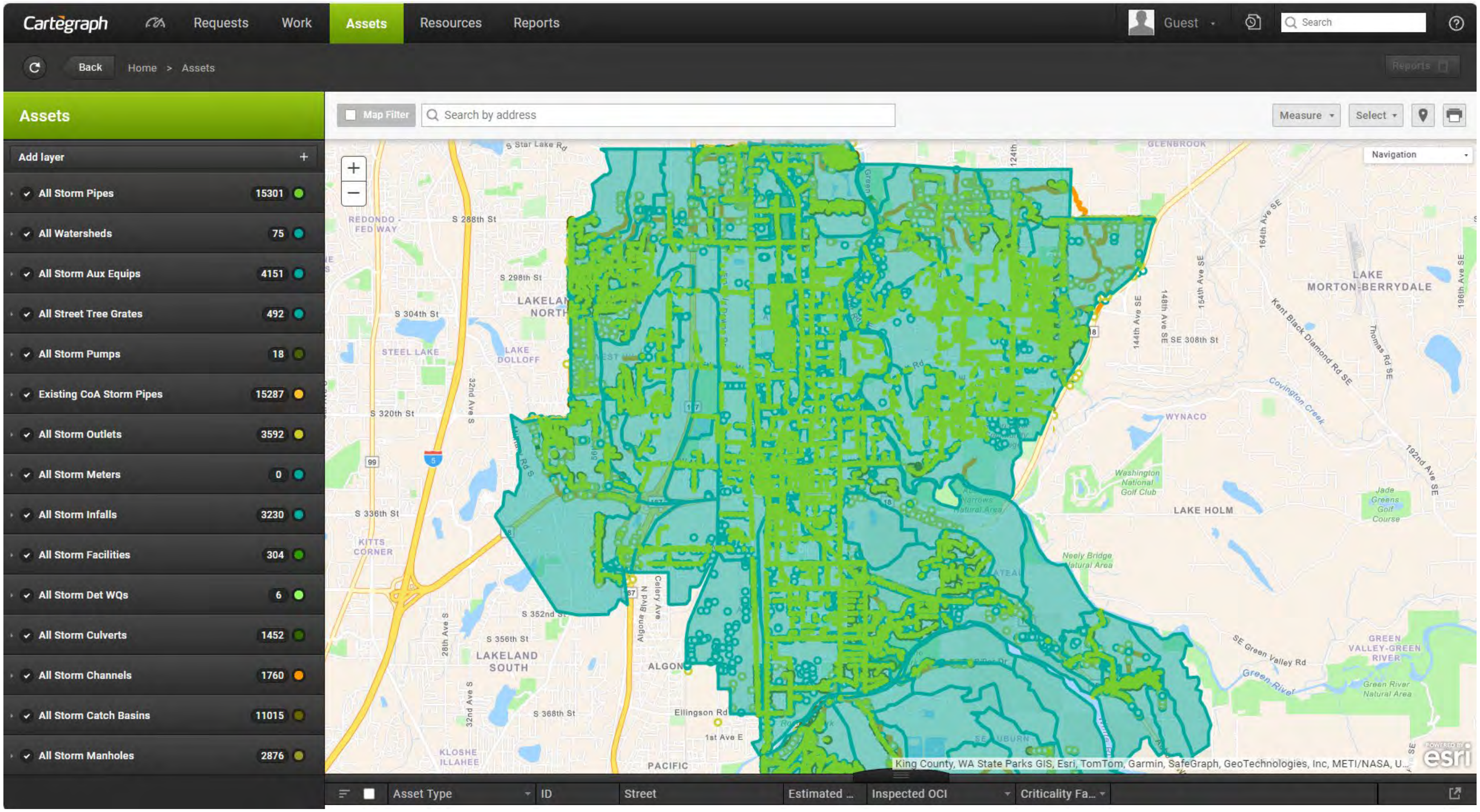
# 1. Condition Assessment and Data Gaps Analysis

## 1.1 Existing Conditions

The City uses Cartegraph, a computerized maintenance management system (CMMS), to manage its active asset inventory. Cartegraph may be used to develop work requests, document the time and cost of the work performed, keep track of resources available, and produce reports of various kinds related to asset management. The City uses a Cartegraph mobile app during field assessments, but any further updates/changes to the asset is done on the desktop in a geographic information system (GIS). The City assured that the information between GIS and Cartegraph is universal for active assets.

Figure C-1 shows the City's Cartegraph Asset dashboard. The type and count of stormwater assets within the City's asset inventory is listed on the lefthand side of the figure. Each stormwater asset has several attributes that may be tracked and documented alongside the feature. Some assets have an overall condition index (OCI) rating set up in Cartegraph. However, it is not universal to all stormwater assets, and the City expressed interest in reviewing and revising how the rating was generated.

City field staff noted the Cartegraph mobile app allows users a few options for scoring or making notes, but not all conditions can be accurately noted in the field. For example, one staff member noted that an aspect of a pipe was observed to be failing in the field, but since the failure condition wasn't explicitly asked for in the Cartegraph mobile app, the condition was rated as 100% (signifying an excellent condition). Staff must ensure the conditions are accurately conveyed and update them as necessary after returning from the field.



| | |
|---|---|
| All Storm Pipes | 15301 |
| All Watersheds | 75 |
| All Storm Aux Equips | 4151 |
| All Street Tree Grates | 492 |
| All Storm Pumps | 18 |
| Existing CoA Storm Pipes | 15287 |
| All Storm Outlets | 3592 |
| All Storm Meters | 0 |
| All Storm Infalls | 3230 |
| All Storm Facilities | 304 |
| All Storm Det WQs | 6 |
| All Storm Culverts | 1452 |
| All Storm Channels | 1760 |
| All Storm Catch Basins | 11015 |
| All Storm Manholes | 2876 |

Figure C-1. City's Cartegraph Asset Dashboard and Stormwater Asset Inventory

Screenshot was taken June 4, 2024. Because most of the asset management review was performed more than 6 months prior to taking the screenshot, it is likely there may be some differences in total asset count shown in Figure C-1 and total counts reported elsewhere in this document.

## 1.2 Critical Attribute Data

One of the goals of this evaluation is to develop criteria for preparing a criticality and risk analysis for the City's stormwater assets. This involved preparing a method for scoring the likelihood of failure and criticality of failure of each type of asset. The likelihood of failure score reflects the expected asset condition based on specified attributes, and the criticality of failure score is demonstrative of the anticipated response should the asset fail.

Each stormwater asset was reviewed, and the criteria necessary for developing its scores was determined based on professional judgment and considered the data available. Some asset types were grouped together because they were anticipated to require similar levels of management/maintenance from the Storm Drainage Utility. Other asset types listed in Cartegraph, specifically fences, infalls, outlets, meters, and auxiliary equipment, were not grouped because they are linked to one of the greater asset types reviewed and should be assigned the same likelihood of failure and criticality of failure as the greater asset it is linked to (as work/inspection is anticipated to occur at the same time).

Another asset type listed in Cartegraph, Storm Channels (ditches), was not assigned criteria for criticality scores either because its condition is based on maintenance and will not be repaired or replaced (see the Ditch Maintenance and Operations Program).

Details regarding the critical attributes used in assigning the criticality scores are listed below. Scoring is discussed in the Criticality Review section.

- Age: Based on the installation date of the asset (current year minus installation year).
- Useful life: The expected amount of time an asset is expected to perform its function. Based on either the material (pipes, culverts, network structures) or type of asset (pumps, ponds). Useful life estimates are given in the Criticality Review section.
- Previous inspection data: The previously inspected condition of the asset.
- Proximity to critical facilities: Based on a GIS analysis where a buffer was placed around critical facilities within the City. Assets were assumed to have a higher criticality of failure if they were closer to a critical facility.
- Adjacency to critical roadways: Based on a GIS analysis where a buffer was placed around critical roadways within the City. Assets were assumed to have a higher criticality of failure if they were adjacent to a critical roadway.
- Adjacency to priority roadways: Based on a GIS analysis where a buffer was placed around priority roadways within the City. Assets were assumed to have a higher criticality of failure if they were adjacent to a priority roadway.

Table C-1 lists the recommended criteria to consider in calculating the likelihood of failure and criticality of failure scores for each category of stormwater asset.

Table C-1. Recommended Criteria for Calculating Criticality Scores of Stormwater Assets

| Asset Name in Cartegraph | Asset Category | Likelihood of Failure Attributes | Criticality of Failure Attributes |
|---|---|---|---|
| Storm Pipes | Pipes | Age<br>Useful life<br>Previous inspection data | Proximity to critical facilities<br>Adjacency to critical roadways<br>Adjacency to priority roadways |
| Storm Culverts | Culverts | Age<br>Useful life<br>Previous inspection data | Proximity to critical facilities<br>Adjacency to critical roadways<br>Adjacency to priority roadways |
| Storm Pumps | Pumps | Installation date<br>Useful life | Proximity to critical facilities<br>Adjacency to critical roadways<br>Adjacency to priority roadways |
| Street Tree Grates | Network structures | Age<br>Useful life<br>Previous inspection data | Proximity to critical facilities<br>Adjacency to critical roadways<br>Adjacency to priority roadways |
| Storm Manholes | | | |
| Storm Catch Basins | | | |
| Storm Facilities | Ponds | Installation date<br>Type | Proximity to critical facilities<br>Adjacency to critical roadways<br>Adjacency to priority roadways |
| Storm Det WQs | | | |

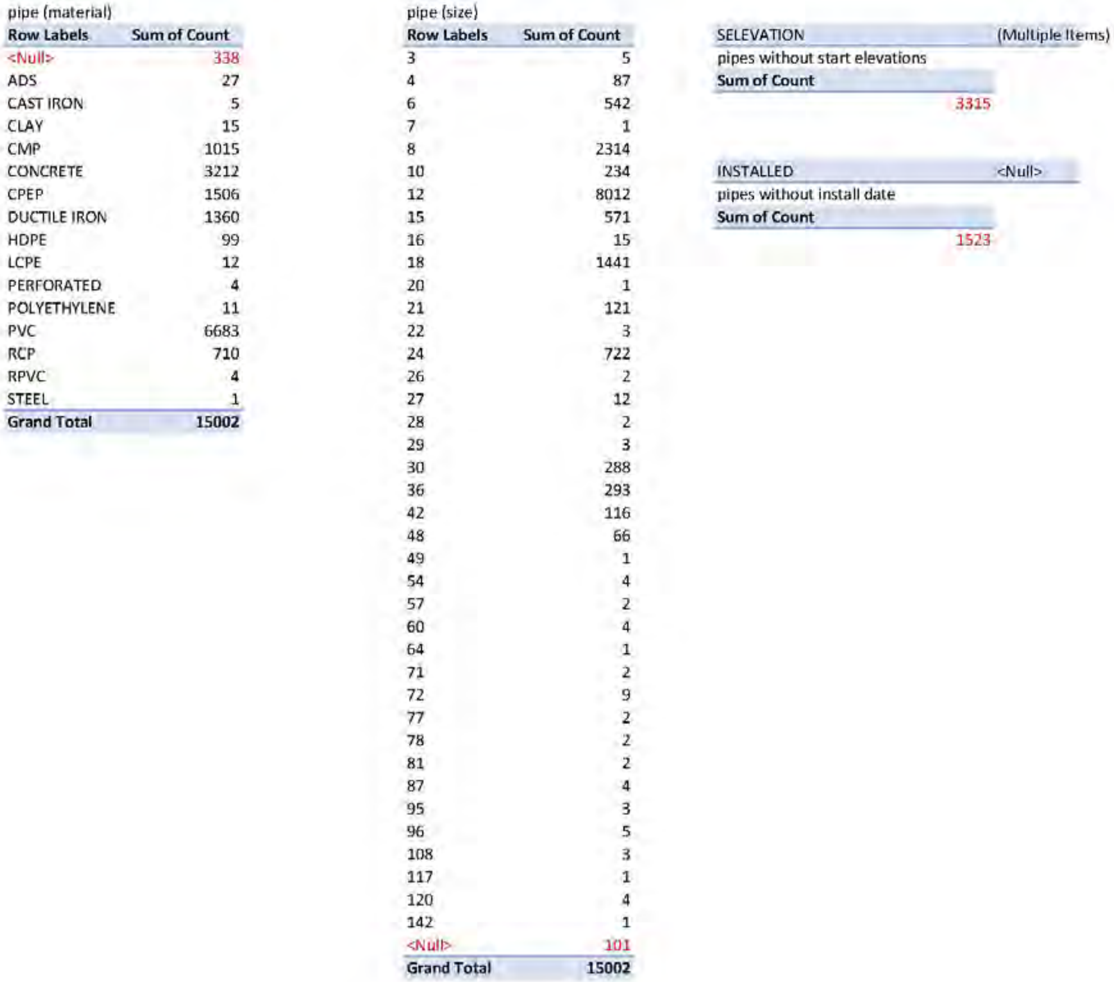
## 1.3 Data Gaps

After the critical attributes were identified for stormwater assets, a data gaps analysis was performed to see what needed to be addressed. This followed a previous effort led by the City to address data gaps in its stormwater asset inventory using a high precision antenna. As there were several stormwater assets, stormwater pipes and culverts were used as examples to demonstrate the completeness of the asset inventory.

Figure C-2 shows the distribution and availability of data for several attributes in the pipe dataset (namely, material, size, start elevation, and installation date). Figure C-3 shows the same for the culvert dataset (with the addition of end elevation). The figures demonstrate a fair amount of the attributes reviewed had <Null> entries. Most significantly, stormwater pipes are missing approximately 10% of their installation dates, while culverts are missing 75%.

Installation date was deemed to be a critical attribute for all of the stormwater assets in determining criticality scores. Lacking this attribute would then have the potential to prioritize an asset for work, even if it were expected to have been installed recently (and more likely to be in good condition), over an asset that is expected to have been installed 50 years ago. The goal of the criticality review is to simplify and provide reasoning for the prioritization of work, so it was deemed beneficial to perform a desktop GIS analysis to provide placeholder estimates for installation year. The stormwater pipe dataset was used for this process.

A copy of the stormwater pipes layer was made, and a new attribute column created for the estimated installation date. This was to make sure that the estimated installation dates entered could be distinguished from the installation dates in the dataset previously. Professional judgment was used to estimate installation dates by considering adjacent infrastructure, parcel build-out years, and historical imagery, as needed. Another attribute column was also created to provide notes as to why the estimated installation date was chosen for that feature. In this way, the remaining pipe dataset was assigned estimated installation dates and used to carry forward in the criticality review.



pipe (material)

| Row Labels | Sum of Count |
|---|---|
| <Null> | 338 |
| ADS | 27 |
| CAST IRON | 5 |
| CLAY | 15 |
| CMP | 1015 |
| CONCRETE | 3212 |
| CPEP | 1506 |
| DUCTILE IRON | 1360 |
| HDPE | 99 |
| LCPE | 12 |
| PERFORATED | 4 |
| POLYETHYLENE | 11 |
| PVC | 6683 |
| RCP | 710 |
| RPVC | 4 |
| STEEL | 1 |
| **Grand Total** | **15002** |

pipe (size)

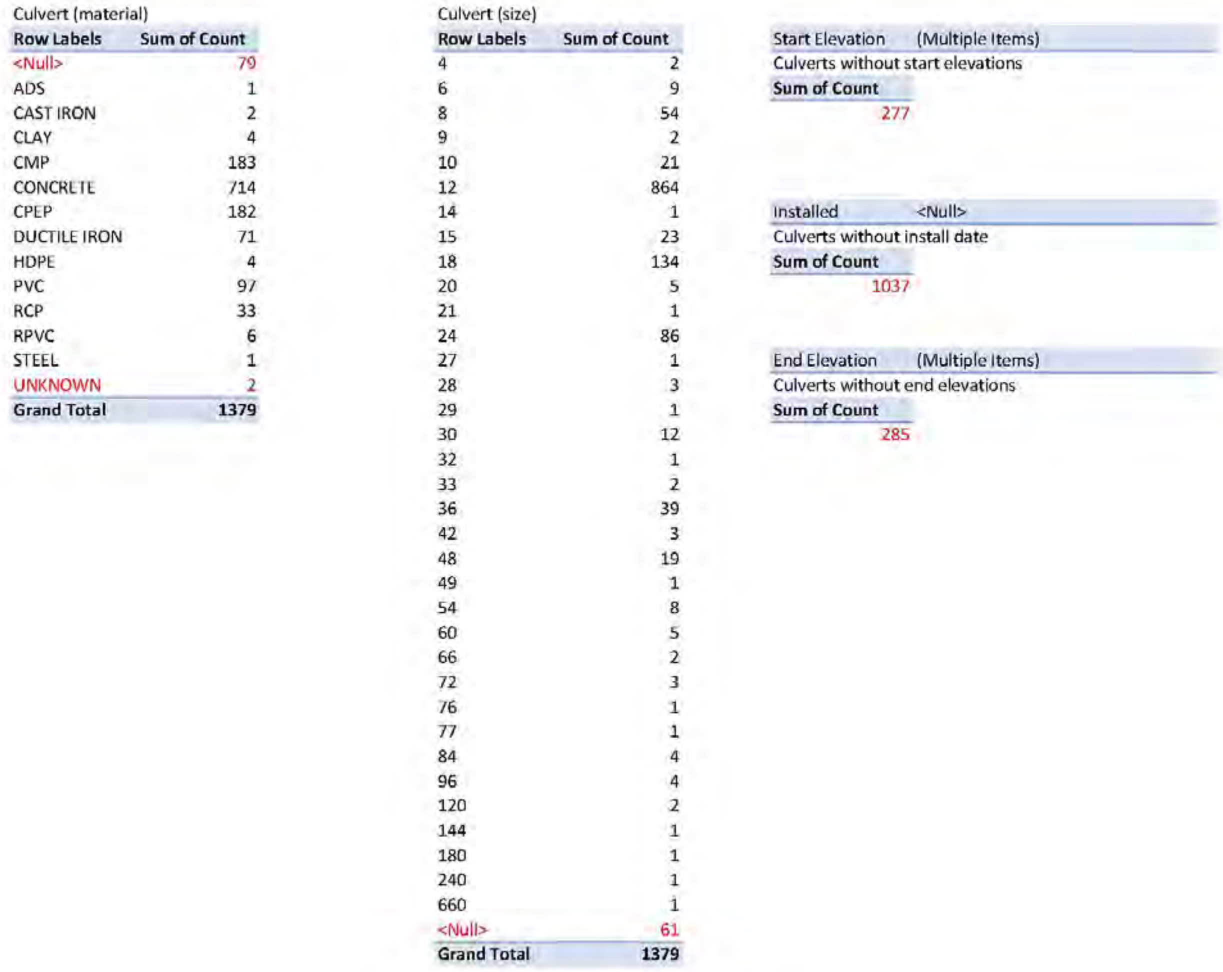
| Row Labels | Sum of Count |
|---|---|
| 3 | 5 |
| 4 | 87 |
| 6 | 542 |
| 7 | 1 |
| 8 | 2314 |
| 10 | 234 |
| 12 | 8012 |
| 15 | 571 |
| 16 | 15 |
| 18 | 1441 |
| 20 | 1 |
| 21 | 121 |
| 22 | 3 |
| 24 | 722 |
| 26 | 2 |
| 27 | 12 |
| 28 | 2 |
| 29 | 3 |
| 30 | 288 |
| 36 | 293 |
| 42 | 116 |
| 48 | 66 |
| 49 | 1 |
| 54 | 4 |
| 57 | 2 |
| 60 | 4 |
| 64 | 1 |
| 71 | 2 |
| 72 | 9 |
| 77 | 2 |
| 78 | 2 |
| 81 | 2 |
| 87 | 4 |
| 95 | 3 |
| 96 | 5 |
| 108 | 3 |
| 117 | 1 |
| 120 | 4 |
| 142 | 1 |
| <Null> | 101 |
| **Grand Total** | **15002** |

| SELEVATION | (Multiple Items) |
|---|---|
| pipes without start elevations | |
| **Sum of Count** | |
| 3315 | |

| INSTALLED | <Null> |
|---|---|
| pipes without install date | |
| **Sum of Count** | |
| 1523 | |

Figure C-2. Stormwater Pipe Attribute Data Available in Cartegraph

Note: Attribute data were reviewed prior to capturing a screenshot of Cartegraph (Figure C-1), hence there may be some differences in asset count.



Culvert (material)

| Row Labels | Sum of Count |
|---|---|
| <Null> | 79 |
| ADS | 1 |
| CAST IRON | 2 |
| CLAY | 4 |
| CMP | 183 |
| CONCRETE | 714 |
| CPEP | 182 |
| DUCTILE IRON | 71 |
| HDPE | 4 |
| PVC | 97 |
| RCP | 33 |
| RPVC | 6 |
| STEEL | 1 |
| UNKNOWN | 2 |
| **Grand Total** | **1379** |

Culvert (size)

| Row Labels | Sum of Count |
|---|---|
| 4 | 2 |
| 6 | 9 |
| 8 | 54 |
| 9 | 2 |
| 10 | 21 |
| 12 | 864 |
| 14 | 1 |
| 15 | 23 |
| 18 | 134 |
| 20 | 5 |
| 21 | 1 |
| 24 | 86 |
| 27 | 1 |
| 28 | 3 |
| 29 | 1 |
| 30 | 12 |
| 32 | 1 |
| 33 | 2 |
| 36 | 39 |
| 42 | 3 |
| 48 | 19 |
| 49 | 1 |
| 54 | 8 |
| 60 | 5 |
| 66 | 2 |
| 72 | 3 |
| 76 | 1 |
| 77 | 1 |
| 84 | 4 |
| 96 | 4 |
| 120 | 2 |
| 144 | 1 |
| 180 | 1 |
| 240 | 1 |
| 660 | 1 |
| <Null> | 61 |
| **Grand Total** | **1379** |

| Start Elevation | (Multiple Items) |
|---|---|
| Culverts without start elevations | |
| **Sum of Count** | |
| 277 | |

| Installed | <Null> |
|---|---|
| Culverts without install date | |
| **Sum of Count** | |
| 1037 | |

| End Elevation | (Multiple Items) |
|---|---|
| Culverts without end elevations | |
| **Sum of Count** | |
| 285 | |

Figure C-3. Culvert Attribute Data Available in Cartegraph

Note: Attribute data were reviewed prior to capturing a screenshot of Cartegraph (Figure C-1), hence there may be some differences in asset count.

## 1.4 Recommendations

The findings from the condition assessment and data gaps analysis resulted in the following recommendations for the program:

- City field staff should be able to accurately report/enter asset conditions in the field. If there are features that are consistently being scored incorrectly due to issues with the Cartegraph app, this should be reviewed and amended to simplify the entry process from the field.
- The OCI rating should be reviewed and revised.
- The likelihood of failure and criticality of failure attributes from Table C-1 should be used as the criteria for criticality scoring.
- A similar GIS desktop analysis may be beneficial for other asset types with missing installation dates. Specifically, culverts are expected to benefit as they were missing 75% of their installation dates.

# 2. Criticality Review

## 2.1 Likelihood of Failure

To develop the likelihood of failure score, assumptions had to be made regarding the critical attributes listed in Table C-1.

### 2.1.1 Useful Life

The useful life estimates based on pipe material are given in Table C-2 below.

Table C-2. Useful Life Estimates for Pipe Material

| Pipe Material (Cartegraph) | Description | Useful Life Estimate |
|---|---|---|
| <Null> | No material listed | 50 |
| ADS | Advanced drainage system (type of high density polyethylene pipe) | 50 |
| CAST IRON | Cast iron pipe | 75 |
| CLAY | Vitrified clay pipe | 100 |
| CMP[1] | Corrugated metal pipe | 50 |
| CONCRETE[1] | Concrete pipe | 100 |
| CPEP | Corrugated polyethylene pipe | 50 |
| DUCTILE IRON[1] | Ductile iron pipe | 75 |
| HDPE[1] | High density polyethylene pipe | 100 |
| LCPE | Line corrugated polyethylene pipe | 50 |
| PERFORATED | Perforated pipe | 50 |
| POLYETHYLENE | Polyethylene pipe | 50 |
| PVC[1] | Polyvinyl chloride pipe | 100 |

| Pipe Material (Cartegraph) | Description | Useful Life Estimate |
|---|---|---|
| RCP[1] | Reinforced concrete pipe | 100 |
| RPVC | Rigid polyvinyl chloride pipe | 50 |
| STEEL[1] | Ductile steel pipe | 75 |

[1] Useful life estimates were sourced from a similar process performed for the Multnomah County Drainage District. The remaining materials were not included in this process and were assigned a conservative estimate of 50 years as a placeholder value. This value may be updated by the City as they see fit.

Useful life estimates can be made in a similar way for culverts and network structures based on their material. These have not been prepared as a part of this assessment.

Useful life estimates for the ponds category from Table C-1 are given in Table C-3. The possible components for each type of facility was listed, and an estimate of useful life given using professional judgment. The most conservative useful life of one of the facility's components should be used to assign the useful life of the facility. These estimates were given as a basis for developing a likelihood of failure score for the ponds asset category. The useful life of pumps can be estimated in a similar manner as shown in Table C-3, but has not been estimated as a part of this assessment.

## Table C-3. Useful Life Estimates for Ponds (Stormwater Facilities and Detention/Water Quality Treatment Facilities)

| | Total[1] | Useful Life of Components Assumption (Years)[2] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Facility Type | Useful Life Assumption (Years) | Control Structure Replacement | Mechanism Replacement | In-Place Soil Media | Media Box Replacement | Vault | Rebuild | Notes |
| <Null> | – | – | – | – | – | – | – | – |
| BAFFLE OIL/WATER SEPARATOR | 20 | – | 20 | – | – | 50 | – | – |
| BASIC BIOFILTRATION SWALE | N/A[3] | – | – | – | – | – | – | Maintenance based |
| BIORETENTION | 25 | – | – | 25 | – | – | – | Full media replacement |
| CARTRIDGE FILTER | 20 | – | – | – | 20 | 50 | – | – |
| CP OIL/WATER SEPARATOR | 20 | – | 20 | – | – | 50 | – | – |
| DETENTION POND | 25 | 25 | – | – | – | – | – | Assume 25 years for control structure |
| DETENTION TANK | 25 | 25 | – | – | – | 50 | – | Assume 25 years for control structure |
| DETENTION VAULT | 25 | 25 | – | – | – | 50 | – | Assume 25 years for control structure |
| FILTER STRIPS | 25 | – | – | 25 | – | – | – | Full media replacement |
| FLOOD STORAGE | 25 | 25 | – | – | – | – | – | Assume 25 years for control structure |
| HYDRODYNAMIC SEPARATOR | 10 | – | 10 | – | – | 50 | – | – |
| INFILTRATION | 20 | – | – | 20 | – | – | – | Full media replacement |
| INFILTRATION POND | 20 | – | – | 20 | – | – | – | Full media replacement |
| MODULAR WETLAND | 20 | – | – | – | 20 | – | – | – |
| PERMEABLE PAVEMENT | 10 | – | – | – | – | – | 10 | – |
| TREE BOX | 20 | – | – | – | 20 | – | – | – |
| WET BIOFILTRATION SWALE | N/A[3] | – | – | – | – | – | – | Maintenance based |
| WET POND | 25 | 25 | – | – | – | – | – | Assume 25 years for control structure |
| WET VAULT | 25 | 25 | – | – | – | 50 | – | Assume 25 years for control structure |

1 Total useful life is based on the most conservative estimate listed for one of the facility's component parts.

2 Estimates were made using professional judgment regarding the useful life expectancy for the components of each facility. There is not a value listed for each facility for the possible components as they do not apply to each facility listed.

3 Facilities that do not have a useful life assumption are maintenance based and should be managed as part of routine maintenance rather than a repair and replacement program.

### 2.1.2 Remaining Useful Life

The remaining useful life is calculated using its age and its useful life, as shown below.

$$Remaining\ useful\ life = asset\ age - useful\ life$$

This is the basis for the likelihood of failure score for the stormwater assets.

### 2.1.3 Previous Inspection Data

The previous condition of the asset feature was used to make an adjustment to the likelihood of failure score, if it was available, since this would be the most reliable source of data regarding its condition.

Thus, the remaining useful life equation would be:

$$Remaining\ useful\ life = asset\ age - useful\ life + previous\ inspection\ data\ adjustment$$

Table C-4 shows the adjustment to the useful life based on the previous OCI assigned. These estimated adjustments were only considered for stormwater pipes and should be evaluated to see whether a similar adjustment can be made for network structures. This is not recommended for ponds and pumps.

Table C-4. Remaining Useful Life Adjustment for Pipes and Culverts Based on Previous Inspection Data

| Overall Condition Index | Description | Useful Life Year Adjustment |
|---|---|---|
| 0 | Failed | 0 |
| 20 | Poor | 10 |
| 40 | Fair | 20 |
| 60 | Good | 30 |
| 80 | Excellent | 40 |

### 2.1.4 Likelihood of Failure Score

Table C-5 shows how the likelihood of failure score was assigned based on remaining useful life. A score of 5 is the most likely to fail, while a score of 1 is the least likely to fail.

Table C-5. Likelihood of Failure Score

| Score | Description | Useful Life Years Remaining with Updated Inspection Results |
|---|---|---|
| 5 | Structure is greater than 25 years beyond useful life and should be prioritized for inspection | -75 |
| 4 | Structure is past end of useful life and must be inspected | -25 |
| 3 | Structure is nearing end of useful life and should be inspected | 0 |
| 2 | Failure not expected for 25+ years | 25 |
| 1 | Unlikely failure in foreseeable future | 75 |

## 2.2 Criticality of Failure Score

To develop the criticality of failure score, assumptions had to be made regarding the critical attributes listed in Table C-1. Each critical attribute metric was scored independently and then averaged to result in the criticality of failure score.

### 2.2.1 Proximity to Critical Facilities

A 1,000-foot buffer was placed around the critical facilities within the City of Auburn in GIS. If any asset was within 1,000 feet of a critical facility, then its failure was assumed to be most critical. The score for this assessment is shown in Table C-6 below.

Table C-6. Proximity to Critical Facilities Score

| Distance from Critical Facility | Proximity to Critical Facilities Score |
|---|---|
| 0–1000 feet | 5 |
| Greater than 1000 feet | 1 |

This GIS analysis was only performed for stormwater pipes for this assessment but can be easily performed for other stormwater assets by applying the same GIS buffer.

### 2.2.2 Adjacency to Critical Roadways

The roadways considered as critical in this assessment are listed below.

- Emergency evacuation route.
- Snow plow route.
- King County Metro bus route.
- Sound Transit bus route.
- Pierce Transit bus route.

A buffer was placed around the critical roadways in the City in GIS. If any asset was within this buffer, it was deemed to be most critical of failure. The score for this assessment is shown in Table C-7 below.

Table C-7. Adjacency to Critical Roadways Score

| Distance from Critical Roadway | Proximity to Critical Roadways Score |
|---|---|
| Within right-of-way buffer of critical roadway | 5 |
| Outside of critical roadway buffer | 1 |

This GIS analysis was only performed for stormwater pipes for this assessment but can be easily performed for other stormwater assets by applying the same GIS buffer.

### 2.2.3 Proximity to Priority Roadways

A priority rank was assigned to the different functional classifications of roads within the City. A GIS analysis was performed where a buffer was placed around each street. Assets were then assigned a proximity to priority roadways score equal to the priority rank of the street right-of-way where it lay. The priority rank (and proximity to priority roadways score) based on street functional classification is shown in Table C-8 below.

Table C-8. Priority Rank based on Street Functional Classification

| Street Functional Classification | Priority Rank |
|---|---|
| ALLEY | 4 |
| HIGHWAY | 5 |
| LOCAL | 3 |
| MINOR ARTERIAL | 1 |
| NON RESIDENTIAL COLLECTOR | 2 |
| PRINCIPAL ARTERIAL | 1 |
| RAMP | 4 |
| RESIDENTIAL COLLECTOR | 2 |
| RURAL COLLECTOR | 4 |
| #N/A | 3 |
| <Null> | 3 |

This GIS analysis was only performed for stormwater pipes for this assessment but can be easily performed for other stormwater assets by applying the same GIS buffer.

### 2.2.4 Criticality of Failure Score

The criticality of failure score was calculated by taking the average of the proximity to critical facilities score, adjacency to critical roadways score, and adjacency to priority roadways score. The criticality of failure score is summarized in Table C-9 below.

Table C-9. Criticality of Failure Score

| Criticality of Failure Score | Description |
|---|---|
| 5 | Structure has critical facilities <1000 ft away, is adjacent to a critical roadway, and adjacent to a higher priority roadway functional classification |
| 4 | |
| 3 | |
| 2 | |
| 1 | Structure is not adjacent to critical facilities, critical roadways, or higher priority roadways. |

## 2.3 Results

The criticality of failure and likelihood of failure scores can be summed to create a combined score or used independently. A spreadsheet was created to score the stormwater pipes inventory using the methods described above. A screenshot is shown in Figure C-4 below of the first page of results. This spreadsheet may be used as an example for the other stormwater assets in creating a likelihood of failure and criticality of failure score.

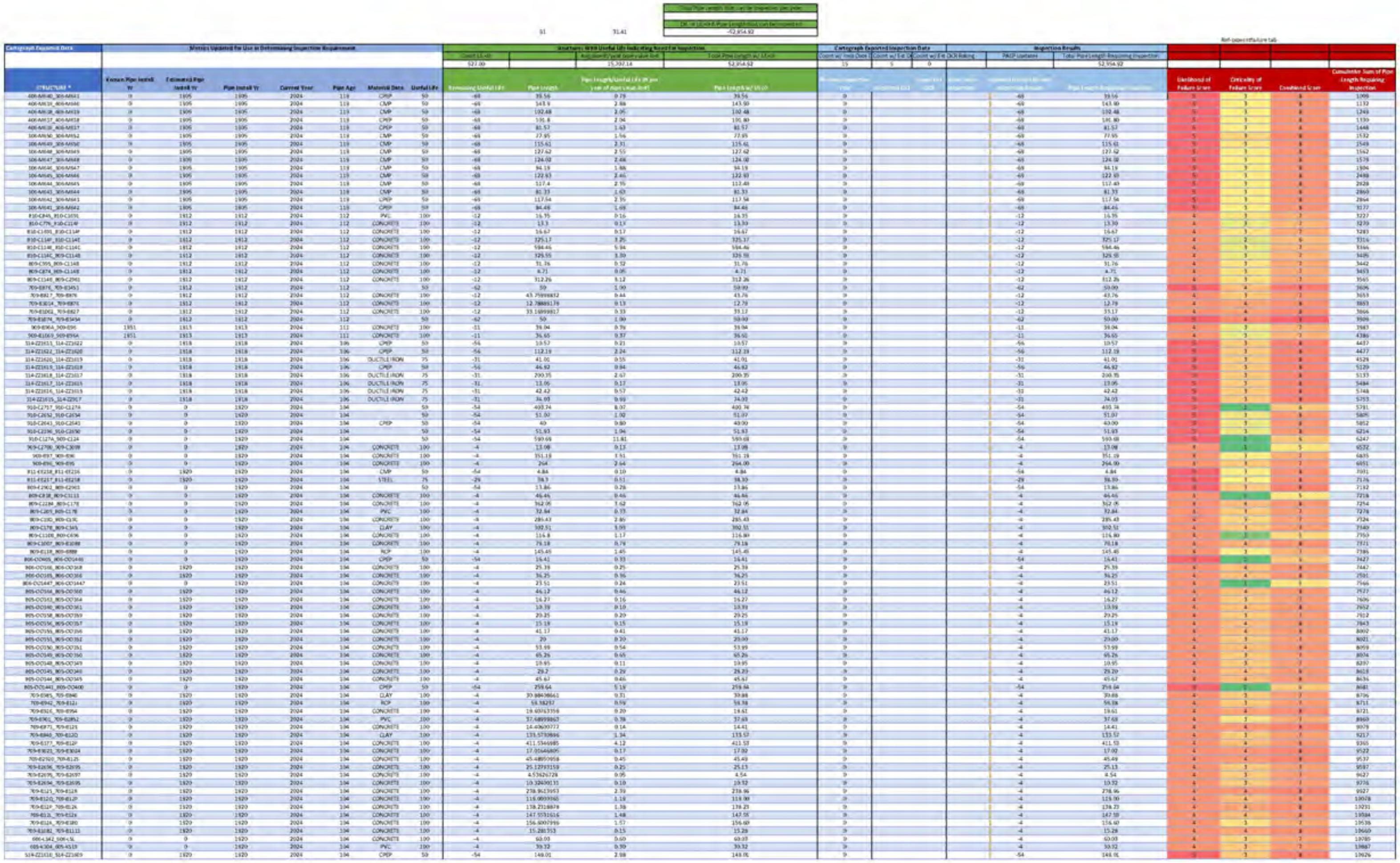


Figure C-4. Criticality Spreadsheet Results for Stormwater Pipes

## 2.4 Recommendations

The following actions are recommended after the criticality review:

- Estimate useful life for culverts, pumps, and network structures
- Consider whether previous inspection data should be used in adjusted useful life for network structures
- Perform GIS desktop analysis needed for the other stormwater assets in Table C-1 based on the methods described for the criticality of failure score.
- Enact the criticality of failure and likelihood of failure scores in Cartegraph for stormwater pipes, then follow suit with the stormwater assets listed in Table C-1.

# 3. Pipe Depreciation Analysis

The resulting failure scores allow for the City to rank different assets both on likelihood and criticality of failure. It is recommended to use this ranking strategy to develop an inspection program where inspections of different types of assets are prioritized based on their rank. The asset inspection program will serve to fill data gaps, update the likelihood of failure score based on field verification, and identify asset features requiring repair or replacement. After inspection data are input for an asset feature, the results of the inspection will supersede the use of estimated remaining useful life and installation date (where applicable) in calculating a likelihood of failure score. Using this system to prioritize maintenance allows resources to be used more efficiently and fills in data gaps resulting in a more robust asset inventory.

## 3.1 Inspection of Pipes, Culverts, and Network Structures

For the City's pipe system, the recommended program would prioritize inspection based on likelihood of failure and then criticality of failure. In this way, pipes with likelihood of failure scores greater than or equal to 4 (or a negative useful life estimate) will be inspected first. The next tier of inspections should address pipes with likelihood of failure scores equal to 3 and pipes with unknown installation dates. After pipes are inspected, they should be assigned a condition score, which will supersede the installation date and useful life expectancy in determining the likelihood of failure. The likelihood of failure for a pipe will increase over time, and this prioritization method will take this into account while integrating field inspection data. Table C-10 summarizes the length of pipe requiring inspection using this method.

Table C-10. Pipes Requiring Inspection Summary

| | Feet | Miles | Relative to Existing City Total (%) | Notes |
|---|---|---|---|---|
| Total length of pipe in Cartegraph | 2,439,196 | 461.97 | | This includes all jurisdictions and statuses. |
| Total length of pipe in City | 1,292,737.73 | 244.84 | 100% | Jurisdiction = "CoA" and Status = "Existing" |
| Total pipe length requiring inspection | 52,954.92 | 10.03 | 4.10% | Applies for any pipe whose Likelihood of Failure Score = 4 or 5 (Useful Life <0) |

Since storm catch basins and storm manholes are related to pipes, it is recommended to inspect these at the same time as adjacent pipes. The same inspection prioritization method is recommended for culverts because the failure consequences are similar.

## 3.2 Inspection of Remaining Stormwater Assets

For storm pumps, it is recommended to closely evaluate their condition as their useful life nears the end (e.g., 5 or fewer years) and upgrade or replace them before probable failure. Stormwater control facilities should be routinely inspected and prioritized for inspection when critical feature data are unavailable.

# 4. Pipe Replacement Cost Projection

A brief review of costs were included in the asset management evaluation for consideration in setting the repair and replacement budget and resource planning goals for the 2024 Plan. A comprehensive cost estimate was prepared for both pipe replacement and the replacement of catch basins and manholes within the City. The assumptions and results of this analysis are noted below.

## 4.1 Method and Assumptions

The cost estimate for pipe replacement is meant to function as a generic cost estimate for the as opposed to being based off a particular project or area. The primary cost estimation calculations assume the replacement of 5,000 linear feet of pipe as well as the associated conveyance structures, such as manholes and catch basins. The estimate also includes work commonly associated with a pipe replacement project, including temporary erosion and sediment control (TESC); site prep, such as the removal of surface pavement and existing structures; the installation of the conveyance system structures, such as trenching and backfill; surface/pavement repair; and project costs, such as design contingency and permitting.

Additional assumptions and further explanation of cost breakdown for the cost of pipe replacement are as follows:

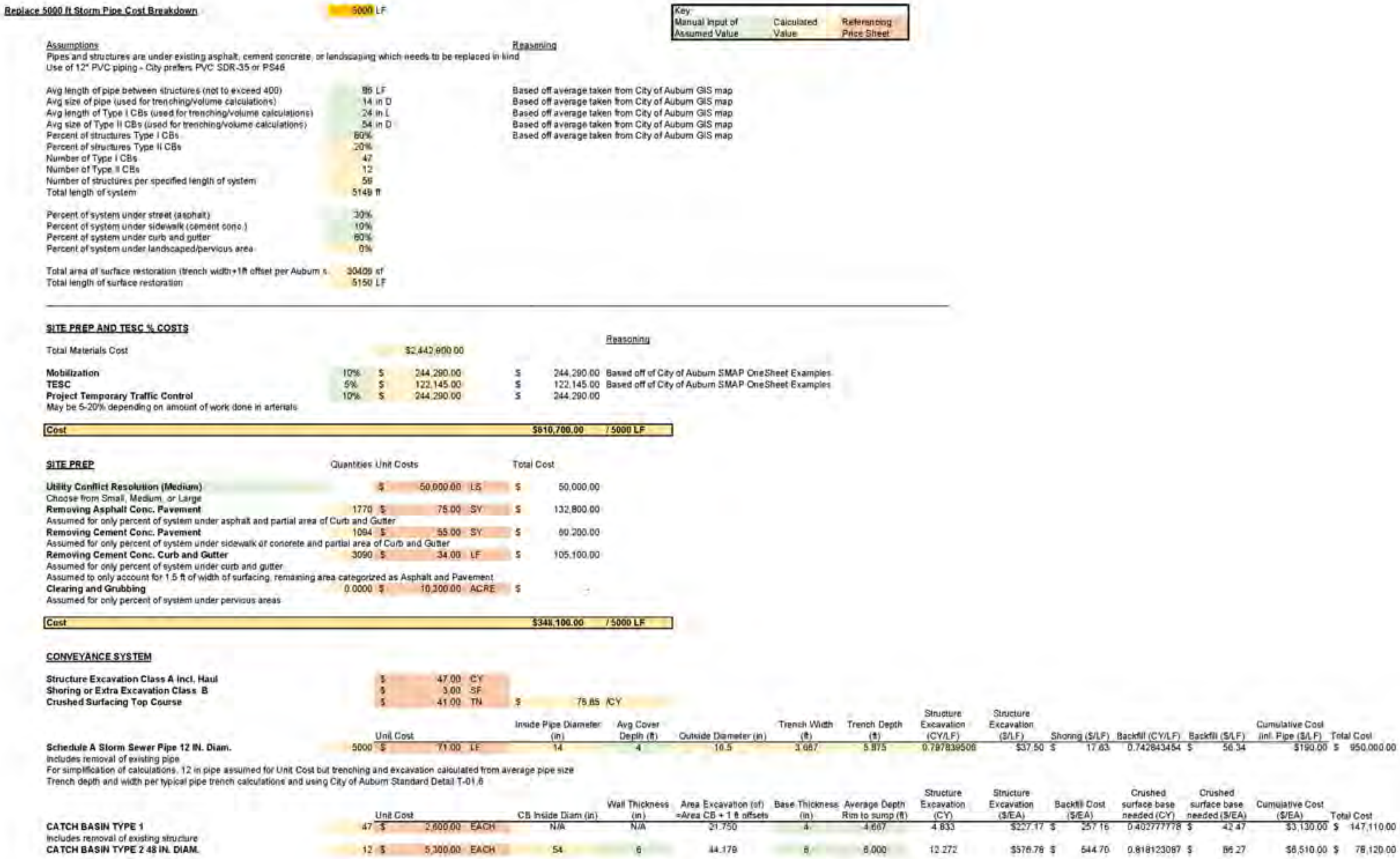
- General:
    - → All pipes and structures are assumed to be within the same/connecting system.
    - → Pipes and structures are under existing asphalt, cement concrete, or landscaping that would need to be replaced in kind.
    - → The City of Auburn GIS map was used to provide information about average pipe sizes, pipe lengths, types of catch basins, and land surface cover in the area that was used to make a general calculation of cost to replace 5,000 linear of pipe.
    - → The City of Auburn Engineering Design Standards (February 2024) as well as the Standard Details (February 2024) was used to inform typical design for the purpose of cost and quantity calculations.
- TESC and site prep: Site prep costs include the removal and cutting of surfaces that may be over the top of existing conveyance systems as well as Utility Conflict Resolution. Other costs for site prep, such as TESC, mobilization, and project temporary traffic control are calculated based on percentages commonly used in projects of a similar nature. Project temporary traffic control for the replacement of conveyance systems may vary depending on the

amount of work done in arterials or heavily trafficked areas. For this cost estimate, it was assumed that the work will need a medium amount of traffic control.

- Conveyance system and structural/asphalt repair: For the simplification of calculations, certain generalizations were made in calculating quantities and costs, such as the assumption that all pipes are the same size, material, and depth. See Figures C-5 through C-8 for assumptions.
- Project costs: Project costs percentages were based off the percentages used for the Stormwater Management Action Plan “One Sheets” completed for the City of Auburn in 2023. They include project costs for design contingency, permitting, design, City project management administration, and construction management.
- Unit costs: Unit costs were based off the assumption of 5,000 or 10,000 linear feet of pipe replacement and associated quantities for other conveyance system replacement appurtenances. Unit costs were estimated using the Washington State Department of Transportation Unit Bid Analysis tabs as well as other project cost estimates that have similar attributes to the general cost estimate of replacing conveyance system structures and pipes.

## 4.2 Results

Cost estimates were made to show the average cost of replacing 5,000 feet of pipe within the City of Auburn (Figure C-5), replacing 5,000 linear feet of pipe in downtown (Figure C-6), and 10,000 linear feet of pipe in rural areas (Figure C-7). A cost estimate was also made for replacing catch basins without replacing any adjacent pipes (Figure C-8).



**Replace 5000 ft Storm Pipe Cost Breakdown** 5000 LF

| Key: | | |
|---|---|---|
| Manual Input of Assumed Value | Calculated Value | Referencing Price Sheet |

Assumptions

Pipes and structures are under existing asphalt, cement concrete, or landscaping which needs to be replaced in kind
Use of 12" PVC piping - City prefers PVC SDR-35 or PS46

| Assumptions | | Reasoning |
|---|---|---|
| Avg length of pipe between structures (not to exceed 400) | 86 LF | Based off average taken from City of Auburn GIS map |
| Avg size of pipe (used for trenching/volume calculations) | 14 in D | Based off average taken from City of Auburn GIS map |
| Avg length of Type I CBs (used for trenching/volume calculations) | 24 in L | Based off average taken from City of Auburn GIS map |
| Avg size of Type II CBs (used for trenching/volume calculations) | 54 in D | Based off average taken from City of Auburn GIS map |
| Percent of structures Type I CBs | 80% | Based off average taken from City of Auburn GIS map |
| Percent of structures Type II CBs | 20% | |
| Number of Type I CBs | 47 | |
| Number of Type II CBs | 12 | |
| Number of structures per specified length of system | 59 | |
| Total length of system | 5149 ft | |
| Percent of system under street (asphalt) | 30% | |
| Percent of system under sidewalk (cement conc.) | 10% | |
| Percent of system under curb and gutter | 60% | |
| Percent of system under landscaped/pervious area | 0% | |
| Total area of surface restoration (trench width+1ft offset per Auburn s | 30409 sf | |
| Total length of surface restoration | 5150 LF | |

**SITE PREP AND TESC % COSTS**

Total Materials Cost $2,442,900.00

| | | | | Reasoning |
|---|---|---|---|---|
| **Mobilization** | 10% | $ 244,290.00 | $ 244,290.00 | Based off of City of Auburn SMAP OneSheet Examples |
| **TESC** | 5% | $ 122,145.00 | $ 122,145.00 | Based off of City of Auburn SMAP OneSheet Examples |
| **Project Temporary Traffic Control** | 10% | $ 244,290.00 | $ 244,290.00 | |

May be 5-20% depending on amount of work done in arterials

**Cost** $610,700.00 / 5000 LF

**SITE PREP**

| | Quantities | Unit Costs | | Total Cost |
|---|---|---|---|---|
| **Utility Conflict Resolution (Medium)**<br>Choose from Small, Medium, or Large | | $ 50,000.00 | LS | $ 50,000.00 |
| **Removing Asphalt Conc. Pavement**<br>Assumed for only percent of system under asphalt and partial area of Curb and Gutter | 1770 | $ 75.00 | SY | $ 132,800.00 |
| **Removing Cement Conc. Pavement**<br>Assumed for only percent of system under sidewalk or concrete and partial area of Curb and Gutter | 1094 | $ 55.00 | SY | $ 60,200.00 |
| **Removing Cement Conc. Curb and Gutter**<br>Assumed for only percent of system under curb and gutter<br>Assumed to only account for 1.5 ft of width of surfacing, remaining area categorized as Asphalt and Pavement | 3090 | $ 34.00 | LF | $ 105,100.00 |
| **Clearing and Grubbing**<br>Assumed for only percent of system under pervious areas | 0.0000 | $ 10,300.00 | ACRE | $ - |

**Cost** $348,100.00 / 5000 LF

**CONVEYANCE SYSTEM**

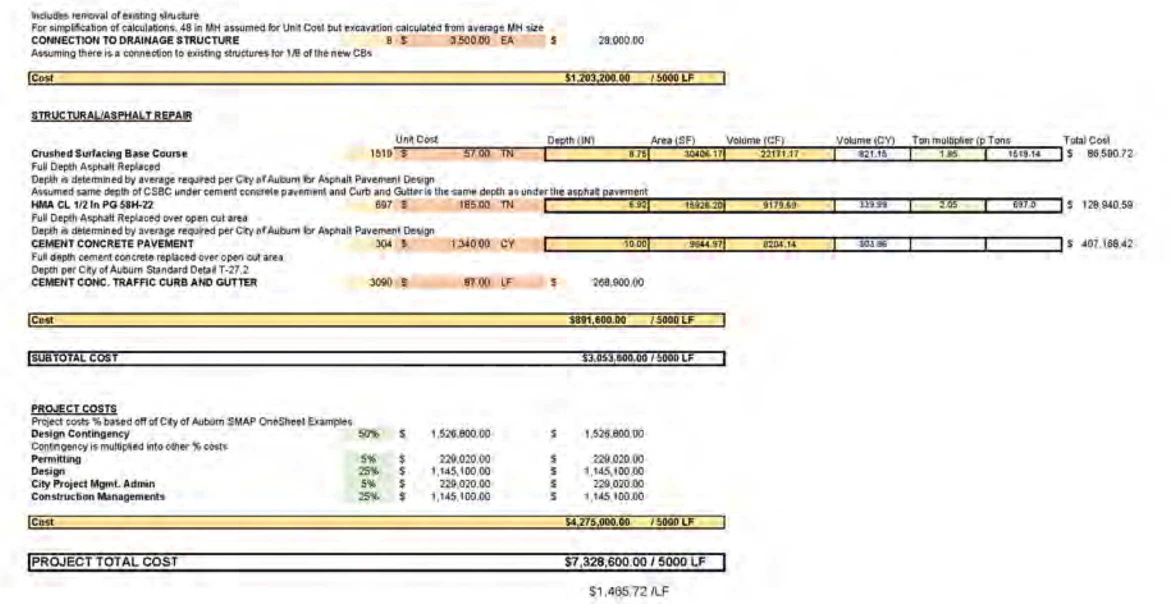
| | | | | |
|---|---|---|---|---|
| **Structure Excavation Class A Incl. Haul** | $ 47.00 | CY | | |
| **Shoring or Extra Excavation Class B** | $ 3.00 | SF | | |
| **Crushed Surfacing Top Course** | $ 41.00 | TN | $ 76.85 | /CY |

| | | Unit Cost | | Inside Pipe Diameter (in) | Avg Cover Depth (ft) | Outside Diameter (in) | Trench Width (ft) | Trench Depth (ft) | Structure Excavation (CY/LF) | Structure Excavation ($/LF) | Shoring ($/LF) | Backfill (CY/LF) | Backfill ($/LF) | Cumulative Cost (inl. Pipe ($/LF) | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Schedule A Storm Sewer Pipe 12 IN. Diam.** | 5000 | $ 71.00 | LF | 14 | 4 | 16.5 | 3.667 | 5.875 | 0.797839506 | $37.50 | $ 17.63 | 0.742843454 | $ 56.34 | $190.00 | $ 950,000.00 |

Includes removal of existing pipe
For simplification of calculations, 12 in pipe assumed for Unit Cost but trenching and excavation calculated from average pipe size
Trench depth and width per typical pipe trench calculations and using City of Auburn Standard Detail T-01,6

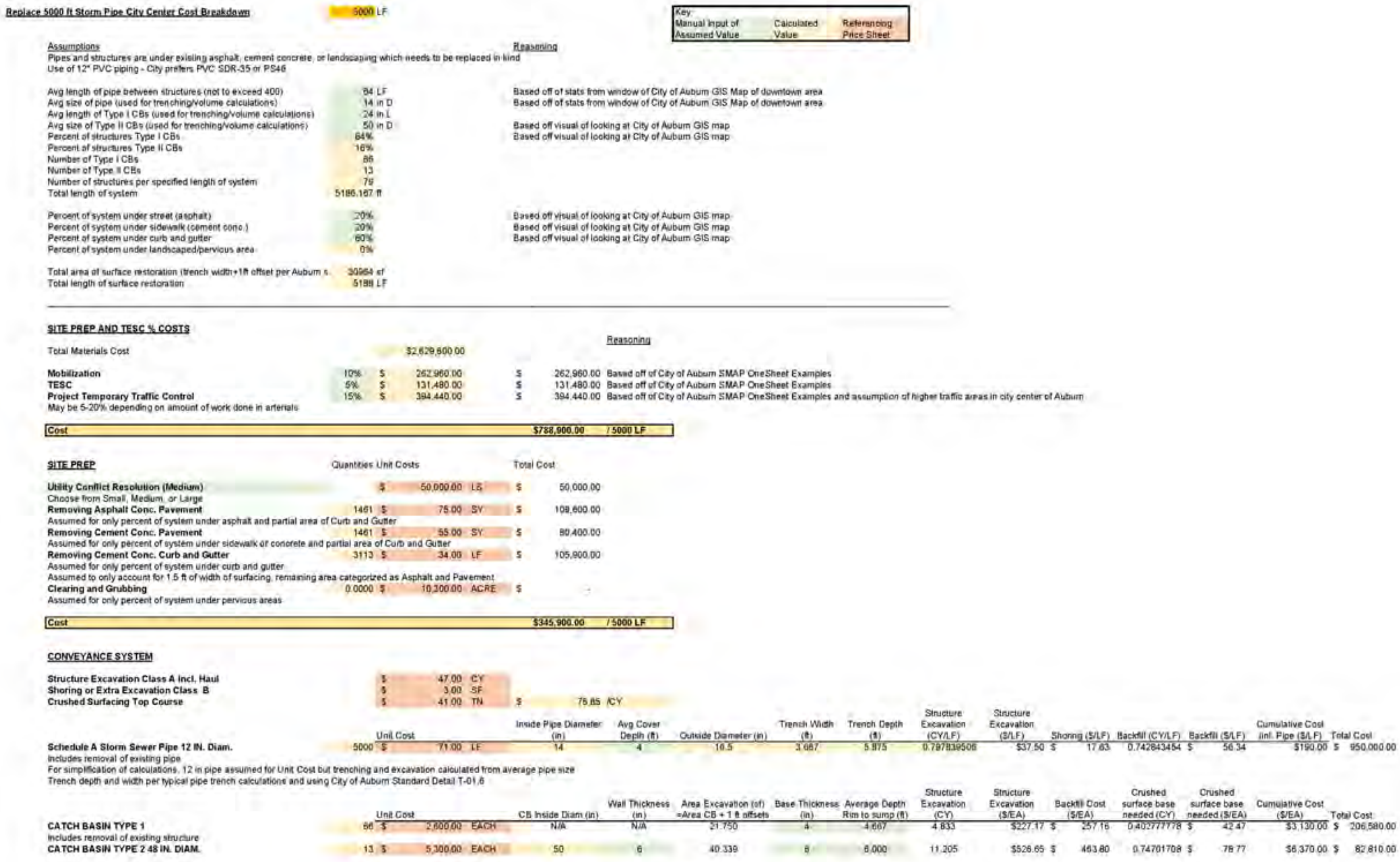
| | | Unit Cost | | CB Inside Diam (in) | Wall Thickness (in) | Area Excavation (sf) =Area CB + 1 ft offsets | Base Thickness (in) | Average Depth Rim to sump (ft) | Structure Excavation (CY) | Structure Excavation ($/EA) | Backfill Cost ($/EA) | Crushed surface base needed (CY) | Crushed surface base needed ($/EA) | Cumulative Cost ($/EA) | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CATCH BASIN TYPE 1**<br>Includes removal of existing structure | 47 | $ 2,600.00 | EACH | N/A | N/A | 21.750 | 4 | 4.667 | 4.833 | $227.17 | $ 257.16 | 0.402777778 | $ 42.47 | $3,130.00 | $ 147,110.00 |
| **CATCH BASIN TYPE 2 48 IN. DIAM.** | 12 | $ 5,300.00 | EACH | 54 | 6 | 44.179 | 8 | 6.000 | 12.272 | $576.78 | $ 544.70 | 0.818123087 | $ 86.27 | $6,510.00 | $ 78,120.00 |

Figure C-5. Average Cost of Replacing 5,000 Feet of Stormwater Pipe in the City of Auburn



|  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Includes removal of existing structure |  |  |  |  |  |  |  |  |  |  |  |  |
| For simplification of calculations. 48 in MH assumed for Unit Cost but excavation calculated from average MH size |  |  |  |  |  |  |  |  |  |  |  |  |
| **CONNECTION TO DRAINAGE STRUCTURE** | 8 | $ | 3,500.00 | EA | $ 28,000.00 |  |  |  |  |  |  |  |
| Assuming there is a connection to existing structures for 1/8 of the new CBs |  |  |  |  |  |  |  |  |  |  |  |  |
| **Cost** |  |  |  |  | **$1,203,200.00** | **/ 5000 LF** |  |  |  |  |  |  |
| **STRUCTURAL/ASPHALT REPAIR** |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | Unit Cost |  |  | Depth (IN) | Area (SF) | Volume (CF) | Volume (CY) | Ton multiplier (p | Tons |  | Total Cost |
| **Crushed Surfacing Base Course** | 1519 | $ | 57.00 | TN | 8.75 | 30406.17 | 22171.17 | 821.15 | 1.85 | 1519.14 | $ | 86,590.72 |
| Full Depth Asphalt Replaced |  |  |  |  |  |  |  |  |  |  |  |  |
| Depth is determined by average required per City of Auburn for Asphalt Pavement Design |  |  |  |  |  |  |  |  |  |  |  |  |
| Assumed same depth of CSBC under cement concrete pavement and Curb and Gutter is the same depth as under the asphalt pavement |  |  |  |  |  |  |  |  |  |  |  |  |
| **HMA CL 1/2 In PG 58H-22** | 697 | $ | 185.00 | TN | 6.92 | 15926.20 | 9179.69 | 339.99 | 2.05 | 697.0 | $ | 128,940.59 |
| Full Depth Asphalt Replaced over open cut area |  |  |  |  |  |  |  |  |  |  |  |  |
| Depth is determined by average required per City of Auburn for Asphalt Pavement Design |  |  |  |  |  |  |  |  |  |  |  |  |
| **CEMENT CONCRETE PAVEMENT** | 304 | $ | 1,340.00 | CY | 10.00 | 9844.97 | 8204.14 | 303.86 |  |  | $ | 407,168.42 |
| Full depth cement concrete replaced over open cut area |  |  |  |  |  |  |  |  |  |  |  |  |
| Depth per City of Auburn Standard Detail T-27.2 |  |  |  |  |  |  |  |  |  |  |  |  |
| **CEMENT CONC. TRAFFIC CURB AND GUTTER** | 3090 | $ | 87.00 | LF | $ 268,900.00 |  |  |  |  |  |  |  |
| **Cost** |  |  |  |  | **$891,600.00** | **/ 5000 LF** |  |  |  |  |  |  |
| **SUBTOTAL COST** |  |  |  |  | **$3,053,600.00 / 5000 LF** |  |  |  |  |  |  |  |
| **PROJECT COSTS** |  |  |  |  |  |  |  |  |  |  |  |  |
| Project costs % based off of City of Auburn SMAP OneSheet Examples |  |  |  |  |  |  |  |  |  |  |  |  |
| **Design Contingency** | 50% | $ | 1,526,800.00 |  | $ 1,526,800.00 |  |  |  |  |  |  |  |
| Contingency is multiplied into other % costs |  |  |  |  |  |  |  |  |  |  |  |  |
| **Permitting** | 5% | $ | 229,020.00 |  | $ 229,020.00 |  |  |  |  |  |  |  |
| **Design** | 25% | $ | 1,145,100.00 |  | $ 1,145,100.00 |  |  |  |  |  |  |  |
| **City Project Mgmt. Admin** | 5% | $ | 229,020.00 |  | $ 229,020.00 |  |  |  |  |  |  |  |
| **Construction Managements** | 25% | $ | 1,145,100.00 |  | $ 1,145,100.00 |  |  |  |  |  |  |  |
| **Cost** |  |  |  |  | **$4,275,000.00** | **/ 5000 LF** |  |  |  |  |  |  |
| PROJECT TOTAL COST |  |  |  |  | $7,328,600.00 / 5000 LF |  |  |  |  |  |  |  |
|  |  |  |  |  | $1,465.72 /LF |  |  |  |  |  |  |  |

Figure C-5 (continued). Average Cost of Replacing 5,000 Feet of Stormwater Pipe in the City of Auburn



**Replace 5000 ft Storm Pipe City Center Cost Breakdown** 5000 LF

| Key: | | |
|---|---|---|
| Manual Input of Assumed Value | Calculated Value | Referencing Price Sheet |

Assumptions

Pipes and structures are under existing asphalt, cement concrete, or landscaping which needs to be replaced in kind
Use of 12" PVC piping - City prefers PVC SDR-35 or PS46

| Assumptions | | Reasoning |
|---|---|---|
| Avg length of pipe between structures (not to exceed 400) | 64 LF | Based off of stats from window of City of Auburn GIS Map of downtown area |
| Avg size of pipe (used for trenching/volume calculations) | 14 in D | Based off of stats from window of City of Auburn GIS Map of downtown area |
| Avg length of Type I CBs (used for trenching/volume calculations) | 24 in L | |
| Avg size of Type II CBs (used for trenching/volume calculations) | 50 in D | Based off visual of looking at City of Auburn GIS map |
| Percent of structures Type I CBs | 84% | Based off visual of looking at City of Auburn GIS map |
| Percent of structures Type II CBs | 16% | |
| Number of Type I CBs | 66 | |
| Number of Type II CBs | 13 | |
| Number of structures per specified length of system | 79 | |
| Total length of system | 5186.167 ft | |
| | | |
| Percent of system under street (asphalt) | 20% | Based off visual of looking at City of Auburn GIS map |
| Percent of system under sidewalk (cement conc.) | 20% | Based off visual of looking at City of Auburn GIS map |
| Percent of system under curb and gutter | 60% | Based off visual of looking at City of Auburn GIS map |
| Percent of system under landscaped/pervious area | 0% | |
| | | |
| Total area of surface restoration (trench width+1ft offset per Auburn s | 30964 sf | |
| Total length of surface restoration | 5188 LF | |

**SITE PREP AND TESC % COSTS**

| | | | | | Reasoning |
|---|---|---|---|---|---|
| Total Materials Cost | | $2,629,600.00 | | | |
| **Mobilization** | 10% | $ 262,960.00 | $ | 262,960.00 | Based off of City of Auburn SMAP OneSheet Examples |
| **TESC** | 5% | $ 131,480.00 | $ | 131,480.00 | Based off of City of Auburn SMAP OneSheet Examples |
| **Project Temporary Traffic Control** | 15% | $ 394,440.00 | $ | 394,440.00 | Based off of City of Auburn SMAP OneSheet Examples and assumption of higher traffic areas in city center of Auburn |
| May be 5-20% depending on amount of work done in arterials | | | | | |
| Cost | | | | $788,900.00 | / 5000 LF |

**SITE PREP**

| | Quantities | Unit Costs | | Total Cost |
|---|---|---|---|---|
| **Utility Conflict Resolution (Medium)** | | $ 50,000.00 | LS | $ 50,000.00 |
| Choose from Small, Medium, or Large | | | | |
| **Removing Asphalt Conc. Pavement** | 1461 | $ 75.00 | SY | $ 109,600.00 |
| Assumed for only percent of system under asphalt and partial area of Curb and Gutter | | | | |
| **Removing Cement Conc. Pavement** | 1461 | $ 55.00 | SY | $ 80,400.00 |
| Assumed for only percent of system under sidewalk or concrete and partial area of Curb and Gutter | | | | |
| **Removing Cement Conc. Curb and Gutter** | 3113 | $ 34.00 | LF | $ 105,900.00 |
| Assumed for only percent of system under curb and gutter<br>Assumed to only account for 1.5 ft of width of surfacing, remaining area categorized as Asphalt and Pavement | | | | |
| **Clearing and Grubbing** | 0.0000 | $ 10,300.00 | ACRE | $ - |
| Assumed for only percent of system under pervious areas | | | | |
| Cost | | | | $345,900.00 / 5000 LF |

**CONVEYANCE SYSTEM**

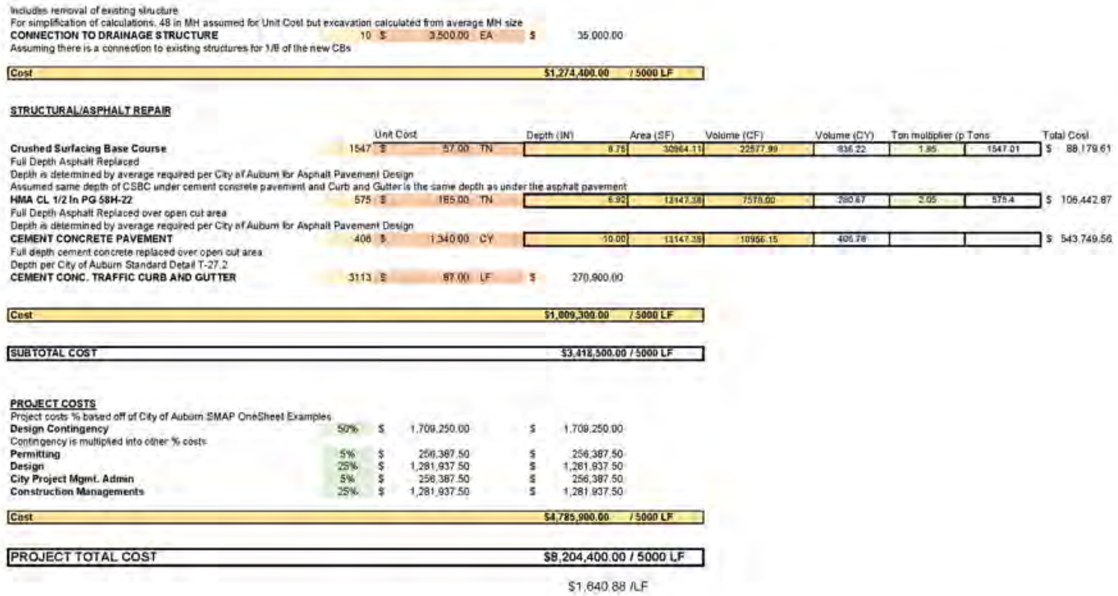
| | | | | |
|---|---|---|---|---|
| **Structure Excavation Class A Incl. Haul** | $ 47.00 | CY | | |
| **Shoring or Extra Excavation Class B** | $ 3.00 | SF | | |
| **Crushed Surfacing Top Course** | $ 41.00 | TN | $ 75.85 | /CY |

| | | Unit Cost | | Inside Pipe Diameter (in) | Avg Cover Depth (ft) | Outside Diameter (in) | Trench Width (ft) | Trench Depth (ft) | Structure Excavation (CY/LF) | Structure Excavation ($/LF) | Shoring ($/LF) | Backfill (CY/LF) | Backfill ($/LF) | Cumulative Cost (inl. Pipe ($/LF) | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Schedule A Storm Sewer Pipe 12 IN. Diam.** | 5000 | $ 71.00 | LF | 14 | 4 | 16.5 | 3.667 | 5.875 | 0.797839506 | $37.50 | $ 17.63 | 0.742843454 | $ 56.34 | $190.00 | $ 950,000.00 |

Includes removal of existing pipe
For simplification of calculations, 12 in pipe assumed for Unit Cost but trenching and excavation calculated from average pipe size
Trench depth and width per typical pipe trench calculations and using City of Auburn Standard Detail T-01.6

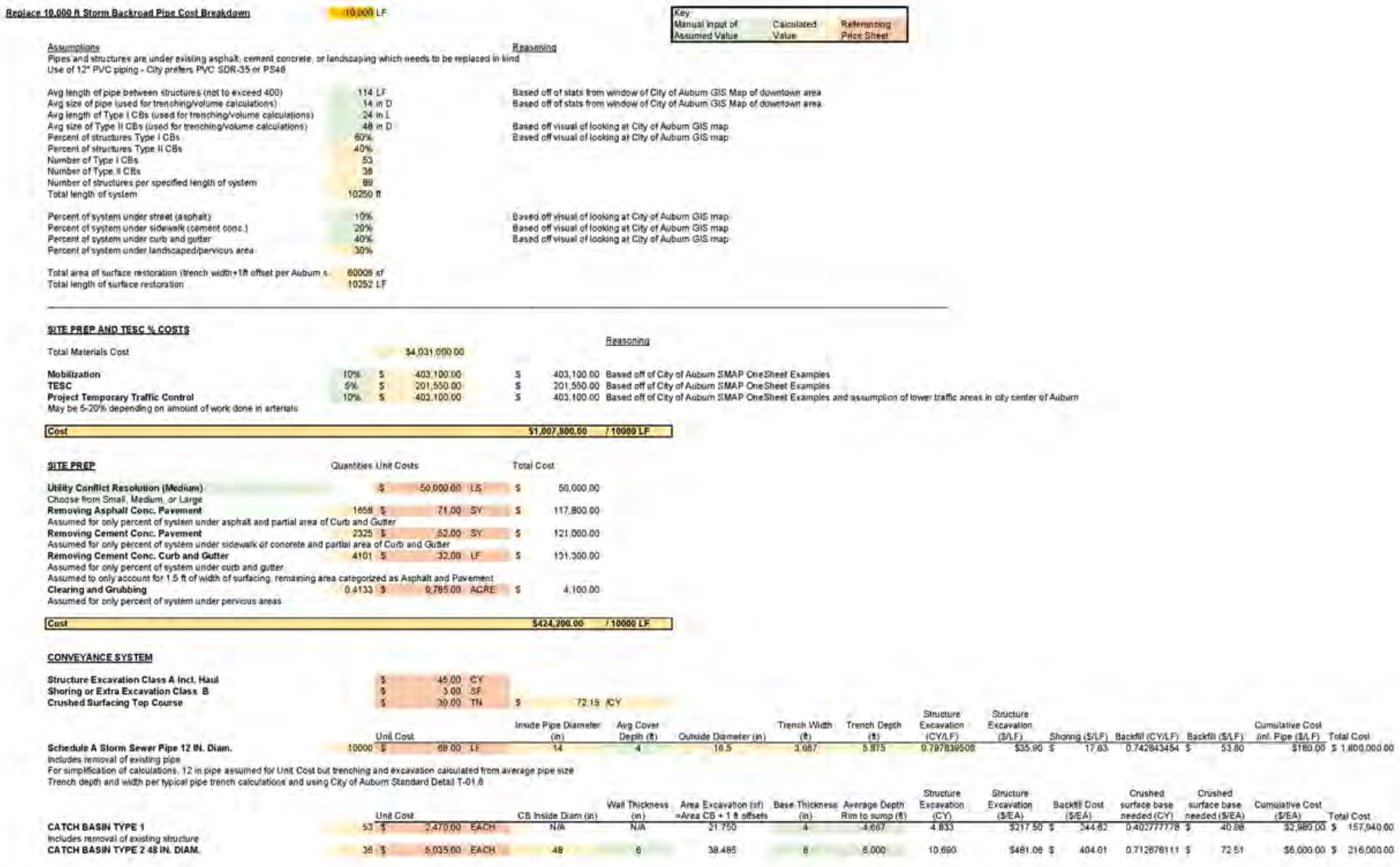
| | | Unit Cost | | CB Inside Diam (in) | Wall Thickness (in) | Area Excavation (sf) =Area CB + 1 ft offsets | Base Thickness (in) | Average Depth Rim to sump (ft) | Structure Excavation (CY) | Structure Excavation ($/EA) | Backfill Cost ($/EA) | Crushed surface base needed (CY) | Crushed surface base needed ($/EA) | Cumulative Cost ($/EA) | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CATCH BASIN TYPE 1** | 66 | $ 2,600.00 | EACH | N/A | N/A | 21.750 | 4 | 4.667 | 4.833 | $227.17 | $ 257.16 | 0.402777778 | $ 42.47 | $3,130.00 | $ 206,580.00 |
| Includes removal of existing structure | | | | | | | | | | | | | | | |
| **CATCH BASIN TYPE 2 48 IN. DIAM.** | 13 | $ 5,300.00 | EACH | 50 | 6 | 40.339 | 8 | 6.000 | 11.205 | $526.65 | $ 463.80 | 0.74701708 | $ 78.77 | $6,370.00 | $ 82,810.00 |

Figure C-6. Average Cost of Replacing 5,000 Feet of Stormwater Pipe in Downtown Auburn



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Includes removal of existing structure | | | | | | | | | | | |
| For simplification of calculations. 48 in MH assumed for Unit Cost but excavation calculated from average MH size | | | | | | | | | | | |
| **CONNECTION TO DRAINAGE STRUCTURE** | 10 | $ | 3,500.00 | EA | $ | 35,000.00 | | | | | |
| Assuming there is a connection to existing structures for 1/8 of the new CBs | | | | | | | | | | | |
| Cost | | | | | $1,274,400.00 | / 5000 LF | | | | | |
| **STRUCTURAL/ASPHALT REPAIR** | | | | | | | | | | | |
| | | Unit Cost | | | Depth (IN) | Area (SF) | Volume (CF) | Volume (CY) | Ton multiplier (p | Tons | Total Cost |
| **Crushed Surfacing Base Course** | 1547 | $ | 57.00 | TN | 8.75 | 30964.11 | 22577.99 | 836.22 | 1.85 | 1547.01 | $ 88,179.61 |
| Full Depth Asphalt Replaced | | | | | | | | | | | |
| Depth is determined by average required per City of Auburn for Asphalt Pavement Design | | | | | | | | | | | |
| Assumed same depth of CSBC under cement concrete pavement and Curb and Gutter is the same depth as under the asphalt pavement | | | | | | | | | | | |
| **HMA CL 1/2 In PG 58H-22** | 575 | $ | 165.00 | TN | 6.92 | 13147.38 | 7578.00 | 280.67 | 2.05 | 575.4 | $ 106,442.87 |
| Full Depth Asphalt Replaced over open cut area | | | | | | | | | | | |
| Depth is determined by average required per City of Auburn for Asphalt Pavement Design | | | | | | | | | | | |
| **CEMENT CONCRETE PAVEMENT** | 406 | $ | 1,340.00 | CY | 10.00 | 13147.38 | 10956.15 | 405.78 | | | $ 543,749.56 |
| Full depth cement concrete replaced over open cut area | | | | | | | | | | | |
| Depth per City of Auburn Standard Detail T-27.2 | | | | | | | | | | | |
| **CEMENT CONC. TRAFFIC CURB AND GUTTER** | 3113 | $ | 87.00 | LF | $ | 270,900.00 | | | | | |
| Cost | | | | | $1,009,300.00 | / 5000 LF | | | | | |
| SUBTOTAL COST | | | | | $3,418,500.00 / 5000 LF | | | | | | |
| **PROJECT COSTS** | | | | | | | | | | | |
| Project costs % based off of City of Auburn SMAP OneSheet Examples | | | | | | | | | | | |
| **Design Contingency** | 50% | $ | 1,709,250.00 | | $ | 1,709,250.00 | | | | | |
| Contingency is multiplied into other % costs | | | | | | | | | | | |
| **Permitting** | 5% | $ | 256,387.50 | | $ | 256,387.50 | | | | | |
| **Design** | 25% | $ | 1,281,937.50 | | $ | 1,281,937.50 | | | | | |
| **City Project Mgmt. Admin** | 5% | $ | 256,387.50 | | $ | 256,387.50 | | | | | |
| **Construction Managements** | 25% | $ | 1,281,937.50 | | $ | 1,281,937.50 | | | | | |
| Cost | | | | | $4,785,900.00 | / 5000 LF | | | | | |
| PROJECT TOTAL COST | | | | | $8,204,400.00 / 5000 LF | | | | | | |
| | | | | | $1,640.88 /LF | | | | | | |

Figure C-6 (continued). Average Cost of Replacing 5,000 Feet of Stormwater Pipe in Downtown Auburn



**Replace 10,000 ft Storm Backroad Pipe Cost Breakdown** 10,000 LF

| Key: | | |
|---|---|---|
| Manual Input of Assumed Value | Calculated Value | Referencing Price Sheet |

Assumptions | Reasoning

Pipes and structures are under existing asphalt, cement concrete, or landscaping which needs to be replaced in kind
Use of 12" PVC piping - City prefers PVC SDR-35 or PS46

| | | | |
|---|---|---|---|
| Avg length of pipe between structures (not to exceed 400) | 114 | LF | Based off of stats from window of City of Auburn GIS Map of downtown area |
| Avg size of pipe (used for trenching/volume calculations) | 14 | in D | Based off of stats from window of City of Auburn GIS Map of downtown area |
| Avg length of Type I CBs (used for trenching/volume calculations) | 24 | in L | |
| Avg size of Type II CBs (used for trenching/volume calculations) | 48 | in D | Based off visual of looking at City of Auburn GIS map |
| Percent of structures Type I CBs | 60% | | Based off visual of looking at City of Auburn GIS map |
| Percent of structures Type II CBs | 40% | | |
| Number of Type I CBs | 53 | | |
| Number of Type II CBs | 36 | | |
| Number of structures per specified length of system | 89 | | |
| Total length of system | 10250 | ft | |
| Percent of system under street (asphalt) | 10% | | Based off visual of looking at City of Auburn GIS map |
| Percent of system under sidewalk (cement conc.) | 20% | | Based off visual of looking at City of Auburn GIS map |
| Percent of system under curb and gutter | 40% | | Based off visual of looking at City of Auburn GIS map |
| Percent of system under landscaped/pervious area | 30% | | |
| Total area of surface restoration (trench width+1ft offset per Auburn s | 60009 | sf | |
| Total length of surface restoration | 10252 | LF | |

**SITE PREP AND TESC % COSTS**

| | | | | | Reasoning |
|---|---|---|---|---|---|
| Total Materials Cost | | $4,031,000.00 | | | |
| **Mobilization** | 10% | $ 403,100.00 | $ | 403,100.00 | Based off of City of Auburn SMAP OneSheet Examples |
| **TESC** | 5% | $ 201,550.00 | $ | 201,550.00 | Based off of City of Auburn SMAP OneSheet Examples |
| **Project Temporary Traffic Control** | 10% | $ 403,100.00 | $ | 403,100.00 | Based off of City of Auburn SMAP OneSheet Examples and assumption of lower traffic areas in city center of Auburn |
| May be 5-20% depending on amount of work done in arterials | | | | | |
| Cost | | | | $1,007,800.00 | / 10000 LF |

**SITE PREP**

| | Quantities | Unit Costs | | Total Cost |
|---|---|---|---|---|
| **Utility Conflict Resolution (Medium)** | | $ 50,000.00 | LS | $ 50,000.00 |
| Choose from Small, Medium, or Large | | | | |
| **Removing Asphalt Conc. Pavement** | 1658 | $ 71.00 | SY | $ 117,800.00 |
| Assumed for only percent of system under asphalt and partial area of Curb and Gutter | | | | |
| **Removing Cement Conc. Pavement** | 2325 | $ 52.00 | SY | $ 121,000.00 |
| Assumed for only percent of system under sidewalk or concrete and partial area of Curb and Gutter | | | | |
| **Removing Cement Conc. Curb and Gutter** | 4101 | $ 32.00 | LF | $ 131,300.00 |
| Assumed for only percent of system under curb and gutter<br>Assumed to only account for 1.5 ft of width of surfacing, remaining area categorized as Asphalt and Pavement | | | | |
| **Clearing and Grubbing** | 0.4133 | $ 9,765.00 | ACRE | $ 4,100.00 |
| Assumed for only percent of system under pervious areas | | | | |
| Cost | | | | $424,200.00 / 10000 LF |

**CONVEYANCE SYSTEM**

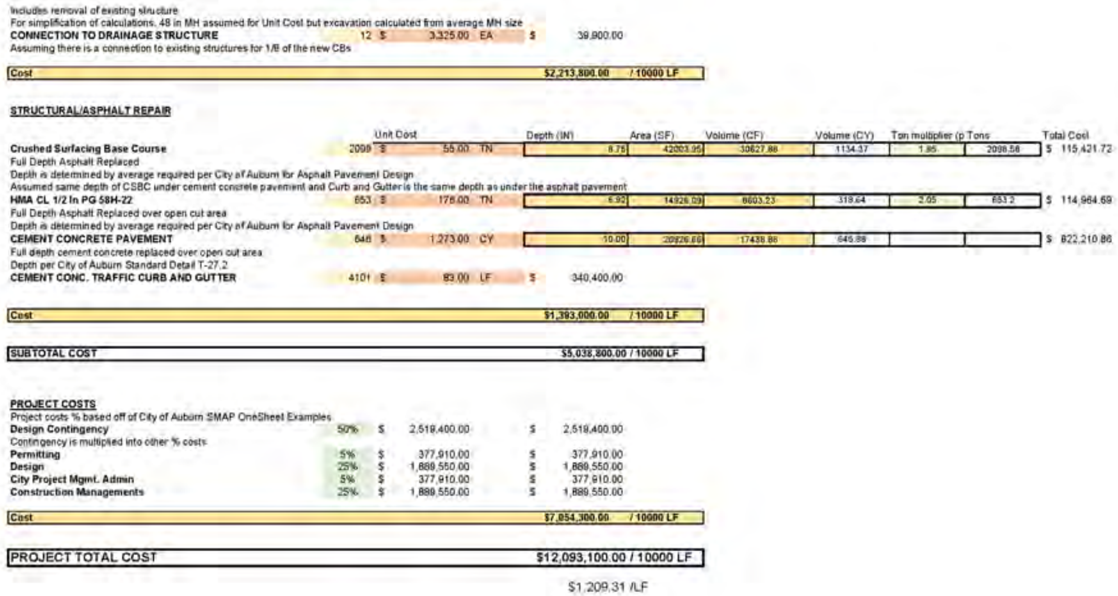
| | | | |
|---|---|---|---|
| **Structure Excavation Class A Incl. Haul** | $ 45.00 | CY | |
| **Shoring or Extra Excavation Class B** | $ 3.00 | SF | |
| **Crushed Surfacing Top Course** | $ 39.00 | TN | $ 72.15 /CY |

| | | Unit Cost | | Inside Pipe Diameter (in) | Avg Cover Depth (ft) | Outside Diameter (in) | Trench Width (ft) | Trench Depth (ft) | Structure Excavation (CY/LF) | Structure Excavation ($/LF) | Shoring ($/LF) | Backfill (CY/LF) | Backfill ($/LF) | Cumulative Cost (inl. Pipe ($/LF) | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Schedule A Storm Sewer Pipe 12 IN. Diam.** | 10000 | $ 68.00 | LF | 14 | 4 | 16.5 | 3.667 | 5.875 | 0.797839506 | $35.90 | $ 17.63 | 0.742843454 | $ 53.80 | $160.00 | $ 1,600,000.00 |

Includes removal of existing pipe
For simplification of calculations, 12 in pipe assumed for Unit Cost but trenching and excavation calculated from average pipe size
Trench depth and width per typical pipe trench calculations and using City of Auburn Standard Detail T-01.6

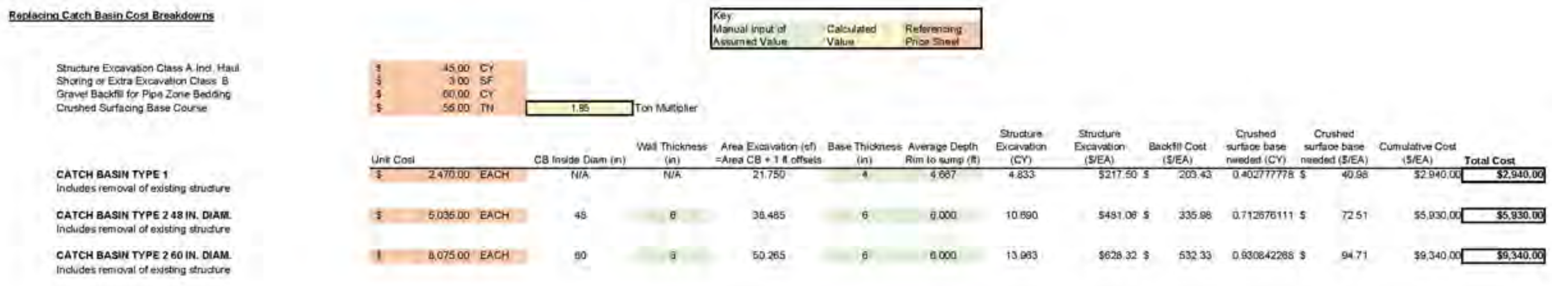
| | | Unit Cost | | CB Inside Diam (in) | Wall Thickness (in) | Area Excavation (sf) =Area CB + 1 ft offsets | Base Thickness (in) | Average Depth Rim to sump (ft) | Structure Excavation (CY) | Structure Excavation ($/EA) | Backfill Cost ($/EA) | Crushed surface base needed (CY) | Crushed surface base needed ($/EA) | Cumulative Cost ($/EA) | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CATCH BASIN TYPE 1** | 53 | $ 2,470.00 | EACH | N/A | N/A | 21.750 | 4 | 4.667 | 4.833 | $217.50 | $ 244.62 | 0.402777778 | $ 40.98 | $2,980.00 | $ 157,940.00 |
| Includes removal of existing structure | | | | | | | | | | | | | | | |
| **CATCH BASIN TYPE 2 48 IN. DIAM.** | 36 | $ 5,035.00 | EACH | 48 | 6 | 38.485 | 8 | 6.000 | 10.690 | $481.06 | $ 404.01 | 0.712876111 | $ 72.51 | $6,000.00 | $ 216,000.00 |

Figure C-7. Average Cost of Replacing 10,000 Feet of Stormwater Pipe in Rural Auburn



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Includes removal of existing structure | | | | | | | | | | | |
| For simplification of calculations. 48 in MH assumed for Unit Cost but excavation calculated from average MH size | | | | | | | | | | | |
| **CONNECTION TO DRAINAGE STRUCTURE** | 12 | $ | 3,325.00 | EA | $ 39,900.00 | | | | | | |
| Assuming there is a connection to existing structures for 1/8 of the new CBs | | | | | | | | | | | |
| Cost | | | | | $2,213,800.00 | / 10000 LF | | | | | |
| **STRUCTURAL/ASPHALT REPAIR** | | | | | | | | | | | |
| | | Unit Cost | | | Depth (IN) | Area (SF) | Volume (CF) | Volume (CY) | Ton multiplier (p | Tons | Total Cost |
| **Crushed Surfacing Base Course** | 2099 | $ | 55.00 | TN | 8.75 | 42003.95 | 30627.88 | 1134.37 | 1.85 | 2098.58 | $ 115,421.72 |
| Full Depth Asphalt Replaced | | | | | | | | | | | |
| Depth is determined by average required per City of Auburn for Asphalt Pavement Design | | | | | | | | | | | |
| Assumed same depth of CSBC under cement concrete pavement and Curb and Gutter is the same depth as under the asphalt pavement | | | | | | | | | | | |
| **HMA CL 1/2 In PG 58H-22** | 653 | $ | 176.00 | TN | 6.92 | 14926.09 | 8603.23 | 318.64 | 2.05 | 653.2 | $ 114,964.69 |
| Full Depth Asphalt Replaced over open cut area | | | | | | | | | | | |
| Depth is determined by average required per City of Auburn for Asphalt Pavement Design | | | | | | | | | | | |
| **CEMENT CONCRETE PAVEMENT** | 646 | $ | 1,273.00 | CY | 10.00 | 20926.66 | 17438.88 | 645.88 | | | $ 822,210.86 |
| Full depth cement concrete replaced over open cut area | | | | | | | | | | | |
| Depth per City of Auburn Standard Detail T-27.2 | | | | | | | | | | | |
| **CEMENT CONC. TRAFFIC CURB AND GUTTER** | 4101 | $ | 83.00 | LF | $ 340,400.00 | | | | | | |
| Cost | | | | | $1,393,000.00 | / 10000 LF | | | | | |
| SUBTOTAL COST | | | | | $5,038,800.00 / 10000 LF | | | | | | |
| **PROJECT COSTS** | | | | | | | | | | | |
| Project costs % based off of City of Auburn SMAP OneSheet Examples | | | | | | | | | | | |
| **Design Contingency** | 50% | $ | 2,519,400.00 | | $ 2,519,400.00 | | | | | | |
| Contingency is multiplied into other % costs | | | | | | | | | | | |
| **Permitting** | 5% | $ | 377,910.00 | | $ 377,910.00 | | | | | | |
| **Design** | 25% | $ | 1,889,550.00 | | $ 1,889,550.00 | | | | | | |
| **City Project Mgmt. Admin** | 5% | $ | 377,910.00 | | $ 377,910.00 | | | | | | |
| **Construction Managements** | 25% | $ | 1,889,550.00 | | $ 1,889,550.00 | | | | | | |
| Cost | | | | | $7,854,300.00 | / 10000 LF | | | | | |
| PROJECT TOTAL COST | | | | | $12,093,100.00 / 10000 LF | | | | | | |
| | | | | | $1,209.31 /LF | | | | | | |

Figure C-7 (continued). Average Cost of Replacing 10,000 Feet of Stormwater Pipe in Rural Auburn



**Replacing Catch Basin Cost Breakdowns**

| Key: | | |
|---|---|---|
| Manual input of Assumed Value | Calculated Value | Referencing Price Sheet |

| | | | | | |
|---|---|---|---|---|---|
| Structure Excavation Class A Incl. Haul | $ | 45.00 | CY | | |
| Shoring or Extra Excavation Class B | $ | 3.00 | SF | | |
| Gravel Backfill for Pipe Zone Bedding | $ | 60.00 | CY | | |
| Crushed Surfacing Base Course | $ | 56.00 | TN | 1.95 | Ton Multiplier |

| | Unit Cost | | | CB Inside Diam (in) | Wall Thickness (in) | Area Excavation (sf) =Area CB + 1 ft offsets | Base Thickness (in) | Average Depth Rim to sump (ft) | Structure Excavation (CY) | Structure Excavation ($/EA) | Backfill Cost ($/EA) | Crushed surface base needed (CY) | Crushed surface base needed ($/EA) | Cumulative Cost ($/EA) | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CATCH BASIN TYPE 1**<br>Includes removal of existing structure | $ | 2,470.00 | EACH | N/A | N/A | 21.750 | 4 | 4.667 | 4.833 | $217.50 | $ 203.43 | 0.402777778 | $ 40.98 | $2,940.00 | **$2,940.00** |
| **CATCH BASIN TYPE 2 48 IN. DIAM.**<br>Includes removal of existing structure | $ | 5,035.00 | EACH | 48 | 6 | 38.485 | 6 | 6.000 | 10.690 | $481.08 | $ 335.98 | 0.712676111 | $ 72.51 | $5,930.00 | **$5,930.00** |
| **CATCH BASIN TYPE 2 60 IN. DIAM.**<br>Includes removal of existing structure | $ | 8,075.00 | EACH | 60 | 6 | 50.265 | 6 | 6.000 | 13.963 | $628.32 | $ 532.33 | 0.930842268 | $ 94.71 | $9,340.00 | **$9,340.00** |

Figure C-8. Average Cost of Replacing Catch Basins in Rural Auburn

## 4.3 Discussion

The resulting cost opinion is intentionally conservative, approximately $1,500 per linear foot, to account for the wide range of generalizations and assumptions inherent in the process. Notably, the analysis indicated that pipe replacement in rural areas is expected to be less costly than in the City center. Additionally, replacing a larger quantity of pipe is only marginally more cost-effective.

As a prudent practice, it is recommended to diligently track the costs associated with installation, repair, and replacement of asset features on an annual basis. This data serve as valuable reference information for future asset replacement budget planning. As additional data are collected, cost opinions can be updated to enhance accuracy.

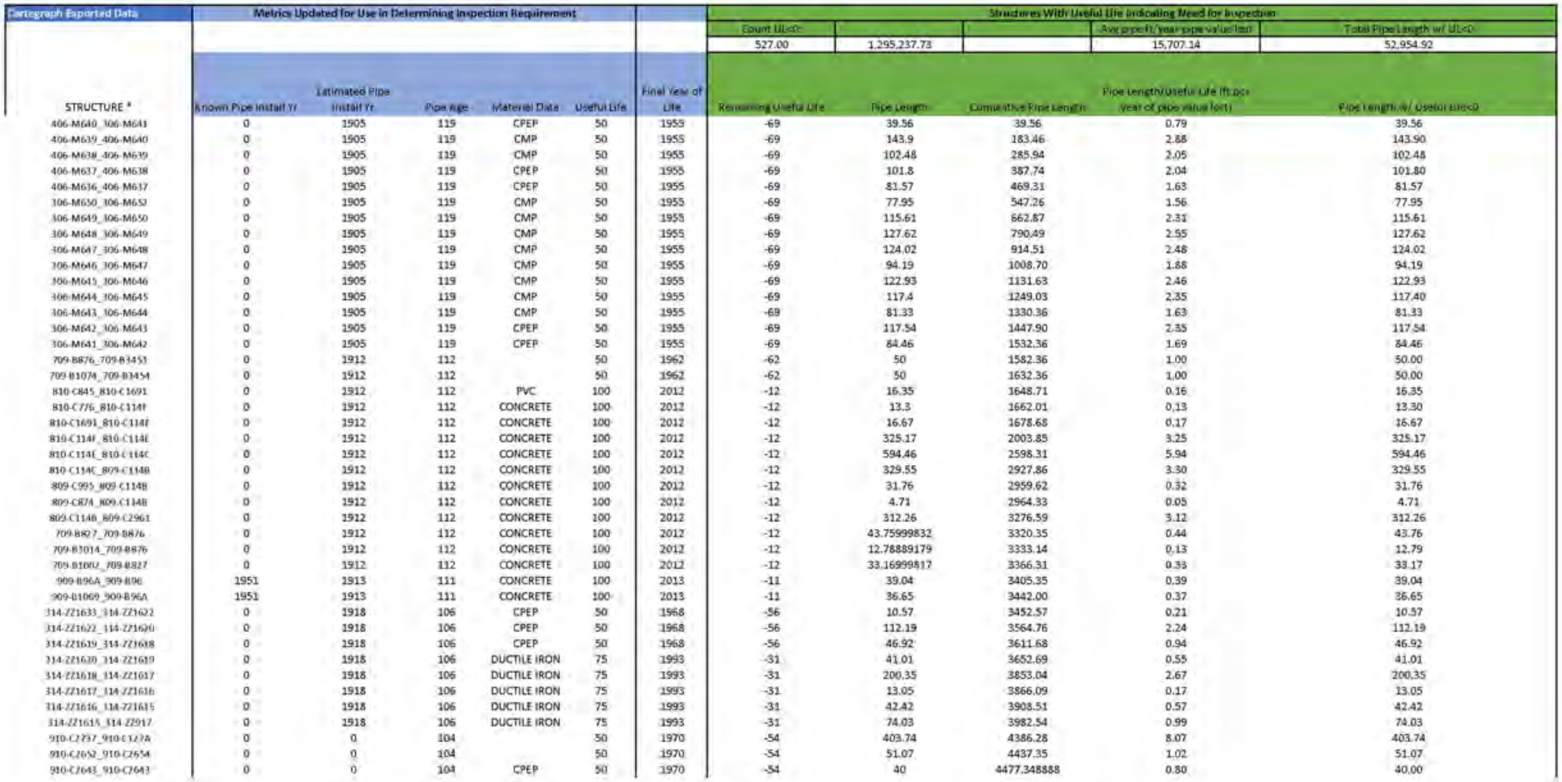
# 5. Pipe Depreciation Analysis

A life cycle analysis was performed for stormwater pipes to demonstrate the expected depreciation rate of each asset and provide background for the recommended maintenance frequency of the entire system. To do so, a spreadsheet was created to analyze the remaining useful life estimate for the City's pipe database over time. A screenshot of the first page of the spreadsheet is shown in Figure C-9. This shows the existing condition dataset of the stormwater pipes. In the spreadsheet, a cumulative total was calculated for the pipes whose remaining useful life score had gone negative. This represented the total linear feet of pipe "lost." As shown in Figure C-9, at the time of this assessment, approximately 53,000 feet of pipe is expected to be beyond its useful life.

An average rate of pipe loss was calculated by dividing each pipe's useful life from its length and then summing to find the total for the system. As shown in Figure C-9, the average rate of pipe value "lost" is approximately 15,700 feet per year.

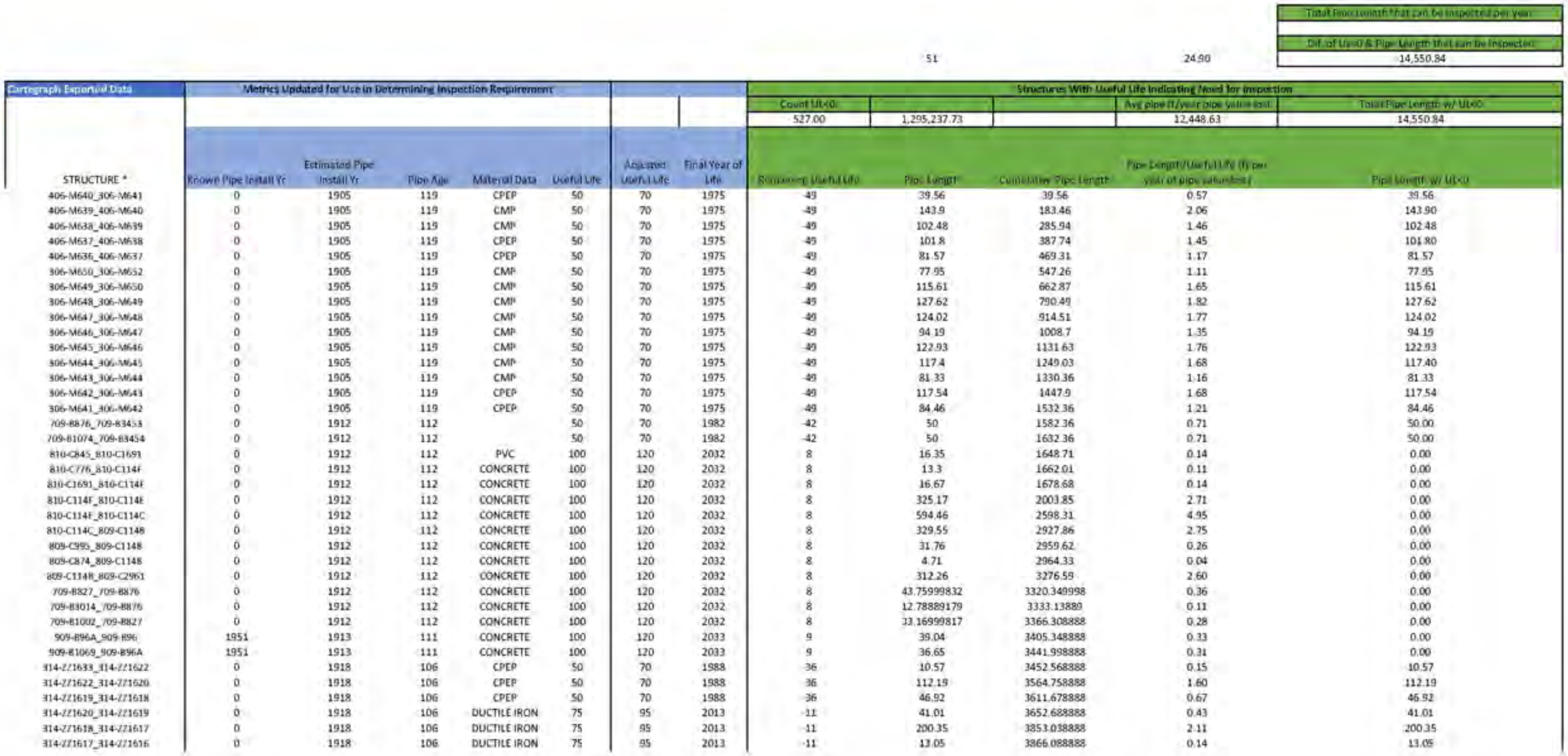
To show the sensitivity of the results, a copy of the spreadsheet was created, and all useful life estimates were increased by 20 years. A screenshot of the first page is shown in Figure C-10. This scenario shows the total linear feet of pipe beyond its useful life to be approximately 14,500 feet, and the average rate of pipe loss per year to be approximately 12,500 feet.

Both scenarios were used to project the amount of pipe replacement needed over 10-, 20-, and 50-year replacement durations. The costs estimated in the previous section were used to provide estimates for these replacements for reference. Figure C-11 shows the results of this projection.



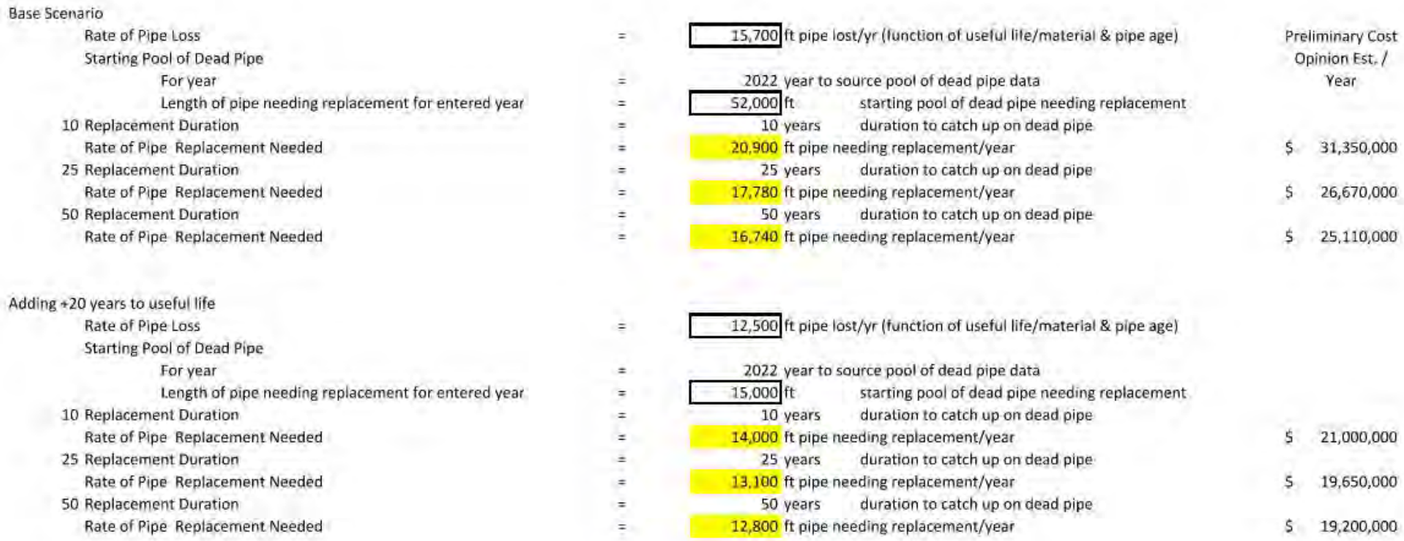
| Cartegraph Exported Data | Metrics Updated for Use in Determining Inspection Requirement | | | | | | Structures With Useful Life Indicating Need for Inspection | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Count UL<0 | | | Avg pipe ft/year pipe value lost | Total Pipe Length w/ UL<0 |
| | | | | | | | 527.00 | 1,295,237.73 | | 15,707.14 | 52,954.92 |
| STRUCTURE * | Known Pipe Install Yr | Estimated Pipe Install Yr | Pipe Age | Material Data | Useful Life | Final Year of Life | Remaining Useful Life | Pipe Length | Cumulative Pipe Length | Pipe Length/Useful Life (ft per year of pipe value lost) | Pipe Length w/ Useful Life<0 |
| 406-M640_306-M641 | 0 | 1905 | 119 | CPEP | 50 | 1955 | -69 | 39.56 | 39.56 | 0.79 | 39.56 |
| 406-M639_406-M640 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 143.9 | 183.46 | 2.88 | 143.90 |
| 406-M638_406-M639 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 102.48 | 285.94 | 2.05 | 102.48 |
| 406-M637_406-M638 | 0 | 1905 | 119 | CPEP | 50 | 1955 | -69 | 101.8 | 387.74 | 2.04 | 101.80 |
| 406-M636_406-M637 | 0 | 1905 | 119 | CPEP | 50 | 1955 | -69 | 81.57 | 469.31 | 1.63 | 81.57 |
| 306-M650_306-M652 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 77.95 | 547.26 | 1.56 | 77.95 |
| 306-M649_306-M650 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 115.61 | 662.87 | 2.31 | 115.61 |
| 306-M648_306-M649 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 127.62 | 790.49 | 2.55 | 127.62 |
| 306-M647_306-M648 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 124.02 | 914.51 | 2.48 | 124.02 |
| 306-M646_306-M647 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 94.19 | 1008.70 | 1.88 | 94.19 |
| 306-M645_306-M646 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 122.93 | 1131.63 | 2.46 | 122.93 |
| 306-M644_306-M645 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 117.4 | 1249.03 | 2.35 | 117.40 |
| 306-M643_306-M644 | 0 | 1905 | 119 | CMP | 50 | 1955 | -69 | 81.33 | 1330.36 | 1.63 | 81.33 |
| 306-M642_306-M643 | 0 | 1905 | 119 | CPEP | 50 | 1955 | -69 | 117.54 | 1447.90 | 2.35 | 117.54 |
| 306-M641_306-M642 | 0 | 1905 | 119 | CPEP | 50 | 1955 | -69 | 84.46 | 1532.36 | 1.69 | 84.46 |
| 709-B876_709-B3453 | 0 | 1912 | 112 | | 50 | 1962 | -62 | 50 | 1582.36 | 1.00 | 50.00 |
| 709-B1074_709-B3454 | 0 | 1912 | 112 | | 50 | 1962 | -62 | 50 | 1632.36 | 1.00 | 50.00 |
| 810-C845_810-C1691 | 0 | 1912 | 112 | PVC | 100 | 2012 | -12 | 16.35 | 1648.71 | 0.16 | 16.35 |
| 810-C776_810-C114F | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 13.3 | 1662.01 | 0.13 | 13.30 |
| 810-C1691_810-C114F | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 16.67 | 1678.68 | 0.17 | 16.67 |
| 810-C114F_810-C114E | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 325.17 | 2003.85 | 3.25 | 325.17 |
| 810-C114E_810-C114C | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 594.46 | 2598.31 | 5.94 | 594.46 |
| 810-C114C_809-C114B | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 329.55 | 2927.86 | 3.30 | 329.55 |
| 809-C995_809-C114B | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 31.76 | 2959.62 | 0.32 | 31.76 |
| 809-C874_809-C114B | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 4.71 | 2964.33 | 0.05 | 4.71 |
| 809-C114B_809-C2961 | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 312.26 | 3276.59 | 3.12 | 312.26 |
| 709-B827_709-B876 | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 43.75999832 | 3320.35 | 0.44 | 43.76 |
| 709-B3014_709-B876 | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 12.78889179 | 3333.14 | 0.13 | 12.79 |
| 709-B1002_709-B827 | 0 | 1912 | 112 | CONCRETE | 100 | 2012 | -12 | 33.16999817 | 3366.31 | 0.33 | 33.17 |
| 909-B96A_909-B96 | 1951 | 1913 | 111 | CONCRETE | 100 | 2013 | -11 | 39.04 | 3405.35 | 0.39 | 39.04 |
| 909-B1069_909-B96A | 1951 | 1913 | 111 | CONCRETE | 100 | 2013 | -11 | 36.65 | 3442.00 | 0.37 | 36.65 |
| 314-ZZ1633_314-ZZ1622 | 0 | 1918 | 106 | CPEP | 50 | 1968 | -56 | 10.57 | 3452.57 | 0.21 | 10.57 |
| 314-ZZ1622_314-ZZ1620 | 0 | 1918 | 106 | CPEP | 50 | 1968 | -56 | 112.19 | 3564.76 | 2.24 | 112.19 |
| 314-ZZ1619_314-ZZ1618 | 0 | 1918 | 106 | CPEP | 50 | 1968 | -56 | 46.92 | 3611.68 | 0.94 | 46.92 |
| 314-ZZ1620_314-ZZ1619 | 0 | 1918 | 106 | DUCTILE IRON | 75 | 1993 | -31 | 41.01 | 3652.69 | 0.55 | 41.01 |
| 314-ZZ1618_314-ZZ1617 | 0 | 1918 | 106 | DUCTILE IRON | 75 | 1993 | -31 | 200.35 | 3853.04 | 2.67 | 200.35 |
| 314-ZZ1617_314-ZZ1616 | 0 | 1918 | 106 | DUCTILE IRON | 75 | 1993 | -31 | 13.05 | 3866.09 | 0.17 | 13.05 |
| 314-ZZ1616_314-ZZ1615 | 0 | 1918 | 106 | DUCTILE IRON | 75 | 1993 | -31 | 42.42 | 3908.51 | 0.57 | 42.42 |
| 314-ZZ1615_314-ZZ917 | 0 | 1918 | 106 | DUCTILE IRON | 75 | 1993 | -31 | 74.03 | 3982.54 | 0.99 | 74.03 |
| 910-C2737_910-C127A | 0 | 0 | 104 | | 50 | 1970 | -54 | 403.74 | 4386.28 | 8.07 | 403.74 |
| 910-C2652_910-C2654 | 0 | 0 | 104 | | 50 | 1970 | -54 | 51.07 | 4437.35 | 1.02 | 51.07 |
| 910-C2643_910-C2643 | 0 | 0 | 104 | CPEP | 50 | 1970 | -54 | 40 | 4477.348888 | 0.80 | 40.00 |

Figure C-9. Screenshot of Stormwater Pipe Depreciation Spreadsheet



| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Total Pipe Length that can be inspected per year |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | Dif. of UL<0 & Pipe Length that can be inspected |
| | | | | | | | | | | 51 | | 24.90 | 14,550.84 |
| Cartograph Exported Data | Metrics Updated for Use in Determining Inspection Requirement | | | | | | | | Structures With Useful Life Indicating Need for Inspection | | | | |
| | | | | | | | | | Count UL<0 | | | Avg pipe ft/year pipe value lost | Total Pipe Length w/ UL<0 |
| | | | | | | | | | 527.00 | 1,295,237.73 | | 12,448.63 | 14,550.84 |
| STRUCTURE * | Known Pipe Install Yr | Estimated Pipe Install Yr | Pipe Age | Material Data | Useful Life | Adjusted Useful Life | Final Year of Life | Remaining Useful Life | Pipe Length | Cumulative Pipe Length | Pipe Length/Useful Life (ft per year of pipe value lost) | Pipe Length w/ UL<0 | |
| 406-M640_306-M641 | 0 | 1905 | 119 | CPEP | 50 | 70 | 1975 | -49 | 39.56 | 39.56 | 0.57 | 39.56 | |
| 406-M639_406-M640 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 143.9 | 183.46 | 2.06 | 143.90 | |
| 406-M638_406-M639 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 102.48 | 285.94 | 1.46 | 102.48 | |
| 406-M637_406-M638 | 0 | 1905 | 119 | CPEP | 50 | 70 | 1975 | -49 | 101.8 | 387.74 | 1.45 | 101.80 | |
| 406-M636_406-M637 | 0 | 1905 | 119 | CPEP | 50 | 70 | 1975 | -49 | 81.57 | 469.31 | 1.17 | 81.57 | |
| 306-M650_306-M652 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 77.95 | 547.26 | 1.11 | 77.95 | |
| 306-M649_306-M650 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 115.61 | 662.87 | 1.65 | 115.61 | |
| 306-M648_306-M649 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 127.62 | 790.49 | 1.82 | 127.62 | |
| 306-M647_306-M648 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 124.02 | 914.51 | 1.77 | 124.02 | |
| 306-M646_306-M647 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 94.19 | 1008.7 | 1.35 | 94.19 | |
| 306-M645_306-M646 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 122.93 | 1131.63 | 1.76 | 122.93 | |
| 306-M644_306-M645 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 117.4 | 1249.03 | 1.68 | 117.40 | |
| 306-M643_306-M644 | 0 | 1905 | 119 | CMP | 50 | 70 | 1975 | -49 | 81.33 | 1330.36 | 1.16 | 81.33 | |
| 306-M642_306-M643 | 0 | 1905 | 119 | CPEP | 50 | 70 | 1975 | -49 | 117.54 | 1447.9 | 1.68 | 117.54 | |
| 306-M641_306-M642 | 0 | 1905 | 119 | CPEP | 50 | 70 | 1975 | -49 | 84.46 | 1532.36 | 1.21 | 84.46 | |
| 709-8876_709-83453 | 0 | 1912 | 112 | | 50 | 70 | 1982 | -42 | 50 | 1582.36 | 0.71 | 50.00 | |
| 709-81074_709-83454 | 0 | 1912 | 112 | | 50 | 70 | 1982 | -42 | 50 | 1632.36 | 0.71 | 50.00 | |
| 810-C845_810-C1691 | 0 | 1912 | 112 | PVC | 100 | 120 | 2032 | 8 | 16.35 | 1648.71 | 0.14 | 0.00 | |
| 810-C776_810-C114F | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 13.3 | 1662.01 | 0.11 | 0.00 | |
| 810-C1691_810-C114F | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 16.67 | 1678.68 | 0.14 | 0.00 | |
| 810-C114F_810-C114E | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 325.17 | 2003.85 | 2.71 | 0.00 | |
| 810-C114F_810-C114C | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 594.46 | 2598.31 | 4.95 | 0.00 | |
| 810-C114C_809-C1148 | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 329.55 | 2927.86 | 2.75 | 0.00 | |
| 809-C995_809-C1148 | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 31.76 | 2959.62 | 0.26 | 0.00 | |
| 809-C874_809-C1148 | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 4.71 | 2964.33 | 0.04 | 0.00 | |
| 809-C1148_809-C2961 | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 312.26 | 3276.59 | 2.60 | 0.00 | |
| 709-8827_709-8876 | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 43.75999832 | 3320.349998 | 0.36 | 0.00 | |
| 709-83014_709-8876 | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 12.78889179 | 3333.13889 | 0.11 | 0.00 | |
| 709-81002_709-8827 | 0 | 1912 | 112 | CONCRETE | 100 | 120 | 2032 | 8 | 33.16999817 | 3366.308888 | 0.28 | 0.00 | |
| 909-896A_909-896 | 1951 | 1913 | 111 | CONCRETE | 100 | 120 | 2033 | 9 | 39.04 | 3405.348888 | 0.33 | 0.00 | |
| 909-81069_909-896A | 1951 | 1913 | 111 | CONCRETE | 100 | 120 | 2033 | 9 | 36.65 | 3441.998888 | 0.31 | 0.00 | |
| 314-Z71633_314-Z71622 | 0 | 1918 | 106 | CPEP | 50 | 70 | 1988 | -36 | 10.57 | 3452.568888 | 0.15 | 10.57 | |
| 314-Z71622_314-Z71620 | 0 | 1918 | 106 | CPEP | 50 | 70 | 1988 | -36 | 112.19 | 3564.758888 | 1.60 | 112.19 | |
| 314-Z71619_314-Z71618 | 0 | 1918 | 106 | CPEP | 50 | 70 | 1988 | -36 | 46.92 | 3611.678888 | 0.67 | 46.92 | |
| 314-Z71620_314-Z71619 | 0 | 1918 | 106 | DUCTILE IRON | 75 | 95 | 2013 | -11 | 41.01 | 3652.688888 | 0.43 | 41.01 | |
| 314-Z71618_314-Z71617 | 0 | 1918 | 106 | DUCTILE IRON | 75 | 95 | 2013 | -11 | 200.35 | 3853.038888 | 2.11 | 200.35 | |
| 314-Z71617_314-Z71616 | 0 | 1918 | 106 | DUCTILE IRON | 75 | 95 | 2013 | -11 | 13.05 | 3866.088888 | 0.14 | 13.05 | |

Figure C-10. Screenshot of Stormwater Pipe Depreciation Spreadsheet Adding 20 Years to Useful Life



| | | | | | |
|---|---|---|---|---|---|
| Base Scenario | | | | | |
| Rate of Pipe Loss | = | 15,700 | ft pipe lost/yr (function of useful life/material & pipe age) | | Preliminary Cost Opinion Est. / Year |
| Starting Pool of Dead Pipe | | | | | |
| For year | = | 2022 | year to source pool of dead pipe data | | |
| Length of pipe needing replacement for entered year | = | 52,000 | ft | starting pool of dead pipe needing replacement | |
| 10 Replacement Duration | = | 10 | years | duration to catch up on dead pipe | |
| Rate of Pipe Replacement Needed | = | 20,900 | ft pipe needing replacement/year | | $ 31,350,000 |
| 25 Replacement Duration | = | 25 | years | duration to catch up on dead pipe | |
| Rate of Pipe Replacement Needed | = | 17,780 | ft pipe needing replacement/year | | $ 26,670,000 |
| 50 Replacement Duration | = | 50 | years | duration to catch up on dead pipe | |
| Rate of Pipe Replacement Needed | = | 16,740 | ft pipe needing replacement/year | | $ 25,110,000 |
| | | | | | |
| Adding +20 years to useful life | | | | | |
| Rate of Pipe Loss | = | 12,500 | ft pipe lost/yr (function of useful life/material & pipe age) | | |
| Starting Pool of Dead Pipe | | | | | |
| For year | = | 2022 | year to source pool of dead pipe data | | |
| Length of pipe needing replacement for entered year | = | 15,000 | ft | starting pool of dead pipe needing replacement | |
| 10 Replacement Duration | = | 10 | years | duration to catch up on dead pipe | |
| Rate of Pipe Replacement Needed | = | 14,000 | ft pipe needing replacement/year | | $ 21,000,000 |
| 25 Replacement Duration | = | 25 | years | duration to catch up on dead pipe | |
| Rate of Pipe Replacement Needed | = | 13,100 | ft pipe needing replacement/year | | $ 19,650,000 |
| 50 Replacement Duration | = | 50 | years | duration to catch up on dead pipe | |
| Rate of Pipe Replacement Needed | = | 12,800 | ft pipe needing replacement/year | | $ 19,200,000 |

Figure C-11. Cost Projection Results for 10-,20-, and 50-Year Pipe Replacement Durations

## 5.1 Discussion

The depreciation analysis was performed to provide a point of comparison on which to base the City's resource planning recommendations. Though the costs of pipe replacement are conservative, the anticipated cost of the various replacement durations was considered too great for the asset repair and replacement program. Thus, the escalated budget for repair and replacement from previous years was used as the basis for the asset repair and replacement program for the 2024 Plan. However, the results from this analysis can be used to inform the budget for future plans should it be of interest to expand the scope of the repair and replacement program. A similar depreciation analysis could be done for culverts.

# 6. Future Work & Maintenance

This asset management assessment provides a starting point from which the City can base its asset management program. The following actions will be needed to implement the discussed variables into the City's program.

- Review issues with scoring in the Cartegraph app. Ensure that any features being scored incorrectly are reviewed and amended to simplify the entry process from the field.
- The OCI rating should be reviewed and revised as needed.
- Enact the criticality of failure and likelihood of failure scores in Cartegraph for stormwater pipes and use these to prioritize inspections for pipes and adjacent network structures.
- The criticality of failure metrics should be periodically run in GIS and updated in Cartegraph for criticality of failure score.

Future actions that should be considered to expand upon the work described in this assessment are listed below.

- A GIS desktop analysis to fill in estimated installation dates should be considered for other asset types (specifically, culverts are expected to benefit, as they were missing 75% of their installation dates.
- Perform a GIS desktop analysis needed for the other stormwater assets in Table C-1 based on the methods described for the criticality of failure score.
- Estimate useful life for culverts, pumps, and network structures.
- Consider whether previous inspection data should be used in adjusted useful life for network structures.
- Enact the criticality of failure and likelihood of failure scores in Cartegraph for the remaining stormwater assets. Then follow suit with the stormwater assets listed in Table C-1.

# Appendix D

## Regulatory-Driven Improvements Assessment

The Regulatory-Driven Improvements technical memorandum will be completed and included as Appendix D of this Plan after the final version of the Western Washington Phase II NPDES MS4 permit is issued in August 2024.

# Appendix E

## Ditch Maintenance and Operations Program - Development and Recommended Actions

Parametrix
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DATE: June 6, 2024
TO: Tim Carlaw, PE
FROM: Paul Fendt, PE
SUBJECT: Ditch Maintenance and Operations Program
CC: Michael Murray, PE
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PROJECT NUMBER: 553-1931-052
PROJECT NAME: Comprehensive Storm Drainage Plan Update

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## Overview and Introduction

This memorandum documents the proposed ditch maintenance and operations (M&O) program of the Stormwater Programs Task for the Comprehensive Storm Drainage Plan (Plan) for the City. This effort has been implemented to improve the M&O of the City's ditch inventory to control stormwater runoff and improve the quality of downstream receiving waters. The analysis considers the existing ditch M&O program and determines if additional controls and resources are required to meet needs and address potential liabilities. This technical memorandum discusses the City's ditch inventory, existing ditch M&O program, an outline for the proposed ditch M&O program, and future recommendations for consideration.

## Ditch Inventory Evaluation

The evaluation of the City's existing ditch M&O program began with an assessment of its asset inventory. The City's ditch inventory is mapped under the "Channels" layer in the City's computerized maintenance management system, Cartegraph. At the time of investigation, there were 1,698 features within the Channels layer. Figure E-1 at the end of this memorandum demonstrates the extent of the channel inventory within Cartegraph.

The evaluation of the inventory included reviewing the available attribute and location data for the Channels layer features. The feature attribute review revealed an incomplete dataset with several attributes having little to no data inputs. While the data may be incomplete for the entire inventory, the following attribute fields were available for input and were either beneficial during evaluation or are anticipated to be of use in the program once data is made available.

- Owner: The jurisdiction responsible for M&O of the feature.
- Installed: The date the feature was constructed.
- Channel type: Labels the feature as a ditch or a stream.
- Channel shape: Identifies the feature as having a parabolic, v-bottom, or trapezoidal shape.
- Bottom width: The width of the bottom face of the feature.
- Bottom material: Identifies the feature as having a concrete, grass, plastic, riprap, or soil bottom.
- Slope: The longitudinal slope of the feature from inlet to outlet.
- Length: The length of the feature from inlet to outlet.
- Easement: A yes/no field that indicates whether the feature is within an easement.

Having feature data for these attributes would help with determining maintenance needs and options for water quality retrofits, making an educated guess for the useful life of component parts, and identifying the parties responsible for feature M&O. It is recommended to update features with these attributes upon implementing the ditch M&O program.

Channel features were further evaluated to determine whether they should be considered ditches and, consequently, whether they should be included in the City's ditch M&O program. A copy of the Channels layer was created to classify features accordingly. Attachment E1 describes the process used in classifying layer features and demonstrates the different categories created within the copied layer. The result of this process was a copy of the Channels layer broken into four categories based on expectations from the City's M&O program. These categories are summarized below.

- Roadside conveyance: Ditches within road right-of-way that are assumed to be capturing road runoff. This is the most common form of ditch.
- Facility-related: Ditches within close proximity to stormwater facilities that solely convey stormwater to and from the stormwater facilities.
- Collection (other): The remaining City-owned channel features that are expected to be maintained by the Storm Drainage Utility. This excludes any surface water linework (streams, rivers, etc.), ditches owned by other jurisdictions (including private ownership), and ditches maintained by other divisions within the City (for example, ditches within the median of the airport).
- N/A: All features not included in the preceding categories and not maintained by the City's Storm Drainage Utility.

The tasks proposed on behalf of each of these categories are discussed in a later section of this memorandum.

## Existing Ditch Maintenance and Operation Program

The City was consulted regarding the existing M&O program for their ditch inventory. Maintenance activities include regrading and removal of sediment; nuisance vegetation; and isolated obstructions such as trash, trees, and accumulated debris. Because vegetation is important for erosion control, removal of beneficial vegetation is minimized.

Maintenance of the City's ditch inventory is time intensive. Six M&O staff are required for a single ditch maintenance crew to operate the City-owned excavator, control traffic, and manually regrade or remove obstructions. While the City aims to implement a ditch maintenance program, the City's ditch inventory is only maintained on an as-needed basis.

## Proposed Ditch Maintenance and Operation Program

The components of the program are listed and discussed below.

### Incorporation of Ditch Classifications

Depending on the type of ditch, there may be a specific inspection regime and go-to maintenance activities. It is recommended that the City incorporate the earlier-listed classifications as feature attributes in their Channels layer in Cartegraph.

As detailed in Attachment E1, all channels classified as streams were shown to overlap with surface water linework in the geographic information system (GIS) and assumed to be streams. No streams are included in the ditch M&O program; however, complaints and observations, such as erosion around structures, may be addressed and included in customer service. For the purpose of this technical memorandum, none of the stream features will be discussed further.

## Inspection and Routine Maintenance

All ditches will need to be inspected regularly to determine whether further maintenance or construction is required. Routine maintenance will occur during inspection and will include smaller-scale tasks, such as picking up trash, clearing out shopping carts, addressing spot complaints, and mowing. A full inspection will involve evaluating the system for any structural or vegetation issues and documenting the results to determine whether a work order is needed. Ditches identified in a work order should result in a follow up within 15 days.

Roadside ditches are expected to require constant maintenance. The collection ditches will require additional routine maintenance, such as annual mowing and sediment removal. Facility-related ditches are recommended to be maintained and inspected with the facilities they are related to. A checklist for the full inspection and routine maintenance task, along with any additional tasks required for certain types of ditches, should be developed as a follow-up to this memorandum.

## Overall System Management

A general management system will be needed to ensure features are mapped, add new ditches to the City inventory, investigate encroachments, develop capital items, coordinate complaint response, make recommendations for water quality retrofits, promote general environmentally friendly practices, and facilitate the generation of work orders. These items are covered in more detail below.

### Mapping Update

In addition to updating the Channels layer with the attribute classifications described earlier, the mapped features will need to be evaluated for accuracy after field inspection and confirm they are classified correctly. Similarly, attributes and linework for the feature should be reviewed and modified after field work.

It is recommended that in addition to the attributes listed in the Ditch Inventory Evaluation section, the following attributes be defined and verified for each feature as work orders are developed.

- Inverts (as available).
- Average bottom and top width.
- Permitted encroachments (utility structures, driveways, etc.).
- Ownership and easements.

Some of the attributes may be field verified during inspection, while others may involve desktop research.

### Adding New Ditches

There should be a protocol in place where any ditches observed in the field should be noted and then verified of their existence in the City's ditch inventory. This will aim to pick up on any unmapped ditches within the City to ensure features are maintained and operated appropriately. Newly added ditches will require ownership and responsibility research and subsequent easements or purchase.

### Encroachment Investigation

Any encroachments observed in the ditch features while in the field must be documented. Examples of encroachments include utility boxes, utility poles, driveway locations, and driveway pipes. These items will need to be investigated and handled appropriately.

### Capital Development

The results of the feature inspection may warrant minor capital repairs or replacement. The projects should be added as a program to the Storm Drainage Utility's capital improvement plan. Items noted during inspection that may require capital repair or replacement include sedimentation, erosion, and system/structural failures.

### Responding to Complaints

The program does not deal with private ditches. However, if a complaint is received, the City may need to respond. The City may either notify the owner of the complaint and insist they handle it appropriately, or the City may handle the complaint and then bill the owner for the work.

### Water Quality Retrofits

As part of the program, the City's ditches should be evaluated for potential water quality retrofits, focusing on roadside ditches. Retrofits would implement strategies to provide treatment for the various pollutants found in road runoff (6PPD-quinone, road maintenance chemicals, heavy metals, eroded soil, etc.). Determining potential retrofits to consider and deciding how a ditch is chosen for retrofit should be determined as a follow-up to this memorandum.

### General Environmentally Friendly Practices

It is recommended to follow general environmentally friendly practices when performing ditch maintenance. A few of these practices have been listed below and can be researched further in Volume IV of the Pierce County Stormwater and Site Development Manual.

- Encourage vegetation by not mowing too low.
- Avoid using chemicals where possible.
- Perform regular inspections.
- Conduct vegetative maintenance in the late spring or early fall.

### Work Order Development

The following items will need to be addressed and managed in incorporating the proposed ditch M&O program.

- How does inspection turn into a work order?
- How often should ditches be inspected?
- What are the thresholds for action?

## Recommendations

It is recommended to implement the proposed ditch maintenance program as detailed above. Further work to develop the inspection checklists, decide on how to implement water quality retrofits, and address the work order development items is necessary as a follow-up to this memorandum. It is recommended to reflect upon the program after 5 years to assess whether any adjustments would be beneficial to the program.

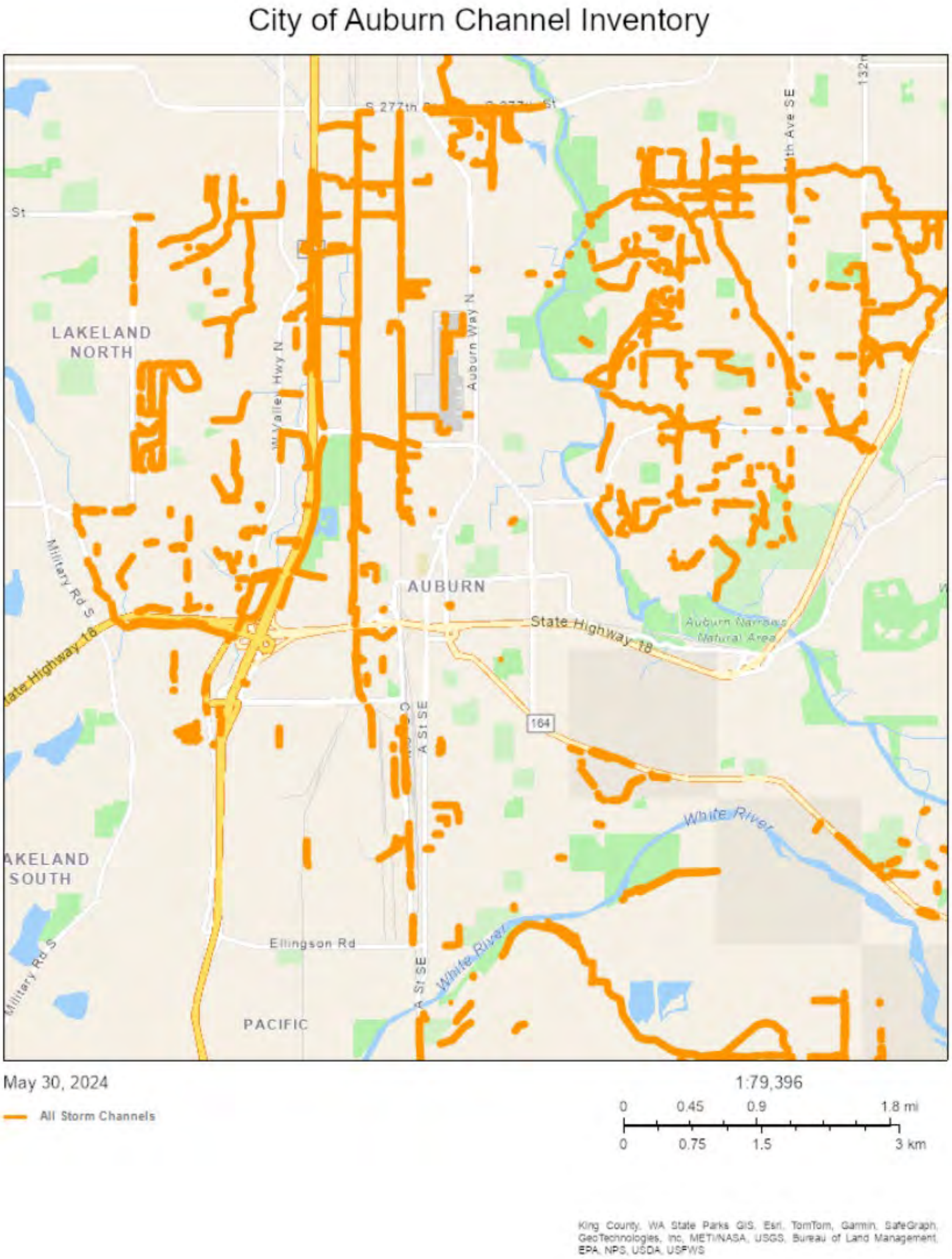

Figure E-1. Extent of Channels Layer in Cartegraph

# Attachment E1

## Channel Classification

# Attachment E1

## Channel Classification

The Channel layer was exported from the City's Cartegraph inventory and was used as the basis for the data review. At the time of export, there were 1,698 features with a total of more than 440,000 feet in summed length.

After reviewing the channel inventory, it was determined that a categorization of the channels by type would be beneficial in developing the required inspection criteria, frequency, and maintenance needs. Two attribute columns were added to the Channel layer, named "Source_Drainage" and "Source_Drainage_Note" to ease this process. Features were assigned a common category in the "Source_Drainage" attribute column, and any notes or reasoning for the assignment were justified in the "Source_Drainage_Note" attribute column. The process for classification of the channel inventory (and filling out the Source_Drainage attribute column) is detailed in the following sections.

The characteristics evaluated for classification along with a description of the process for each are listed below.

### Ownership

The channels were first broken down using the feature's Owner attribute. The process for this breakdown is listed below.

- Any ditches marked as Owner = "COA"[1] or "0" or blanks were assumed to be City owned and broken down further.
- Any ditches marked as Owner = "Private" were marked as "Private – Ditch."
- Any ditches marked as Owner = "WSDOT" were marked as "WSDOT – Ditch."
- Any ditches marked as any owner not previously identified were marked as "Other Jurisdiction – Ditch."

### Surface Water

The Channels layer was overlaid in GIS with linework from surface water and stream network layers. Any features from the Channels layer that overlapped with the surface water and stream network linework were marked as "Streams." These features would not be considered in the ditch maintenance and operations program.

If any features appeared to be visually similar to streams in GIS but did not overlap with any surface water linework, they were marked as "COA – Channelized Streams." An example of this instance is shown in Figure E1-1 below.

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[1] Where COA is an abbreviation for City of Auburn.

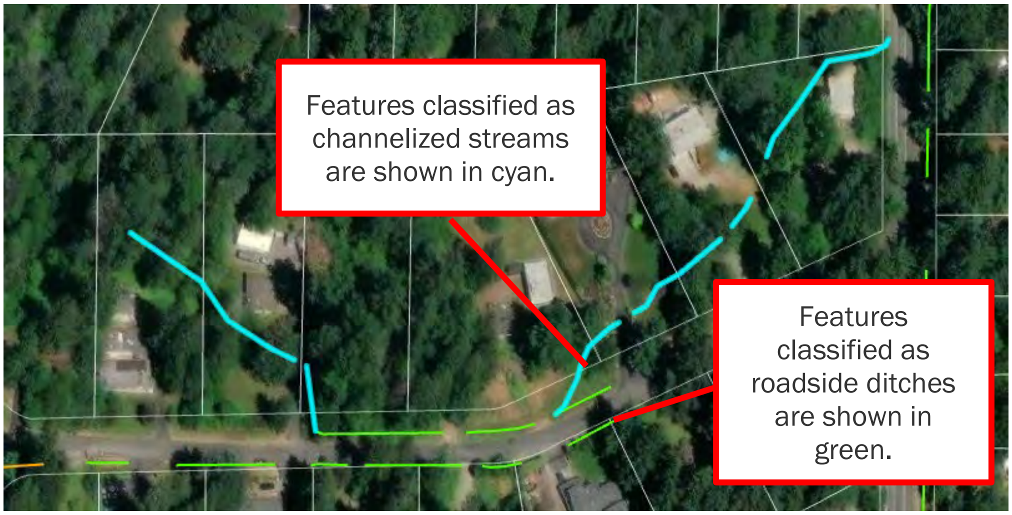


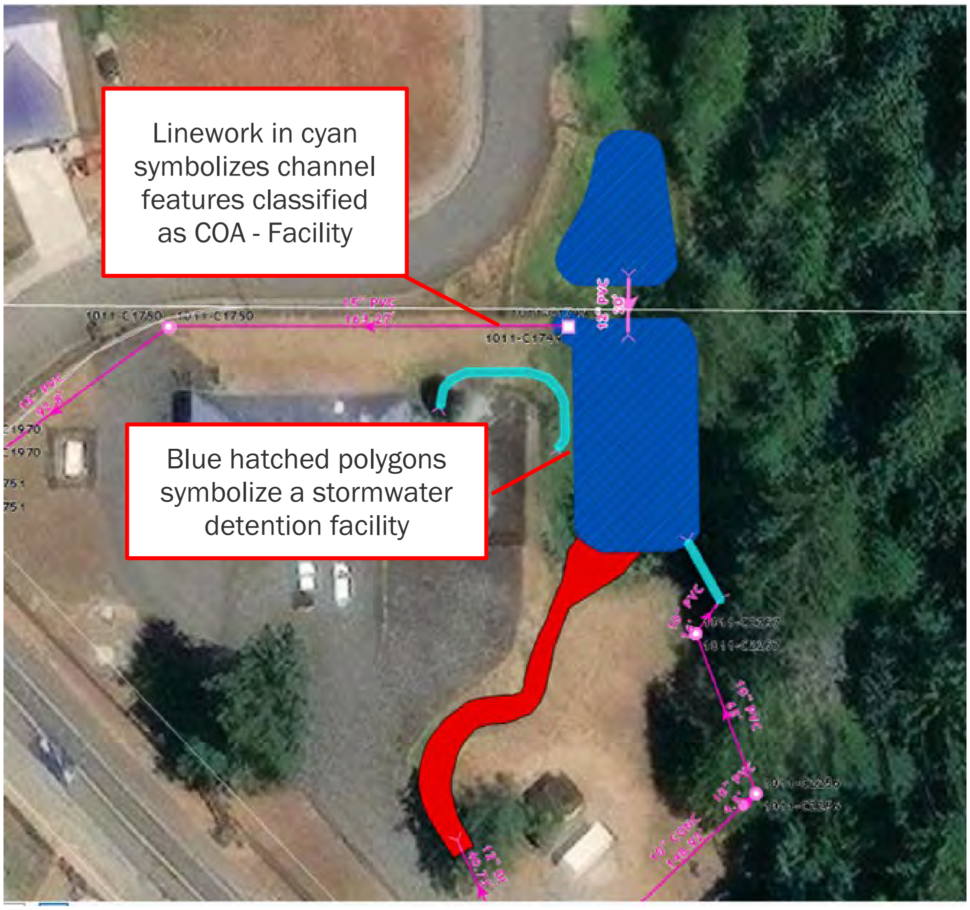
Figure E1-1. COA – Channelized Streams and Roadside Ditches Example

## Roadside Ditch

A buffer was applied around roadways in GIS to capture any of the channel features within right-of-way. Any ditches within this buffer were marked as “COA – Roadside Ditch.” These features are assumed to be capturing road runoff and are anticipated to be the most common form of a ditch. Examples of these features are shown in green in Figure E1-1.

## Stormwater Facility

In a similar fashion to roadside ditches, a buffer was applied around the City’s existing stormwater facilities. Any channels that lay within this buffer were visually evaluated to confirm that they seemed to be associated with a stormwater facility. Channel features that were confirmed to be associated with a stormwater facility were marked as “COA – Facility.” Maintenance for ditches associated with an existing facility are anticipated to follow a schedule dictated by maintenance of the overall facility. An example of this feature type is shown below in Figure E1-2.



Linework in cyan symbolizes channel features classified as COA - Facility

Blue hatched polygons symbolize a stormwater detention facility

Figure E1-2. COA – Facility Features Example

## Airport Median

There were three channel features shown in the airport median that were classified separately. These features were marked as “COA – Other.” These are likely not ditches and would follow a different maintenance schedule than what is recommended elsewhere. Maintenance would be dictated by airport requirements. The three channel features of this type are shown below in Figure E1-3.

Features shown in yellow linework are classified as “COA – Other”

Figure E1-4. COA – Other Features

## Public Ditches

The remaining channel features that were City owned and not surface water, not receiving roadside drainage, not associated with a stormwater facility, and not within the airport median were classified as "COA – Public." These features will require different inspection and maintenance techniques than the roadside ditches because access may be more challenging and captured runoff is anticipated to be sourced from more than roadways. An example of a channel feature classified as "COA – Public" is shown below in Figure E1-4.

Figure E1-4. COA – Public Feature Example

## Results

After classifying the Channels layer as detailed above, the resulting breakdown of features in each category is demonstrated below in Table E1-1.

Table E1-1. Channel Classification Breakdown

| Owner[1] | Classification[2] | Length[3] (feet) | Length (miles) | Percent of City-Owned Channels | Percent of Total Channels |
|---|---|---|---|---|---|
| Various | Stream | 84,000 | 16 | - | 19% |
| WSDOT | WSDOT - Ditch | 29,000 | 5 | - | 6% |
| Other Jurisdictions | Other Juris - Ditch | 9,000 | 2 | - | 2% |
| Private | Private - Ditch | 101,000 | 19 | - | 23% |
| COA | COA - Channelized Stream | 14,000 | 3 | 6% | 3% |
| COA | COA - Roadside Ditch | 176,000 | 33 | 79% | 39% |
| COA | COA - Facility | 5,000 | ~1 | 2% | 1% |
| COA | COA - Other | 3,000 | ~1 | 1% | 1% |
| COA | COA - Public | 26,000 | 5 | 12% | 6% |
| **-** | **COA Total** | **224,000** | **42** | **100%** | **50%** |
| - | **Total** | **447,000** | **85** | **-** | **100%** |

1 Owner corresponds to the data for the feature attribute of the same name. COA = City of Auburn; WSDOT = Washington Department of Transportation. “Other Jurisdictions” includes any other ownership not included in COA, WSDOT, or Private. Other jurisdictions listed as owners of channel features include City of Algona, City of Kent, King County, and the Muckleshoot Indian Tribe.

2 Classification also refers to the “Source_Drainage” attribute column developed for this evaluation.

3 Length has been rounded up to the nearest thousand. The columns to the right have all been calculated based on this rounded number.

## Work Implications

The review of the channel inventory layer was conducted as part of a larger effort to develop a drainage ditch maintenance program for the City. Breaking down the layer into the classifications identified in Table 1 allow for resources to be evaluated appropriately. While the channel classifications aid in giving additional context for the features within the Channel layer, some of the classifications are expected to require the same work items and maintenance frequencies, while others are not maintained by the storm drainage utility and will not be included within the ditch maintenance program. To simplify drainage ditch M&O needs, features can be split into broader categories based on expected work. Table E1-2 shows the groupings for ditch M&O work as they relate to the COA channel classifications.

### Table E1-2. COA Drainage Ditch M&O Categories Relative to Channel Classifications

| COA Drainage Ditch M&O Category | Channel Classification | Length (feet) | Length (miles) |
|---|---|---|---|
| Roadside Conveyance | COA - Roadside Ditch | 176,000 | 33 |
| Facility-Related | COA - Facility | 5,000 | ~1 |
| Collection (Other)[1] | COA - Channelized Stream | 40,000 | 8 |
| | COA - Public | | |
| Total Maintained by Storm Drainage Utility | | 221,000 | 42 |
| N/A[2] | COA - Other | 226,000 | 43 |

COA = City of Auburn; M&O = maintenance and operation

[1] This grouping combines all other COA ditches maintained by the storm drainage utility collecting stormwater. For the purposes of this preliminary ditch maintenance program, these ditches are expected to have the same maintenance needs and frequency of work.

[2] N/A includes all features in the channel classifications layer not sorted into one of the other three M&O categories, and not included in the City's ditch maintenance program. COA-Other is included in this category as it is not expected to be maintained by the storm drainage utility. It is expected to have different maintenance expectations dictated by the airport. If this is proven otherwise, it should be sorted into one of the other M&O categories based on expected level of need.

Facility-related ditches will largely be maintained alongside the facilities they correspond with. This may require a first step in associating facility-related features with the respective facility they serve in Cartegraph to ensure that these features are not missed. After this exercise, facility maintenance may include maintenance of any associated ditches (depending on recommended maintenance frequency, facilities may be maintained several times per year, while facility-related ditches may not need as many visits). While these features are still included within the ditch maintenance program, the frequency and scheduling of work is dependent on timing for associated facilities. Though, the work associated with ditch inspection and maintenance will be dictated by the ditch inspection program.

In terms of M&O tasks, features classified as COA-Channelized Stream are expected to have the same inspection and maintenance requirements as those in COA-Public, so these will be treated the same in terms of recommended M&O actions.

# Appendix F

## SEPA Compliance Documentation

The SEPA Compliance Documentation will be included as Appendix F of the final Plan.

# AGENDA BILL APPROVAL FORM

| | | |
|---|---|---|
| **Agenda Subject:**<br>Capital Facilities Element (Steiner) | | **Date:**<br>June 11, 2024 |
| **Department:**<br>Community Development | **Attachments:**<br>Attachment C - Capital Facilities Element Presentation<br>Attachment D - V1 Draft 2024 Capital Facilities Element | **Budget Impact:**<br>Current Budget: $0<br>Proposed Revision: $0<br>Revised Budget: $0 |

**Administrative Recommendation:**

**Background for Motion:**

**Background Summary:**

See Attachments

**Reviewed by Council Committees:**

**Councilmember:**

**Staff:** Steiner

**Meeting Date:** June 18, 2024

Item Number:

CITY DEPARTMENTS

# 2024 COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

JOSH STEINER, AICP, SENIOR PLANNER
PLANNING COMMISSION

JUNE 18, 2024

Department of Community Development
Planning • Building • Development Engineering • Permit Center
Economic Development • Community Services • Code Enforcement

AUBURN VALUES

SERVICE
ENVIRONMENT
ECONOMY
CHARACTER
SUSTAINABILITY
WELLNESS
CELEBRATION

# 2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

## Core Changes to Land Use Element

- Regulatory Requirements (RCW 36.70A.070)

(3) A capital facilities plan element consisting of:

(a) An inventory of existing capital facilities owned by public entities, including green infrastructure, showing the locations and capacities of the capital facilities;

(b) Forecast of the future needs for such capital facilities;

(c) Proposed locations and capacities of expanded or new capital facilities;

(d) At least a six-year plan that will finance such capital facilities within projected funding capacities and clearly identifies sources of public money for such purposes; and

(e) Requirement to reassess the land use element if probable funding falls short of meeting existing needs and to ensure that the land use element, capital facilities plan element, and financing plan within the capital facilities plan element are coordinated and consistent. Park and recreation facilities shall be included in the capital facilities plan element.

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# 2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

## Core Changes to Land Use Element

- Element Update Framework

  - Pull in policy and non-financial text from Capital Facilities Plan
  - Incorporate information from Utilities Element as appropriate
  - Include inventories for capital facilities
    - Reference on goals, policies, and technical information from other Elements as appropriate to avoid duplication
  - Overall formatting and refinements for readability

  - Few comments from agencies
  - Capital Facilities Plan is included as part of CFE package (6-year CIP)
  - Multi-Department Effort

# 2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

IMAGINE AUBURN
~COMPREHENSIVE PLAN UPDATE 2024~

## Core Changes to Land Use Element

### Element Update Framework

- **Capital Facilities Inventory** – list of facilities and attributes (condition, age, size, etc.)
- **Level of Service** – Adopted Level of Service standards that apply to facilities for identification of future needs. May be a reference to another document.
- **Known Capacity Issues** – Deficiencies identified by Level of Service analysis and/or capacity issues identified in other documents (systems plans, etc.)
- **Future Plans** – Summary of identified future projects or reference to other documents where information is found (systems plans, etc.)

Not all information is provided for each facility type

# 2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

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## Core Changes to Land Use Element

### Capital Facilities Types

- **Municipal Facilities**
  - **Community Facilities (golf courses, cemeteries, etc.)**
  - **Public Libraries**
  - **Police**
  - **Fire Protection**
  - **Parking**
- **Parks and Recreation**
- **Transportation**
- **Public Utilities (city-provided and other)**
- **Public Education Facilities**

# 2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

IMAGINE AUBURN
COMPREHENSIVE PLAN UPDATE 2024

## Core Changes to Land Use Element

- Policy Updates

- **Majority of policies are from existing CFE, CFP, and related Elements**
- **New or amended policies address gaps in GMA requirements**

- **CF-6 Provide additional public facility capacity when existing facilities are used to their maximum level of efficiency (consistent with adopted standards for level of service).**
- CF-10. The city will perform its activities and make capital budget decisions in conformity with the comprehensive plan. The Land Use Element of the comprehensive plan shall be reassessed if probable funding falls short of meeting existing needs.
- CF-11 Establish land use patterns that optimize the use of public facilities.

# 2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

## Next Steps

- July 2nd – Public Hearing
  - Requested updates based on feedback
- October 23rd – Planning Commission Action (same night as Utilities Element and Water Comprehensive Plan action)

# 2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

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## Questions, Discussion, and Feedback

City of Auburn

# Capital Facilities Element

CITY OF AUBURN WASHINGTON

# Table of Contents

# Introduction

This volume provides overall policy direction for the different capital facility plans and programs provided by the City. Capital facilities belonging to privately owned utilities (electricity, natural gas lines, etc.) and those that are city-operated (water, sewer, stormwater, etc.) are covered in the Utilities Element (Volume 4). Certain City plans and programs are further refined in other sections of this volume, such as Parks, Recreation, and Open Space, and Transportation. Overall, however, this volume acts as a reference for all of the City's various capital facility plans except for those found in other Elements, including the City of Auburn Six-Year Capital Facilities Plan (a key component of and adopted with this plan), comprehensive plans, capital improvement and investment programs, inventories, and studies that together represent the planning and financing mechanisms required to serve the capital facility needs of Auburn. For more details on a particular capital facility or the City's overall capital facility plan, see the most recently adopted version of the following:

- City of Auburn Airport Master Plan
- City of Auburn Capital Facilities Plan
- City of Auburn Comprehensive Water Plan
- City of Auburn Comprehensive Sewer Plan
- City of Auburn Comprehensive Stormwater Plan
- City of Auburn Parks and Recreation Master Plan
- City of Auburn Comprehensive Transportation Plan
- Auburn School District Capital Facilities Plan
- Kent School District Capital Facilities Plan
- Dieringer School District Capital Facilities Plan
- Federal Way School District Capital Facilities Plan
- Valley Regional Fire Authority (VRFA) Capital Facilities Plan

## *Vision*

*Capital facilities in Auburn are planned, designed, and constructed in a manner that adequately supports the future growth scenarios in the City's Land Use Element and that meets the needs of residents, visitors, and businesses. Sustainability is a principle that guides decisions about where facilities are placed, how they are constructed, how they are operated and maintained, and how all aspects of design, construction, and operation are funded.*

# Conditions and Trends

Growth: The provision and sizing of public facilities such as streets or waterlines and sewer lines can influence the rate or timing of development and is an important means of managing growth. Timed provision of facilities also ensures that new development can be assimilated into the existing community without serious disruptions or adverse impacts. This Plan establishes policies to allow development when and where all public facilities are adequate or can be made adequate, but only if such development can be adequately served by public facilities and services consistent with the adopted level-of-service standards.

A key provision of the Growth Management Act is concurrency. In general, concurrency seeks to ensure that development is permitted only if adequate public facilities are, or can be guaranteed to be, available to support new development. Concurrency requires that facilities needed to maintain a locally adopted level of service be provided “concurrently” with development. Concurrency places the finance function of local government in a much more prominent role in the land use development process. While the concept of concurrency is new to many jurisdictions, it has been used in Auburn since the adoption of its 1986 Comprehensive Plan.

The Act requires concurrency only for transportation facilities, though if a jurisdiction desires, concurrency can be applied to other public facilities as well. With respect to transportation facilities, concurrent is defined within the Act as being provided at the time of or within 6 years of development (this is done to coincide with the six-year time frame of most capital facilities plans). If the facility is not available at the time of development, the funding to construct the facility must be included in the six-year capital facilities plan.

Regardless of whether a local jurisdiction applies concurrency to public facilities beyond those for transportation, new development must be coordinated with the provision of capital facilities. This ensures that all relevant public facilities and services are planned and available to serve the demands of new growth.

## Planning Approach

The Capital Facilities planning approach is to manage growth in a manner that enhances from community quality and values by actively coordinating land use type and intensity with City facility and service development and provision.

## Values

<u>Character:</u> Public buildings and spaces incorporate high-quality building and landscape design so that they positively impact the surrounding built environment.

<u>Wellness:</u> Public spaces that are purchased and developed for capital facilities also incorporate features and infrastructure that provide more complete nonmotorized connections.

Service: City utilities and buildings are of high quality and complete, reliable, and available to residents and business owners.

Economy: City utilities are available or planned to be available to serve allowed commercial, recreational, and residential uses.

Celebration: Capital facility spaces will be available, designed, and programmed in a manner that promotes public gathering.

Environment: Development of capital facilities will place a premium on environmental preservation and protection.

Sustainability: Our philosophy of designing, constructing, and maintaining utilities and buildings embraces a long-term investment horizon rather than concepts that only provide short-term benefits and outcomes.

# Concurrency and Levels of Service

## Levels of Service

Level of Service (LOS) is a common measure used to determine the efficiency or effectiveness of services. For the City of Auburn, LOS targets serve as a means to assess the adequacy of public facilities in meeting the needs of the population for which it serves. The GMA requires that LOS be established for certain transportation facilities for the purposes of applying concurrency to development proposals. The State GMA guidelines recommend the adoption of LOS standards for other capital facilities to measure the provision of adequate public facilities.

Typically, measures of level of service are expressed as ratios of facility capacity to demand (i.e., actual or potential users). Table 1-1 lists generic examples of level of service measures for some capital facilities:

For example, in the case of park space, when there is an increase in population without a corresponding increase in park acreage, the LOS unit of measure (acres per 1,000 population) will decline, indicating a potential need to increase the total amount of park acreage to keep pace with population growth. On the other hand, a slight increase in population, coupled with a large increase in facilities, will result in an increased LOS. For example, facilities such as buildings or burial plots may be constructed or expanded to keep pace with anticipated population growth. While this will have the effect of increasing LOS in the short-term, in the longer-term, the LOS will gradually decline to the targeted level based on forecasted population. The impact of population growth to the LOS for facilities will vary depending on the type of facility and long-range planning by the City.

## Concurrency

The GMA requires that jurisdictions have certain capital facilities in place or available within a specified time frame when development occurs. This concept is called concurrency. Under the GMA, concurrency is required for transportation facilities and is recommended by the State for certain other public facilities, namely potable water and sanitary sewer.

Concurrency has a direct relationship to level of service. The importance of concurrency to capital facilities planning is that development may be denied if it reduces the level of service for a capital facility below the locally adopted minimum. The level of service is unique for each type of facility and is presented in the subsequent sections. Concurrency has a direct relationship to level of service. The importance of concurrency to capital facilities planning is that development may be denied if it reduces the level of service for a capital facility below the locally adopted minimum. The level of service is unique for each type of facility and is presented in the subsequent sections.

The need for capital facilities is largely determined by a community's adopted LOS standards and whether or not the community has formally designated capital facilities, other than transportation, as necessary for development to meet the concurrency test. The CFP itself is therefore largely influenced by the selection of the level of service standards. Level of service standards are measures of the quality of life in the City. The standards should be based on the City's vision of its future and its values.

## *Level of Service Standards and Needs*

Based on the proposed six-year capital projects and the projected population increase of 4,585 (5.1%) between 2023 and 2028, the LOS for the following City-owned public facilities will change as follows:

The LOS for the following facilities will be increased as a result of the Capital Facilities Plan (CFP), comparing the 2023 LOS to the projected 2028 LOS.

| Capital Facility | LOS Units | 2023 LOS | 2028 LOS (Projected) |
|---|---|---|---|
| Cemetery | Burial Plots per 1,000 population | 29.00 | 56.00 |
| Community Parks | Acres per 1,000 population | 2.62 | 2.95 |
| Linear Parks | Acres per 1,000 population | 0.18 | 0.21 |
| Neighborhood Parks | Acres per 1,000 population | 0.72 | 0.78 |

The LOS for the following facilities will be maintained as a result of the CFP.

| Capital Facility | LOS Units | 2023 LOS | 2028 LOS (Projected) |
|---|---|---|---|
| Transportation | See Comprehensive Transportation Plan | | |
| Airport | % of Air Operations Support | 100% | 100% |
| Sanitary Sewer | Residential GPCPD[1] | 171.00 | 171.00 |
| Storm Drainage | N/A | N/A | N/A |

| | | | |
|---|---|---|---|
| Water | Residential GPCPD[1] | 182.00 | 181.00 |

1 – GPCPD = Gallons per Customer per Day

The LOS for the following facilities will be decreased as a result of the CFP, comparing the 2023 LOS to the projected 2028 LOS.

| Capital Facility | LOS Units | 2023 LOS | 2028 LOS (Projected) |
|---|---|---|---|
| General Municipal Buildings | Square Feet per 1,000 population | 3,290.44 | 3,173.11 |
| Open Space | Acres per 1,000 population | 4.25 | 4.10 |
| Senior Center | Square Feet per 1,000 population | 135.70 | 129.12 |
| Special Use Areas | Acres per 1,000 population | 2.83 | 2.69 |

Other Level of Service metrics and thresholds related to specific capital facilities are located in the sections below.

# Capital Facilities and Services

## Municipal Facilities

The current inventory of City government administration and operations facilities include 207,629 square feet for general government operations, 66,469 square feet for police services, and 21,726 square feet for fire protection, for a total of 295,824 square feet. Table GM – 1 “Facilities Inventory” lists the facilities along with their current capacity and location.

### *Community Facilities*

#### GM- 1 Facilities Inventory

| Facility Name | Location | Size |
|---|---|---|
| Community Center | 910 9th St SE | 19,804 sq ft |
| Senior Center | 808 9th St SE | 11,667 sq ft |
| Cemetery | 2020 Mountain View Dr | 4,011 sq ft (out buildings not included) |
| Golf Course | 29630 Green River Rd | 14,114 sq ft (out buildings not included) |
| Postmark Center for the Arts | 20 Auburn Ave | 8,744 sq ft |
| GSA | 2905 C St SW | 11,837 sq ft |
| 4910 A Street | 4910 A Street | 5,920 sq ft |
| City Hall | 25 W Main St | 57, 316 sq ft |
| City Hall Annex | 1 E Main St | 47,000 sq ft |
| Justice Center | 340 E Main St | 36,000 sq ft |

| | | |
|---|---|---|
| Maintenance & Operations | 1305 C St SW | 18,232 sq ft (out buildings not included) |
| Parks Maintenance | 1403 C St SW | 6,094 sq ft (out buildings not included) |
| Les Gove MPP Building | 1040 Deal's Way | 1,262 sq ft (out buildings not included) |
| R Street Building | 2840 Riverwalk Drive SE | 4,798 sq ft (out buildings not included) |
| Warren Building | 411 E Street NE | 1,813 sq ft (out buildings not included) |
| Herr Storage | 1140 Auburn Way S | 3,600 sq ft |
| Auburn Ave Theatre (scheduled for demolition) | 10 Auburn Ave | 7,590 sq ft |
| Auburn valley Humane Society | 4910 A Street SE | 5,920 sq ft |

### Level of Service

The current LOS of 3,290 square feet per 1,000 population is based on the existing inventory divided by the 2023 citywide population of 89,904. The proposed LOS of 3,173 square feet per 1,000 population is based on the projected inventory divided by the 2028-projected citywide population of 94,489.

### Future Plans

As of 2024, the City is in the process of designing and constructing a replacement for the Auburn Ave Theatre, which was damaged when the adjacent historic mixed-use building on E Main Stret was damaged beyond repair due to fire. The new theatre is anticipated to be an activity anchor in downtown with its central location.

## *Public Library Facilities*

The City of Auburn is served by the King County Library System in 15,000 square foot Auburn Library building at 1102 Auburn Way S. The library opened in 2000 after moving first from the Carnegie Library building in downtown (constructed in 1914), then from another facility in Les Gove Park (constructed in 1964). The current building has continued to be renovated and expanded over the past 25 years, with the last construction completed in 2012. Detailed information regarding the King County Library System is available at www.kcls.org.

## *Police*

### Facility Inventory

| Name | Location | Size |
|---|---|---|
| Auburn Justice Center (Police) | 340 E Main St | 16,000 sq ft |
| Evidence Building | 340 E Main St | 4,400 sq ft |

The Auburn Police Department has a staff of the Chief, Assistant Chief, 5 Commanders, 13 Sergeants, 57 Patrol Officers, 20 Detectives, 5 Traffic Officers, and multiple supervisors, specialists, technicians, and other staff as of 2023.

Police services are centered around the Auburn Justice Center that serves the entire City and supports the required staff, the majority of who are assigned to the patrol division. In 2004, the police department took occupancy of a portion of the Justice Center, primarily in the basement, with the Court located on the primary level.  The police portion occupies just over 16,000 square feet.  Currently the police facility houses 118 sworn police officers in addition to 22 civilian staff.  Police headquarters provides both designated and temporary workspace, meeting rooms, common areas, locker rooms, storage space, utility space, electrical and utility space, and records storage space. A separate evidence building at the same site houses evidence storage, general equipment storage, and records archives. Additionally, the department maintains temporary evidence storage in the basement of city hall, utilizing approximately 200 square feet of space.

A facility needs assessment was completed in 2020 and was incorporated in the 2020 Facilities Master Plan.

## Known Capacity Issues

Police facilities lack adequate space to support current staff and operations, and future growth.

- Suboptimal climate control, especially on ground floor as HVAC zone configuration does not align with current space configuration due to renovations.
- Facility too small to accommodate both Court and Police in long-term.
- Severely space-constrained, especially for Police, which grew 40% between 2004 and 2019.
- Undersized public lobby and soft interview space.
- Limited meeting/briefing space for all meeting types, including large groups, confidential discussions, and interviews.

Police office space is primarily in basement areas that have limited natural light.

- Defensive tactics and classroom training occur in a room with irregular column placement which impedes sightlines, creates barriers for physical training, and complicates furniture/mat reconfiguration.
- Evidence building is at capacity.
- Undersized parking; unsecured parking for marked vehicles.

## Future Plans

A property located near 12th street southeast property has been acquired by the City. 2023-2024 budget allocated funding for facility planning at new location. Other than planning, there is no funding allocated for this project.

## *Fire Protection*

The Valley Regional Fire Authority (VRFA) provides critical fire and life safety services to the approximately 97,000 citizens residing in the 37 square miles of Algona, Auburn, and Pacific. Oversight of the VRFA is provided by a nine-member Governance Board consisting of the Mayor and two council members from each participating city. Twenty personnel respond from five fire stations. These stations are staffed 24 hours a day, seven days a week, by four shifts. A battalion chief oversees each shift, and a deputy chief manages the entire division.

The Auburn Fire Department was formed over a century ago as a result of a devastating fire in August of 1890. The fire destroyed an entire city block of businesses in what was then known as the town of Slaughter. The original department, consisting of volunteer firefighters and a hand-drawn hose cart, was first named the Auburn Bucket Brigade. The name changed to the Auburn Volunteer Fire Department in 1908. On January 1, 2007, as a result of a voter-approved measure, the Auburn Fire Department combined with the Pacific Fire Department and the City of Algona to form the Valley Regional Fire Authority, which provides fire and EMS services to all three cities.

In an emergency, every second counts. The VRFA has established a Total Response Time (TRT) benchmark of seven minutes and 34 seconds (7:34) for EMS Calls and seven minutes and 49 seconds (7:49) for fire calls. TRT is the time it takes a unit to arrive at a scene once the call is received at the Fire Alarm Center. In 2022, we achieved those benchmarks 51% of the time for fire response and 57% for EMS response.

The VRFA's Capital Facilities Plan (CFP), which was adopted by the Board of Governance in 2021, made four recommendations:

- Priority 1: build an additional station in the northern part of VRFA's service area
- Priority 2: relocate and rebuild Station 38 in Pacific
- Priority 3: remodel or replace Station 31
- Priority 4: find a permanent location for Support Services

In 2022, the VRFA took several significant steps to implement the CFP, including:

- Purchasing property on 30th and I Street Northeast for a new north end fire station. Evaluating property on the Ellingson corridor in Pacific in order to relocate Station 38.
- Contracting with the leading architectural firm TCA to consult on land acquisition and complete preliminary design concepts on each element of the CFP.
- Initiating a discussion on the best way to fund these critical projects.

In 2022, 45% of revenue was from Property Taxes, 34% from Fire Benefit Charges, and 21% from other sources such as grants and permit fees. Expenditures in 2022 include 52% for wages, 15% for capital projects, 19% for benefits and 14% for other services and supplies.

Valley Regional Fire Authority Capital Facility Plans, Annual Reports, and other documents can be found at www.vrfa.org.

### Level of Service

The current LOS of 0.20 fire apparatus per 1,000 population is based on the existing inventory (18 fire apparatus) divided by the 2023 citywide population estimate of 89,904. The proposed LOS of 0.20 fire apparatus per 1,000 is based on the 2028-planned inventory (19 fire apparatus) divided by the 2028-projected citywide population of 94,489.

## *Parking*

### Facilities Inventory

| Facility Name | Location | Capacity | Condition |
|---|---|---|---|
| Kiss-n-Ride Parking Lot | Parcel #7815700172 | 21 Non-Handicap spaces; 1 accessible space | Fair |
| 11 A Street NW Parking Lot | 11 A Street NW | 47 Non-Handicap spaces; 2 accessible spaces | Poor |
| B Street Parking Lot | 137 E Main Street | 60 Non-Handicap spaces; 13 accessible spaces | Fair |
| Safeway Parking Lot | Parcel #7331400135 | 122 Non-Handicap spaces; 4 accessible spaces | Poor |
| D Street Parking Lot | 350 E Main St | 20 Non-Handicap spaces; 0 accessible spaces | Very Poor |
| JC Employee Parking Lot | 20 D Street SE | 55 Non-Handicap spaces; 1 accessible spaces | Fair |

### Future Plans

On April 1, 2024, the City of Auburn relinquished possession and use of 113 off-site parking stalls to Sound Transit. The 113 parking stalls were code required parking stalls tied to two office-condominiums owned by the City and utilized as office space by City employees. The City will need to replace these 113 parking stalls within the code required 1,000/ft radius of the office condominiums with which they serve. Funding for the parking replacement will come in whole or in part from the monetary amount awarded to the City by the arbitrator who presided over the arbitration hearing.

Replacement of the 113 parking stalls relinquished to Sound Transit will likely need to be accomplished by constructing a multi-story parking garage.

### *Cemeteries*

The City owns two cemeteries. The Mountain View Cemetery is a fully developed facility (60 acres and five buildings) that provides burial services and related merchandise for the community. The Pioneer Cemetery is a historic cemetery that is no longer used for burial purposes.

### Level of Service

The current LOS of 29 burial plots/niches and cremation in ground plots per 1,000 population is based on the existing inventory divided by the estimated 2023 citywide population. The proposed LOS of 56 burial and plots/niches and cremation in ground plots per 1,000 population is based on the projected inventory divided by the 2028-projected citywide population.

## Parks and Recreation

The Parks, Recreation, and Open Space (PROS) Plan is needed to meet legal requirements and secure funding for the City's parks and recreation areas for the next six to ten years. Developed with public involvement, city staff, and several city commissions, this plan provides a summary of the city's parks, recreation programs, and open spaces, and gathers information on the community's recreational needs through surveys, outreach, and online tools. This Plan establishes a vision, goals, and assesses the current level of service provided by city parks and open spaces. The Capital Improvement Plan (CIP) and its formal approval adoption completes the PROS Plan suggesting a series of recommended improvements to better serve the citizens of Auburn for the next six years and beyond, each tied to potential grant funding sources, serving to guide the City's response and priorities to the desired quality of life envisioned from its citizens.

### Facilities Inventory

Currently, the City manages a diverse range of parks and recreation assets, including 23 neighborhood, or local, parks, 14 community parks, 7 parcels of dedicated open space including a golf course, trail systems, and 16 special use facilities. More information parks and recreation assets can be found in Appendix F – PROS Plan of the Comprehensive Plan.

### Level of Service (LOS)

A 10-minute walk is considered an important park access metric for several reasons. A 10-minute walk (approximately 1/2 mile on level ground) as a park access metric is important because it promotes physical activity, equity, sustainability, social interaction, and overall community well-being. It aligns with various health, environmental, and social goals the City has and should encourage staff and policymakers to prioritize accessible green spaces as a fundamental part of Auburn's development and the community's desired quality of life.

## Future Plans

A Needs Analysis and Capital Improvement Program (CIP) project list can be found in Appendix F – PROS Plan of the Comprehensive Plan.

# Transportation

Roadways: The City's street system consists of a network of approximately 249 miles of arterials, collectors, local streets and alleys. Existing nonmotorized facilities include a mix of trails, sidewalks, and both dedicated and shared bicycle facilities.

Signals and ITS: The City's transportation system also includes 95 traffic signals, a Traffic Control Center employing Intelligent Transportation Systems (ITS), which centrally directs the signals, 89 traffic cameras, and various traffic beacons all communicating on a network of copper wire and fiber optic cable. The City also has three roundabouts.

Transit: King County Metro Transit, Sound Transit and Pierce Transit serve the Auburn area. Auburn is currently served by six Metro, two Sound Transit, and one Pierce Transit bus route. In addition, Sound Transit "Sounder" commuter trains provide peak hour and midday service at the Auburn Station. The Sounder also provides special event service to selected sporting events. Park and Ride facilities and the Auburn Station support bus and rail service.

## Facilities Inventory

| Quantity | Description |
|---|---|
| 249 | Miles of Streets |
| 17 | Bridges |
| 11,000 | Street Signs |
| 13,389 | Feet of Guardrail |
| 96 | Traffic Signals |
| 31 | Rapid Rectangular Flashing Beacons |
| 3.684 | Street Lights - City Owned |
| 2,261 | Street Lights - PSE Owned |
| 53 | School Zone Flashing Beacons |
| 19 | Speed Radar Feedback Signs |
| 89 | Traffic Cameras |
| 12 | Speed Photo Enforcement Locations (School Zones) |
| 4 | Dynamic Message Signs |
| 43.86 | Miles of Fiber Optic Systems |
| 2 | Community Banner Locations |
| 22.62 | Miles of Class I Bikeways |
| 1.29 | Miles of Class II Bikeway with Buffer (Both Sides of Roadway) |

| | |
|---|---|
| 15.95 | Miles of Class II Bikeway (Both Sides of Roadway) |
| 4.21 | Miles of Class II Bikeway (Intermittent or 1 Side of Roadway) |
| 2.60 | Miles of Class III Bikeway with Pavement Markings |
| 298.21 | Miles of City Sidewalk |

## Level of Service

The City's Comprehensive Transportation Plan (CTP) establishes multimodal level of service standards for City streets, active transportation facilities, and access to transit service, and freight movement to provide guidance to evaluate the multimodal facilities, identify deficiencies, and prioritize projects to eventually reach a complete multimodal network that can support and promote mode shift, reducing the vehicle capacity demand on the roadways. The following policies relate to vehicle level of service which the City primarily utilizes to evaluate transportation system capacity. Other level of service standards are utilized for concurrency and planning but generally focus on the existing or absence of facilities and services and the quality of those facilities and services rather than their capacity.

- Policy TR6-1-1: The City adopts the following Vehicle Level of Service (LOS) Standards for the AM and PM peak periods per the Highway Capacity Manual:
    - Signalized: The LOS standard for signalized intersections is "D", with the following exceptions: for signalized intersections of two principal arterial roads the LOS standard is "E".
    - Stop Controlled: The LOS standard stop controlled intersections is "D".
    - Roundabout: The LOS standard for roundabout controlled intersections is "D" with a V/C ratio for each lane group of less than 0.90.
    - Queuing: The LOS standard for intersection queuing is the 95th percentile queue shall not extend across an adjacent driveway, alley, or street intersection, except if the driveway, alley, or street intersection is within the functional intersection boundary of the queue in which case the queue may extend to the limit of the functional intersection boundary. Additionally, queuing for a designated turn lane shall not exceed turn lane storage area and cause a blockage of through lane(s).

## Known Capacity Issues

The City utilizes the vehicle intersection delay level of service standard to evaluate general transportation system capacity for concurrency. Of the 157 intersections evaluated with the CTP, the following 11 (or 8%) were operating below the City's adopted level of service standard under existing conditions:

- Auburn Way North & 45th Street NE
- 116th Avenue SE & SE 304th Street
- 46th Place S/44th Avenue S & S 321st Street/51st Avenue S
- 51st Avenue S & 316th Avenue
- Henry Road NE/Pike Street NE & 8th Street NE
- C Street SW & 3rd Street NW
- M Street SE & Auburn Way South
- Auburn Way South & 17th Street SE
- A Street SE & 44th Street SE
- Lakeland Hills Way SE & Oravetz Road SE
- R Street SE & 33rd Street SE

Initial modeling of future conditions (2044) added another 10 intersections to the list of intersections that would be operating below the City's adopted level of service standard:

- Auburn Way N & 42nd Street NE
- I Street NE & 37th Street NE
- 30th Street NE & I Street NE
- 112th Avenue SE & SE 304th Street
- SE 304th Street & 118th Avenue SE
- 56th Avenue S & S 316th Avenue
- 15th Street NE & M Street NW
- A Street SE & 12th Street SE
- A Street SE & 21st Street SE
- A Street SE & Ellingson Road/41st Street SE

### Transportation Project List

The Comprehensive Transportation Plan (CTP) includes projects and programs to address the vehicle level of service issues at intersections identified in the existing and future conditions. Those projects include new traffic signals, new roundabouts, modified lane configurations, new roadways, and other measures intended to reduce intersection vehicle delays. The CTP also includes projects, programs, and other actions intended to address to address level of service issues related to active transportation (bicycle and pedestrian), transit, and freight movement. Please refer to the CTP for lists and summaries of the projects, programs, and actions.

## Public Utilities

The City of Auburn manages sanitary sewer, water, and storm drainage utilities as well as solid waste collection. The sanitary sewer and water utilities serve the City and several areas outside the City limits. The efficient provision of these services can play a significant role in managing the growth of the City as well as affecting the quality of life for residents of Auburn and the surrounding areas. Public utilities can serve the following goals:

- To protect the public health and safety by providing efficient and cost-effective water, sanitary sewer, storm drainage, and solid waste services to the community.
- Ensure that development will only occur if the urban services necessary to support such development will be available when it is developed.

## *Water*

The City provided water service to over 15,000 service connections as of 2024. The City's water sources include the Coal Creek Springs and West Hill Springs watersheds and are supplemented by a system of ten wells (6 active) and two connections to the regional water system operated by Tacoma Public Utilities. Storage facilities are found on the Enumclaw plateau, at Lakeland Hills, and at Lea Hill. For more background information, see the Comprehensive Water Plan.

### Facilities Inventory

- Approximately 306 miles of Water Main
- Over 15,000 Service Connections
- 8 Pump Stations
- 8 Reservoirs
- 1 Satellite Water System
- 6 Active Wells
- 2 Springs

### Levels of Service Standards

The System Policies included in Appendix A of the Comprehensive Water Plan and provide direction for City Staff in the management of the utility. The City of Auburn (City) manages the water utility in accordance with established water system policies that govern various facets of utility operations. City policies are established by the City to provide a vision or mission of the water utility and to provide a framework for the design, operation, and ongoing wellbeing of the City's water utility.

The policies included in Appendix A of the Comprehensive Water Plan are developed specifically for the City's multi-source municipal water system and seek to provide consistent treatment to all utility customers and to provide documentation to current water-system customers as well as those considering service from the City.

The City's Comprehensive Water Plan is based upon the following mission statement for the water utility:

"The City will provide for the efficient, environmentally sound and safe management of the existing and future water system within Auburn's service area."

The City's Water utility policies are grouped within goal statements that are headlined under the following categories:

- Business Practices
- Service Area
- Operations and Maintenance
- Financial
- Planning
- Environmental Stewardship
- Design and Construction

A few examples of policies related to level of service standards provided by the water system include:

- Policy 5.3 - System-Wide Reliability
  The City shall invest the resources necessary to construct, maintain, and renew water-system infrastructure and equipment to ensure that customers are provided consistent, reliable service in accordance with WAC 246-290-420 Reliability and Emergency Response. Wherever possible, the City should anticipate system interruptions and design and operate the system to minimize the impact of such interruptions to customers.

- Policy 5.8 - Water Supply Planning
  The City's objective is to ensure a continuous, safe water supply to meet firm customer demands. Provision of water service must be consistent with the goals, objectives, and policies of the City of Auburn Comprehensive Water Plan. Effects of past water conservation will be considered when projecting future water needs. Future water demands will be estimated using existing water usage patterns and projected future populations developed by the City's comprehensive Plan and consistent with the Puget Sound Regional Council data.

- Policy 5.10 - Service Pressure
  The City should provide potable water to customers in sufficient quantity to meet maximum day demands at a pressure that meets or exceeds all minimum applicable regulations, except during emergency conditions. Property owners may install private booster pumps to achieve higher pressures under supervision of the City and in accordance with WAC 246-290-230 Distribution Systems.

## Known Capacity Issues (based on Level of Service or other standards)

The preparation of the Comprehensive Water Plan included hydraulic modeling for existing and future conditions. Issues derived from the modeling with respect to pipeline improvements needed to meet fire flow conditions were ranked, with those locations ranked higher given more priority to be completed. The projects are anticipated to be completed under the Repair and Replacement program identified in Chapter 7 of the Comprehensive Water Plan. In addition, other known capacity issues with respect to water facilities and sources, include:

- Lea Hill Intertie Booster Pump Station - the Intertie Booster Pump Station (serves the Lea Hill 648 pressure zone) has a pumping capacity deficit, and the Pump Station lacks emergency power, impacting water supply during power outages.
- Lea Hill Service Area Storage - There is a reservoir/storage capacity shortage of 0.54 MG for the Lea Hill service area.
- Valley Service Area Storage - There is a reservoir/storage capacity shortage of 1.28 MG in the Valley service area.
- Wells 3A/3B - are offline due to high manganese levels.
- Wells 7 - is offline due to high manganese levels.
- Coal Creek Springs - is underutilizing its water right, leading to inefficiency.
- Well 5 - needs upgrades and property acquisition for expansion.
- Well 4 - requires facility and electrical improvements for efficient operation.
- Well 1 and Well 4 - Liquid chlorine degradation at the facilities affect water treatment during low winter demand periods.
- West Hill Springs - Aging chlorination building.
- Lea Hill Pump Station – pump station lacks redundancy.
- Game Farm Wilderness Park - pumps need replacement and building repairs.
- Reservoir 2 - Limited maintenance access to Reservoir 2 valves and lack of earthquake resiliency.
- Coal Creek Springs Transmission Main- 100+ year old pipe that needs to be replaced and is susceptible to leaks.
- West Hill Springs - Poor condition of existing cast iron transmission main.
- Howard Road Corrosion Control Treatment Facility (CCTF) - will exceed capacity after Coal Creek Springs Rehabilitation project completion.
- Howard Road Corrosion Control Treatment Facility (CCTF) - Existing liquid chlorine generating equipment reaching the end of its useful life at Fulmer CCTF.

## *Stormwater*

The System consists of a combination of open ditches, closed conveyance pipes, water quality facilities, and pump stations. For more details, see the Comprehensive Storm Drainage Plan.

### Facilities Inventory

- Over 240 miles of storm drainage pipe

- Over 40 miles of open channels and ditches
- Over 13,900 junction structures (catch basins, manholes)
- 167 detention ponds
- 7 pump stations.

### Levels of Service Standards

The System Policies included in Chapter 3 of the Comprehensive Storm Drainage Plan provide direction for City Staff in the management of the utility. The following policies are specifically related to designed capacity level of service provided by the sewer conveyance system:

- Policy 1.1 -The City shall seek to manage stormwater runoff within the public Right of Way (ROW):
    - to provide access to and functionality of critical services.
    - to preserve mobility on major transportation routes (i.e., arterial roads) and residential roads.
    - to protect real property structures (e.g., residences and businesses.)
- Policy 1.2 - The City shall seek to provide pump redundancy and backup power generators or dual power feeds at City- owned and -operated drainage pump stations.
- Policy 1.3 - The City shall routinely assess the performance of pumped systems with a focus on capacity and vulnerability. This review aims to ensure that these systems operate efficiently, meet their intended capacity, and remain resilient against potential risks.

### Known Capacity Issues

The preparation of the Comprehensive Storm Drainage Plan included hydraulic modeling focused on updating models within locations of proposed capital projects. In addition, existing drainage problems have been observed by the staff and are known to cause flooding of roadways at the following locations:

- Auburn Way South/ SR 18 Underpass - minor roadway flooding causes disruptions to traffic during periods of certain intense rainfall events.
- I St NE between 33rd St NE and 35th St NE – minor flooding has been observed when the Green River flows are high, and the gravity discharge is impacted.
- There are areas within the city not served by the public storm system, such as paved alleys or residential streets where minor flooding is observed.

### Future Plans

The 6-year capital improvements are discussed in detail in Chapter 7 and the implementation schedule presented in Chapter 8 of the Comprehensive Storm Drainage Plan.

## *Sewer*

The system is primarily a collection system with treatment provided by Metro. The system includes approximately 205 miles of sewers and force mains and 17 sewer pump stations. Significant portions of the City's service area are currently on septic systems, although plans for future expansion of sewer service into these areas is included in the Comprehensive Sewer Plan. For more details, see the Comprehensive Sewer Plan.

## Facilities Inventory

Sewer facilities in the City currently consist of:

- 205 miles of gravity sanitary sewer main
- 17 sewer pump stations
- 5 miles of force main associated with pump stations
- 3 siphons (1 single pipe, and one double pipe under the Green River
- 2,700 sewer service connections

## Level of Service Standards

The System Policies included in Chapter 2 of the Comprehensive Sewer Plan provide direction for City Staff in the management of the utility. The following policies are specifically related to designed capacity level of service provided by the sewer conveyance system:

Policy 3.3 - Require the transport of sewage by gravity whenever feasible in order to increase reliability, sustainability, and long-term cost effectiveness.

Policy 4.5 - Size the sewer collection system for peak wet weather flow rates that include I/I flows. Gravity sewers will be sized to convey the once-per-20-year peak hour flow without surcharging.

Policy 4.6 - Size pump stations and force mains for peak wet weather flow rates that include I/I flows. Pump stations will be sized to convey the once per 5-year flow with one pump out of service and convey the once per 20-year flow with all pumps in service.

## Known Capacity Issues

The preparation of the Comprehensive Sewer Plan included hydraulic modeling for three scenarios. The first used existing system wastewater flows and applied the expected additional flow during a design storm (with a 20-year recurrence). The second was to escalate wastewater base flows based on population and employment projections for the year 2044, and the last was to increase the intensity and duration of the design storm based on anticipated rainfall changes associated with climate change.

- The existing system is shown to have few deficient pipes, none of which cause overflows.
- For future scenarios (2044-both including and not including climate change effects) show the following deficiencies:

  - The Rainier Ridge Pump Station's capacity is anticipated to be under capacity; however, a project is currently underway to replace that station in 2025.
  - The Dogwood Pump Station is anticipated to be under capacity in 2044.
  - Approximately 4,000 feet of gravity sewer in Roegner Park is expected to be under capacity in 2044.
  - Individual pipe segments upstream of each of the Green River crossings are expected to be under capacity at various times throughout the 20-year planning period. The precise timing is dependent on the rate and distribution of population and employment growth.

### Future Plans

Conceptual plans for future sewer extensions and facilities are shown on Figure 5.5 of the Comprehensive Sewer Plan. Those extensions are to be funded by the property owners of the parcels served by them, so the timing of their construction is unknown. The Capital Improvement Plan is described in detail in Chapter 7 of the Comprehensive Sewer Plan. The Plan includes projects related to system capacity, repair and replacement, and system evaluation.

## *Solid Waste*

The City of Auburn contracts with Waste Management (WM) for collection of municipal garbage, recycling, and yard waste. Waste Management disposes of Auburn's garbage at a King County Solid Waste transfer station. Recycling is processed at WM's material recycling facility in Tacoma, WA. WM takes the yard and food waste to either DTG in Tacoma, WA or Cedar Grove in Maple Valley, WA to be converted into compost. There is a small area of Auburn that was recently annexed. This area is serviced by Republic Services. Republic Services takes the garbage to a King County Solid Waste transfer station, the recycling is processed at their material recycling center in Seattle, WA, and yard and food waste is taken to Cedar Grove in Maple Valley, WA.

## *Telecommunications*

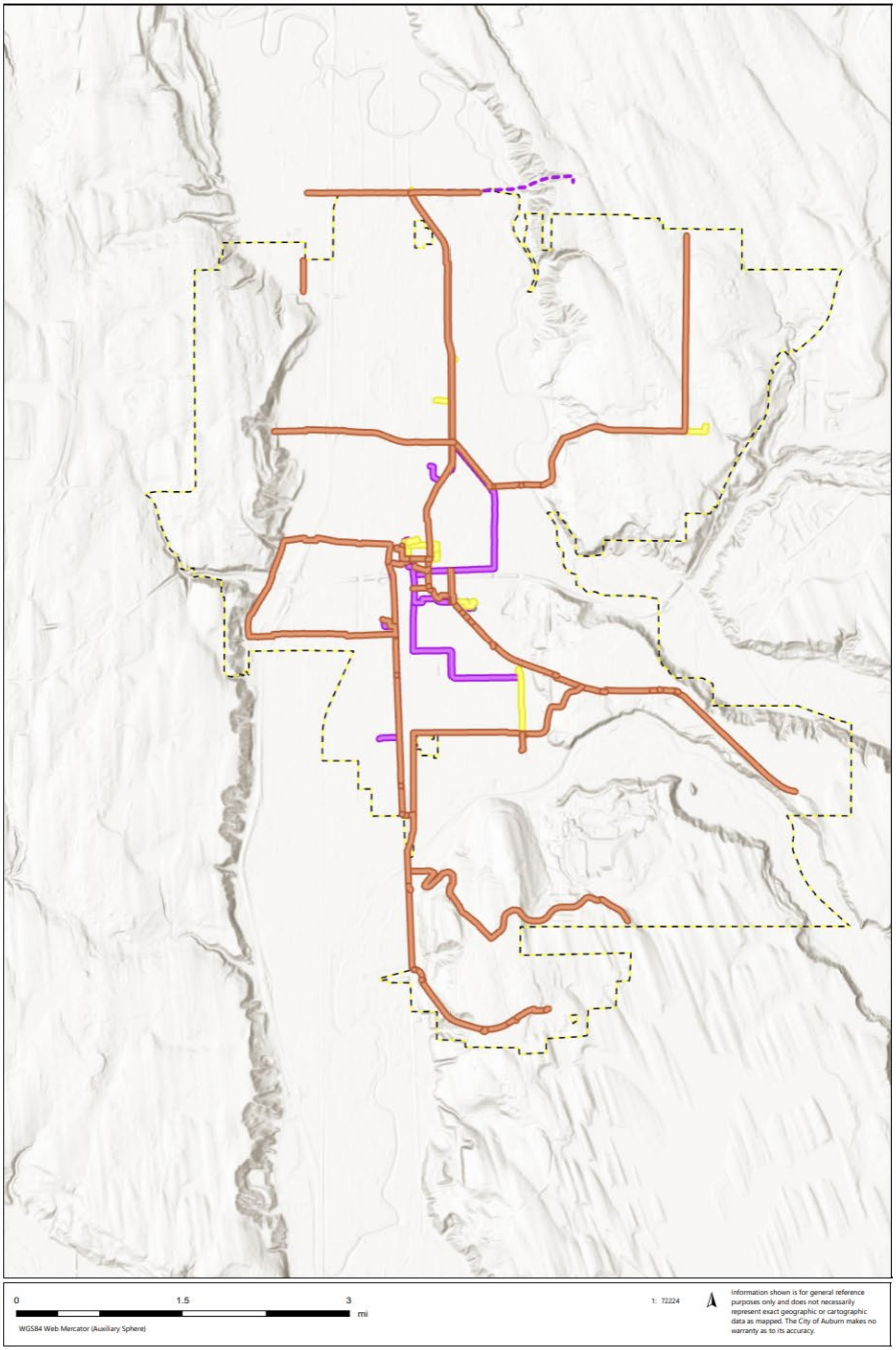
The City of Auburn owns and maintains a robust fiber optic Metropolitan Area Network (MAN) that connects most City owned facilities throughout the Auburn area. This infrastructure delivers secure, high-speed broadband capabilities essential for supporting various government functions, including public safety, public works, planning, permitting, and tourism.

Additionally, our fiber optic network enhances city operations by facilitating interconnections with regional partners and service providers such as City of

Algona, City of Pacific, King County, The Community Connectivity Consortium, University of Washington, Valley Communications and Microsoft.

## City of Auburn Owned Fiber

Printed On: 5/29/2024
Map created by City of Auburn eGIS



Information shown is for general reference purposes only and does not necessarily represent exact geographic or cartographic data as mapped. The City of Auburn makes no warranty as to its accuracy.

# Public Education Facilities

Auburn's residential areas are served by a combination of Auburn School District, Dieringer School District, Federal Way Public Schools, and Kent School District. Detailed inventories of school district capital facilities and levels-of-service are contained in the Capital Facilities Plan (CFP) of each school district. The CFPs of the four school districts serving Auburn residential areas and the associated school impact fees are adopted annually as part of the Annual Comprehensive Plan amendment process. Locations of schools and school districts within the City of Auburn which are illustrated in the map below.

## Future Plans

To accommodate projected growth, the school districts have noted the following projects in their 2023 Capital Facilities Plans:

Auburn School District

- Portable Relocation – Opens 2023-2024
- Middle School #5 – Opens 2027-2028

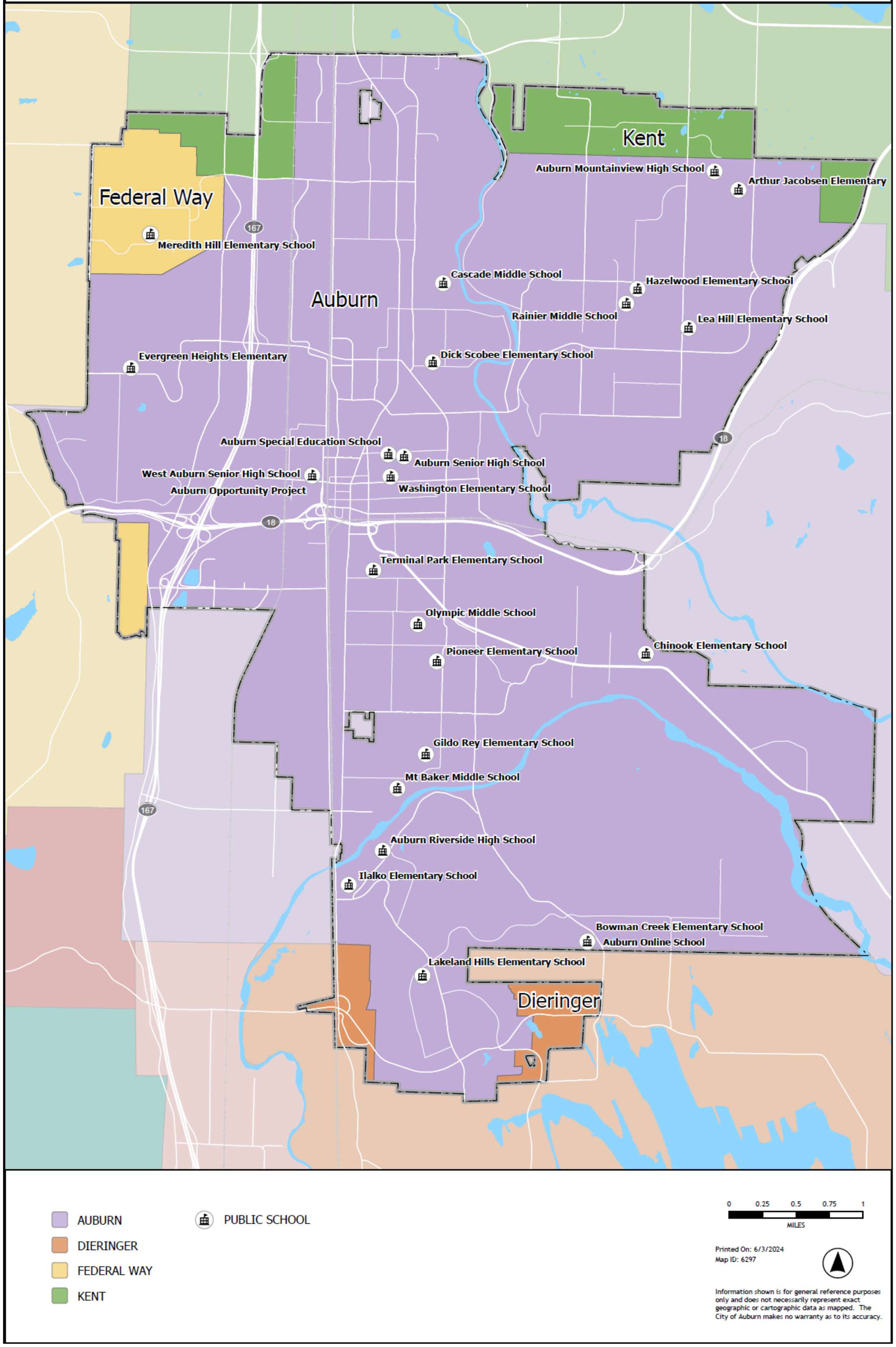
Dieringer School District

- Elementary School #3 – Opens 2027
- North Tapps Middle School Classroom Addition – Opens 2027

Federal Way Public Schools

- Illahee Middle School Modernization and Expansion – Opens 2024
- Former DeVry/ES 24 Site Acquisition – Opens 2028
- Portables Expansion – Through 2030

# City of Auburn School Districts



Printed On: 6/3/2024
Map ID: 6297

Information shown is for general reference purposes only and does not necessarily represent exact geographic or cartographic data as mapped. The City of Auburn makes no warranty as to its accuracy.

# Goals and Policies

## Goal # 1 - Keeping Pace with Growth

Ensure that new development does not outpace the City's ability to provide and maintain adequate public facilities and services, by allowing new development to occur only when and where adequate facilities exist or will be provided, and by encouraging development types and locations that can support the public services they require.

Policies:

CF-1. Lands designated for urban growth by this Plan shall have public facilities (streets, sewer, water, storm drainage, and parks) that meet City standards prior to or concurrent with development.

CF-2. Encourage development where new public facilities can be provided in an efficient manner.

CF-3. If adequate facilities are currently unavailable and public funds are not committed to provide such facilities, developers must provide such facilities at their own expense to develop their proposed projects.

CF-4. The City shall encourage and approve development only where adequate public services including police protection, fire and emergency medical services, education, parks and other recreational facilities, solid waste collection, drinking water, storm drainage, roadway and nonmotorized and other governmental services are available or will be made available at acceptable levels of service prior to project occupancy or use.

CF-5. Provide additional public facility capacity when existing facilities are used to their maximum level of efficiency (consistent with adopted standards for level of service).

CF-6. Encourage development where new public facilities can be provided in an efficient manner.

CF-7. Public facilities shall be provided in accord with the guidance of the Capital Facilities Plan or, as may be appropriate a system plan for each type of facility designed to serve at an adequate level of service the locations and intensities of uses specified in this Comprehensive Plan.

CF-8. New development shall not be approved that is not supported by a minimum of facilities to support the development and that does not provide for its proportionate share of related system needs.

CF-9. The city will perform its activities and make capital budget decisions in conformity with the comprehensive plan. The Land Use Element of the comprehensive plan shall be reassessed if probable funding falls short of meeting existing needs.

CF-10. Establish land use patterns that optimize the use of public facilities.

CF-11. Exempt the following from the concurrency management program:

- Development vested by RCW 19.27.095, 58.17.033 or 58.17.170.
- Development that creates no added impact on public facilities.
- Expansions of existing development that were disclosed and tested for concurrency as part of the original application.

## Goal # 2 – Public Facilities and Funding

Provide needed public facilities that are within the ability of the City to fund or within the City's authority to require others to provide.

Policies:

CF-12. Establish level of service standards that are achievable with the financing plan of this Capital Facilities Plan.

CF-13. Base the financing plan for public facilities on realistic estimates of current local revenues and external revenues that are reasonably anticipated to be received by the City.

CF-14. Match revenue sources to capital projects based on sound fiscal policies.

- The City shall continue to fund utility costs through utility enterprise funds, based on user fees and grants. Public facilities included in utilities are sewer, solid waste, storm drainage, and water.
- Where feasible pursue joint venture facility construction, construction timing, and other facility coordination measures for City provided facilities, as well as with school districts and other potential partners in developing public facilities.
- The City shall continue to assist through direct participation, LIDs and payback agreements, where appropriate and financially feasible. Where funding is available, the City may participate in developer-initiated facility extensions or improvements, but only to the extent that the improvements benefit the broader public interest and are consistent with the policies of this Capital Facilities Plan.

CF-15. If the projected funding is inadequate to finance needed public facilities and utilities based on adopted level of service standards and forecasted growth, the City will do one or more of the following to achieve a balance between available revenue and needed public facilities:

- Lower the level of service standards;
- Increase the amount of revenue from existing sources;
- Adopt new sources of revenue;

- Require developers to provide such facilities at their own expense; and/or
- Amend the Land Use Element to reduce the need for additional public facilities.

CF-16. Both existing and future development will pay for the costs of needed capital improvements.

- Ensure that existing development pays for capital improvements that reduce or eliminate existing deficiencies and pays for some or all of the cost to replace obsolete or worn-out facilities. Existing development may also pay a portion of the cost of capital improvements needed by future development. Existing development's payments may take the form of user fees, charges for services, special assessments, and taxes.
- Ensure that future development pays a proportionate share of the cost of new facilities that it requires. Future development may also pay a portion of the cost to replace obsolete or worn-out facilities. Future development's payments may take the form of voluntary contributions for the benefit of any public facility, impact fees, mitigation payments, capacity fees, dedications of land, provision of public facilities, and future payments of user's fees, charges for services, special assessments, and taxes.

CF-17. The City will determine the priority of public facility capital improvements using the following criteria as general guidelines. Any revenue source that cannot be used for the highest priority will be used beginning with the highest priority for which the revenue can legally be expended.

- Projects that eliminate hazardous conditions.
- Refurbishment of existing facilities that contribute to achieving or maintaining standards for adopted level of service.
- New or expanded facilities that reduce or eliminate deficiencies in level of service for existing demand.
- New or expanded facilities that provide the adopted level of service for new development and redevelopment during the next six fiscal years.
- Capital improvements that significantly reduce the operating cost of providing a service or facility, or otherwise mitigate impacts of public facilities on future operating budgets.
- Capital improvements that contribute to stabilizing and developing the economy of the City.
- Project priorities may also involve additional criteria that are unique to each type of public facility, as described in other elements of this Comprehensive Plan.

CF-18. Ensure that the ongoing operating and maintenance costs of a capital facility are financially feasible prior to constructing the facility.

## Goal # 3 – Public and Environmental Health

Protect public health, environmental quality, and neighborhood stability and viability through the appropriate design and installation of public facilities.

Policies:

CF-19. Promote conservation of energy, water and other natural resources in the location and design of public facilities.

CF-20. Require the separation of sanitary and storm sewer facilities wherever combined sewers may be discovered.

CF-21. Practice efficient and environmentally responsible maintenance and operating procedures.

CF-22. The siting, design, construction and improvement of all public buildings shall be done in full compliance with the Americans with Disabilities Act (ADA).

CF-23. Promote economic and community stability and growth through strategic investments in public facilities and public/private partnerships.

## Goal # 4 – Community Benefits of Public Facilities

Provide public facilities that provide a sense of community that is inclusive of diverse populations.

Policies:

CF-24. Contribute to community pride and foster a sense of community through provision of public facilities that create a community-gathering place for neighbors, family and friends.

CF-25. Through provision of public facilities, offer a broad range of activities promoting social interactions especially with new residents.

CF-26. Provide maximum flexibility and multiple uses through design of public facilities that are adaptable to changing interests.

CF-27. Provide a community center facility that is financially feasible, affordable for participants, and can generate revenue to offset a portion of the operating costs.

## Goal # 5 – Consistency with Other Adopted Plans

Make the Capital Facilities Plan consistent with other elements of the comprehensive plan, and with other city, county, regional and state adopted plans.

Policies:

CF-28. Ensure that the growth and development assumptions used in the Capital Facilities Plan are consistent with similar assumptions in other elements of the comprehensive plan.

CF-29. Coordinate with non-city providers of public facilities on a joint program for maintaining applicable level of service standards, concurrency requirements, funding, and construction of public facilities.

## Goal # 6 - Solid Waste

To provide area residents and businesses with a universal and compulsory system for collection and disposal of all solid waste, including ample waste reduction and recycling opportunities intended to maximize diversion of the City's waste stream away from costly landfills, incineration, or other solid waste disposal facilities, and to conserve exhaustible resources.

Policies:

CF-30. The King County Solid Waste Management Plan and Solid Waste Interlocal Forum, except as modified by City of Auburn Ordinance No. 4413 and this Plan shall form the basis for solid waste management activities within the City.

CF-31. The City shall continue to fund solid waste collection, disposal and waste reduction and recycling programs and services through the existing solid waste utility, with supplemental funding provided through available grants.

CF-32. The City shall implement solid waste management programs and services that provide ample opportunities and incentives to maximize the community's participation in local and regional waste reduction and recycling efforts.

CF-33. The City's solid waste management programs shall be developed to make waste reduction and recycling efficient, reliable, cost-effective, and convenient for all residents and businesses.

CF-34. The City encourages and should promote the use of products manufactured from recycled materials, and the use of materials that can be recycled. City Departments and contractors shall use recycled and recyclable products whenever and wherever feasible.

CF-35. The City shall implement solid waste reduction and recycling programs that have the cumulative effect maintaining the 50 percent waste reduction and recycling goal (recycling tons/total solid waste stream).

CF-36. The City shall periodically monitor and evaluate the effectiveness of Auburn's waste reduction and recycling programs to ensure that local and state goals and policies are being met.

CF-37. The City shall promote the recycling of solid waste materials by providing opportunities for convenient recycling and by developing educational materials on recycling, composting and other waste reduction methods.

## Goal #7 - Public and Institutional Buildings

To site public and institutional buildings in accord with their service function and the needs of the members of the public served by the facility.

Policies:

CF-38. All "people-oriented" City facilities should be located near high-amenity sites. Les Grove Park and downtown are particularly appropriate sites for senior services, community centers, libraries, museums, etc.

CF-39. City park buildings should be developed in accordance with the Parks, Recreation, and Open Space Element.

CF-40. Public and institutional facilities should incorporate practices that reduce energy consumption, reduce the emission of greenhouse gases, conserve water, provide electric vehicle infrastructure, and preserve native vegetation.

CF-41. Public and institutional facilities that attract a large number of visitors (City Hall, museums, libraries, educational facilities, permit and license offices, health and similar facilities, etc.) should be sited in areas that are accessible (within 1/4 mile) by transit.

CF-42. The City shall encourage other agencies to follow these siting principles in considering new sites for public buildings.

CF-43. The location of religious institutions, private schools, community centers, parks and similar public or institutional facilities shall be related to the size of the facility and the area served. Citywide facilities should be sited in visible and accessible locations.

CF-44. Small public or institutional facilities intended to serve one or two residential neighborhoods may be located within a neighborhood. Larger public or institutional facilities intended to serve mainly Auburn residents or businesses shall be located along major arterial roads within the community-serving area of Auburn; however, elementary schools should be given flexibility to locate along smaller roads. Buffering from adjacent land uses may be required.

CF-45. The location of utility facilities is often dependent upon the physical requirements of the utility system. Sewage lift stations, pump stations, water reservoirs, and other similar facilities should be sited, designed, and buffered (through extensive screening and/or landscaping) to fit in harmoniously with their surroundings. When sited within or adjacent to residential areas, special attention should be given to minimizing noise, light, and glare impacts.

CF-46. Public facilities of an industrial or heavy commercial character should be confined to the region-serving area of Auburn, unless no other reasonable siting opportunity exists, in which case siting still must comply with applicable zoning standards. Examples of such facilities are the City maintenance and operations facility, state and regional solid waste facilities, and the Auburn School District bus barn.

CF-47. The siting and relocation of City maintenance and operation facilities shall be responsive to growing demands for utility, transportation, and fleet services, and shall also account for the City's role in emergency preparedness and response.

## Goals # 8 - Essential Public Facilities

The Growth Management Act requires that a local comprehensive plan include a process for siting essential public facilities.  This section contains Auburn's process for siting essential public facilities.

Policies:

CF-48. The City will review proposals through the process outlined in Policies 3 through 8 below, if the essential public facility largely serves a regional, countywide, statewide, or national need, and is included in a policy sense within an adopted state or regional plan that meets both of the following criteria:

> a. The state or regional plan was developed through an appropriate public process (including at least one local public hearing) and has undergone a NEPA and/or SEPA review.
>
> b. A clear policy statement supporting the type of facility proposed must be included. The plan should also include, in a policy sense, a set of siting guidelines to be used for such a facility. Such criteria may include but are not limited to the type and sufficiency of transportation access, colocation requirements, preferred adjacent land uses, on- or off-site security and/or mitigation, and required public facilities and services.

CF-49. If the essential public facility largely serves a regional, countywide, statewide or national need and is not part of an adopted state or regional plan, the proponent will be required to request that the appropriate state or regional plan be amended to include the proposal meeting the criteria contained in Policy CF-1 above. The proposal will also be reviewed following the process outlined in Policies CF-3 through CF-4.

CF-50. Essential Public Facilities of a regional, countywide, statewide, or national nature:

a. Essential public facilities of a regional, countywide, statewide or national nature will be reviewed by the City through the special area plan process. The boundaries of the special area plan will be set at a scale directly related to the size and magnitude of the proposal. For facilities of regional, state, and national need, an alternative analysis will be performed, but will not be limited to, the guidelines described in Policy CF-1 above. Auburn staff shall participate in the review process outlined in Policy 1 above, and use the data, analysis, and environmental documents prepared in that process to aid the City's special area plan review, if Auburn determines that those documents are adequate. If the facility requires other development permits, those approvals also shall be considered within the review process.

b. Impacts of the proposed essential public facility must be identified and an appropriate mitigation plan developed. Unless otherwise governed by state law, the financing strategy for the mitigation plan shall be structured so that the costs of the plan shall be allocated proportionally on a benefit basis using nonlocal sources of funding, although local sources of funding may also be used.

c. The special area plan process to be used for essential public facilities of a regional, countywide, statewide, or national nature shall follow the City's Comprehensive Plan amendment process that includes multiple opportunities for public involvement.

d. An analysis of the facility's impact on City finances shall be undertaken. If the study shows that locating a facility in a community would result in a disproportionate financial burden on the City of Auburn, an agreement with the project's proponents must be executed to mitigate the adverse financial impact or the approval shall be denied.

CF-51. Essential Public Facilities of a primarily local nature:

If the essential public facility meets largely local needs (for example, in-patient facilities, including substance abuse facilities, mental health facilities and group homes), the facility shall be considered based upon Policy CF-52 below.

CF-52. All Essential Public Facilities:

a. The following criteria shall be used to evaluate all applications to site essential public facilities:

1) Whether there is a public need for the facility.

2) The impact of the facility on the surrounding uses and environment, the City and the region.

3) Whether the design of the facility or the operation of the facility can be conditioned, or the impacts mitigated, in a manner similar to those used

in traditional private development, in order to make the facility compatible with the affected area and the environment.

4) Whether a package of mitigating measures can be developed that would make siting the facility within the community more acceptable.

5)Whether the factors that make the facility difficult to site can be modified to increase the range of available sites or to minimize impacts on affected areas and the environment.

6) Whether the proposed essential public facility is consistent with the Auburn Comprehensive Plan.

7) Essential public facilities shall comply with any applicable state siting and permitting requirements (e.g., hazardous waste facilities).

8) Whether the State proves by clear, cogent, and convincing evidence that (1) a sufficient and reasonable number of alternative sites have been fully, fairly, and competently considered, and (2) such sites were found to be unsuitable for an SCTF for reasons other than the cost of property.

9) Whether careful analysis has been completed to show that siting of the facility will have no undue impact on any one racial, cultural, or socioeconomic group, and that there will not be a resulting concentration of similar facilities in a particular neighborhood, community, jurisdiction, or region.

CF-53. The Planning Director or designee shall determine whether a development application will result in a significant change of use or a significant change in the intensity of use of an existing essential public facility. If the Planning Director or designee determines that the proposed changes are significant, the proposal will be subject to the essential public facility siting process as defined in Goal #4, Policy CF-10. If the Planning Director or designee determines that the proposed changes are insignificant, the application shall be reviewed through the City’s standard development review procedures. The Planning Director or designee's determination shall be based upon:

a. The proposal’s impacts on the surrounding area.

b. The likelihood that there will be future additions, expansions, or further activity related to or connected with the proposal.

CF-54. One of the difficulties of siting essential public facilities is that they are allowed in some but not all appropriate areas. To help address this problem, Auburn shall allow essential public facilities in all zones where they would be compatible. The types of facilities that are compatible will vary with the impacts likely from the facility and the zoning district. In the M-2 Zoning District, many essential public facilities will be compatible uses and broad use categories allowing such uses should be included in the zone.

CF-55. Essential public facilities shall be allowed in those zoning districts in which they would be compatible, and impacts can be mitigated. In situations where specific development standards cannot be met, but it is determined that the facility can be made compatible, the City Council can waive those specific standards with the requirement that appropriate mitigation is provided. The M-2 Zoning District should include broad use categories that allow all essential public facilities that are difficult to site as permitted or conditional uses as appropriate.

CF-56. Essential public facilities should be equitably located throughout the City, county and state. No jurisdiction should absorb a disproportionate share.

CF-57. Essential public facilities of a regional, countywide, statewide, or national nature should be restricted to the region-serving area of Auburn. Such facilities should be located in relationship to transportation facilities in a manner appropriate to their transportation needs. Extensive buffering from adjacent uses may be required. Facilities that generate a significant amount of truck traffic should be located such that they are served by existing truck routes or mitigation provided to address impacts on the street network.

## AGENDA BILL APPROVAL FORM

| | | |
|---|---|---|
| **Agenda Subject:**<br>Comprehensive Plan DEIS (Steiner) | | **Date:**<br>June 11, 2024 |
| **Department:**<br>Community Development | **Attachments:**<br>**No Attachments Available** | **Budget Impact:**<br>Current Budget: $0<br>Proposed Revision: $0<br>Revised Budget: $0 |

**Administrative Recommendation:**

**Background for Motion:**

**Background Summary:**

**Reviewed by Council Committees:**

| | | | |
|---|---|---|---|
| **Councilmember:** | | **Staff:** | Steiner |
| **Meeting Date:** | June 18, 2024 | Item Number: | |