



CITY OF TUKWILA

SURFACE WATER COMPREHENSIVE PLAN

2024 UPDATE



Adopted

City of Tukwila Surface Water Comprehensive Plan

2024 Update

Prepared for

City of Tukwila, Washington

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Acronyms and Abbreviations

6PPD	N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine
6PPD-q	6PPD-quinone
B-IBI	Benthic Index of Biotic Integrity
BMP	Best Management Practice
CBD	Southeast Central Business District
CBP3	Community-Based Public-Private Partnerships
CCTV	Closed Circuit Television
CTP	Cooperative Technical Partners
Ecology	Washington State Department of Ecology
EMP	Enhanced Maintenance Plan
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HAHD	Howard A. Hanson Dam
ILA	Interlocal Agreement
KCFCD	King County Flood Control District
LF	linear feet
LID	Low Impact Development
mg/L	milligrams per liter
MS4	Municipal Separate Storm Sewer System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPDES Phase II Permit	NPDES Phase II Municipal Stormwater Permit
O&M	Operations and maintenance
PEIS	Programmatic Environmental Impact Statement
ROW	right-of-way
SEPA	State Environmental Policy Act
SMAP	Stormwater Management Action Plan
STORM	Stormwater Outreach for Regional Municipalities
SWCP	Surface Water Comprehensive Plan
TMDL	total maximum daily load
TSS	total suspended solids
TUC	Tukwila Urban Center
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area
WSDOT	State of Washington Department of Transportation

The City of Tukwila acknowledges the land and water addressed in this 2024 Surface Water Comprehensive Plan is the ancestral lands and water of the Coast Salish people of past and present who have been living and working here since time immemorial. The City recognizes and honors with gratitude their elders past and present. This acknowledgement does not take the place of authentic relationships with tribal communities but serves as a first step in honoring the land we are on and the people and the cultures it has nurtured.

Executive Summary

This 2024 Surface Water Comprehensive Plan (SWCP) is an update to the SWCP prepared in 2013. The purpose of this Surface Water Comprehensive Plan is to provide a strategic framework for the management of surface water within the City of Tukwila. The 2024 SWCP strives to have a multi-benefit approach to surface water management by:

- Protecting the public's health and safety
- Protecting public property, private property, and roads from localized flooding from stormwater drainage
- Conserving and enhancing the natural aquatic systems within the City
- Restoring salmon habitat and improving access to salmon habitat
- Coordinating with Tribes within whose ancestral lands the City of Tukwila is located
- Aligning with regional surface water plans and projects
- Having a clear understanding of the existing stormwater system
- Maintaining compliance with local, state, and federal regulations related to surface water

The recommendations outlined in the 2024 SWCP consist of programmatic solutions and policies, studies, and capital projects. Not all capital improvement projects (CIPs) are recommended for implementation in this surface water planning window, due to funding availability. The tables below outline the recommendations by priority.

Table E-1
High Priority Capital and Programmatic Recommendations

Recommendation	Reason	Implementation
In-progress Surface Water CIPs identified in the City's 2023-2028 Capital Improvement Program	Ongoing	Prior years – 2025 or beyond
Programmatic changes pursuant to 2024-2029 NPDES Phase II permit requirements - TBD	Maintain regulatory compliance	2025-2029
CIP-1 Norfolk Outfall Trunkline Sewer Separation Preliminary Feasibility Study	Reduce potential City liability for combined sewer overflows and responsibility for Superfund site cleanup	2025

Table E-1
High Priority Capital and Programmatic Recommendations

Recommendation	Reason	Implementation
CIP 91241202 Stormwater Outfalls Water Quality Retrofit Program	Grant award received; meets regional priorities for reducing harmful effects of urban runoff on water bodies; completes programmatic CIP begun in 2017	2024
CIP 99441202 Soil Reclamation Facility / Enhanced Maintenance Program and Decant Facility Design – Part 1	Grant award received; supports NPDES Phase II permit requirements; meets regional priorities for reducing harmful effects of urban runoff	2024-2025
Stormwater Management Action Program (SMAP) CIPs	Meets expected requirement of 2024-2029 NPDES Phase II permit; meets regional priorities for reducing harmful effects of urban runoff on water bodies; eligible for grant funding	Begin 2025, then ongoing every 2-3 years
WSDOT Retrofit Program	Required in order to charge surface water management fee to WSDOT; meets regional priorities for reducing harmful effects of urban runoff on water bodies; funded by WSDOT	2024 and annually
CIP-102 Middle Fork Southgate Creek – Stream and Slope Stability Study	Stream condition severely degraded and private property at risk. Coordinates with ongoing Southgate Hydraulic Study encompassing Normed Facility and could make use of findings from City's successful FEMA-funded landslide study.	2026
CIP-3 Fort Dent Park Water Quality Retrofit, Alternative 1	Meets regional priorities for reducing harmful effects of urban runoff on water bodies; low-cost alternative that can be implemented by City crews.	2027
CIP-2 S Ryan Way Pipe Rehabilitation	Collaboration with City Transportation Department; preventive repair and replacement; reduce sheet flow on steep high-traffic roadway	Coordinate timing with City Transportation Department
MS4 mapping and documentation programmatic recommendations	City risks permit non-compliance. Barriers to information sharing hinders stormwater planning, regulatory review of development and construction, inspection and enforcement, and capital project development.	2025-2029

Table E-1
High Priority Capital and Programmatic Recommendations

Recommendation	Reason	Implementation
Apply for grant funding for eligible phases of programmatic water quality CIPs and medium priority projects identified below	Allows City to continue to fund higher levels of capital investments without impacting surface water utility rates	2024-2034
Ecosystem Services Conservation Program	Reduces disparities in access to healthy environments, improves interdepartmental coordination in working on regional priorities such as reducing harmful effects of urban runoff, increasing access to fish habitat, and increasing quality of fish habitat	Begin 2025
Regulatory and Policy change - omit the current regulatory enforcement procedure which permits temporary gravel parking lots to be constructed without stormwater drainage and runoff treatment facilities and then effectively to become permanent untreated impervious surfaces.	City risks permit non-compliance. Strategically time interdepartmental negotiations and policy-setting with reissuance of NPDES Phase II permit in 2024.	2025
CIP-104 Tukwila Master Plan for the Lower Green River Levee Projects	Flood protection projects sponsored by KCFCD and federal partners are imminent. City will need to begin master planning immediately in order to guide aesthetic and community considerations of these projects.	Begin 2025

Table E-2
Medium Priority Capital and Programmatic Recommendations

Recommendation	Reason	Implementation
CIP 98641222 S 143rd St Storm Drain System	Longstanding drainage / flooding issue which may be eligible for grant funding from KCFCD	2027
CIP 99441202 Soil Reclamation Facility / Enhanced Maintenance Program and Decant Facility Design – Part 2	Increase efficiency and effectiveness of operations and maintenance program	2026

Table E-2
Medium Priority Capital and Programmatic Recommendations

Recommendation	Reason	Implementation
CIP 98741202 Nelson/Longacres – Phase II	Longstanding drainage / flooding issue which requires coordination with railroad and may be eligible for grant funding from KCFCD	2028
CIP-6 Johnson Creek Fish Barrier Mitigation Alternatives Analysis	Meets regional priorities to increase access to fish habitat; ensures balanced portfolio of CIP projects by including fish barrier removals at regular intervals	2026
CIP-90341214 S 146th St and 35th Ave S Drainage	Longstanding drainage / flooding issue which may be eligible for grant funding from KCFCD	2029

The 2024 SWCP provides a strategic framework for the management of surface water within the City of Tukwila. It is an ambitious proposal for tackling drainage issues, water quality issues, erosion/sedimentation issues, habitat loss, and maintenance and condition of the stormwater system. The 2024 SWCP recognizes that City of Tukwila can be a key partner with state agencies, King County, Tribes, and organizations in reaching toward regional priorities to protect and restore the region's cherished natural resources.

The City of Tukwila Public Works Department asserts that the 2024 Surface Water Comprehensive Plan would not have significant adverse impacts on the environment. The attached SEPA Environmental Checklist provides more information related to this 2024 Surface Water Comprehensive Plan.

1.0 Introduction

The City of Tukwila's Surface Water Management Program in the Public Works Department serves Tukwila rate payers in managing storm water and protecting surface waters that are important for fish and wildlife and for people as recreational amenities for boating, fishing, and enjoyment. The Surface Water Management Program plans and implements projects that manage flood hazards, improve water quality, restore habitat, and often serve as public amenities. These multi-beneficial projects are capable of garnering broad support from granting agencies, working in tandem to support Tribal treaty rights, Federal Clean Water Act and Endangered Species Act requirements, while addressing a variety of City Comprehensive Plan goals and regional goals. Tukwila is an integral member of WRIA 9, a keystone city where salt water of Elliott Bay and fresh water from the Green and Black Rivers mix in the transition zone of the Duwamish River. Water quality impairments and loss of aquatic and riparian habitat due to flood control projects and land development have degraded the Green/Duwamish River and threaten the existence of Chinook salmon, steelhead, and the iconic Southern Resident Killer Whales (Orca) that depend on Chinook salmon for food. The Surface Water Management Program works in partnership with Water Resource Inventory Area 9 (WRIA 9), the King County Flood Control District, Our Green-Duwamish Partnership, non-governmental organizations, and others to create a resilient, equitable and sustainable future centered around a vision of a community connected to its river.

Section 1.0 Introduction introduces the topics and concepts that will be explored in further detail in the plan within the following sections.

Section 2.0 Drainage Basin and Watershed Characteristics summarizes the existing conditions of the waters and watersheds within the City, and how their conditions have been influenced by local and regional changes to rivers and streams, vegetation cover, and land cover.

Section 3.0 Regulations and City Policies summarizes the surface water regulations from federal and state agencies which guide the City's surface water compliance activities, and it introduces the City policies pertinent to regulating surface water.

Section 4.0 Coordination with Regional Plans describes regional efforts and plans to address widespread and systemic problems such as salmon recovery, Puget Sound recovery, flood protection, and watershed protection which are supported by the City.

Section 5.0 Surface Water Known Issues and Solutions identifies the numerous specific drainage, erosion, water quality, and habitat issues within the city limits and presents a menu of solutions to address the types of problems identified. The section also prioritizes the issues and solutions.

Section 6.0 Capital Improvement Projects and Studies describes the projects and studies selected to solve the priority issues identified in Section 5.0.

Section 7.0 Operations and Maintenance was not updated for the 2024 Surface Water Comprehensive Plan and will likely be reinstated in the next 10-year update.

Section 8.0 Recommendations proposes an implementation plan which discusses funding, partnerships, and priorities.

1.1 Background

The purpose of this Surface Water Comprehensive Plan is to provide a strategic framework for the management of surface water within the City of Tukwila. It further serves as a guidebook for City staff to define and build upon for capital projects, work programs, and strategies for meeting existing and future surface water management needs. The 2024 Surface Water Comprehensive Plan (2024 SWCP) is intended to be a flexible document that may be revised should priorities or regulatory requirements change. It can also serve as a reference for City departments whose activities may impact surface water drainage, water quality, or aquatic habitat.

This 2024 SWCP is an update to the Surface Water Comprehensive Plan prepared in 2013 (CH2MHILL, 2013). Previous surface water plans were prepared in 2003 and 1993. The 2024 SWCP addresses changes that have taken place since 2013, including addition of new positions, stormwater planning, emerging pollutants, changing regulatory requirements, and strengthening partnerships to address regional goals. See Section 3.0 for more information on the changing regulations and Section 4.0 for more about regional partnerships. The 2024 SWCP also reflects the surface water capital and non-structural investments that the City of Tukwila has made since the 2013 Surface Water Comprehensive Plan, including addressing priority drainage, water quality, and aquatic habitat issues identified in that plan.

The City has made significant progress since the 2013 Surface Water Comprehensive Plan was drafted. Tukwila completed numerous projects identified in that plan, some projects are in progress in 2024, and some projects were identified subsequent to that plan and have been started or completed.

The following are completed or resolved projects that were identified in previous surface water plans:

- East Marginal Way S Stormwater Outfall and Conveyance Inspection (91041204)
- 53rd Ave S Storm Drain System (90341213)
- Gilliam Creek 42nd Ave S Culvert (99341208)
- Christensen Rd Pipe Replacement (98941202)
- Storm Lift Station No. 15 Improvements (91041203)
- Foster Golf Course Riverbank (90330106)
- Riverton Creek Flapgate Removal (99830103)
- Duwamish Gardens (90630102)
- Minkler Boulevard Culvert Replacement (90341208)
    - Note: This project was intended to address local flooding. It was not completed because a redevelopment project upstream resolved the issue.

The following projects identified in previous planning documents are now in-process:

- Gilliam Creek Fish Barrier Removal (99830105)
- Lower Gilliam Creek Channel Improvements (90330116)
- Nelsen Side Channel Habitat Assessment (90330104)
- Duwamish Riverbank Stabilization 1B at S 104th St (99441205)
- Duwamish Riverbank Stabilization II near S 115th St (99441209)
- Northwest Gilliam Storm Drainage System (90341206)
    - Note: A portion of this project has been completed. The remaining portion is on the 2024 Small Drainage Project List.
- Water Quality Retrofit Program (91241201)
    - Note: One of three identified project locations, S 122nd St, is not complete.

The following projects and changes to the Surface Water Management Program were identified or implemented following the completion of the 2013 Surface Water Comprehensive Plan as priorities and regulations changed and opportunities arose:

- The Surface Water Management Program added staff to support regulatory compliance and expanding program goals:
    - In accordance with the 2013 recommendation, the City added a Habitat Project Manager position to the Surface Water Management Program in 2015

to manage time-sensitive and critical habitat restoration projects. The position has been reclassified to a Surface Water Project Manager, which allows the position to manage a range of multi-beneficial projects.

  - The City added a Levee Project Manager position to the Surface Water Management Program in 2021 to manage and facilitate levee projects in partnership with the King County Flood Control District and the U.S. Army Corps of Engineers. The position also manages the effort to get the Tukwila 205 levee certified and ultimately accredited by the Federal Emergency Management Agency (FEMA) and oversees the City's Floodplain Permit requirements for development.
  - In 2022, the City expanded the Surface Water Management Program workload by adding business source control inspections and fats-oils-grease (FOG) compliance inspections. As a result, a second inspector was added to the Surface Water Management Program. The positions are classified Environmental Compliance Inspector to reflect the broader scope of work.

- Completed the Stormwater Management Action Plan (SMAP) for Riverton Creek (see Appendix F).
- Completed Stormwater Outfall Water Quality Retrofit Project Design Report (for four projects in the Green/Duwamish Basin).
  - Stormwater Outfalls Water Quality Retrofit Project (for four projects along the Green/Duwamish River). Two sites along Tukwila International Boulevard and Interurban Avenue South are under construction as of the writing of this plan.
- Ongoing programmatic changes as a result of reissuance of the National Pollutant Discharge Elimination System Phase II Permit (NPDES Phase II Permit) in 2019.
- Began a sediment transport and flooding study along the main stem of Southgate Creek.
- Obtained a grant to begin a City-wide Landslide Study with a grant from FEMA.
- Created the "Green the Green" Program to fund shoreline revegetation projects on public lands and through public-private partnerships. The City is in the maintenance phase of two installed projects at NC Machinery and the Southcenter Office Park and is working with MidSound Fisheries on a shoreline revegetation and depaving project on West Valley Highway.
- Identified and began the S 131st Pl Drainage Improvements project (91641204).

- Identified the need for improving the surface water inventory and committed funding for it (90241201 and 80241201).
- Started the Chinook Wind Trail Project and completed Chinook Wind Public Access Project to connect the Chinook Wind Mitigation Site (by King County's Mitigation Reserve Program) to the Duwamish Gardens, which began as a Surface Water Management Program habitat restoration initiative in 2015.

1.2 Plan Objective

As documented within this 2024 SWCP and in numerous regional studies and plans, Puget Sound, the Green River, the Duwamish River, and local streams have been extensively impacted by various and interrelated human alterations of the water bodies and lands that drain to them. Impacts include, but are not limited to, direct loss of habitat for salmon due to construction of levees and bank armoring, reduction of fish access to portions of the water bodies due to construction of impoundments such as dams and floodgates, introduction of pollutants that kill or damage fish and other aquatic life from agriculture, industry, and urban stormwater runoff, and loss of vegetation which absorbs and evaporates rain and shades streams and rivers to provide cool temperatures needed by many native aquatic species and salmon. The overarching goal of the 2024 SWCP is to advocate for Tukwila's strong participation with county, state, and federal partners to address regional surface water goals while providing high quality stormwater drainage and water quality service to the citizens of Tukwila.

In service of the overarching goal, the objectives of this 2024 SWCP include providing a surface water management framework that will protect the public's health and safety, protect both public and private property, conserve and enhance the natural aquatic systems within the City, participate in regional restoration of salmon habitat, coordinate with regional surface water plans and projects, have a clear understanding of the existing stormwater system, and maintain compliance with local, state, and federal regulations related to surface water. This Plan is also intended to support Tukwila's elected officials in advocating for the City's identified priorities and needs in a regional setting.

The 2024 SWCP strives to have a multi-benefit approach to surface water management. As a result, where possible, the projects and programs identified serve multiple purposes, including, but not limited to, water quality improvement, flood risk reduction, habitat restoration, community amenities, recreation, and equitable distribution of resources.

An outcome of the 2024 SWCP is to acknowledge and support the City's active role in addressing regional and watershed-wide problems, and to document how the City can

leverage regional programs to address local needs. Current City program guidance comes from the following:

- Flood Control – the City has an Interlocal Agreement (ILA) with the King County Flood Control District (KCFCD) in which the KCFCD manages, maintains, repairs and funds levee projects, along with the US Army Corps of Engineers (for Federally-authorized levees), along the Green River. The Tukwila Levee Accreditation Phase 1 (NHC, 2015) & Phase 2 (NHC, 2019) as well as the Green River System Wide Improvement Framework (SWIF) (KCFCD, 2019) are guiding documents for City flood hazard management priorities and recommendations for implementation. KCFCD Motion 20-07 declared the King County Flood Control District's commitment to integrated floodplain management and multi-benefit projects and to the principles of environmental stewardship, equity, social justice, and environmental justice, and it redefined how the District plans capital projects and reimagined how the District designs projects.
- Water Quality – the City is a member of Our Green Duwamish Partnership, which is an emerging group among jurisdictions in the watershed and partners to address regional water quality issues. This group is working to establish a formal framework for membership similar to WRIA 9 or KCFCD.
- Habitat Restoration – the City is a paying jurisdictional member of WRIA 9, formed to guide recovery of the ESA-listed Puget Sound Chinook salmon, listed as threatened in 1999. Steelhead, bull trout, and Southern Resident killer whales have been listed since then. The WRIA 9 Salmon Habitat Plan includes projects along the Green/Duwamish River within the City of Tukwila; when the City to sponsors habitat projects, the City may qualify for funding from various sources for project implementation.
- NPDES Phase II Permit – this City-wide permit, issued by the Washington State Department of Ecology (Ecology), is coordinated through the Surface Water Management Program. The permit, reissued and expanded every five years, places increasingly greater emphasis on, and requirements of, permittees to make measurable improvements in water quality through actions like water quality retrofits, regional partnerships to address large- scale water quality problems, source control, urban forestry, stormwater planning, mapping, and policy implementation.
- Move Ahead Washington’s Stormwater Retrofit Proviso, 2022 provides funding for water quality retrofits on priority state highways for 16 years. Several state highways cross the Green/Duwamish River and tributaries in Tukwila, and the state’s preliminary draft prioritization of state highways segments for runoff treatment

includes several highway segments in Tukwila. Proving treatment for runoff from state highways before it enters surface waters is a state priority and a local priority for Tukwila.

1.2.1 City Comprehensive Plan Goals and Policies

This 2024 SWCP supports the draft 2024-2044 Tukwila Comprehensive Plan and the Washington State Growth Management Act (GMA) which requires the City to develop a comprehensive plan. The GMA has several goals which are relevant to this 2024 SWCP. The GMA aims to protect the environment, water quality, and shorelines of the state. It seeks to ensure that cities provide adequate public facilities and services, including stormwater conveyance and facilities, necessary to support development.

The City's capital plans, including this 2024 SWCP, are integrated into the City's Capital Facilities element of the Comprehensive Plan. The Capital Facilities element is required to include an inventory of capital facilities, a forecast of future needs, proposed expanded or new capital facilities, and a six-year plan to finance capital facilities projects. One of the key links between the two plans is the following policy:

- Use the Surface Water Fund to retrofit surface water systems to improve water quality, support forest conservation and restoration, restore aquatic and riparian habitat and enhance fish passage by establishing an urban canopy preservation program that emphasizes support for Citywide canopy preservation policies and strategies.

The 2024 Comprehensive Plan also informs this 2024 SWCP. The draft Comprehensive Plan outlines several key ideas that are important to surface water management, including but not limited to:

- Tukwila is envisioned as a high-performing, service- and results-oriented government that recognizes and solves problems.
- Growth is managed in a way that protects the environment.
- Ensuring plans, such as the Surface Water Comprehensive Plan, benefit existing and future populations in an equitable manner.
- Promote affordable and equitable access to public services to all communities, especially underserved communities.
- Retention and planting of trees.
- Increasing resiliency to climate change.
- Functional, healthy water resources for fish, wildlife, human safety, and recreation.

- Vital and self-sustaining fish and wildlife habitat areas and corridors that are protected and restored.
- An open space network that is protected and expanded through acquisition, donation, easements, partnerships, and regulation.

2.0 Drainage Basin and Watershed Characteristics

This section contains a description of the physical characteristics of the City of Tukwila. Drainage, water quality, and aquatic habitat conditions are also presented. Appendix A contains maps of the City's public stormwater system by basin. Appendix B contains the detailed information in support of this section.

2.1 General Description

The City of Tukwila encompasses approximately 9.7 square miles straddling the Green and Duwamish Rivers (Figure 2-1). The climate is strongly influenced by the Pacific Ocean with wet and mild winters with temperatures varying from 30°F to 50°F and dry and cool summers with temperatures typically less than 80°F. The average annual precipitation is between 32 and 38 inches.

The Green and Duwamish Rivers, tributaries, and associated floodplains dominate the geography and topography of Tukwila. Relatively flat, and poorly drained floodplains exist adjacent to the rivers and steep valley walls dominate the areas on the west side of Tukwila along the I-5 corridor. Soils in the valley floor tend to be fine sandy loam and silty clay loam (Newberg and Woodinville Series, respectively). The valley walls typically are comprised of soils from the Alderwood Series (interbedded silts and clays) and are characterized by numerous hillside springs and the accompanying potential for instability.

All of the surface waters in the City of Tukwila eventually discharge to the Green/Duwamish River. In Tukwila, the Green/Duwamish River flows northward along 14 river miles, meandering through the entire length of the City, from river mile 17.3 at Kent city limits to river mile 3.3 at Seattle city limits. The Green/Duwamish River is tidally influenced within the Tukwila city limits. Tidal fluctuations are recorded as far upstream as the Auburn stream gauge, upstream of the City of Kent. The salinity transition zone occurs from river mile 1 to 10, located downstream of the I-5 crossing in Tukwila. The historic Black River confluence with the Green/Duwamish River at river mile 11 defines the transition zone from the Green River to the Duwamish River.

Tukwila's hydrology today is vastly different from its historic state, when forested floodplains spanned the valley, which was flattened during glacial recession and overlain with deposits from Mount Rainier's volcanic activity. At that time the White River, which now flows west and south into the Puyallup River and into Commencement Bay, met the Green River south of Tukwila and flowed north to Elliot Bay. In 1906, a large debris jam diverted the White River at Auburn towards the south, reducing the volume of the Green River. Historically, Lake

Washington drained into the Black River, which flowed south, meeting the White River (now the Green River) at Tukwila, and forming the Duwamish River. The Black River dried up in the early 20th Century after extensive changes to regional hydrology for the purposes of industry and flood control, including the following: construction of the Lake Washington Ship Canal, which moved the outlet of Lake Washington to the north, and diversion of the Cedar River from the Black River to Lake Washington to avoid flood risk in Renton. Construction of the Howard A. Hanson Dam changed the flow regime and transport of sediment from the Upper Green River into the Middle and Lower Green River segments by retaining snow melt and precipitation and controlling flows. The culmination of these regional changes to hydrology has led to a much-altered hydrologic character in Tukwila.

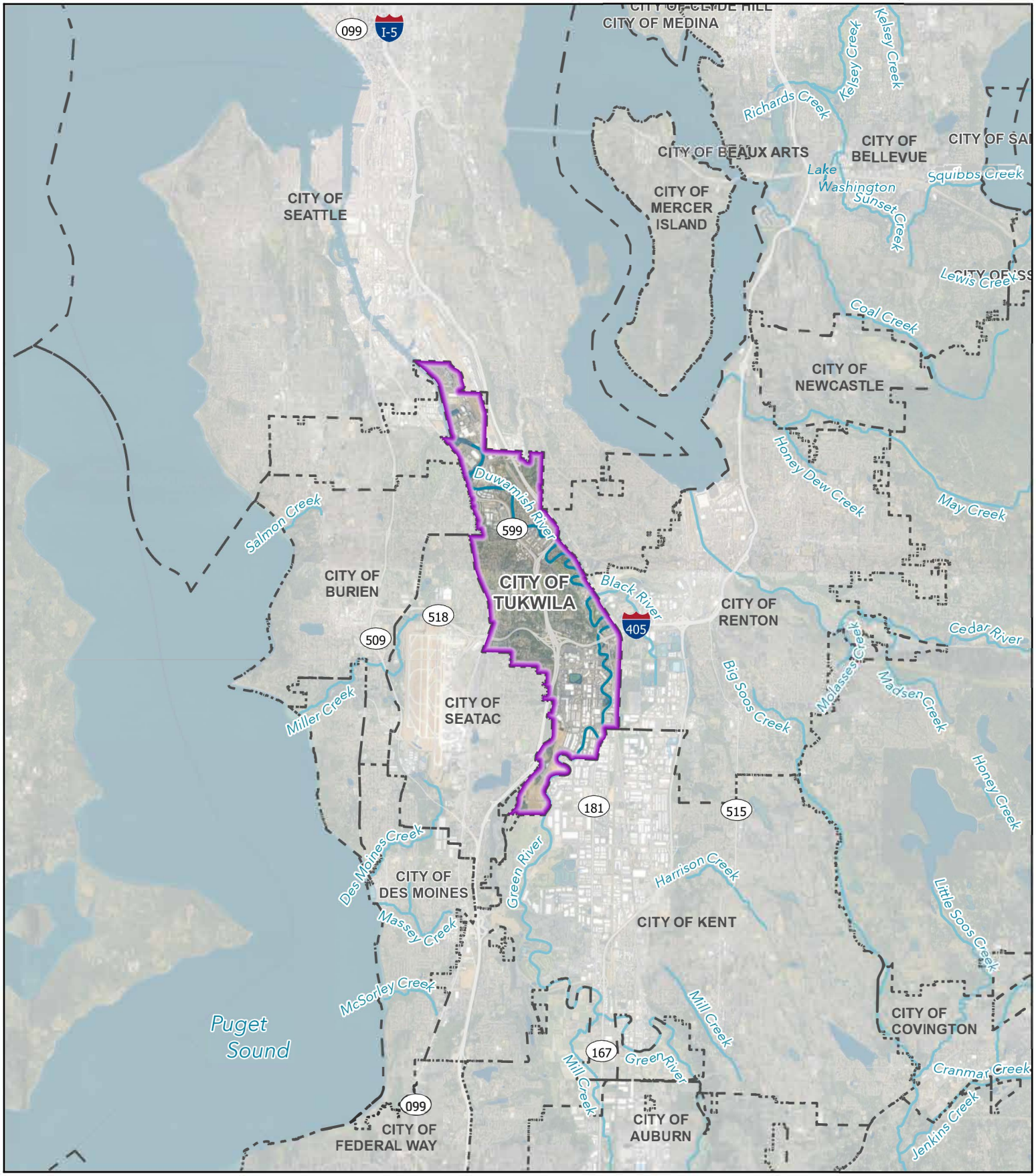

FIGURE 2-1
VICINITY MAP

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Legend
- City Boundary
- Neighboring Cities
- Streams and Rivers

0 — 5 Miles

Data Sources: King County, City of Tukwila, Google Maps
Date: 3/20/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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2.2 Population, Existing Land Use and Future Development

The City of Tukwila's population in 2023 was 22,780, with an estimated with an estimated 46,000 people employed at businesses located within the city limits. The resident population of Tukwila is expected to increase by approximately 17,000 by 2044. Any further increase in residents would be due to redevelopment that may increase residential densities.

Tukwila's Southcenter Urban Center and the undeveloped Tukwila South area is expected to accommodate the majority of this residential growth. Additional employees working in the City of Tukwila are expected to be accommodated in the Southcenter Urban Center and the Tukwila Manufacturing and Industrial Center. The 2044 targets for additional housing units and employees are 6,500 and 15,890, respectively.

The City of Tukwila has relatively few areas of undeveloped land which are not significantly encumbered by critical areas. The remaining large tracts of developable undeveloped land are located in the Tukwila South area. The City's remaining undeveloped land are in sensitive areas and in locations that are difficult to build on, such as wetlands, floodplains, seeps, steep slopes, and buffers. Figure 2-2 shows the zoning within the City of Tukwila in 2024 and Table 2-1 lists the distribution of land uses by drainage basin.

Land use, re-development, and future development are pertinent to the Surface Water Management Program because urbanization and development create impacts on surface waters such as:

- Polluted stormwater runoff that contributes to poor water quality in streams, lakes, rivers, and Puget Sound which impacts fish, wildlife, and human health.
- Changes to stream flow due to placement of culverts, levees, or bank armoring that can prevent fish from accessing or using streams and rivers for migration, spawning, and rearing.
- Loss of riparian vegetation to shade streams, lakes, and rivers, which keeps them cool and helps maintain adequate dissolved oxygen levels for fish.
- Increase in velocity, volume, and duration of stormwater flows in streams that can lead to erosion and accelerated rates of sediment transport, with impacts both to municipal infrastructure and to aquatic habitat.
- Increase in velocity and volume of stormwater flows in streams that can reduce ability of fish to rest, forage for food, survive, or use the stream.

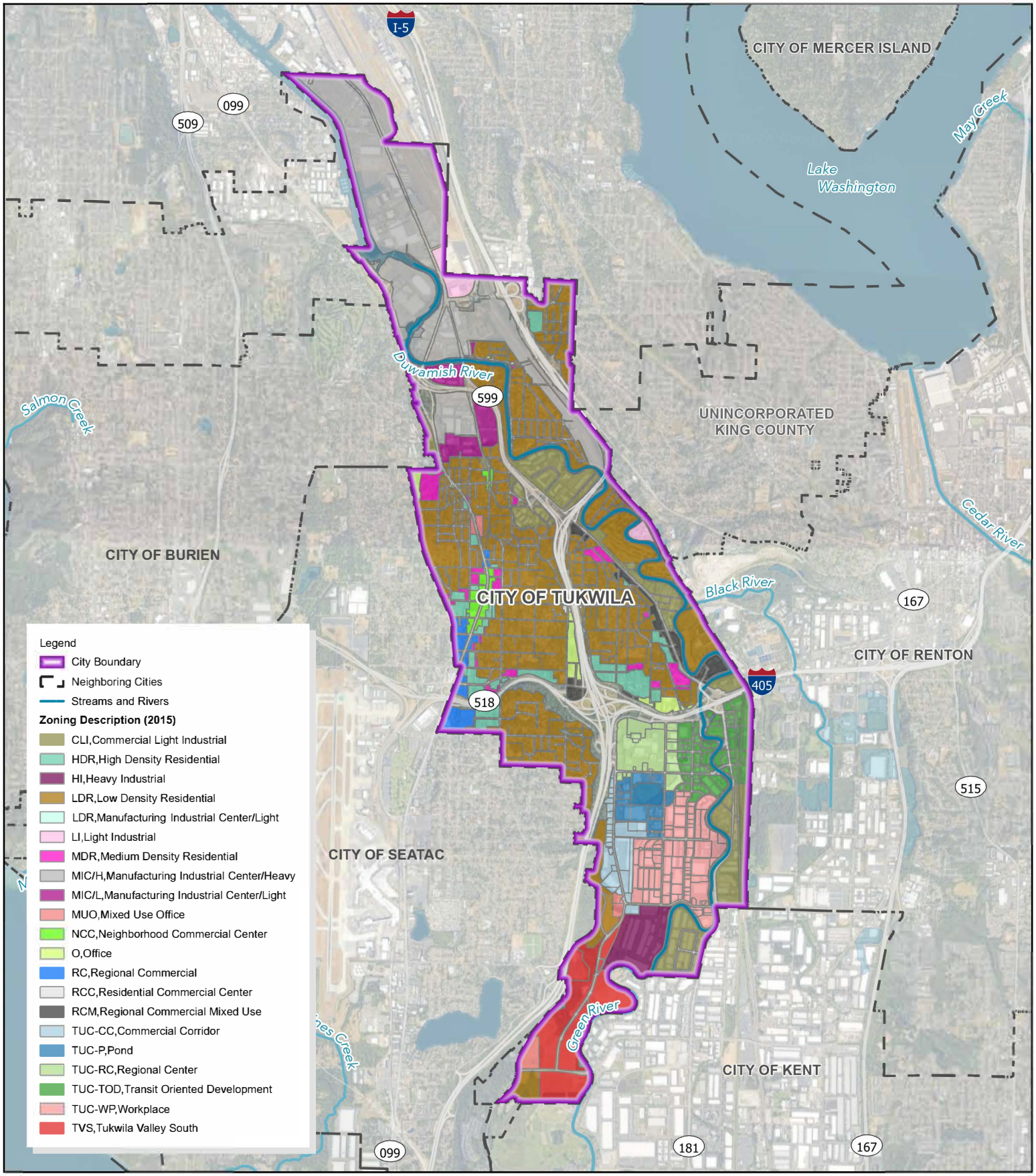

FIGURE 2-2
CITY ZONING

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

0 1 Mile

Data Sources: King County, City of Tukwila, Google Maps. Zoning data from 2015
Date: 3/19/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Table 2-1
Tukwila Zoning and Land Use by Basin (2022)

	Low-Density Residential		Multi-Family Residential		Industrial		Commercial		Wetland or Park		Right-Of-Way[1]		Other	
Basin Name	**Acres**	**% of Basin[2]**	**Acres**	**% of Basin[2]**	**Acres**	**% of Basin[2]**	**Acres**	**% of Basin[2]**	**Acres**	**% of Basin[2]**	**Acres**	**% of Basin[2]**	**Acres**	**% of Basin[2]**
Gilliam Creek	433	33%	127	10%	9	1%	232	18%	58	4%	383	29%	73	6%
Green/Duwamish River	492	19%	31	1%	638	25%	424	16%	206	8%	449	17%	350	14%
Johnson	0.5	0%	0	0%	0	0%	0	0%	26	9%	34	12%	61	21%
Mill Creek	0	0%	0	0%	5	5%	68	78%	0	0%	12	14%	2	3%
Nelsen	3	3%	0	0%	21	19%	38	35%	1	1%	24	22%	22	20%
P17	47	6%	4	0.5%	33	4%	445	55%	33	4%	94	12%	152	19%
Riverton Creek	106	26%	1	0.3%	9	2%	148	37%	14	4%	100	25%	25	6%
Southgate Creek	249	50%	35	7%	1	0.3%	56	11%	29	6%	107	21%	27	5%
Springbrook Creek	0	0%	0	0%	23.8	51%	0	0%	23.2	49%	0	0%	0	0%

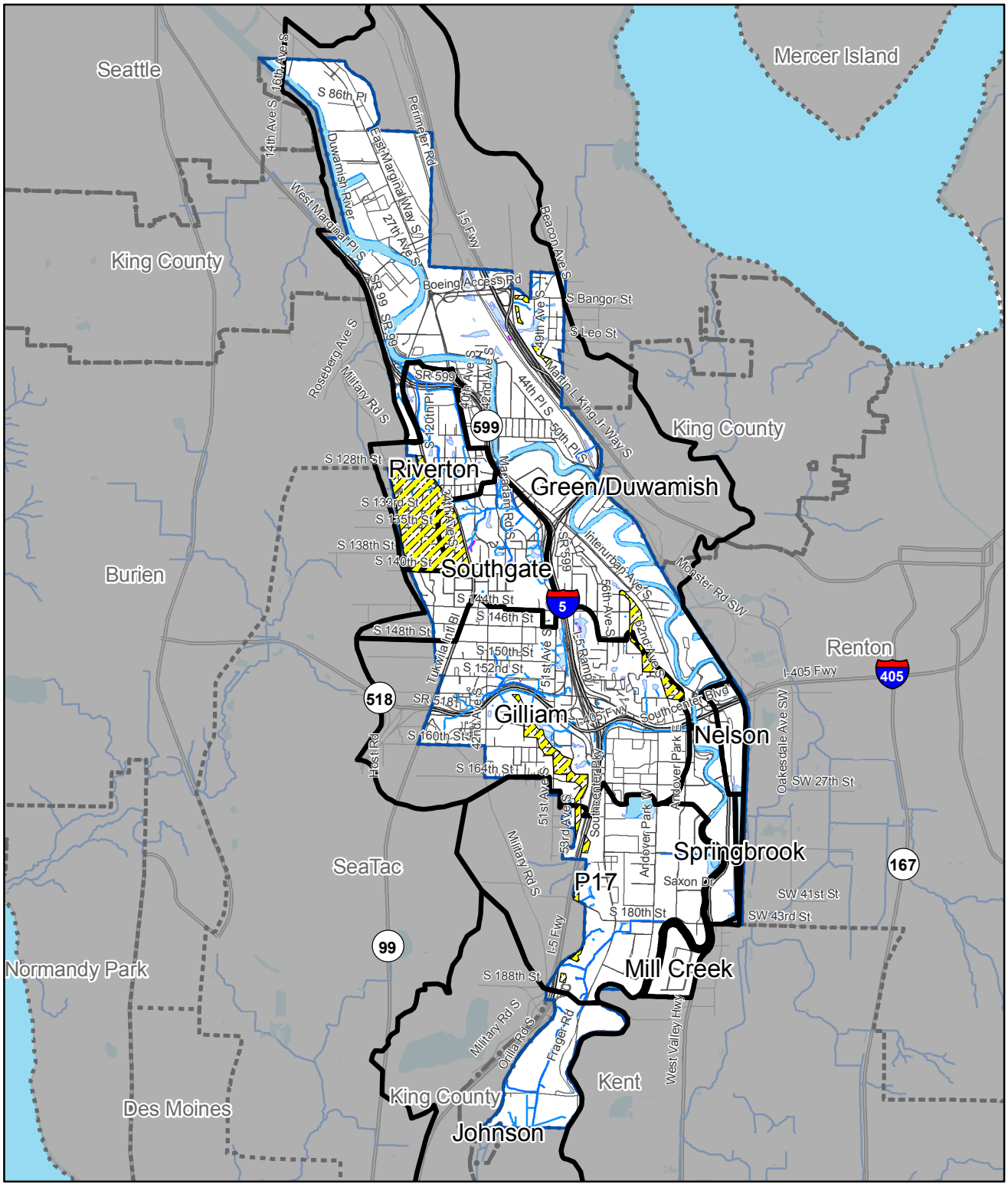
[1] ROW boundaries used for this analysis are imprecise; these values are approximate

[2] % of Basin calculated on area within city limits only.

Stormwater management on re-development and future development sites is undertaken in accordance with the City's storm drainage manual, which is the latest version of the King County Surface Water Design Manual (2021, at the time of writing of this plan) and the latest version of the City's Infrastructure Design and Construction Standards (2019, at the time of writing). The City has identified areas where infiltration is not allowed as a surface water management approach due to steep slopes and/or high groundwater table (Figure 2-3).

The City of Tukwila has established three levels of flow control standards covering different basins plus one area with a basin-specific standard established in a developer agreement for the Tukwila South project (Figure 2-4). Tukwila has established Basic Flow Control, Conservation Flow Control, and Flood Flow Control areas. Chapter 5 of the City's Infrastructure Design and Construction Standards (City of Tukwila, 2019) includes descriptions of each of the flow control levels applicable within the city limits. The basin-specific flow control requirement, which is located in the southern portion of the P17 Basin and in the Johnson Creek Basin, will revert to the Conservation Flow Control level when the developer agreement expires in December 2024. Upon expiration of the developer agreement, the City will regulate new development in the undeveloped portions of the P17 Basin and Johnson Creek Basin using the Conservation Flow Control standard.

The 2024 SWCP uses basin boundaries which were updated based on current drainage patterns during the development of the SMAP. Because of the basin boundary changes developed pursuant to the SMAP, the basin boundaries used in the 2019 Infrastructure Design and Construction Standards to define the areas where various flow control levels apply are now outdated. The City will update the Infrastructure Design and Construction Standards in 2025. The boundaries of the flow control levels should be updated at that time. Figure 4 is labeled with the basin names that match current basins in Table 5.0.1 – Flow Control Standards by Drainage Basin – in the Infrastructure Design and Construction Standards as well as the basin names used in the 2024 SWCP in parenthesis.



Areas where infiltration not allowed

Drainage Basins

N

0 1 2 Miles

FIGURE 2-3
Infiltration Not Allowed
City of Tukwila 2012 Surface Water Comprehensive Plan

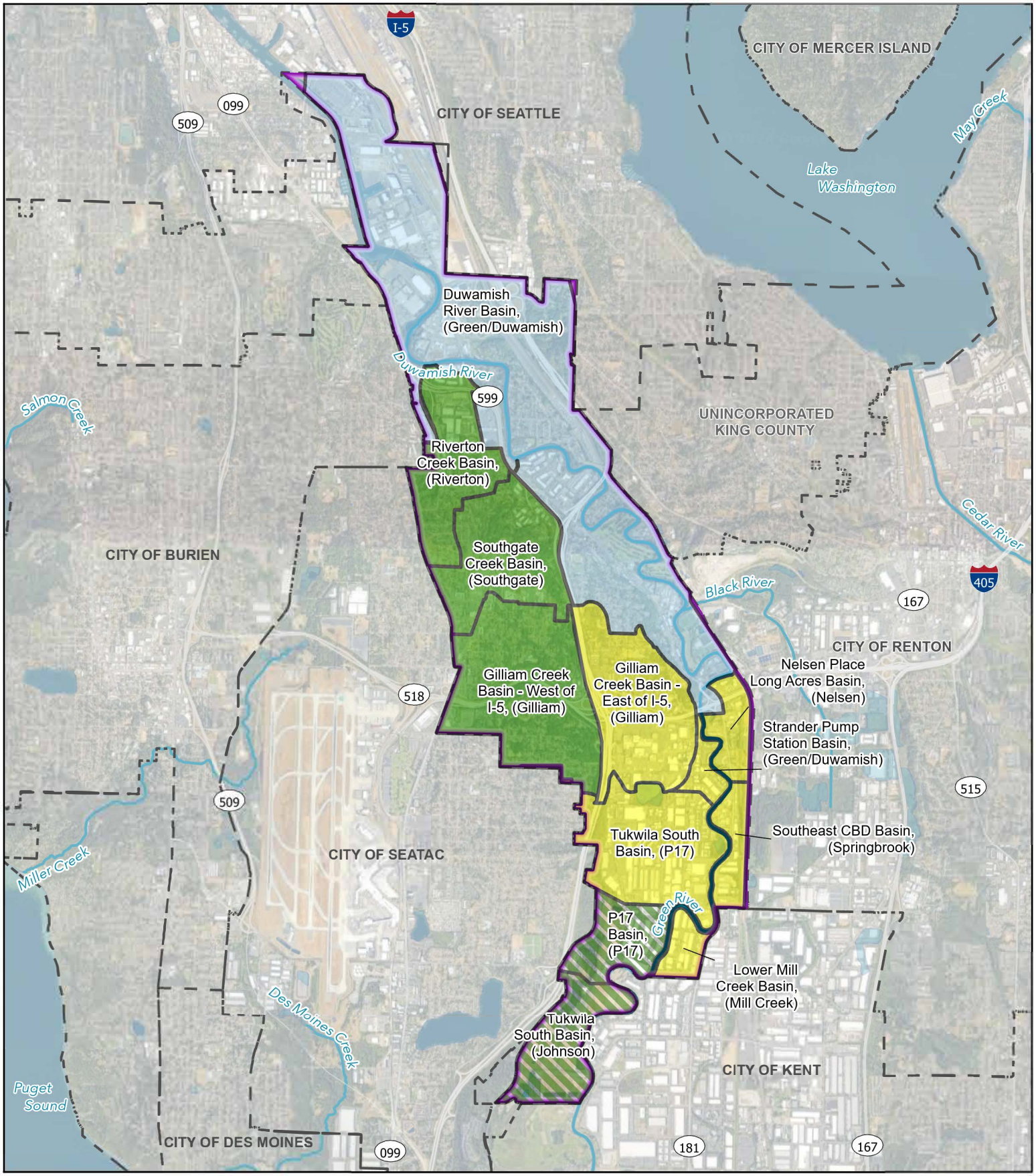


FIGURE 2-4
FLOW CONTROL STANDARDS BY BASIN

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers

Flow Control Standard

- Conservation FC Area
- Basic FC Area
- Basin Specific
- Flood FC Area (Existing)

Mile
0 1

Data Sources: King County, City of Tukwila, Google Maps
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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2.3 Drainage Basins

The City is divided into nine drainage basins (Figure 2-5):

- Gilliam Creek
- Green/Duwamish River Mainstem
- Johnson Creek
- Mill Creek
- Nelsen
- P17
- Riverton Creek
- Southgate Creek
- Springbrook Creek

Portions of these basins are located outside city limits as shown in Table 2-2. The basin boundary delineations are based on information from field visits, the City Geographic Information System (GIS), and previously developed basin plans, including the Stormwater Management Action Plan (Appendix F).

Table 2-2
Drainage Basin Areas Summary

Basin Name	Total Basin Area (Square Miles)	Area of Basin in City of Tukwila (Square Miles)	Percent of Basin in City of Tukwila
Gilliam Creek	2.9	2.1	71.0%
Green/Duwamish River	465.0	4.0	0.9%
Johnson Creek	2.7	0.5	16.5%
Mill Creek	8.0	0.1	1.7%
Nelsen	0.2	0.2	98.7%
P17	2.4	1.3	53.3%
Riverton Creek	0.8	0.6	78.3%
Southgate Creek	0.8	0.8	99.6%
Springbrook Creek	3.6	0.1	2.0%
Total	486.4	9.7	

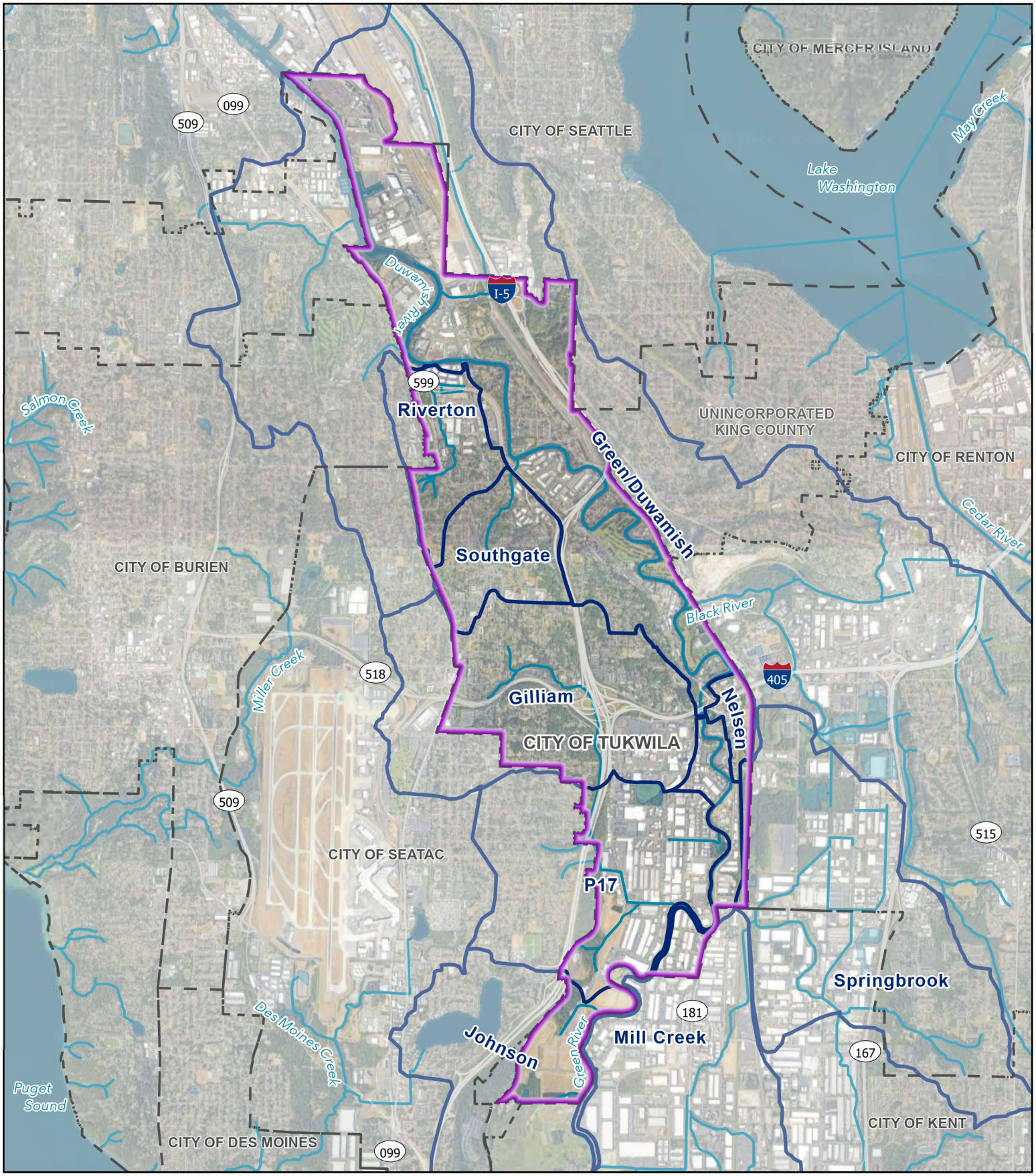

FIGURE 2-5
DRAINAGE BASINS

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Legend
- City Boundary
- Neighboring Cities
- Drainage Basins
- Streams and Rivers

0 1 Mile

Data Sources: King County, City of Tukwila, Google Maps
Date: 3/27/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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2.4 Drainage System Characterization

All of the surface water in the City of Tukwila eventually discharges to the Green and Duwamish Rivers. The Green/Duwamish River is called the Duwamish below the confluence with the Black River and is called the Green River upstream of that point.

Tukwila's drainage network consists of both closed-pipe and open channel conveyance. Numerous outfalls discharge directly to the river, while other outfalls discharge to creeks and some to wetlands. The outfalls with the largest discharge are typically associated with the creek systems located entirely or partially within the City, including Riverton Creek, Gilliam Creek, Southgate Creek, and Johnson Creek. Several of the creeks are fitted with tide gates or flapgates at the mouth, preventing river and tidal flows from flowing up into the drainage basins. The City has removed the flapgate at the mouth of Riverton Creek to increase access to salmon habitat. The City plans to evaluate and remove other tide gates and flapgates, if feasible.

Tukwila's stormwater assets include pipes, manholes, ditches, ponds, culverts, detention facilities, runoff treatment facilities, and surface water pump stations. The City aims to update the inventory of stormwater assets routinely as projects are built which change the system. The data used in the 2024 SWCP was current as of 2021. Table 2-3 lists each of the City-owned surface water pump stations (also shown in Figure 2-5). Outfalls, tide gates, pump stations, and other drainage assets are shown in the Stormwater System Maps in Appendix A. Note that King County owns and operates a pump station (P17) within the City of Tukwila's P17 drainage basin, which is also shown on Figure 2-5 and in Appendix A.

Table 2-3
Surface Water Pump Stations

Station Name	Physical Location	Drainage Basin	Ownership
P17 Pump Station	Minkler Public Works Facility	P17	King County Flood Control District[1]
Sta #15	5880 S 180th Street – near Claim Jumper Restaurant	P17	City of Tukwila Stormwater Utility
Sta #16	7420 S. 180th Street – underpass	Springbrook Creek, Green/ Duwamish River	City of Tukwila Stormwater Utility
Sta #17	530 Strander Boulevard – Bicentennial Park	Green/ Duwamish River	City of Tukwila Stormwater Utility
Sta #18	4225 S. 122nd Street – Allentown	Green/ Duwamish River	City of Tukwila Stormwater Utility
Sta #19	Fort Dent Park	Green/ Duwamish River	City of Tukwila Parks Department

[1] This pump station is owned and operated by the KCFCD and manages City of Tukwila stormwater systems draining to the P17 pond.

Supporting information for the drainage system, water quality, and aquatic habitat characterizations located in Sections 2.4, 2.5, and 2.6, respectively, was developed for the 2013 Surface Water Plan and is contained in Appendix B. Updates for the 2024 SWCP have been incorporated directly into the sections. Appendix B has not been updated except for the fish barrier inventory (Attachment A to Appendix B). Appendix B otherwise remains unchanged for reference.

2.5 Water Quality Characterization

This section contains a description of the water quality characteristics of Tukwila's receiving waters, all of which flow to the Green/Duwamish River. Water quality assessments of the receiving waters is assessed based on reports of historical contamination, Washington State water quality standards, biological conditions of streams, water quality sampling, and anecdotal reports. Overall, the water quality of the Green/Duwamish River and its tributaries is poor with a designated Superfund site, state water quality standards not being met, poor to very poor aquatic biological conditions, observed salmon mortality, and ongoing concerns with trash, pollutants, and sedimentation.

2.5.1 Superfund

The northern-most portion of the City of Tukwila lies within the Lower Duwamish Waterway Superfund Site, designated by the U.S. Environmental Protection Agency (EPA) in 2001. King County, the Port of Seattle, and the cities of Seattle and Tukwila are working with Ecology and the EPA to control sources of pollution in the Lower Duwamish Waterway. Ecology is the lead agency for implementing source controls in the Lower Duwamish Waterway. In 2002 the City of Seattle, King County, and the Boeing Company developed a public-private partnership called the Lower Duwamish Waterway Group to coordinate source control activities. Five Early Action Area cleanups have focused on areas of highly contaminated mud on the river bottom which were predicted to reduce average PCB levels by 50% across the Lower Duwamish Waterway. Two early action sites in Tukwila and are at, or near, completion as of 2024. The Jorgensen Forge site in Tukwila is partially cleaned up with some pollution stabilized and left in place. The other, Boeing Plant 2, is a former industrial site. The cleanup effort involved dredging and removing contaminated sediments. Today, the waterfront is an award-winning new habitat area.

2.5.2 Washington State Water Quality Standards

In 2003, Ecology adopted a water use-based classification for state surface waters (RCW 173-201A, Table 602) that determines the surface water quality standards applicable for that water body (RCW 173-201A-600(1)). The available classifications of designated uses, or beneficial uses, include, but are not limited to, aquatic life uses such as salmonid spawning, rearing, and migration, recreational uses, water supply uses, and miscellaneous uses. The designated uses Ecology has established for the Duwamish River in Tukwila are Salmonid Rearing/Migration Only and Primary Contact Recreation. The designated uses Ecology has established for the portion of the Green River in Tukwila are Salmonid Spawning/Rearing and Primary Contact Recreation. Ecology sets state water quality standards for water bodies based on their established uses.

None of the tributaries to these rivers within Tukwila is called out in Table 602. Therefore, the uses defined for tributaries are the same as the river to which they discharge. Riverton Creek and Southgate Creek discharge to the Duwamish River so they have a use-based classification of Salmonid Rearing/Migration and Primary Contact Recreation. Gilliam Creek, Johnson Creek, Springbrook (Mill Creek), and P17 drainage basins have a use-based classification of Salmonid Spawning/Rearing and Primary Contact Recreation.

Ecology maintains a list of water bodies that do not meet water quality standards, known as the 303(d) list. The water quality assessment and 303(d) list for the state of Washington were updated in 2022. Figure 2-6 shows the 303(d) listed water bodies in Tukwila. The Green/Duwamish River within the City of Tukwila does not meet water quality standards

according to the 2022 303(d) list. Both the Green River and Duwamish River are listed as Category 5 (at least one designated use is impaired) for dissolved oxygen, temperature, and pH, based on water sampling and analysis. There are Category 5 listings for Gilliam Creek for bioassessment, Johnson Creek (Angle Lake) for bacteria, Springbrook (Mill) Creek for bacteria, zinc, dissolved oxygen, and bioassessment, and Riverton Creek for bioassessment.

2.5.3 Benthic Index of Biotic Integrity

Stream quality is also assessed using the Benthic Index of Biotic Integrity (B-IBI) data. The B-IBI scoring system is a quantitative method for determining and comparing the biological condition of streams with a higher B-IBI score out of 100 indicating better stream ecological health. A score lower than 20 is considered very poor, 20-40 is considered poor, 40-60 is considered fair, 60-80 is considered good, and 80-100 is considered excellent.

The B-IBI score for Gilliam Creek is very poor (9.1), Mill Creek is poor (30.5) and very poor (14.5), and Riverton Creek is poor (28.9). No B-IBI sample locations were found inside the Green/Duwamish River, P17, Johnson Creek, Nelsen, Southgate Creek, or Springbrook basins.

2.5.4 Water Quality Sampling and Anecdotal Reports

In a study conducted in June and September 1997, two Gilliam Creek samples were collected during summer baseflow conditions. Several samples taken during these months did not meet the then-current state dissolved oxygen water quality standard, with one sample recorded at 3.2 mg/L, well below the state water quality standard of 6 mg/L. These samples also fell slightly below the pH state water quality standard. In September, the measured stream temperature of 17.5 degrees Celsius barely fell below the state water quality standard of 18 degrees.

Two years later water quality sampling was performed during storm runoff events in the fall of 1999 as part of the Gilliam Creek Stormwater Management Plan (Herrera Environmental Consultants, 2001). Temperature, dissolved oxygen, and pH (the latter with the exception of one sample) all met then-current state water quality standards during this sampling. Turbidity was somewhat elevated, generally ranging from 25 to 50 NTUs. Similarly suspended solids were also only modestly elevated, generally ranging from 20 to 60 milligrams per liter (mg/L). Dissolved lead met applicable water quality criteria, as did nearly 90% of the dissolved zinc samples. About half of the samples failed to meet the dissolved copper criteria. Finally, nearly all of the fecal coliform samples exceeded the state water quality standards.

City-collected data from the lower reach of Gilliam Creek in 2018-2020 indicated concerns with pH, turbidity, and total suspended solids. Metals, dissolved oxygen, and temperature met then-current water quality standards in Gilliam Creek.

Data from 2019 testing in Riverton Creek indicated there are concerns with dissolved oxygen. Temperature and pH met state water quality standards in Riverton Creek. Fish mortality due to urban runoff in Riverton Creek has been observed by City staff.

Agricultural activities in the City of Kent likely contribute fecal coliform to Johnson Creek.

City data in Southgate Creek basin from 1994 and 1995 indicates there are moderate concerns with dissolved oxygen and pH. In addition, Southgate Creek has sediment issues due to bank stabilization. Permitted (Hydraulic Project Approval) dredging maintenance is often required to manage sediment. Hydraulic Project Approvals from the Washington Department of Fish and Wildlife (WDFW) are required in or near state waters to ensure work activities, in this case dredging maintenance, is done in a manner that protects fish and their aquatic habitat.

There are homeless encampments along the Green/Duwamish riverbanks that are prone to winter flooding and could contribute unknown debris and contaminants. In addition, Fort Dent Park has synthetic turf sports fields that could potentially be a source of 6PPD-quinone. However, further research is needed to determine if either of these situations pose a threat to water quality in the river.

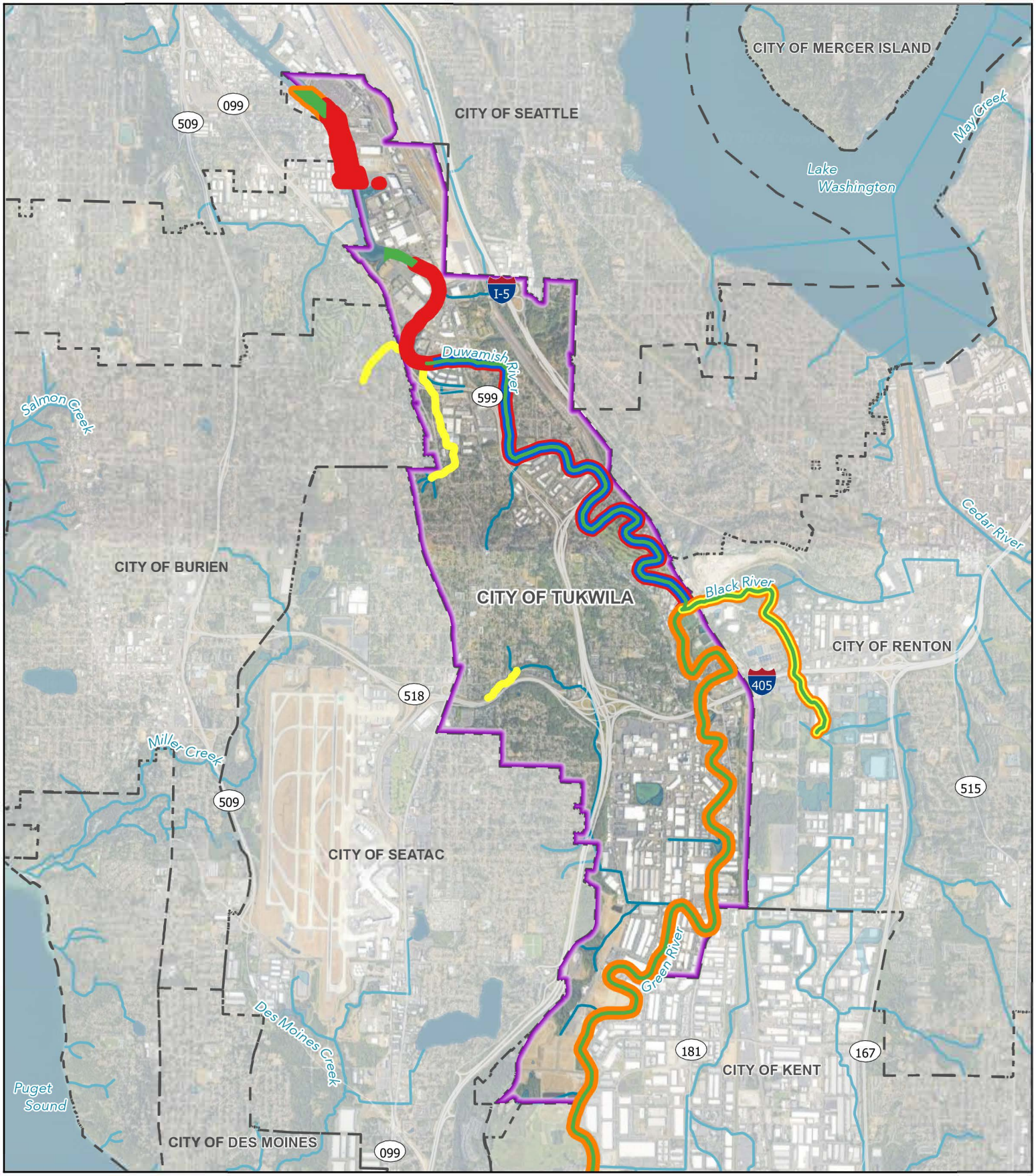

FIGURE 2-6
ECOLOGY 303(D) LISTED WATER BODIES
TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps
Date: 3/27/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers

Receiving Water Impairment

- Bioassessment
- Bacteria
- pH
- Dissolved Oxygen
- Temperature

0 1 Mile

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2.6 Aquatic Habitat Characterization

This section contains a summary of the existing conditions of the City's rivers and streams and their use by fish and other aquatic life. Anadromous fish such as various salmon species are the primary focus of this inquiry. Salmon and other anadromous fish spend a part of their life cycle in fresh waters such as streams and rivers, migrate to ocean waters, and typically migrate back to fresh waters to reproduce.

Supporting information for the aquatic habitat characterization located in this section is contained in Appendix B. A detailed fish-blocking culvert inventory, updated in 2024, is included as Attachment A to Appendix B.

2.6.1 Green/Duwamish River

Productive, good quality fish habitat, both in the main channel and in off-channel tributaries, is generally lacking along the Green/Duwamish River. Several factors explain the existing lack of fish habitat.

The Green/Duwamish River course and flows have been significantly altered as described in Section 2.0 in ways that affect the presence of, and access to, aquatic habitat regionally. Significantly, regulation of flow in the Green River at the Howard A. Hanson Dam (HAHD) has reduced seasonal flows and lowers the river elevation enough to disconnect it from its floodplain and tributaries, which historically provided rearing and high flow refuge. Little, if any, historical rearing habitat occurs in the City.

The Green/Duwamish River channel has also been significantly altered from its natural condition along many reaches in the City of Tukwila. Development within the floodplain and buffers and construction of levees and revetments along the river shoreline disconnect critical floodplain and tributary habitat that support all salmon life stages, and in particular juvenile salmon during their out-migration through Tukwila. Levees and revetments are maintained free of tree canopy that would produce shade to cool the river and assist in maintaining healthy dissolved oxygen levels to support fish. Juvenile fish are particularly vulnerable to environmental conditions, and the absence of habitat that supports juvenile fish limits the population size that can survive and reach the Duwamish Estuary, Puget Sound, and the Pacific Ocean. Currently, most of the juveniles are being flushed down the Green/Duwamish River too quickly because they do not have places to rest, forage, and shelter from predation in the river. The absence of this type of habitat leads to mortality and/or arriving in the Duwamish Estuary underdeveloped and ill-equipped to survive the saline conditions. WDFW studies have shown that Chinook salmon that are able to find habitat and rear in the river and tributaries make up 93-95% of the adult salmon that return.

On the contrary, salmonids that do not find adequate habitat only make up 5% of returning adults.

Non-native and other less desirable trees and shrubs such as blackberry have replaced native riparian vegetation along the Green/Duwamish River. Riprap also borders the river along many reaches.

While habitat conditions along the Green/Duwamish River are still poor a number of projects along the mainstem have improved pockets of habitat in Tukwila. Codiga Park (Army Corps, 2005), the first off channel habitat restoration project in the City, is a natural area that is a partially restored tidal wetland that now provides shelter for juvenile salmon. The Chinook Wind Mitigation project (King County Mitigation Reserves Program, 2023), Duwamish Gardens (City of Tukwila, 2016), North Wind's Weir (King County, 2009), and Cecil Moses Memorial Park (King County, ca. 2006) also provide habitat for juvenile salmon. A number of the more recent habitat projects are well-used, as documented by UW Wetland Ecosystem student study of "Juvenile Chinook Salmon Effectiveness Monitoring of Duwamish Shallow Water Restoration Sites." Despite these projects in Tukwila, numerous other levee setbacks, shoreline restoration in Puget Sound, and revegetation in the watershed, Chinook salmon numbers continue to decline in the watershed and region.

In a 2019 Biological Opinion, the National Marine Fisheries Service (NMFS) identified the lack of fish passage at HAHD upstream of Tukwila as a jeopardy to the viability of ESA-listed Chinook salmon, steelhead, and Southern Resident killer whales. In December 2023, Tukwila Mayor Allan Ekberg joined 32 other governments, organizations, and business in signing a letter supporting the HAHD downstream fish passage project, a project of regional and national significance that received $220 million in funding allocated through the federal government in 2022. The HAHD downstream fish passage project would restore access to over 100-miles of salmon spawning habitat in the upper watershed and is believed to be the largest single opportunity to increase salmon production in the Puget Sound. The HAHD fish passage project has been a top priority of WRIA 9 since the 2005 Salmon Habitat Plan was published. The broad-based show of support over the last five years has been critical to continuing to advance this regionally significant project.

There are restoration efforts addressing invasive species, such as Himalayan blackberries, along the Duwamish River shoreline to improve habitat. The Green the Green Program is working in concert with the Muckleshoot Indian Tribe to prioritize canopy restoration at specific locations to maximize shade, especially where there is an absence of shade at southern and western exposures.

In summary, productive, good quality fish habitat, both in the main channel and in off-channel tributaries, is generally lacking along the Green/Duwamish River. Significant investment is needed to improve habitat and increase access to existing habitat.

In addition to the mainstem Green/Duwamish River channel, aquatic habitat is provided in the five tributaries that drain most of Tukwila to the Green Duwamish River. These tributaries include Gilliam Creek, Riverton Creek, Southgate Creek, Johnson Creek, and Mill Creek. The remainder of this section includes a description of the aquatic habitat available to fish in these creek systems.

2.6.2 Gilliam Creek

To access Gilliam Creek from the Green/Duwamish River anadromous fish need to first pass through the Gilliam Creek flapgate. The flapgate is inaccessible other than during high flow events in Gilliam Creek which force the flapgate open. While several species of anadromous fish are reported to make use of the lower reach of Gilliam Creek, along the south shoulder of I-405 between the Green River and the I-5/I-405 interchange, their numbers are small despite habitat availability. The fish present include Chinook salmon, coho salmon, and cutthroat trout.

The lower reach of Gilliam Creek provides mostly rearing and possibly some scattered spawning habitat. Spawning gravels are covered by sediments deposited by upstream erosion and by historical construction activities. Habitat in the lower reach of Gilliam Creek is available to fish through the flapgate at the outlet of Gilliam Creek only under certain conditions, when the Green River water level is elevated but remains lower than the water level in Gilliam Creek. At the time of writing, the City is advancing a project that will replace the existing flapgate with a fish friendly flapgate. If the project is funded, it will also provide rearing habitat and flood refugia. These actions are intended to benefit Puget Sound Chinook salmon in the juvenile life stage during the out-migration, to support survival and development during the sensitive, and vulnerable life stage transition from parr to fry. Other fish and marine life in Puget Sound will also benefit.

There are more than 10 additional total and partial fish passage barriers along Gilliam Creek both upstream and downstream of the I-5/I-405 interchange limiting fish movement (see Appendix B for more information). These barriers are privately-owned, City-owned, and owned by the State of Washington Department of Transportation (WSDOT).

WDFW determined that several of the tributaries to upper Gilliam Creek provide some rearing habitat (WSDOT, 2007). Since there are culverts underneath the I-5/I-405 interchange that are total barriers to anadromous fish, it is likely that only resident fish such as cutthroat

trout and sculpin are utilizing the available habitat in the upper reaches of Gilliam Creek at this time. Fish barriers will need to be addressed to provide anadromous fish access to this rearing habitat.

Fish barriers also exist in the upper reaches of Gilliam Creek, including a WSDOT-owned culvert beneath SR 518 that conveys a tributary that is identified as a total fish passage barrier.

2.6.3 Riverton Creek

Both west and east forks of Riverton Creek are characterized by narrow, straight channels and long sections of culverts in their lower reaches. Both forks are considered fish-bearing. Coho salmon, fall Chinook salmon, fall chum, and resident coastal cutthroat trout are potentially present in Riverton Creek. Overall, Riverton Creek provides some limited rearing habitat for salmon, but no longer provides substantial spawning habitat. Additionally, City staff may have witnessed urban runoff mortality of salmon in Riverton Creek. There are more than 80 culverts and more than 10 total or partial fish passage barriers along Riveron Creek.

Up until 2021, there were two culverts with flapgates at the outlet of Riverton Creek to the Duwamish River, built by WSDOT in the 1960s, which were impassable to fish during low flows plus somewhat impassable all other times, with one gate fixed open. Hydraulic analysis showed that the flapgates did not provide upstream flood protection, and so through the Riverton Flapgate Removal Project, the City removed the two culverts and flapgates, daylit the creek, installed a trail bridge, and improved habitat and plantings along 1,200 linear feet of the creek.

The East Fork of Riverton Creek just upstream of the SR 599 culvert is characterized by a wide, exposed, sandy, and silty streambed which provides fish passage but no spawning or rearing habitat. This section of Riverton Creek is part of a wetland complex. Upstream of that reach, a more than 2,000 linear feet (LF) culvert likely prevents at least some anadromous fish from accessing suitable habitat located in the upper reach between S 126th Street and S 128th Street, where good overhead cover from riparian plants, sufficient flows, and streambed gravels appears suitable for coho salmon spawning. Anecdotal evidence from a local resident during a February 2011 site visit suggests that anadromous salmon can and do access the east fork up to S 128th Street.

The gradient upstream of S 128th Street is likely too steep for anadromous fish.

Approximately 2,000 LF of restored channel in the West Fork of Riverton Creek just upstream of SR 599 has provided some spawning and rearing habitat. The culverts within this restored reach could fill with sediment from upper watershed erosion and surface water runoff, which

could potentially block fish passage. Just upstream of the restored reach, a 20-foot-tall manmade waterfall prevents fish from passing upstream to S 126th Street. A private property owner owns and operates a fish hatchery and releases juvenile salmon at the base of the waterfall into the west fork at the upper end of the restored reach.

A King County Metro project for the South Annex Base expansion will improve the east and west forks of Riverton Creek. The project plans to daylight portions of both Riverton Creek branches and install three fish-passable culverts on the project site. The first culvert will be under S 120th Pl along the east fork. The second and third culverts will be beneath the internal access drive and parking long along the west fork. Approximately 940 linear feet of Riverton Creek will be daylit, 328 linear feet of the west fork and 612 linear feet of the east fork, 0.5 acres of riparian vegetation will be restored, and the wetland the east fork runs through will be restored. This project will improve instream habitat, water quality, and fish passage along both forks of Riverton Creek.

Upstream of the waterfall on the west fork up to S 126th Street, there is about 500 feet of potential fish habitat, though that reach also includes additional fish passage barriers. Fish would likely not be able pass upstream of S 126th Street because of a steep gradient, even if the waterfall and other nearby barriers were removed. However, this upper reach beyond S 126th Street has a cobble streambed that is likely supporting macroinvertebrates, a food source for fish downstream of the barriers.

2.6.4 Southgate Creek

The east fork of Southgate Creek begins as a relatively small channel just south of S 137th Street and flows north through a steep ravine, several culverts, and ditches before it merges with the west fork. The west fork begins as three smaller tributaries that collect flow from the hillside just west of 40th Avenue S and merge just upstream of S 133rd Street. The west fork then passes underneath S 133rd Street and Macadam Road S through more than 500 feet of culvert and merges with the east fork coming from a ditch along S 133rd Street. From there, the main stem of Southgate Creek extends under SR 599 through about 320 feet of culvert, a fish ladder, and large arch culvert into the Duwamish River downstream of the Black River confluence.

Bank erosion from the combination of steep gradients and surface water runoff from urban development have deposited sediments in the lower reach, which have reduced effective culvert conveyance capacities and covered up salmon spawning gravels. The section of the main stem just downstream of the confluence of the west and east Forks is often completely blocked by sediment and debris. An upcoming sediment and hydraulic study in Southgate

Creek will provide more information on how the City can reduce sedimentation in Southgate Creek.

As in other urbanized streams, development has altered Southgate Creek's riparian buffer and natural channel alignment, resulting in increased channel incision, stream bank erosion, and degraded water quality. Rearing habitat is available in the main stem between SR 599 and S 132nd Street culvert. Rearing habitat is available in some small sections of the east fork along S 131st Place and S 134th Place. Rearing and some spawning habitat is available in the recently restored section of the west fork just upstream of S 133rd Street.

Coho salmon, fall chinook, fall chum, resident coastal cutthroat, and winter steelhead are potentially present in Southgate Creek. The fish ladder at Interurban Ave S is a barrier to anadromous fish during low stream flows. Two additional total barriers are located at S 132nd Street and S 133rd Street/E Marginal Way, both along the main stem of Southgate Creek. During a February 2011 site visit, juvenile salmon were observed in the section of the east fork along S 131st Place, which are regularly released into the stream by a nearby homeowner, according to local residents and City of Tukwila staff. Fish are unlikely to be present in the west fork of Southgate Creek upstream of Macadam Way S due to the steep gradient. Some resident fish may use the upper reaches of the east fork within Southgate Park.

2.6.5 Johnson Creek

Johnson Creek in Tukwila is an intermittent stream that flows east and discharges to the Green River. There are two likely tributaries to Johnson Creek in the City of Tukwila, Ditches C and J2, which both flow south. Coho salmon, fall chinook, fall chum, resident coastal cutthroat, and winter steelhead are potentially present in Johnson Creek. Tributaries in this section of the Green River are often used by out-migrating Chinook for rearing and flood refugia.

The Johnson Creek flapgate and outfall to the Green River, once partial blockages to fish passage, were replaced in 2011 as part of the mitigation for the proximate commercial development. As part of the commercial development, the lower reach of Johnson Creek was reconstructed and now provides aquatic habitat opportunities. This flapgate was considered fish-passable when it was installed in 2011. However, a recent King County study documented no fish in Johnson Creek, possibly due to debris clogging the debris rack, low elevation placement of the flapgate, which causes it to be closed during the Chinook outmigration period, low water velocity, which likely impedes the ability of juvenile salmonids to pass through the flapgate, or a combination of these conditions. Another potential barrier was identified in 2011 at S 204th Street along Johnson Creek.

In 2023, King County purchased 30 acres of land, which includes an equestrian track and several residences on the Kent side of S. 204th Street. With this acquisition, there is interest and opportunity for multi-jurisdictional collaboration to remedy the fish barrier at Johnson Creek and improve floodplain connectivity and habitat conditions in the lower Johnson Creek basin. Because development in the basin may change the habitat conditions, a revised aquatic habitat assessment should be performed after the commercial development in the Johnson Creek Basin has been completed.

2.6.6 Mill Creek

The Mill Creek drainage basin is the area east of the Green River north of S 190th Street and west of 72nd Avenue South. This area flows into the Duwamish River and/or south and east into the Mill Creek basin within the City of Kent. All drainage conveyance is piped. No natural channels exist in this basin within the City of Tukwila.

Mill Creek flows north from the City of Kent into the City of Renton, then discharges into the Green/Duwamish River within the City of Renton. Habitat opportunities and problems within the Mill Creek drainage within the City of Kent are identified in the Kent Surface Water Comprehensive Plan, likewise for those opportunities and problems within the City of Renton.

3.0 Regulations and City Policies

This section contains a brief description of the current and anticipated future surface water regulations applicable to the City of Tukwila. The City's Surface Water Management Program coordinates compliance and reporting for the surface water regulations, which are applicable to all City departments and operations. Appendix C contains the detailed information in support of this Section 3.

3.1 Applicable Surface Water Regulations

Since preparation of the 2013 Surface Water Comprehensive Plan, the NPDES Phase II Permit has been reissued to Tukwila by Ecology. The current permit became effective on August 1, 2019, and will expire on July 31, 2024. Regulations currently applicable to the City of Tukwila are described in detail in Appendix C. (Note that Green and Duwamish River flooding and flood protection are outside the scope of this Plan.)

The City conducted an evaluation, or gap analysis, of Tukwila's Surface Water Management Program against the 2019-2024 permit in 2020 and implemented the recommendations in it to maintain compliance with the permit. Specific actions recommended to continue to maintain regulatory compliance are presented in Section 8 of this Plan. At the time of writing, the City is nearing completion of an assessment of its NPDES compliance program, which will provide program recommendations and actions both near-term and long-term.

The Endangered Species Act (ESA) establishes protections for fish, wildlife, and plants and that are listed as threatened or endangered and their habitat. A species may be listed as threatened or endangered under the ESA because of any of the following five factors:

- present or threatened destruction, modification, or curtailment of its habitat or range;
- over-utilization of the species for commercial, recreational, scientific, or educational purposes;
- disease or predation;
- inadequacy of existing regulatory mechanisms; and
- other natural or manmade factors affecting its continued existence.

The Puget Sound Chinook salmon, Puget Sound Steelhead, and Bull Trout were listed as threatened in 1999, 2007, and 1998, respectively. In 2005, the Southern Resident Orcas were designated as endangered. The WRIA 9 Salmon Habitat Plan was a Green/Duwamish River

watershed-based response to the Puget Sound Chinook salmon being listed as threatened under the ESA.

3.2 Potential Regulatory Changes

A number of changes in regulations relevant to surface water management are expected to occur in the 10-year timeframe covered by the 2024 SWCP. Ecology will reissue the NPDES permit in 2024. A draft of the NPDES Phase II 2024-2029 Permit has been reviewed, and the anticipated changes and key requirements include:

- Adopt tree canopy goals and policies to support stormwater management and water quality improvements and begin mapping tree canopy.
- Implement projects recommended by the SMAP or other water quality projects and activities.
- Develop a SMAP for another basin.
- Increase detail of stormwater system mapping.
- Update illicit discharge prohibitions and source control requirements to incorporate limitations on discharge of PCBs and other emerging pollutants.
- Adopt an updated stormwater management manual which includes new thresholds for providing runoff treatment facilities on development sites with multiple threshold discharge areas and new thresholds for requiring stormwater management on road-related redevelopment projects and commercial or industrial redevelopment projects.

Changes to the associated Total Maximum Daily Load (TMDL) program are possible, as well as the possibility of additional listings (or downgrading of existing listed species) under the ESA. In general, these changes are expected to increase the City's obligations for surface water management, water quality, and aquatic habitat protection and restoration. Tukwila will need to accommodate such changes in its Surface Water Management Program, possibly with additional financial resources and/or additional staff time.

Section 8 includes a section on recommendations to address these regulatory requirements anticipated in this next surface water planning cycle.

4.0 Coordination with Regional Plans and Tribes

The City of Tukwila is committed to working in partnership with other jurisdictions and community partners to address shared regional goals including the following:

- Improving water quality in the Green/Duwamish River and tributaries in Tukwila;
- Restoring habitat conditions in the Green/Duwamish Watershed and the Puget Sound; and
- Reducing flood risk along the Green and Duwamish Rivers.
- Protecting and ensuring access to historical and tribal sites and access to the river.

The City partners with other jurisdictions and coordinates with regional efforts, including those described below, to realize the City's objectives and support progress toward regional goals.

4.1 Lower Green River Corridor Flood Hazard Management Plan

The Lower Green River, between river miles 11 and 32, which flows through the southern portion of Tukwila, is at risk of severe flooding. The King County Flood Control District (KCFCD) will develop a Lower Green River Corridor Flood Hazard Management Plan. This plan will be developed to guide investments to reduce flood risk over the next 30 to 50 years. At the time of writing KCFCD has finalized a Programmatic Environmental Impact Statement (PEIS) which will inform when the plan is drafted, and which approach is taken to reduce flood risk and other objectives. The City and many other stakeholders commented on the Draft PEIS' three alternatives. In 2019, the City requested the inclusion of the following ten flood control projects in KCFCD's capital construction budget over the following ten years:

- Gaco-Mitchell-Segale Levee
- S. 180th Bridge to Pedestrian Bridge
- Christensen Rd. Levee
- Ratolo Levee
- Van Warden Levee
- Christensen Rd. Levee
- Segale-Green Levee

- Gunter Levee
- Christensen Rd. Levee
- Cross Levee

The City continues to coordinate with KCFCD and has supported two additional flooding control projects within the City limits which are on the KCFCD's current six-year CIP: the Desimone Levee Repair and the Fort Dent Levee Repair.

4.2 Salmon Habitat Plan

Tukwila falls within the Duwamish and Lower Green River sub-watersheds within Water Resource Inventory Area 9 (WRIA 9). WRIA 9 developed a Salmon Habitat Plan, most recently updated in 2021, which focuses on identifying, prioritizing, and implementing salmon recovery actions.

WRIA 9 Salmon Habitat Plan 2021 Update is an addendum to the 2005 WRIA 9 Salmon Habitat Plan. The 2021 Update is a status update for the Green River Chinook salmon population for which the long-term goal is to achieve self-sustaining levels of Puget Sound Chinook numbers, distribution, and diversity. The Plan Update introduces new 10-year habitat goals for "necessary future conditions" for achieving a viable salmon population. The prioritized actions in the plan align with creating supportive rearing and high-flow refuge habitat in the lower basins to support increased spawning habitat in the upper watershed that will become available with the Howard A. Hanson Dam downstream fish passage project planned for 2030 (see Section 2.6.1).

There are two 10-year goals for the Duwamish River Sub Basin. The first is creation of 40-acres of shallow water habitat between river mile 1 and 10. The second is revegetating 170-acres/9.8 miles of streambank.

The plan has several goals related to off-channel habitat, riparian forest, large woody debris, and bank armor in the Lower Green River Sub Basin. The off-channel habitat goals include restoring 240-acres of floodplain habitat, restoring 550 feet of high flow channels and 3,470 feet of low flow channels, and re-connecting 75-acres of backwater habitat, 66-acres of floodplain wetland, and 99-acres of other 100-year floodplain. The riparian goal includes revegetating 250-acres/8.52 miles of high-priority unforested shoreline. The large woody debris goal includes achieving the installation of 425 pieces/mile. The bank armor goal includes setting back one mile of levee.

A total of 127 projects were identified and ranked into three tiers. Tier 1 projects have significant potential to advance salmon recovery and contribute to habitat goals. Tier 2 and

Tier 3 projects have moderate to limited potential, respectively, to advance recovery and achieve habitat goals. The projects identified in the Salmon Habitat Plan are opportunistic and rely on willing landowners; the plan has a long horizon, allowing proponents to act on opportunities when they arise.

Numerous Tier 1 projects are within the City of Tukwila:

- Project number DUW-2 (Rendering Plant): Acquire and restore approximately seven acres with side channel and backwater habitat enhancements and reforestation.
- Project number DUW-7 (Chinook Wind): Expand and enhance low velocity, shallow water rearing habitat (shallow subtidal and intertidal) in the Duwamish transition zone. This project was constructed in 2021 and created more than four acres of estuarine wetland, aquatic, and riparian habitat area which provides off-channel habitat.
- Project number DUW-7a (Chinook Wind Extension): Expand and enhance the land between Chinook Wind Mitigation and Duwamish Gardens to create a unified park and restoration site. This project is currently in design and is on the City's 2023-2028 Capital Improvement Program.
- Project number DUW-25 (Desimone Oxbow Restoration): Acquire and restore 45.4-acre site resulting in 23.6 acres of marsh created, 10.8 acres of vegetation, and 34.4 acres refuge habitat created. This project is unlikely to take place in the near future, despite WRIA and government coordination efforts. An Amazon warehouse and shoreline restoration was completed in 2021 on this parcel.
- Project number DUW-64 (U-Haul River Project): Acquire and restore an approximate four-acre parcel by creating off-channel mudflat, marsh, and riparian habitat.
- Project number LG-35 (P-17 Pond Connection Reconnection): Relocate the City of Tukwila's stormwater pond; clean and connect the existing pond to the river, setback the levee to create up to seven acres off-channel habitat.

4.3 Our Green Duwamish Implementation Plan

The City of Tukwila is a partner with Our Green Duwamish which strives to improve air, land, and water conditions in the Green/Duwamish River watershed. The Our Green Duwamish Implementation Plan is a coordinated regional effort to restore stormwater quality and control stormwater quantity. The City of Tukwila has committed to numerous actions to achieve the plan's goals and objectives.

4.4 Action Agenda for Puget Sound

Puget Sound Partnership is a Washington state agency leading the regional effort to restore and protect Puget Sound. The City of Tukwila falls within the Puget Sound National Estuary Program area, and the City supports the Partnership's Action Agenda for Puget Sound. At the time of writing the Action Agenda is a 2022-2026 plan that outlines a set of strategies to achieve 23 desired outcomes that will have multi-benefit results. As a recovery partner the City is committed to implementing specific projects, programs, and actions to advance recovery of Puget Sound.

4.5 Duwamish Blueprint: Salmon Habitat in the Duwamish Transition Zone

The Duwamish Blueprint: Salmon Habitat in the Duwamish Transition Zone document originated from a program in the 2005 WRIA 9 Salmon Habitat Plan. The Duwamish Blueprint Working Group finalized the current working draft in 2014. The document provides guidance to improve the aquatic ecosystem of the Duwamish Estuary which extends from Kellogg Island in the City of Seattle to the I-5/SR-599 interchange in Tukwila. This estuarine habitat is particularly important for migrating juvenile salmon which need food, shelter, and habitat to osmoregulate as they transition to saltwater fish. Several of the projects sponsored by the City of Tukwila in the Duwamish Blueprint are now projects outlined in the WRIA 9 Salmon Habitat plan. Several more projects have already been completed within the city limits.

4.6 2020 State of our Watershed

The Northwest Treaty Tribes' State of Our Watersheds Report was most recently released in 2020. The City of Tukwila falls within the Muckleshoot Tribe's geographic area of interest which includes WRIAs 8, 9, and 10. The report illustrates the need to continue to protect habitat and achieve restoration goals. The report specifically notes the need to establish a riparian shade corridor along the Green River, including through Tukwila, to address water temperatures.

4.7 Stormwater Parks

King County published a provisional goal of implementing 30 stormwater parks throughout the County in partnership with municipalities and organizations. Stormwater parks are facilities that serve to both treat stormwater from a larger area, such as a regional treatment facility, and provide recreational opportunities, such as parks, trails, or community gardens). Stormwater parks can provide numerous benefits, including but not limited to equity, climate resilience, green space, wildlife habitat, and educational opportunities. Puget Sound

Regional Council provides guidance related to the siting and design of stormwater parks. The 2024 SWCP recommends implementing multi-benefit stormwater parks in Tukwila where feasible.

4.8 Coordinating with Tribes

City of Tukwila Surface Water Program is committed to coordinating protection of surface waters and river-adjacent cultural resources with the Duwamish Tribe and the Muckleshoot Indian Tribe. A representative of the Duwamish Tribe commented on a draft of the 2024 SWCP (Appendix G), and the Surface Water Program will integrate the following considerations into plans when implementing projects and programs:

- Protect cultural resources during groundbreaking activities.
- Support access to the Duwamish River for the Tribe and other local community members.
- Where outdoor lighting is planned, consider responsible outdoor lighting that protects the night skies.
- Observe stream and wetland buffers.
- Use woody debris where sensible in urban streams to slow down flows.
- Consult with the Duwamish Tribe on Lushootseed signage around their sacred sites.

5.0 Surface Water Known Issues and Solutions

This section summarizes surface water known issues discovered during preparation of the 2024 SWCP. These known issues are organized by type of surface water issue: drainage, water quality, erosion, maintenance, or habitat. Appendix D contains the detailed information in support of this section.

5.1 Available Data and Information

Known issues identified in the 2013 Surface Water Comprehensive Plan were evaluated and kept if still relevant. The following sources of information were used to identify known issues in the 2013 Plan:

- Anecdotal and recorded information provided by City staff.
- Observations made during field visits by CH2M HILL and City staff.
- 2003 City of Tukwila Comprehensive Surface Water Management Plan.
- The following drainage studies:
    - 1993 Surface Water Management Comprehensive Plan.
    - 1994 Gilliam Creek Detention and Water Quality Enhancements.
    - 1996 Fostoria Basin Stormwater Quality Management Plan.
    - 1997 Southgate Creek By-Pass Study.
    - 2001 Gilliam Creek Basin Storm Water Management Plan.

In addition to these sources, the 2024 SWCP references the following to identify known issues:

- Anecdotal and recorded information provided by City staff, including:
    - List of polluting gravel yards
    - 2022 Small Drainage Project List
    - Flood Patrol Assets List
    - Sites catalogued during fieldwork and workshops in 2022 and 2023
- 2013 Surface Water Comprehensive Plan.
- Juvenile Chinook Use of Non-natal Tributaries in the Lower Green River (2019).
- Gilliam Creek Water Quality Assessment and Report (2019).

- Riverton Sampling Report from the Riverton Flapgate Removal Project (2020).
- Tukwila Pond Park Master Plan (2022).
- Technical Information Report for Starfire Fields at Fort Dent Park (2003).
- Citizen reports at an open house in 2023.

5.2 Surface Water Known Issues

The 2024 SWCP has identified 169 specific surface water known issues within the City of Tukwila. Localized drainage problems are the one primary surface water concern for the residents of the City of Tukwila. Drainage issues arise on both public and private property where there are no storm drainage systems, the existing conveyance systems are damaged or in need of maintenance, or the existing conveyance systems have inadequate hydraulic capacity. Much of the development in Tukwila occurred before current stormwater flow control standards. In addition, as impervious surfaces are added, more stormwater runs off during storms, exacerbating existing problems.

Water quality problems are evident in the Green and Duwamish River system and in each of the major creek systems within Tukwila. The Green River and Duwamish River are listed as impaired on the 2022 Ecology 303(d) list for the following pollutants associated with stormwater runoff and reduction in riparian cover: dissolved oxygen, temperature, and pH. Untreated runoff from arterial streets with intensive traffic usage, areas of dense commercial development, parking lots, and I-5 and I-405 contributes to these problems. All of Tukwila's creek systems are also affected. Runoff conveyed to the river via these creeks is contributing to impairment of the Green and Duwamish Rivers. Bacteria and poor bioassessment are also issues in Tukwila's streams.

A new chemical called 6PPD (N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine) that causes acute death of coho salmon was identified in 2020. 6PPD is used in all tires as a rubber preservative to increase the lifespan of the tire. 6PPD is also found in all recycled tire products. When exposed to air this chemical reacts with ozone to create 6PPD-quinone (6PPD-q) which contaminates stormwater runoff and is lethal to coho salmon even in small quantities, less than one part per billion. Stormwater managers are researching best management practices (BMPs) that manage 6PPD-q contaminants in stormwater runoff. At the time of writing research indicates that BMPs that use infiltration, sorption, and/or filtration are expected to reduce the concentrations of 6PPD-q in runoff. Additionally, it is expected that preventive maintenance, such as street sweeping or catch basin cleaning, prevent runoff of 6PPD-q to receiving waters. 6PPD-q is a regional, statewide, and citywide concern.

Available aquatic habitat has been significantly reduced in the creeks that drain Tukwila due to the effects of development and the loss of riparian buffer areas. Uncontrolled runoff flows coupled with steep slopes in the upper reaches of Gilliam, Southgate, Riverton, and Johnson Creeks cause channel erosion that in turn delivers sediments to the lower-gradient downstream reaches of these streams. Other causes such as landslides may be contributing to the sedimentation in the lower stream reaches. Sediment deposition significantly reduces the conveyance capacity of the channels, restricts fish passage, and hinders the potential for salmonid spawning in these lower reaches. Better quality aquatic habitat in the lower reaches of Tukwila's streams and changes to river velocity at the confluences would provide refuge to salmonids from high flows and predators in the Green and Duwamish Rivers. Several culverts are blockages to fish passage from the lower reaches to the upper reaches of several creek systems. Addressing these blockages to fish passage would provide salmonids access to aquatic habitat in the middle and upper reaches of these systems. In addition, restoration of riparian buffer areas both in the upper and lower reaches of these creeks would reduce water temperatures, which is better for salmonids at all life cycles. Many opportunities for salmon habitat restoration (and protection) are outlined in the WRIA 9 Salmon Habitat Plan (WRIA 9 2021).

Table 5-1 summarizes the surface water known issues by type. Individual surface water issues are shown on Figure 5-1 and discussed in detail in Appendix D.

Table 5-1
Surface Water Known Issue Summary

		Type of Surface Water Issue				
Drainage Basin	**Number of Issues[1]**	**Drainage**	**Water Quality**	**Erosion / Sediment**	**Maintenance**	**Habitat[2]**
Gilliam	64	27	10	0	27	0
Green/Duwamish	62	16	32	0	13	1
Johnson	4	0	3	0	0	1
Mill Creek	0	0	0	0	0	0
Nelson	8	1	5	0	2	0
P17	15	4	5	0	5	1
Riverton	34	11	11	1	10	1
Southgate	49	18	18	1	12	0
Springbrook	1	0	0	0	1	0
Totals	237	77	84	2	70	4

[1] 169 total known issues were documented. Many issues are categorized into multiple types, therefore the total count by issue type (237) exceeds the total number of issues documented (169).

[2] Number of habitat known issues exceed totals documented in this table. Findings of the separate Fish Passage Barrier Update memorandum are not documented here. See Appendix B.

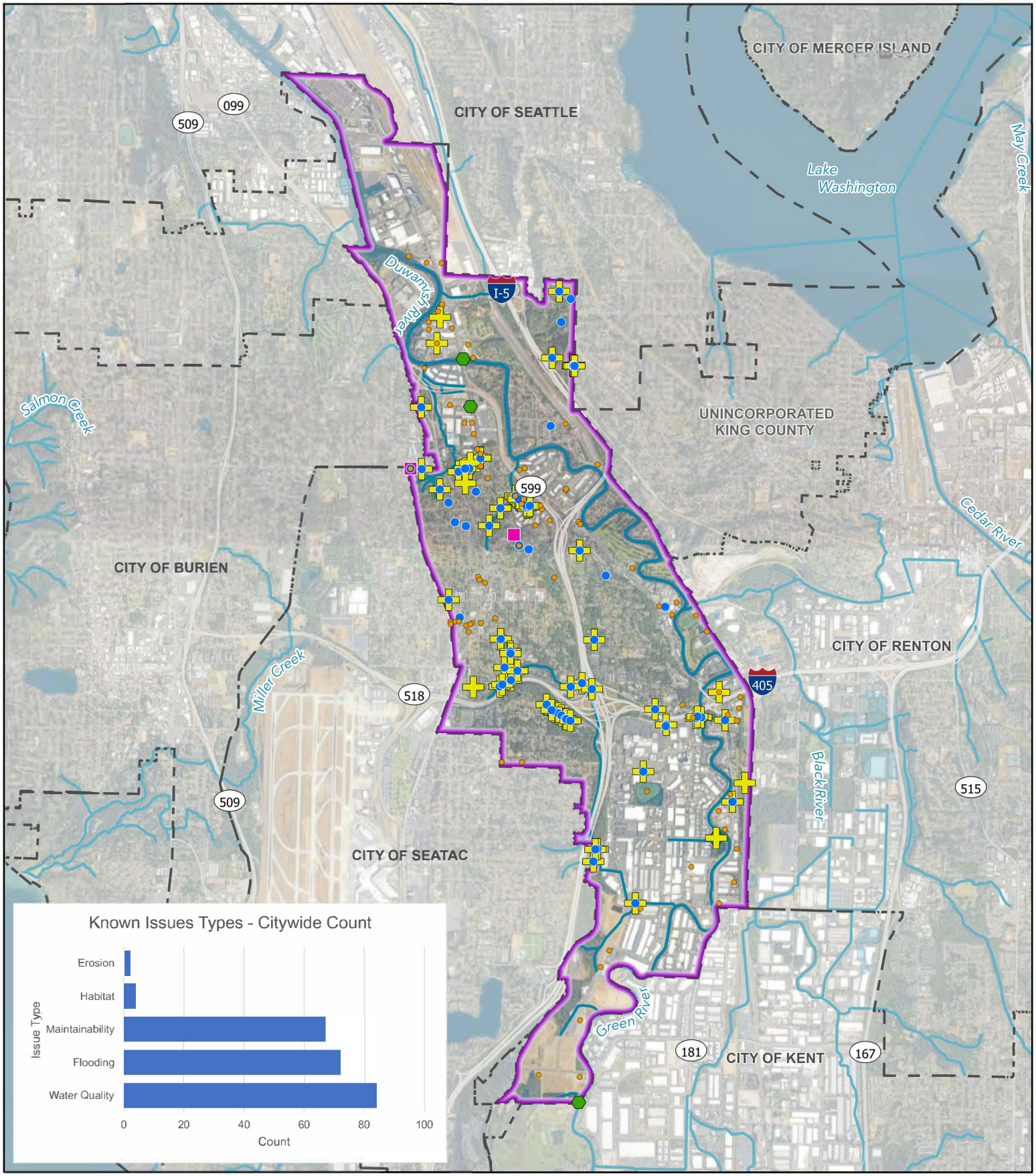

FIGURE 5-1
KNOWN ISSUES
TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers

Known Issue Point

- Water Quality
- Flooding
- Erosion
- Maintainability
- Habitat

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Data Sources: King County, City of Tukwila, Google Maps.
Date: 3/29/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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5.3 Menu of Solutions to Address Surface Water Issues

This section outlines the menu of solutions that could be used to address the surface water issues identified in the City of Tukwila. No single type of action, activity, or project is a "one size fits all" fix to all of these identified problems. Some surface water problems have structural solutions, while others have programmatic (non-structural) solutions, and many have both programmatic and structural solutions. Implementing a diverse portfolio of solutions allows for different aspects of the issues to be addressed by different solutions.

Potential solutions are divided into actions that would not involve construction or land acquisition, collectively referred to as programmatic approaches, and projects that would require construction or land acquisitions and would be listed in the City of Tukwila Capital Improvement Program. The programmatic activities have the benefit of often being strategic rather than reactionary. Instead of fixing a single problem with a structural solution, programmatic alternatives often address a series of existing problems and are effective at preventing future problems.

Often, capital (structural) solutions are most effective for single-location surface water problems and programmatic solutions are most effective for watershed-wide or other large-scale problems. Regulatory requirements (such as the NPDES Phase II Permit) emphasize programmatic approaches to problems. Also, water quality problems can be targeted successfully using programmatic means such as source control measures. Sub-basin- or watershed-wide water quantity problems, such as increase in impervious surface runoff, can be addressed with programmatic solutions. Location-specific known issues can be addressed with capital projects. Using capital projects and programmatic solutions in tandem is the most effective method of addressing problems comprehensively.

Because multiple sources contribute to the problems, multiple solutions targeting different sources and different aspects of sources are appropriate. Programmatic actions can provide overlapping benefits, thus addressing several pollution sources at once. However, capital projects can yield immediate, measurable results in a specific location, such as reduction of sediment load to the Green River from a specific parking lot. An additional benefit of capital projects is that the City can implement any number of individual capital projects in any given year depending upon funding availability.

A programmatic capital improvement program is a hybrid approach combining the programmatic and capital solution types described above. A programmatic capital improvement program acknowledges that the solution to intractable or widespread surface water issues requires coordinated and prioritized capital investments over a long period of time and/or large geographic area. As examples, programmatic CIPs may be employed to

improve water quality in a full stream system, to restore access to fish habitat in several stream systems, or to address widespread small drainage issues over an entire City. Programmatic CIPs often rely on studies or alternatives analyses to evaluate the most effective capital projects and the most effective order in which to implement projects. As City of Tukwila participates more vigorously in reaching regional goals such as salmon recovery, protection of Puget Sound, and protection of developed lands and people from severe flooding of the Green River and Duwamish River, programmatic CIPs are useful in identifying and prioritizing projects that the City can implement to realize progress toward regional goals. In addition, the next issuance of the NPDES Phase II Permit may require permittees such as Tukwila to implement water quality retrofit projects identified in the SMAP. The SMAP for Riverton Creek Basin can be considered, in part, as a programmatic CIP with the goal of improving water quality in Riverton Creek for fish and people, as can the Water Quality Retrofit Program and Green the Green Program, which endeavor to provide structural retrofits and shoreline revegetation, respectively.

5.3.1 Programmatic Solutions

One objective of the Surface Water Comprehensive Plan is to comprehensively address drainage, water quality, erosion, maintenance, and habitat issues identified in the City of Tukwila. Another is to coordinate with regional efforts to improve water quality, fish passage and habitat, and flood protection in and along the region's streams, rivers, lakes, and Puget Sound. The type(s) of surface water issues that could be addressed by individual programmatic solutions are summarized in Table 5-2. Note that many of these activities are required in whole or in part by the City's NPDES Phase II Permit. The remainder of this sub-section discusses each of programmatic solutions in further detail.

Table 5-2
Known Issue Types Addressed by Programmatic Solutions

	Known Issue Type					
Program Element	**Drainage**	**Water Quality**	**Erosion / Sedimentation**	**Maintenance**	**Habitat**	**Required by NPDES Phase II Permit***
Stormwater Planning		x	x		x	x
Regulatory and Policy Changes	x	x	x		x	x
Inspection and Enforcement	x	x	x			x
Operations and Maintenance	x	x	x	x	x	x

Table 5-2
Known Issue Types Addressed by Programmatic Solutions

Program Element	Known Issue Type					Required by NPDES Phase II Permit*
	Drainage	Water Quality	Erosion / Sedimentation	Maintenance	Habitat	
MS4 Mapping and Documentation	x	x	x	x	x	x
Public Education and Outreach	x	x	x		x	x
Public Involvement and Participation	x	x			x	x

* Required in whole or in part

5.3.1.1 Stormwater Planning

Stormwater planning is an NPDES Phase II Permit requirement. In part, stormwater planning requires the City to cooperate interdepartmentally to ensure the protection of water quality and compliance with the NPDES Phase II Permit. Stormwater planning improves water quality by developing a set of policies and strategies to implement based on receiving water conditions. The City has developed an inter-disciplinary team to inform stormwater planning in Tukwila and coordinates with other planning efforts in the City to ensure water quality is taken into account.

The City has adopted Low Impact Development (LID) regulations and BMPs which reduce the impact of new development and redevelopment projects on surface waters. The City will continue to review and revise these regulations as new information becomes available.

Among other collaborative, regional stormwater planning efforts described in Section 4, the City completed a Stormwater Management Action Plan (SMAP) for Riverton Creek in 2023 which can be found in Appendix F. This SMAP identifies stormwater retrofits, land management and development strategies, customized stormwater management actions, and instream improvements to protect and restore water quality in the Riverton Creek basin.

Stormwater planning benefits water quality, erosion/sedimentation, and habitat.

5.3.1.2 Regulatory and Policy Changes

There are two broad categories of water quality problems in Tukwila: 1) non-point source pollution, which include contaminants coming from roads, vehicles, parking lots and buildings and 2) point source pollution, which is identifiable and traceable to a particular

source. Sources include illicit discharges of material into storm drains or permitted industrial discharges. Regulations prohibit the illicit discharge of contaminants to stormwater runoff, and protection of water quality is dependent on improved regulations to address the source of the pollutants so that stormwater runoff entering the City's storm drains is as clean as possible.

Programmatic solutions can be used to prevent future drainage and water quality problems by managing how new development and redevelopment is conducted. The Tukwila Municipal Code, the 2019 Infrastructure Design Standards, and the 2021 King County Surface Water Design Manual regulate stormwater management for development and redevelopment projects.

The Surface Water Management Program staff is aware of frequent use of the nonconforming parking lot standards in TMC 18.70.080, which permit temporary gravel parking lots to be constructed without drainage and water quality treatment facilities. Many of these lots have since effectively become permanent installations and may contribute to localized flooding and water quality issues. The City has identified 65 gravel parking lots without drainage or treatment facilities. The nonconforming parking lot standards have not been updated since 1997.

Changes to City policies and regulations would have drainage, water quality, erosion/ sedimentation, and aquatic habitat benefits.

5.3.1.3 Inspection and Enforcement

Inspection and enforcement meet the requirements of the NPDES Phase II Permit. The City conducts various surface water-related inspections. The following types of inspections are conducted by City of Tukwila's Surface Water Management Program or by the Department of Community Development:

- Inspections to detect, remove, and prevent illicit connections, discharges, and improper disposal of non-stormwater runoff, including spills, into the surface water system.
- Construction site erosion and sedimentation control inspections and pollution control inspections to reduce sources of pollution in stormwater runoff.
- Development site stormwater facility inspections to review construction of required stormwater management facilities on permitted development and redevelopment sites.

- Private stormwater facility maintenance inspections to review maintenance condition of required privately-operated stormwater facilities.
- Public stormwater facility and catch basin maintenance inspections to review maintenance condition of the City's stormwater facilities and refer required facility maintenance tasks to other personnel.
- Business source control inspections to reduce sources of pollutants in stormwater.
- As-needed closed-circuit television (CCTV) inspections of stormwater conveyance pipes to assess both structural condition and maintenance condition.

Possible changes to inspections and enforcement include:

- Prioritizing business source control inspections in a single drainage basin to make measurable progress toward water quality improvement in a high-priority stream system (see the SMAP in Appendix F).
- Escalating enforcement when violations are found. Note that the NPDES Phase II Permit requires each permittee to include escalating enforcement procedures and actions as part of its illicit discharge prohibition regulations by July 1, 2027.
- Incorporating information about PCBs and other emerging pollutants of concern into inspection training materials, inspection checklists, and technical assistance materials.

Inspection and enforcement activities have drainage, water quality, and maintenance benefits.

5.3.1.4 Operations and Maintenance

Operations and maintenance are essential to maintaining a functional drainage network, removing pollution, managing erosion and sedimentation, and supporting aquatic habitat. Elements of operations and maintenance duties are spelled out in the NPDES Phase II Permit requirement.

Currently, Tukwila City maintenance staff maintain the surface water system, including but not limited to pipes, manholes, inlets and catch basins, ditches, open streams, and pump stations. The City implements maintenance standards in the latest version of the King County Surface Water Design Manual. The City has also developed a program for long-term operations and maintenance for City facilities. By conducting proactive maintenance Tukwila may benefit water quality and habitat by reducing pollutant and total sediment load to creeks. An example of this is cleaning out catch basins more often than required by the NPDES Phase II Permit in sensitive areas such as near salmon-bearing creeks. Another example is street sweeping.

The City has two upcoming projects that will adjust the existing operations and maintenance program: an Enhanced Maintenance Plan (EMP) and NPDES Program Assessment. Developing an EMP is a requirement of the Department of Ecology in order for the City to obtain funding for its future decant facility. The EMP will describe the City's current surface water maintenance program and develop recommendations for maintenance procedures that will further improve water quality. The NPDES Program Assessment provides a gap analysis with both short-term and long-term programmatic improvements including operations and maintenance.

Tukwila is also required to inspect private stormwater facilities according to the NPDES Phase II Permit. The City must have a regular inspection plan for both public and private facilities.

Maintenance benefits drainage, water quality, erosion/sedimentation, maintenance, and habitat.

5.3.1.5 MS4 Mapping and Documentation

Municipal Separate Storm Sewer System (MS4) mapping and documentation is an NPDES Phase II Permit requirement. MS4 mapping is an important tool for engineering staff and operations and maintenance staff to visualize what and where stormwater assets are, to delineate what assets belong to the City as opposed to adjacent cities, other agencies, or private properties. The tool is used by staff to locate assets for both routine maintenance and repair as well as detection of illicit discharges and illicit connections. The information is referenced by in-house and consulting designers and engineers and is often the subject of requests by the public and by developers. As such, it is important to keep the MS4 mapping as up-to-date and accessible as possible. At the time of this writing, the Technology and Information Services Department is in the process of creating a self-service portal for stormwater assets so that the public may directly access this information, saving them time and staff time.

City staff have experienced challenges to maintaining an accurate and updated MS4 mapping system. In 2023, Public Works hired a GIS Field Technician to collect in-field utility data, support Lucity software integration for operations and maintenance work order management, and support the Technology and Information Services Department to integrate field data and as-built information into the GIS MS4 map.

MS4 mapping benefits drainage, water quality, erosion/sedimentation, maintenance, and habitat.

5.3.1.6 Public Education and Outreach

Public education and outreach is an NPDES Phase II Permit requirement. Many surface water issues in Tukwila are caused by the everyday actions of people that live in or visit the City. Educating the public about the link between human actions and activities and their effect on watershed and ecosystem health is a key component to restoring water quality.

The City's current efforts are strategically driven to deliver effective personal messaging to residents, property owners, fixed and mobile businesses, to build general awareness, effect behavior change, and create stewardship opportunities for residents and interested outside parties. The City uses regional resources and public partnerships to implement the program including Stormwater Outreach for Regional Municipalities (STORM), Washington Stormwater Center, Municipal Resource Service Center/Washington Cities Insurance Agency, and regional meetings.

Public education and outreach have drainage, water quality, and habitat benefits.

5.3.1.7 Public Involvement and Participation

Public involvement and participation are an NPDES Phase II Permit requirement. Public involvement can promote awareness of and foster a sense of responsibility for the health of the watersheds of Tukwila and of the greater Puget Sound, and it can help identify problems and solutions. Engaging people in the reporting and documenting of surface water problems through phone hotlines increases detection of problems.

A technique for reducing impervious surfaces, which may improve drainage, water quality, and habitat indirectly, is to remove existing unneeded pavement, also known as 'depaving.' Depaving is an established community partnership model used in Washington and Oregon to replace unwanted impervious surface with healthy urban tree canopy in support of adopted City goals and regulations around surface water management, the environment, livability, health, and equity.

Public involvement activities can be coordinated with the educational activities mentioned previously.

Public involvement benefits drainage, water quality, and habitat.

5.3.2 Capital Project Solutions

Capital projects implemented as part of a comprehensive capital improvement program (CIP) can together address many of the surface water problems identified in the City of Tukwila often resulting in multiple benefits. Capital projects have the potential to reduce and/or store stormwater volumes, reduce peak flows, improve water quality, reduce erosion,

reduce maintenance demand, restore habitat, and provide a public amenity. This section includes descriptions of the methods that can be utilized to address these surface water issues using capital projects. The type(s) of known issues that could be addressed by capital projects are summarized in Table 5-3. The remainder of this sub-section discusses each of the types of capital projects in further detail. Capital project types are organized by known issue type (drainage, water quality, erosion/sedimentation, maintenance, and habitat).

Table 5-3
Surface Water Issue Types Addressed by Capital Projects

	Surface Water Issue Type				
Capital Project Type	**Drainage**	**Water Quality**	**Erosion/ Sedimentation**	**Maintenance**	**Habitat**
Increase conveyance capacity*	x			x	
Provide drainage system (or re-route existing)	x			x	
Infiltration*	x	x	x		x
On-site detention/retention	x	x	x		
Regional detention/retention	x	x	x		
Velocity reduction (check dams, etc.) *	x	x	x	x	x
High flow bypass	x		x		
Impervious surface reduction*	x	x	x		x
Point source control		x			x
Water quality treatment*		x			x
Conveyance system cleaning and inspection*	x	x		x	x
Capital repair & replacement of stormwater facilities				x	
Land acquisition*	x	x			x
Sanitary sewer separation	x	x			x
Riparian buffer restoration / protection*	x	x	x		x
Channel stabilization*	x	x	x		
Channel physical habitat restoration					x
Fish passage barrier removal*					x

* These capital project types were marked as a priority by the Duwamish Tribe.

There is increasing emphasis on providing larger-scale, collaborative stormwater capital projects, and a variety of the capital project solution types described below are candidates for procurement and implementation using Community-Based Public-Private Partnerships (CBP3). See Section 8.2.1 for more about CBP3 as an implementation strategy for surface water capital improvements.

5.3.2.1 Drainage

Capital projects meant to address altered hydrology (that is, water quantity) include infiltration, regional detention/retention, onsite detention/retention, reductions in impervious surface, velocity reduction, high-flow bypass facilities, dispersion, stream buffer restoration, and land purchase. The effectiveness of any of these alternatives can be limited by physical space constraints. The feasibility of any of these alternatives is also often limited by topography, soil conditions, and the presence of sensitive areas.

Increasing Conveyance Capacity of a drainage network is often performed to alleviate localized drainage issues. Pipes are removed and replaced with a larger diameter pipe. Hydraulic and hydrologic analysis should be performed in order to assess upstream and downstream impacts of proposed conveyance capacity changes.

Providing a drainage network where there is currently no formal system will provide conveyance of stormwater away from a location. Lack of a formal (that is engineered or planned) drainage network is common in areas developed before current stormwater standards.

Infiltration is an extremely effective method to reduce stormwater runoff volumes and peak flows. Under pre-development conditions, a significant portion of the annual precipitation infiltrated into the ground. After development, and the corresponding increase in impervious surfaces that prevents infiltration, much more of the annual precipitation runs off as stormwater, a generally warm, chemically compounded water, which moves quickly across the landscape, through pipes and ditches, into receiving waters or downstream conveyances that may flood or scour as a result. Promoting infiltration is a method to reduce the impacts of development by mimicking natural hydrologic processes, capturing pollutants, and slowly releasing the water through the subterranean hyporheic zone, which in turn, supplies streams and rivers with cool water through warmer and drier months.

Infiltration effectiveness is a function of soil infiltration capacity. Many areas of Tukwila have topsoil that is conducive to infiltration. When local soils are not conducive to infiltration, soils amended with organic material can be brought in and placed over native soils. Even if the native underlying soils have low infiltration capacity, the infiltrated water will use the storage

available in the soil column of the amended soil layer until infiltration into the underlying layer is possible. Moisture retained in the amended soil layer is available for plant uptake, including lawns.

During construction activities, it is common for the native top layer of soil to be stripped away. In this case, amended soils should be introduced rather than relying on the remaining native soils. Planting, then maintaining, a lawn on the remaining native soil will require watering and fertilizing that would not be necessary if the native top layer were still in place or if amended soils were used.

Regional detention/retention is a plausible structural solution. Regional detention could be used to detain erosive peak flows. Total volumes of stormwater runoff and the duration of erosive flows to streams can be reduced through retention via evaporation, plant uptake, and infiltration. In addition to implementation of new facilities, existing regional detention facilities can be retrofitted to promote capacity and capability. A more recent advance is to provide real-time control of releases from regional detention facilities based on weather predictions; a proprietary version of this technology is known as Continuous Monitoring and Adaptive Control (CMAC) by OptiRTC, Inc. Real-time control may be used to retrofit existing detention facilities for better performance and may also be used in the design of new regional detention. **Onsite detention/retention** and other site-specific measures are also effective at detaining peak flows, decreasing total volumes of stormwater runoff, and reducing the duration of erosive flows to streams. Onsite detention and other site-specific measures on public, City-owned property is considered capital projects and are therefore discussed in this section. Onsite detention and other site-specific measures on private property are discussed in the programmatic solutions section under education and regulations. That said, it may be feasible to use public funds to fund on-site detention on private property if the benefit is shared by a larger group than just the private property owner. Dispersion, for purposes of this discussion, is considered a type of on-site stormwater management.

Reductions in impervious surface can reduce runoff volumes and velocities. Low Impact Development (LID) regulations can promote reduced widths of newly constructed roadways and is covered in the regulations section (programmatic), but retrofitting existing infrastructure is a structural solution. Pilot projects for reducing road widths and using permeable pavements can be implemented within the City to address water quantity concerns.

Conveyance system cleaning and inspection provides information as to the condition of the stormwater conveyance system that allows for prioritization of rehabilitation, repair, or

replacement efforts. In addition, cleaning of the conveyance system can increase the effective conveyance capacity by removing accumulated sediment and other material. Water quality benefits may also be obtained by removing that sediment from the stormwater system.

Stormwater runoff velocities can be reduced using **check dams and vegetation in existing ditches**. In addition, **high-flow bypass facilities** can be installed in areas that are prone to erosion under high flow regimes. **Stream buffer restoration** can reduce stormwater volumes via plant uptake and reduce stormwater velocities by adding roughness to the flow path. **Land acquisition** can be an effective method to reduce developed land surface and therefore reduce impervious surface, promote infiltration, and retain the natural tree canopy.

Sanitary sewer separation can ensure stormwater runoff does not mix with sanitary sewerage and discharge untreated sewage to surface waters.

5.3.2.2 Water Quality

The most effective methods to reduce pollutant loading to the City of Tukwila's receiving waters are controlling pollutants at the source and controlling stormwater flows (that is, peak flows, volumes, and durations of erosive flows). Water quality treatment can also be an effective method, but effectiveness is often limited by available technology. Channel stabilization also has water quality benefits.

Source control measures tend to be programmatic in nature rather than structural and are therefore addressed in the programmatic solution section. However, **control of point source** water quality problems is covered in this section.

Alternatives geared towards reducing volumes, peaks, and durations of stormwater runoff discussed in the drainage section also have positive impacts on pollutant inputs by reducing erosion and erosive capabilities of stormwater and by reducing total stormwater inputs to receiving water bodies. These solutions include infiltration, regional or on-site detention or retention, impervious surface reduction, velocity reduction, stream buffer restoration, and land purchase.

The effectiveness of **water quality treatment** as an alternative is limited by available technology. Total suspended solids (TSS) are relatively easy to remove but other pollutants such as nutrients and heavy metals are not. Particulate-bound copper can be removed via treatment, but dissolved copper is difficult to remove. Though particulate-bound copper can be removed using sedimentation and filtration, dissolved copper requires adsorption, precipitation, or separation. 6PPD-q is an emerging pollutant of concern that can early studies are showing can be removed from stormwater runoff using infiltration, sorption,

and/or filtration. Water quality treatment best management practices (BMPs) are available to remove each of these pollutants at varying costs.

The pollutant removal capabilities of stormwater treatment is dependent upon the concentrations of pollutants entering the treatment facility. The lower the influent concentration, the harder it is to remove. The term "irreducible limits" refers to the concentration at which no more of a constituent can be removed. The irreducible limit depends on available technology. The higher the influent concentration, the easier the constituent is to remove.

Channel stabilization can be used to reduce channel erosion propagated by increasing stormwater peak flows and volumes, in that it can minimize erosion and total suspended solids contributions. However, the use of channel stabilization needs to be weighed against risk when working in-stream since channel migration is an important stream forming process that supports off-channel rearing, refuge and food production for migratory salmon and other aquatic species. This structural solution can prevent significant erosion and minimize the risk of increasing channel incision (that is, down-cutting).

The selection of a preferred water quality solution is dependent upon pollutants of concern in the receiving water body.

5.3.2.3 Erosion/Sedimentation

Stream buffer restoration can reduce stormwater volumes via plant uptake and reduce stormwater velocities by adding roughness to the flow path. Velocity reduction can reduce erosion of the streambank and sedimentation downstream.

Channel stabilization can be used to reduce channel erosion propagated by increasing stormwater peak flows and volumes. This structural solution can prevent significant erosion and minimize the risk of increasing channel incision (that is, down-cutting).

5.3.2.4 Maintenance

Project types that improve conveyance, drainage, and facility design or condition have the possibility of decreasing maintenance frequency by reducing service calls for localized flooding and stormwater facility condition. These project types include **increasing conveyance capacity, providing drainage system, velocity reduction** within existing facilities that have been damaged by improperly managed inputs, **conveyance system cleaning and inspection,** and **capital repair and replacement of stormwater facilities.**

5.3.2.5 Habitat

Direct structural solutions aimed at aquatic habitat restoration include **replacing culverts, flapgates, or other structures that block fish passage**, **restoration of physical features of creek and river channels**, and **riparian buffer restoration and protection**. Any of these solutions can aid in aquatic habitat restoration. The 2024 SWCP contains an inventory of blockages to fish passage in Tukwila. Restoring physical features of creek channels and protecting and restoring stream buffers also have water quantity and water quality benefits, in addition to aquatic habitat benefits. Note that habitat restoration or protection projects on the Green or Duwamish Rivers will require significant partnerships with regulatory agencies and with other municipalities such as King County.

Land acquisition can be an effective and often necessary method to restore habitat, particularly critically-needed off-channel rearing habitat, which requires enough space to restore floodplain that supports shallow-gradient, slow water with sufficient space for the necessary earthwork and riparian buffer restoration. With Tukwila highly urbanized, and with older development encroaching well within historic buffers, and an extensive levee system along the Green River, there is insufficient space available along the river and its tributaries to create this off-channel habitat. Acquisition is an important tool to reduce developed land surface and therefore promote infiltration, retain the natural tree canopy, and restore stream buffers. Retention of the natural tree canopy and restoration of stream buffers promote improvement of aquatic habitat through shading.

Several other types of stormwater management solutions can indirectly improve fish habitat by reducing high stormwater flows that make it difficult for fish to conduct their lifecycle activities and by reducing stormwater pollution that affects water chemistry, such as **infiltration, velocity reduction, impervious surface reduction, point source control, water quality treatment, conveyance system cleaning and inspection, and sanitary sewer separation.**

5.4 Solutions to Tukwila's Surface Water Issues

The purpose of this sub-section is to specify individual solutions to the surface water issues outlined earlier in this section in Table 5-3. Table 5-4 outlines all major surface water issues identified during this planning effort. All of the surface water issues identified have been assigned one or more possible solutions. Each issue can be wholly or partially addressed by that, or those, solutions. Note that some City-wide problems such as the creation of temporary gravel parking lots without stormwater facilities will need to be addressed by either a programmatic activity (such as a regulatory change) or a programmatic CIP. Problems identified at specific locations may be addressed by a capital project, a

programmatic action, or a combination of both programmatic and capital investment. A recommended solution is also shown in Table 5-4.

Note that both the programmatic activities and capital projects recommended as part of the 2024 SWCP are described in Section 8 (Recommendations). Section 6 provides a listing of the capital projects.

Table 5-4
Recommended Solutions

ID	Problem Description	Location	Issue Type	Possible Solutions	Recommended Solution
KI-1	Sediment/clogging issues along all of Southgate Creek including Normed Drainage Issue	Southgate Creek	Drainage, water quality	Studies followed by Capital and/or Programmatic	Study (in progress)
KI-2*	Gilliam Creek dissolved oxygen issue	Gilliam Creek	Water quality	Capital (infiltration, retention, riparian buffer restoration, channel stabilization, sanitary sewer separation), or programmatic (education, source control)	Programmatic
KI-3	Gilliam Creek turbidity issue	Gilliam Creek	Water quality	Capital (all BMPs for Water Quality and Erosion/Sedimentation issue types), or programmatic (education, inspections, source control)	Capital and programmatic
KI-4	Gilliam Creek low pH issue	Gilliam Creek	Water quality	Programmatic (education, source control)	Programmatic
KI-5	Gilliam Creek Sediment (PAHs) Issue	Gilliam Creek	Water quality	Capital (water quality treatment, impervious surface reduction, point source control) or programmatic (education, inspection for source control)	Capital and programmatic

Table 5-4
Recommended Solutions

ID	Problem Description	Location	Issue Type	Possible Solutions	Recommended Solution
KI-6*	Riverton Creek Sediment (Metals) Issue	Riverton Creek	Water quality	Capital (water quality treatment, impervious surface reduction, riparian buffer restoration) or programmatic (education, operations and maintenance)	Programmatic SMAP for Riverton Creek Basin CIP and programmatic
KI-7*	Riverton Creek dissolved oxygen Issue	Riverton Creek	Water quality	Capital (infiltration, retention, riparian buffer restoration, channel stabilization, sanitary sewer separation), or programmatic (education, source control)	Programmatic SMAP for Riverton Creek Basin CIP
KI-8*	Fort Dent Park 6PPD-quinone issue	Fort Dent Park	Water quality	Study to confirm issue, or Capital (infiltration, water quality treatment)	CIP-3 Fort Dent Park Water Quality Retrofit
KI-9*	Runoff damaging private septic system	Beacon Ave S and S 103 St	Drainage	Capital (provide drainage system)	Programmatic Annual Small Drainage Program CIP
Mul-tiple	2022 Small Drainage Program List: KI-10 to KI-18 and KI-70 to KI-73 and KI-81, KI-87	Various	Drainage, Maintenance	Capital (increase conveyance capacity, provide drainage system, velocity reduction, capital repair & replacement)	Programmatic Annual Small Drainage Program CIP
Mul-tiple	Flood Patrol Assets – long list of stormwater system locations City staff checks	Various	Drainage, Maintenance	Programmatic (operations and maintenance)	Programmatic (operations and maintenance)

Table 5-4
Recommended Solutions

ID	Problem Description	Location	Issue Type	Possible Solutions	Recommended Solution
	during all storms: KI-19 to KI-69				
KI-74*	Fish mortality in Riverton Creek	Riverton Creek	Water quality	Study to confirm issue, or Capital (all BMPs for Water Quality issue types), or programmatic (education, operations for street sweeping)	Programmatic SMAP for Riverton Creek Basin CIP and study to confirm issue
KI-75*	Lack of off-channel salmon habitat along lower Duwamish River: Issue ID 4 in 2013 Plan	Duwamish River near light rail crossing	Habitat	Capital (physical habitat restoration)	Capital (physical habitat restoration) – Duwamish Gardens Phase II
KI-76	Fish habitat accessibility issues in Riverton Creek culvert: Issue ID 4 in 2013 Plan	E Marginal Way south of SR599	Habitat	Capital (barrier removal, physical habitat restoration)	Capital – King County Metro Base redevelopment project includes daylighting Riverton Creek
KI-77	Dumping	Citywide	Water quality	Programmatic (education, illicit discharge detection, maintenance, enforcement)	Programmatic (education, illicit discharge detection, maintenance, enforcement)
KI-78	Ponding in low spot, possible ponding on the east side of road: Issue ID 2 in 2013 Plan	49th Ave S and S Hazel Street	Drainage	Capital (increase capacity)	Solved

Table 5-4
Recommended Solutions

ID	Problem Description	Location	Issue Type	Possible Solutions	Recommended Solution
KI-79	Tukwila stormwater line discharges to WSDOT pipe, no access due to I-405 widening: Issue ID 10 in 2013 Plan	Andover Park W at Gilliam Creek	Drainage/ Maintenance	Capital (increase conveyance capacity, replacement of culvert to be fish-passable)	Capital CIP-4 Tukwila Parkway / Gilliam Creek Outfalls
KI-80	Historical landslide: Issue ID 10 in 2013 Plan	S 137th St at 44th Ave S	Water quality/ Drainage / Erosion/Sedimentation	Study	Study CIP-102 Middle Fork of Southgate Creek – Stream and Slope Stability Study
KI-82	Andover Park 48-inch storm-water pipe in poor condition, possibly damaged: Issue ID 11 in 2013 Plan	Andover Park W	Drainage	Capital (conveyance system repair & replacement)	Capital (conveyance system repair & replacement)
KI-83	34th Ave S Water-logged Property	34th Ave S north of S 135th St	Drainage	Capital (provide drainage system) or Programmatic (technical assistance)	None – private responsibility[2]
KI-84	Water Quality in Tukwila Pond	Tukwila Pond	Water quality	Capital (water quality treatment)	CIP-5 Tukwila Pond Water Quality Improvement
KI-85	Cascade view/S 128th St Landslide Known Issue	Military Rd S and S 128th St	Water quality, Drainage, Erosion/ Sedimentation	Study	Landslide study grant from Federal Emergency Management Agency (FEMA)

Table 5-4
Recommended Solutions

ID	Problem Description	Location	Issue Type	Possible Solutions	Recommended Solution
KI-86	Unauthorized encampment in Parcel 3747	Hwy 99 and S 146th St	Water quality	Capital (land acquisition)	N/A – parcel subsequently sold
Mul-tiple	Pollution-generating gravel parking lots: KI-88 to KI-154	Citywide	Drainage, Water quality	Programmatic (regulatory and policy changes, inspection, and enforcement)	Programmatic (regulatory and policy changes, inspection, and enforcement)
KI-155	Springbrook Maintenance	Springbrook	Maintenance	Programmatic (operation and maintenance)	Programmatic (operation and maintenance)[2.] City of Renton is responsible.
KI-156	S Ryan Way Drainage and Pipe Condition Issues	S Ryan Way between Beacon Ave S and Martin Luther King Way S	Drainage, Maintenance	Capital (repair & replacement of stormwater facilities)	CIP-2 S Ryan Way Pipe Rehabilitation
KI-157	Erosion at inlet of 108" diameter culvert carrying Gilliam Creek under 66th Ave S and the Green River Trail	66th Ave S and I-405	Drainage, Maintenance	Capital (velocity reduction, channel stabilization, repair & replacement)	Capital (velocity reduction, channel stabilization, repair & replacement) – project in progress
KI-158	Foster Heights erosion problem in Southgate	43rd Ave S just north of S 137th St	Erosion	Study	Study CIP-102 Middle Fork Southgate Creek Stream and Slope Stability Study

Table 5-4
Recommended Solutions

ID	Problem Description	Location	Issue Type	Possible Solutions	Recommended Solution
KI-159	Norfolk Trunkline Sewer Separation	East Marginal Way and S Norfolk St	Water quality	Capital (provide drainage system, sanitary sewer separation)	CIP-1 Norfolk Outfall Trunkline Sewer Separation Preliminary Feasibility Study
KI-160	General Water Quality and Flow Control Issues in Southgate Creek – Opportunity for Stormwater Park	44th Ave S and S 131st Pl	Water quality	Capital (regional detention/retention, water quality treatment, land acquisition)	Capital (regional detention/retention, water quality treatment, land acquisition)
KI-161*	Barriers to fish passage (citywide) and Johnson Creek Flapgate Fish Passage Barrier	Near Frager Rd S and S 204th St	Habitat	Capital (fish passage barrier removal, channel physical habitat restoration)	CIP-6 Johnson Creek Fish Barrier Mitigation Alternatives Analysis and Study CIP-101 Fish Passage Barrier Prioritization
KI-162	Incomplete transfers of responsibility of old WSDOT stormwater facilities to City	Interurban Ave S and South-west Grady Way & others	Water quality, Maintenance	Programmatic (policy changes)	Programmatic (policy changes)
KI-163	S 180th Pump Station Capacity Concern	S 180th St just east of South-center Pkwy	Drainage, Maintenance	Study	Study CIP-103 P17 Pond and Southcenter Subarea Hydraulic Study
KI-164	Minkler Property Sale and P17 Pond Replacement	Minkler Blvd east of Industry Rd	Habitat, Drainage, Maintenance	Study	Study CIP-103 P17 Pond and Southcenter Subarea Hydraulic Study

Table 5-4
Recommended Solutions

ID	Problem Description	Location	Issue Type	Possible Solutions	Recommended Solution
		along Green/ Duwamish River			
KI-165	ROW and private property flooding in Southgate Creek basin. Issue ID 24 in 2013 Plan.	S 146th St and 35th Ave S	Drainage	Capital (increase conveyance capacity)	CIP 90341214 S 146th St Pipe and 35th Ave Drainage System
KI-166	Unknown condition of storm system in Southcenter Subarea.	Southcenter Subarea	Maintenance	Programmatic (operation and maintenance)	CIP 91241203 Tukwila Urban Center Conveyance Inspections
KI-167	ROW and private property drainage issues occur along S 143rd St. Issue ID 9 in 2013 Plan.	S 143rd east of Interurban Ave	Drainage	Capital (provide drainage system)	CIP 98641222 S 143rd St Drainage System
KI-168*	No functional outlet to drainage network at Nelsen/Longacres. Issue ID 19 in 2013 Plan.	Area bounded by SR 181, Green River, BNRR, and Strander Blvd.	Drainage	Capital (provide drainage system)	CIP 98741202 Nelson/Longacres Drainage Improvement, Phase II
KI-169	Permanent home for soils reclamation facility (decant facility). Issue ID 18 in 2013 Plan.	TBD	Water quality	Capital (land acquisition and site development for decant facility)	CIP 99441202 Soil Reclamation Decant Facility

Table 5-4
Recommended Solutions

ID	Problem Description	Location	Issue Type	Possible Solutions	Recommended Solution
N/A**	Addressing flood protection along the Green/Duwamish River within the City, including the need to certify the Tukwila 205 Levee for accreditation from the Federal Emergency Management Agency (FEMA)	River corridor, citywide	Major flooding**	Capital (flood protection)**	CIP-104 Tukwila Master Plan for the Lower Green River Levee Projects

* These issues and solutions have been recognized as priorities by the Duwamish Tribe.

** This issue was added near the end of planning. The major flooding issue and flood protection capital solution type are not discussed extensively elsewhere in this document and are primarily the responsibility of the KCFCD.

5.5 Issue and Solution Prioritization and Selection

The planning process for the 2024 SWCP identified more issues that require a capital improvement than the City could afford to construct over the next 10 years. As a result, the issues were screened to identify the most important issues to address first. For the most important issues, potential capital improvement projects were prioritized based on a variety of factors. In addition to selecting capital improvement projects based on individual characteristics, the process also ensured that the City's portfolio of surface water CIPs and studies in the 2024 SWCP would solve a comprehensive set of surface water issue types and would address regional priorities. Table 5-5 describes the known issue screening factors, and Table 5-6 describes project prioritization weighting.

Table 5-5
Known Issue Screening Factors

	Audience		
Issue Type	**City**	**Regional Priority**	**Public Input**
Intractable, severe, or widespread issue within City	x		x
Localized drainage Issues	x		x
Degraded water quality from urban pollutants	x	x	x
Degraded water quality from erosion and landslides	x		
Flow control	x	x	
Degraded or lack of off-river fish habitat	x	x	x
Barriers to fish passage	x	x	x
Poor condition and aging of storm sewer system	x		x

Table 5-6
Project Prioritization Weights

Project Characteristics	Relative Weight		
	High	Medium	Low
Multi-beneficial project which combines solutions to multiple problems	x		
Multi-beneficial project which coordinates with efforts of other Tukwila departments and divisions (e.g., Parks, Transportation) or other agencies	x		
Project addresses a regional priority or anticipated regulatory requirement	x		
Project is eligible for grant funding	x		
Project received favorable public input	x		
Previously identified project not yet implemented		x	
Standalone water quality project		x	
Standalone habitat / fish barrier removal project		x	
Standalone flooding / drainage project, high severity		x	
Standalone erosion / sedimentation project		x	
Tukwila Surface Water Management Program is not the lead agency and does not control timing of multi-benefit project[1]			x
Standalone maintainability or capital repair/replacement			x
Standalone flooding / drainage project, low or medium severity			x

[1] Change priority to "high" when another department or agency is ready to advance the project

6.0 Capital Improvement Projects and Studies

This section summarizes the individual capital improvement projects, programmatic CIPs, and studies recommended for inclusion into the City of Tukwila's capital improvement program. The capital projects are listed in Table 6-1. Figure 6-1 shows the locations of each individual capital project. Appendix E contains the details for each capital project, programmatic CIP, and study, including cost estimates. Projects that are already in-process or have funding committed are listed in Section 1.1.

Table 6-1
Recommended Capital Projects and Studies

ID	Project Name	Project History	Estimated Total Project Cost (2023 dollars)
	Individual Capital Projects		
98641222	S 143rd St storm drain system	2003 and 2013 Plans	$1,410,000
98741202	Nelsen/Longacres – Phase II	2013 Plan	$1,000,000
99441202	Soil Reclamation Facility / Decant Facility Design – Phase I	2003 and 2013 Plans; City will study cost under Enhanced Maintenance Planning grant in 2024	$540,000
90341214	S 146th St pipe and 35th Ave S drainage	2003 and 2013 Plans	$1,290,000
91241203	Tukwila Urban Center Conveyance Inspections	2003 and 2013 Plans	$790,000
CIP-1	Norfolk Outfall Trunkline Sewer Separation Preliminary Feasibility Study	New	$155,000
CIP-2	S Ryan Way Pipe Rehabilitation	New	Alt. 1: $840,000 Alt. 2: $680,000
CIP-3	Fort Dent Park Water Quality Retrofit	New	Alt. 1: 90,000 Alt. 2: $1,745,000
CIP-4	Tukwila Pkwy/Gilliam Cr Outfalls	2013 Plan ID 91241202; 2023 Tukwila CIP ID 91241205; CIP-4 is a redesign	$1,240,000

Table 6-1
Recommended Capital Projects and Studies

ID	Project Name	Project History	Estimated Total Project Cost (2023 dollars)
CIP-5	Tukwila Pond Water Quality Improvement	New	$940,000
CIP-6	Johnson Creek Fish Barrier Mitigation Alternatives Analysis	New	$280,000
	Programmatic CIPs		
81241207	Annual Small Drainage Program	Ongoing, Annual	Avg. $950,000 / year
91241202	Stormwater Outfalls Water Quality Retrofit Program	2013 Plan (ID 91241201); some projects in program have been completed.	Varies by project
TBD	SMAP Program CIP	New	$3,640,000
TBD	Green Infrastructure Program	New	TBD
TBD	WSDOT Stormwater Retrofit and Maintenance Program	Ongoing	Varies by project
	Studies and Plans		
CIP-101	Fish Passage Barrier Prioritization Study	New	$147,000
CIP-102	Middle Fork of Southgate Creek – Stream and Slope Stability Study	New	$200,000
CIP-103	P17 Pond and Southcenter Subarea Hydraulic Study	New	$300,000
CIP-104	Tukwila Master Plan for the Lower Green River Levee Projects	New	$275,000

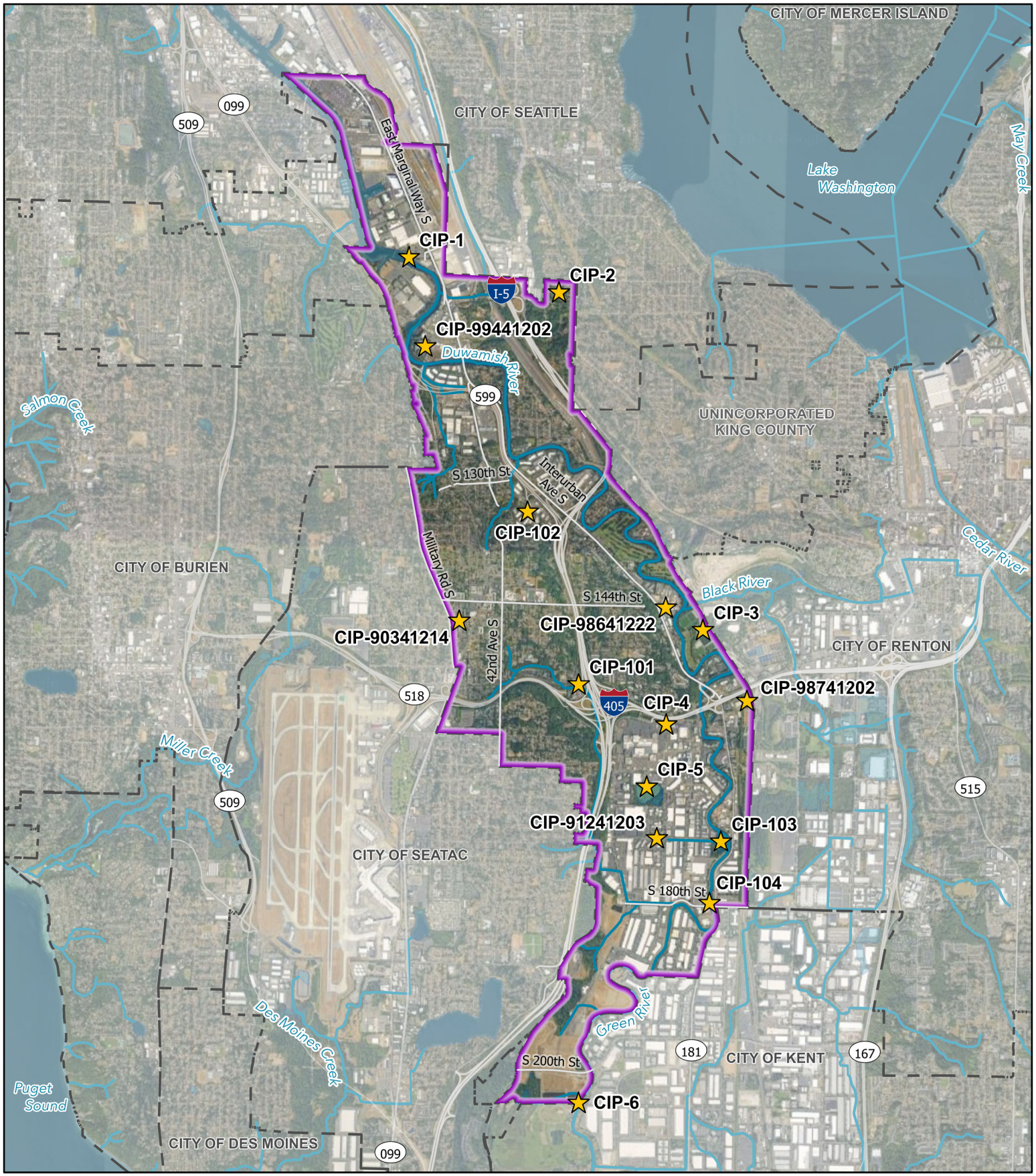

FIGURE 6-1
CAPITAL IMPROVEMENT PROJECTS AND STUDIES
TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Legend
- City Boundary
- Neighboring Cities
- Streams and Rivers
- Capital Improvement Projects

0 1 Mile

Data Sources: King County, City of Tukwila, Google Maps.
Date: 6/5/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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7.0 Operations and Maintenance

In the 2013 SWCP, this section contained a description of the operations and maintenance activities applicable to the City of Tukwila's Surface Water Management Program. This section has not been updated for the 2024 SWCP, and the content has been omitted from the plan.

Two significant studies are already underway which will soon provide the City guidance for updating Surface Water Management Program O&M. These are 1) an Enhanced Maintenance Plan (EMP) and 2) NPDES Program Assessment. The EMP will describe, assess, and recommend updates to the City's operations and maintenance program. The NPDES Program Assessment will evaluate the current operations and maintenance program to identify gaps and where the City can improve compliance with the Phase II NPDES Permit.

Section 7.0 has been retained in the 2024 SWCP as a placeholder for the next plan update, expected in about 10 years. At that time, updated information about the Surface Water Management Program operations and maintenance program should be re-integrated into the plan document.

8.0 Recommendations

This section describes the recommendations made in the 2024 SWCP for the City of Tukwila's Surface Water Management Program and an implementation plan, which considers funding, partnerships, prioritization, and scheduling.

8.1 Recommended Activities

8.1.1 Capital Projects

Section 6 outlines the individual capital projects, programmatic CIPs, and studies proposed in this plan.

Not all capital projects are recommended for implementation in the 10-year planning window, due to funding availability. The remaining capital projects represent the continuing need for capital improvements in the City of Tukwila in order to achieve surface water goals. The City of Tukwila should consider this list of unfunded capital projects when making investments in other arenas (such as transportation) or when outside funding sources are identified (such as grants or loans). This list will likely be a starting point for the next round of comprehensive surface water planning.

To implement capital project recommendations, the City will need to proceed with a thorough design and permitting process for each project. The capital project design process will consider the possibility of encountering Duwamish Tribe or Muckleshoot Indian Tribe cultural resources or archaeological deposits, conflicts with other utilities, presence of critical areas such as wetlands and steep slopes, and other factors to be assessed during the design and permitting process.

8.1.2 Programmatic Solutions and Policies

Subsequent to the 2013 Surface Water Comprehensive Plan, the City made substantial improvements to the Surface Water Management Program within the Public Works Department in order to comply with the then-current NPDES Phase II Permit. The current programmatic recommendations are comparatively modest and are tailored primarily toward voluntary programmatic actions to participate in regional water quality and aquatic habitat improvement efforts. This sub-section contains a summary of the recommended improvements to Tukwila's Surface Water Management Program needed in order to more fully comply with applicable regulations or to voluntarily improve efficiency, performance, or outcomes.

The City should continue to comply with the NPDES Phase II Permit and continue to implement its required annual NPDES Stormwater Management Program. The recommendations below are limited to new programs or substantial changes to programs.

8.1.2.1 Stormwater Planning

To protect water quality and prepare for anticipated requirements in the next NPDES Phase II Permit cycle, the City should adopt and implement its Stormwater Management Action Plan (SMAP) for Riverton Creek (Appendix F) as part of the implementation plan for the 2024 SWCP.

It is also recommended that the City develop an asset management system to inform stormwater planning efforts and operation and maintenance of the stormwater system. Capital projects and programmatic solutions are informed by data the City or partners collect. A dashboard would track all metrics related to surface water issues within the city limits and receiving waters.

8.1.2.2 Regulatory and Policy Changes

The City should respond to any new and additional requirements in the next NPDES Phase II Permit cycle, which will likely include changes to thresholds for providing stormwater management facilities on development and redevelopment sites and a requirement to preserve and increase forest cover as a stormwater management BMP.

To protect water quality and maintain compliance with the NPDES Phase II Permit, the City should consider changing policies, regulations, or enforcement, include the following:

- Study whether to update nonconforming parking lot standards in TMC 18.70.080 to modify redevelopment thresholds for nonconforming parking areas. The temporary gravel parking areas developed under this standard have effectively become permanent impervious surfaces which can contribute to surface water pollution. Another option is to change enforcement procedures to ensure that temporary nonconforming lots do not become effectively permanent. A change in policy or enforcement will require coordination between the Public Works and Community Development departments.
- Establish a policy to preserve and increase forest cover in the City in coordination with the draft Comprehensive Plan Goal 13 to increase tree cover at least by the time a policy is required by the 2024-2029 NPDES Phase II Permit in 2028.
- Require annual inspections and corrections for septic systems (where applicable).
- Allow new roads, driveways, parking areas and walkways to be constructed of pervious materials such as pervious asphalt, concrete, or pavers where infiltration is feasible.

- Update thresholds for providing stormwater management facilities on development and re-development when required by the 2024-2029 NPDES Phase II Permit.
- Update regulation to prohibit discharge of PCBs into stormwater from washdown of commercial and industrial buildings that date from 1950 to 1980 when required by the 2024-2029 NPDES Phase II Permit.

Changes to policies or to regulations at the state or national level are outside the scope of this document.

In addition, the City should keep track of possible modifications to its NPDES stormwater permit over future cycles to include TMDL requirements on the Green and Duwamish Rivers.

8.1.2.3 Inspection and Enforcement

The City should complete as-needed CCTV inspections of the City's stormwater pipes where sedimentation or poor condition is suspected due to age, system design, or observed localized flooding. Complete cleaning of identified stormwater pipes in order to allow inspections to occur.

The City should enhance its inspection program to reduce noncompliance with source control and private stormwater facility maintenance requirements to protect against the risk of water quality violations.

The concurrent NPDES Program Assessment Project, ongoing as of the writing of the 2024 SWCP, may identify required changes to address requirements of the next NPDES Phase II Permit.

8.1.2.4 Operations and Maintenance

The City should assess its maintenance program for opportunities to improve or increase services to improve stormwater quality. The concurrent NPDES Program Assessment Project, ongoing as of the writing of the 2024 SWCP, may identify required changes to address requirements of the next NPDES Phase II Permit.

The City should build a permanent Vactor waste treatment facility (decant facility) to allow more frequent and thorough maintenance of the storm system.

To voluntarily enhance the City's active commitment to protecting ESA-listed fish, the City should consider applying to the Regional Road Maintenance Program and formally adopting and following the Regional Road Maintenance Guidelines. The program and application of the guidelines ensure that road maintenance is conducted in a fashion that does not harm ESA-listed fish.

8.1.2.5 MS4 Mapping and Documentation

To improve effectiveness in managing the stormwater system and prepare for anticipated requirements in the 2024-2029 NPDES Phase II Permit cycle the City should:

- Develop an administrative policy from the City Administrator's office detailing responsibilities for coordinating the routing of information and updating the MS4 map cooperatively between Community Development, Technology and Innovation Services, and Public Works. The policy should also ensure adequate access to data for City staff end users. This action is not required by the NPDES Phase II Permit, but it could facilitate needed cooperation and understanding between departments.
- Map additional characteristics of the MS4, such as connection points to private stormwater systems, when required by 2024-2029 NPDES Phase II Permit.
- Map tributary basins to outfalls and discharge points, and document acreages that are not managed in a stormwater treatment or flow control facility when required by 2024-2029 NPDES Phase II Permit.
- Begin mapping tree canopy when required by 2024-2029 NPDES Phase II Permit.
- Reassess outfall identification after the Community Development Department revises the City's stream mapping and identification. It is thought that a more complete stream mapping will reveal that some stormwater system structures should be classified as outfalls to receiving waters.

8.1.2.6 Public Education and Outreach

The City's existing public education and outreach activities appear adequate to meet requirements of the current NPDES Phase II Permit. The concurrent NPDES Program Assessment Project, ongoing as of the writing of the 2024 SWCP, may identify required changes to address requirements of the 2024-2029 NPDES Phase II Permit.

The City may wish to expand the program offerings voluntarily. The educational topics listed below could supplement the current City of Tukwila education program:

- Proper maintenance of septic systems (where applicable).
- Stream reach needs – get to know your backyard, adding Adopt-a-Stream to the Adopt A Spot program.
- Free "mutt mitts" for pet owners.

- Free technical assistance for private property owners wishing to implement on-site surface water management (such as rain gardens or rain barrels).
- Community Rain Garden Stewardship Program (see SMAP-20 in Appendix F).
- Green Tukwila.
- Tree giveaway.

8.1.2.7 Public Involvement and Participation

Environmental stewardship activities should continue with a focus on overburdened communities, which the EPA defines as minority, low-income, and tribal populations that may experience disproportionate environmental harms and risks. Ecology may require increased emphasis on involvement of overburdened communities in the upcoming NPDES Phase II Permit, so The City should document its efforts to involve these communities. The concurrent NPDES Program Assessment Project, ongoing as of the writing of the 2024 SWCP, may identify required changes to address requirements of the next NPDES Phase II Permit.

Green Tukwila presents an opportunity for the Surface Water Management Program to capitalize further on an existing City program. Green Tukwila aims to restore and maintain more than 100 acres of Tukwila's forested parks and natural land, ensure natural lands provide ecosystem benefits, and engage volunteers to lead restoration efforts. The program recognizes that natural lands reduce stormwater runoff, improve water quality, provide habitat, and much more. The program could also serve to improve public awareness of stormwater issues.

8.2 Implementation

The 2024 SWCP is an ambitious proposal for tackling both regional and local issues. The City's prior surface water plans were comprised of capital and programmatic solutions targeting drainage concerns and minimum compliance with NPDES Phase II Permit requirements. The 2024 SWCP also emphasizes interdepartmental and regional cooperation to achieve multi-benefit solutions serving regional priorities to protect and restore the region's cherished natural resources.

8.2.1 Funding and Partnerships

Projects implemented primarily for surface water management purposes are funded with the City's Fund 412, Surface Water Fund. Fund 412 is an enterprise account for utility operations which is self-supported through Surface Water rate charges. At the time of writing, the City has projected annual increases to surface water rates through 2028. Including both

projected rate revenue and projected proceeds from grants, the City's 2023-2028 rate model analysis allows for slow growth in expenditures for programmatic elements such as operations and maintenance and permit compliance activities. It allows for variable annual funding for the CIP ranging from $1,965,000 at the lowest in 2027 to $12,995,000 at the highest in 2025. It should be noted that the projections are used for planning purposes and are not adopted City budgets. The City adopts a budget and a six-year CIP biennially.

Grant and bond revenue is also deposited into Fund 412 when available. The City has made extensive use of grants from Ecology and KCFD for surface water capital projects. City Council approved $13.6 million in capital expenditures from the Surface Water Fund in the first two years of the adopted 2023-2028 Capital Improvement Program. Nearly half of the approved capital expenditures are from grants as illustrated in Figure 8-1.

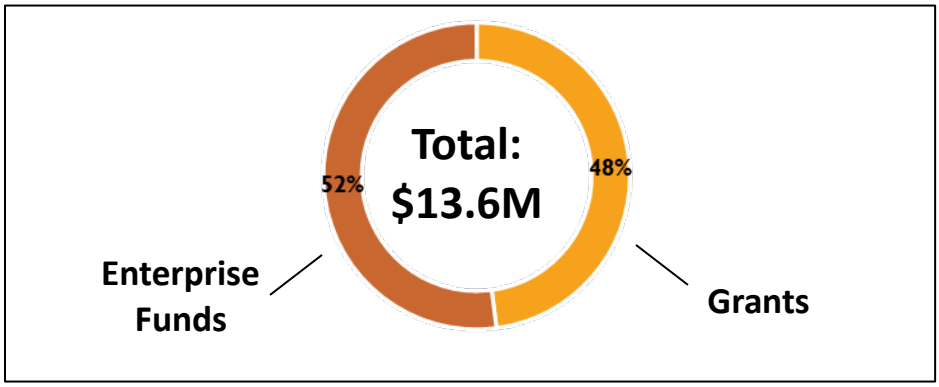

Figure 8-1 Surface Water Capital Program Funding 2023-2024

The City has received approximately $3.2 million in grant funding for stormwater planning and stormwater retrofit CIPs from Department of Ecology between 2016 and 2023. The City has current agreements totaling $2.3 million in grant funding for the Enhanced Maintenance Program and Decant Facility Design (CIP 99341208) and the Stormwater Quality Retrofit Program Part 2 (91241202).

The City has received a landside grant from FEMA Cooperative Technical Partners (CTP) to study existing landslides. The findings from the study could produce findings that assist with the Middle Fork Southgate Creek Stream Stability Study (CIP-102). The City has submitted an application for funding to FEMA CTP for P17 Pond and Southcenter Subarea Hydraulic Study (CIP-103).

The City may qualify for grant funding from the King County Flood Control District for projects that reduce the impact of flooding. The program categories are Flood Reduction, Urban Streams, Coastal Erosion/Coastal Flooding, and Culvert Replacement/Fish Passage

Restoration. Projects that achieve multiple benefits are encouraged. Eligible project types that are applicable to the City proposed CIPs are:

- Upgrading aging or undersized stormwater systems in urban or suburban areas.
    - CIP-2 S Ryan Way Pipe Rehabilitation
    - CIP 90341214 S 146th St Drainage
    - CIP 98641222 S 143rd St Drainage
    - CIP 98741202 Nelsen Place/Longacres Phase 2
- Replacing culverts that block fish passage and restrict flows and undermine streambanks.
    - CIP-6 Johnson Creek Fish Barrier Mitigation Alternatives Analysis

In addition, Ecology typically awards the City a Capacity Grant each year to support compliance with the Phase II NPDES Permit with activities such as education and outreach about stormwater, a volunteer Stream Team, charity car washes, technical assistance for stormwater source control, and other required compliance activities.

Based upon the findings of the NPDES Program Assessment, expected to be complete in 2024, and the Enhanced Maintenance Program Analysis, expected to be complete in 2025, the City should reevaluate Operations & Maintenance expenditures and request budget increases and staffing increases if findings support those increases. This could require shifting some resources away from the CIP Program expenditures in order to maintain the Fund 412 balance required by the City's financial policies.

The City intends to leverage partnerships to increase effectiveness of its programs and capital investments and to obtain grants to fund elements of the CIP.

The City partners with Washington State to fund stormwater retrofit projects and certain maintenance activities with surface water management fees collected by the City from WSDOT. This partnership aims to retrofit limited-access state highways in Tukwila with water quality treatment BMPs. An annual retrofit plan and project status report must be submitted to and approved by WSDOT in order to collect a surface water management fee from WSDOT. See Appendix F for the Tukwila Retrofit and Maintenance Plan for WSDOT Facilities Memorandum.

The 2024 SWCP recommends implementing Community-Based Public-Private Partnerships (CBP3) to plan, deliver, and/or maintain public stormwater projects. CBP3s are partnerships between a local government and a private entity to collaboratively plan, deliver, or maintain

public stormwater projects. These partnerships are intended to achieve community benefits beyond stormwater improvements and permit compliance through performance-based contracts and alternative procurement. CBP3 projects can vary greatly but are intended to achieve stormwater improvements in addition to community benefits. The Washington State Department of Commerce has developed a guidebook to assist local governments to more effectively achieve stormwater and community objectives. Ecology is also developing a program that will support jurisdictions, including Tukwila, in developing and implementing CBP3s.

8.2.2 Prioritization and Scheduling

The City will determine a schedule for implementing the recommendations in the 2024 SWCP based on priority and availability of funding. Table 8-1 lists recommendations by priority.

Table 8-1
Recommended Priority for Implementing Recommendations

Recommendation	Reason	Schedule
High Priority		
Ongoing CIPs identified in Table E-7 (Appendix E)	Ongoing	Prior years – 2025 or beyond
Programmatic changes pursuant to 2024-2029 NPDES Phase II Permit requirements - TBD	Maintain regulatory compliance	2025-2029
CIP-1 Norfolk Outfall Trunkline Sewer Separation Preliminary Feasibility Study	Reduce potential City liability for combined sewer overflows and responsibility for Superfund site cleanup	2025
CIP 91241202 Stormwater Outfalls Water Quality Retrofit Program	Grant award received; meets regional priorities for reducing harmful effects of urban runoff on water bodies; completes programmatic CIP begun in 2017	2024
CIP 99441202 Soil Reclamation Facility / Enhanced Maintenance Program and Decant Facility Design – Part 1	Grant award received; supports NPDES Phase II Permit requirements; meets regional priorities for reducing harmful effects of urban runoff	2024-2025
SMAP Program CIPs	Meets expected requirement of 2024-2029 NPDES Phase II Permit; meets regional priorities for reducing harmful effects of urban runoff on water bodies; eligible for grant funding	Begin 2025, then ongoing every 2-3 years

Table 8-1
Recommended Priority for Implementing Recommendations

Recommendation	Reason	Schedule
WSDOT Retrofit Program	Required in order to charge surface water management fee to WSDOT; meets regional priorities for reducing harmful effects of urban runoff on water bodies; funded by WSDOT	2024 and annually
CIP-102 Middle Fork Southgate Creek – Stream and Slope Stability Study	Stream condition severely degraded and private property at risk. Coordinates with ongoing Southgate Hydraulic Study encompassing Normed Facility and could make use of findings from City's successful FEMA-funded landslide study.	2026
CIP-3 Fort Dent Park Water Quality Retrofit, Alternative 1	Meets regional priorities for reducing harmful effects of urban runoff on water bodies; low-cost alternative that can be implemented by City crews.	2027
CIP-2 S Ryan Way Pipe Rehabilitation	Collaboration with City Transportation Department; preventive repair and replacement; reduce sheet flow on steep high-traffic roadway	Coordinate timing with City Transportation Department
MS4 mapping and documentation programmatic recommendations	City risks permit non-compliance. Barriers to information sharing hinders stormwater planning, regulatory review of development and construction, inspection and enforcement, and capital project development.	2025-2029
Apply for grant funding for eligible phases of programmatic water quality CIPs and medium priority projects identified below	Allows City to continue to fund higher levels of capital investments without impacting surface water utility rates	2024-2034
Green Infrastructure Program	Reduces disparities in access to healthy environments, improves interdepartmental coordination in working on regional priorities such as reducing harmful effects of urban runoff, increasing access to fish habitat, and increasing quality of fish habitat	Begin 2025
CIP-104 Tukwila Master Plan for the Lower Green River Levee Projects	Flood protection projects sponsored by KCFCD and federal partners are imminent. City will need to begin master planning immediately in order to guide aesthetic considerations and community connections for these projects.	Begin 2025

Table 8-1
Recommended Priority for Implementing Recommendations

Recommendation	Reason	Schedule
Regulatory and Policy change - study whether to update nonconforming parking lot standards in TMC 18.70.080 or update enforcement procedures.	City risks permit non-compliance. Strategically time interdepartmental negotiations and policy-setting with reissuance of NPDES Phase II Permit in 2024.	2025
Medium Priority		
CIP 98641222 S 143rd St Storm Drain System	Longstanding drainage / flooding issue which may be eligible for grant funding from KCFCD	2027
CIP 99441202 Soil Reclamation Facility / Enhanced Maintenance Program and Decant Facility Design – Part 2	Increase efficiency and effectiveness of operations and maintenance program	2026
CIP 98741202 Nelson/Longacres – Phase II	Longstanding drainage / flooding issue which requires coordination with railroad and may be eligible for grant funding from KCFCD	2028
CIP-6 Johnson Creek Fish Barrier Mitigation Alternatives Analysis	Meets regional priorities to increase access to fish habitat; ensures balanced portfolio of CIP projects by including fish barrier removals at regular intervals	2026
CIP-90341214 S 146th St and 35th Ave S Drainage	Longstanding drainage / flooding issue which may be eligible for grant funding from KCFCD	2029
Low Priority		
Other programs and CIPs not listed above		2030 and beyond

8.3 Conclusion

The 2024 SWCP proves a strategic framework for the management of surface water within the City of Tukwila. It is an ambitious proposal for tackling drainage issues, water quality, erosion / sedimentation issues, habitat loss, and maintenance and condition of the stormwater system. The 2024 SWCP recognizes that City of Tukwila can be a key partner with state agencies, King County, Tribes, and organizations in reaching toward regional priorities to protect and restore the region's cherished natural resources.

9.0 References

Accola, Kerry, et. al. 2024. *Technical Report on Juvenile Chinook Salmon Effectiveness Monitoring of Duwamish Shallow Water Restoration Sites, 2023*. Prepared by Wetland Ecosystem Team and Fisheries Acoustics Lab, School of Aquatic and Fishery Sciences, University of Washington. Prepared for WRIA 9. March.

CH2M HILL. 2003. *City of Tukwila Comprehensive Surface Water Management Plan*. Prepared by CH2M HILL, Inc. Prepared for the City of Tukwila. November.

CH2M HILL. 2013. *City of Tukwila Surface Water Comprehensive Plan*. Prepared by CH2M HILL, Inc. Prepared for the City of Tukwila. February.

City of Tukwila. 2019. *Inhouse Baseline Water Quality Assessment and Report Riverton Flapgate Removal Project*. January 17.

City of Tukwila. 2022. *Tukwila Pond Park Master Plan*. https://www.tukwilawa.gov/wp-content/uploads/Tukwila-Pond-Park-Master-Plan_2022-01-22.pdf accessed February 2024. January.

City of Tukwila. 2024. *Annual Small Drainage Program*. https://www.tukwilawa.gov/departments/public-works/construction-projects-and-transportation-impacts/annual-small-drainage-program/ accessed February 2024.

City of Tukwila. 2024. *Chinook Wind*. https://www.tukwilawa.gov/departments/public-works/construction-projects-and-transportation-impacts/chinook-wind/ accessed February 2024.

City of Tukwila. 2024. *Green Tukwila Partnership*. https://www.tukwilawa.gov/departments/parks-and-recreation/volunteering/green-tukwila-partnership/ accessed February 2024.

City of Tukwila. 2024. *Stormwater Management Program (SWMP)*. https://www.tukwilawa.gov/wp-content/uploads/PW-NPDES-2024-SWMP-Draft-Comment.pdf accessed February 2024.

City of Tukwila. 2024. *Stormwater Outfalls Water Quality Retrofit Project Report*. https://www.tukwilawa.gov/departments/public-works/construction-projects-and-transportation-impacts/stormwater-outfalls-water-quality-retrofit-project/ accessed February 2024.

City of Tukwila. 2024. *Tukwila Comprehensive Plan 2024-2044: Draft Plan Forwarded to City Council for Review*. https://www.tukwilawa.gov/departments/community-development/comprehensive-plan/comprehensive-plan-element-drafts/ accessed March 2024.

Duwamish Alive! Coalition. 2024. *Duwamish Sites*. https://www.duwamishalive.org/duwamish-sites/ accessed February 2024.

Duwamish Blueprint Working Group. 2014. *Salmon Habitat in the Duwamish Transition Zone*. Prepared for the Green/Duwamish and Central Puget Sound (WRIA 9) Watershed Ecosystem Forum. https://www.govlink.org/watersheds/9/plan-implementation/duwblueprint/duwblueprint-nov6-2014-final.pdf accessed February 2024. November 6.

Essayons Consulting Engineers, Inc. 2003. *Technical Information Report for Starfire Fields at Fort Dent Park*. May 27.

Forterra. 2017. *Green Tukwila 20-Year Stewardship Plan. https://www.tukwilawa.gov/wp-content/uploads/PR-Green-Tukwila-20-Year-Stewardship-Plan.pdf accessed February 2024.*

Green/Duwamish and Central Puget Sound Watershed Water Resource Inventory Area 9 (WRIA 9). 2021. *Salmon Habitat Plan*. https://www.govlink.org/watersheds/9/pdf/2021_PlanUpdate.pdf accessed February 2024. February 11.

King County. 2023. *Provisional Regional Stormwater Action Goals*. April.

King County Department of Natural Resources and Parks. 2019. *Juvenile Chinook Use of Non-natal Tributaries in the Lower Green River*. Prepared for WRIA 9 Implementation Technical Committee and Watershed Ecosystem Forum. https://your.kingcounty.gov/dnrp/library/2019/kcr3093/kcr3093.pdf accessed February 2024. December.

King County Flood Control District. 2024. *Lower Green River Corridor Flood Hazard Management Plan*. https://www.lowergreensepa.org/ accessed February 2024.

King County Metro. 2019. *RAISE Grant Proposal South Annex Base*. https://kingcounty.gov/~/media/depts/metro/programs-projects/bus-base-expansion/south-campus/raise-attachments.pdf accessed February 2024. May 1.

Northwest Indian Fisheries Commission Member Tribes. 2020. *2020 State of Our Watersheds A Report by the Treaty Tribes in Western Washington*. https://files.nwifc.org/sow/2020/state-of-our-watersheds-sow-2020-final-web.pdf?_gl=1*1col5d5*_ga*MjAwMTM1MzMyMS4xNzA5ODQ4OTQy*_ga_XGZ6DS8QV6*MTcxMTY0ODAzNS41LjAuMTcxMTY0ODAzNS4wLjAuMA..#page=1 accessed February 2024.

Our Green/Duwamish. 2021. *Our Green/Duwamish Implementation Plan*. https://ourgreenduwamish.files.wordpress.com/2021/01/ogd-implementation-plan_final.pdf February 2024.

PBS Engineering and Environmental, Inc. 2019. *Gilliam Creek Water Quality Assessment and Report*.

Puget Sound Partnership. 2022. *2022-2026 Action Agenda for Puget Sound*. June 15.

Puget Sound Regional Council. 2024. *Stormwater Parks*. https://www.psrc.org/our-work/stormwater-parks accessed February 2024.

Seattle Times. 2024. *Biden earmarks half a billion for salmon on upper Green River*. https://www.seattletimes.com/seattle-news/environment/biden-earmarks-half-a-billion-for-salmon-on-upper-green-river/. March 11.

State of Washington Department of Commerce. 2019. *Is A Community-Based Public-Private Partnership Right For Your Community? A Guide for Municipal Stormwater Managers in Washington State*. https://www.commerce.wa.gov/wp-content/uploads/2019/11/Report-LGD-Stormwater-II.pdf accessed February 2024. November 20.

State of Washington Department of Ecology Environmental Assessment Program and Water Quality Program. 2022. *6PPD in Road Runoff Assessment and Mitigation Strategies*. Prepared for Model Toxics Control Act Legislative Program Washington State Legislature. https://apps.ecology.wa.gov/publications/documents/2203020.pdf accessed February 2024. October.

State of Washington Department of Ecology. 2024. *Stormwater Community-Based Public-Private Partnership Program*. https://ecology.wa.gov/water-shorelines/water-quality/water-quality-grants-and-loans/community-based-public-private-partnership-program accessed February 2024.

State of Washington Department of Ecology. 2023. *Draft Western Washington Phase II Municipal Stormwater Permit 2024-2029*. https://fortress.wa.gov/ecy/ezshare/wq/permits/MS4_2024_Phase%20II%20WWA_DraftPermit.pdf accessed February 2024.

State of Washington Department of Ecology. 2024. *Western Washington Phase II Municipal Stormwater Permit 2019-2024*. https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Municipal-stormwater-general-permits/Western-Washington-Phase-II-Municipal-Stormwater accessed February 2024.

State of Washington Department of Fish and Wildlife. 2022. *Statewide Washington Integrated Fish Distribution*. https://geo.wa.gov/datasets/wdfw::statewide-washington-integrated-fish-distribution/explore?location=47.437697%2C-122.256279%2C12.00 accessed February 2024. March 2.

United State Environmental Protection Agency. 2024. *Lower Duwamish Waterway Seattle, WA Cleanup Activities*. https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=1002020#bkground accessed February 2024. March 28.

United States Department of Commerce. 2019. Letter *Re: Biological Opinion on Howard Hanson Dam, Operations, and Maintenance, Green River (HUC 17110013) King County, Washington*. Prepared by National Marine Fisheries Service to United States Army Corps of Engineers. https://www.nws.usace.army.mil/Portals/27/docs/environmental/resources/2018EnvironmentalDocuments/2019_02-15_HowardHansonDam_WCR-2014-997.pdf. Accessed April 2024. February 15.

United States Senator Patty Murray. 2024. *Senator Murray Statement on the President's Fiscal Year 2025 Budget Request*. https://www.murray.senate.gov/es/senator-murray-statement-on-the-presidents-fiscal-year-2025-budget-request/. March 11.

References from the 2013 Plan

CH2M HILL. 2003. *City of Tukwila Comprehensive Surface Water Management Plan*. Prepared by CH2M HILL, Inc. Prepared for the City of Tukwila. November.

Washington Department of Ecology (Ecology). 2006. *Water Quality Standards for Surface Waters of the State of Washington – Chapter 173-201A WAC*. Publication No. 06-10-091. Lacey, Washington.

Ecology 2010. *2008 Washington State Water Quality Assessment*. http://www.ecy.wa.gov/programs/wq/303d/2008/index.html accessed on November 17, 2010.

Entranco, Inc., et al. 1997. *Riverton Creek Stormwater Quality Management Plan: Water Quality, Stream Habitat, and Flood Control*. Prepared by Entranco Inc., Taylor Associates Inc., and Envirovision Inc. Prepared for the City of Tukwila. November.

Herrera Environmental Consultants, Inc. 2001. *Gilliam Creek Basin: Stormwater Management Plan*. Prepared for the City of Tukwila. March.

City of Tukwila. 2019. Infrastructure Design and Construction Standards.

Washington Department of Fish and Wildlife (WDFW). 2010. Fish Passage Barrier Inventory Geodatabase. Accessed via email by Brian Benson, WDFW Habitat Program, on January 14, 2011.

Washington State Department of Transportation (WSDOT). 2007. SR 518 SeaTac Airport to I-5/I-405 Interchange Widening Project: Culvert Mitigation. February.

Water Resource Inventory Area. (WRIA). 2005. Salmon Habitat Plan: Making Our Watershed Fit for a King. August.

2024 City of Tukwila Surface Water Comprehensive Plan

Appendices

Appendix A

Stormwater System Maps by Basin

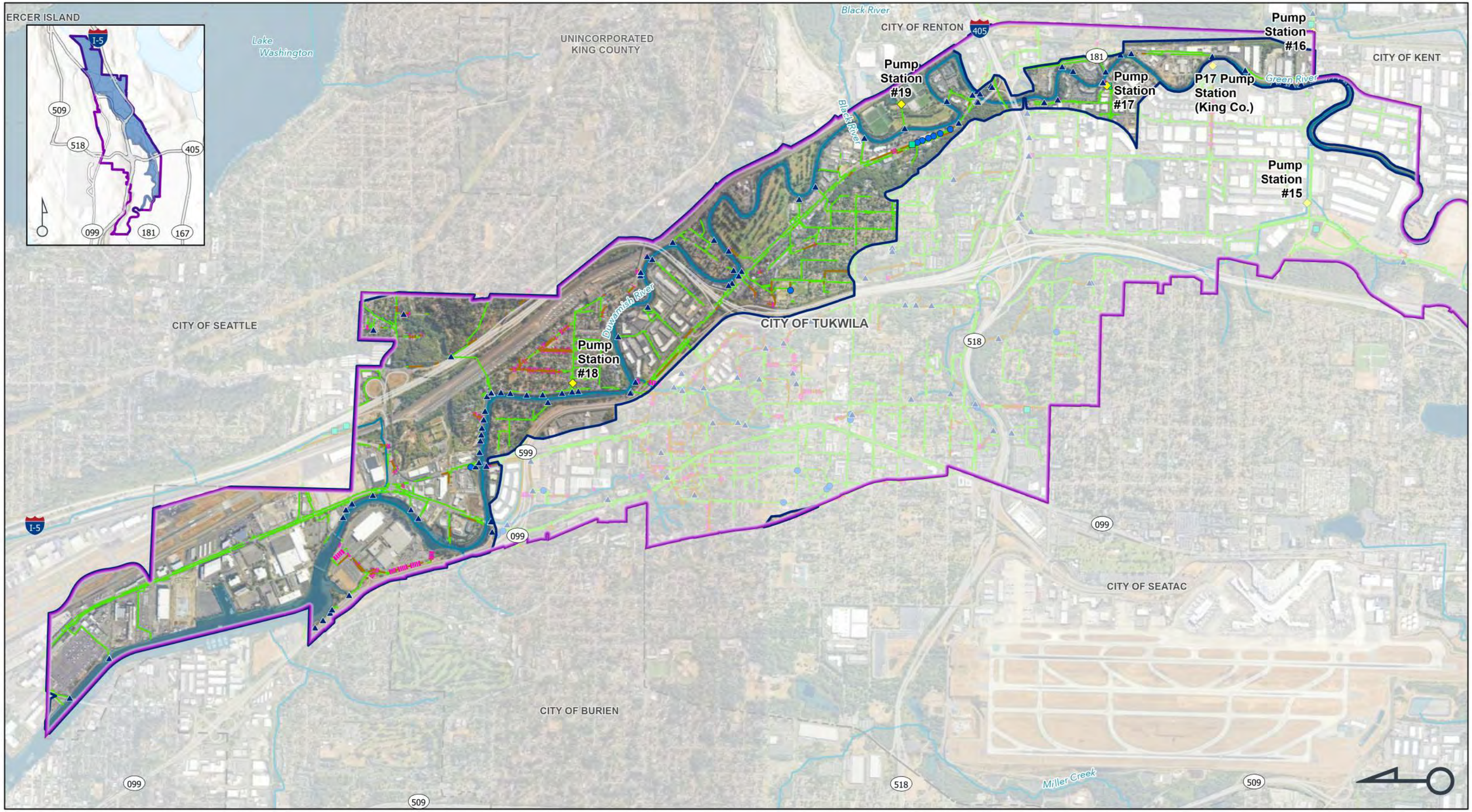

FIGURE A-1
CITY STORMWATER SYSTEM
GREEN/DUWAMISH BASIN
TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers
- Green/Duwamish Basin

Stormwater Facilities

- Flow Control Facility
- Pump Station
- Water Quality Facility
- Outfalls

Pipes and Ditches

- Closed Pipe
- Culvert
- Ditch

0 — 1 Mile

Otak



FIGURE A-2

CITY STORMWATER SYSTEM
RIVERTON BASIN

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers
- Riverton Basin

Stormwater Facilities

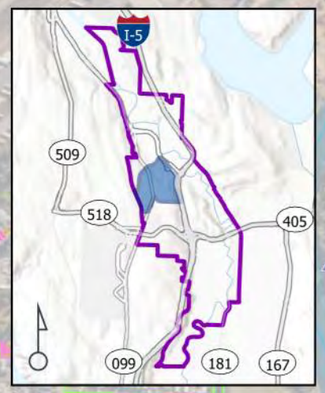
- Water Quality Facility
- Outfalls

Pipes and Ditches

- Closed Pipe
- Culvert
- Ditch

0 — 0.25 Mile

Otak



I-5
599
518
Duwamish River
CITY OF TUKWILA
599
518
CITY OF SEATAC
CITY OF BURIEN

FIGURE A-3

CITY STORMWATER SYSTEM SOUTHGATE BASIN

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps.
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers
- Southgate Basin

Stormwater Facilities

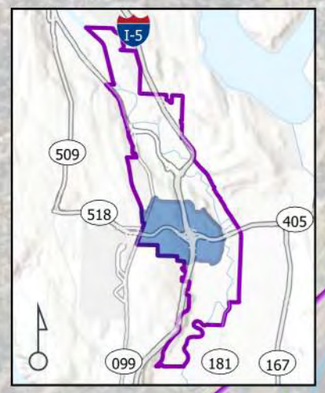
- Water Quality Facility
- Outfalls

Pipes and Ditches

- Closed Pipe
- Culvert
- Ditch

0 0.5 Mile

Otak



CITY OF RENTON

Black River

Green River

Green River

Green River

I-5

405

CITY OF TUKWILA

518

Duwamish River

599

099

CITY OF SEATAC

CITY OF BURIEN

FIGURE A-4
CITY STORMWATER SYSTEM
GILLIAM BASIN
TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers
- Gilliam Basin

Stormwater Facilities

- Flow Control Facility
- Water Quality Facility
- Outfalls

Pipes and Ditches

- Closed Pipe
- Culvert
- Ditch

0 — 1 Mile

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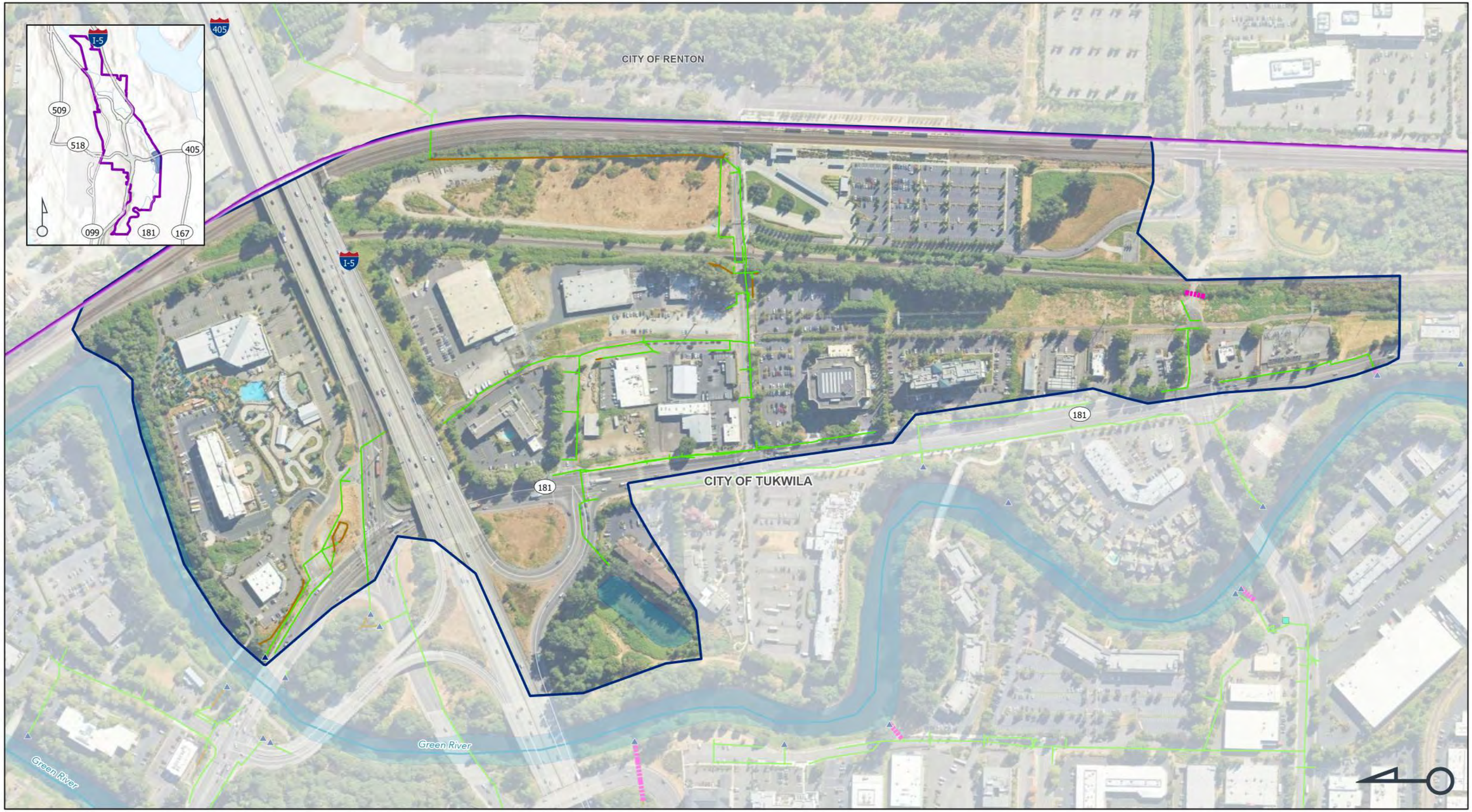

FIGURE A-5

CITY STORMWATER SYSTEM
NELSEN BASIN

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers
- Nelsen Basin

Stormwater Facilities

- Flow Control Facility
- Outfalls

Pipes and Ditches

- Closed Pipe
- Culvert
- Ditch

0 — 0.25 Mile

Otak



FIGURE A-6

CITY STORMWATER SYSTEM SPRINGBROOK BASIN

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps.
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers
- Springbrook Basin

Stormwater Facilities

- Flow Control Facility
- Pump Station
- Outfalls

Pipes and Ditches

- Closed Pipe
- Culvert
- Ditch

0 — 0.25 Mile

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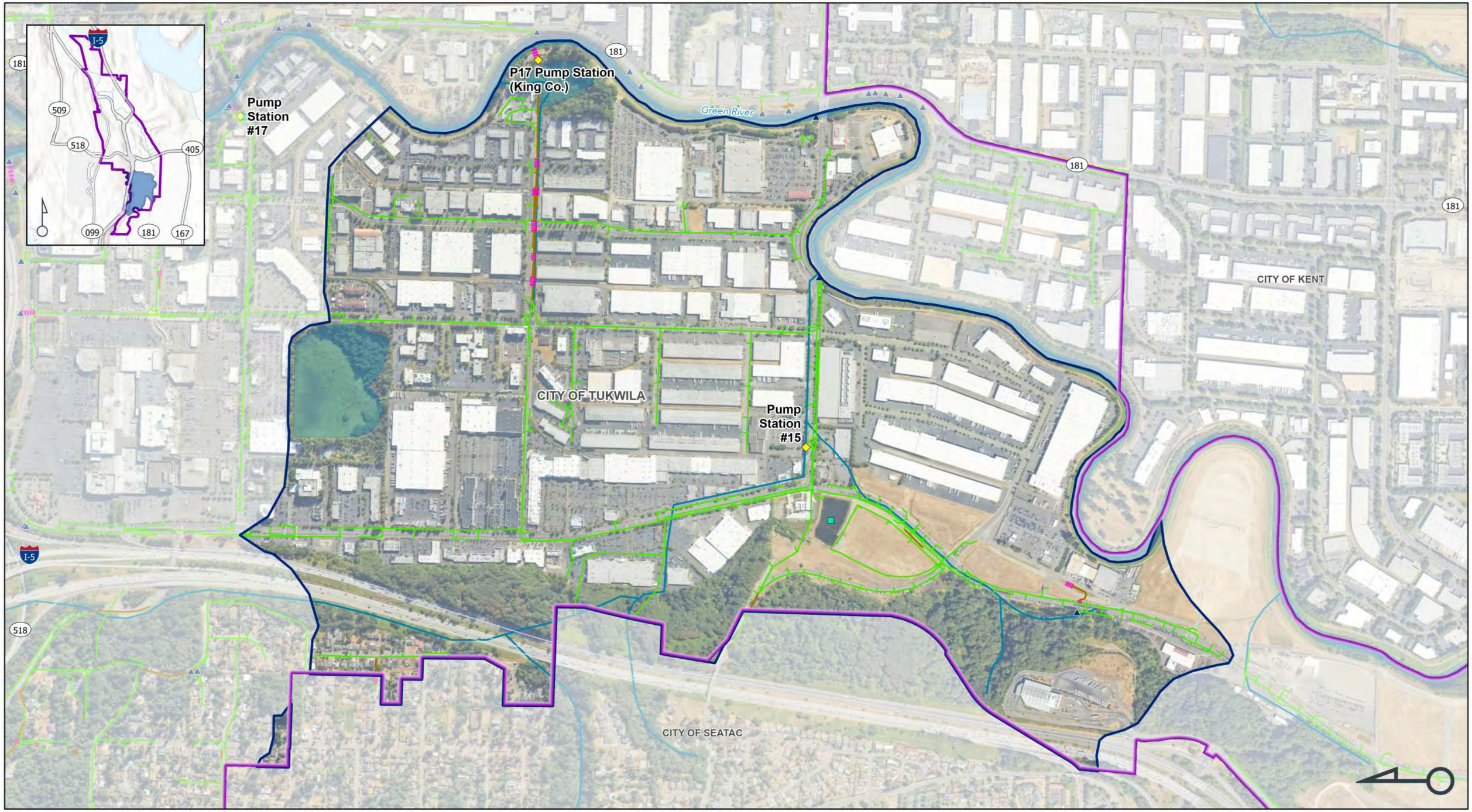

FIGURE A-7

CITY STORMWATER SYSTEM
P17 BASIN

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers
- P17 Basin

Stormwater Facilities

- Flow Control Facility
- Water Quality Facility
- Outfalls
- Pump Station

Pipes and Ditches

- Closed Pipe
- Culvert
- Ditch

0 — 0.5 Mile

Otak



FIGURE A-8

CITY STORMWATER SYSTEM
MILL CREEK BASIN
TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps.
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers
- Mill Creek Basin
- Outfalls

Pipes and Ditches

- Closed Pipe
- Culvert
- Ditch

0 — 0.25 Mile

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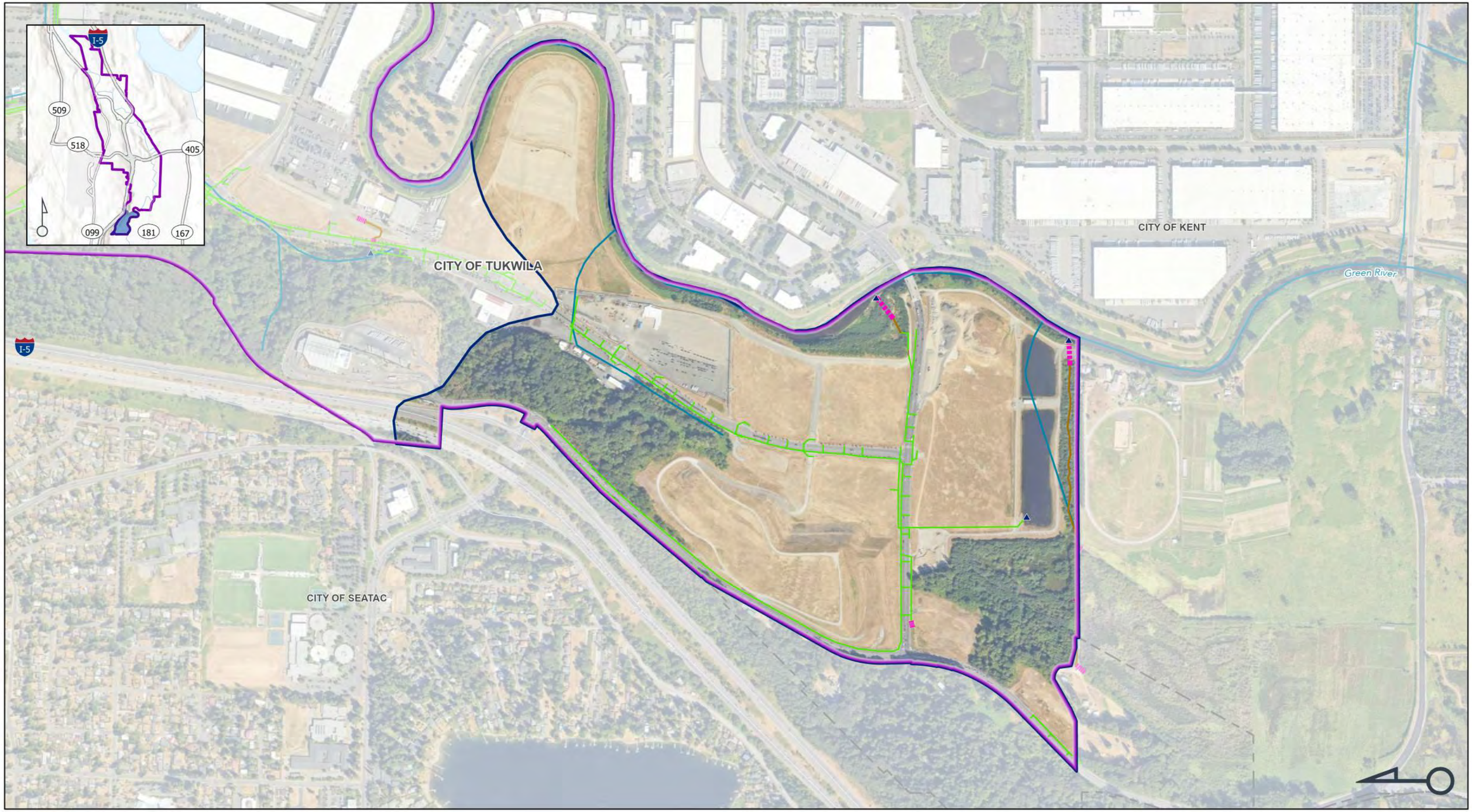

FIGURE A-9

CITY STORMWATER SYSTEM
JOHNSON BASIN

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps.
Date: 3/25/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Neighboring Cities
- Streams and Rivers
- Johnson Basin

Stormwater Facilities

- Flow Control Facility
- Outfalls

Pipes and Ditches

- Closed Pipe
- Culvert
- Ditch

0 — 0.5 Mile

Otak

Appendix B

Drainage, Water Quality, and Fish Habitat Characterization

APPENDIX B

Drainage, Water Quality, and Fish Habitat Characterization

Appendix B was compiled in support of the 2013 Surface Water Comprehensive Plan, and only the fish habitat element of this appendix has been updated for the 2024 Surface Water Comprehensive Plan (2024 SWCP). Updates to the drainage and water quality characteristics of basins based on new information have been made directly into Section 2 of the 2024 SWCP. The bulk of Appendix B is provided for historic reference of the previously compiled detailed information.

As of 2024, the City recognizes nine drainage basins. As of 2013, The City recognized eight drainage basins. This Appendix is organized by the eight drainage basins recognized as of 2013, as follows:

- Green/Duwamish River Mainstem
- Gilliam Creek
- Nelsoe Place – Long Acres
- P17
- Riverton Creek
- Southeast Central Business District (CBD)
- Southgate Creek
- Johnson Creek

The remaining content of Appendix B, with the exception of Attachment B, remains unaltered from its publication in 2013.

Basin boundary delineation was based on information from field visits, the City Geographic Information System (GIS), and previously developed basin plans. The City of Tukwila is nearly finished with an inventory and mapping of the drainage network. Basin boundaries should be re-visited once this inventory and mapping is complete.

Green/Duwamish River Mainstem Basin

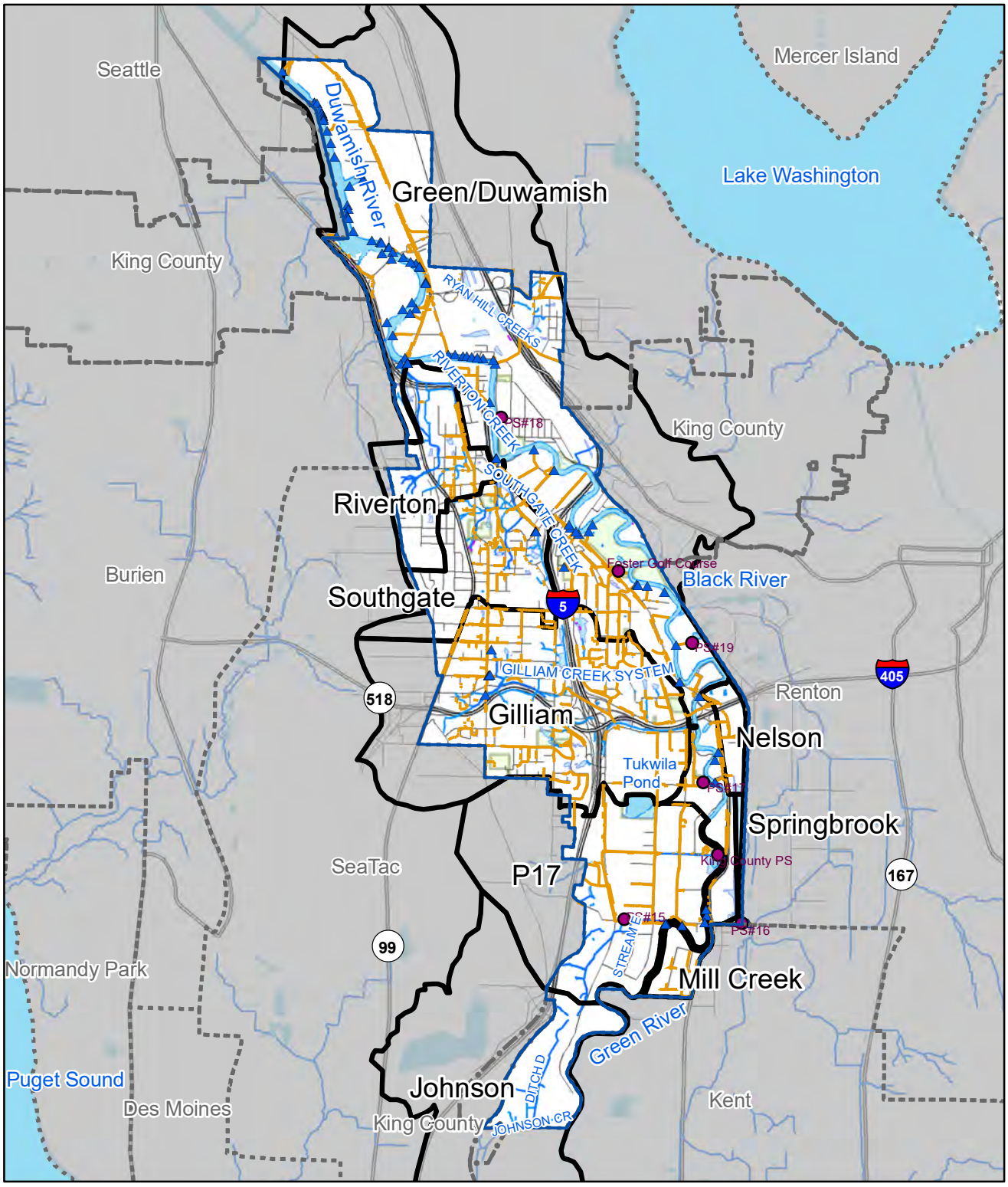
Drainage Characterization

The Green/Duwamish River meanders from the southeast to northwest through the City of Tukwila. The Green/Duwamish River is tidally influenced along most of length of the river

within the City of Tukwila. The Green/Duwamish River is called the Duwamish below the confluence with the Black River and is called the Green River upstream of that point. The flood and floodplain management of the Green/Duwamish River is outside of the scope of this surface water comprehensive plan. The Green/Duwamish River drainage basin shown in Figure B-1 has multiple outlets, or outfalls, into both the Green and Duwamish Rivers.

This basin is almost entirely developed. Industrial areas, including portions of the Boeing Airfield, make up the development in the area north of the Riverton Creek Basin. The areas east of the Riverton and Southgate Creek basins and north of the Gilliam Creek basin are mostly residential. Foster Golf Course and Fort Dent Park are within this basin. The area east of the P17 basin is mostly commercial.

City of Tukwila surface water pump stations #17, #18, and #19 are located within the Green Duwamish River Mainstem drainage basin (Figure B-1).



City of Tukwila
King County Unincorporated
Other Municipalities
Stormwater Pump Station
Stormwater Pipe
Drainage Basins
Outfall

N

0 1 2 Miles

FIGURE B-1
City of Tukwila Drainage System (2013)
City of Tukwila 2012 Surface Water Comprehensive Plan

SEA \\SIMBA\PROJ\TUKWILAWACITYOF\412954SWCOMPPL\GIS\LAYOUT\FIGUREB-1_DRAINAGESYSTEM.MXD TJANTZEN 4/2/2013 12:36:19

CH2MHILL

Water Quality Characterization

In 2003, Ecology adopted a water use-based classification for state surface waters (RCW 173-201A, Table 602) that determines the surface water quality standards applicable for that water body (RCW 173-201A-600(1)). The Duwamish River (below the confluence with the Black River) is classified as Salmonid Rearing/Migration Only and Secondary Contact Recreation. The Green River (above the confluence with the Black River) is classified as Salmonid Spawning/Rearing Only and Primary Contact Recreation. None of the tributaries to these rivers within Tukwila is listed in Table 602. Therefore, the uses defined for these tributaries are the same as the Green River to which they discharge. Table B-1 shows the classifications for surface waters in the City of Tukwila.

Table B-1
Use-based Classification for Surface Waters in City of Tukwila

	Use-based Classification (Source: RCW 173-201A-600(1))	
Water Body	**Aquatic Life Uses**	**Recreational Uses**
Duwamish River (Green/Duwamish River, downstream of confluence with Black River)	Salmonid Rearing/Migration Only	Secondary Contact Recreation
Riverton Creek (to Duwamish River)	Salmonid Rearing/Migration Only	Secondary Contact Recreation
Southgate Creek (to Duwamish River)	Salmonid Rearing/Migration Only	Secondary Contact Recreation
Green River (Green/Duwamish River, upstream of confluence with Black River)	Salmonid Rearing/Migration Only	Primary Contact Recreation
Gilliam Creek (to Green River)	Salmonid Rearing/Migration Only	Primary Contact Recreation
Johnson Creek (to Green River)	Salmonid Rearing/Migration Only	Primary Contact Recreation
Other Tukwila drainage basins (to Green River): Nelson Place / Long Acres Southeast CBD P17	Salmonid Rearing/Migration Only	Primary Contact Recreation

Ecology maintains a list of water bodies that do not meet water quality standards, known as the 303(d) List. The United States Environmental Protection Agency (EPA) approved the 2008 Water Quality Assessment 305(b) report and 303(d) list on January 29, 2009. This is the current water quality assessment and 303(d) list for the state of Washington. Four sections of the Green/Duwamish River within the City of Tukwila do not meet water quality standards according to the 2008 303(d) list. Both the Green River and Duwamish River are listed as Category 5 (at least one designated use is impaired) for dissolved oxygen, temperature, pH, and fecal coliform, based on water sampling and analysis. Figure B-2 shows the 303(d) listings for water bodies within the City of Tukwila and Table B-2 shows the 303(d) listings relevant for the City of Tukwila.

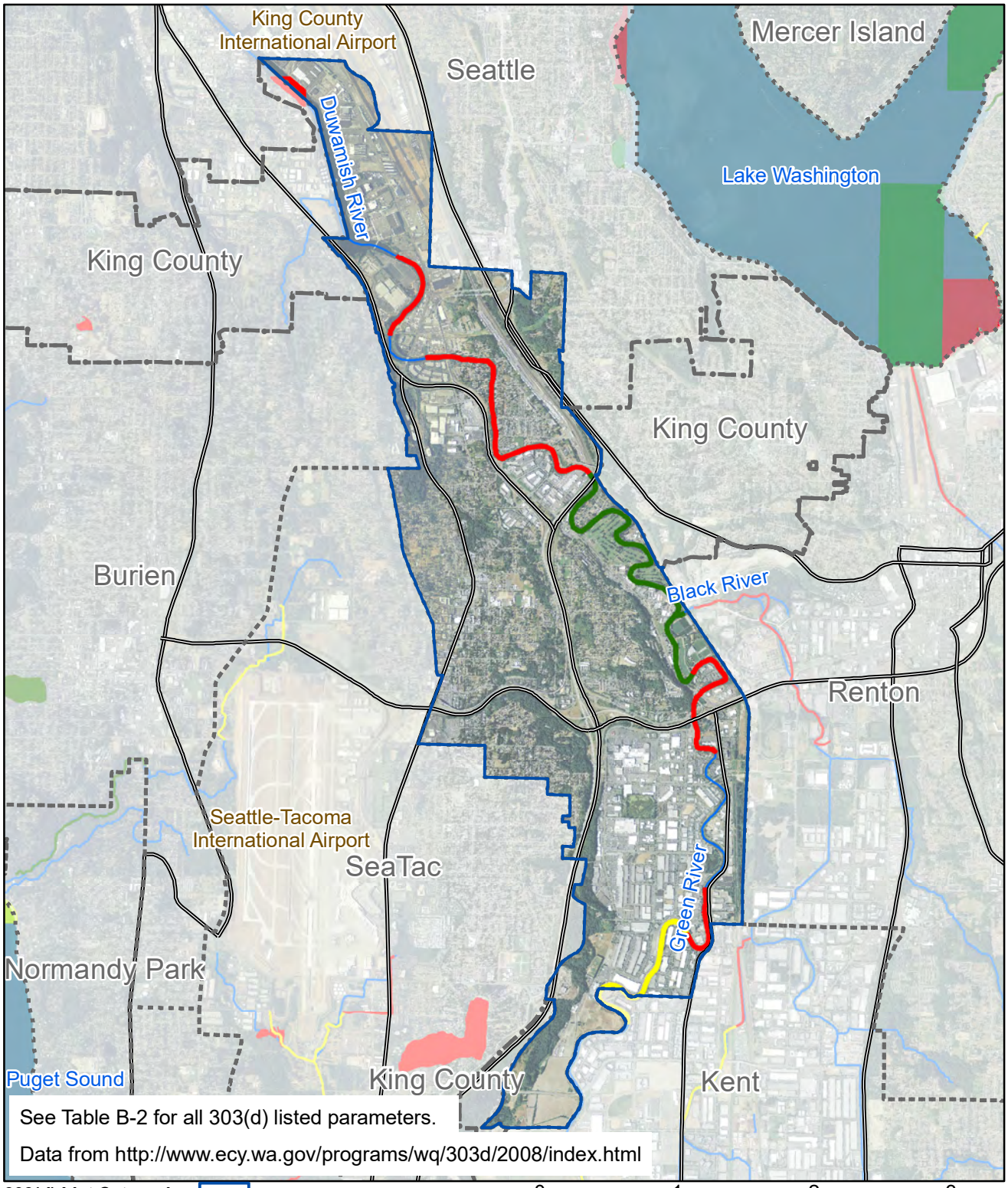


FIGURE B-2
Ecology 303(d) Listed Water Bodies (2013)
City of Tukwila 2012 Surface Water Comprehensive Plan

Table B-2
303(d) Water Quality Listings for Surface Waters within City of Tukwila Boundaries (2013)

	Listing		
Water Body	**Category**	**Parameter**	**Medium**
Duwamish River	1	Ammonia-N	Water
Duwamish River	1	Fecal Coliform	Water
Duwamish River	2	Bis(2-Ethylhexyl) Phthalate	Water
Duwamish River	2	Dissolved Oxygen	Water
Duwamish River	2	Temperature	Water
Duwamish Waterway	4A	Ammonia-N	Water
Duwamish River	5	pH	Water
Duwamish Waterway	5	Dissolved Oxygen	Water
Duwamish Waterway	5	Fecal Coliform	Water
Green River	1	Ammonia-N	Water
Green River	1	pH	Water
Green River	2	Bis(2-Ethylhexyl) Phthalate	Water
Green River	4A	Ammonia-N	Water
Green River	5	Dissolved Oxygen	Water
Green River	5	Fecal Coliform	Water
Green River	5	Temperature	Water
Springbrook (Mill) Creek	1	Ammonia-N	Water

In addition to Ecology's 303(d) listings, King County has collected monthly water quality data along the Green/Duwamish River for many years (King County, 2011). Two monitoring stations fall within the City of Tukwila: Duwamish River at E Marginal Way Bridge and Green River at West Valley Road. These data were reviewed for the period of 2003 through 2008. They reflect around 70 samplings and are the latest data available. The Duwamish station meets water quality standards for dissolved oxygen, pH, and fecal coliform. Temperature is exceeded in 11 percent of the total samples, during the months of July and August. For the Green River station, temperature is exceeded in 15 percent of the total samples, also during the same summer period. In addition, 15 percent of the dissolved oxygen samples from the Green River station fail to meet standards, mostly during the summer period. The lowest

dissolved oxygen measurement at the Green River station was 7.0 milligrams per liter (mg/L). Fecal coliform and pH surface water quality standards were met at this station.

Turbidity standards are expressed as an allowable increase over background conditions and the water quality data do not allow for a direct assessment. The maximum recorded turbidity at either station during this six-year period is around 70 Nephelometric Turbidity Units (NTUs) and that only four values at each station exceeded 10 NTUs, indicating relatively clear water conditions nearly all of the time.

The northern-most portion of the City of Tukwila lies within the Lower Duwamish Waterway Superfund Site, designated by the EPA in 2001. King County, the Port of Seattle, and the cities of Seattle and Tukwila are working with the Washington Department of Ecology (Ecology) and the EPA to control sources of pollution in the Lower Duwamish Waterway. Decades of heavy industrial activity along both sides of the waterway have resulted in the accumulation of high levels of PCBs, polyaromatic hydrocarbons (PAHs), arsenic and other pollutants in the upland soils and within the waterway sediments (Windward Environmental, 2010). Dredging and capping projects in limited areas of the waterway have removed some of these pollutants and more removal actions are planned. Upland sources of these pollutants are also being addressed. Ecology is the lead agency for implementing source controls in the Lower Duwamish Waterway. In 2002 the entities listed above formed the Lower Duwamish Waterway Source Control Work Group to coordinate source control activities.

The Norfolk Basin, located in the southern portion of the superfund site, lies partially within the jurisdiction of the City of Tukwila. This area is included in the Duwamish River Basin shown on Figure B-1. The Norfolk Basin discharges to the Lower Duwamish Waterway and includes both stormwater runoff and occasional combined sewer overflows. In 2007, the City of Tukwila signed a memorandum of agreement with the City of Seattle allowing the latter to inspect suspected contaminated sites in the Norfolk Basin that lie within the jurisdiction of the city of Tukwila. The City of Seattle has carried out sediment sampling and cleaning of storm sewers in the Norfolk Basin. Of the numerous chemical parameters analyzed in the storm sewers, phthalates and zinc consistently exceeded the cleanup screening level (CSL), above which adverse impacts on marine organisms would be likely. Total petroleum hydrocarbons were also consistently high. The City of Seattle removed sediment from the storm sewer serving Martin Luther King Way South prior to a recent sewer upgrade.

In 2007, Ecology produced a Source Control Action Plan (SCAP) for Early Action Area 7 (the Norfolk Basin) (Ecology and Environment, 2007). The plan lists a number of potential upland sources of contaminants to the surface water system. Through the memorandum of

agreement mentioned earlier, the City of Seattle is conducting inspections to determine whether cleanup measures should be carried out. The SCAP states that there is an incomplete mapping of the surface water system serving the Norfolk Basin. It identifies the need for a cooperative effort between the City of Seattle and the City of Tukwila to use available GIS and as-built storm sewer drawings to better delineate the surface water system.

The EPA is sponsoring another round of storm drain sampling in 2011. The City has recently signed another agreement allowing continued inspection and sampling with the Norfolk Basin (Larson, 2011).

Fish Habitat Characterization

The Green/Duwamish River channel is significantly altered from its natural condition along most reaches in the City of Tukwila. Non-native and other less desirable trees and shrubs such as blackberry have replaced native riparian vegetation. Riprap also borders the river along many reaches. Urban development in and near the City has greatly reduced the vegetated buffer of the river and has encroached upon the banks. Flooding and drainage problems associated with this urban development throughout the basin (including the levees constructed to address flooding) have degraded fish and other wildlife habitat in and along the river.

Productive, good quality fish habitat, both in the main channel and in off-channel refuge, is generally lacking (King County, 2000). Spawning gravel recruitment to the Green/Duwamish River in this area has been diminished due to the comprehensive effects of urban development, in particular the diversion of the White River and the Cedar/Black River away from the Duwamish River. Little, if any, spawning habitat occurs in the river reaches within the City.

Gilliam Creek Basin

Drainage Characterization

The Gilliam Creek basin has a single outlet to the Green River through an outfall and flap gate located to the south of I-405. Most of the Gilliam Creek basin is located within the central region of the City of Tukwila, with the remainder (27 percent) located in the City of SeaTac. The basin has been almost fully developed except for the steep slopes above the I-5 corridor. The portion of the basin located north of I-405 and east of I-5 is mostly residential, with some commercial areas located along Southcenter Boulevard. Residential developments make up most of the basin west of I-5, with the exception of the Tukwila International Boulevard corridor which contains commercial development. Southcenter Mall and other commercial areas dominate the portion of the basin east of I-5 and south of I-405.

Tukwila Pond is within the 25-acre Tukwila Pond Park located to the south of Southcenter Mall. Historically, this area drained north into Gilliam Creek via both subsurface and surface flow. As this area was developed, Tukwila Pond was formed. Currently, under normal flow conditions, Tukwila Pond drains to the south into the P17 basin then on to the Green River. A conveyance system built along Andover Park West in the mid-1980s provides overflow conveyance north towards Gilliam Creek. A gate valve installed at the discharge point to Gilliam Creek is usually closed. When open, the City of Tukwila has the capability to either allow Tukwila Pond to flow into Gilliam Creek when the pond is at high levels or to provide storage when the Green River is at high levels and backs water into the storm drain systems in the lower portion of the Gilliam Creek Basin. Figure B-1 shows the location of Tukwila Pond.

Water Quality Characterization

Gilliam Creek's use-based classification is Salmonid Spawning/Rearing and Primary Contact Recreation, because Gilliam Creek enters the Green River upstream of the confluence with the Black River. The water quality characterization for Gilliam Creek in this section is drawn from the stormwater management plan prepared for Gilliam Creek in 2001 (Herrera, 2001). Water quality data for the creek was collected in support of that study. No additional water quality data for the creek has been found subsequent to this study. Thus, the discussion in this section is drawn from that study.

The creek water samples were taken at eight locations during three different storm runoff events in the fall of 1999. The data therefore reflect the effects of active stormwater runoff and cooler temperature conditions. In summary, temperature, dissolved oxygen, and pH (the latter with the exception of one sample) all met current state water quality standards. Turbidity was somewhat elevated, generally ranging from 25 to 50 NTUs. Similarly suspended solids were also only modestly elevated, generally ranging from 20 to 60 mg/L. Dissolved lead met applicable water quality criteria, as did nearly 90 percent of the dissolved zinc samples. About half of the samples failed to meet the dissolved copper criteria. Finally, nearly all of the fecal coliform samples were above the state water quality standards. The study noted that the two sites most frequently exceeding the criteria for zinc and copper both directly drained Highway 99 and appear to be heavily influenced by the high level of traffic and parking lots in the upper basin. Similar conditions exist in the lower reaches of Gilliam Creek near Southcenter Mall, but the dilution effects occurring in the lower portion of the basin may mitigate against higher metals concentrations in the creek.

In a study that had been conducted several years prior, two creek samples were collected during summer baseflow conditions (June and September of 1997). Several samples taken during these months did not meet the state dissolved oxygen standard, with one sample

recorded at 3.2 mg/L, well below the state standard of 6 mg/L. These samples also fell slightly below the pH standard. In September, the measured stream temperature of 17.5 degrees Celsius barely fell below the state standard of 18 degrees. This suggests the likelihood that portions of the stream may exceed the state temperature standard during the warmer summer months. Gilliam Creek flows into a section of the Green River that is on Ecology's 303(d) list for temperature, dissolved oxygen and fecal coliform. Thus, the degraded water quality conditions in Gilliam Creek may be contributing to water quality problems in the Green River.

Given both the age and the limited amount of water quality data available for Gilliam Creek, additional water quality data should be collected to determine if similar water quality conditions continue to persist in this creek.

Fish Habitat Characterization

Several species of anadromous fish, including coho salmon, chinook salmon, and sea-run cutthroat trout are reported to make use of the lower reach of Gilliam Creek, along the south shoulder of I-405 between the Green River and the I-5/I-405 interchange (Washington Department of Fish and Wildlife [WDFW], 2010; Herrera, 2001). This lower reach provides mostly rearing and possibly some scattered spawning habitat. Spawning gravels are covered by sediments deposited by upstream erosion and by historical construction activities.

Habitat in the lower reach of Gilliam Creek is available to fish through the flap gate at the outlet of Gilliam Creek only under certain high flow conditions, when the Green River water level is elevated but remaining lower than the water level in Gilliam Creek. WDFW has characterized this flap gate a partial fish passage barrier (WDFW, 2010). Two more partial fish passage barriers exist in the lower reach of Gilliam Creek. A State of Washington Department of Transportation (WSDOT) -owned culvert that conveys at least 1,000 feet of the creek under the south shoulder of I-405 is identified as a partial fish barrier (WDFW, 2010). Farther upstream, a log at the inlet of the WSDOT-owned culvert at the I-405 on-ramp observed in spring of 2011 appears capable of blocking fish passage.

WDFW determined that several of the tributaries to upper Gilliam Creek provide some rearing habitat (WSDOT, 2007). Since the culvert underneath the I-5/I-405 interchange is a total barrier to anadromous fish, it is likely that only resident fish such as cutthroat trout and sculpin are utilizing the available habitat in the upper reaches of Gilliam Creek at this time. Fish barriers do exist in the upper reaches of Gilliam Creek, including a WSDOT-owned culvert beneath SR 518 that conveys one of these tributaries that is identified as a total fish passage barrier.

Figure B-3 shows the inventory of fish-blockages in the creek systems of Tukwila, including Gilliam Creek. Attachment A to this Appendix B contains a detailed inventory of barriers to fish passage within the City of Tukwila.

Nelson Place – Long Acres Basin

Drainage Characterization

The Nelson Place – Long Acres basin is located east of the Green River on the eastern edge of the City of Tukwila (Figure B-1). The Renton city limits form the east boundary of the basin. Commercial developments line the West Valley Highway corridor. The areas east and west of the West Valley Highway corridor are mostly undeveloped.

Runoff from the West Valley Highway and the area in the western part of the drainage basin drains directly into the Green River through numerous storm drainage outfalls. Runoff from the area east of the West Valley Highway drains to the open ditch and culvert system located on the east side of the basin adjacent to the Burlington Northern Santa Fe (BNSF) Railroad track. A 24-inch-diameter pipe located under the BNSF tracks directs drainage from this series of open ditches and culverts east to drainage systems in the City of Renton. Figure B-1 shows the Nelson Place – Long Acres Basin in relation to the city boundaries and to the other drainage basins in Tukwila.

Water Quality Characterization

The Nelson Place – Long Acres drainage basin use-based classification is Salmonid Spawning/Rearing and Primary Contact Recreation, because the drainage discharges to the Green River upstream of the confluence with the Black River. No water quality data is available for this drainage basin.

Fish Habitat Characterization

The former alignment of the Green River, prior to construction of I-405 in 1962, extended through the Nelson farm property and into the property currently occupied by Homestead Studio Suites. Part of that former alignment has been filled, isolating a pond area and reducing off-channel habitat and floodplain connectivity in this reach of the river. Apart from along the mainstem Green River, which is described in an earlier section of this Appendix, no fish habitat was identified in this basin.

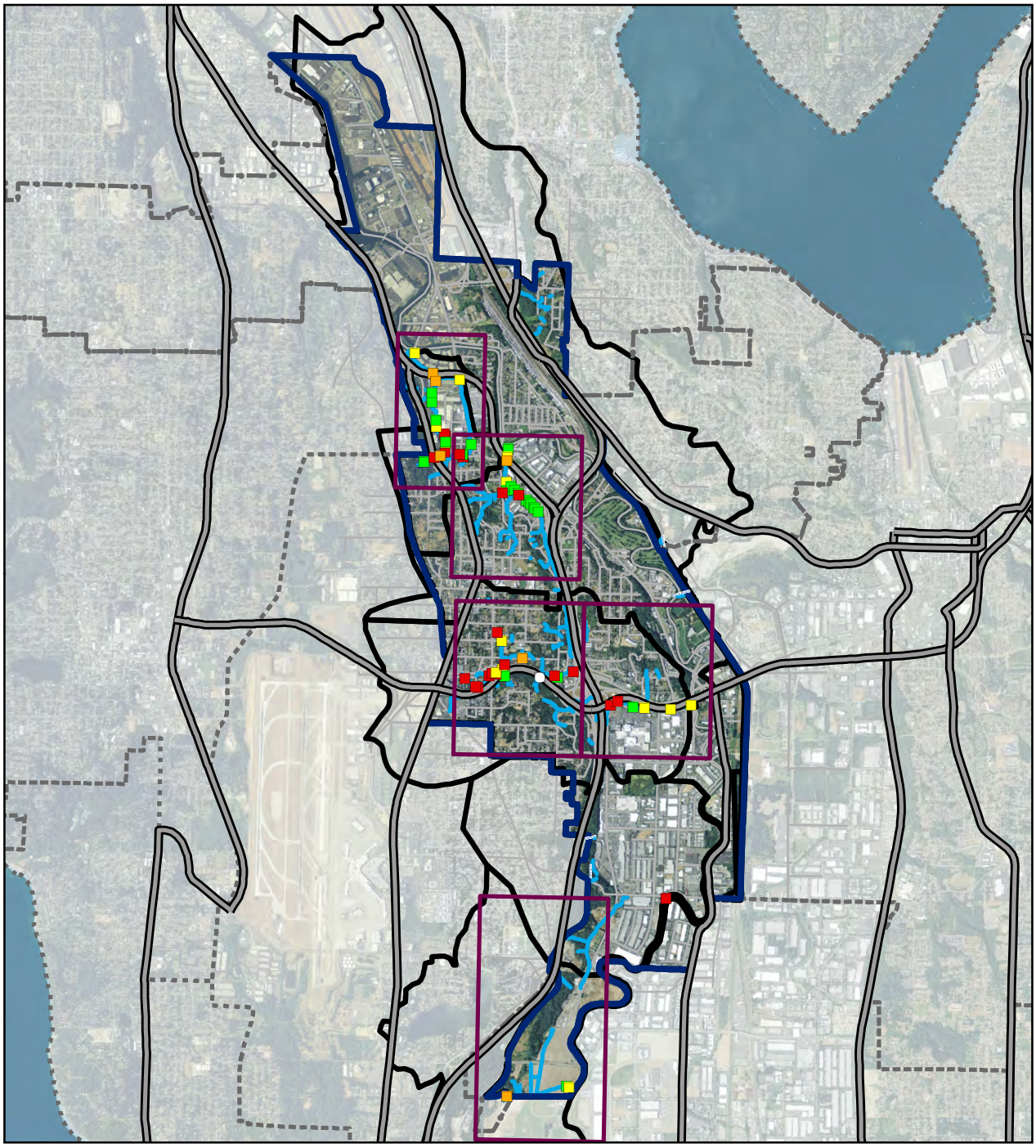


FIGURE B-3
Inventory of Fish Blocking Culverts (2013)
City of Tukwila 2012 Surface Water Comprehensive Plan

P17 Basin

Drainage Characterization

The P17 drainage basin is located south of the Gilliam Creek basin (Figure B-1). Approximately 60 percent of this basin is located within the City of Tukwila, with the remaining portion in the City of SeaTac. The basin is almost fully developed for the exception of the steep slopes adjacent to the I-5 corridor. The P17 basin includes a portion of the Tukwila South development site.

Typically, flows from Tukwila Pond are routed through drainage basin P17. A drainage pipe adjacent to Andover Park West conveys pond outflow into the basin. As discussed earlier, drainage is routed north to Gilliam Creek when the gate valve at the overflow pipe to Gilliam Creek is open and the pond water level is elevated.

The P17 drainage basin has multiple outlets, or outfalls, into the Green River. Runoff from the northern portion of the basin is routed to the P17 stormwater pump station located at the east end of Minkler Boulevard. This P17 pump station, owned and operated by King County, discharges to the Green River. The southern portion of the basin drains to the P17 pump station or directly into the Green River through a WSDOT outfall. City of Tukwila's surface water pump station #15 is located within this P17 drainage basin (Figure B-1).

Water Quality Characterization

The P17 drainage basin use-based classification is Salmonid Spawning/Rearing and Primary Contact Recreation, because the drainage discharges to the Green River upstream of the confluence with the Black River. No water quality data is available for this drainage basin.

Fish Habitat Characterization

Apart from along the mainstem of the Green River, which is described in an earlier section of this Appendix, no fish habitat was identified in this basin.

Riverton Creek Basin

Drainage Characterization

The Riverton Creek basin is located in the northwest region of Tukwila. Nearly the entire basin is located within the City of Tukwila boundaries with the remaining portion of the basin in unincorporated King County and in the City of Sea-Tac. The basin is almost entirely developed except for about 50 acres of forested land west of Tukwila International Boulevard. Residential and commercial developments are located on the steep slopes in the southern and western portions of the basin. Light industrial developments are located in the valley floor in the northern portion of the basin.

There are two major forks to Riverton Creek, named the East Fork and West Fork. The East Fork and West Fork of Riverton Creek merge just upstream of SR 599, and then pass underneath SR599 through approximately 300 feet of culvert, through about 1,000 feet of open channel and finally through two 48-inch culverts (each with a flap gate) into the Duwamish River downstream of the confluence with the Black River (Figure B-1).

Water Quality Characterization

The Riverton Creek use-based classification is Salmonid Spawning/Rearing and Secondary Contact Recreation, because the drainage discharges to the Duwamish River downstream of the confluence with the Black River. No water quality data is available for this drainage basin.

Fish Habitat Characterization

The flap gates at the Duwamish River are impassable to fish during low flows plus somewhat impassable all other times. Both west and east forks of Riverton Creek are characterized by narrow, straight channels and long sections of culvert in their lower reaches. Both forks are considered fish-bearing. Coho salmon, Chinook salmon, and resident cutthroat trout are potentially present in Riverton Creek (WDFW, 2010; Entranco, 1997). Overall, Riverton Creek provides some limited rearing habitat for salmon, but no longer provides substantial spawning habitat.

The East Fork of Riverton Creek just upstream of the SR 599 culvert is characterized by a wide, exposed, sandy and silty streambed that provides fish passage but no spawning or rearing habitat. Upstream of that reach, a more than 2,000 linear foot (LF) culvert likely prevents at least some anadromous fish from accessing suitable habitat located in the upper reach between S 126th Street and S 128th Street, where good overhead cover from riparian plants, sufficient flows, and streambed gravel appears suitable for coho salmon spawning. Anecdotal evidence from a local resident during a February 2011 site visit suggests that anadromous salmon can and do access the east fork up to S 128th Street. The gradient upstream of S 128th Street is likely too steep for anadromous fish.

Approximately 2,000 LF of restored channel in the West Fork of Riverton Creek just upstream of SR 599 has provided some spawning and rearing habitat. The culverts within this restored reach could fill with sediment from upper watershed erosion and stormwater runoff, which could potentially block fish passage. A log jam in the upper portion of the restoration area may also be a partial fish passage barrier. Just upstream of the restored reach, a 20-foot-tall manmade waterfall prevents fish from passing upstream to S 126th Street. Juvenile salmon are released from a city-operated fish hatchery at the base of the waterfall into the west fork at the upper end of the restored reach.

Upstream of the waterfall up to S 126th Street, there is about 500 feet of potential fish habitat, though that reach also includes two total fish passage barriers. Fish would likely not be able pass upstream of S 126th Street because of a steep gradient, even if the waterfall and other nearby barriers were removed. However, this upper reach beyond S 126th Street has a cobble streambed that is likely supporting macroinvertebrates, a food source for fish downstream of the barriers.

Figure B-3 shows the inventory of fish-blockages in the creek systems of Tukwila, including Riverton Creek. Attachment A to this Appendix B contains a detailed inventory of barriers to fish passage within the City of Tukwila.

Southeast Central Business District (CBD) Basin

Drainage Characterization

The Southeast CBD drainage basin shown in Figure B-1 is formed by the Green River on the west and the BNSF railroad track to the east. Most of the basin contains developed commercial areas along the West Valley Highway corridor with some wetland areas located along the east side of the basin adjacent to the BNSF railroad track.

The Southeast CBD basin has multiple outlets. Drainage from the West Valley Highway and the area in the west side of the drainage basin drain directly into the Green River through numerous storm drainage outfalls. The area east of the West Valley Highway drains into the wetlands on the east side of the basin. Overflow from these wetlands drains east into the City of Renton through culverts under the BNSF railroad tracks. City of Tukwila surface water pump station #16 is located within this CBD drainage basin (Figure B-1).

Water Quality Characterization

The use-based classification for the Southeast CBD basin is Salmonid Spawning/Rearing and Primary Contact Recreation, because the drainage discharges to the Green River upstream of the confluence with the Black River. No water quality data is available for this drainage basin.

Fish Habitat Characterization

Apart from along the mainstem Green River, which is described in an earlier section of this Appendix, no fish habitat was identified in this basin.

Southgate Creek Basin

Drainage Characterization

The Southgate Creek basin is located in the northwest region of Tukwila, south of Riverton Creek (Figure B-1). Most of the basin is located in the City of Tukwila with the remaining portion (approximately 11 percent) located in the City of SeaTac. Commercial and residential developments are located on the steep-sided slopes in the west portion of the basin (west of Tukwila International Boulevard) and lowlands in the central portion of the basin (between Tukwila International Boulevard and 42nd and 43rd Avenue S). The east portion of the basin, also located in the lowlands, is the least-developed portion of the basin. Private residences are the primary type of development in this area, covering nearly 80 percent of the basin.

Water Quality Characterization

The Southgate Creek use-based classification is Salmonid Spawning/Rearing and Secondary Contact Recreation, because the drainage discharges to the Duwamish River downstream of the confluence with the Black River. No water quality data is available for this drainage basin.

Fish Habitat Characterization

The East Fork of Southgate Creek begins as a relatively small channel just south of S 137th Street and flows north through a steep ravine, several culverts, and an asphalt-lined ditch before it merges with the west fork. The West Fork begins as three smaller tributaries that collect flow from the hillside just west of 40th Avenue S and merge just upstream of S 133rd Street. The West Fork then passes underneath S 133rd Street and 42nd Avenue S through more than 500 feet of culvert and merges with the east fork coming from a ditch along S 132nd Street. From there, the main stem of Southgate Creek extends under SR 599 through about 320 feet of culvert, a fish ladder, and large arch culvert into the Duwamish River downstream of the Black River confluence.

Coho salmon are potentially present in Southgate Creek, according to WDFW, and resident trout or and other types of non-anadromous fish are likely present. The fish ladder at the SR 599 culvert likely is a fish barrier to anadromous fish during low stream flows.

As in other urbanized streams, development has altered Southgate Creek's riparian buffer and natural channel alignment, resulting in increased channel incision, stream bank erosion, and degraded water quality. Suitable fish habitat is limited to the following:

- Rearing habitat in the main stem between SR 599 and S 132nd Street culvert
- Rearing habitat in some small sections of the east fork along S 131st Place and S 134th Place

- Rearing and some spawning habitat in the recently-restored section of the west fork just upstream of S 133rd Street

Bank erosion from the combination of steep gradients and stormwater runoff from urban development have deposited sediments in the lower reach, which have reduced effective culvert conveyance capacities and covered up salmon spawning gravels. The section of the main stem just downstream of the confluence of the West and East Forks is often completely blocked by sediment and debris.

During a February 2011 site visit, juvenile salmonids were observed in the section of the east fork along S 131st Place, which are reportedly released into the stream by a nearby homeowner.

Fish are unlikely to be present in the West Fork of Southgate Creek upstream of Macadam Way S due to the steep gradient. Some resident fish may use the upper reaches of the east fork within Southgate Park.

Figure B-3 shows the inventory of fish-blockages in the creek systems of Tukwila, including Southgate Creek. Attachment A to this Appendix B contains a detailed inventory of barriers to fish passage within the City of Tukwila.

Johnson Creek Basin

Drainage Characterization

The Johnson Creek basin is located to the south of the P17 basin and extends southward to the City of Tukwila boundary with the City of Kent and westward to I-5. Much of the Johnson Creek basin was recently annexed into the City of Tukwila (Figure B-1). The approximately 850-acre basin includes about half of the Tukwila South commercial development site.

The basin includes steep hillsides leading up to I-5 as well as Green River floodplain lowlands. In times of high Green River water levels, runoff ponds behind the Green River levees until the river stage drops, allowing discharge by gravity through the flap gate and outfall at the Johnson Creek outlet to the Green River.

Water Quality Characterization

The Johnson Creek use-based classification is Salmonid Spawning/Rearing and Primary Contact Recreation, because the drainage discharges to the Green River upstream of the confluence with the Black River. No water quality data is available for this drainage basin.

Fish Habitat Characterization

The Johnson Creek flap gate and outfall to the Green River, partial blockages to fish passage, were replaced with a fish-passable structure as part of the mitigation for the proximate commercial development. No other barriers to fish passage were identified in Johnson Creek. Figure B-3 shows the inventory of fish-blockages in the creek systems of Tukwila, including Johnson Creek. Attachment A to this Appendix B contains a detailed inventory of barriers to fish passage within the City of Tukwila.

The lower reach of Johnson Creek was reconstructed in 2011 as part of mitigation for the commercial development in the area. As the commercial development is completed, an aquatic habitat assessment should be conducted in order to assess conditions post-development and to assess the effectiveness of the mitigation.

References

Ecology and Environment. 2007. *Lower Duwamish Waterway Source Control Action Plan*. Ecology Publication No. 07-09-003, Lacey, Washington.

Entranco, Inc., et al. 1997. *Riverton Creek Stormwater Quality Management Plan: Water Quality, Stream Habitat, and Flood Control*. Prepared by Entranco Inc., Taylor Associates Inc., and Envirovision Inc. Prepared for the City of Tukwila. November.

Herrera Environmental Consultants, Inc. 2001. *Gilliam Creek Basin: Stormwater Management Plan.* Prepared for the City of Tukwila. March.

King County and Washington State Conservation Commission. 2000. Habitat Limiting Factors and Reconnaissance Assessment Report: Green/Duwamish and Central Puget Sound Watersheds. December.

King County. 2011. *Stream and River Water Quality Monitoring*. http://green.kingcounty.gov/wlr/waterres/streamsdata/ accessed on February 10, 2011.

Larson. 2011. Personal communication (conversation with Ryan Larson, City of Tukwila Public Works Department). Tukwila City Hall, Tukwila, WA. November 30.

WSDOT. 2007. SR 518 SeaTac Airport to I-5/I-405 Interchange Widening Project: Culvert Mitigation. February.

WDFW. 2010. Fish Passage Barrier Inventory Geodatabase. Accessed via email by Brian Benson, WDFW Habitat Program, on January 14, 2011.

Windward Environmental. 2010. *Lower Duwamish Waterway Remedial Investigation*, Seattle, Washington.

ATTACHMENT B-1

Fish-blocking Culvert Inventory

Memorandum

To:	Sherry Edquid, City of Tukwila
From:	Brogan Kellerman, GIT; Shailee Jain, PE; Alessandra Capretti, PWS
Copies:	Trista Kobluskie
Date:	March 18, 2024
Subject:	Revised Tukwila Revised Fish Barrier Inventory: 2024 Addendum to Appendix B Attachment A Fish-blocking Culvert Inventory from 2013 City of Tukwila Surface Water Comprehensive Plan
Project No.:	33383

This memorandum updates Attachment A, Fish-blocking Culvert Inventory, to Appendix B of the 2013 Surface Water Comprehensive Plan (SWCP). The memorandum has been prepared for the 2024 update to the SWCP. This addendum documents the methodology used to update the status of the inventory.

The fish-blocking culvert inventory in the 2013 SWCP documented only culverts and omitted some stream systems. It comprised a combination of data gathered from the Washington Department of Fish and Wildlife (WDFW) fish passage database and a windshield survey completed by CH2M HILL in 2011. Data sources used by CH2M HILL are listed in Table 1 of Appendix B, Attachment A. Table 1 is available in the original memorandum by CH2M HILL. For the purposes of this addendum, Otak reviewed both a WDFW fish passage geodatabase from 2022 and the WDFW current online database (as of February 2024) to determine if any of the fish-blocking culverts in Table 1 of the 2013 inventory have since been removed or now have a different status. Additional crossings and fish-blocking culverts also were documented.

Table 2, below, presents the updated inventory of crossings and fish-blocking barriers with revised barrier status, survey date, owner type, data source, and problem where applicable. “Revised” means the most current information available documented by WDFW, as of February 2024. In some cases, the most current is the same information as in Table 1 where data was collected by CH2M HILL through the windshield survey, or where the WDFW survey date did not change. Otak added three waterways and the associated unnamed tributaries to the inventory. The table is organized with crossings listed from downstream to upstream in each stream system. Not all crossings listed are barriers.

The Washington State Department of Transportation (WSDOT) operates highways and culverts in Tukwila. In 2013, in order to preserve the treaty rights of northwest Indian tribes, the U.S District Court ruled that WSDOT must refrain for building or operating culverts that restrict fish passage. The court issued a permanent injunction, and WSDOT developed a list of culverts subject to the injunction that must be removed by 2030. There are seven uncorrected WSDOT injunction barriers within the City of Tukwila. Table 3, below, presents the list of WSDOT Current Injunction Barriers; these are also listed in Table 2.

Figures B-4 through B-7 present the revised mapped crossings documented from the WDFW databases within the City of Tukwila. Note that the WDFW database referenced for this update is available at

Washington State Fish Passage web map and does not allow features to be labeled. Therefore, labels in Figures B-4 through B-6 are derived from an older version of the database and are only shown where available. Records with survey dates in December 2023 through February 2024 are not labeled.

Table 2 Tukwila Revised Fish Barrier Inventory

Fish Passage Id[a] (Former)	Fish Passage Id[b] (WDFW Current)	Location[c]	Feature Type	Barrier Status (Revised)	Survey Date[d] (Revised)	Owner Type (Revised)	Data Source (Revised)	Problem[e] (Revised)	Culvert Id[f]
Riverton Creek									
50002	No Data	Unnamed road (Outfall to Duwamish River)	Culvert (removed)	Not a barrier	N/A	N/A	Otak	Barrier Removed through City's Riverton Creek Flapgate Removal Project Constructed in 2021-2022	
**	936306	Steel and concrete footbridge over confluence of Riverton Cr with the Duwamish R.	Non Culvert Xing	Not a barrier	3/16/2023	City	WDFW	None	
50003	935937	SR 599 N	Culvert	Unknown	3/16/2023	WSDOT	WDFW	Insufficient Data	
**	935936	SR 599 S	Culvert	Unknown	3/28/2023	WSDOT	WDFW	Insufficient Data	
50004	935700	parking; S 120th Pl	Culvert	Yes, % Passable Unknown	5/31/2022	County	WDFW	Rack	
50009	935813	S 120th Pl (Restored stream length in industrial park)	Culvert	Passable	6/1/2022	City	WDFW	None	872
50010	935816	S 120th Pl (Restored stream length in industrial park)	Culvert	Passable	6/13/2022	Private	WDFW	None	920
50011	935779	driveway; S 120th Pl (Restored stream length in industrial park)	Culvert	Not a barrier	8/23/2022	Private	WDFW	None	925
50022	No Data	W of Group Health building (main stream reach)	Log jam	Partial	2/4/2011	Unknown	CH2M HILL	Insufficient pool downstream of log jam obstacle	
**	936305	Behind building southwest of 35th Ave S and S 124th St (unnamed tributary to Riverton Creek)	Artificial waterfall	Total	3/28/2023	Private	WDFW	WS Drop	
**	936344	Behind building southwest of 35th Ave S and S 124th St (unnamed tributary to Riverton Creek)	Streambed Control	Partial	3/28/2023	Private	WDFW	WS Drop	
20533	09.0004X 0.47	W of 35th Ave S	Artificial waterfall	Total	6/28/2022	Private	WDFW	Slope	
20534	935819	W of 35th Ave S	Dam	Partial	6/28/2022	Private	WDFW	WS Drop	
14677	995968	S 126th St	Culvert	Unknown	6/26/2022	Private	WDFW	Level B Required	
14676	995967	S 126th St	Culvert	Passable	6/26/2022	Private	WDFW	None	
14675	995966	S 126th St	Culvert	Partial	6/29/2022	City	WDFW	Slope	1077
19812	995965	N of S 128th St	Dam	Total	10/2/2003	Private	WDFW	Unspecified	885
21065	995964	34th Ave S	Culvert	Passable	7/5/2022	City	WDFW	None	1460
14674	995963	Tukwila International Blvd	Culvert	Total	7/6/2022	City	WDFW	Slope	
14673	995962	W (upstream) of SR 99	Culvert	Total	7/6/2022	Private	WDFW	Slope	
**	936252	South of SR 599	Culvert	Unknown	9/1/2021	City	WDFW	Insufficient Data	
50005	No Data	Adjacent to E Marginal Way just S of SR 599	Culvert	Partial	2/4/2011	City	CH2M HILL	Length; others possible	
50006	922617	S 126th St	Culvert	Unknown	3/2/2022	City	WDFW	Insufficient Data	994
**	922618	S 128th St	Culvert	Total	3/2/2022	City	WDFW	Slope	
50008	922620	S 128th St	Culvert	Total	3/2/2022	City	WDFW	Slope	
**	936044	Driveway; S 128th St	Culvert	Unknown	9/19/2022	WSDOT	WDFW	Other	
**	922621	35th Ave S	Culvert	Unknown	3/2/2022	City	WDFW	WS Drop	

Fish Passage Id[a] (Former)	Fish Passage Id[b] (WDFW Current)	Location[c]	Feature Type	Barrier Status (Revised)	Survey Date[d] (Revised)	Owner Type (Revised)	Data Source (Revised)	Problem[e] (Revised)	Culvert Id[f]
**	936345	West of 35th Ave S (unnamed tributary to Riverton Creek)	Other	Total	9/15/2022	Private	WDFW	WS Drop	
**	922622	Tukwila International Blvd (unnamed tributary to Riverton Creek)	Culvert	N/A	3/2/2022	City	WDFW	N/A	
**	936042	Lot; E Marginal Way S	Culvert	Partial	9/1/2022	WSDOT	WDFW	Slope	
50007	936043	access rd;S 128th St	Culvert	Unknown	9/1/2022	Private	WDFW	Insufficient Data	
50023	936047	S 128th St	Artificial waterfall	Total	9/19/2022	Private	WDFW	WS Drop	
**	922619	37th Ave S (unnamed tributary to Riverton Creek)	Culvert	N/A	3/3/2022	City	WDFW	N/A	
Southgate Creek									
50012	922624	Unnamed road (Outfall to Duwamish River)	Culvert	Unknown (Information in WDFW appears to be incorrect) / Partial	3/2/2022	City	WDFW	Culvert with a flap gate at outlet. Possible debris dam US not allowing enough water pressure to open flap gate.	1487
50013	No Data	Interurban Ave S	Culvert	Partial	2/3/2011	City	CH2M HILL	Fish ladder at low flows	1932
50014	935836	SR 599	Culvert	Unknown	3/7/2022	WSDOT	WDFW	Insufficient Data	1932
50015	922625	S 132nd St	Culvert	Total	3/3/2022	City	WDFW	Slope	1420
50016	922635	44th Pl S	Culvert	Passable	3/7/2022	City	WDFW	None	1035
50018	No Data	S 133rd St	Culvert	None	2/3/2011	City	CH2M HILL	None	2086
50017	922636	S 132nd St	Culvert	Unknown	3/8/2022	City	WDFW	Insufficient Data	1591
50019	922640	Commercial lot just S of S 133rd St	Culvert	Unknown	3/7/2022	City	WDFW	Insufficient Data	2225
50025	945477	S 134th Pl	Culvert	Not a barrier	12/20/2023	Private	WDFW	N/A	953
50026	945478	S 134th Pl	Culvert	Not a barrier	12/20/2023	Private	WDFW	N/A	988
50027	945479	S 134th Pl	Culvert	Not a barrier	12/20/2023	Private	WDFW	N/A	2068
50028	945481	S 134th Pl	Culvert	Partial	12/20/2023	Private	WDFW	Slope	1285
50029	945482	S 134th Pl	Culvert	Partial	12/202023	Private	WDFW	Slope	1370
50030	945483	S 134th Pl	Culvert	Total	12/20/2023	Private	WDFW	Slope	1203
**	945488	Non-motorized crossing	Culvert	Unknown	1/29/2024	Private	WDFW	Insufficient Data	
**	922637	48th Ave S	Culvert	Total	3/8/2022	City	WDFW	WS Drop	
**	922638	S 136th St	Culvert	Partial	3/8/2022	City	WDFW	Slope	
**	945485	Macadam Ave S	Culvert	Total	1/8/2024	Private	WDFW	Slope	
**	922639	Macadam Rd S	Culvert	N/A	3/8/2022	City	WDFW	N/A	
**	945487	Macadam Ave S	Culvert	N/A	1/8/2024	City	WDFW	N/A	
**	945500	Macadam Ave S	Culvert	N/A	1/8/2024	City	WDFW	N/A	
**	945486	Macadam Ave S	Culvert	N/A	1/8/2024	City	WDFW	N/A	
50020	420921	S 133rd St - Unnamed road (driveway in restored stream length just N of S 133rd St)	Culvert	Patial	11/28/2023	Private	WDFW	Slope	
50021	922626	S 133rd St/E Marginal Way	Culvert	Total	3/3/2022	City	WDFW	WS Drop	1877
**	945484	Non-motorized crossing	Culvert	Total	1/3/2024	Private	WDFW	Slope	
**	922641	Macadam Rd S	Culvert	Total	3/8/2022	City	WDFW	Slope	
**	922642	Abandoned Rd; S 137th St	Culvert	N/A	3/8/2022	City	WDFW	N/A	
**	922644	S 137th St	Culvert	Total	3/9/2022	City	WDFW	Slope	
**	420924	40th Ave S	Culvert	Total	12/12/2023	Private	WDFW	WS Drop	
**	420923	40th Ave S	Culvert	Total	12/12/2023	Private	WDFW	WS Drop	

Fish Passage Id[a] (Former)	Fish Passage Id[b] (WDFW Current)	Location[c]	Feature Type	Barrier Status (Revised)	Survey Date[d] (Revised)	Owner Type (Revised)	Data Source (Revised)	Problem[e] (Revised)	Culvert Id[f]
**	922627	40th Ave S	Culvert	Total	3/3/2022	City	WDFW	WS Drop	
**	922628	Access Rd; 40th Ave S	Culvert	N/A	3/3/2022	City	WDFW	N/A	
**	922629	40th Ave S	Culvert	N/A	3/3/2022	City	WDFW	N/A	
**	922631	40th Ave S	Culvert	Unknown	3/7/2022	City	WDFW	Insufficient Data	
**	922632	38th Ave S	Culvert	Total	3/7/2022	City	WDFW	WS Drop	
**	922633	37th Ave S	Culvert	Total	3/7/2022	City	WDFW	WS Drop	
**	922634	Tukwila International Blvd	Culvert	N/A	3/7/2022	City	WDFW	N/A	
Black River									
**	606773	<Null>	Non Culvert Xing	Passable	10/9/2019	<Null>	WDFW		
**	938400	<Null>	Non Culvert Xing	Passable	8/26/2009	WSDOT	WDFW		
**	938399	<Null>	Non Culvert Xing	Passable	8/26/2009	WSDOT	WDFW		
Gilliam Creek									
44994	938435	Tukwila Pkwy	Culvert	Total	6/24/2020	City	WDFW	Tidegate	
40864	998967	I-405; EB lanes	Culvert	Passable	12/22/2022	WSDOT	WDFW	None	
**	935715	I-405	Culvert	Unknown	10/7/2021	WSDOT	WDFW	Insufficient Data	
14611	*995857	I-405; NB on-ramp	Culvert	Partial	6/24/2020	WSDOT	WDFW	Depth	
40863	998966	61st Ave SE	Culvert	Passable	6/24/2020	City	WDFW	None	
14737	*996030	I-5; NB to I-405	Culvert	Total	1/26/2022	WSDOT	WDFW	Slope	
40861	*998964	I-5; NB off-ramp	Culvert	Total	1/24/2022	WSDOT	WDFW	WS Drop	
**	930716	I-5	Culvert	N/A	9/21/2009	WSDOT	WDFW	N/A	
**	997696	SR 518; EB off-ramp	Culvert	N/A	9/20/2005	WSDOT	WSFW	N/A	
**	*997697	SR 518	Culvert	Total	1/24/2022	WSDOT	WDFW	WS Drop / Slope	
**	935800	SR 518	Culvert	N/A	1/25/2022	WSDOT	WDFW	N/A	
17539	997689	SR 518	Culvert	N/A	2/7/2022	WSDOT	WDFW	None. Non-Fish Bearing Stream	
44986	938438	Southcenter Blvd	Culvert	Total	9/9/2009	City	WDFW	Slope	
44985	938437	51st Ave S	Bridge Non-Culvert Crossing	Passable	9/9/2009	City	WDFW	None	
44984	938436	Southcenter Blvd	Culvert	Total	9/9/2009	City	WDFW	Slope	
**	922646	51st Ave S	Culvert	N/A	3/9/2022	City	WDFW	N/A	
**	922645	51st Ave S	Culvert	N/A	3/9/2022	City	WDFW	N/A	
45118	992652	SR 518 (Upper Gilliam)	Abandoned/ Non-Culvert Crossing	Passable	9/16/2009	Unknown	WDFW	Abandoned	
50031	No Data	S 152nd St (Upper Gilliam)	Culvert	Potential		City	CH2M HILL	Unknown	
45078	938440	Gilliam Regional Detention Facility at SR 518/Southcenter Blvd (Upper Gilliam)	Dam	Partial	2/7/2022	WSDOT	WDFW	WS Drop	
44989	938439	Southcenter Blvd	Culvert	Total	9/9/2009	City	WDFW	WS Drop	
44992	930720	S 150th St (Upper Gilliam)	Culvert	Partial	9/16/2009	City	WDFW	US end has aluminum collar insert with trash rack. Professional judgement barrier due to trash rack and velocity	
44993	930721	N of S 150th St (Upper Gilliam)	Culvert	Total	9/17/2009	Private	WDFW	WS Drop	
44983	930719	SR 518 (Upper Gilliam)	Culvert	Partial	2/7/2022	WSDOT	WDFW	Slope	
40532	*992651	SR 518	Culvert	Total	2/7/2022	WSDOT	WDFW	WS Drop	

Fish Passage Id[a] (Former)	Fish Passage Id[b] (WDFW Current)	Location[c]	Feature Type	Barrier Status (Revised)	Survey Date[d] (Revised)	Owner Type (Revised)	Data Source (Revised)	Problem[e] (Revised)	Culvert Id[f]
44990	930711	42nd Ave S	Culvert	Passable	1/26/2022	County	WDFW	None. Corrected Barrier	3086
44991	930712	W of 42nd Ave S (Upper Gilliam)	Dam	Total	9/10/2009	City	WDFW	WS Drop	
40359	*998886	SR 518	Culvert	Total	1/24/2022	WSDOT	WDFW	Slope	
44979	930717	39th Ln S (Upper Gilliam)	Culvert	Total	9/15/2009	City	WDFW	PVC at DS end, CAL at US end. Combination depth, velocity and outfall drop with no plunge pool.	
44981	930718	S 154th St (Upper Gilliam)	Culvert	Total	9/15/2009	Private	WDFW	WS Drop	
Cottage Creek (Tributary to Gilliam Creek)									
**	998965	I-405	Culvert	N/A	3/1/2007	WSDOT	WDFW	N/A	
**	935811	I-405; WB ROW	Natural Barrier	N/A	10/21/2021	WSDOT	WDFW	Uknown	
Tributaries to Green River in P17 Basin									
**	922650	Andover Park E	Culvert	Passable	3/9/2022	City	WDFW	N/A	
**	922651	Andover Park W	Culvert	N/A	3/9/2022	City	WDFW	N/A	
**	995976	I-5	Culvert	Total	11/3/2003	WSDOT	WDFW	Slope	
**	996037	180th St	Culvert	Total	11/3/2004	WSDOT	WDFW	WS Drop	
Johnson Creek									
50000	No Data	Outfall to Green River	Flood gate	Partial	n/a	City	CH2M HILL	Additional statistical analysis on flood gate recommended	
50001	No Data	S 204th St	Culvert	Potential	2/3/2011	Unknown	CH2M HILL	Unknown	
50024	No Data	Outfall to Green River	Culvert	None	n/a	City	CH2M HILL	Assumes newly installed culvert is fish-passable.	
Duwamish River									
**	997686	SR 99	Culvert	N/A	9/1/2005	WSDOT	WDFW	N/A	
**	922611	S 102nd St	Non Culvert Xing	Passable	3/1/2022	City	WDFW		
**	*997684	SR 99 (on unnamed tributary to Duwamish River)	Culvert	Total	5/12/2015	WSDOT	WDFW	WS Drop	
**	997683	SR 99 (on unnamed tributary to Duwamish River)	Culvert	N/A	9/1/2005	WSDOT	WDFW	N/A	
**	922614	Tukwila International Blvd	Non Culvert Xing	Passable	3/1/2022	City	WDFW		
**	922630	S 116th St (on unnamed tributary to Duwamish River)	Culvert	N/A	3/7/2022	City	WDFW	N/A	
**	922615	East Marginal Way S	Non Culvert Xing	Passable	3/1/2022	City	WDFW		
**	922616	Allentown Footbridge	Non Culvert Xing	Passable	3/2/2022	City	WDFW		
**	922623	42nd Ave S	Non Culvert Xing	Passable	3/2/2022	City	WDFW		
**	997022	I-5	Non Culvert Xing	Passable	9/7/2005	WSDOT	WDFW		
**	922643	56th Ave S	Non Culvert Xing	Passable	3/9/2022	City	WDFW		
**	922612	S 109th St	Culvert	Passable	3/1/2022	City	WDFW	N/A	
**	922613	47th Ave S	Culvert	Unknown	3/1/2022	City	WDFW	Debris	

Fish Passage Id[a] (Former)	Fish Passage Id[b] (WDFW Current)	Location[c]	Feature Type	Barrier Status (Revised)	Survey Date[d] (Revised)	Owner Type (Revised)	Data Source (Revised)	Problem[e] (Revised)	Culvert Id[f]
**	922652	49th Ave S	Culvert	N/A	3/16/2022	City	WDFW	N/A	
Green River									
**	922647	Starfire Way	Non Culvert Xing	Passable	3/9/2022	City	WDFW		
**	922977	Interurban Ave S	Non Culvert Xing	Passable	10/20/2022	City	WDFW	N/A	
**	922976	I-405; SB on-ramp	Non Culvert Xing	Passable	10/20/2022	WSDOT	WDFW	N/A	
**	606839	Southcenter Blvd	Non Culvert Xing	Passable	12/2/2019	<Null>	WDFW		
**	999117	I-405	Non Culvert Xing	Passable	4/24/2007	WSDOT	WDFW		
**	922648	Strander Blvd	Non Culvert Xing	Passable	3/9/2022	City	WDFW		
**	922649	S 180th St	Non Culvert Xing	Passable	3/9/2022	City	WDFW		
**	922106	S 200th St	Non Culvert Xing	Passable	6/7/2021	City	WDFW		

NOTES:

(a) The Fish Passage ID (former) number is a unique identifier number that corresponds to the "Fish_Passage_ID" attribute within the GIS database and figures from the 2013 SWCP. The number was either assigned by WDFW (where WDFW was the data source for the fish passage feature) or by CH2M HILL (where CH2M HILL was the data source for the fish passage feature). **Records that were not included in the 2013 SWCP inventory are identified with a double-asterisk in this column.

(b) The Fish Passage ID (WDFW Current) is the unique identification number that corresponds to "Site Id" in WDFW's current fish passage database. If the fish-blocking culvert was identified in the 2013 SWCP by CH2M HILL through a windshield survey but the culvert is not in the WDFW database, "No Data" is noted. For rows where the Fish Passage ID (WDFW Current) is "No Data", the corresponding barrier status, survey date, owner type, and data source information is the same as that in the 2013 SWCP. The Sites identified with * in this column are on WSDOT's Current Injunction list (2023).

(c) The Location indicates the road crossing or other location description based on the nearest road or major landmark (taken from 2013 SWCP); WDFW database identifies this field as Road Name.

(d) The Survey Date Revised indicates one of three things: 1) the survey date recorded in the 2013 SWCP, 2) an updated survey date from WDFW, or 3) date information updated by Otak. If no date is listed, the feature has not yet been assessed in the field. No fieldwork was done for the 2024 SWCP update.

(e) The Problem listed here indicates the specific cause of fish impassability. It was taken from either 1) the problem recorded in the 2013 SWCP or 2) an updated reason for impassability from WDFW, whichever is more current. No fieldwork was done for the 2024 SWCP update.

(f) The Culvert ID corresponds to the culvert feature ID number in the City's GIS database and has not been updated since 2013 SWCP.

Table 3 *WSDOT Current Injunction Barriers

Fish Passage Id (WDFW current)	Location	Feature Type	Barrier Status (Revised)	Survey Date (Revised)	Owner Type (Revised)	Data Source (Revised)	Problem (Revised)
996030	I-5; NB off-ramp to I-405	Culvert	Total	1/26/2022	WSDOT	WSDOT	Slope
997697	SR 518	Culvert	Total	1/24/2022	WSDOT	WSDOT	WS Drop / Slope
992651	SR 518	Culvert	Total	2/7/2022	WSDOT	WDFW	WS Drop
998886	SR 518	Culvert	Total	1/24/2022	WSDOT	WDFW	Slope
998964	I-5; NB off-ramp	Culvert	Total	1/24/2022	WSDOT	WDFW	WS Drop
995857	I-405; NB on-ramp	Culvert	Partial	6/24/2020	WSDOT	WDFW	Depth
997684	SR 99	Culvert	Total	5/12/2015	WSDOT	WDFW	WS Drop

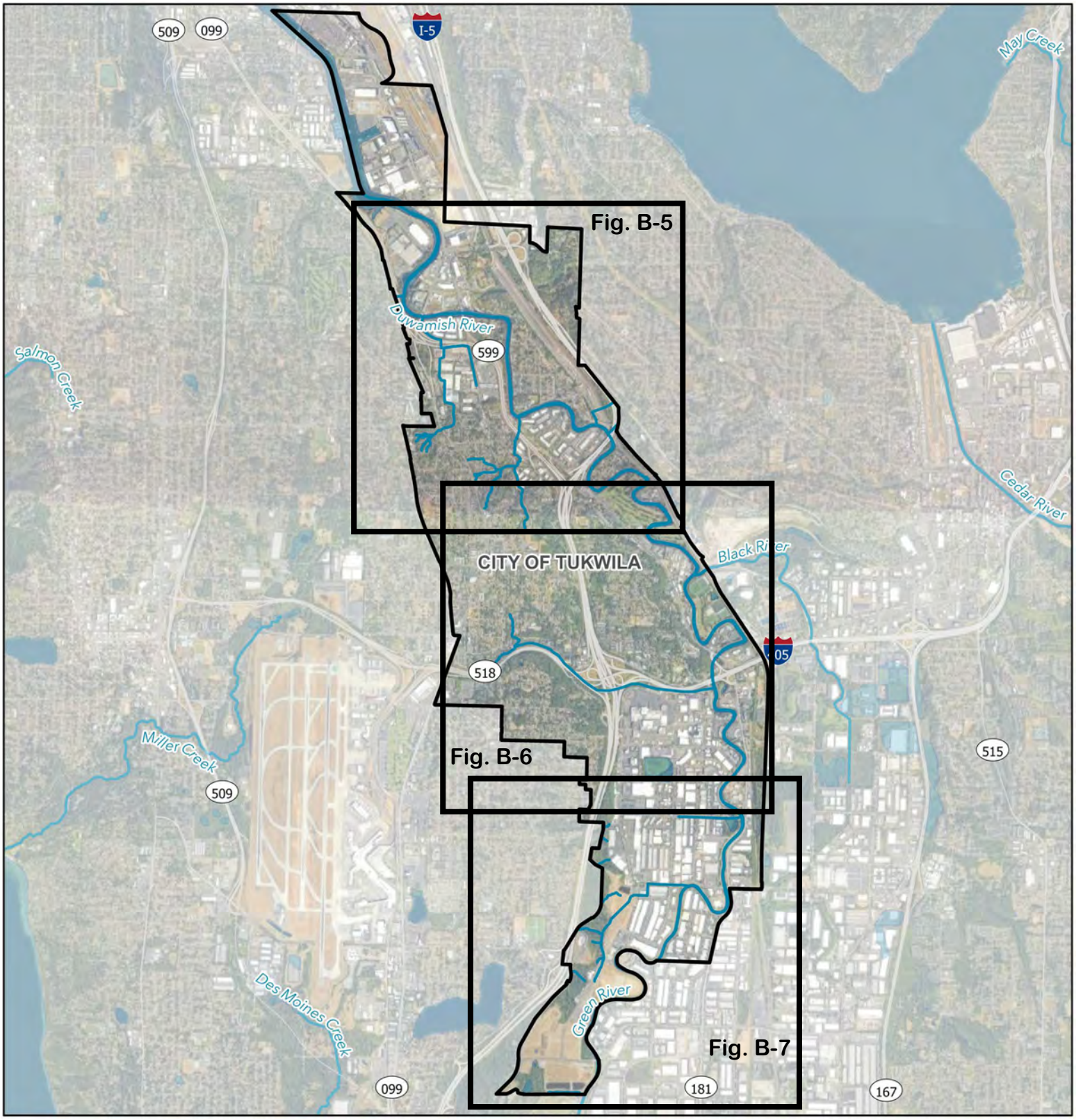


FIGURE B-4
FISH PASSAGE LOCATOR MAP

TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Mile
0 0.5 1

LEGEND

- City Boundary
- Tukwila_Mask
- Streams and Rivers
- WSDOT_-_Functional_Class_Data_for_State_Routes
- WSDOT_-_Functional_Class_Data_for_State_Routes
- Streams and Rivers
- DNR_Hydrography_-_Water_Bodies_-_Forest_Practices_Regulation

Otak

Data Sources: King County, WDFW, WSDOT, City of Tukwila, Google Maps
Date: 3/18/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

K:\Project\33300\33383\CADD\GIS\APRXs\33383 Tukwila SWCP Fish Passage\33383 Tukwila SWCP Fish Passage Revised.aprx

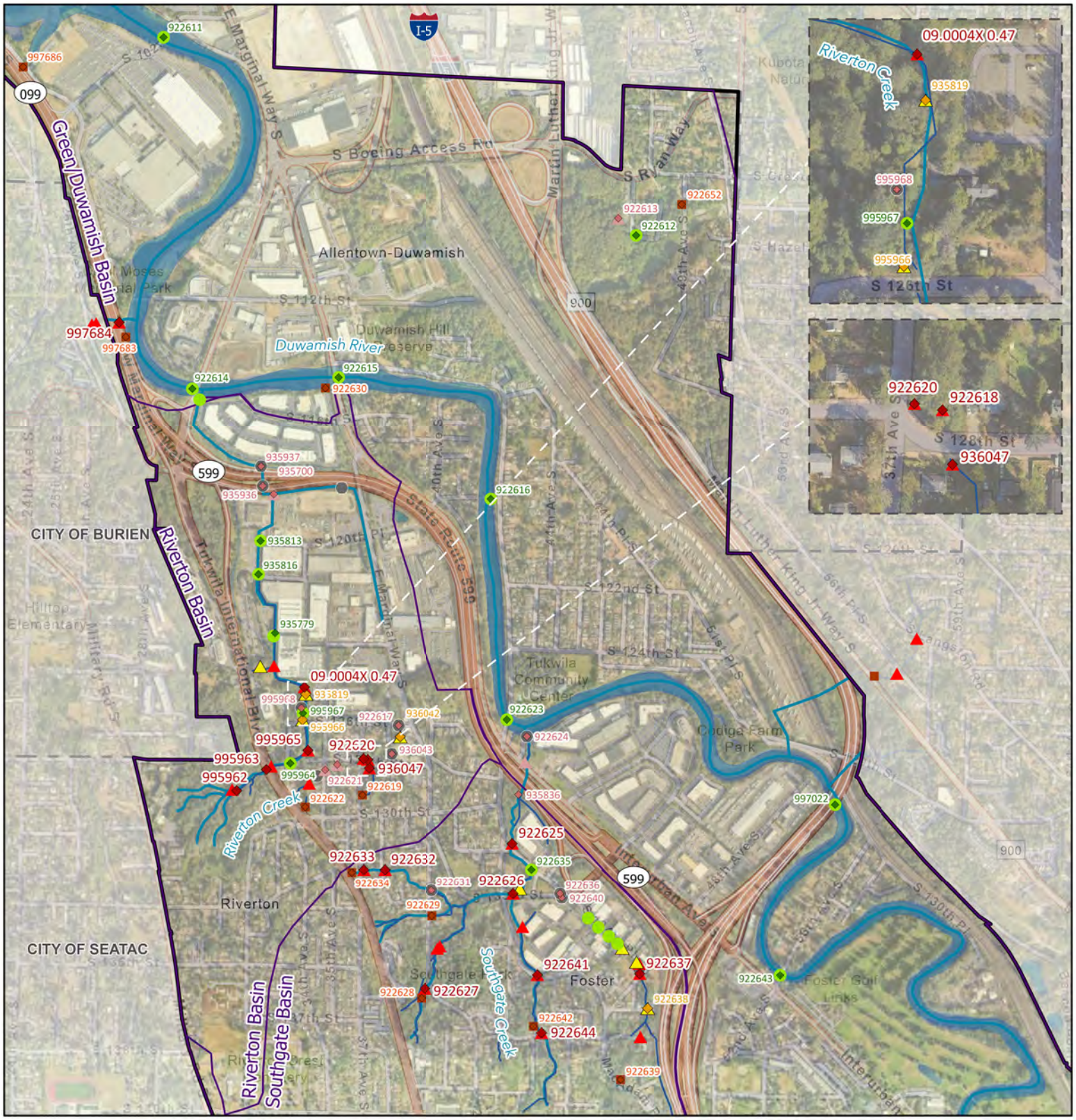


FIGURE B-5
FISH PASSAGE BARRIERS
TUKWILA NORTH

TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Mile
0 0.5

Otak

Data Sources: King County, WDFW, WSDOT, City of Tukwila, Google Maps
Date: 3/19/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

K:\Project\33300\33383\CADD\GIS\APRXs\33383 Tukwila SWCP Fish Passage\33383 Tukwila SWCP Fish Passage Revised.aprx

LEGEND

WDFW Fish Passage, Percent (2022)

Percent Passable

- Total Blockage
- Partial Blockage - 67% or 33%
- Passable
- Unknown
- N/A - Non-fish bearing stream

WDFW Fish Passage, Percent (2024)

- Not a barrier
- Partial Fish Passage Blockage
- Total Fish Passage Blockage
- Barrier, Unknown Percent Passable
- On a Non-Fish Bearing Stream
- Unknown
- Drainage Basins

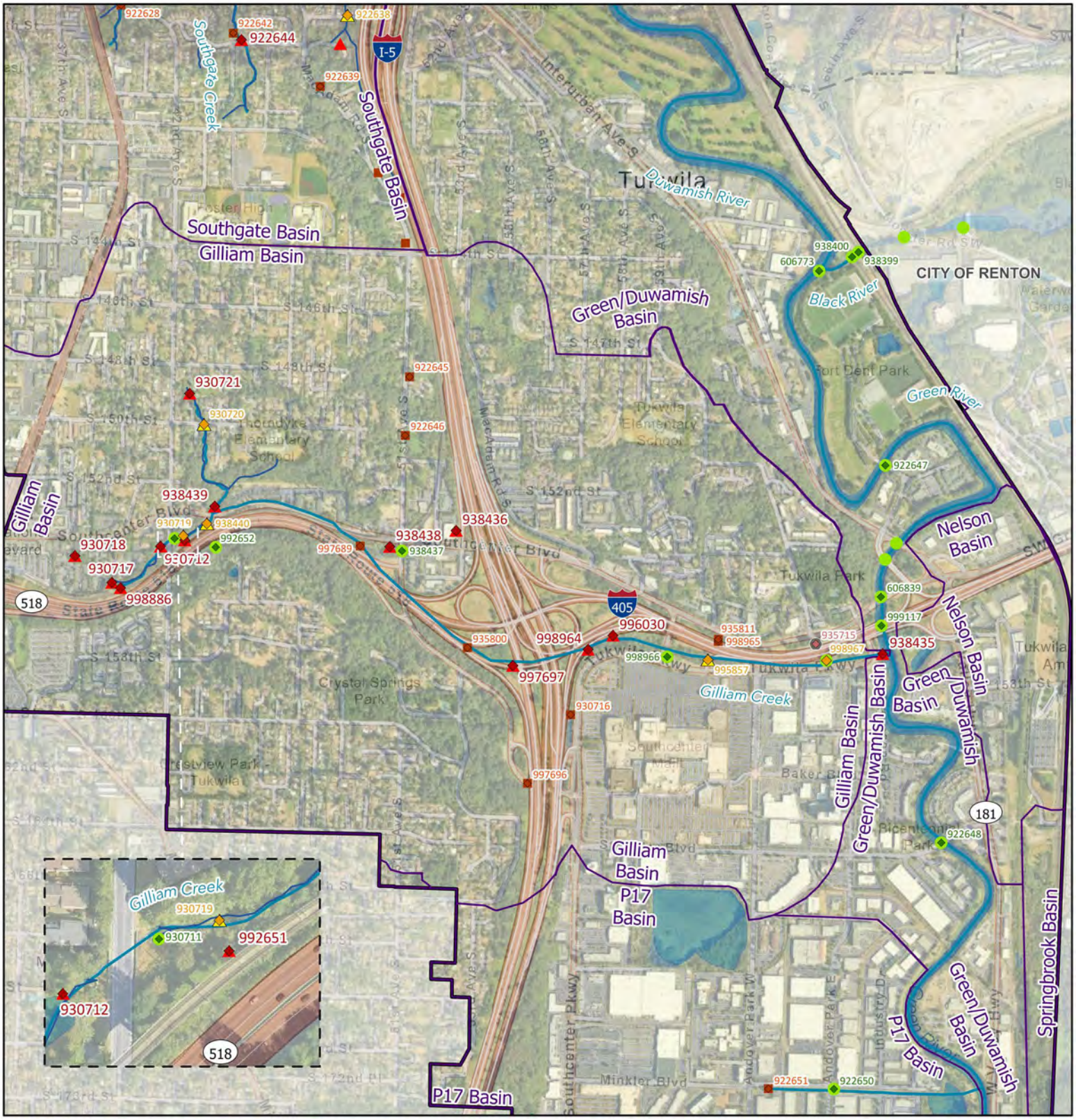


FIGURE B-6
FISH PASSAGE MAP
TUKWILA CENTRAL

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

0 0.5 Mile

LEGEND

WDFW Fish Passage, Percent (2022)

Percent Passable

- Total Blockage
- Partial Blockage - 67% or 33%
- Passable
- Unknown
- N/A - Non-fish bearing stream

WDFW Fish Passage, Percent (2024)

- Not a barrier
- Partial Fish Passage Blockage
- Total Fish Passage Blockage
- Barrier, Unknown Percent Passable
- On a Non-Fish Bearing Stream
- Unknown
- Drainage Basins

Otak

Data Sources: King County, WDFW, WSDOT, City of Tukwila, Google Maps
Date: 3/19/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

K:\Project\33300\33383\iCADD\GIS\APRXs\33383 Tukwila SWCP Fish Passage\33383 Tukwila SWCP Fish Passage Revised.aprx

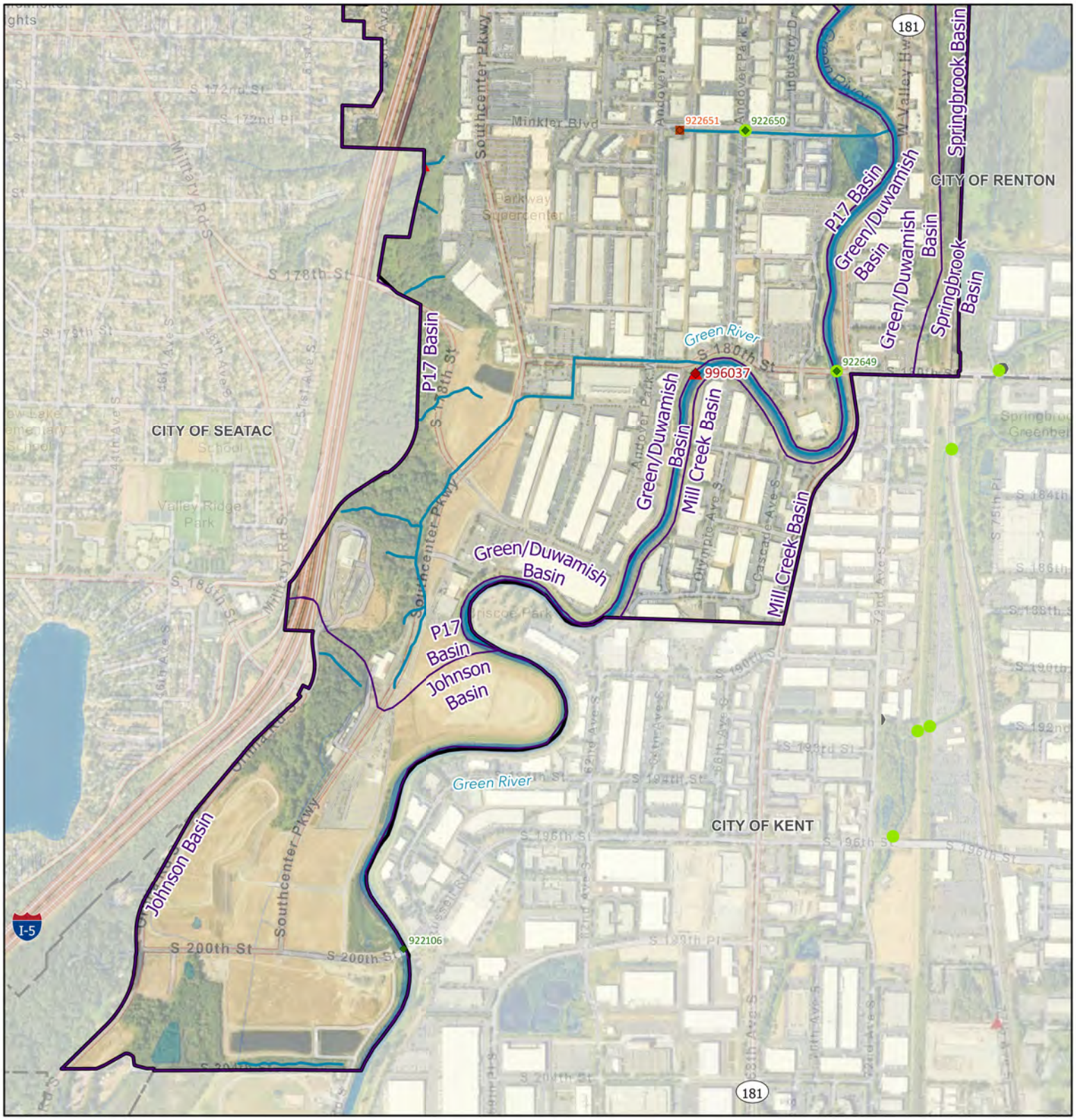


FIGURE B-7
FISH PASSAGE MAP
TUKWILA SOUTH

TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

0 0.5 Mile

LEGEND

WDFW Fish Passage, Percent (2022)

Percent Passable

- Total Blockage
- Partial Blockage - 67% or 33%
- Passable
- Unknown
- N/A - Non-fish bearing stream

WDFW Fish Passage, Percent (2024)

- Not a barrier
- Partial Fish Passage Blockage
- Total Fish Passage Blockage
- Barrier, Unknown Percent Passable
- On a Non-Fish Bearing Stream
- Unknown
- Drainage Basins

Otak

Data Sources: King County, WDFW, WSDOT, City of Tukwila, Google Maps
Date: 3/19/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

K:\Project\33300\33383\CADD\GIS\APRXs\33383 Tukwila SWCP Fish Passage\33383 Tukwila SWCP Fish Passage Revised.aprx

ATTACHMENT A

Fish-blocking Culvert Inventory

City of Tukwila Fish Passage Barrier Inventory

PREPARED FOR: Ryan Larson, City of Tukwila Surface Water Management

PREPARED BY: Erin Thatcher/CH2M HILL
Randy Whitman/CH2M HILL

REVIEWED BY: Amy Carlson/CH2M HILL

DATE: November 22, 2011

PROJECT NUMBER: 412954.TT.02

Introduction

This memo documents the fish passage barrier inventory developed for the City of Tukwila (the City). The purpose of the inventory is to provide a baseline of information that will inform future planning efforts and prioritization of capital and programmatic improvements related to fish-bearing streams within the City's jurisdiction. The inventory includes information gathered from the Washington Department of Fish and Wildlife (WDFW) and a windshield survey completed for the City's 2010 Surface Water Comprehensive Plan.

The inventory encompasses the four main fish-bearing streams in the City's jurisdiction: Riverton Creek, Southgate Creek, Gilliam Creek, and Johnson Creek. Each of these streams is identified by WDFW as having the potential to support anadromous fish such as coho salmon (*Oncorhynchus kisutch*). The WDFW fish passage barrier inventory does not currently identify any barriers on the Duwamish River, and the inventory in this memo does not include the Duwamish River.

Determining a culvert's (or other structure's) fish passability according to accepted standards involves a detailed engineering analysis (developed by WDFW) beyond the scope of this effort. For the areas that were not covered by WDFW's existing inventory, a best professional judgment of fish passability was made based on information gathered during the windshield survey. The windshield survey was conducted by a CH2M HILL professional fish biologist and an assistant scientist on February 3 and 4, 2011.

Method

The steps outlined below summarize the method used to develop the fish passage barrier inventory.

1. Gathered existing information and data from WDFW and other sources (listed below)
2. Created a basemap from the existing data, which included roads, stream channels, WDFW-mapped fish presence, WDFW fish barrier inventory, and City-mapped culverts

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3. Identified information gaps from the basemap and existing information (e.g., road crossings without a corresponding WDFW fish passage feature)
4. Completed a windshield survey to fill information gaps, determine fish passability of areas uncovered by WDFW's inventory, and assess general aquatic habitat conditions for the 2010 Surface Water Comprehensive Plan
5. Created a new GIS database file of fish passage barriers incorporating WDFW's existing inventory and new information from the windshield survey

Sources of existing information on fish passage and habitat that were evaluated during development of the inventory include:

- WDFW Fish Passage Barrier Inventory GIS data (WDFW, 2010)
- WSDOT Fish Passage Inventory (WSDOT and WDFW, 2010)
- WRIA 9 Limiting Factors Analysis (King County and Washington State Conservation Commission, 2000)
- Existing knowledge of City of Tukwila staff (Personal communications)
- Tukwila's 2003 Comprehensive Surface Water Management Plan (CH2M HILL, 2003)
- Gilliam Creek Basin Plan (Herrera, 2001)
- Riverton Creek Basin Plan (Entranc, 1997)
- Fostoria (Southgate) Creek Basin Plan (Herrera, 1996)
- Johnson Creek Restoration Plan (Cedarock Consultants, 2010)
- Tukwila South Project Final Environmental Impact Statement
- King County's WRIA 9 Salmon Habitat Plan
- Wild Fish Conservancy (formerly Washington Trout) website: http://wildfishconservancy.org/

Of these, the primary sources of information used to create the inventory are the WDFW fish passage barrier inventory and the February 2011 windshield survey. The WDFW fish passage barrier data are collected under the auspices of the Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual (WDFW, 2009). The data do not represent a complete and comprehensive inventory of all waters. Numerous fish passage inventories are being conducted across the state and the data set is updated when new information becomes available.

Table 1 summarizes key information from the fish passage inventory GIS database. Road crossings and other fish passage features were not always covered by the WDFW inventory or accessible in the field during the windshield survey. Remaining information gaps are noted by the entry "Unknown" both in the GIS database and in Table 1.

Figures 1, 2, 3, 4, and 5 on the following pages show the fish passage barrier inventory for Riverton Creek, Southgate Creek, Lower Gilliam Creek, Upper Gilliam Creek, and Johnson Creek, respectively. Attachment A to this memo provides photographs of the fish passage features observed during the February 2011 windshield survey; not all fish passage features were accessible for photographs.

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TABLE 1
Tukwila Fish Barrier Inventory

Fish Passage ID[a]	Location[b]	Feature Type	Barrier Status	Survey Date[c]	Owner Type	Data Source	Problem[d] (CH2M HILL Added)	Culvert ID[e]
Riverton Creek								
14673	W (upstream) of SR 99	Culvert	None	10/2/2003	City	WDFW	None	
14674	SR 99	Culvert	Total	10/2/2003	State	WDFW	Unknown	
14675	126th St	Culvert	Partial	10/2/2003	City	WDFW	Unknown	1077
14676	S 126th St	Culvert	Partial	10/2/2003	Private	WDFW	Unknown	
14677	S 126th St	Culvert	None	10/2/2003	Private	WDFW	None	
19812	N of S 128th St	Dam	Total	10/2/2003	Private	WDFW	Unknown	885
21065	34th Ave S	Culvert	Potential	10/2/2003	City	WDFW	Unknown	1460
20534	W of 35th Ave S	Artificial waterfall	Total	7/8/2003	Private	WDFW	Gradient	n/a
20533	W of 35th Ave S	Artificial waterfall	Total	7/8/2003	Private	WDFW	Gradient	n/a
50002	Unnamed road (Outfall to Duwamish River)	Culvert	Partial	n/a	City	CH2M HILL	Flap gate	
50003	SR 599	Culvert	Potential	n/a	State	CH2M HILL	Unknown	
50005	Unnamed road (Adjacent to E Marginal Way just S of SR 599)	Culvert	Partial	2/4/2011	City	CH2M HILL	Length; others possible	
50006	S 126th St	Culvert	None	2/4/2011	City	CH2M HILL	None	994
50007	S 128th St	Culvert	None	2/4/2011	City	CH2M HILL	None	1803
50008	S 128th St	Culvert	Total	2/4/2011	City	CH2M HILL	Gradient; length, others possible	1606
50004	Unnamed road (Just upstream of SR 599)	Culvert	Potential	n/a	Unknown	CH2M HILL	Unknown	
50009	S 120th Pl (Restored stream length in industrial park)	Culvert	None	2/4/2011	City	CH2M HILL	None	872
50010	Unnamed road (Restored stream length in industrial park)	Culvert	None	2/4/2011	City	CH2M HILL	None	920
50011	Unnamed (Restored stream length in industrial park)	Culvert	None	2/4/2011	City	CH2M HILL	None	925
50022	W of Group Health building (main stream reach)	Log jam	Partial	2/4/2011	Unknown	CH2M HILL	Insufficient pool downstream of log jam obstacle	n/a
50023	S 128th St	Artificial waterfall	Total	2/4/2011	Private	CH2M HILL	Gradient	n/a
Southgate Creek								
50012	Unnamed road (Outfall to Duwamish River)	Culvert	None	2/3/2011	City	CH2M HILL	None	1487
50013	Interurban Ave S	Culvert	Partial	2/3/2011	City	CH2M HILL	Fish ladder at low flows	1932
50014	SR 599	Culvert	Potential	n/a	State	CH2M HILL	Unknown	1932
50015	S 132nd St	Culvert	Partial	2/3/2011	City	CH2M HILL	Sediment blockage	1420
50016	44th Pl S	Culvert	None	2/3/2011	City	CH2M HILL	None	1035
50017	S 132nd St	Culvert	None	2/3/2011	City	CH2M HILL	None	1591
50018	S 133rd St	Culvert	None	2/3/2011	City	CH2M HILL	None	2086
50019	Commercial lot just S of S 133rd St	Culvert	Total	2/3/2011	Unknown	CH2M HILL	Perched; no flow	2225

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TABLE 1
Tukwila Fish Barrier Inventory

Fish Passage ID[a]	Location[b]	Feature Type	Barrier Status	Survey Date[c]	Owner Type	Data Source	Problem[d] (CH2M HILL Added)	Culvert ID[e]
50020	Unnamed road (driveway in restored stream length just N of S 133rd St)	Culvert	None	2/3/2011	Unknown	CH2M HILL	None	
50021	S 133rd St/E Marginal Way	Culvert	Total	2/3/2011	City	CH2M HILL	Gradient; others possible	1877
50025	S 134th Pl	Culvert	None	2/3/2011	City	CH2M HILL	None	953
50026	S 134th Pl	Culvert	None	2/3/2011	City	CH2M HILL	None	988
50027	S 134th Pl	Culvert	None	2/3/2011	City	CH2M HILL	None	2068
50028	S 134th Pl	Culvert	None	2/3/2011	City	CH2M HILL	None	1285
50029	S 134th Pl	Culvert	None	2/3/2011	City	CH2M HILL	None	1370
50030	S 134th Pl	Culvert	None	2/3/2011	City	CH2M HILL	None	1203
Gilliam Creek								
14611	I-405; NB on-ramp	Culvert	Partial	12/11/2007	State	WDFW	Unknown	
14737	I-5; NB to I-405	Culvert	Total	9/9/2009	State	WDFW	Unknown	
40359	SR 518	Culvert	Total	9/15/2009	State	WDFW	Unknown	
40863	61st Ave SE	Culvert	None	3/1/2007	City	WDFW	Unknown	
40864	I-405 NB shoulder	Culvert	Partial	9/8/2009	State	WDFW	High discharge during high flows; length	
44984	Southcenter Blvd	Culvert	Total	9/9/2009	City	WDFW	Unknown	
44985	51st Ave S	Bridge	None	9/9/2009	City	WDFW	Unknown	n/a
44986	Southcenter Blvd	Culvert	Total	9/9/2009	City	WDFW	Unknown	
44989	Southcenter Blvd	Culvert	Total	9/9/2009	City	WDFW	Unknown	
44990	42nd Ave S	Culvert	Total	9/10/2009	City	WDFW	Unknown	3086
44994	Tukwila Pkwy	Culvert	Partial	9/8/2009	City	WDFW	Flap gate	
17539	SR 518	Culvert	N/A	9/13/2005	State	WDFW	Unknown	
40532	SR 518	Culvert	Total	9/16/2009	State	WDFW	Unknown	
40861	I-5; NB off-ramp	Culvert	Total	2/27/2007	State	WDFW	Unknown	
44979	39th Ln S (Upper Gilliam)	Culvert	Total	9/15/2009	Unknown	WDFW	Unknown	
44981	S 154th St (Upper Gilliam)	Culvert	Total	9/15/2009	Private	WDFW	Unknown	
44983	SR 518 (Upper Gilliam)	Culvert	Partial	9/16/2009	Unknown	WDFW	Unknown	
44991	W of 42nd Ave S (Upper Gilliam)	Dam	Total	9/10/2009	Private	WDFW	Gradient	n/a
44992	S 150th St (Upper Gilliam)	Culvert	Partial	9/16/2009	City	WDFW	Unknown	
44993	N of S 150th St (Upper Gilliam)	Culvert	Total	9/17/2009	Unknown	WDFW	Unknown	
45078	Gilliam Regional Detention Facility at SR 518/Southcenter Blvd (Upper Gilliam)	Dam	Partial	9/10/2009	City	WDFW	Unknown	n/a
45118	SR 518 (Upper Gilliam)	Abandoned	None	9/16/2009	Unknown	WDFW	Unknown	
50031	S 152nd St (Upper Gilliam)	Culvert	Potential	n/a	City	CH2M HILL	Unknown	

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TABLE 1
Tukwila Fish Barrier Inventory

Fish Passage ID[a]	Location[b]	Feature Type	Barrier Status	Survey Date[c]	Owner Type	Data Source	Problem[d] (CH2M HILL Added)	Culvert ID[e]
Johnson Creek								
50000	Outfall to Green River	Flood gate	Partial	n/a	City	CH2M HILL	Assumes newly installed flood gate is fish-passable at most flows.	
50001	S 204th St	Culvert	Potential	2/3/2011	Unknown	CH2M HILL	Unknown	
50024	Outfall to Green River	Culvert	None	n/a	City	CH2M HILL	Assumes newly installed culvert is fish-passable.	

NOTES:
[a] The Fish Passage ID number is a unique identifier number that corresponds to the "Fish_Passage_ID" attribute within the GIS database and figures. The number was either assigned by WDFW (where WDFW is the data source for the fish passage feature) or by CH2M HILL (where CH2M HILL was the data source for the fish passage feature).
[b] The Location indicates the road crossing or other location description based on the nearest road or major landmark.
[c] The Survey Date indicates either 1) the date that WDFW surveyed the fish passage feature or 2) CH2M HILL visited the feature during windshield survey. If no date is listed, the feature has not yet been assessed in the field.
[d] The Problem listed here corresponds to the "CH_Problem" attribute within the GIS database, and indicates the specific cause of fish impassability. Some information was not available from the WDFW inventory or windshield survey.
[e] The Culvert ID corresponds to the culvert feature ID number in the City's GIS database.

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References

Cedarock Consultants, Inc. 2010. *Tukwila South Project Fisheries Mitigation Plan*. June.

CH2M HILL. 2003. *City of Tukwila Comprehensive Surface Water Management Plan*. Prepared by CH2M HILL, Inc. Prepared for the City of Tukwila. November.

Entranco, Inc., et al. 1997. *Riverton Creek Stormwater Quality Management Plan: Water Quality, Stream Habitat, and Flood Control*. Prepared by Entranco Inc., Taylor Associates Inc., and Envirovision Inc. Prepared for the City of Tukwila. November.

Herrera Environmental Consultants, Inc. 1996. *Fostoria Basin: Stormwater Quality Management Plan.* Prepared for the City of Tukwila. March.

Herrera Environmental Consultants, Inc. 2001. *Gilliam Creek Basin: Stormwater Management Plan.* Prepared for the City of Tukwila. March.

Howat. 2010. Personal communication (conversation with John Howat, City of Tukwila Public Works Department). Tukwila City Hall, Tukwila, WA. November 30.

King County and Washington State Conservation Commission. 2000. *Habitat Limiting Factors and Reconnaissance Assessment Report: Green/Duwamish and Central Puget Sound Watersheds.* December.

Washington Department of Fish and Wildlife (WDFW). 2009. Fish Passage and Surface Water Diversion Screening Assessment and Prioritization Manual. Washington Department of Fish and Wildlife. Olympia, Washington.

WDFW. 2010. Fish Passage Barrier Inventory Geodatabase. Accessed via email by Brian Benson, WDFW Habitat Program, on January 14, 2011.

Whiting. 2011. Personal communication (email correspondence with Sandra Whiting, City of Tukwila Department of Community Development). CH2M HILL, Bellevue, WA. January 27.

WSDOT and WDFW. 2010. *Progress Performance Report for WSDOT Fish Passage Barrier Inventory.* May.

WSDOT. 2007. *SR 518 SeaTac Airport to I-5/I-405 Interchange Widening Project: Culvert Mitigation.* February.

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Appendix C

Surface Water Regulations and Policies

Surface Water Regulations and Policies

Appendix C contains the detailed assessment of regulations applicable to the City of Tukwila's surface water program. The information presented here is summarized in Section 3 of the 2024 Surface Water Comprehensive Plan (2024 SWCP).

Applicable Surface Water Regulations

Regulatory changes have occurred since preparation of the 2013 Surface Water Comprehensive Plan. The changes most significant for Tukwila are with National Pollutant Discharge Elimination System (NPDES) Phase II permit. Regulations currently applicable to the City of Tukwila's surface water management program are shown in Table C-1. (Note that flood protection and flooding as a result of Green or Duwamish River flooding are outside the scope of the 2024 SWCP.)

Table C-1
Summary of Applicable Surface Water Regulations

Regulation or Program (organized by category)		Tukwila Surface Water Management Program Areas		
		Surface Water	**Water Quality**	**Aquatic Habitat**
Surface Water Management	Surface Water Management Ordinance, Tukwila Municipal Code 14.30, and resultant surface water planning	Capital projects to address drainage problems; many needed projects await funding	Capital projects to address water quality concerns; projects await funding	Capital projects to address aquatic habitat concerns or opportunistically protect/restore habitat; projects await funding
	Surface Water Design Manual	Adoption of the 2021 King County Surface Water Design Manual	Adoption of the 2021 King County Surface Water Design Manual	Not Applicable.

Table C-1
Summary of Applicable Surface Water Regulations

Regulation or Program (organized by category)		Tukwila Surface Water Management Program Areas		
		Surface Water	**Water Quality**	**Aquatic Habitat**
Water Quality	State surface water quality standards	The NPDES Phase II permit does not authorize a discharge which would be a violation of State surface water quality standards and requires permittees to act if a stormwater system discharge is found to cause or contribute to a violation.	Several water bodies do not meet standards. Anti-degradation standard difficult to achieve. Need to identify pollution sources and implement prevention programs.	Degraded water quality impacts aquatic habitat, lessening benefits of habitat protection or restoration efforts
	Section 303(d) list	The Green/Duwamish River, Riverton Creek, Black River, Gilliam Creek, do not meet State surface water quality standards for several parameters.	303(d) impaired listings may require development of TMDLs; Tukwila would be one of several jurisdictions involved	Not Applicable.

Table C-1
Summary of Applicable Surface Water Regulations

Regulation or Program (organized by category)		Tukwila Surface Water Management Program Areas		
		Surface Water	**Water Quality**	**Aquatic Habitat**
	Superfund	No Applicable	The Lower Duwamish Waterway (LDW) Superfund Site has polluted sediments. Tukwila cooperates with Ecology and King County to control sources of pollution.	
	Total Maximum Daily Loads (TMDLs)	The Green River Temperature TMDL (Ecology, 2011) applies to Tukwila. Compliance with the NPDES permit constitutes compliance with the goals for of the TMDL.	Not yet applicable to Tukwila (see above); however, studies and implementation may be initiated as a part of TMDL development	Not Applicable.
	NPDES Phase II permit	See Attachment C-1	See Attachment C-1	Not Applicable.
Habitat Protection	Endangered Species Act	City regulations and policies generally support compliance with the ESA and encourage salmon recovery.	City demonstrates understanding of environmental baseline conditions (see basin pans and other documents).	The SEPA checklist includes consideration of endangered and threatened species.

Table C-1
Summary of Applicable Surface Water Regulations

Regulation or Program (organized by category)	Tukwila Surface Water Management Program Areas		
	Surface Water	**Water Quality**	**Aquatic Habitat**
State Salmon Recovery Planning Act	Not Applicable.	Not Applicable.	City has implemented capital improvement projects that restore fish habitat for ESA-listed species and participates in Water Resource Inventory Area (WRIA) 9 salmon recovery efforts.
Growth Management Act	Adopted Stormwater Management Manual for Western Washington	Adopted Stormwater Management Manual for Western Washington	Not Applicable.

NPDES Municipal Stormwater Phase II Permit

Attachment C-1 contains a detailed gap analysis of Tukwila's surface water management program against the NPDES permit as of 2020. Because the NPDES permit is expected to be reissued later in 2024, and its terms have not been finalized, Tukwila has not completed a gap analysis against the 2024-2029 NPDES permit.

Environmental Species Act (ESA)

The Environmental Species Act (ESA) of 1973 provided broad protection for listed threatened and endangered species and their designated critical habitat. As of March 2024, the salmon and trout listings applicable for Puget Sound are:

- Chinook salmon (Threatened, Critical Habitat Designation)
- Steelhead (Threatened, Critical Habitat Designation)
- Bull trout (Threatened)

The ESA prohibits a "take" of a listed species by any person subject to the jurisdiction of the United States, which applies to both public and private lands and activities. Both a person whose actions harm or harass a protected species and a government entity that authorizes that person's actions can violate the ESA prohibitions. Thus, the City of Tukwila is responsible for implementation of plans and policies that support the ESA prohibitions.

Generally, City regulations and policies support compliance with ESA and encourage salmon recovery.

Potential Changes to Surface Water Regulations

This plan includes a discussion of potential changes to the following regulations:

- Endangered Species Act listings
- Clean Water Act–- NPDES Phase II
- Clean Water Act – Total Maximum Daily Loads

Endangered Species Act

If additional species are listed or current listings are downgraded, the City's surface water program will need to be re-prioritized to place greater emphasis on habitat protection and restoration measures for these additional species.

NPDES Phase II Permit

The City of Tukwila is covered under the Washington State Department of Ecology's NPDES program for municipalities as a 'small MS4' with a Phase II municipal stormwater permit. The current Western Washington Phase II Municipal Stormwater Permit became effective August 1, 2019, and will expire July 31, 2024. Ecology will reissue the permit in June or July 2024, and it will become effective August 1, 2024.

While the new permit has not been finalized, a draft has been distributed for comment. Based on this draft language, it is anticipated that the reissued Phase II permit will include requirements to:

- Adopt tree canopy goals and policies to support stormwater management and water quality improvements and begin mapping tree canopy
- Implement projects recommended by the SMAP or other water quality projects and activities
- Develop a Stormwater Management Action Plan (SMAP) for another catchment or basin

- Increase detail of stormwater system mapping
- Update illicit discharge prohibitions and source control requirements to incorporate limitations on discharge of PCBs and other emerging pollutants
- Adopt an updated stormwater management manual which includes new thresholds for providing runoff treatment facilities on development sites with multiple threshold discharge areas and new thresholds for requiring stormwater management on road-related redevelopment projects and commercial or industrial redevelopment projects
- Continue at similar levels of effort for education, public involvement, operation and maintenance, and inspections.

The impact of potential new requirements has not been assessed. Section 8 of the 2024 SWCP recommends the City conduct a gap analysis after the permit has been issued and plan for the appropriate technical, staffing, equipment, capital improvements, and professional services which may be required to maintain compliance.

Establishment of a TMDL for the Green and Duwamish River System

Ecology is required to establish a TMDL for each pollutant identified in each impaired water body on the Section 303(d) list. The Green/Duwamish River system is listed as Category 5 (impaired) for pH, dissolved oxygen, bacteria, and temperature. (A complete list of 303(d) listings is included in Table B-2 of Appendix B of this Plan).

A TMDL for temperature has been published and includes waste load allocations (WLA) for discharge of warm water. Tukwila is assumed to meet its WLA by complying with its Phase II NPDES permit.

While TMDLs have not yet been established for pH, dissolved oxygen, or bacteria, it is anticipated that a TMDL will be established in the future. Ecology can use mechanisms such as the municipal NPDES permit program to establish water quality control requirements for individual drainage basins. If TMDL requirements were to be incorporated into the NPDES permit mechanism, the earliest this likely would occur is with the next permit cycle (beginning approximately August 2030,). Before this can occur, Ecology would spearhead establishment of the TMDL using data collection and modeling.

The impact of the anticipated TMDL on Tukwila's surface water program during this surface water planning cycle is likely in the form of staff time or financial resources during the technical portion of establishment of the TMDL.

ATTACHMENT C-1

City of Tukwila NPDES Permit 2019-2024 Compliance Support

Compliance Analysis Summary

Submitted to:
City of Tukwila
6200 Southcenter Boulevard
Tukwila, WA

Prepared By:
Otak, Inc.
700 Washington Street, Suite 300
Vancouver, WA 98660

March 18, 2020

Project No. 19340

Otak

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Appendix A—Gap Analysis Matrix

Section 1—Introduction

The City of Tukwila (City) is an existing permittee under the National Pollutant Discharge Elimination Systems (NPDES) Western Washington Phase II Municipal Separate Storm Sewer (MS4) Permit (Permit), issued by Washington Department of Ecology (Ecology). Ecology recently reissued the Permit, effective August 1, 2019, through July 31, 2024.

The reissued Permit includes several permit conditions which are new or have changed. The City has requested Otak's assistance in preparing to comply with the requirements of the 2019-2024 Permit.

Section 2—Method

Otak compared the City's 2019 Stormwater Management Program Plan and supporting documents with the Permit and looked for potential gaps in compliance focusing on the following permit conditions that are new or changed:

- S5.C.1, Stormwater Planning
- S5.C.4, MS4 Mapping and Documentation
- S5.C.6, Controlling Runoff from New Development, Redevelopment, and Construction Sites (including Appendices 1 and 10)
- S5.C.8, Source Control for Existing Development

Documents Reviewed

Otak submitted a detailed request for documents relevant to the Permit stormwater management program elements. The City provided documents specific to the existing Stormwater Management Program as well as numerous general City documents related to the new program requirements.

Overall

- 2019 Stormwater Management Program (SWMP) Plan
- 2018 NPDES Permit Annual Report answers

S5.C.1, Stormwater Planning

- City of Tukwila Comprehensive Plan 2015
- City of Tukwila Surface Water Comprehensive Plan 2013
- Green Tukwila 20-Year Stewardship Plan 2017
- 2019-2024 Financial Planning Model and Capital Improvement Program
- Transportation and Infrastructure Committee page, tukwilawa.gov

S5.C.4, MS4 Mapping and Documentation

- City of Tukwila GIS Database: Catch_basins, Drain_points, Pipes_and_Ditches, Storm_Clean_Out, Storm_Pump_Station, Storm_Vault_Lid, Stormwater_Detention_Water_Quality_Structure

S5.C.6, Controlling Runoff from New Development, Redevelopment, and Construction Sites (including Appendices 1 and 10)

- 2019 Stormwater Management Program (SWMP) Plan
- 2018 NPDES Permit Annual Report answers

S5.C.8, Source Control for Existing Development

- Tukwila Municipal Code - Title 14: Water and Sewers
- Informal Source Control Inspection Program Standard Operation Procedures (SOP)
- Historic Spill Kit Outreach and Source Control Business Inspections by ECOSS
- Private Stormwater Facility Inspections (Residential and Business/Commercial) by Public Works staff
- Source Control Inventories: Pools, Spas, Restaurants, Auto Lots
- Private Drainage Inspection list (spreadsheet entitled “NPDES Properties”)

Section 3—Program Review Summary

S5.C.1, Stormwater Planning

Requirements

Permit section S5.C.1., Stormwater Planning, is a new requirement for the 2019-2024 Permit term. The City will need to allocate additional effort to meet the new requirements. Some of the requirements may be met by modifying or expanding current activities. Upcoming long-term plan update efforts are applicable to the long-term planning requirements. Ongoing efforts to make Low Impact Development (LID) the preferred and commonly-used approach to site development under the Controlling Runoff from New Development, Redevelopment, and Construction Sites program now fall under this permit section.

C.1.a.	Convene an inter-disciplinary team to inform and assist in the development, progress, and influence of this program.
C.1.b.i.a.	On the 2021 NPDES Annual Report, respond to the Stormwater Planning questions to describe how anticipated stormwater impacts on water quality were addressed, if at all, during the 2013-2019 Permit term in updates to the Comprehensive Plan.
C.1.b.i.b.	On the 2023 NPDES Annual Report, respond to the Stormwater Planning questions to describe how anticipated stormwater impacts on water quality are informing the planning update process during the 2019-2024 Permit term.
C.1.c.	Continue to require LID principles and Best Management Practices (BMPs) to make LID the preferred and commonly-used approach to site development.
C.1.d.i.	Prepare a Receiving Water Assessment.
C.1.d.ii.	Prepare a Receiving Water Prioritization.
C.1.d.iii.	Develop a Stormwater Management Action Plan (SMAP) for at least one high priority catchment area.

Findings

Existing Activities

- City has a long-term planning process for stormwater: *Surface Water Comprehensive Plan*
- City has incorporated LID into the development code
- City’s Surface Water Comprehensive Plan includes information on basins within the City

Observed Gaps

- City needs to convene an inter-disciplinary team to inform stormwater planning
- City will need to include NPDES coordinator in upcoming long-term plan updates
- City will need to continue to assess and eliminate barriers to LID
- City will need to:
  - Prepare a Receiving Water Assessment, which could be addressed by updating basin information in the *Surface Water Comprehensive Plan*
  - Prepare a Receiving Water Prioritization
  - Develop an SMAP for at least one high priority catchment area

Recommendations

The City currently forms temporary working groups to address specific projects. The City should establish a standing committee to inform and assist development of the stormwater planning program. The committee should include members from Public Works divisions including Transportation, Development Services, Facility and Street Maintenance, and Surface Water, as well as departments outside Public Works including Community Development, Economic Development, and Parks and Recreation. The committee should advise on the City's *Surface Water Comprehensive Plan* and *Comprehensive Plan* updates and any other long-term planning efforts or surface water program changes. The committee should first convene by August of 2020. At a minimum, the team should meet at the beginning of each planning process to establish tasks and agree on priorities, and at the end to review deliverables. Establishing the committee through a policy from the City Administrator would assist with broad participation.

This effort may be addressed with existing staffing.

The NPDES coordinator will need to answer questions about how stormwater management needs and protection/improvement of receiving water health were (or were not) addressed in existing long-term plans on the 2021 NPDES Annual Report. The relevant long-term plans include:

- *2013 Surface Water Comprehensive Plan*
- *2015 City of Tukwila Comprehensive Plan*
- *2019 - 2024 Financial Planning Model and Capital Improvement Program*
- *2017 Green Tukwila 20-Year Stewardship Plan*

The NPDES Coordinator will need to review the Annual Report questions and collect the necessary information prior to March 31, 2021.

This effort may be addressed with existing staffing.

The NPDES Coordinator will also need to answer questions about how the how stormwater management needs and protection/improvement of receiving water health are (or are not) informing the planning update process and influencing policy and strategies on the 2023 Annual Report. The City's Surface Water Program Manager and NPDES Coordinator should be involved in the updates to the City's *Comprehensive Plan* and other long-term plans.

- The City's *Surface Water Comprehensive Plan* will be updated in 2021
- The City's *Comprehensive Plan* will be updated in 2023

This effort may be addressed with existing staffing.

The City will need to establish a process to continue to assess and consider any newly identified administrative or regulatory barriers to LID implementation. The process could be documented in the upcoming update to the *Surface Water Comprehensive Plan*, and the interdisciplinary stormwater committee could play a role in identifying and considering barriers.

This effort may be addressed with existing staffing.

The City will need to prepare a Receiving Water Assessment, Receiving Water Prioritization and develop an SMAP by March 2023 following a process similar to that described in Ecology's 2019 *Stormwater Management Action Planning Guidance*.

The basin descriptions in the City's current *Surface Water Comprehensive Plan* already contain much of the information needed for the Receiving Water Assessment, and the City may choose to include the whole process, including completing the SMAP, in the update of the *Surface Water Comprehensive Plan* planned for 2021.

Although this would accelerate the timeline required by the Permit, it would avoid duplication of effort and would include the SMAP in the planned effort.

This effort may be addressed with existing staffing with the support of professional services.

S5.C.4, MS4 Mapping and Documentation

Requirements

Permit section S5.C.4, MS4 Mapping and Documentation, was previously categorized under Illicit Discharge Detection and Elimination. As a result, the new section includes continuing effort as well as new requirements.

The following requirements represent continuing effort:

C.4.a.i.	Map the known MS4 outfalls and known MS4 discharge points.
C.4.a.ii.	Map receiving waters, other than groundwater.
C.4.a.iii.	Map stormwater treatment and flow control BMPs/facilities owned or operated by the permittee.
C.4.a.iv.	Map geographic areas served by the permittee's MS4 that do not discharge stormwater to surface waters.
C.4.a.v.	Map 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. Include the following features/attributes: tributary conveyance type, material, and size where known; associated drainage areas; and land use.
C.4.a.vi.	Map connections between the MS4 owned or operated by the permittee and other municipalities or public entities.
C.4.a.vii.	Map all connections to the MS4 authorized or allowed by the permittee after February 16, 2007. (Do not need to map residential connections for individual driveways, sump pumps, or roof downspouts).
C.4.d./e.	Upon request, and to the extent appropriate, the permittee shall provide mapping information to Ecology, federally-recognized Indian Tribes, municipalities, and other permittees.

The following requirements are new and will require additional effort by the City to meet the 2019-2024 Permit requirements:

C.4.b.i.	Begin to collect size and material for all known MS4 outfalls during normal course of business (e.g., during field screening, inspection, or maintenance) and update records.
C.4.b.ii.	Complete mapping of all known connections from the MS4 to a privately-owned stormwater system.
C.4.c.	Store all required mapping data in a GIS or CAD drawings and develop mapping standards.

Findings

The activities organized in the 2019-2024 Permit in the MS4 Mapping and Documentation section continue and expand on activities previously organized under the IDDE program. As a result, the City is already conducting many of the required activities. The Permit now requires electronic mapping of the MS4 in a GIS or in CAD with documented standards.

The City GIS Coordinator maintains a GIS database of the MS4 and receiving waters. Additional data is maintained by the NPDES Coordinator in KML files (Google Earth), and a list of outfalls used for IDDE inspections is maintained in Excel spreadsheets. Many MS4 assets are also tracked in Lucity with attributes such as material and size.

The City recently adopted a new GIS data dictionary. Implementing this data dictionary across the users of the City's GIS database will address the requirement to describe the City's electronic mapping standards.

Existing Activities

- The City has a GIS database which includes public stormwater infrastructure, receiving waters, and private stormwater facilities.
- The City has an inventory of outfalls used for dry weather inspections under the Illicit Discharge Detection and Elimination (IDDE) program; this outfall list likely conforms to the definition[1] of outfall in the Permit.
- As part of its IDDE inspection program, the City collects data such as pipe size and material of outfalls.
- The City has a newly adopted GIS data dictionary.
- The City has an asset management system, Lucity, which tracks many of the required attributes of the MS4 system, such as size and materials of outfalls.

Observed Gaps

Most or all of the required mapping elements (both existing and new) are already tracked by the City either in the GIS, in Excel, or in Lucity. However, some required mapped elements are not explicitly shown in the GIS, and elements and attributes that are tracked in a different data repository must be transferred or copied to the GIS.

- The GIS database does not have an "outfall" feature that conforms to the definition of outfall in the Permit. The dry weather inspection outfall inventory and map likely conform to the definition of "outfall" in the Permit, but they do not qualify under the new electronic mapping standard.
- The GIS database does not have a "discharge point" feature that conforms to the definition of discharge point in the Permit.
- The GIS database does not appear to have a way to distinguish connections between interconnected systems and connections between different elements of the same system.
- The attributes of stormwater assets such as pipes that are tracked within Lucity do not qualify under the new electronic mapping standard, and these attributes must be transferred to the GIS.
- City will need to collect and record size and materials of pipes to MS4 outfalls where such data are missing.
- City will need to establish mapping standards (see *Mapping Guidance for Municipal Stormwater Permittees*).

Recommendations

The City will need to perform some analyses of existing data and transfer information from other data repositories (e.g. Excel, Lucity) into the GIS to meet the following mapping requirements:

- Map geographic areas served by the permittee's MS4 that do not discharge stormwater to surface waters.
- Create an outfall feature type in the GIS and identify true outfalls from among the various "drain points" in the existing GIS. Attach attributes such as pipe size and materials.
- Create a discharge point feature type in the GIS and identify true discharge points from among the various "drain points" in the existing GIS.
- Create a system connection feature type in the GIS and identify connections between the City's storm sewer and storm sewers of adjacent
- Ensure that attributes of tributary conveyances to outfalls of 24-inches in diameter or greater that are tracked in another repository are incorporated into the GIS (where known).

The following new requirement may require field reconnaissance and manual entry of new data:

- Create a system connection point feature type in the GIS.

[1] Definitions are found beginning on page 49 of the 2019-2024 Phase II Permit.

- Map connections from the MS4 to private stormwater systems.

The City should include this work and updates to the GIS database in the existing GIS consultant contract. For a limited duration of six months to one year, this effort will require additional work by a staff member familiar with Permit definitions and with the City's MS4. Approximately 100 hours of staff time will be required to locate various source data (e.g. Lucity), coordinate the work of the contractor to ensure that the GIS updates conform to Permit requirements, and perform quality control checks on the resulting GIS data sets. Additional field reconnaissance that may be needed is not included in this estimate.

S5.C.6, Controlling Runoff from New Development, Redevelopment, and Construction Sites (including Appendices 1 and 10)

Requirements

Changes to Permit section S6.C.6, Controlling Runoff from New Development, Redevelopment, and Construction Sites, are relatively minor. The 2019-2024 Permit adopts Appendix 10, which is new, and which is referenced by this section and by Appendix 1.

The following requirements represent continuing effort and will see minor changes as a result of adopting the requirements of Appendix 10:

C.6.a.	Implement an ordinance or other enforceable mechanism to reduce pollutants in stormwater runoff to the MS4 from new development, redevelopment, and construction sites.
C.6.b.	Revise ordinance or other enforceable mechanism to meet the requirements of S5.C.6.b(i) through (iii).
C.6.c.i.	Review all stormwater site plans for proposed development activities.
C.6.c. ii.	Inspect, prior to clearing and construction, 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, or, alternatively, inspect all construction sites meeting the minimum thresholds adopted.
C.6.c.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.
C.6.c.iv.	Manage maintenance activities to inspect all stormwater treatment and flow control BMPs/facilities, and catch basins, in new residential development every 6 months until 90% of the lots are constructed to identify maintenance needs and enforce compliance with maintenance standards as needed.
C.6.c.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 facilities.
C.6.c.vi.	Document compliance with the inspection requirements in S5.C.6.b.ii. through v. Compliance shall be determined by achieving at least 80% of the required inspections.
C.6.c.vii.	Implement a procedure for keeping records of inspection and enforcement actions, including inspection reports, warning letters, notices of violation, and other enforcement records. Keep records of maintenance inspections and activities.
C.6.c.viii.	Implement an enforcement strategy in cases of non-compliance.

C.6.d.	Make available the electronic links to Ecology's Construction Stormwater General Permit Notice of Intent (NOI) form and the Industrial Stormwater General Permit NOI form, as applicable, to representatives of new development and redevelopment.
C.6.e.	Train all staff responsible for implementing the program to control stormwater runoff from new development, redevelopment, and construction sites (including permitting, plan review, construction site inspections, and enforcement) to conduct these activities. Keep training records.

The City will need to adopt the standards contained in Appendix 1 as part of the Controlling Runoff from New Development, Redevelopment, and Construction Sites.

Findings

The City has adopted the 2016 King County Surface Water Design Manual (KCSWDM) and King County Stormwater Pollution Prevention Manual, a Phase I program equivalent to Appendix 1, and the 2014 Stormwater Management Manual for Western Washington.

Existing Activities

- The City currently implements the thresholds, definitions, and minimum requirements of Appendix 1 under the 2013-2018 permit.

Observed Gaps

- The City will need to update its standards for controlling runoff from development and construction sites by June 30, 2022.

The City has several options to update its standards, including:

- Wait for King County to update its own manuals and program to comply with the analogous Phase I Permit requirement (due by July 1, 2021), and then adopt the updated King County manuals and program.
- Continue to enforce the 2016 King County manual and program, and adopt independent amendments or errata equivalent to Appendix 10.
- Adopt Ecology's 2019 Stormwater Management Manual for Western Washington.
- Develop an independent manual and program using the thresholds, definitions, and minimum requirements of the 2019-2024 Appendix 1.

Recommendations

The City of Tukwila plans to adopt the updated King County manuals and program prior to June 30, 2022. This recommendation assumes that King County will update its manuals and programs in accordance with Phase I Permit's Appendix 1 by summer of 2021.

This effort may be addressed with existing staffing.

S5.C.8, Source Control for Existing Development

Requirements

Permit section S5.C.8., Source Control for Existing Development, is a new requirement for the 2019-2024 Permit term. The City will need to allocate additional effort to meeting the new requirement. Some of the requirements may be met by modifying or expanding current activities.

C.8.b.i.	Adopt and make effective an ordinance(s), or other enforceable documents, requiring the application of source control.
C.8.b.ii.	Establish an inventory that identifies publicly and privately owned institutional, commercial, and industrial sites which have the potential to generate pollutants to the MS4.
C.8.b.iii.	Implement an inspection program for sites identified in C.8.b.ii.
C.8.b.iii.a	Provide information to those identified sites about activities that may generate pollutants and the source control requirements applicable to those activities.
C.8.b.iii.b	Complete the number of inspections equal to 20% of the businesses and/or sites listed in the source control inventory to assess BMP effectiveness and compliance with source control requirements. May count follow-up inspections at the same site towards meeting the 20% inspection rate.
C.8.b.iii.c/d	Inspect 100% of sites identified through credible complaints. Permittee may count inspections conducted based on complaints, or when the property owner denies entry, to the 20% inspection rate.
C.8.b.iv.a/b	Implement a progressive enforcement policy that requires sites to comply with stormwater requirements within a reasonable time period.
C.8.b.iv.c	Maintain records, including documentation of each site visit (including denied entries), inspection reports, warning letters, notices of violations, and other enforcement records to demonstrated efforts to bring sites into compliance.
C.8.b.iv.d	The City may refer non-emergency violation (NOV) to Ecology, provided the Permittee also makes a documented effort of progressive enforcement (i.e., documentation of inspections and warning letters or NOVs).
C.8.b.v.	Provide training to staff responsible for implementing the source control program, including follow-up training to address changes in procedures, techniques, requirements, or staffing. Keep training records.

Findings

Source Control for Existing Development is an entirely new Permit requirement for Phase II permittees. The City conducts elements of this requirement under existing programs for IDDE and Operations and Maintenance. However, the new requirement will require additional authority for inspection and enforcement.

Existing Activities

- As part of its IDDE program, existing stormwater facilities inspection program, and business licensing, the City maintains an inventory of commercial sites which it inspects for illicit discharges.
- As part of its IDDE program, the City enforces Tukwila Municipal Code - Title 14: Water and Sewers.
- City conducts source control inspections as part of the IDDE program and existing stormwater facilities inspection program, and the City contracts with ECOSS to conduct source control outreach and provide spill kits to businesses.
- The City conducts source tracing for complaints received as part of the IDDE program.
- The City conducts source control training for field staff who may encounter illicit discharges or pollutant sources during normal work activities.

Observed Gaps

- Title 14 of the existing code appears insufficient to authorize inspections on existing private property, which may or may not have a drainage system that was authorized by the City, for the purposes of observing preventative source control measures and requiring application of BMPs to prevent pollution of stormwater runoff in the absence of an observed illicit discharge.
- The City will need to adopt and implement a source control ordinance or other enforceable document that:
  - Applies to existing development
  - Authorizes entry

    - Establishes standards for sites to follow (adopt a source control BMP manual)
    - Develops or references enforcement procedures
- The City will need to compile and maintain an inventory of sites which require source control. The current inventory of sites, as referenced under existing activities, does not fully meet the new requirement.
- The City will need to implement a source control inspection program that is designed to conduct a number of inspections equal to 20% of the sites listed in the source control inventory.
- The City will need to maintain records of source control inspections and enforcement actions.
- The City will need to adopt and implement a progressive enforcement policy for sites which fail to implement source control.
- The City will need to maintain specific records of source control staff training.

Recommendations

The City attorney should review the Permit requirement and determine if the City needs to adopt an ordinance or other enforceable document to provide sufficient authority.

The City will need to compile and maintain an inventory of sites which require source control. Appendix 8 of the Permit contains a list of business types with North American Industry Classification System (NAICS) codes that are potential sources of pollutants. The City stopped licensing businesses in 2019, and the Washington State Department of Revenue took over licensing businesses. The Washington State Department of Revenue issues business licenses and maintains a database of businesses by NAICS available to the City through a partnership agreement. This database will allow the City to identify businesses in the City with NAICS codes included in Appendix 8 of the Permit. The City has approximately 6146 businesses licensed with the Department of Revenue.

We reviewed the last list of business licenses issued by the City of Tukwila in November 2018. Approximately 47% of these businesses have an NAICS code included in Appendix 8. Based on that ratio, 2917 of the 6146 businesses licensed in Tukwila may require inspection under the Source Control Program. Reviewing each business license and confirming the business has a location in the City of Tukwila that should be included on the inventory will take approximately two weeks initially, and a week each year to maintain.

Approximately 600 source control inspections will be required each year. Currently, the City is conducting source control-like inspections on approximately 500 sites each year as part of the City's stormwater Operations and Maintenance inspections. These inspections could qualify as source control inspections if some additional observations were made and recorded. These inspections require 0.25 full-time equivalent staff (FTE) each year. It is unknown how many of these sites may overlap the estimated 3,000-site source control inventory. Assuming that half the existing sites would qualify as a source control inspection (250 sites), then 350 additional source control inspections would be required each year to reach the annual 20% of inventory goal.

Considering the work to create and maintain the inventory, inspection of 350 additional sites, additional record-keeping and reporting, and the additional education requirement, an additional 0.25-0.30 FTE may be required to address this permit requirement.

Section 4—Summary of Recommendations and Implementation Schedule

The City will need to begin new activities in the first quarter of 2020, particularly for the Stormwater Planning requirement. The majority additional effort for Mapping and Documentation should fall into 2020 or 2021 to meet an August 2021 Permit deadline to map all required elements in a GIS or CAD system.

An additional 100 hours of staff time (one-time) outside of current FTE is recommended in 2020 to oversee consultant services for Mapping and Documentation. A total of 0.25-0.3 new ongoing FTE for Source Control beginning in 2021 is recommended.

Table 1—Permit Requirements Implementation Summary (New/Changed Requirements Only)

Permit Section	Requirement	Begin Date	Permit Due Date	Current Progress	Recommended Activities and Estimated Effort
S5.C.1, Stormwater Planning					
C.1.a.	Interdisciplinary stormwater planning team	March 2020	August 1, 2020 (begin)	Not started	▪ NPDES Coordinator to invite a representative from various departments to the interdisciplinary team. ▪ Team should plan to meet approximately twice a year.
C.1.b.i.a.	Existing long-term planning Annual Report	December 2020	March 31, 2021	Plans identified	NPDES Coordinator should review plans and Annual Report questions.
C.1.b.i.b.	New long-term planning Annual Report	March 31, 2022	March 31, 2022	Plans identified	NPDES Coordinator should be included on plan updates and prepare to answer report questions.
C.1.c.	Document policy for continuing to address barriers to LID when found; annually report on findings and resolutions	Immediately	Annually beginning March 31, 2020	Continuation of effort from 2013-2018 Permit	Include LID barrier assessment process in *Surface Water Comprehensive Plan* update.
C.1.d.i.	Receiving Water Assessment	Concurrently with the Surface Water Comprehensive Plan update	March 31, 2022	Build on *Surface Water Comprehensive Plan*	Include in *Surface Water Comprehensive Plan* update.
C.1.d.ii.	Receiving Water Prioritization	Concurrently with the Surface Water Comprehensive Plan update	June 30, 2022	Not started	Include in *Surface Water Comprehensive Plan* update.
C.1.d.iii.	Stormwater Management Action Plan (SMAP)	March 2022	March 31, 2023	Not started	Include in *Surface Water Comprehensive Plan* update.

Permit Section	Requirement	Begin Date	Permit Due Date	Current Progress	Recommended Activities and Estimated Effort
S5.C.4, MS4 Mapping and Documentation					
C.4.a.iv.	Map geographic areas served by the permittee's MS4 that do not discharge stormwater to surface waters	January 2020	August 1, 2021	Data available in the City's stormwater GIS database, but not explicitly mapped	▪ Analyze existing GIS data ▪ Include in existing GIS consultant contract work
C.4.a.v.	Map tributary conveyances to all known outfalls and discharge points with a 24-inch nominal diameter or larger	January 2020	August 1, 2021	Data available in the City's stormwater GIS database, but outfalls themselves are not explicitly mapped Some field data collection may be required.	▪ Analyze existing GIS data to identify outfalls to receiving waters ▪ Create outfall feature type ▪ Create discharge point feature type ▪ Assess whether tributary conveyances to outfalls and discharge points 24-inches diameter or greater are mapped ▪ Include in existing GIS consultant contract work ▪ Collect additional field data for mapping tributary conveyances, if needed
C.4.b.i.	Collect size and material for MS4 outfalls	January 2020	January 1, 2020 (Begin)	Data available in the City's stormwater GIS database	▪ Analyze existing GIS data ▪ Include in existing GIS consultant contract work
C.4.b.ii.	Map connections from the MS4 to a privately-owned stormwater system	Immediately (as part of existing stormwater facility inspection program)	August 1, 2023	Some data available in the City's stormwater GIS database	▪ Analyze existing GIS data ▪ Create system connection feature type ▪ Include in existing GIS consultant contract work ▪ Some field reconnaissance may be required
C.4.c.	Electronic format for mapping with fully described mapping standards	January 2020 (establish and implement standards)	August 1, 2021	The City has a stormwater GIS database	▪ Document mapping standards ▪ Include in existing GIS consultant contract work

Permit Section	Requirement	Begin Date	Permit Due Date	Current Progress	Recommended Activities and Estimated Effort
S5.C.6, Controlling Runoff from New Development, Redevelopment, and Construction Sites (including Appendices 1 and 10)					
Appendix 1, Appendix 10	Amend any enforceable documents to be functionally equivalent to Appendix 1 and the required portions of 2019 SWMMWW.	June 2021	June 30, 2022	Not started	Adopt updated King County program and manuals
S5.C.8, Source Control for Existing Development					
C.8.b.i.	Ordinance(s), or other enforceable documents, requiring the application of source control BMPs	August 2021	August 1, 2022	Not started	▪ City attorney should review permit requirements and determine if ordinance is required. ▪ If ordinance is required, the City may choose to prepare ordinance in house or hire consultant.
C.8.b.ii.	Inventory of publicly and privately owned institutional, commercial, and industrial sites which have the potential to generate pollutants to the MS4.	January 2022	August 1, 2022	City maintains partial inventories of sites as part of the IDDE program, existing stormwater facilities inspection program, and business permits	▪ Update inventory based on State business license database ▪ Approximately 0.05 FTE per year
C.8.b.iii.	Implement a source control inspection program.	July 2022	January 1, 2023	City conducts informal source control inspections as part of the existing stormwater facilities inspection program	▪ Conduct source control inspections of 20% of sites on the source control inventory ▪ Approximately 0.25-0.30 FTE additional per year

Permit Section	Requirement	Begin Date	Permit Due Date	Current Progress	Recommended Activities and Estimated Effort
C.8.b.iii.a.	Provide information to identified sites about source control requirements.	July 2022	January 1, 2023 (Begin)	City contracts with ECOSS (an environmental education, resources and technical assistance company) to provide information and spill kits to some businesses	▪ The City can expand its contract with ECOSS to include all sites on the source control inventory, or ▪ The City can obtain and distribute source control literature using City staff
C.8.b.iii.b.	Complete the number of inspections equal to 20% of the sites listed in the source control inventory	January 2023	Annually beginning January 1, 2023	City conducts some source control inspections as part of the	
C.8.b.iii.c/d.	Inspect 100% of sites identified through credible complaints.	January 2023	January 1, 2023 (Begin)	The City conducts inspections in response to complaints as part of the IDDE program	No additional effort above current IDDE complaint response
C.8.b.iv.(a/b)	Implement a progressive enforcement policy	January 2022	January 1, 2023	The City may modify the IDDE enforcement policy to include source control	The City should establish a source control enforcement policy and include this policy in the *Surface Water Comprehensive Plan* update
C.8.b.iv.(c)	Maintain records, including documentation of each site visit, inspection reports, warning letters, notices of violations, and other enforcement records	July 2022	January 1, 2023 (Begin)	Not started	▪ The City should prepare an inspection and enforcement documentation system prior to the start of inspections ▪ The City may be able to use Lucity to organize this documentation

Permit Section	Requirement	Begin Date	Permit Due Date	Current Progress	Recommended Activities and Estimated Effort
C.8.b.iv.(d)	May refer non-emergency violation to Ecology, provided, the Permittee also makes a documented effort of progressive enforcement	January 1, 2023	January 1, 2023	Not started	No additional effort beyond source control record keeping

Figure 1: Implementation Schedule (New/Changed Requirements Only)

Permit Element	2019	2020	2021	2022	2023	2024
Stormwater Planning						
Interdisciplinary stormwater planning team		■ ♦	▫	▫	▫	▫
Low impact development code	■	♦	♦	♦	♦	♦
Receiving water assessment		■	▫	♦		
Receiving water prioritization		■	▫	♦		
Stormwater Action Plan		■	▫		♦	
Mapping and Documentation						
Ongoing mapping requirements	▫	▫	▫	▫	▫	▫
Map geographic areas not discharging to surface waters in GIS		■	♦			
Map tributary conveyances to outfalls and discharge points in GIS		■	♦			
Collect and map size and materials of outfalls (begin)*		■	♦	▫	▫	▫
Map connections to privately-owned stormwater systems		■	▫	▫	♦	▫
Establish & use fully described electronic mapping standards		■	♦	▫	▫	▫
Runoff from Development, Redevelopment, & Construction Sites						
Enforce standards through plan review & inspection (ongoing)	▫	▫	▫	▫	▫	▫
Adopt updated standards			■	♦		
Source Control for Existing Development						
Adopt an ordinance requiring source control BMPs on existing sites			■	♦		
Inventory commercial and industrial properties				■ ♦		
Implement an inspection program and enforcement strategy				■	♦	▫
Source control education for sites (begin)*				■	♦	▫

* Note: some permit due dates are the date by which a new activity must begin. These are denoted with the word "begin" in the task.

Legend
Begin Date ■
Continue Effort ▫
Permit due date ♦

Appendix A

Appendix A: Gap Analysis Matrix

Gap Analysis - Selected Permit Section

2019-2024 Phase II Western Washington NPDES Municipal Stormwater Permit

Status as of: December 10, 2019

Permit Condition	Sub-Section	Permit Section	Permit Cross Reference	Compliance Action	Target Due Date	Status	Current Activities	Gap from 2019-2024 Permit
S5.	C.1.a.	Stormwater Planning	Appendix 3: Q5	Convene a team to inform and assist in the development, progress, and influence of stormwater planning program.	8/1/2020	Not started	New permit requirement.	The City will need to establish an inter-disciplinary team to inform the stormwater planning program. Team make-up should include representatives from the stormwater program, long-term planning, transportation, and parks and recreation. The purpose is to inform future planning requirements and coordinate across City departments. The Permit does not state how frequently the team should meet or the precise duties of the team. At a minimum the team should meet at the beginning of each planning process to establish tasks and agree on priorities and at the end to review deliverables. The NPDES Coordinator should be a member of this team.
S5.	C.1.b.i.a.	Stormwater Planning	Appendix 3: Q6, Q7, Q8, Q9, Q10, Q10a, Q11, Q11a, Q12, Q12a, Q12b, Q12c, Q13, Q14	Describe (via responses to annual reporting questions) how stormwater management needs and protection/improvement of receiving water health were (or are not) addressed during the planning update process and influencing policy and strategies (e.g., updates to Comprehensive Plan or other long-range land use plans used to accommodate growth or transportation).	3/31/2021	Not started	The relevant long-term plans include: - The City's 2013 Surface Water Comprehensive Plan - The 2015 City of Tukwila Comprehensive Plan - 2019 - 2024 Financial Planning Model and Capital Improvement Program - The 2017 Green Tukwila 20-Year Stewardship Plan	The NPDES Coordinator will need to review the Annual Report questions and collect the necessary information prior to March 31, 2021.
S5.	C.1.b.i.b.	Stormwater Planning	Appendix 3: Q6, Q7, Q8, Q9, Q10, Q10a, Q11, Q11a, Q12, Q12a, Q12b, Q12c, Q13, Q14	Describe (via a report) how stormwater management needs and protection/improvement of receiving water health are (or are not) informing the planning update process and influencing policy and strategies (e.g., updates to Comprehensive Plan or other long-range land use plans used to accommodate growth or transportation).	1/1/2023	Not started	Permit requirement refers to future planning efforts.	The City's Surface Water Program Manager and NPDES Coordinator should be involved in the updates to the City's Comprehensive Plan and other long-term plans. - The City's Surface Water Comprehensive Plan will be updated in 2021. - The City's Comprehensive Plan will be updated in 2023.
S5.	C.1.c.i.	Stormwater Planning	Appendix 3: Q15, Q16, Q16a; Appendix 1; Appendix 10	Continue to require LID Principles and BMPs when updating, revising, and developing new local development codes, rules, standards, and other enforceable documents. Make LID the preferred and commonly-used approach to site development.	Ongoing	Ongoing	The City assessed and updated development codes during the 2013-2018 permit under the Controlling Runoff from New Development, Redevelopment and Construction Sites program.	The purpose is to move this responsibility to staff responsible for long-term planning and continue progress toward making LID the preferred and commonly used approach during future updates to the development code and reduce barriers to implementing LID when they are newly identified.

Permit Condition	Sub-Section	Permit Section	Permit Cross Reference	Compliance Action	Target Due Date	Status	Current Activities	Gap from 2019-2024 Permit
S5.	C.1.c.i.a.	Stormwater Planning	Appendix 3: Q16, Q16a	Assess and document any newly identified admin or regulatory barriers to LID implementation. Describe (if any) mechanisms adopted to encourage or require implementation of LID principles or BMPs.	Annually	Not started	The City assessed and updated development codes during the 2013-2018 permit under the Controlling Runoff from New Development, Redevelopment and Construction Sites program.	Continue to evaluate the existing and new development code for barriers to the implementation of LID.
S5.	C.1.d.i.	Stormwater Planning	Appendix 3: Q17, Q17a	Receiving Water Assessment: Using a table format, document and assess existing info related to local receiving waters and contributing area conditions to identify receiving waters most likely to benefit from stormwater management planning.	3/31/2022	Additional work required	The City's 2013 Surface Water Comprehensive Plan (specifically Chapter 2 and Appendix B) describes and assesses the basins located in the City.	Review and update the basin information contained in the Surface Water Comprehensive Plan and place in table format.
S5.	C.1.d.ii.	Stormwater Planning	Appendix 3: Q18, Q18a	Receiving Water Prioritization: Develop and implement a prioritization method and process to determine which receiving waters will receive the most benefit from the retrofits, SWMP actions, and other land/development management actions. Document the prioritized and ranked list of receiving waters.	6/30/2022	Not started	Not yet started.	Using the Receiving Water Assessment, the City will need to produce a prioritized list of receiving waters based on the potential benefits from retrofits, SWMP actions, and other land/development management actions. Resources for this process include S*tormwater Management Action Planning Guidance Phase I and Western Washington Phase II Municipal Stormwater Permits* by the Washington State Department of Ecology and *Building Cities in the Rain: Watershed Prioritization for Stormwater Retrofits* by the Washington State Department of Commerce.
S5.	C.1.d.iii.	Stormwater Planning	Appendix 3: Q19, 19a	Develop a SMAP for at least one high priority catchment area that identifies: a) Stormwater facility retrofits needed,; b) Land management/development strategies and/or actions for water quality management; c) Targeted, enhanced, or customized implementation of stormwater actions related to S5; d) Changes needed to local long-range plans; e) Implementation schedule and budget for short-term and long-term actions; f) Process and schedule for future assessment and feedback to improve planning process and implementation of procedures or projects.	3/31/2023	Not started	Not yet started.	Select one watershed from the Receiving Water Prioritization to prepare a Stormwater Management Action Plan (SMAP). Ecology published the *Stormwater Management Action Planning Guidance Phase I and Western Washington Phase II Municipal Stormwater Permits* to assist with this process.
S5.	C.4.a.i.	MS4 Mapping and Documentation	Appendix 3: Q29	Map the known MS4 outfalls and known MS4 discharge points.	Ongoing	Ongoing	The City maintains a geographic (GIS) mapping program of its stormwater drainage system.The data base includes 1955 drain points. Of these, 586 are categorized as "Flows Out" and owned by the City of Tukwila. The database also includes 370 closed pipes categorized as flowing to an "Open Pipe End." The Public Works department maintains a list of outfalls as part of the IDDE dry weather inspection program.	The City may need to conduct a GIS map analysis and fieldwork to identify outfalls to receiving waters and eliminate geographic duplicates.

Permit Condition	Sub-Section	Permit Section	Permit Cross Reference	Compliance Action	Target Due Date	Status	Current Activities	Gap from 2019-2024 Permit
S5.	C.4.a.ii.	MS4 Mapping and Documentation	Appendix 3: Q29	Map receiving waters, other than groundwater.	Ongoing	Ongoing	The GIS data provided through the public records request did not include receiving water data. The data may be included in other GIS data.	The City's GIS data may need to be updated to include receiving waters or the receiving water data documented in stormwater mapping standards.
S5.	C.4.a.iii.	MS4 Mapping and Documentation	Appendix 3: Q29	Map stormwater treatment and flow control BMPs/facilities owned or operated by the permittee.	Ongoing	Ongoing	The City's GIS data base includes Stormwater Detention and Water Quality facilities	No gap identified.
S5.	C.4.a.iv.	MS4 Mapping and Documentation	Appendix 3: Q29	Map geographic areas served by the permittee's MS4 that do not discharge stormwater to surface waters.	Ongoing	Ongoing	The GIS data provided through the public records request did not specifically include parts of the MS4 that do not dishcarge to surface waters.	The City may need to conduct a GIS map analysis and fieldwork to identify areas of the City that do not outfall to receiving waters.
S5.	C.4.a.v.	MS4 Mapping and Documentation	Appendix 3: Q29	Map 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. Include the following features/attributes: tributary conveyance type, material, and size where known; associated drainage areas; and land use.	Ongoing	Additional work required	Diameter and material is included in records for pipes.	The City may need to conduct additional analysis and fieldwork to map MS4 basins for outfalls with a 24-inch diameter and associate with land use.
S5.	C.4.a.vi.	MS4 Mapping and Documentation	Appendix 3: Q29	Map connections between the MS4 owned or operated by the permittee and other municipalities or public entities.	Ongoing	Additional work required	The City's GIS database includes some drain points with notes indicating connections to non-city of Tukwila facilities.	The City may need to conduct additional analysis and fieldwork to identify connections to the MS4 may be necessary.
S5.	C.4.a.vii.	MS4 Mapping and Documentation	Appendix 3: Q29	Map all connections to the MS4 authorized or allowed by the permittee after February 16, 2007. (Do not need to map residential connections for individual driveways, sump pumps, or roof downspouts).	Ongoing	Additional work required	In addition to city owned facilities, the City's GIS database includes some features categorized as owned by "King County" and "Private" or "null."	The City may need to conduct additional analysis and fieldwork may be required to identify all private connections to the MS4. 541 out of 1955 drain points are categorized as "null."
S5.	C.4.b.i.	MS4 Mapping and Documentation	Appendix 3: Q30, Q30a	Begin to collect size and material for all known MS4 outfalls during normal course of business (e.g., during field screening, inspection, or maintenance) and update records.	1/1/2020	Not started	The City's GIS database does not include size and material for drain points. Diameter and material is included in records for pipes.	The City may need to conduct additional analysis and fieldwork to associate this data with outfalls or collect additional data may be necessary.
S5.	C.4.b.ii.	MS4 Mapping and Documentation	Appendix 3: Q31	Complete mapping of all known connections from the MS4 to a privately owned stormwater system.	8/1/2023	Additional work required	The City's GIS database annotates some drain points with "From Private," "From Priv." or "From pvt."	The City should standardize the designation for private connections and additional analysis may be needed to identify all connection to or from privately owned storm systems.
S5.	C.4.c.	MS4 Mapping and Documentation	Appendix 3: Q32	Require electronic format for mapping with fully described mapping standards.	8/1/2021	Additional work required	The City has a GIS map of the surface water system.	The City may need to describe in a policy memo or other document the mapping standards to meet the "…fully described mapping standards." requirement. The City should review the *Mapping Guidance for Muncipal Stormwater Permittees* published by Ecology.
S5.	C.4.d./e.	MS4 Mapping and Documentation		Upon request, and to the extent appropriate, the permittee shall provide mapping information to Ecology, federally-recognized Indian Tribes, municipalities, and other permittees.	When triggered by an event	Complete	Available on request.	No gap identified.

Permit Condition	Sub-Section	Permit Section	Permit Cross Reference	Compliance Action	Target Due Date	Status	Current Activities	Gap from 2019-2024 Permit
S5.	C.6.a.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 3: Q43; Appendix 1; Appendix 10	Implement an ordinance or other enforceable mechanism to reduces pollutants in stormwater runoff to the MS4 from new development, redevelopment and construction sites.	Ongoing	Ongoing		Minor changes may be required to address updates to the minimum requirements in Appendix 1.
S5.	C.6.b.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 3: Q44, Q44a, Q45, Q46; Appendix 1; Appendix 10	Revise ordinance or other enforceable mechanism to meet the requirements of S5.C.6.b(i) through (iii).	6/30/2022	Update		See Otak's assessment of Appendix 10 on page 8.
S5.	C.6.c.i.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 3: Q47	Review all stormwater site plans for proposed development activities.	Ongoing	Ongoing		No gap identified.
S5.	C.6.c.ii.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 3: Q47, Q48, Q48a; Appendix 7	Inspect, prior to clearing and construction, 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*; or, alternatively, inspect all construction sites meeting the minimum thresholds adopted.	Ongoing	Ongoing		No gap identified.
S5.	C.6.c.iii.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 3: Q49, Q49a; Appendix 1; Appendix 10	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.	Ongoing	Ongoing		No gap identified.
S5.	C.6.c.iv.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 3: Q49b; Appendix 1; Appendix 10	Manage maintenance activities to inspect all stormwater treatment and flow control BMPs/facilities, and catch basins, in new residential development every 6 months, until 90% of the lots are constructed to identify maintenance needs and enforce compliance with maintenance standards as needed.	Ongoing	Ongoing		No gap identified.
S5.	C.6.c.v.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 3: Q50, Q51	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 facilities.	Ongoing	Ongoing		No gap identified.
S5.	C.6.c.vi.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 3: Q52, Q53	Document compliance with the inspection requirements in S5.C.6.b.ii. through v. Compliance shall be determined by achieving at least 80% of the required inspections.	Ongoing	Ongoing		No gap identified.

Permit Condition	Sub-Section	Permit Section	Permit Cross Reference	Compliance Action	Target Due Date	Status	Current Activities	Gap from 2019-2024 Permit
S5.	C.6.c.vii.	Controlling Runoff from New Development, Redevelopment, and Construction Sites		Implement a procedure for keeping records of inspection and enforcement actions, including inspection reports, warning letters, notices of violation, and other enforcement records. Keep records of maintenance inspections and activities.	Ongoing	Ongoing		No gap identified.
S5.	C.6.c.viii.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 1; Appendix 10	Implement an enforcement strategy in cases of non-compliance.	When triggered by an event	As needed		No gap identified.
S5.	C.6.d.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	Appendix 3: Q54	Make available the electronic links to Ecology's CSWGP NOI form and the ISWGP NOI form, as applicable, to representatives of new development and redevelopment.	Ongoing	Ongoing		No gap identified.
S5.	C.6.e.	Controlling Runoff from New Development, Redevelopment, and Construction Sites	S5.C.6.; Appendix 3: Q55	Train all staff responsible for implementing the program to control stormwater runoff from new development, redevelopment, and construction sites (including permitting, plan review, construction site inspections, and enforcement) to conduct these activities. Keep training records.	Ongoing	Ongoing		Minor changes may be required to address updates to the minimum requirements in Appendix 1.
S5.	C.8.b.i.	Source Control Program for Existing Development	Appendix 3: Q73; Appendix 1; Appendix 10	Adopt and make effective an ordinance(s), or other enforceable documents, requiring the application of source control BMPs for pollutant generating sources using sources control BMPs in the SWMMWW or Ecology-approved Phase I Program. Require applicable operational source BMPs for all pollutant generating sources and structural source control BMPs if operational source control BMPs are inadequate.	8/1/2022	Not started	Not yet started.	The City does not currently have a source control ordinance.
S5.	C.8.b.ii.	Source Control Program for Existing Development	Appendix 3: Q74, Q74a	Establish an inventory that identifies publicly and privately owned institutional, commercial, and industrial sites which have the potential to generate pollutants to the MS4.	8/1/2022	Additional work required	The City currently maintains inventories of commercial, industrial, and residential sites which have the potential to generate pollutants to the MS4as part of the IDDE program and Controlling Runoff from New Development, Redevelopment, and Construction Sites private facility inspection programs.	The City's available source control inventories were collected for several purposes and may be incomplete. The City will need to collect data from these inventories, city and state business licenses, and compare the data to Appendix 8 of the permit to identify properties where businesses and activities with potential outdoor pollutant generating sources that discharge to the MS4. The database/inventory compiled should be formatted to allow the City to track inspections and inspection rate.
S5.	C.8.b.iii.	Source Control Program for Existing Development	Appendix 3: Q77, Q78	Implement an inspection program for sites identified in C.8.b.ii.	1/1/2023	Additional work required	The City currently conducts source tracing as part of the IDDE program and limited source control inspections Controlling Runoff from New Development, Redevelopment, and Construction Sites private facility inspection program.	Additional work will be required to create a program specifically to inspect for source control. The city's existing source control inspection procedures likely satisfy the permit requirements, and the City will need a comprehesive inventory and inspection tracking system.

Permit Condition	Sub-Section	Permit Section	Permit Cross Reference	Compliance Action	Target Due Date	Status	Current Activities	Gap from 2019-2024 Permit
S5.	C.8.b.iii.a.	Source Control Program for Existing Development	Appendix 3: Q75, Q77	Provide information to those identified sites about activities that may generate pollutants and the source control requirements applicable to those activities.	Beginning 1/1/2023	Additional work required	The City currently contracts with ECOSS to provide source control information and spill kits to businesses in the City.	The City will need to expand the information program to provide all identified sites with a business address information about activities that may generate pollutants and the source control requirements applicable to those activities at least once during the permit term.
S5.	C.8.b.iii.b.	Source Control Program for Existing Development	Appendix 3: Q78	Complete the number of inspections equal to 20% of the businesses and/or sites listed in the source control inventory to assess BMP effectiveness and compliance with source control requirements. May count follow-up inspections at the same site towards meeting the 20% inspection rate.	Annually beginning 1/1/2023	Not started	The City currently conducts limited source control inspections as part of other permit requirements.	The City will need to systematize and expand the inspections. As part of the formalization of the program, the City will need to establish a system for tracking inspections and inspection rates.
S5.	C.8.b.iii.c/d.	Source Control Program for Existing Development		Inspect 100% of sites identified through credible complaints. Permittee may count inspections conducted based on complaints, or when the property owner denies entry, to the 20% inspection rate.	Ongoing beginning 1/1/2023	Ongoing	The City currently conducts source tracing inspections stemming from complaints as part of the IDDE program.	No gap identified.
S5.	C.8.b.iv.(a/b)	Source Control Program for Existing Development	Appendix 3: Q76, Q77; Appendix 1; Appendix 10	Implement a progressive enforcement policy that requires sites to comply with stormwater requirements within a reasonable time period.	Ongoing beginning 1/1/2023	Not started	The City currently has an IDDE enforcement policy which addresses pollutant sources which result in an illicit discharge.	The City will need to write an enforcement policy referencing the municipal code for source control inspections. The enforcement policy will need to include a process for maintaining records documenting enforcement actions.
S5.	C.8.b.iv.(c)	Source Control Program for Existing Development	Appendix 3: Q76, Q77	Maintain records, including documentation of each site visit (including denied entries), inspection reports, warning letters, notices of violations, and other enforcement records to demonstrated efforts to bring sites into compliance.	Ongoing beginning 1/1/2023	Not started	The current source control records document inspection locations and dates, and outreach records from ECOSS include whether a voluntary inspection took place and whether a spill kit was accepted by the sites visited.	The City will need to establish a records and tracking system to track continuing engagement with sites to document site visits, inspections, reports and enforcement records that can be used to demonstrate efforts to bring sites into compliance over time.
S5.	C.8.b.iv.(d)	Source Control Program for Existing Development	Appendix 3: Q76, Q77	May refer non-emergency violation to Ecology, provided, the Permittee also makes a documented effort of progressive enforcement (i.e., documentation of inspections and warning letters or NOVs).	Ongoing beginning 1/1/2023	Not started	Not yet started.	The City will need to establish a records and tracking system to track continuing engagement with sites to document site visits, inspections, reports and enforcement records that can be used to demonstrate efforts to bring sites into compliance over time.
S5.	C.8.b.v.	Source Control Program for Existing Development	S5.C.8; Appendix 3: Q79	Provide training to staff responsible for implementing the source control program, including follow-up training to address changes in procedures, techniques, requirements, or staffing. Keep training records.	Ongoing beginning 1/1/2023	Additional work required	The City currently trains public works staff to observe source control measures during site visits.	The City will need to update and track this training as the City updates the municipal code, inspection requirements, and enforcement procedures.
Appendix 1		Minimum Technical Requirements for New Development & Redevelopment	Appendix 10	Identifies the exemptions, definitions related to the Minimum Requirements, applicability of the Minimum Requirements that need to included in the Ecology equivalent stormwater management manual.	Ongoing	Ongoing	The City currently follows Minimum Requirements in compliance with the 2013-2018 permit.	The City will need to adopt minor changes to the minimum requirements as part of appendix 1.

Permit Condition	Sub-Section	Permit Section	Permit Cross Reference	Compliance Action	Target Due Date	Status	Current Activities	Gap from 2019-2024 Permit
Appendix 10		Equivalent Programs for Runoff Controls for New and Redevelopment & Construction Sites	Appendix 1	Amend any enforceable documents to be functionally equivalent to Appendix 1 and the required portions of 2019 SWMMWW.	6/30/2022	Not started	The City currently follows Minimum Requirements in compliance with the 2013-2018 permit.	The City has several options to meet this new requirement. 1. Wait for King County to update the KCSWDM and adopt the updated manual 2. Adopt the 2019 SWMMWW 3. Write and adopt an addendum to the KCSWDM which includes the changes contained in Appendix 10

Appendix D

Surface Water Issues and Solutions

Technical Memorandum

To:	Sherry Edquid (City of Tukwila)
From:	Trista Kobluskie, Sara Mardani
Copies:	File
Date:	May 17, 2023
Subject:	City of Tukwila Surface Water Comprehensive Plan Review of Existing Data
Project No.:	33383

Introduction

The purpose of this memorandum is to document the discovery phase of the City of Tukwila Surface Water Comprehensive Plan (SWCP). This memorandum summarizes the review of available information as well as the process for summarizing useful information about problems and solutions to be carried forward in development of the recommendations for the SWCP. The planning area for the SWCP is defined by Tukwila city limits.

Review of Existing Information

The discovery phase began with a review of existing information pertaining to the stormwater infrastructure and stream systems within the planning area. This information includes stormwater reports, stormwater infrastructure plans, records of flooding and drainage issues, City's staff's individual informal records of issues, and community plans. Exhibit A contains a comprehensive list of documents provided by the client and reviewed by Otak staff.

The existing information review was supplemented by meetings and email exchanges with City of Tukwila staff to collect additional background knowledge and discuss known issue locations for the stormwater infrastructure and stream corridors in the planning area. These meetings consisted of a site visit to known issue locations with the City's project manager and other team members on October 17, 2022, and six meetings with City staff on September 7 and 14, 2022, February 16, 2023, March 29, 2023, April 24, 2023, and May 10, 2023.

Additionally, potential project ideas were discussed with City of Tukwila staff during the field visit on October 17, 2022.

Collect and Categorize Issues

The information about issues in the storm system collected during the discovery phase was compiled and classified in an ESRI geodatabase. The geodatabase was composed of a collection of geographic points that identify the location of known issues, site visit locations, and potential projects for the SWCP. The schema for the geodatabase and numbering conventions are presented in Exhibit B.

Identifying known issues was the first step in the process of studying the storm system and developing solutions. Each known issue was given a unique identification number in the geodatabase. Additional fields provided descriptive information about the issue, such as the full name of the issue, a long description of the nature of the issue, last year of the issue, issue frequency, issue severity, as well as issue ownership.

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A group of fields were included to indicate if the known issue was primarily related to water quality, water quantity, erosion, habitat, or maintenance. An issue was designated as a water quality issue if there was a lack of water quality structures in the local storm system or if there was a known source affecting water quality. An issue was designated as a water quantity issue if there were consistent drainage problems or flooding at the location. An issue was designated as a habitat issue if the natural environment and living conditions of wildlife species were in danger. An issue was designated as an erosion issue if the land or soil is being worn away and transported by natural forces such as wind or water. An issue was designated as a maintenance issue if maintenance was needed to resolve the issue or if there was a problem performing maintenance.

Table 1 shows the number of issues that fall into each category. Some issues fall into multiple categories.

Table 1 Number of Known Issues Within Each Category

Type of Issue	Count
Quantity	70
Maintenance	63
Quality	81
Erosion	3
Habitat	2

A complete list of known issues is presented in Exhibit C.

To further describe some of the known issues, seven sites were selected (Figure 1) for field visits with approval from the City of Tukwila. Sites were selected when more information was needed to understand the issue. During the field visit, site conditions and potential solutions were documented using the ESRI Collector App.

Cascade View/S 128th Street Landslide Issue
(Known Issue 88)



Water Quality Issue in Tukwila Pond
(Known Issue 84)



Fort Dent Park 6PPD-Quinone Issue
(Known Issue 8)



Flood Patrol, Storm Outfalls
(Known Issue 35)



Figure 1 Selected Site Visit Photos (October 17, 2022)

Solutions

For most known issues, a solution will be proposed. A solution could be a large capital improvement project or a program.

Known issues that are candidates for large capital improvement projects are given a unique potential project identification number (PPID). The potential project list will be studied and further developed in a subsequent planning step. An attribute field for “no action” was created for instances in which the site visit or another source of information determined that no additional action was warranted for a known issue. The final list of potential projects will be rated and ranked for select CIPs.

Programs are groups of similar small and medium projects that are tackled gradually over time with fixed yearly funding. Most of the known issues will be grouped into programs that will enable the City staff to address stormwater needs that require attention but do not rise to the scale or priority level of a capital project. Known issues that are program candidates will be identified in the Known Issues Geodatabase by a text field called “Program” and by a numeric field called “Program ID.”

Collect and Map Supporting Data

To support the known issue identification and solutions analysis, various supporting data were collected and mapped.

Planning Area

The planning area is within Tukwila city limits.

Basin Delineation

The City has been divided into nine drainage basins. Portions of these basins are located outside City limits. The basin boundary delineation was based on information from field visits, the City’s Geographic Information System (GIS) data, and previously developed basin plans. Aspect re-visited the 2013 SWCP basin boundaries to ensure the drainage network is up to date. Only minor changes to the existing basin delineations were found.

Capital Improvements

The City’s existing capital improvement plans for transportation, parks, and other disciplines were mapped because it can be more cost-effective to coordinate with the City’s other capital improvements.

Exhibit A

SWCP Data Inventory

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SWCP Data Inventory

Doc ID	Title	Published Year	Author	Received From
1	Stormwater Outfall Water Quality Retrofit Project	January, 2021	KPG Interdisciplinary Design	City of Tukwila
2	2021-2025 Our Green Duwamish Implementation	June 30, 2021	OGD Partner group	Downloaded from Our Green Duwamish website
3	Gilliam Creek Final Report	June 19, 2019	Megan Nageire; PBS Engineering and Environmental, Inc.	Aspect
4	Southgate Creek Sedimentation Assessment	October, 2010	CH2MHILL	Aspect
5	City of Tukwila 2013 Surface Water Comprehensive Plan	February, 2013	CH2MHILL	Aspect
6	Technical Information Report for Starfire Fields at Fort Dent Park	May 27, 2003	Essayons Consulting Engineers, Inc.	Aspect
7	Technical Specifications Starfire Sports Expansion at Fort Dent Park	April 23, 2008	John Knowles & Associates, Inc.	City of Tukwila
8	Starfire Sports Expansion at Fort Dent Park, Hydrology Map (Existing and develop condition)	June 30, 2008	John Knowles & Associates, Inc.	City of Tukwila
9	Inhouse Baseline Water Quality Assessment and Report Riverton Flap Gate Removal Project	January, 2019	Russell Betterdge, NPDES Inspector, City of Tukwila	Aspect
10	Riverton Sampling Report Riverton Flap Gate Removal Project	February 26, 2020	Russell Betterdge, NPDES Inspector, City of Tukwila	Aspect
11	2022 Small Drainage Project List_Staff Recommendation Only - Not Approved by City Administration or Council - Subject to Change	2022	City of Tukwila	City of Tukwila
12	Flood Patrol Assets List	Unknown	City of Tukwila	City of Tukwila
13	Salmon Habitat Plan 2021 Update	February, 2021	Matthew Goehring, WRIA 9 Kollin Higgins, King County Doug Osterman, WRIA 9 Suzanna Smith, WRIA 9	Downloaded from Salmon Conservation and Restoration Green/Duwamish and Central Puget Sound Watershed
14	Southgate Fish Enhancement Project Report	1992		City of Tukwila
15	Tukwila Pond Park Master Plan	February, 2022	J.A. Brennan, PLLC, BHC Consulting, and Sieger Consulting	City of Tukwila
16	Pollutant Gravel Yard	February 16, 2023	City of Tukwila	City of Tukwila
17	Tukwila International Boulevard Slope Stability Evaluation	March 11, 2022	Sean Gertz	City of Tukwila
18	WSDOT CMP Segale Property	April 22, 2020	WSDOT	City of Tukwila

Exhibit B

Geodatabase Schema

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Tukwila SWCP Geodatabase Schema - 05/09/2023

Feature Class	Feature Dataset	Feature Class Name	Geometry	Attributes:
Known Issue Point	Tukwila_Known_Issues	Known_Issue_P	point	
"Known_Issue_P"				
Represents known issues points. Associated lines and ppolygons have the same UNIQUEID value. Associated site visit points will be related by the "Site_Visit_ID" fields in both Known Issues Points and Site Visit Points feature classes.				

Field	KI_ID	FullName	Quality	Quantity	Erosion
Alias	*Known Issue ID*	*Full Name*	*Water Quality Issue*	*Flooding Issue*	*Erosion Issue*
Format	Short Int	Text, 100	Short Int	Short Int	Short Int
Content	Unique ID for the known issue. All known issues are recorded as point features. Example "1001"	Full name of the issue	1 for yes or 0 for no regarding water quality issue	1 for yes or 0 for no regarding water quantity issue	1 for yes or 0 for no regarding water erosion issue

Field	Habitat	Maint	InfoSource	LongDesc	Last_Occur_Yr
Alias	*Habitat Issue*	*Maintainability Issue*	*Information Source*	*Long description*	*Last Year of Issue Occurance*
Format	Short Int	Short Int	Text, 50	Text, 1500	Text, 4
Content	1 for yes or 0 for no regarding Habitat issue	1 for yes or 0 for no regarding maintenance issue	Category of source (i.e. interview, previous study, existing data)	A long description of the issue and the nature of the issue.	A 4 digit text field for last year of known issue occurance.

Field	Frequency	Issue_Sev	Status	Issue_Owner	Program
Alias	*Issue Frequency*	*Issue Severity*	Status	Issue Ownership	*Program*
Format	Text, 50	Text, 50	Text, 24 - Domain	Text, 48 - Domain	Text, 64
Content	A text description of known issue frequency.	A text description of known issue severity.	Documents the status of the known issue, including such values as active, solved, solution in progress, unconfirmed, and inconsequential	Documents whether known issue is the responsibility of the client (using value "public") or is the responsibility of a private party, another public agency, or unknown responsibility.	Name of the Stormwater Program, if applicable

Field	ProgramID	PP_ID	CIP_ID	Site_Visit_ID	FileLocationLink
Alias	*Program ID*	*Potential Project ID*	*CIP ID*	*Site Visit ID*	File Location Link
Format	Short Int	Text, 32	Short Int	Text, 10	Text, 120
Content	Stormwater Program ID Number, if applicable (see below)	Unique alphanumeric ID for related Potential Projects point (if applicable)	Unique ID Number for related CIP Projects point (if applicable)	Unique ID for the site visit. See "site visit" feature class to populate with the Site Visit ID.	A hyperlink to the location of any corresponding files or resources

Field	Line	Area	CreatedUser	CreatedDate	LastEditedUser
Alias	Line	Area	*Created User*	*Created Date*	*Last Edited User*
Format	Short Int	Short Int	Text, 50	Date	Text, 50
Content	Indicates if there is a Known Issue Line association. 1 for yes or 0 for no	Indicates if there is a Known Issue Area association. 1 for yes or 0 for no	Person/Agency who created the point - automated	XX/XX/XXXX - automated	Person/Agency who updated the point - automated

Field	LastEditedDate
Alias	*Last Edited Date*
Format	Date
Content	XX/XX/XXXX - automated

Site Visit Point	N/A	Site_Visit_P	point
"Site_Visit_P"			
Represents site visit data points. Photo attachments are enabled for field use.			

Field	Site_Visit_ID	Related_KI_ID	Visit_Date	Access	Team
Alias	*Site Visit ID*	Related Known Issue ID	*Field Visit Date*	*Site Visit Access*	Staff Initials
Format	Text, 10	Short Int	Date	Text, 120	Text, 12
Content	Unique ID for the site visit. This field will be related to the same field in Known Issues Points.	Related Known Issue ID	Date of the field visit	Site access instructions or obvservations	Initials of staff who visited

Field	Site_Descrip	Study_Area	Land_Owner	Site_Long_Descript	CreatedUser
Alias	Site Description	Study Area	*Land Ownership*	Site Long Description	*Created User*
Format	Text, 255	Text, 50	Text, 70	Text, 5000	Text, 50
Content	Describes the site and the primary problem to be addressed	Name of the study area, if applicable.	Documents whetherthe site visit is within the responsibility of a private party, public agency, or unknown responsibility.	A longer description of the site and underlying issues in the site visit vicinity.	Person/Agency who created the area - automated

Field	Prop_Solution	Wider_Bene	FileLocationLink	CreatedDate	LastEditedUser
Alias	*Proposed Solution*	*Wider Benefits*	File Location Link	*Created Date*	*Last Edited User*
Format	Text, 5000	Text, 5000	Text, 120	Date	Text, 50
Content	A description of a proposed solution to an issue found at the site visit.	A description of possible wider benefits to the project area from proposed solutions.	A hyperlink to the location of any additional site visit notes or additional photos	XX/XX/XXXX - automated	Person/Agency who updated the area - automated

Field	LastEditedDate	PhotoAttach
Alias	*Last Edited Date*	*Photo Attachment*
Format	Date	Related Table Photo
Content	XX/XX/XXXX - automated	Photo Attachment

Existing CIPs	N/A	Existing_CIPs	point
"Existing_CIPs"			
Represents the City's exisitng Capital Improvement Projects in a point feature class.			

Field	Proj_ID	Proj_Name	Proj_Loc	Parcel_Num	Proj_Type
Alias	Project ID	Project Name	Project Location	Parcel Number	Project Type
Format	Text, 24	Text, 70	Text, 70	Text, 32	Domain
Content	The jurisdiction's existing City project number.	The jurisdiction's CIP project name	Brief location of project.	Parcel Number, if applicable. Default is "N/A"	Type of Captal Improvement Project. Domain values include: Transportation, Parks, Sewer, Storm, and Other

Field	Owner	Proj_Yr	Design_Man	File Path	CreatedUser
Alias	Project Owner	Project Year	Design Manual	CIP Source Document	Created User
Format		Text, 10	Text, 20	Text, 32	Text, 50
Content	CIP owner/administrator.	Project year (of probable or planned construction). Text string allows date range.	If known, documents the stormwater design engineering manual used for design	Abbreviated title and year of source where CIP was documented	Person/Agency who created the area - automated

Field	CreatedDate	LastEditedUser	LastEditedUser	LastEditedDate
Alias	Created Date	Last Edited User	Last Edited User	Last Edited Date
Format	Date	Text, 50	Text, 50	Date
Content	XX/XX/XXXX - automated	Person/Agency who updated the area automated	Person/Agency who updated the area - automated	XX/XX/XXXX - automated

Exhibit C

Known Issues List

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OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
1	KI-1	Sediment/clogging issues along all of Southgate Creek including Normed Drainage Issue	5_2013 Plan (ID25) & 4_Southgte Assssmnt (2010)	2013 SWCP (table 7) proposes the following solutions for the Sediment/clogging issues (issue ID25, table 7, 2013 SWCP): Possible solution: Regrading of wetlands on private property by private property owner. Recommended solution: To be addressed by others and City Code Enforcement. The creek and culvert accumulates sediments and overtops during storm events to flood 44th Avenue South and the NorMed site (solution is in design now).	Unkn	Periodically	Unknown	Water Quality & Flooding
2	KI-2	Gilliam Crk DO Issue	3_Gilliam Crk Water Qulty Assssent & Rprt (2019)	9 samples over 12 months (June 2018-May 2019) were collected from 2 locations in the open channel of Gilliam Crk. DO exceeded the threshold value (8 mg/L) during Aug 2018 in both locations.	2019	Periodically	Unknown	Water Quality
3	KI-3	Gilliam Crk Turbidity Issue	3_Gilliam Crk Water Qulty Assssent & Rprt (2019)	9 samples over 12 months (June 2018-May 2019) were collected from 2 locations (upstream and downstream) in the open channel of Gilliam Crk. Turbidity levels were above the threshold in the downstream sampling location. Upstream Turbidity levels were used as background.	2019	Periodically	Unknown	Water Quality
4	KI-4	Gilliam Crk pH Issue	3_Gilliam Crk Water Qulty Assssent & Rprt (2019)	9 samples over 12 months (June 2018-May 2019) were collected from 2 locations in the open channel of Gilliam Crk. PH levels were below the 6.5 threshold in both locations.	2019	Periodically	Unknown	Water Quality
5	KI-5	Gilliam Crk Sediment (PAHs) Issue	3_Gilliam Crk Water Qulty Assssent & Rprt (2019)	3 samples on June 14, 2018 were collected from 3 locations in the open channel of Gilliam Crk. Several PAHs exceeded the NOAA Screening Levels in one of the sampling locations. Note that there is debate about the criteria used to assess the samples.	2018	Unknown	Low	Water Quality
6	KI-6	RivertonCrk Sediment (Metal) Issue	7_Riverton Smplng Rprt_Flapgate rmvl (2020)	3 samples on Aug 1, 2016 were collected from 3 locations in the open channel of Riverton Crk. Copper and Zinc samples exceeded the NOAA Screening Levels the samples.	2016	Unknown	Low	Water Quality
7	KI-7	RivertonCrk DO Issue	7_Riverton Smplng Rprt _Flapgate rmvl (2020)	12 samples over 12 months (Feb 2019 to Dec 2019) were collected from 2 locations in the open channel of Riverton Crk. DO exceeded the threshold value (8 mg/L) during April to September.	2019	Unknown	Unknown	Water Quality
8	KI-8	Fort Dent Park 6PPD-quinone Issue	6_TIR for Starfire Fields at Fort Dent Park (2003)	6PPD-quinone concern due to tire material on field	Unkn	Unknown	Unknown	Water Quality
9	KI-9	Runoff Issue at 10349 Beacon Ave S	8_2022 Small Drainage Project List (2022)	Resident at 10349 Beacon Ave S. has roadway runoff entering her property causing damage to her septic system. Surveyed in 2008. Priority Ranking for this issue is 2. City proposes the following solutions: 1- Obtain easements from private property owners to construct new drainage system to the west. 2- Construct a deep storm line to Ryan Way. The preferred method will need to be determined during design. Solution : remain in the Small Drainage program	Unkn	Unknown	Unknown	Flooding
10	KI-59	Flood Patrol, Storm Structures, DR00217	9_Flood Patrol Assets List	Storm Structures, ID=DR00217, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
11	KI-57	Flood Patrol, Storm Structures, DR00218	9_Flood Patrol Assets List	Storm Structures, ID=DR00218, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
12	KI-60	Flood Patrol, Storm Structures, DR00219	9_Flood Patrol Assets List	Storm Structures, ID=DR00219, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
13	KI-58	Flood Patrol, Storm Structures, DR00220	9_Flood Patrol Assets List	Storm Structures, ID=DR00220, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
14	KI-56	Flood Patrol, Storm Structures, DR00221	9_Flood Patrol Assets List	Storm Structures, ID=DR00221, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
15	KI-62	Flood Patrol, Storm Structures, DR00598	9_Flood Patrol Assets List	Storm Structures, ID=DR00598, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
16	KI-54	Flood Patrol, Storm Structures, DR00902	9_Flood Patrol Assets List	Storm Structures, ID=DR00902, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
17	KI-55	Flood Patrol, Storm Structures, DR01190	9_Flood Patrol Assets List	Storm Structures, ID=DR01190, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
18	KI-53	Flood Patrol, Storm Structures, DR01701	9_Flood Patrol Assets List	Storm Structures, ID=DR01701, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
19	KI-52	Flood Patrol, Storm Structures, DR01878	9_Flood Patrol Assets List	Storm Structures, ID=DR01878, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
20	KI-61	Flood Patrol, Storm Structures, DR03532	9_Flood Patrol Assets List	Storm Structures, ID=DR03532, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
21	KI-48	Flood Patrol, Storm Structures, DR04308	9_Flood Patrol Assets List	Storm Structures, ID=DR04308, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
22	KI-49	Flood Patrol, Storm Structures, DR04309	9_Flood Patrol Assets List	Storm Structures, ID=DR04309, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
23	KI-50	Flood Patrol, Storm Structures, DR04315	9_Flood Patrol Assets List	Storm Structures, ID=DR04315, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
24	KI-51	Flood Patrol, Storm Structures, DR05540	9_Flood Patrol Assets List	Storm Structures, ID=DR05540, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
25	KI-68	Flood Patrol, Storm Structures, DR35006	9_Flood Patrol Assets List	Storm Structures, ID=DR35006, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
26	KI-24	Flood Patrol, Storm Outfalls, DR06865	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06865, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
27	KI-36	Flood Patrol, Storm Outfalls, DR06942	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06942, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
28	KI-35	Flood Patrol, Storm Outfalls, DR06945	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06945, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
29	KI-34	Flood Patrol, Storm Outfalls, DR06946	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06946, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
30	KI-46	Flood Patrol, Storm Outfalls, DR07256	9_Flood Patrol Assets List	Storm Outfalls, ID=DR07256, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
31	KI-47	Flood Patrol, Storm Outfalls, DR07259	9_Flood Patrol Assets List	Storm Outfalls, ID=DR07259, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
32	KI-65	Flood Patrol, Storm Outfalls, DR06618	9_Flood Patrol Assets List	Storm Outfalls, ID=DR07355, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
33	KI-69	Flood Patrol, Storm Outfalls, DR07438	9_Flood Patrol Assets List	Storm Outfalls, ID=DR07438, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
34	KI-20	Flood Patrol, Storm Outfalls, DR36071	9_Flood Patrol Assets List	Storm Outfalls, ID=DR36071, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
35	KI-19	Flood Patrol, Storm Outfalls, DR36070	9_Flood Patrol Assets List	Storm Outfalls, ID=DR36070, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
36	KI-21	Flood Patrol, Storm Outfalls, DR40017	9_Flood Patrol Assets List	Storm Outfalls, ID=DR40017, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
37	KI-66	Flood Patrol, Storm Outfalls, DR36123	9_Flood Patrol Assets List	Storm Outfalls, ID=DR36123, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
38	KI-67	Flood Patrol, Storm Outfalls, DR30689	9_Flood Patrol Assets List	Storm Outfalls, ID=DR30689, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
39	KI-25	Flood Patrol, Storm Outfalls, DR30862	9_Flood Patrol Assets List	Storm Outfalls, ID=DR30862, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
40	KI-26	Flood Patrol, Storm Outfalls, DR30863	9_Flood Patrol Assets List	Storm Outfalls, ID=DR30863, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
41	KI-23	Flood Patrol, Storm Outfalls, DR31112	9_Flood Patrol Assets List	Storm Outfalls, ID=DR31112, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
42	KI-22	Flood Patrol, Storm Outfalls, DR31117	9_Flood Patrol Assets List	Storm Outfalls, ID=DR31117, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
43	KI-42	Flood Patrol, Storm Outfalls, DR06220	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06220, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
44	KI-41	Flood Patrol, Storm Outfalls, DR06219	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06219, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
45	KI-40	Flood Patrol, Storm Outfalls, DR06218	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06218, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
46	KI-39	Flood Patrol, Storm Outfalls, DR06217	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06217, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
47	KI-44	Flood Patrol, Storm Outfalls, DR06224	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06224, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
48	KI-43	Flood Patrol, Storm Outfalls, DR06223	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06223, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
49	KI-38	Flood Patrol, Storm Outfalls, DR06412	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06412, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
50	KI-37	Flood Patrol, Storm Outfalls, DR06411	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06411, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
51	KI-45	Flood Patrol, Storm Outfalls, DR06469	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06469, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
52	KI-64	Flood Patrol, Storm Outfalls, DR06597	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06597, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
53	KI-65	Flood Patrol, Storm Outfalls, DR06618	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06618, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
54	KI-28	Flood Patrol, Storm Outfalls, DR06698	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06698, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
55	KI-29	Flood Patrol, Storm Outfalls, DR06697	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06697, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
56	KI-30	Flood Patrol, Storm Outfalls, DR06696	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06696, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
57	KI-31	Flood Patrol, Storm Outfalls, DR06695	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06695, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
58	KI-32	Flood Patrol, Storm Outfalls, DR06694	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06694, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
59	KI-33	Flood Patrol, Storm Outfalls, DR06693	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06693, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
60	KI-27	Flood Patrol, Storm Outfalls, DR06699	9_Flood Patrol Assets List	Storm Outfalls, ID=DR06699, frequent/difficult maintenance spot City checks during all storms. Solution: operations/maintenance	2021	Annual	Low	Flooding & Maintainability
61	KI-10	Old culvert tile pipe at 34th & Military Road	8_2022 Small Drainage Project List (2022)	On 34th & Military Road – Root plugged, old culvert tile pipe. Priority Ranking for this issue is 2. City proposes the following solution: Replace 18” pipe from Military Road to 34th at old gas station to corner of S. 144th Street. Solution : remain in the program	Unkn	Unknown	Unknown	Flooding & Maintainability
62	KI-11	Broken pipe from ditch on 45th to S. 137th	8_2022 Small Drainage Project List (2022)	Old broken pipe from ditch on 45th to S. 137th – Mismatched pipe, junk system. Priority Ranking for this issue is 2. City proposes the following solution: Replace approximately 450 feet of 12” pipe and add (8) catch basins on east side of 45th.	Unkn	Unknown	Unknown	Flooding
63	KI-12	12” CMP/concrete culvert tile pipe running through yard to manhole under deck and then out to pond	8_2022 Small Drainage Project List (2022)	At the NE corner of 33rd and S. 132nd, 3306 S. 132nd manufactured home has 12” CMP/concrete culvert tile pipe running through yard to manhole under deck and then out to pond in neighbor’s yard then to 34th, live stream. Priority Ranking for this issue is 2. City proposes the following solution: Replace/re-route system, HPA needed.	Unkn	Unknown	Unknown	Flooding
64	KI-13	Runoff Issue at 38th Ave & S. 130th St to dead end	8_2022 Small Drainage Project List (2022)	38th Ave & S. 130th to dead end – Needs new drainage system. Old mismatched pipe, deep ditches, steep driveways. Water running into home on lower side of road. Priority Ranking for this issue is 2. City proposes the following solution: Install new 12” storm system with catch basins and thickened edges to get water to new catch basins. Solution : remain in the program.	Unkn	Unknown	Unknown	Flooding

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
65	KI-14	Blocked 30" CMP pipe due to rocked and debries at S. 133rd & S. 134th Street	8_2022 Small Drainage Project List (2022)	S. 133rd & S. 134th – Clean rocks and other debris out of 30” CMP pipe on west branch of Southgate Creek. NPDES issue and private property issue. Priority Ranking for this issue is 3. Debris plugs low flow pipe, hard to keep clean. NPDES issue and private property issue. Solution : remain in the program	Unkn	Unknown	Unknown	Flooding & Maintainability
66	KI-15	West Valley Hwy at the CAT Rental Store – Railroad tracks to the ditch	8_2022 Small Drainage Project List (2022)	West Valley Hwy at the CAT Rental Store – Railroad tracks to the ditch. Priority Ranking for this issue is 3. City proposes the following solution: Replace 650 feet of 12” pipe and install (5) Type I catch basins. Crossing OK, need R-O-W survey.Solution : remain in the program	Unkn	Unknown	Unknown	Flooding & Maintainability
67	KI-16	Broken and old mismatched pipe on 37th Ave S	8_2022 Small Drainage Project List (2022)	On 37th Ave South from S. 126th to S. 128th, then down S. 126th to creek – Old mismatched pipe is broken, junk system etc. Priority Ranking for this issue is 3. City proposes the following solution: Replace 750 feet of 12” pipe and install (12) catch basins. . Solution : remain in the program	Unkn	Unknown	Unknown	Maintainability
68	KI-17	Broken and old mismatched pipe on S. 130th Street	8_2022 Small Drainage Project List (2022)	On S.130th at East Marginal Way on west side – Old mismatched pipe is broken, junk system etc. From East Marginal Way to 34th – Both sides of road, new system. Priority Ranking for this issue is 3. City proposes the following solution: Replace pipe from ditch on north side crossing with 950 feet of 12” pipe and (15) catch basins, including angle across street. Solution : remain in the program	Unkn	Unknown	Unknown	Maintainability
69	KI-18	Local crawl space flooding at S. 135th between 37th and 35th	8_2022 Small Drainage Project List (2022)	Off S. 135th between 37th and 35th – Local crawl space flooding due to no drainage in private alley. Priority Ranking for this issue is 3. City proposes the following solution: Install drainage and hook up homes. Need petition from property owners. Solution : remain in the program	Unkn	Unknown	Unknown	Flooding
70	KI-70	Undersized inlet pipe to catch basin on S. 150th	8_2022 Small Drainage Project List (2022)	S. 150th creek outfall to catch basin on S. 150th (off Macadam Road). Undersized inlet “debris plugs”, south of Baptist church. Priority Ranking for this issue is 3. City proposes the following solution: Install new cone grate and Type II manhole. Solution : remain in the program	Unkn	Unknown	Unknown	Flooding & Maintainability
71	KI-71	Ditch problem on 56th Ave S & S. 141st to S. 139th	8_2022 Small Drainage Project List (2022)	56th Ave S & S. 141st to S. 139th problem area – Problem ditch. Long berms need new drainage system to prevent homes from being flooded. Priority Ranking for this issue is 3. City proposes the following solution: Install approx. 600 feet of 12” storm main and (4-6) catch basins from S. 141st to S. 139th. Fill ditch, both sides of 56th Ave South. Solution : remain in the program	Unkn	Unknown	Unknown	Flooding
72	KI-72	Vault at Gilliam Creek crossing on S. 154th	8_2022 Small Drainage Project List (2022)	Large Contech pot style vault at Gilliam Creek crossing on S. 154th – vault needs better access for pot cleaning and replacement. Priority Ranking for this issue is 3. City proposes the following solution: Pull lid from vault and add 2-3 feet riser section asphalt area. Add fences and gates for vehicle access for cleaning . Solution : remain in the program	Unkn	Unknown	Unknown	Maintainability
73	KI-73	Abandoned pipe downstream of 10831 Tukwila International Blvd	8_2022 Small Drainage Project List (2022)	10831 Tukwila International Blvd – Downstream pipe was abandoned (no idea when) and is now slowing to north through pipes at reverse grade. Priority Ranking for this issue is unknown. City proposes the following solution: Replace 5 type-1 CBs and 330’ of 12” storm pipe from DR00037 to DR00020. Solution : remain in the program	Unkn	Unknown	Unknown	Maintainability
74	KI-74	Fish mortality in Riverton Crk	City's Staff Observation	City's Staff witnessed fish mortality in Riverton Crk near the mouth	Unkn	Unknown	Unkn	Water Quality
75	KI-75	Lack of off-channel salmon habitat along lower Duwamish	5_2013 Plan - Table 7 - Issues and Solutions	The issue is located at Duwamish River near light rail crossing. The 2013 SWCP (table 7 - issue ID 4) proposes the following solutions for the issue. Possible solution: Capital (channel physical habitat restoration). Recommended solution: Physical habitat restoration (capital project - Duwamish Gardens)	Unkn	Unknown	Unkn	Habitat
76	KI-76	Fish habitat accessibility issues in Riverton Creek culvert	5_2013 Plan - Table 7 - Issues and Solutions	The issue is located at E Marginal Way south of SR599. The 2013 SWCP (table 22, Issue ID 4) proposes the following solutions for the issue. Possible solution: Capital (removal/replacement of fish-blocking culvert). Recommended solution: Conveyance system cleaning and inspection (capital project)	Unkn	Unknown	Unknown	Habitat

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
77	KI-77	Dumping_City wide issue	City's Staff observation	The site is one example of several where the City is concerned about encampments of houseless people on the levees, in streams, and in stormwater facilities. The people may not be safe in those locations, and the infrastructure may also be damaged by human activities. Recommendation may be for City council to address houselessness more broadly.	2022	Weekly	Unknown	Water Quality
78	KI-78	Ponding in low spot, possible ponding on the east side of roa	5_2013 Plan - Table 7 - Issues and Solutions	The issue is located at: 49th Ave S and S Hazel Street. The 2013 SWCP (table 7 -issue ID 2) proposes the following solutions for the issue. Possible solution: Capital (increase conveyance capacity,retention/detention) Recommended solution: Move onto 2012 Small Drainage Project List	Unkn	Unknown	Unkn	Flooding
79	KI-79	Tukwila stormwater line discharges to WSDOT pipe, no access due to I-405 widening	5_2013 Plan - Table 7 - Issues and Solutions	The issue is located at Andover Park W at Gilliam Creek. The 2013 SWCP (table 7 -issue ID 10) proposes the following solutions for the issue. Possible solution: Capital (re-route drainage system). Recommended solution: Re-route drainage system (capital project).	Unkn	Unknown	Unknown	Flooding
80	KI-80	Historical landslide	5_2013 Plan - Table 7 - Issues and Solutions	The issue is located at S 137th St at 44th Ave S . The 2013 SWCP (table 7 -issue ID 10) proposes the following solutions for the issue. Possible solution: Capital (complete channel stabilization and riparian buffer restoration). Recommended solution: No capital project at this time; monitor status and review during next planning period.	Unkn	Unknown	Unkn	Water Quality & Flooding
81	KI-81	Runoff Issue at Allentown – 48th, 49th, S. 124th	8_2022 Small Drainage Project List (2022)	Allentown – 48th, 49th, S. 124th – These streets have no formal drainage and have always had problems with runoff into yards and homes from right-of-way. Priority Ranking for this issue is 1. City proposes the following solution: Install new pipe one street at a time.	Unkn	Unknown	Unknown	Flooding
82	KI-82	Andover Park 48 inch stormwater pipe in poor condition, possibly damaged	5_2013 Plan - Table 7 - Issues and Solutions	The issue is located at Andover Park W. The 2013 SWCP (table 7 -issue ID 11) proposes the following solutions for the issue. Possible solution: Capital (increase effective conveyance capacity). Recommended solution: No capital project at this time; address once collection system has been clean and inspected; had been CIP project #98641217	Unkn	Unknown	Unkn	Flooding
84	KI-84	Water Quality in Tukwila Pond	City Staff and Tukwila Pond Master Plan	Pond has a poor WQ and high levels of phosphorus. Tukwila pond is the result of filling in and paving the areas around it. The pond is pretty shallow (5-6 feet); before surrounding development built up the surrounding are there were pastures here. During periods of high flow, it discharges to Green river, but under gravity flow conditions it outlets to Gilliam Creek. (Russell has some info regarding the discharges)	Unkn	Unknown	Unknown	Water Quality
85	KI-85	Cascade view/S 128th street Landslide Known Issue	City Staff_Field Visit	A parking lot owned by a non-profit entity is sloughing/cracking off at the top of a historic landslide. Further upslope, which is in City of Burien, a retirement facility has a pond which discharges near the top of the slope on the landslide. City staff spoke with City of Burien staff about the pond, but the pond design follows an applicable stormwater manual. There is a pipe that outfalls into Tukwila through property in Burien. There is occasional flooding in this area according to City staff.	Unkn	Unknown	Unkn	Water Quality
86	KI-86	Unauthorized encampment.in Parcel 3747	City's Staff	The issue includes unauthorized encampment. The City owns the parcel. Could we use this vacant parcel to provide water quality treatment here?	Unkn	Unknown	Unknown	Water Quality
87	KI-87	Damaged/Rusted pipe at 13601 40th Ave S	8_2022 Small Drainage Project List (2022)	13601 40th Ave S. Old brick built CB2s and 18” CMP pipe are completely impacted with roots. Sections of the pipe have rusted away, and water is scouring the ground around the pipe depositing sediment into Southgate Creek. Priority Ranking for this issue is 1. City proposes the following solution: 90’ of 18” CMP; 80’ of 12” concrete; two CB2s and one CB1 need to be replaced.	Unkn	Unknown	Unknown	Flooding & Maintainability

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
88	KI-88	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
89	KI-89	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
90	KI-90	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
91	KI-91	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
92	KI-92	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
93	KI-93	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
94	KI-94	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
95	KI-95	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
96	KI-96	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
97	KI-97	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
98	KI-98	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
99	KI-99	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
100	KI-100	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
101	KI-101	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
102	KI-102	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
103	KI-103	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
104	KI-104	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
105	KI-105	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
106	KI-106	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
107	KI-107	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
108	KI-108	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
109	KI-109	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
110	KI-110	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
111	KI-111	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
112	KI-112	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
113	KI-113	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
114	KI-114	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
115	KI-115	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
116	KI-116	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
117	KI-117	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
118	KI-118	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
119	KI-119	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
120	KI-120	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
121	KI-121	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
122	KI-122	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
123	KI-123	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
124	KI-124	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
125	KI-125	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
126	KI-126	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
127	KI-127	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
128	KI-128	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
129	KI-129	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
130	KI-130	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
131	KI-131	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
132	KI-132	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
133	KI-133	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
134	KI-134	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
135	KI-135	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
136	KI-136	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
137	KI-137	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
138	KI-138	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
139	KI-139	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
140	KI-140	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
141	KI-141	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
142	KI-142	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
143	KI-143	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
144	KI-144	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
145	KI-145	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
146	KI-146	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
147	KI-147	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
148	KI-148	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
149	KI-149	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
150	KI-150	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
151	KI-151	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
152	KI-152	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
153	KI-153	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
154	KI-154	Pollution Generating Gravel Yard	~GE0000g20236.kmz/Polluting Gravel Yard	The Known Issue is one of many on a list of pollution generating gravel yards kept by the City. The City has permitted many temporary parking lots with gravel surfaces that were supposed to be paved within 3 years. Gravel parking lots with catch basins and connections to the municipal storm sewer may be discharging untreated runoff to the municipal storm sewer.	2022	Annual	Low	Water Quality
155	KI-155	Springbrook Maintenance	CityStaff_Meeting March 16, 2023	The issue is located in Springbrook basin between the two railroad lines. FEMA maps indicate this area ponds. This channel is rarely cleaned out, last likely around 2015. There might have been an beaver dam in the past. This area needs to be cleaned out again.	Unkn	Periodically	Low	Maintainability
157	KI-156	S Ryan Way Drainage Issues	Meeting with City staff on March 29, 2023	There is poor pipe condition along S Ryan Way and there are associated drainage issues. Paving is needed. If brought down to the base of the road, stormwater standards will be triggered which includes the flow control threshold. Possible solution would be funded by the Transportation funds.	Unkn	Unknown	Moderate	Flooding & Maintainability
158	KI-157	Erosion at inlet of 108” diameter culvert carrying Gilliam Creek under 66th Ave S and the Green Rive	Meeting with City staff on May 11, 2023	Erosion at inlet of 108” diameter culvert carrying Gilliam Creek under 66th Ave S and the Green River Trail. A debris rack was installed by the City to prevent large material from getting in the culvert, and if it’s not maintained frequently, the flows in Gilliam Creek erode the slopes around the culvert. It happened in the winter of 2022-2023 with up to 12-20 feet of losses. The new angle of repose will intercept 66th Ave. South and undermine it if the slope is not stabilized. The City is currently working on a larger fish passage enhancement project at this location.	2022	Unknown	High	Erosion & Maintainability

OBJ ID	KI_ID	FullName	InfoSource	LongDesc	Last_Occur_ Yr	Frequency	Issue Severity	MapSymbol (Issue Type)
159	KI-158	Foster Heights erosion problem in Southgate	Meeting with City staff on May 11, 2024	The Foster Heights area of town was annexed from the county and shortly after a plat began construction before the 2008 downturn. Just north of S 137th Street, 43rd Avenue S is collapsing. The ROW has been vacated, and the roadway is now located on private property and is closed. Southgate Creek passes under 43rd Avenue S in the private tract. The collapsing roadway is contributing debris to the stream, which travels downstream and is deposited behind Evergreen Catering Equipment. The business has installed Ecology Blocks to prevent stream from eroding their property.	Unkn	Unknown	Moderate	Water Quality & Erosion

Appendix E

Surface Water Capital Projects and Studies

Surface Water Capital Projects and Studies

Appendix E contains a summary of the recommended surface water capital projects, the 2024 Annual Small Drainage Program list, and recommended studies. The information presented here is summarized in Section 5 and Section 6 of the 2024 Surface Water Comprehensive Plan.

A major component of this Plan is the identification of surface water management issues and corresponding solutions to those issues. The Plan identifies both programmatic (non-structure) and structural solutions to those issues. Structural solutions are further categorized as capital projects, which are large complex projects generally requiring a design by a professional engineer and likely to be bid to a contractor for construction as an individual project, and small drainage projects, which are less complicated drainage system repairs and modifications that may not require an engineered design and that can sometimes be constructed by City Operations staff. The purpose of this appendix is to outline the capital projects, Annual Small Drainage Program projects, and studies recommended for implementation in the Plan.

Attachment A to this Appendix contains the basis for the cost estimates for each of the capital projects recommended for inclusion in Tukwila's CIP. Attachment B to this Appendix contains the summary sheets for each of the capital projects that can be utilized as part of the budget planning process and CIP development. Attachment C to this Appendix contains the 2024 Annual Small Drainage Program list. Attachment D to this Appendix contains copies of the public involvement process used to help prioritize projects.

The surface water needs, or known issues, were identified as part of SWCP development. Needs were categories as drainage, water quality, erosion, maintenance, or aquatic habitat needs. Once these needs were identified, one or more potential solutions were identified. These solutions were either programmatic or structural (capital) in nature.

Otak and City staff screened the list of known issues into solution categories – programmatic and structural.

Capital Projects

Project Development

Otak and City staff prioritized structural solutions and requested input from the public on capital project prioritization. Otak and City of Tukwila staff collaborated on the preferred solution for the highest priority projects. Otak developed preliminary design concepts and planning-level cost estimates for the highest priority capital projects.

Most of the capital projects presented in this memorandum are focused on rectifying discrete drainage, water quality, or aquatic habitat problems. Some of the known issues identified are not readily solved using discrete capital projects. For example, widespread water quality problems in urban runoff entering Riverton, Southgate, and Gilliam Creeks cannot be solved with individual capital improvements. It can be appropriate to address water quality problems with land use or stormwater management regulations (for example, requiring water quality treatment for redevelopment projects) or by bundling stormwater runoff retrofits into programmatic CIPs to address water quality.

Studies are recommended when a solution to a problem cannot be identified because the causes or appropriate prioritization is not clear.

Prioritization

The planning process for the 2024 SWCP identified more issues that require a capital improvement than the City could afford to construct over the next ten years. As a result, the issues were screened to identify the most important ones to address first. For the most important issues, capital improvement projects were prioritized based on a variety of factors. In addition to selecting capital improvement projects based on individual characteristics, the process also ensured that the City's portfolio of surface water CIPs and studies in the 2024 SWCP would solve a comprehensive set of issue types and would address regional priorities and lead to multiple benefits. Tables E-1 describes the known issue screening factors, and Table E-2 describes project prioritization weighting.

Table E-1
Known Issue Screening Factors

	Audience		
Issue Type	**City**	**Regional Priority**	**Public Input**
Intractable, severe, or widespread issue within City	x		x
Localized drainage issues	X		x
Degraded water quality from urban pollutants	x	x	x
Degraded water quality from erosion and landslides	x		
Flow control	x	x	
Degraded or lack of fish habitat	x	x	x
Barriers to fish passage	x	x	x
Poor condition and aging of storm sewer system	x		x

Table E-2
Project Prioritization Weights

Project Characteristics	Relative Weight		
	High	Medium	Low
Multi-beneficial project which combines solutions to multiple problems	x		
Multi-beneficial project which coordinates with efforts of other Tukwila departments (e.g. Parks, Transportation) or other agency	x		
Project addresses a regional priority or anticipated regulatory requirement	x		
Project is eligible for grant funding	x		
Project received favorable public input	x		
Previously identified project not yet implemented		x	
Standalone water quality project		x	
Standalone habitat / fish barrier removal project		x	
Standalone flooding / drainage project, high severity		x	
Standalone erosion / sedimentation project		x	
Tukwila Surface Water Program is not the lead agency and does not control timing of multi-benefit project			
Standalone maintainability or capital repair/replacement			x
Standalone flooding / drainage project, low or medium severity			x

[1] Change priority to "high" when another department of agency is ready to advance the project

Capital Projects Recommended for Inclusion into the CIP

Table E-3 presents the capital projects recommended for inclusion into Tukwila's Surface Water CIP. Projects with an eight-digit ID were previously recommended and assigned an ID number using Tukwila's CIP numbering system. Projects with an alphanumeric ID are new projects identified for this Plan, and they will be assigned an eight-digit ID when they are incorporated into the City's capital improvement program. Attachment A to this memorandum contains the basis for the project costs. Attachment B contains project summary sheets with project scopes, benefits, schematic sketches, and cost estimates for each project.

Table E-3
Recommended Capital Projects

ID	Project Name	Project History	Estimated Total Project Cost (2023 dollars)
98641222	S 143rd St storm drain system	2003 and 2013 Plans	$1,410,000
98741202	Nelsen/Longacres – Phase II	2013 Plan	$1,000,000
99441202	Soil Reclamation Facility / Enhanced Maintenance Program and Decant Facility Design – Part 1	2003 and 2013 Plans; City will study cost under Enhanced Maintenance Planning grant in 2024	$540,000
90341214	S 146th St pipe and 35th Ave S drainage	2003 and 2013 Plans	$1,290,000
91241203	Tukwila Urban Center Conveyance Inspections	Gilliam Cr./P17	$790,000
CIP-1	Norfolk Outfall Trunkline Sewer Separation Preliminary Feasibility Study	New	$155,000
CIP-2	S Ryan Way Pipe Rehabilitation	New	Alt. 1: $840,000 Alt. 2: $680,000
CIP-3	Fort Dent Park Water Quality Retrofit	New	Alt. 1: 90,000 Alt. 2: $1,745,000
CIP-4	Tukwila Pkwy/Gilliam Cr Outfalls	2013 Plan (ID 91241202); 2023 Tukwila CIP ID 91241205. CIP-4 is a redesign.	$1,240,000
CIP-5	Tukwila Pond Water Quality Improvement	New	$940,000
CIP-6	Johnson Creek Fish Barrier Mitigation Alternatives Analysis	New	$280,000

Attachment B contains project summary sheets with project scopes, benefits, schematic sketches, and cost estimates for each project.

Programmatic CIPs

The City's objectives to improve water quality for salmon and human health, meet stormwater planning requirements of the NPDES Phase II Permit, and coordinate on regional priorities cannot be met with a single capital investment. In addition, the Annual Small Drainage Program programmatic CIP allows the City to dedicate funding annually to make consistent progress in addressing public complaints. Five programmatic capital improvement programs are recommended for inclusion in the City's CIP.

The purpose of the Annual Small Drainage Program is to fix small public drainage issues that often start as customer service requests or issues discovered in the field. For greater efficiency, these projects are often batched together. Solutions typically entail installing catch basins, pipes, berms, and other small improvements within the public right-of-way. These projects proactively ensure public safety, reduce flooding, decrease maintenance demands, and protect critical infrastructure. Otak and City staff reviewed the 2022 Annual Small Drainage Program list to verify the status of the underlying surface water known issue. The 2024 Annual Small Drainage Program comprises the remaining active known issues from the 2022 Small Drainage Program list and a small number of newly identified surface water known issues. Attachment C to this Appendix contains the 2024 Annual Small Drainage Program list and information about the disposition of small projects on previous lists.

The Stormwater Outfalls Water Quality Retrofit Program has been active since 2015 with the outfall retrofit at Interurban and 53rd Ave S. It focuses on treating roadway runoff close to outfalls into the Green/Duwamish. In 2021, the City evaluated eight sites and developed preliminary designs for four sites. The City has obtained a grant from Ecology to advance the design and construction of sites No. 5 and No. 8, while sites No. 4 No. 7 will be designed to 90% and put on hold. This programmatic CIP is city-wide and could be used to identify and implement opportunities for stormwater parks in the future. See Appendix F for the Stormwater Outfalls Design Report.

The Stormwater Management Action Plan (SMAP) for Riverton Creek identifies four priority stormwater retrofits and a handful of lower priority stormwater retrofits with the goal of improving water quality in Riverton Creek. Riverton Creek has good quality fish habitat in several reaches, and the City and King County Metro each have been engaged in improving access to the habitat. Therefore, improvements to water quality in Riverton Creek are especially valuable. Implementation of the SMAP or equivalent water quality protection programs may be required in the next NPDES Phase II permit cycle, and projects in this programmatic CIP are eligible for grant funding from Ecology. See Appendix F for the SMAP document.

The Green Infrastructure Program is envisioned as way to support regional priorities for water quality improvement of the Green/Duwamish Rivers, protection of Puget Sound, habitat improvements for fish, and providing a healthy environment for people. The Green Infrastructure Program would be partnership between Tukwila's Public Works, Parks and Recreation, and Department of Community Development departments. The program would help manage habitat restoration sites and identify, acquire, restore, and manage forested lands, wetlands, river side channels, and other lands that benefit surface water. The Green Infrastructure Program would expand on the City's existing Green Tukwila Program which is currently not on track to enroll all 138 acres in restoration and active maintenance within the 20-year time frame. The proposed program would increase collaboration between departments to achieve the Green Tukwila Program goal. The programmatic CIP is nascent, and the costs and implications have not been studied.

The WSDOT Stormwater Retrofit and Maintenance programmatic CIP aims to retrofit limited-access state highways in Tukwila with water quality treatment BMPs. The program The City partners with State to fund stormwater retrofit projects and certain maintenance activities with surface water management fees collected from WSDOT. An annual retrofit plan and project status report must be submitted to and approved by the State in order to collect a surface water management fee from WSDOT. See Appendix F for the WSDOT Retrofit Project Opportunities Memorandum.

Table E-4
Recommended Programmatic Capital Projects

ID	Project Name	Project History
81241207	Annual Small Drainage Program	Begin prior to 2013 Plan
91241202	Stormwater Outfalls Water Quality Retrofit Program	2013 Plan (ID 91241201); some projects in program have been completed.
TBD	SMAP Program CIP	New
TBD	Green Infrastructure Program	New
TBD	WSDOT Stormwater Retrofit and Maintenance Program	Ongoing

Appendix F contains three reports supporting the programmatic water quality retrofit CIPs.

Capital Projects Recommended for Removal from the CIP

Several capital projects developed in previous plans and appearing in previous CIPs are recommended for removal from the CIP for one or more of the following reasons:

- Project has been completed.
- Solution is in progress (that is, under design or construction).
- Alternative solutions were developed under a different capital project included in the CIP.

These projects are listed in Table E-5.

Table E-5
Capital Projects Removed from the CIP

ID	Capital Project Name	Reason
90330104	Nelsen Side Channel	In progress
98941202	Christensen Rd. pipe replacement	Complete
99341208	Gilliam Creek 42nd Ave S culvert	Complete
90341206	Northwest Gilliam Storm Drainage System	Partially complete; Add remainder to Annual Small Drainage
90341213	53rd Ave S storm drain system	Complete
91041203	Storm Lift Station No. 15 Improvements	Complete
91041204	E. Marginal Way S Stormwater Outfall	Complete
91041204	E. Marginal Way Conveyance Inspection	Complete
90630102	Duwamish Gardens	Complete
99830103	Riverton Creek Flap Gate Removal	Complete
99830105	Gilliam Creek Fish Barrier Removal	In progress

Capital Projects Added Since 2013 Plan

The City has been active in identifying and pursuing surface water capital improvements since the 2013 Plan was published, including several which had not been previously listed. Table E-6 lists projects on the City's 2023-2028 Capital Improvement Program list for the Surface Water Fund which were not identified in the 2013 Surface Water Comprehensive Plan, and which are not yet completed. Some of the projects fall outside of the focus area of the 2024 SWCP, such as levee certification.

Table E-6
Current Capital Projects Identified After the 2013 Plan

ID	Capital Project Name	Short Description
70041201	Regional Surface Water Partnerships	Ongoing inter-agency partnerships related to surface water
91641202	Green the Green Program	Supports revegetation efforts along watercourses to provide habitat and reduce temperatures
91341203	Tukwila 205 Levee Certification (Program)	Reconstruct the Tukwila 205 Levee to provide 500-year level of flood protection and obtain levee certification
91641204	S 131st Pl Drainage Improvements	Replace an existing 36" culvert under S. 131st P
91441202	Chinook Winds Public Access	Develop public access and maintenance trail to Duwamish Gardens
92341202	Chinook Winds Extension	Develop connecting shoreline habitat and the 'missing trail link' between Duwamish Gardens and Chinook Wind within recently acquired City property
92241203	Duwamish Riverbank Stabilization at S 104th St	Analyze site conditions and develop solutions to create a sustainable shoreline that can withstand hydraulic forces, reduce erosional risk to uplands and provide ecological value
92241203	Duwamish Hill Preserve Phase III	The park master plan calls for moving a portion of S 115th Street landward to improve shallow water habitat, water quality and enjoyment of the shoreline

Studies

The diagnosis of some of the more multifaceted surface water known issues is not readily apparent without further investigation into the causes. In other cases, the most beneficial order of solving a selected subset of known issues is best determined through additional study. Further solution development should not proceed until a diagnosis or prioritization has been completed. In these cases, a study is recommended. Table E-7 lists the recommended studies.

Table E-7
Recommended Studies

ID	Study Name	Study History	Estimated Total Project Cost (2023 dollars)
CIP-101	Fish Passage Barrier Prioritization Study	New	$147,000
CIP-102	Middle Fork of Southgate Creek – Stream and Slope Stability Study	New	$200,000
CIP-103	P17 Pond and Southcenter Subarea Hydraulic Study	New	$300,000
CIP-104	Tukwila Master Plan for the Lower Green River Levee Projects	New	$275,000

Attachment B to this Appendix contains study summary sheets with a scope, benefit and cost estimate for each study.

Surface Water Project Funding

The City of Tukwila's Capital Improvement Program includes projects and program elements that are recommended for implementation in the Surface Water Comprehensive Plan. Projects implemented primarily for surface water management purposes are funded with Fund 412.

Fund 412 is an enterprise account for utility operations which is self-supported through Surface Water rate charges. Grant and bond revenue is also deposited into Fund 412 when available. The City has made extensive use of grants from Department of Ecology and King County Flood Control District for surface water projects.

The City has received approximately $3.2 million in grant funding for stormwater planning and stormwater retrofit CIPs from Department of Ecology between 2016 and 2023. The City has current agreements totaling $2.3 million in grant funding for the Enhanced Maintenance Program and Decant Facility Design (CIP 99341208) and the Stormwater Quality Retrofit Program Part 2.

The City has received a landside grant from FEMA Cooperative Technical Partners (CTP) to study existing landslides. The findings from the study could produce findings that assist with Middle Fork Southgate Creek Stream Stability Study (CIP-102). The City has submitted an application to FEMA CTP for P17 Pond and Southcenter Subarea Hydraulic Study (CIP-103).

The City may qualify for grant funding from the King County Flood Control District for projects that reduce the impact of flooding. The program categories are Flood Reduction, Urban Streams, Coastal Erosion/Coastal Flooding, and Culvert Replacement/Fish Passage Restoration. Projects that achieve multiple benefits are encouraged. Eligible project types that are applicable to the City proposed CIPs are:

- Upgrading aging or undersized stormwater systems in urban or suburban areas.
    - CIP-2 S Ryan Way Pipe Rehabilitation
    - CIP 90341214 S 146th St Drainage
    - CIP 98641222 S 143rd St Drainage
    - CIP 98741202 Nelsen Place/Longacres Phase 2
- Replacing culverts that block fish passage and restrict flows and undermine streambanks.
    - CIP-6 Johnson Creek Fish Barrier Mitigation Alternatives Analysis

Projects financed under the commercial streets, water, and sewer programs may have a stormwater element. Projects with surface water components may funded under the following City Programs, in addition to Fund 412:

- Bridges and Arterial Streets (Fund 104)
- Water Program (Fund 401)
- Sewer Program (Fund 402)
- Parks & Trails (Fund 301)
- City Facilities (Fund 306)

Public Involvement

In order to ensure the public could participate in prioritizing capital projects, City staff and Otak attended an Open House at Showalter Middle School on September 20, 2023, and published an online survey that was open in September and October 2023. The Open House was a joint event with the City's Comprehensive Plan Update.

Attachment D to this Appendix contains the public involvement materials and survey results.

References

CH2M HILL. 2013. City of Tukwila Surface Water Comprehensive Plan. Prepare for the City of Tukwila. February.

CH2M HILL. 2003. City of Tukwila Comprehensive Surface Water Management Plan. Prepared for the City of Tukwila. November.

City of Tukwila. Adopted 2010-2015 Financial Planning Model and Capital Improvement Program. December 7, 2009.

City of Tukwila. Adopted 2023-2028 Financial Planning Model and Capital Improvement Program. November 28, 2022.

ATTACHMENT E-1

Capital Project Cost Development

Memorandum

To:	Sherry Edquid (City of Tukwila)
From:	Trista Kobluskie, Shailee Jain, PE
Copies:	File
Date:	March 21, 2024
Subject:	City of Tukwila SWCP Project Cost Opinion Methodology
Project No.:	33383

For the City of Tukwila, Surface Water Comprehensive Plan (SWCP) Otak developed planning-level cost opinions for capital improvement projects (CIPs) and studies. Otak also updated the project cost estimates for projects identified in the 2003 and 2013 Surface Water Comprehensive Plans that have not been implemented and are still needed. This memorandum summarizes the assumptions made in formulating the cost opinions for newly identified CIPs in Sections 1 through 5, studies and Section 6, and updating costs of older projects in Section 7.

1. CIP Project Scope

The SWCP recommends CIPs such as drainage projects, water quality projects, and pipe replacement projects; these CIPs include an estimate for construction. The cost opinions for CIPs that have a construction estimate are developed as described in Sections 1 through 5. Cost opinions are based on conceptual project scopes and engineering and are presented in 2023 dollars. Conceptual project scopes and designs are developed with limited detail about permit requirements, existing system attributes (e.g., invert elevations), utility conflicts, and external impacts. Conceptual engineering includes preliminary engineering calculations or uses information from recent similar work. All concepts and costs should be considered preliminary.

It is assumed that projects will meet engineering requirements of the King County Surface Water Design Manual in effect when the project is permitted. Cost estimates are based on assumptions derived from current engineering standards.

2. CIP Design

Design costs consist of permitting, engineering, survey, and project administration.

Type of Cost	Includes	How Applied	How Calculated
Basic Permitting*	▪ Basic municipal permits	Most projects, based on engineering judgement	▪ $0, if local permits will not apply ▪ $15,000, if local permits may apply
Engineering	▪ Engineering design ▪ Preparation of SWPPP and erosion & sediment control plans ▪ Geotechnical studies (if needed) ▪ Archaeological survey (if needed) ▪ Other special studies when described in fact sheet	All projects	Varied percentage of total construction cost based on engineering judgement as to type of project and complexity of design. Percentages ranges from 15% to 25%.
Survey	▪ Survey	Most projects, based on probable needs of the design	▪ 0% when survey not needed ▪ 2% to 10% of total construction, based on engineering judgement as to complexity of survey
Project Administration	▪ City's staffing cost to manage the project and related grants if any	All projects	5% of total construction

* Basic Permitting cost is applied to most CIPs and represents cost of local permits. Based on desktop analysis, no CIPs will trigger federal or state environmental permits or environmental mitigation, which would entail additional cost. Therefore, no additional permitting is anticipated.

3. CIP Land (Right of Way)

Land costs consists of permanent easements, if needed, which are calculated at $6 per square foot.

4. CIP Construction Management

Construction management consists of either the City's staffing or a contractor to oversee construction and is calculated as 10% of total construction for all standalone projects. A standalone project is expected to be completed by the Public Works Surface Water Program independent of projects such as transportation or parks. CIP-2, S Ryan Way Pipe Rehabilitation, is not a standalone project because the pipe rehabilitation is expected to be coordinated with and completed as part of a transportation projects. Therefore, construction management for CIP-2 is $0 because we assume the transportation project will fund this cost.

5. CIP Construction

Construction consists of construction elements and required ancillary construction pay items.

5.1. Construction Elements

Construction elements are the necessary significant pay items to construct the project. Items are usually presented as a package that includes labor and a variety of materials. For example, the unit cost for a right-of-way bioretention planter is a package based on a typical design and includes labor and materials such as Portland cement, pipe, bioretention soils, plants, and other needed materials. Otak civil engineers researched unit prices from recently completed local and regional construction projects to estimate project costs. Each project includes an engineer's assumption for preliminary unit quantities.

5.2. Required Ancillary Construction Items

Required ancillary construction items include mobilization, temporary water management, erosion & sedimentation control, traffic control, and a planning level construction contingency. Each of these items are calculated based on a percentage of project costs as described in the table below.

Type of Cost	Includes	How Applied	How Calculated
Mobilization	▪ Contractor's mobilization	All standalone projects	10% of construction elements subtotal
Temporary Water Management	▪ Contractor's temporary water management costs	If needed based on desktop analysis of site conditions	Percentage based on engineering judgement
Erosion & Sedimentation Control	▪ Contractor's erosion control costs	All standalone projects	5% of construction elements subtotal
Traffic Control	▪ Contractor's traffic control costs	If needed based on desktop analysis of site conditions	Percentage based on engineering judgement
Planning Level Construction Contingency	▪ Expected costs that are not specified at the planning level	All projects	Percentage of total construction cost based on engineering judgement as to type of project and complexity of design. Percentages range from 15% to 30%

6. Costs of Alternatives Analyses and Studies

The SWCP also recommends CIPs that must begin with a significant alternatives analysis process before design and construction may proceed as well as studies to diagnose more complex surface water issues before proceeding to solution development. The cost opinion of studies and CIPs that do not have a

construction estimate are developed as follows. Otak's engineers and planners documented the significant tasks of the study or alternatives analysis process using experience performing similar work. The cost opinion for each significant task is based on recent experience and is presented rounded up to the nearest ten thousand dollars.

7. Updating Costs of Older Projects

Not all projects from the 2003 and 2013 Surface Water Comprehensive Plans have been implemented. After working with City staff to determine which remaining projects are still needed, Otak updated the project costs to 2023 dollars. The project costs were updated by maintaining the structures of the estimates, which are divided into materials costs and other items, and without changing the scopes or concepts of the projects.

Otak updated materials costs by applying a construction cost index published by Engineering News-Record. Materials costs were increased by 145.82% based on the Construction Cost Index value from March 2012 to December 2023. Other line items that are expressed as percentages of materials or construction costs, such as dewatering, mobilization, and construction management, were calculated based on the updated materials and construction costs. Sales tax was increased to the current local rate of 10.1%,

8. Escalation and Future Estimation

Costs were estimated in 2023 dollars. Cost opinions in the SWCP do not include escalation. Otak recommends escalating a cost opinion using an established index when the City adds a project to its capital improvement program. After the project design phase is complete, the construction cost opinion should be replaced by the engineers' estimate.

ATTACHMENT E-2

Project and Study Summary Sheets

CAPITAL PROJECTS

PROJECT SUMMARY SHEET—9864122

Project Title: S. 143rd Street Storm Drain System

PROJ. ID: (2013 Plan) 98641222
PROJ. ID: (2003 Plan) 86-DR22

Location: S 143rd Place and S 143rd St.

Project History: The project was identified in the 2003 Tukwila Surface Water Management Comprehensive Plan. The project sketch on the following page is excerpted from the 2003 plan. The project cost was updated for the 2013 Surface Water Comprehensive Plan and has been escalated again for the 2024 SWCP using the construction cost index published by Engineering News-Record. The current sales tax rate has been used.

Project Description:
Design and construct closed pipe drainage system along S. 143rd Street and S. 143rd Place. Provide a WQ treatment manhole and a flap gate at the outlet of the drainage system. Convert existing drainage ditch, located on private property, to a bioswale. Provide asphalt overlay, curb and gutter, and sidewalks for S. 143rd Street. Provide asphalt overlay for S. 143rd Place.

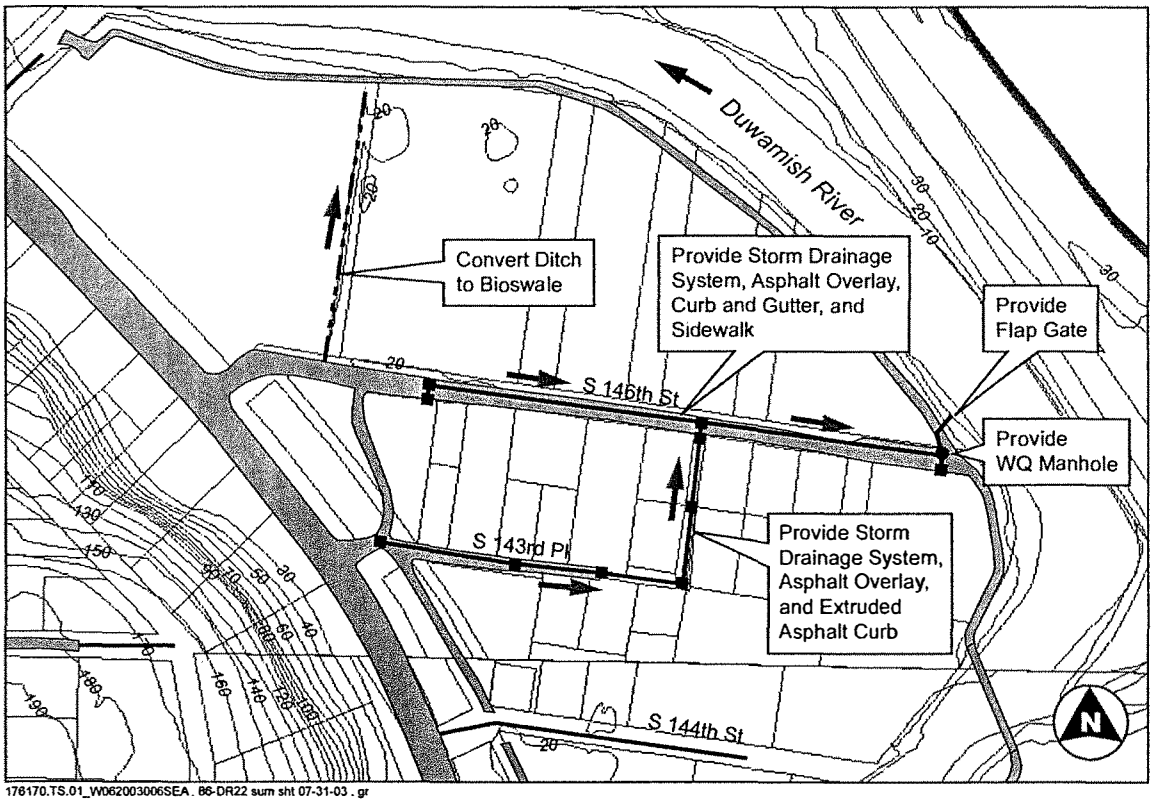
Justification:
New conveyance system will reduce ROW and private property flooding. Bioswale will treat stormwater runoff before it's routed to the Duwamish River. Flap gate will help prevent flooding when the Duwamish River is at high stages.

Comments:
Assumes that parking adjacent to existing ditch will not be disturbed. Potential for LID/ND improvements are not included in estimated cost.

Estimated Project Cost: $1,410,000

Project Sketch

S. 143rd Street Storm Drain System



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PLANNING LEVEL PROJECT COST OPINION
COSTS FROM 2013 TUKWILA SURFACE WATER COMPREHENSIVE PLAN UPDATED
USING THE ENGINEERING NEWS-RECORD CONSTRUCTION COST INDEX

LOCATION:	**S. 143rd Street Storm Drain System**	**BY:**	**SJ**	**DATE:**	**2/7/2024**
PROJ. ID:	**(2013 Plan) 98641222**	**2013 Cost:**	**$1,096,000**	**COST INDEX:**	**145.82%**
PROJ. ID:	**(2003 Plan) 86-DR22**	**2003 Cost:**	**$757,000**		
DESC.	Drainge issues in ROW of S 143 Pl and S 143 St. Reduce ponding and provide runoff treatment. Install asphalt overlay, curb, pipe conveyance, and runoff treatment. Include flapgate at river to prevent flooding.				

ITEM NO.	ITEM	QUANTITY	UNIT	PRICE	PRICE	AMOUNT
1	REMOVE/ABANDON PIPE	85	LF	$ 23.00	$ 34.00	$ 2,890
2	PAVEMENT OVERLAY, ASPHALT CONCRETE CL B (S 143RD ST AND S 143RD PL)	1,305	TN	$ 63.00	$ 92.00	$ 120,060
3	WASHED DRAIN ROCK/STRUCTURAL FILL/PIPE BEDDING	420	TN	$ 26.00	$ 38.00	$ 15,960
4	CURB AND GUTTER, CEMENT AND CONC. (S 143RD ST)	2,300	LF	$ 22.00	$ 32.00	$ 73,600
5	CEMENT CONCRETE SIDEWALK OR DRIVEWAY (S 143RD ST)	1,533	SY	$ 40.00	$ 58.00	$ 88,914
6	CURB RAMP, CEMENT CONCRETE (S 143RD ST)	12	EA	$ 489.00	$ 713.00	$ 8,556
7	CATCH BASINS, TYPE 1	8	EA	$ 1,532.00	$ 2,234.00	$ 17,872
8	CATCH BASINS, TYPE 2 48"-54"	2	EA	$ 4,353.00	$ 6,348.00	$ 12,696
9	STORMCEPTOR WQ MANHOLE (STC 4800)[A]	1	EA	$ 53,000.00	$ 77,285.00	$ 77,285
10	18"-24" DIA. SMOOTH INTERIOR WALL CORROGATED POLYETHENE IN PAVED AREA	500	LF	$ 141.00	$ 206.00	$ 103,000
11	8"-12" DIA. SMOOTH INTERIOR WALL CORROGATED POLYETHENE IN PAVED AREA	1,100	LF	$ 81.00	$ 118.00	$ 129,800
12	TRENCH SAFETY SYSTEMS	16,000	SF	$ 0.92	$ 1.00	$ 16,000
13	REGRADE EXISTING DITCH	500	LF	$ 5.76	$ 8.00	$ 4,000
14	BIOSWALE SEEDING	4,000	SF	$ 1.73	$ 3.00	$ 12,000
15	18" - 24" DIAMETER FLAP GATE	1	EA	$ 3,455.00	$ 5,038.00	$ 5,038
16	UTILITY RELOCATIONS	1	LS	$ 11,516.00	$ 16,793.00	$ 16,793
17	TEMPORARY BYPASS	1	LS	$ 5,758.00	$ 8,396.00	$ 8,396
				Material Subtotal in March 2012		*$ 491,699*
				Material Subtotal in December 2023		***$ 712,860***
Other Items (% of Material Subtotal in December 2023 Dollars)						
18	DEWATERING	5%				$ 35,600
19	OTHER ITEMS	0%				$ -
20	EROSION & SEDIMENTATION CONTROL	2%				$ 14,300
21	TRAFFIC CONTROL	5%				$ 35,600
22	CONTINGENCY	15%				$ 106,900
23	MOBILIZATION (GENERAL REQUIREMENTS)	10%				$ 71,300
24	CONSTRUCTION MANAGEMENT	20%				$ 142,600
25	SALES TAX	10.1%				$ 72,000
26	ENGINEERING/LEGAL/ADMIN	25%				$ 178,200
29	PERMITTING	5%				$ 35,600
					Subtotal Other Items	***$ 692,100***
					Total Project Cost	**$ 1,404,960**
					2023 Dollars Total Estimated Project Cost (Rounded)	**$ 1,410,000**

Notes:

1. The above cost opinion was developed by applying a construction cost index of 145.82% to the materials line items to escalate cost of materials from March 2012 to December 2023.

2. These costs do not account for design and material changes associated with updating the 2003 design to meet current stormwater standards for water quality and conveyance infrastructure.

A. This product has now been replaced by the CDS3020-6-C, which costs $35,000 delivered to site in 2023 construction dollars

PROJECT SUMMARY SHEET—98741202

Project Title: Nelsen Pl/Longacres Phase 2 – Interceptor Pipe

PROJ. ID: (2013 Plan) 98741202
PROJ. ID: (2003 Plan) None

Location: South of I-405, under BNSF railroad tracks on City boundary with Renton

Project History: Phase 1 of **t**he project was identified in the 2003 Tukwila Surface Water Management Comprehensive Plan and was constructed in 2015. Phase 2 of the project was identified in the 2013 Surface Water Comprehensive Plan, and the cost has been escalated for the 2024 SWCP using the construction cost index published by Engineering News-Record. The current sales tax rate has been used.

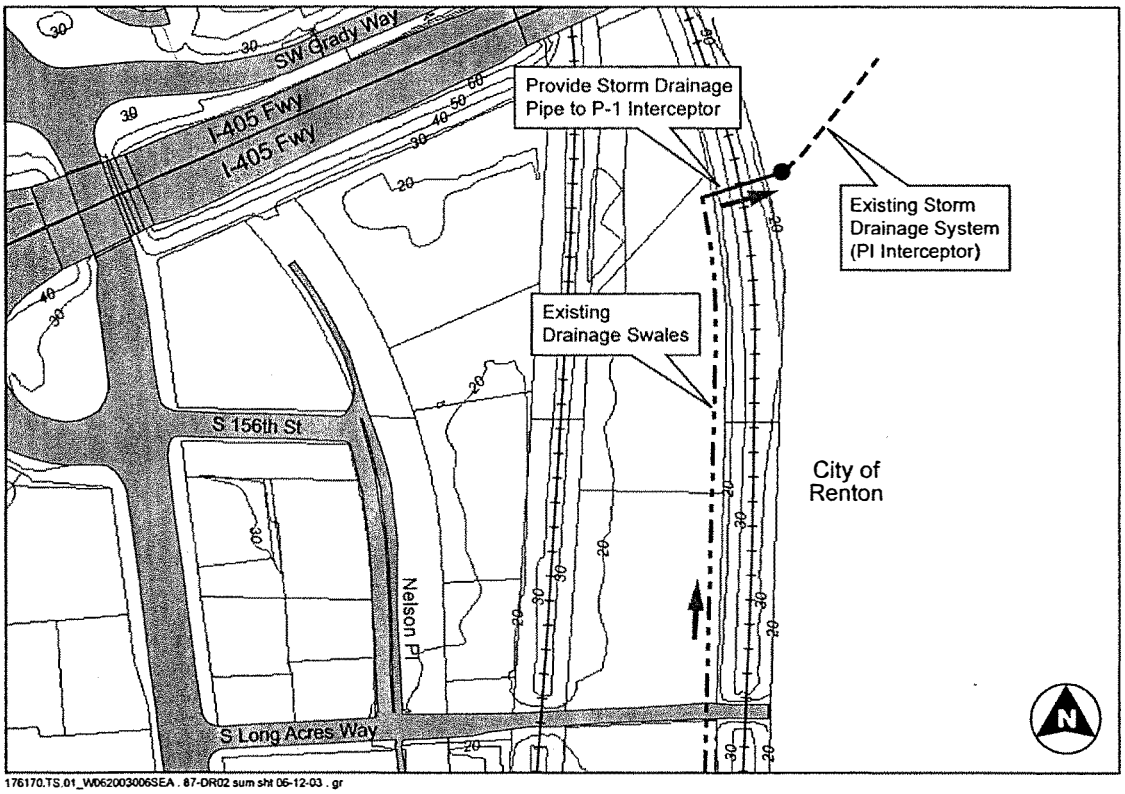
Project Description:
The proposed solution is to install a 48-inch stormwater pipe crossing underneath the Burlington Northern railroad tracks connecting to a previously installed interceptor east of the tracks. This 48-inch stormwater pipe will be constructed using trenchless techniques to minimize the impact to the operation of the railroad. This new pipe will provide drainage from the existing drainage ditch west of the tracks to the P-1 interceptor. Ownership, easement, and maintenance responsibility will be determined and/or verified prior to moving forward with this project.

Justification:
Because of development and increased surface water runoff, flooding is occurring in the right-of-way and on private property. The design objectives are reduction of stormwater ponding and peak flow rate. The project is located within the Burlington Northern Santa Fe (BNSF) corridor.

Estimated Project Cost: $1,000,000

Project Sketch

Nelson Place/Longacres Interceptor Pipe



PLANNING LEVEL PROJECT COST OPINION
COSTS FROM 2013 TUKWILA SURFACE WATER COMPREHENSIVE PLAN
UPDATED USING THE ENGINEERING NEWS-RECORD CONSTRUCTION COST INDEX

LOCATION:	**Nelsen/Longacres - Phase 2**	**BY:**	**MJT**	**DATE:**	**2/7/2024**
PROJ. ID:	**(2013 Plan) 98741202**	**2013 Cost:**	**$ 678,000**	**COST INDEX:**	**145.82%**
PROJ. ID:	**(2003 Plan) N/A**	**2003 Cost:**	**N/A**		
DESC.	Flooding in ROW and on private property. Proposed solution is 48-in stormwater pipe from ditch west of tracks using trenchless technique underneath BN tracks connecting to existing P-1 interceptor east of the tracks. Previous project phase completed in 2015 WVH to Nelsen.				

ITEM NO.	ITEM	QUANTITY	UNIT	2012 UNIT PRICE	2023 UNIT PRICE	AMOUNT
1	CATCH BASIN, TYPE 2 - 84-IN DIAM	1	EA	$ 14,108.00	$20,572.00	$ 20,572
2	TEMPORARY BYPASS	1	LS	$ 5,758.00	$ 8,396.00	$ 8,396
3	RAILROAD INSPECTOR	24	HR	$ 58.00	$ 85.00	$ 2,040
4	42" DIA. SMOOTH WALL INTERIOR CORROGATED POLYETHENE, JACK & BORE CONSTRUCTION	225	LF	$ 1,025.00	$ 1,495.00	$ 336,375
5	JACKING AND RECEIVING PIT	1	EA	$ 40,883.00	$59,616.00	$ 59,616
6	UTILITY RELOCATION	1	LS	$ 11,516.00	$16,793.00	$ 16,793
					Material Subtotal	***$ 443,792***
7	DEWATERING	5%				$ 22,200
8	OTHER ITEMS					$ -
9	EROSION & SEDIMENTATION CONTROL	2%				$ 8,900
10	TRAFFIC CONTROL	5%				$ 22,200
11	CONTINGENCY	15%				$ 66,600
					Subtotal	***$ 563,692***
12	MOBILIZATION (GENERAL REQUIREMENTS)	10%				$ 56,400
					Construction Subtotal	***$ 620,092***
13	CONSTRUCTION MANAGEMENT	20%				$ 124,000
14	SALES TAX	10.1%				$ 62,600
15	ENGINEERING/LEGAL/ADMIN/PERMIT	25%				$ 155,000
16	PERMITTING	5%				$ 31,000
					Project Subtotal	***$ 992,692***
17	CONTINGENCY	0%				***$ -***
					Subtotal	***$ -***
					Total Project Cost	**$ 992,692**
					2023 Dollars Total Estimated Project Cost (Rounded)	**$ 1,000,000**

Notes:

1. The above cost opinion was developed by applying a construction cost index of 145.82% to the materials line items to escalate cost of materials from March 2012 to December 2023.

PROJECT SUMMARY SHEET—99341208

Project Title: Soil Reclamation (Decant) Facility

PROJ. ID: (2013 Plan) 99441202
PROJ. ID: (2003 Plan) N/A

Location: TBD

Project History: The project was identified in the 2013 Tukwila Surface Water Comprehensive Plan. The City has received a grant from the Washington Department of Ecology to propose and Enhanced Maintenance Program for the City's stormwater operations. This study will assess the usefulness, feasibility, cost, and potential locations for a decant facility.

Project Description:
The proposed solution is to build a soil reclamation facility within the City. This capital project consists of property acquisition for this facility.

Justification:
The City maintenance crews collect sediments during typical stormwater system maintenance work tasks such as street sweeping and cleaning out stormwater inlets and pipes. The City is lacking a formal facility to efficiently dewater, treat and dispose of the waste materials. Currently crews drive to Renton to dispose of decant from catch basin cleaning, stormwater system cleaning, and street sweeping.

Estimated Project Cost: TBD

PROJECT SUMMARY SHEET—90341214

Project Title: S 146th St Pipe and 35th Ave S Drainage System

PROJ. ID: (2013 Plan) 90341214
PROJ. ID: (2003 Plan) 03-DR04

Location: S 146th Street, west of Tukwila International Boulevard

Project History: The project was identified in the 2003 Tukwila Surface Water Management Comprehensive Plan. The project sketch on the following page is excerpted from the 2003 plan. The project cost was updated for the 2013 Surface Water Comprehensive Plan and has been escalated again for the 2024 SWCP using the construction cost index published by Engineering News-Record. The current sales tax rate has been used.

Project Description:
Replace existing storm drainage system on S. 146th Street. Provide new storm drainage system for 35th Avenue S. Provide asphalt overlay and extruded asphalt curb for both streets.

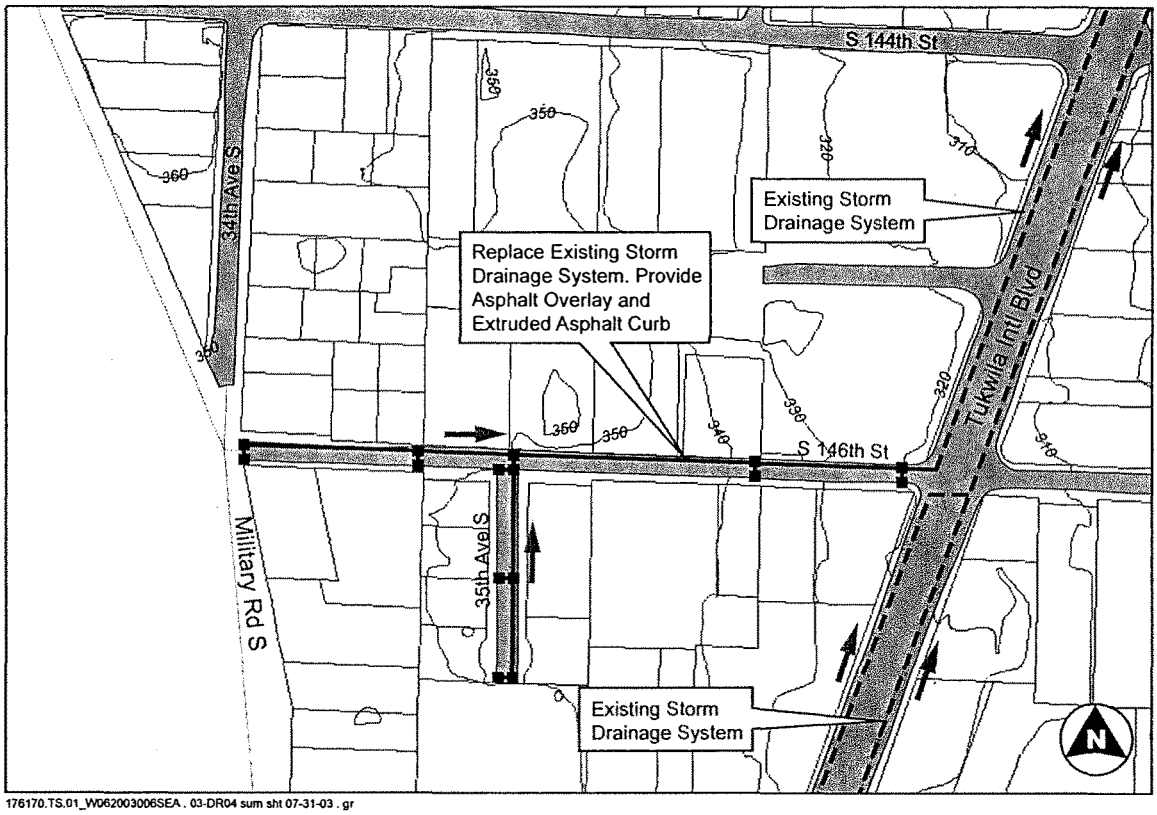
Justification:
Reduce ROW and private property flooding by increasing the hydraulic capacity of the storm drainage system.

Comments:
Potential for LID/ND improvements are not included in estimated cost.

Estimated Project Cost: $1,290,000

Project Sketch

S. 146th Street Pipe and 35th Avenue S. Drainage System



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PLANNING LEVEL PROJECT COST OPINION
COSTS FROM 2013 TUKWILA SURFACE WATER COMPREHENSIVE PLAN
UPDATED USING THE ENGINEERING NEWS-RECORD CONSTRUCTION COST INDEX

LOCATION:	**S 146th St Pipe and 35th Ave S Drainage System**	**BY:**	**SJ**	**MJT**	**2/7/2024**
PROJ. ID:	**(2013 Plan) 90341214**	**2013 Cost:**	**$ 882,000**	**COST INDEX:**	**145.82%**
PROJ. ID:	**(2003 Plan) 03-DR04**	**2003 Cost:**	**$ 550,000**		
DESC.	Flooding in ROW and private property along S. 146th St west of Tukwila Internmational Blvd (TIB). Proposed solution: asphalt overlay, curb, replace pipes along S. 146th Street and a segment of 35th Avenue South. Connect to pipe in TIB.				

ITEM NO.	ITEM	QUANTITY	UNIT	2012 UNIT PRICE	2023 UNIT PRICE	AMOUNT
1	CATCH BASIN TYPE 2 48"-54"	5	EA	$ 4,353.00	$ 6,348.00	$ 31,740
2	CURB, EXTRUDED (ASPHALT OR CEMENT CONCRETE)	2,700	LF	$ 9.00	$ 13.00	$ 35,100
3	TRENCH SAFETY SYSTEM	9,660	SF	$ 1.00	$ 1.00	$ 9,660
4	TEMPORARY BYPASS	1	LS	$ 5,758.00	$ 8,396.00	$ 8,396
5	PAVEMENT, ASPHALT CONCRETE CL B (QTY> 500)	1,062	TN	$ 63.00	$ 92.00	$ 97,704
6	CORRUGATED POLYETHYLENE STORM SEWER PIPE, 8 - 12 IN. DIAM.	560	LF	$ 93.00	$ 136.00	$ 76,160
7	CORRUGATED POLYETHYLENE STORM SEWER PIPE, 18 - 24 IN. DIAM	1,050	LF	$ 162.00	$ 236.00	$ 247,800
8	REMOVE/ABANDON PIPE	1,000	LF	$ 23.00	$ 34.00	$ 34,000
9	REMOVE/ABANDON CATCH BASIN	5	EA	$ 345.00	$ 503.00	$ 2,515
10	UTILITY RELOCATION	1	LS	$ 11,516.00	$ 16,793.00	$ 16,793
					Material Subtotal	***$ 559,868***
11	DEWATERING	5%				$ 28,000
12	EROSION & SEDIMENTATION CONTROL	5%				$ 28,000
13	TRAFFIC CONTROL	5%				$ 28,000
14	CONTINGENCY	15%				$ 84,000
					Subtotal	***$ 727,868***
15	MOBILIZATION (GENERAL REQUIREMENTS)	10%				$ 72,800
					Construction Subtotal	***$ 800,668***
16	CONSTRUCTION MANAGEMENT	20%				$ 160,100
17	SALES TAX	10.1%				$ 80,900
18	ENGINEERING/LEGAL/ADMIN	25%				$ 200,200
19	PERMITTING	5%				$ 40,000
					Project Subtotal	***$ 1,281,868***
20	CONTINGENCY	0%				***$ -***
					Subtotal	
					Total Project Cost	**$ 1,281,868**
					2023 Dollars Total Estimated Project Cost (Rounded)	**$ 1,290,000**

Notes:

1. The above cost opinion was developed by applying a construction cost index of 145.82% to the materials line items to escalate cost of materials from March 2012 to December 2023.

PROJECT SUMMARY SHEET—CIP-1

Project Title: Norfolk Outfall Trunkline Sewer Separation Preliminary Feasibility Study

Location: S Norfolk Street and E Marginal Way S

Issue and Benefit Summary:

Issue	Benefit
Water Quality	Study could result in a project to decrease City stormwater flows to combined sewer and improve water quality of discharges from pipe
Other	Study will assist in determining the extent of City of Tukwila's potential responsibility for combined sewer overflows (CSOs) through the Norfolk CSO trunkline, which outfalls to a Superfund site on the Duwamish River, and will develop alternatives for reducing or removing the City's responsibility.

Issue Description:
The City of Tukwila (City) inherited an 84-in diameter combined sewer overflow (CSO) trunkline and outfall from King County Wastewater Treatment division in 1995 following a 1989 annexation of the area generally known as East Marginal Way (City of Tukwila Resolution No. 1302). The pipe runs northwest southeast along E Marginal Way S and then turns west continuing under a Boeing parking lot before outfalling into the Duwamish River at the S Norfolk Outfall. A combination of City of Tukwila, Boeing, and City of Seattle convey stormwater flows to the outfall. City of Seattle uses the outfall for emergency overflow of combined sewage. King County uses the outfall for conveying treated CSOs from the Henderson (Sewer) Pump Station.

The City installed a stormwater trunkline along E Marginal Way S in the 1990s for the purpose of separating stormwater flows from both the combined sewer system and the adjacent private stormwater system owned by Boeing. However, City staff has anecdotal information that the connections of City stormwater laterals into the E Marginal Way S stormwater trunkline were not completed as designed, likely due to utility conflicts encountered in the field. No construction drawings documenting the ultimate system configuration have been located. Therefore, the City is aware that its existing records of the storm system in this location, such as engineering drawings and GIS mapping, are incomplete or incorrect. The lack of accurate information about the City's connections to the combined sewer trunkline and the Boeing system leaves the City at risk of being held partially responsible for the effects of sewer overflows carried by the Norfolk trunkline or violations of Boeing's National Pollutant Discharge Elimination System (NPDES) Industrial Stormwater Permit. See Figure 1 for the combined sewer system and stormwater drainage system drawn based on conversations with City staff.

In 2001, the United States Environmental Protection Agency (EPA) designated the Lower Duwamish Waterway (LDW) as a Superfund site, and in-water cleanup actions commenced and are ongoing. A cleanup of contaminated river sediments associated with the Norfolk CSO outfall was an early action. City staff are aware of a later study (author and date not found) which indicated that the river sediments had become polluted again with PCBs in the vicinity of the Norfolk outfall. EPA has designated the Washington State Department of Ecology (Ecology) the lead agency for controlling upland sources of contamination entering the LDW through source control, which includes controlling CSOs. Ecology works with various public agencies and potentially responsible parties to conduct source control activities and enforcement in the drainage basin. Ecology has reportedly contacted the City about sharing responsibility

for the CSOs. City staff have reported that a later study found the City's contribution to the resuspension of PCBs in the Duwamish River to be insignificant; however the study has not been located. The City would like to avoid the risk of being found partially responsible for costs associated with Superfund site cleanup. Therefore, the City would like to separate its stormwater completely from combined sewer in this area and turn the S Norfolk CSO pipeline and outfall back over to King County or to City of Seattle, which use it to convey overflows of combined sewage.

Project Description:
The project is a preliminary feasibility study to document the City's and adjacent private property storm drainage systems within the right-of-way and the CSO system in the area within the City boundary, document any City storm drain connections to the CSO line, and evaluate risks and alternative solutions if connections of the City's storm drains to the CSO trunkline and private systems are discovered. A study of this area will include survey of the existing storm system inverts, connections, and potholes to locate existing utilities that may be impacted by a future project. Small scale smoke studies will also be used to identify connections to the sewer trunk line.

The City will also need to review documentation and meet with Boeing and Ecology to identify portions of the private Boeing stormwater system that are both within in E Marginal Way S and regulated under Boeing's industrial stormwater permit.

The study will include an alternatives analysis that compares the feasibility, implementation costs, and benefits of:

- Removing the City's stormwater connections to the sewer trunkline, if any are found, and installing a separate stormwater system,
- Providing water quality treatment for the stormwater prior to connecting to the sewer overflow trunkline where separation is infeasible, and/or
- Conveying stormwater from S Norfolk St to a parcel on the west side of E Marginal Way S to be treated and pumped over the sewer trunkline to connect to the separated storm system to the south.

An important element of the alternatives analysis will include coordination with King County, City of Seattle, Boeing, Ecology, and the nearby business owners and utility agencies, at a minimum.

Next Steps:

1. Collect and review as-builts and agreements from nearby industries regarding connections into the CSO trunkline.
2. Perform surveying and smoke testing of the existing system to determine which sections of storm pipe connect to the combined sewer and the elevations of the existing system.
3. Perform surveying and potholing of utilities in the area to determine type, size, location and elevations of utilities such as water, telecommunications, etc.
4. Conduct the alternatives analysis described above. Each alternative will include a concept layout and implementation cost.
5. Select preferred alternative through coordination with interested parties.

Future Steps (not included in cost estimate below):

1. Hydrologic and hydraulic analyses, including capacity analysis, of the preferred solution.
2. Design, development, and implementation costs of the preferred solution.
3. Permitting costs related to preferred solution.
4. Coordination with interested parties relating to implementation of preferred solution.
5. Maintenance of existing trunklines if needed to implement solution.
6. Negotiation with jurisdictions to turn ownership of the CSO trunkline and the S Norfolk Outfall over from City of Tukwila to King County or City of Seattle.

Scope Items and Estimated Cost:

Scope	Cost
Desktop analysis of existing system, including records research	$25,000
Survey existing system and smoke testing	$50,000
Meetings with interested parties including Ecology and Boeing + Outreach for Smoke Testing + Engagement to Select Preferred Alternative	$40,000
Alternatives analysis using elevation and topographic data + associated documentation	$40,000

Estimated Project Cost: $155,000

Related Projects:
None.

References:
Agreement for Use of Boeing-Owned Storm Water System by City of Tukwila, March 28, 1994

City of Tukwila, Washington, Resolution No. 1302, August 1, 1994

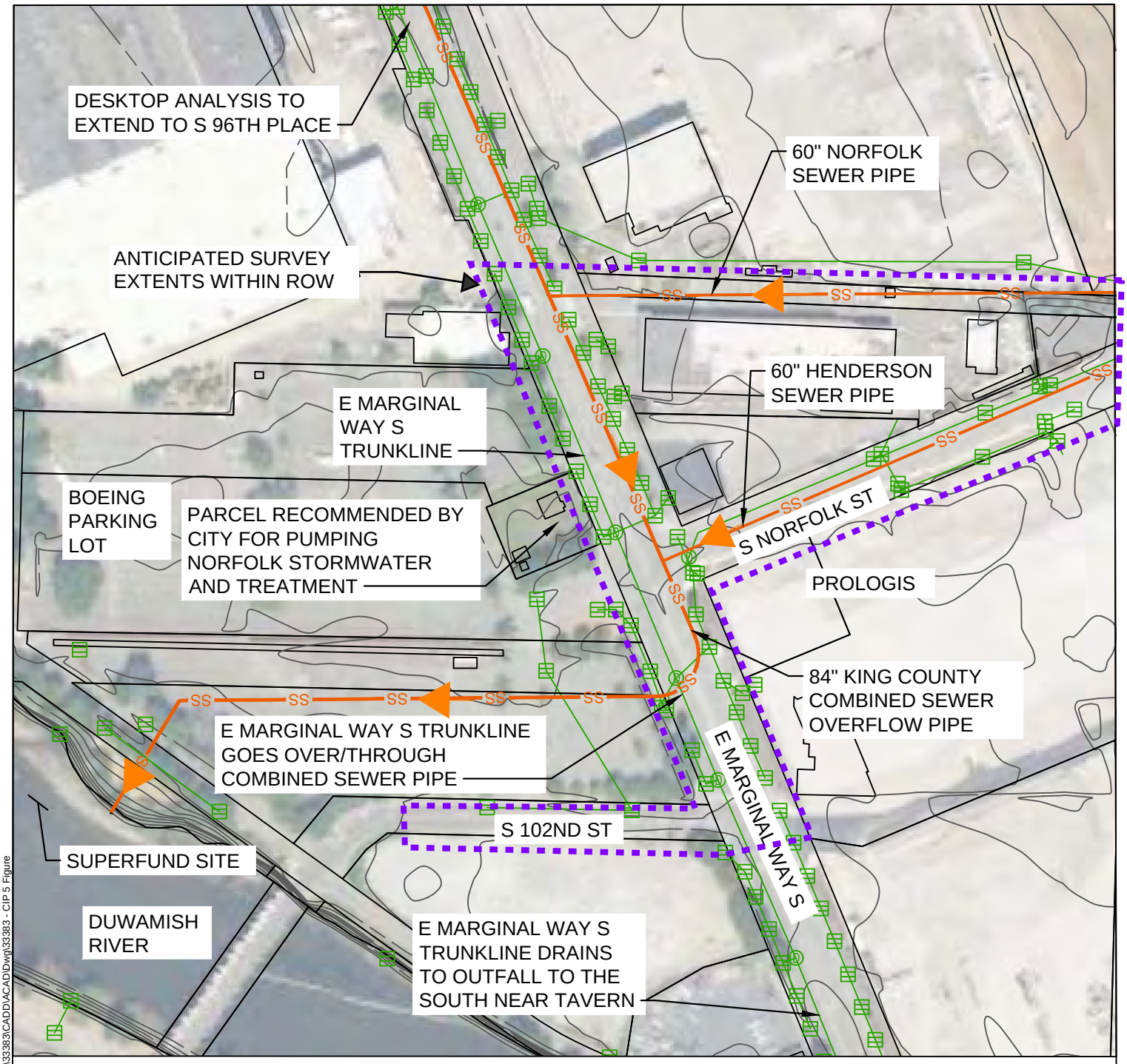
Fact Sheet for NPDES Permit WA0029181, West Point Wastewater Treatment Plan and Combined Sewer Overflows, Public Notice Draft dated April 5, 2023, by Washington Department of Ecology.

Lower Duwamish Waterway Seattle, WA (Superfund Site) EPA home page, (https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=1002020), accessed November 1, 2023

Lower Duwamish Waterway Seattle, WA (Superfund Site) Cleanup Activities web page, (https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=1002020), accessed November 1, 2023

Norfolk Regulator Station Overflow Sediment Remediation Project web page, (https://kingcounty.gov/en/dept/dnrp/waste-services/wastewater-treatment/programs/sediment-management/plan-implementation/norfolk), accessed November 1, 2023

Seattle's Source Control Plan for the Lower Duwamish Waterway (2021-2026) December 2020 Update



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SCALE IN FEET

LEGEND

- 2 FT CONTOURS
- TAXLOTS
- STREAM/CREEK
- EXISTING STORM PIPE
- EXISTING STORM STRUCTURE
- SS — EXISTING COMBINED SEWER PIPE

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CIP 1

Tukwila Surface Water Comprehensive Plan
Norfolk Trunkline Sewer Separation
Preliminary Feasibility Study

PROJECT SUMMARY SHEET—CIP-2

Project Title: S Ryan Way Pipe Rehabilitation

Location: Along S Ryan Way, between the intersection of Beacon Avenue S and Martin Luther King Jr Way S

Issue and Benefit Additional Summary:

Issue	Benefit
Poor condition of existing stormwater system	Avoids failure of existing stormwater system and potential road safety hazards along the steep street.

Issue Description:
S Ryan Way is an arterial providing access to I-5. In Tukwila, the S Ryan Way roadway corridor is approximately 0.3 miles long between the intersections of Beacon Avenue S and Martin Luther King Jr Way S and has approximately 1,830 LF of 12-in diameter storm pipe, 1,300 LF of 18-in diameter storm pipe, and 28 catch basins, based on the City of Tukwila's GIS data. Field observation will need to be performed to confirm that all 28 catch basins are defined accurately by GIS. Based on field observation by the City, storm pipes within S Ryan Way are aging, in poor condition, and are at risk of failure. All existing storm pipes are corrugated metal pipe and are susceptible to corrosion and pipe breakage. It is a priority to replace the storm system within S Ryan Way before a failure occurs, to avoid potential road safety hazards along the steep arterial street.

The existing pavement on S Ryan Way is reportedly in poor condition, and the roadway lacks bike lanes. The Public Works Department is considering implementing an asphalt overlay or a full roadway improvement, including reconstruction of roadway and sidewalks.

Project Description:
This project proposes to replace or repair all existing 12-in and 18-in diameter storm sewer pipes and catch basins within S Ryan Way in coordination with an eventual overlay or reconstruction.

Phase 1

The Public Works Department has completed some CCTV inspection of the conveyance pipes to determine their condition. In the first phase of the project, the CCTV videos will be reviewed, and additional CCTV inspections may be completed if needed. If the damage to the pipe is extensive and there is breakage in the pipe, a full replacement will be necessary (see Alternative 1). If the existing storm pipe is deteriorating but is still whole, then the pipe can be repaired using cured-in-place-pipe (CIPP) lining technology (see Alternative 2).

Phase 2 (Alternative 1)

Alternative 1 is full replacement of pipes, performed in coordination with a roadway improvement project to overlay or reconstruct the roadway. All catch basins with 12-in diameter pipe connections are proposed to be replaced with Catch Basin, Type 1, and all catch basins with 18-in diameter pipe connections are proposed to be replaced with Catch Basin, Type 2.

S Ryan Way Pipe Rehabilitation

Phase 2 (Alternative 2)

Alternative 2 includes cleaning all existing storm pipe in the roadway and then repairing deteriorated pipe using CIPP lining. All catch basins with 12-in diameter pipe connections are proposed to be replaced with Catch Basin, Type 1 and all catch basins with 18-in diameter pipe connections are proposed to be replaced with Catch Basin, Type 2.

Assumptions

- Roadway improvements (either full roadway improvements or asphalt overlay) would begin at the intersection of Beacon Avenue S and end at Martin Luther King Jr Way S. The same limits were assumed for the repair or replacement of the existing storm system.
- Roadway improvements, including pavement restoration or repaving after trenching for pipe placement, will be part of a different City of Tukwila capital improvement project. Costs of roadway improvements are not estimated in this fact sheet.
- The roadway improvements will not significantly change drainage patterns, therefore existing storm alignment and catch basin locations will remain.
- There will only be one construction phase for the project.

Conveyance Analysis

The preliminary drainage basin (approximately 15.7 acres) along S Ryan Way was delineated based on the City's GIS storm system, contour data, and aerial imagery. Preliminary calculations confirm that the existing conveyance pipes have adequate capacity to convey flows from the contributing drainage basin. A more in-depth analysis of the pipe conveyance system in later design phases is recommended to confirm that pipes diameters do not need to be increased.

Future Consideration:

If the City decides to construct full roadway improvements along S Ryan Way, this may trigger stormwater requirements for flow control and runoff treatment. This project does not address flow control or runoff treatment for new or replaced surfaces.

Estimated Project Cost:

Alternative 1: $ 840,000
Alternative 2: $ 680,000

The project cost estimate assumes that the stormwater pipe replacement or rehabilitation is implemented as a part of the City's roadway improvement project on S Ryan Way. Therefore, costs such as permitting, construction management, mobilization, erosion & sedimentation control, traffic control, and pavement surface restoration or paving are assumed to be paid for by the roadway improvement project.

Related Projects:

None.

References:

City of Tukwila Ryan Hill Neighborhood Study, March 2018

S Ryan Way Pipe Rehabilitation

Photographs:



Typical roadway section of S Ryan Way, showing cracked roadway
* Photo from Google Earth Street View

PLANNING LEVEL PROJECT COST OPINION

PROJECT: CIP-2, S Ryan Way Pipe Rehabilitation, Alternative 1 **BY:** FJS
LOCATION: Along S Ryan Way, between the intersection of Beacon Avenue S and Martin Luther King Jr Way S **DATE:** 11/7/2023
DESC. Full replacement of stormwater pipes and catch basins along S Ryan Way, between the intersection of Beacon Avenue S and Martin Luther King Jr Way S

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
DESIGN					
1	BASIC PERMITTING	0%	Of Total Construction		$ -
2	ENGINEERING	15%	Of Total Construction		$ 102,900
3	SURVEY	2%	Of Total Construction		$ 13,800
4	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 34,300
				Total Design	**$ 151,000**
LAND (R/W)					
5	EASEMENTS	0	SF	$ 6	$ -
				Total Land (R/W)	**$ -**
CONSTRUCTION MANAGEMENT					
6	CONSTRUCTION MANAGEMENT	0%	Of Total Construction		$ -
				Total Construction Management	**$ -**
CONSTRUCTION					
Construction Elements					
7	STORM PIPE, 12 IN. DIAM.	1,830	LF	$ 120	$ 219,600
8	STORM PIPE, 18 IN. DIAM.	1,300	LF	$ 150	$ 195,000
9	CATCH BASIN, TYPE 1	17	EA	$ 3,200	$ 54,400
10	CATCH BASIN, TYPE 2	11	EA	$ 5,000	$ 55,000
				Subtotal Construction Elements	*$ 524,000*
Required Ancillary Construction Items					
11	MOBILIZATION	0%	Of Construction Elements		$ -
12	TEMPORARY WATER MANAGEMENT	15%	Of Construction Elements		$ 24,300
13	EROSION & SEDIMENTATION CONTROL	0%	Of Construction Elements		$ -
14	TRAFFIC CONTROL	0%	Of Construction Elements		$ -
15	PLANNING LEVEL CONSTRUCTION CONTINGENCY	20%	Of Total Construction		$ 137,100
				Subtotal Ancillary Items	*$ 161,400*
				Total Construction	**$ 685,400**
				Total Project Cost	**$ 836,400**
				2023 Dollars Total Estimated Project Cost (Rounded)	**$ 840,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs. If escalation is required, we recommend including 3%/yr.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.
3. Property acquisition costs are not included in this estimate.
4. Permitting, Construction Management, Mobilization, Erosion & Sedimentation Control, and Traffic Control costs will be part of the roadway improvements, and are not included in this estimate.
5. Survey only includes the surveying of the existing stormwater system.
6. Storm pipe costs do not include asphalt because repaving is assumed to be part of the roadway improvements.

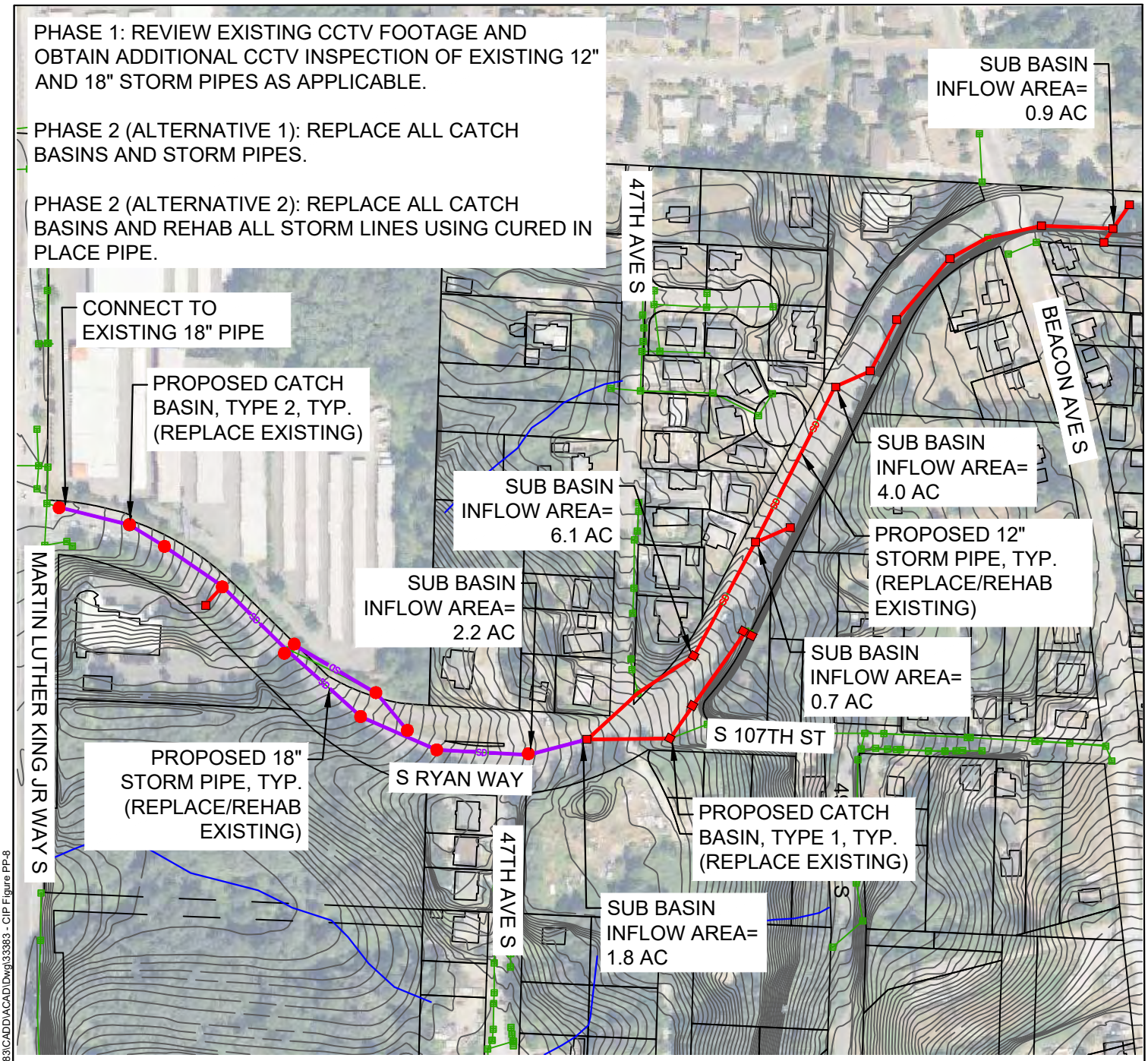
PLANNING LEVEL PROJECT COST OPINION

PROJECT: CIP-2, S Ryan Way Pipe Rehabilitation, Alternative 2 **BY:** FJS
LOCATION: Along S Ryan Way, between the intersection of Beacon Avenue S and Martin Luther King Jr Way S **DATE:** 11/7/2023
DESC. CIPP lining of pipes and catch basin replacement along S Ryan Way, between the intersection of Beacon Avenue S and Martin Luther King Jr Way S

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
DESIGN					
1	BASIC PERMITTING	0%	Of Total Construction		$ -
2	ENGINEERING	15%	Of Total Construction		$ 81,800
3	SURVEY	3%	Of Total Construction		$ 16,400
4	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 27,300
				Total Design	**$ 125,500**
LAND (R/W)					
5	EASEMENTS	0	SF	$ 6	$ -
				Total Land (R/W)	**$ -**
CONSTRUCTION MANAGEMENT					
6	CONSTRUCTION MANAGEMENT	0%	Of Total Construction		$ -
				Total Construction Management	**$ -**
CONSTRUCTION					
Construction Elements					
7	12" STORMPIPE REHABILITATON (CIPP)	1,830	LF	$ 100	$ 183,000
8	18" STORMPIPE REHABILITATON (CIPP)	1,300	LF	$ 120	$ 156,000
9	CATCH BASIN, TYPE 1	17	EA	$ 3,200	$ 54,400
10	CATCH BASIN, TYPE 2	11	EA	$ 5,000	$ 55,000
				Subtotal Construction Elements	*$ 448,400*
Required Ancillary Construction Items					
11	MOBILIZATION	0%	Of Construction Elements		$ -
12	TEMPORARY WATER MANAGEMENT	15%	Of Construction Elements		$ 14,500
13	EROSION & SEDIMENTATION CONTROL	0%	Of Construction Elements		$ -
14	TRAFFIC CONTROL	0%	Of Construction Elements		$ -
15	PLANNING LEVEL CONSTRUCTION CONTINGENCY	15%	Of Total Construction		$ 81,800
				Subtotal Ancillary Items	*$ 96,300*
				Total Construction	**$ 544,700**
				Total Project Cost	**$ 670,200**
				2023 Dollars Total Estimated Project Cost (Rounded)	**$ 680,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs. If escalation is required, we recommend including 3%/yr.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.
3. Property acquisition costs are not included in this estimate.
4. Permitting, Construction Management, Mobilization, Erosion & Sedimentation Control, and Traffic Control costs will be part of the roadway improvements, and are not included in this estimate.
5. Survey only includes the surveying of the existing stormwater system.
6. Costs for stormpipe rehabilitation (CIPP) assumes moderate cleaning of the pipe. Price can vary depending on the quality of the pipe, and how much cleaning is required.
7. Storm pipe costs do not include asphalt because repaving is assumed to be part of the roadway improvements.



LEGEND

- 2 FT CONTOURS
- TAXLOTS
- STREAM/CREEK
- EXISTING STORM PIPE
- EXISTING STORM STRUCTURE
- PROPOSED CATCH BASIN, TYPE 2 (REPLACE EXISTING)
- PROPOSED CATCH BASIN, TYPE 1 (REPLACE EXISTING)
- PROPOSED 12" STORM PIPE (REPLACE/REHAB EXISTING PIPE)
- PROPOSED 18" STORM PIPE (REPLACE/REHAB EXISTING PIPE)

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SCALE IN FEET

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CIP-2

Tukwila Surface Water Comprehensive Plan

S Ryan Way Pipe Rehabilitation

PROJECT SUMMARY SHEET—CIP-3

Project Title: Fort Dent Park Water Quality Retrofit

Location: Fort Dent Park/Starfire Sports Ballfields (parcel # 2323049001)

Issue and Benefit Summary:

Issue	Benefit
Water Quality	Addresses 6PPD-q, an emerging stormwater contaminant of concern, and removes pollutants from untreated urban stormwater runoff.

Issue Description:
Under existing conditions stormwater from artificial turf fields in Fort Dent Park (Park) is collected and discharged into the Fort Dent pond. The Park is owned by the City, and the sports fields are leased by Starfire Sports. The Park is separated and protected from the Green River by a levee and the Burlington Northern railroad embankment. Due to the proximity of the Green River, and the flat topography of the area, the stormwater pond is at similar elevation to the river. Therefore, pumps are required to discharge outflow from the pond during high stages of the river. No water quality treatment was installed for development of four northern and four southern artificial turf fields (Essayons Consulting Engineers, Inc., 2003). The artificial turf fields are made up of ground rubber, which may leach 6PPD-q[1], an emerging stormwater contaminant of concern that is known to cause fish mortality.

Project Description:
This project looks at implementing two alternative solutions. Alternative 1 is a simple low-cost solution to begin addressing 6PPD-q based on recent research. Alternative 2 provides more robust long-term treatment using proprietary stormwater treatment vaults.

Alternative 1 is the addition of Bioretention Urban Retrofits (BURitos) to the existing detention pond. BURitos are filtration devices that consist of a non-proprietary filter media wrapped in a high-density polyethylene sock. The media is composed of a compost and sand bioretention mix. Runoff is filtered as it flows horizontally through the device. BURitos were developed and tested by the City of Bellevue in concert with Cedar Grove VIS Systems® in 2019 (see photograph below). This solution has low capital costs, uses natural materials, and supports innovation.

In Alternative 1, BURitos will be installed adjacent to the pump outlet in the southwest corner of the pond, and they will be keyed into the slope to hold them in place. The length and number of BURitos will be quantified during design based on survey of topography near the outlet. In the test installation, the polyethylene material used as the sock for the BURito began to break down over the span of a year due to UV degradation. Alternative materials or shading methods should be considered in the design.

Alternative 2 is the installation of proprietary stormwater treatment vaults approved by Washington State Department of Ecology (Ecology). The contributing basins were delineated based on as-built drawings. The northern basin (containing Fields 9-12) has approximately 8.85 acres of impervious area, while the southern basin (containing Fields 1-4) has approximately 8.0 acres of impervious area. At this preliminary level of design, the peak 15-minute off-line water quality flow rates of 0.81 cubic feet per second (cfs) and 0.75 cfs were generated for the northern and southern basins, respectively, using the latest version of the

[1] 6 p-Phenylenediamine quinone

Western Washington Hydrology Model (WWHM2012). A facility managing these flow rates would provide runoff treatment of the two basins equal to current standards.
Contech Engineered Solutions' Modular Wetlands® (MWS) Linear Stormwater Treatment System was used to calculate the estimated facility sizes and project cost. One study has described the MWS technology as having a moderate potential to treat 6PPD-q based on its treatment mechanism (Ecology, 2022). The facility sizes were calculated using the basin size, peak flow rate, and other considerations such as available space. Based on the required flow rates, each basin will require two 8-ft x 16-ft vaults. The facilities are sized to provide enhanced treatment (removal of fine sediment and dissolved metals) in accordance with Ecology's General Use Level Designation (GULD) for the MWS. Other GULD approved technologies that provide enhanced treatment and which are considered likely to remove 6PPD-q may be considered during final design.

The existing stormwater trunklines draining from the fields to the pond will be retrofitted with the MWS systems. In each basin, a flow splitter will divide flow equally between two MWS vaults working in parallel. Additional pipes and structures will be required direct flow to each vault and to return treated runoff back to the existing stormwater pipes.

Pollutants Addressed: The project will remove sediment, dissolved metals, and 6PPD-q from stormwater runoff.

Future Considerations: As an emerging pollutant of concern that is known to cause fish mortality, 6PPD-q is being studied closely in Washington State. Ecology has neither established standards for concentrations of 6PPD-q in surface waters nor approved any best management practices (BMPs) for removing it from runoff. Preliminary studies have shown that some biofiltration technologies are successful in removing 6PPD-q from runoff. Over the next several years, Ecology could establish a water quality standard, approve BMPs, issue design guidance, or incorporate requirements for removal of 6PPD-q from runoff into permits. Future development of this CIP will need to consider the state of the science and regulations on 6PPD-q in runoff at the time of implementation.

Both City staff and stakeholders have hypothesized that the artificial turf fields in Fort Dent Park are a source of 6PPD-q, but the City has not confirmed the hypothesis. Before implementing this CIP, the City may want to consider monitoring runoff from the fields for 6PPD-q. Because of the intense local interest in studying the chemical, the City may have the opportunity to partner with a research institution to perform the initial study and any longer-term monitoring studies which may be advantageous based on initial results. Information obtained from a monitoring study could help the community understand the relationship between artificial turf and 6PPD-q and assist in evaluating BMPs to remove it.

It is recommended that the City look for study partners before implementing either alternative because a study could demonstrate that 6PPD-q is not discharged from the fields, or study design may guide the choice of a solution. Otherwise, it is recommended that the City begin with Alternative 1 and consider Alternative 2 if the BURito fails or if new research reverses the findings that the BURito device filters 6PPD-q.

Maintenance Considerations: BURitos may need to be replaced every 2-3 years based on the testing at the City of Bellevue facility. The City currently owns MWS systems and has experience in their operation and maintenance.

Funding: A research study of the 6PPD-q concentrations at different flows, over a longer period, or in influent and effluent from BMPs at the site could qualify for funding from the United States Environmental Protection Agency (EPA), Puget Sound Partnership, Ecology, or conservation organizations. The City could contact potential research partners or funders through Ecology's Stormwater Action Monitoring

(SAM) collective, Ecology's Stormwater Grants of Regional or Statewide Significance (GROSS), or a presumed future Environmental Justice and Puget Sound Ecosystem Recovery grant program funded by EPA's Puget Sound Recovery National Program Office.

Design and construction of MWS or other Ecology-approved stormwater facilities for this project could qualify for funding under Ecology's Water Quality Combined Funding Program.

The City could also explore partnering with private entities. Contech, the manufacturer of MWS, could be interested in piloting a demonstration site where 6PPD-q removal efficacy could be studied. Starfire Sports could be interested in a funding partner if it is found that the artificial turf l is a source of 6PPD-q in runoff.

Estimated Project Cost, Alt 1: $90,000
Alternative 1 does not need complex engineering. To implement it, the City could include the project in its Annual Storm Drainage Program. This alternative might not be eligible for Ecology's Water Quality Combined Funding Program and may need to be financed through City funds, Ecology's SAM program, or other avenues discussed above.

Estimated Project Cost, Alt 2: $1,745,000
The estimated cost for Alternative 2 includes design and construction of four proprietary stormwater treatment vaults. To distribute costs over several years, the project could be phased. To reduce overall costs, the City could install fewer or smaller MWS systems.

Photographs:



Proposed location of BURito on photograph of Fort Dent Pond Outlet from site visit, October 2023.

Fort Dent Park Water Quality Retrofit



BURito application in Bellevue from "Roads to Ruin Will Water Quality Retrofits Save Salmon?" report authored by Jenifer McIntyre.

Bibliography:

Cedar Grove Composting. (accessed November 2023). *Cedar Grove VIS Systems*® web page. https://cedar-grove.com/cedar-grove-vis-stormwater-systems

Essayons Consulting Engineers, Inc. (May 2003). *Technical Information Report for Starfire Fields at Fort Dent Park.*

McIntyre, Jenifer. (July 2021). *Roads to Ruin; Will Water Quality Retrofits Save Salmon? Report to King County WaterWorks Grant Program*. Washington State University. https://www.wastormwatercenter.org/wp-content/uploads/BURito-Report-Final-July-2021.pdf

Navickis-Brasch, Aimee S., et. al. (June 2022). *Stormwater Treatment of Contaminants Best Management Practices Effectiveness, Final Report*. Washington State Department of Ecology. https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/Content/Resources/DocsForDownload/2022_SWTreatmentOfTireContaminants-BMPEffectiveness.pdf

Puget Sound Recovery National Program Office. (accessed December 2023). *Funding Availability for Ensuring Environmental Justice, Human Wellbeing, and Ecosystem Recovery in Puget Sound* web page. United States EPA. https://www.epa.gov/puget-sound/funding-availability-ensuring-environmental-justice-human-wellbeing-and-ecosystem

PLANNING LEVEL PROJECT COST OPINION

PROJECT: **CIP-3, Fort Dent Park Water Quality Retrofit, Alternative 1** **BY:** **CDD**
LOCATION: **Fort Dent Park (parcel # 2323049001)** **DATE:** **11/21/2023**
DESC. **Install Bioretention Urban Retrofits (BURitos) in pond for stormwater runoff treatment retrofit**

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
DESIGN					
1	BASIC PERMITTING	1	LS		$ -
2	ENGINEERING	25%	Of Total Construction		$ 14,300
3	SURVEY	10%	Of Total Construction		$ 5,700
4	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 2,900
				Total Design	**$ 22,900**
LAND (R/W)					
5	EASEMENTS	0	SF	$ 6	$ -
				Total Land (R/W)	**$ -**
CONSTRUCTION MANAGEMENT					
6	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 5,720
				Total Construction Management	**$ 5,720**
CONSTRUCTION					
Construction Elements					
7	BIORETENTION URBAN RETROFIT	LS	1	$ 25,000	$ 25,000
			Subtotal Construction Elements		*$ 25,000*
Required Ancillary Construction Items					
8	MOBILIZATION	10%	Of Construction Elements		$ 2,500
9	TEMPORARY WATER MANAGEMENT	20%	Of Construction Elements		$ 5,000
10	EROSION & SEDIMENTATION CONTROL	20%	Of Construction Elements		$ 5,000
11	TRAFFIC CONTROL	10%	Of Construction Elements		$ 2,500
12	PLANNING LEVEL CONSTRUCTION CONTINGENCY	30%	Of Total Construction		$ 17,200
			Subtotal Ancillary Items		*$ 32,200*
				Total Construction	**$ 57,200**
				Total Project Cost	**$ 85,820**
				2023 Dollars Total Estimated Project Cost (Rounded)	**$ 90,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.

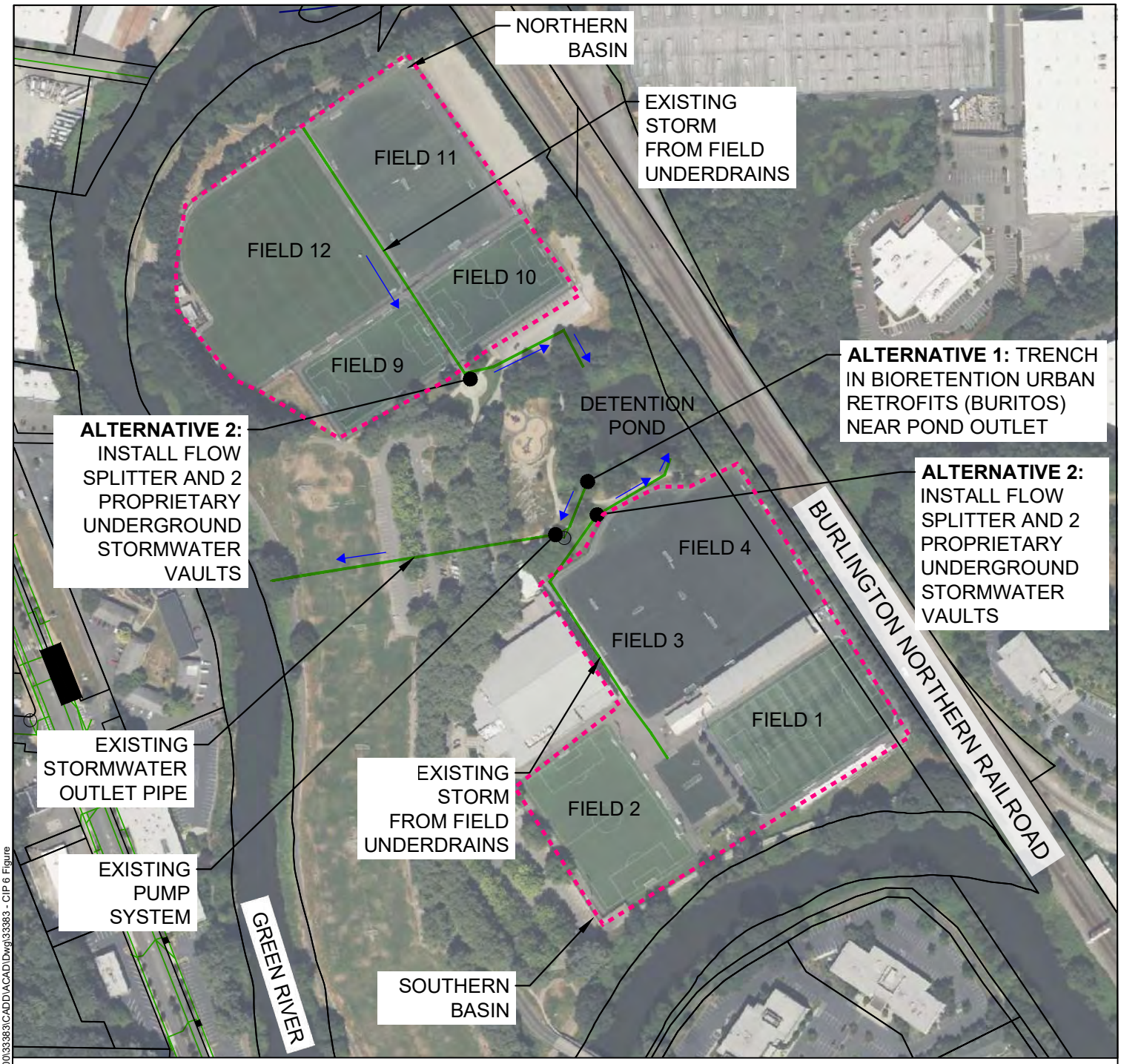
PLANNING LEVEL PROJECT COST OPINION

PROJECT: CIP-3, Fort Dent Park Water Quality Retrofit, Alternative 2 **BY:** CDD
LOCATION: Fort Dent Park (parcel # 2323049001) **DATE:** 11/21/2023
DESC. Construct underground proprietary runoff treatment systems

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
DESIGN					
1	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
2	ENGINEERING	15%	Of Total Construction		$ 196,100
3	SURVEY	2%	Of Total Construction		$ 26,200
4	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 65,400
				Total Design	**$ 302,700**
LAND (R/W)					
5	EASEMENTS	0	SF	$ 6	$ -
				Total Land (R/W)	**$ -**
CONSTRUCTION MANAGEMENT					
6	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 130,800
				Total Construction Management	**$ 130,800**
CONSTRUCTION					
Construction Elements					
7	STORM SEWER PIPE, 12 IN. DIAM	340	LF	$ 190	$ 64,600
8	MANHOLE 48 IN. DIAM. TYPE 1	8	EA	$ 8,240	$ 65,920
9	MANHOLE 60 IN. DIAM. TYPE 3 W/ FLOW SPLITTER	2	EA	$ 20,000	$ 40,000
10	PROPRIETARY UNDERGROUND STORMWATER VAULT*	4	EA	$ 170,000	$ 680,000
			Subtotal Construction Elements		*$ 850,520*
Required Ancillary Construction Items					
11	MOBILIZATION	10%	Of Construction Elements		$ 85,100
12	TEMPORARY WATER MANAGEMENT	5%	Of Construction Elements		$ 42,500
13	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 42,500
14	TRAFFIC CONTROL	3%	Of Construction Elements		$ 25,500
15	PLANNING LEVEL CONSTRUCTION CONTINGENCY	20%	Of Total Construction		$ 261,500
			Subtotal Ancillary Items		*$ 457,100*
				Total Construction	**$ 1,307,620**
				Total Project Cost	**$ 1,741,120**
				2023 Dollars Total Estimated Project Cost (Rounded)	**$ 1,745,000**

* For estimating purposes, a Contech Modular Wetlands® 8'x16'x8' Linear Stormwater Bioretention Unit is assumed.

Notes:
1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.



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CIP-3

Tukwila Surface Water Comprehensive Plan

Fort Dent Park Water Quality Retrofit

PROJECT SUMMARY SHEET—CIP-4

Project Title: Tukwila Parkway / Gilliam Creek Outfalls Stormwater Improvements

Location: Tukwila Parkway at Andover Park West

Issue and Benefit Summary:

Issue	Benefit
Water Quality	Provides runoff treatment for untreated stormwater runoff from high traffic road and highly impervious area.
Access to Inspect and Maintain City Storm System	The addition of flapgates on the 48-in diameter and the 30-in diameter storm pipes will isolate the pipes from the downstream 108-in diameter Washington State Department of Transportation (WSDOT) culvert under the I-405 freeway to allow the City of Tukwila to inspect and maintain the 48-in diameter and the 30-in diameter storm pipes.

Issue Description:
A 48-in diameter City stormwater pipe in Andover Park W and a 30-in diameter City stormwater pipe between the driveways of iFly Indoor Skydiving and Lowes both discharge to an existing 108-in diameter Washington State Department of Transportation (WSDOT) pipe that conveys Gilliam Creek in the I-405 right-of-way. As-built drawings of the 48-in diameter pipe from 1980 show that it is about 10-ft deep. As-builts of the 30-in diameter pipe have not been located and the alignment, connection type, and ownership have been assumed. The flow line of the WSDOT pipe is approximately 1.6 ft above that of the City pipes. This results in backwater to Strander Blvd in high flows and prevents inspection of the City's pipes. In addition, flows conveyed by these stormwater pipes do not receive runoff treatment.

Project Description:
The project expands the scope of CIP 91241205 in the City's 2021-2026 Capital Improvement Program and updates the costs. The existing 48-in diameter manhole will be replaced with an 84-in diameter manhole in Andover Park W just south of the intersection with Tukwila Parkway. A flapgate will be installed on the outgoing pipe. A manhole will be constructed over the 30-in diameter pipe on the south side of Tukwila Parkway and a flapgate installed. As a part of this project, ownership of the pipe should be confirmed. If the pipe is currently privately owned, the ownership and maintenance should be transferred to the City.

To move forward with design of these structures, additional information on the inverts of the pipes and CCTV inspections to determine pipe alignments and conditions will be required. The City has completed preliminary CCTV inspections, which will be reviewed during the design process. These structures are in the Southcenter subarea within the Gilliam basin, which has complicated hydraulics, and the flapgate design will need to analyze impacts of installation and develop flapgate settings. This analysis could be included with this project or as a part of the Surface Water Comprehensive Plan 2024 Update CIP-103, P17 Pond and Southcenter Regional Hydraulic Study, if it proceeds first.

It is desirable to add runoff treatment in the basin draining to Gilliam Creek. Runoff treatment will be provided upstream by replacing the existing catch basins with treatment catch basins. Tukwila Parkway has an average daily traffic (ADT) count over 19,000 cars per 2010 data. According to the King County 2021 Surface Water Design Manual, a facility receiving more than 50% of its runoff from a road with an ADT over 2,000 is required to provide Enhanced Basic Water Quality treatment. Although retrofits do not

have to achieve the same standards, the City would like to provide Enhanced Basic Water Quality treatment.

Contech Engineered Solutions' Modular Wetlands® (MWS) Linear Stormwater Treatment System was used to calculate the estimated runoff treatment facility size and cost. This technology has received a General Use Level Designation (GULD) from Washington Department of Ecology (Ecology) for runoff treatment; other GULD approved technologies may be considered during final design. The City currently owns MWS facilities and has experience in their operation and maintenance.

The existing grated inlets along Tukwila Parkway will be replaced with the grated MWS. The smallest grated MWS is 4-ft x 8-ft and has a maximum treatment flowrate of 0.115 cfs. Preliminary drainage basins were delineated based on City GIS storm system and contour data. The four contributing basins range between 0.5 acre to one acre of impervious area. At this preliminary level of design, the peak 15-minute off-line water quality flow rate generated by the largest basin as calculated using the latest version of the Western Washington Hydrology Model (WWHM2012) is 0.069 cfs. Additional pipe and structures will be required to meet the pipe configuration required for the MWS facilities.

The curb ramp on the southeast side of the Tukwila Parkway and Andover Park W was repaired in the fall/winter of 2022. Requirement for pavement restoration will need to be considered since it was repaved within the last year. This storm system work could also be paired with ADA ramp improvements at the intersection. Work on the stormwater pipes should occur during the summer to limit the backup of Gilliam Creek into the work area.

Pollutants Addressed: The project will remove sediment, dissolved metals, and 6PPD-q[1] from stormwater runoff.

Future Consideration: Survey will be required at the proposed facility installation locations to determine pipe invert elevations. Analysis of the P17 basin hydraulics will be required to determine the basin impacts and the flapgate settings.

Estimated Project Cost: $1,240,000 (does not include hydraulic study)

Related Projects:
Addition of the flapgates should be included in the study of the P17 basin hydraulics since Tukwila Pond is allowed to overflow to the storm line in Andover Park W. See the fact sheet for CIP-103.

[1] 6 p-Phenylenediamine quinone

Photographs:



Intersection of Tukwila Parkway looking south on Andover Park West
*Photo from Google Maps Streetview



Tukwila Parkway looking west at intersection with Andover Park West
*Photo from Google Maps Streetview



Tukwila Parkway looking west
*Photo from Google Maps Streetview

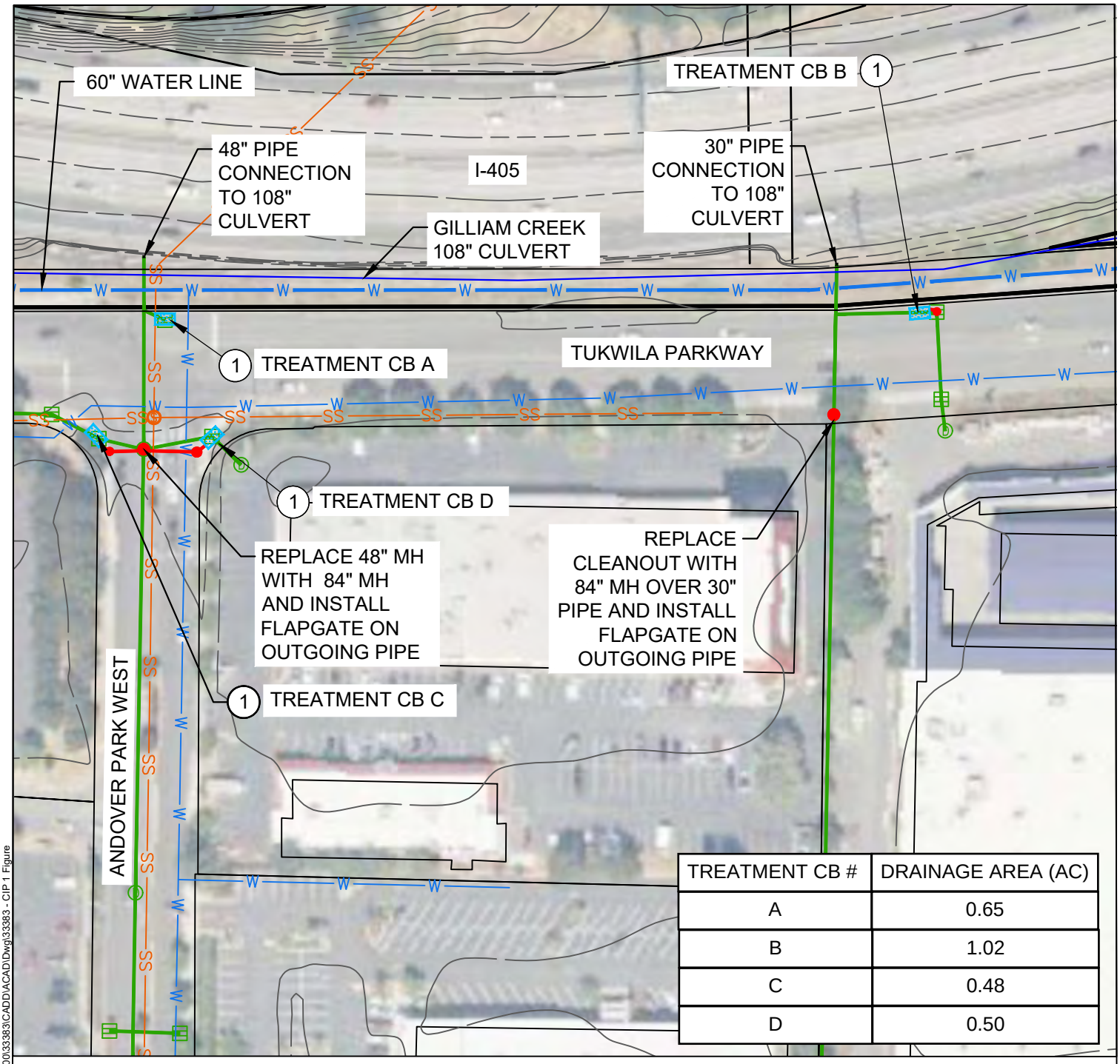
PLANNING LEVEL PROJECT COST OPINION

PROJECT: CIP-4, Tukwila PkwyParkway/Gilliam Creek Outfalls Stormwater Improvements
BY: RCH
LOCATION: Tukwila Parkway at Andover Park West
DATE: 10/30/2023
DESC. Flow, Maintenance and Water Quality Retrofit Improvements at Tukwila Pkwy and Andover Park West

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
DESIGN					
1	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
2	ENGINEERING	20%	Of Total Construction		$ 178,000
3	SURVEY	2%	Of Total Construction		$ 17,800
4	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 44,500
				Total Design	**$ 255,300**
LAND (R/W)					
5	EASEMENTS	0	SF	$ 6	$ -
				Total Land (R/W)	**$ -**
CONSTRUCTION MANAGEMENT					
6	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 89,000
				Total Construction Management	**$ 89,000**
CONSTRUCTION					
Construction Elements					
1	STORM PIPE, 12 IN. DIAM.	90	LF	$ 140	$ 12,600
2	PROPRIETARY WATER QUALITY FACILITY	4	EA	$ 80,000	$ 320,000
3	ROAD RESURFACING	440	LF	$ 40	$ 17,600
4	PAINTED CROSSWALK LINE	80	SF	$ 2	$ 160
5	FLAP GATE	2	EA	$ 16,000	$ 32,000
6	MANHOLE 84 IN. DIAM. TYPE 1	2	EA	$ 20,000	$ 40,000
7	MANHOLE 48 IN. DIAM. TYPE 1	3	EA	$ 7,500	$ 22,500
			Subtotal Construction Elements		*$ 444,860*
Required Ancillary Items					
8	MOBILIZATION	10%	Of Construction Elements		$ 44,500
9	STORMWATER BYPASS	5%	Of Construction Elements		$ 22,300
10	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 22,300
11	TRAFFIC CONTROL	20%	Of Construction Elements		$ 89,000
12	PLANNING LEVEL CONTINGENCY	30%	Of Total Construction		$ 267,000
				Subtotal Ancillary Items	*$ 445,100*
				Total Construction	**$ 889,960**
				Total Project Cost	**$ 1,234,260**
				2023 Dollars Total Estimated Project Cost (Rounded)	**$ 1,240,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.
3. Increase percentage markup if work is in or immediately adjacent to flowing or standing water, steep slope, and/or other erosion-prone conditions.
4. Increase percentage markup if work is in or immediately adjacent to secondary, arterial, or other high-volume road or temporarily closes a roadway.



TREATMENT CB #	DRAINAGE AREA (AC)
A	0.65
B	1.02
C	0.48
D	0.50

0 100 200

SCALE IN FEET

LEGEND

- 2 FT CONTOURS
- TAXLOTS
- STREAM/CREEK
- W — EXISTING WATER PIPE
- SS — EXISTING SANITARY PIPE
- EXISTING STORM PIPE
- SD — PROPOSED STORM PIPE
- EXISTING STORM STRUCTURE
- EXISTING SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED PROPRIETARY MODULAR BIOFILTRATION (TREATMENT CB)
- 1 — REPLACE EXISTING TYPE-1 CB WITH TREATMENT CB

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CIP 4

Tukwila Surface Water Comprehensive Plan

Tukwila Parkway/Gilliam Creek Outfalls Stomwater Improvements

PROJECT SUMMARY SHEET—CIP-5

Project Title: Tukwila Pond Water Quality Improvement

Location: Tukwila Pond Park located south of Westfield Southcenter Mall (Parcel #2623049062)

Issue and Benefit Summary:

Issue	Benefit
Water Quality	Improve quality of stormwater runoff discharging to Tukwila Pond

Project Description:
The project aims to allow Tukwila's Public Works Department to support water quality treatment for surface water runoff draining to the Tukwila Pond, as part of the Tukwila Pond Park Master Plan (Master Plan) improvements. The Parks and Recreation Department will carry out the implementation of the Master Plan, including hiring and managing consultants for design, permitting and construction negotiations, and leading discussions with private property owners. The Public Works Department will contribute funds to support the design and construction of stormwater runoff treatment facilities described in this fact sheet. The recommended water quality improvements are planned for construction during Phases 1B through 6 in the period spanning 2024 to 2038, as specified in the Master Plan.

Below is a summary of the pertinent Master Plan narrative and improvements.

Pond Drainage and Function
The Tukwila Pond is within a depression in the Southcenter region. Its is approximately 19 acres in area and 2.5 feet in depth. The outflow from the pond is complicated; it changes direction based on the stage in Gilliam Creek, the stage in the Green River, the settings of a manually operated slidegate, and the functioning of three pump systems in the area. The hydraulics are described in the Master Plan. One of the key functions of the pond is to provide flood storage when Gilliam Creek and the Green River are high. The flood storage functionality of Tukwila Pond is critical and should not be reduced as a result of any Mater Plan-related improvements.

Pond Water Quality Issues
The Tukwila Pond has high phosphorus, turbidity, and high temperature under existing conditions. It is fed largely by groundwater during the summer and has additional input from precipitation and two nearby swales, which treat runoff from adjacent commercial properties. Groundwater and soils are likely contributing to nutrient loading of the pond, suggesting that even if water quality improves, it may remain high in nutrients. Additionally, there is limited treatment for surface runoff and piped stormwater entering the pond. The pond drains into the Green River either through Gilliam Creek or through pumped and piped conveyances. The Green River in this area is on the Washington State Department of Ecology's list of impaired waters (303(d) list) for temperature, dissolved oxygen, and fecal coliform.

Water Quality Improvements
Several methods of treatment to improve water quality in the pond were compared in the Master Plan. The methods address high nutrient content in the pond caused by groundwater and stagnation, high temperatures in the pond caused by limited tree cover, and pollutants in the urban stormwater runoff draining to the pond. Direct improvements to the pond to address nutrients and temperature are estimated to cost approximately $6 million in 2021 construction dollars while water quality improvements for treating surface runoff or piped runoff draining to the pond are estimated at $656,000. The Public

Tukwila Pond Water Quality Improvement

Works Department's Surface Water Program plans to provide funds for the latter - those elements of the Parks and Recreation project that will treat the surface runoff and piped runoff entering the pond. Within the Master Plan, these elements are grouped as "storm drainage improvements." Storm drainage improvements include improvements to an existing biofiltration-drainage swale system, installation of new stormwater runoff treatment facilities, and installation of associated stormwater conveyance systems.

Several runoff treatment Best Management Practices (BMPs) could be used to treat surface runoff and piped stormwater. Options for treatment of surface runoff include bioswales, filter strips, or proprietary systems (such as Filterra® bioretention system from Contech Engineered Solutions or BioPod™ from Oldcastle Infrastructure). Options for treatment of piped stormwater include wet ponds, wet vaults, or proprietary systems (such as Modular Wetlands® Linear stormwater bioretention system by Contech Engineered Solutions). Some considerations for selecting facility type(s) during engineering design are listed below:

- Area available to site facilities, which may be on private property;
- Whether facilities will be located at the end-of-pipe or dispersed throughout the City's right-of-way and on private properties;
- Hydraulic drop available;
- Whether facilities will be placed above ground or underground;
- Ability to treat the emerging pollutant of concern, 6-PPD-q[1];
- Providing a level of treatment that corresponds to the land use characteristics of the drainage basins and the water quality issues in the Green River; and
- Constructability constraints such as utility conflicts.

The Master Plan recommends further study to compare alternatives and determine the preferred option or combination of options for the water quality treatment described above. The Public Works Department's Surface Water Program plans to support the study, engineering design, and construction of the runoff treatment facilities, within the larger effort to be implemented by the Parks and Recreation Department.

Scope Items and Estimated Cost in 2023 Dollars:

Scope	Cost
Storm Drainage Improvements Construction (from Master Plan, Appendix A)	$656,000
Alternatives Analysis and Engineering Design for Preferred Water Quality Treatment Alternative (30% of Construction Cost, rounded)	$197,000
Total Project Cost in 2021 Dollars (Sum)	$853,000
Project Cost in 2023 Dollars (5% annual escalation, rounded)	$940,000

The Master Plan project cost estimates, which total more than $33 million of improvements for access, recreation, and environment, include necessary costs such as coordination of improvements with landowners, construction contingency, permitting fees, etc. It is assumed that those items will be covered under the larger project and are not included here.

These projects providing stormwater retrofit treatment may be eligible for grant funding through Washington State Department of Ecology.

[1] 6 p-Phenylenediamine quinone

Tukwila Pond Water Quality Improvement

Future Considerations: Tukwila Pond has high temperature and high nutrients affecting its water quality. Stormwater management facilities alone will not address these issues. Some preliminary concepts were evaluated in the Master Plan and found to be high cost. If the Parks and Recreation Department develops solutions for temperature and nutrients in the pond, the Public Works Department could consider sharing cost of implementing those solutions as well. Cost of those projects have not been estimated in this fact sheet.

Estimated Project Cost: $940,000

Related Projects:

- Tukwila Pond Park Master Plan Improvements (City of Tukwila, 2022)
- Gilliam Creek Fish Habitat Enhancement Project (City CIP 2023-2028, Project No. 99830105)
- P17 Pond and Southcenter Regional Hydraulic Study (Surface Water Comprehensive Plan 2024 Update, CIP-103)

PROJECT SUMMARY SHEET—CIP-6

Project Title: Johnson Creek Fish Barrier Mitigation Alternatives Analysis

Location: S 204th Street and Frager Rd at confluence of Johnson Creek with the Green River

Issue and Benefit Summary:

Issue	Benefit
Disconnection of Habitat	Allow fish to access habitat in the Johnson Creek basin

Issue:
Johnson Creek is a low gradient left-bank tributary to the Green River in the river's floodplain. They confluence at river mile (RM) 17.3 through a 60-in diameter culvert with a debris rack at its inlet and a flapgate at its outlet. Tributaries in this section of the Green River are often used by out-migrating Chinook for rearing and flood refugia. The existing flapgate on Johnson Creek was considered fish-passable when it was installed in 2011, and it is not listed as a barrier by Washington State Department of Fish and Wildlife (WDFW) as of 2023. However, a recent study by King County documented that no fish were sampled in Johnson Creek. This was thought to be due to the low elevation of the flapgate, causing it to be submerged and closed during most winter and spring flows when fish would typically access the creek. The study also notes juvenile fish may be swept past the confluence and unable to enter Johnson Creek because the flapgate is located where the tributary enters the Green River such that there is no low velocity setback available. The debris rack on the upstream side of the culvert is also frequently clogged (King County, Dec 2019). Therefore, the City has determined that the flapgate and debris rack limit fish access to habitat in Johnson Creek.



Existing Flapgate at the confluence of Johnson Creek with the Green River

Johnson Creek Context:
The Johnson Creek culvert connects to the Green River through a revetment along the west bank. The elevation of the revetment appears to match that of the levee to the north so that, although the revetment is not certified, it is providing flood protection along with the flapgate (King Co, Feb 2019).

Johnson Creek Fish Barrier Mitigation

The reach approximately 150 meters upstream from the confluence with the Green River is within the Johnson Creek mitigation area that is part of the Segale Properties LLC's Tukwila South Project. This segment of Johnson Creek was reconstructed and relocated in 2011 (Tukwila, 2013) under a Hydraulic Project Approval (HPA) issued in 2007. The 2007 HPA provisions included the following:

> The culvert facility and floodgate at Johnson Creek shall be maintained by the owner(s) per RWC 77.57.030 to ensure continued, unimpeded fish passage. If either structure becomes a hinderance to fish passage, the owner(s) shall be responsible for obtaining and HPA and providing prompt repair. (provision 28)

In 2017 Drainage District #2 of King County, received an HPA to remove a beaver dam on Johnson Creek that caused damage to upstream agricultural lands.

Land Ownership (see Figure):
The Johnson Creek drainage basin includes portions of the City of Tukwila, City of Kent, City of SeaTac, and unincorporated King County. Within the City, the Johnson Creek basin is largely owned by Segale Properties LLC, which has a developer agreement with the City regarding land use and stormwater controls for the Tukwila South Project. Additionally, Drainage District #2 of King County manages stormwater in the majority of the Johnson Creek basin in Tukwila (King County, 2022). The parcel that contains the realigned Johnson Creek is owned by Drainage District #2 of King County. Three parcels in the City of Kent directly south of S 204th Street are owned by King County Water and Land Resources Division's River and Floodplain Section (King County River and Flood) and are classified as farmland preservation properties. Segale Property LLC also owns properties in the City of Kent that serve as wetland mitigation for the Tukwila South Project.

Other Habitat Improvement Plans:
The Water Resource Inventory Area (WRIA) 9 Salmon Habitat Plan 2021 Update includes project LG-34 sponsored by the City of Kent to improve the Jonhson Creek floodplain by acquiring properties, setting back the road and trail to reconnect the floodplain, and creating off-channel habitat.

The parcels owned by King County River and Flood south of S 204th Street were purchased in September 2023 for levee repair and habitat restoration, and little documentation has been located about the project objectives or timeline. There may be an opportunity for the City's Johnson Creek Fish Barrier Mitigation project to be integrated with the King County project when more information becomes available.

Project Description:
The goal of the project will be to identify a preferred solution to improve fish access to Johnson Creek while maintaining flood protection. To meet this goal, the project will include the following steps:

1. Review agreement between Segale LLC, Drainage District #2 of King County and City regarding stormwater controls with the goal of determining whether a portion of their properties may be used for a levee setback.
2. Initiate discussion with impacted properties, and potential project partners.
3. Survey stream channel, adjacent roadway, critical elevations on adjacent properties, and culvert elevation.
4. Review basin hydrology to determine contributing flow to Johnson Creek.
5. Complete statistical analysis of the stages on the Green River to determine an optimum vertical location for a flapgate and evaluate risk of removal of flapgate on flooding of upstream properties depending on their relative elevations. If flapgate removal is not feasible, evaluate feasibility of culvert and flapgate retrofit or replacement.

6. Complete a critical areas study, prepare a stream assessment, and determine bankfull widths to determine a reasonable size of a structure for alternatives that include replacing the existing structure.
7. Complete a preliminary geotechnical analysis that identifies constraints and supports a preliminary design of a replacement structure, if determined that structured needs to be replaced.
8. Complete a hydraulic analysis that will:
    a. Simulate flooding under existing conditions and evaluate the risks associated with removal of the flapgate as well as replacement by a side-hinge flapgate.
    b. Evaluate potential locations along Johnson Creek for the flapgate to be setback from the Green River channel to provide low velocity habitat for juvenile salmonids. This will be done in coordination with item #1.
    c. Evaluate options for replacement debris racks and maintenance intervals.
9. Develop feasible solution concepts and implementation costs with the goal of balancing flood protection while improving fish access to habitat in Johnson Creek. Develop a permitting strategy related to each solution concept.
10. Compare solutions using factors such as habitat uplift, constructability constraints, costs and funding opportunities, implementation timelines, compatibility with future projects etc.
11. Identify a preferred solution in coordination with interested parties. At this stage it is anticipated that interested parties will include Segale Properties LLC, Drainage District #2 of King County, King County, King County River and Flood, King County Flood Control District, the Muckleshoot Indian Tribe, other tribal organizations, WDFW, and Water Resource Inventory Area (WRIA) 9.

Constraints for engineering design:

- The 60-in diameter culvert connecting Johnson Creek with the Green River passes under a cul-de-sac that provides turn-around for roadways connecting properties in the City of Kent. Any setback along this section of the Green River would require realignment of these roadways.
- The low gradient of Johnson Creek limits opportunity to raise the elevation of the connection with the Green River.
- King County identifies much of this land as a seismic hazard area.
- The fine grain silt loams along the Green River and Johnson Creek may have low bearing capacity that would impact structure type and construction methods.

Scope Items and Estimated Cost in 2023 Dollars:

Scope	Cost
Desktop analysis of existing system and agreements	$10,000
Meetings with interested parties including major project partners, permitting organizations, property owners, and King County regarding feasibility of setting back levee and impacting the properties*	$20,000
Survey for stream channel, culvert, and adjacent topography	$20,000
Critical Area Study and Stream Assessment	$30,000
Preliminary Geotechnical Analysis	$30,000
Hydraulic analysis of existing conditions	$30,000
Hydraulic analysis of proposed conditions (see alternatives described above)	$40,000
Peer review and technical reporting of hydraulic analysis	$20,000

Johnson Creek Fish Barrier Mitigation

Scope	Cost
Development of alternative solution concepts and costs and comparison of alternatives**	$40,000
Selecting preferred solution concept through engagement with interested parties	$40,000

* Cost does not include negotiation costs if ownership transfer is needed. It is anticipated that those negotiation costs will be included in the implementation costs for the preferred alternative.

** Cost does not include other coordinating potential projects mentioned in this fact sheet, including channel realignment through City of Kent, WRIA 9 LG-34 project, and King County River and Flood levee setback and habitat restoration project.

Estimated Project Cost: $280,000

References:

King County, Dec 2019. Juvenile Chinook Use of Non-natal Tributaries in the Lower Green River, King County, December 2019.

King County, Feb 2019. System-Wide Improvement Framework Lower Green River King County, Washington, February 2019.

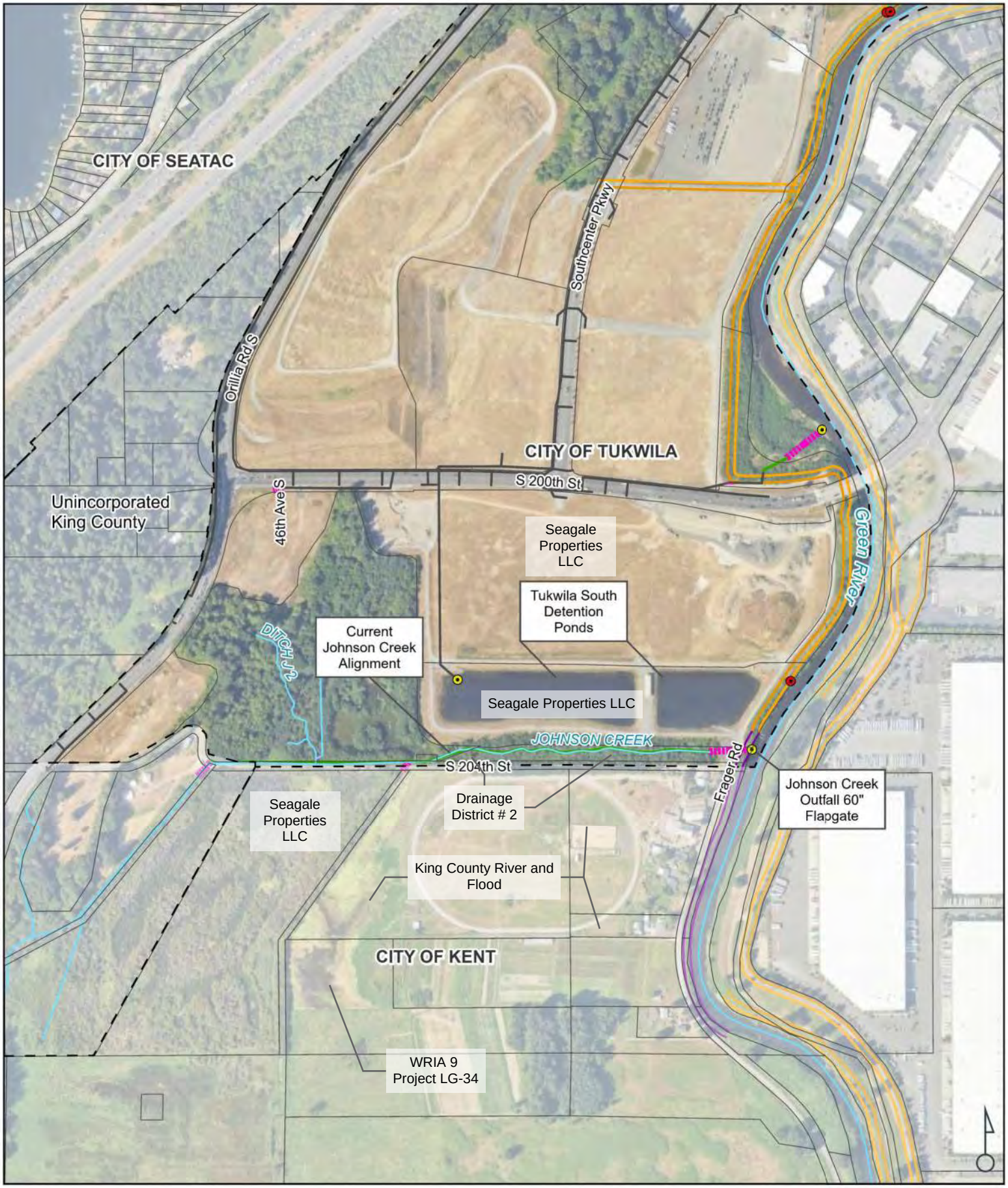
King County, 2022. Signature Report Motion 16184 passed by Metropolitan King County Council on August 16, 2022.

Tukwila, 2005. Tukwila South Project Final EIS, by Raedeke Associates, Inc, Cedarock Consultants, Inc, and A.C. Kindig &Co., June 29, 2005.

Tukwila, 2013. 2013 Surface Water Comprehensive Plan, prepared by CH2MHill, February 2013.

WDFW, 2007. Hydraulic Project Approval for Tukwila South Project, issued by Washington Department of Fish and Wildlife on March 1, 2007.

WDFW, 2017. Hydraulic Project Approval for Drainage District No. 2 Beaver Dam Modification Project, issued by Washington Department of Fish and Wildlife on July 20, 2017.



CIP-6 JOHNSON CREEK FISH BARRIER MITIGATION

TUKWILA SURFACE WATER COMP PLAN

TUKWILA, WA

Data Sources: King County (River Features / Levees), City of Tukwila, Google Maps (basemap).
Date: 12/29/2023
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Legend

- City Boundary
- Parcels
- Stream
- Outfall
- Private Outfall
- Closed Pipe
- Culvert
- Ditch
- Levee
- Revetment

0 800 ft

Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

Otak

STUDIES

STUDY SUMMARY SHEET—CIP-101

Study Title: Fish Passage Barrier Prioritization Study

Study Extents: Citywide

Issue and Benefit Summary:

Issue	Description
Habitat	The City values removing fish passage barriers and wishes to prioritize barrier removal projects prudently. The fish passage inventory in the 2024 SWCP has not been prioritized. The study will prioritize barrier removal opportunities.

Issue:
The presence of fish passage barriers in creeks and streams is a critical risk to salmonids. Fish passage barriers that can be corrected are human-made instream features that impede upstream fish passage, such as culverts, dams, and diversions. The Northwest Indian Fisheries Commission's online map of Statewide Integrated Fish Distribution identifies the presence of multiple fish species, including salmonids, in all Tukwila streams with the exception of Nelsen. The City of Tukwila (City) supports removal of human-made barriers to open valuable habitat to native fish.

Fish passage barriers have been documented in several stream systems in Tukwila: Riverton Creek, Southgate Creek, Gilliam Creek and its tributary Cottage Creek, tributaries to Green River in the P17 Basin, Johnson Creek, and the Duwamish River. Currently, 58 uncorrected fish passage barriers are identified in Table 2 of Appendix B, not including barriers owned by Washington State Department of Transportation (WSDOT). It is assumed that up to 10 additional uncorrected fish passage barriers may exist in Tukwila on private properties not accessible from public roadways. In order to invest prudently in restoring access to fish habitat, the City would like to prioritize the large number of documented barriers. See Appendix B of the 2024 SWCP for more information about the barrier inventory.

Study Description:
The City would like to prioritize potential barrier removal projects. The study will prioritize barrier removals based on feasibility, potential habitat gain, importance of the stream system for fish use, and coordination with other barrier removal efforts and water quality improvement efforts in the stream system.

Because the WDFW fish passage barrier database has been recently updated (2023-2024) with field-verified information about crossings and barriers in the Riverton Creek system and the Southgate Creek system, including barriers on private properties, it is thought that the inventory of barriers is complete enough to conduct the prioritization without conducting additional fieldwork to discover new barriers. The available information in the recently updated records includes potential habitat gain.

The prioritization process will include:

1. Development and implementation of a Fish Passage Barrier Correction Prioritization process to identify fish barrier removal opportunities. Resources such as the WDFW 2019 Manual or King County's Fish Passage Restoration Program' s Fish Passage Barrier Prioritization formula (King County, 2022) could be used to develop prioritization factors. Examples of factors include:
    a. Stream habitat quantity and quality
    b. Watershed habitat quality

   c. Connectivity
   d. Presence of priority salmon species
2. Identifying downstream barriers owned/operated by other entities and documenting the planned date for removing those barriers, if any.
3. Categorizing and grouping fish barrier removal opportunities into programs or capital projects depending on cost, geographic proximity, coordination with other projects or planning efforts, or complexity of solution.

Prioritization will be presented by creek basin.

Note: Private property owners may need significant inducement to voluntarily participate, such as offering eligibility for future cost-share or funding opportunities or limiting reporting on on-property compliance issues unrelated to fish passage barriers.

The study will include concept design and planning level cost for the ten priority barrier removal opportunities.

Estimated Study Cost: $147,000

Funding:
This study and the prioritized projects that result from this study may be eligible for watershed restoration, fish passage barrier, or habitat grant funding or federal appropriations. Examples of these funding opportunities include:

- Washington Department of Ecology: Water Resources Program Streamflow Restoration Competitive Grants.
- Washington Department of Fish and Wildlife and the Recreation Conservation Office: Brian Abbot Fish Barrier Removal Board Grant Program.
- Washington Department of Ecology: Water Quality Combined Funding Program.
- Federal Highway Administration: National Culvert Removal, Replacement and Restoration – Culvert Aquatic Organism Passage Program.
- U.S. Fish and Wildlife Services National Fish Passage Program.
- National Oceanic and Atmospheric Administration, National Marine Fisheries Service: Restoring Fish Passage through Barrier Removal.

Related Issues:
The Washington Department of Transportation (WSDOT) has been working to remove fish passage barriers since 2013 due to a federal culvert injunction. The U.S District Court agreed with twenty-one northwest Washington tribes that the State of Washington has a duty to preserve fish runs. As a result, the State must repair or replace culverts that impede salmon migration under state-maintained roads.

WSDOT developed its Fish Passage Inventory to document fish passage barriers under state roads. WSDOT has removed 114 fish passage barriers under the federal court injunction. As of 2024 at least seven WSDOT fish passage barriers identified for correction under the injunction remain in the City of Tukwila. WSDOT will continue to focus on barrier removal, however, WSDOT does not have plans to correct any fish passage barriers in Tukwila under the injunction by 2030. Following 2030 the City expects WSDOT to address fish passage barriers at the I-5/I-405 interchange which is currently in the preliminary design phase.

PLANNING LEVEL PROJECT COST OPINION

PROJECT:	**CIP-101, Fish Passage Barrier Inventory Update and Prioritization Study**	**BY:**	**TMK**
LOCATION:	**Citywide**	**DATE:**	**3/19/2024**
DESC.	**Programmatic prioritization of barrier removal opportunities by creek basin.**		

ITEM NO.	ITEM	UNIT	QUANTITY	HOW CALCULATED	HOURS
Locations / Properties					
a	Known barrier locations (uncorrected)	each	58	WDFW and 2024 SWCP; does not include state-owned barriers or barriers with revised status of "not a barrier," "passable," "none," or "N/A"	
b	Estimated unknown barrier locations	each	10		
c	Number of creek basins with barriers	each	6	via Appendix B	
Prioritization					
d	Document and compare potential habitat gain	hrs	68	(a+b)*1	68
e	Develop prioritization criteria, inc'l outreach to stakeholders	hrs	60		60
f	Evaluation and Prioritization by Basin	hrs	60	c*60	360
Concept Design					
g	Project Development for 10 Barrier Removals	hrs	40	10*40	400
Average Staff Cost					
h	Average Labor Cost	$/hr	150		
				Total Labor Hours	**888**
				Labor Cost (Total Labor Hours * h)	**133,200**
				Contingency	10%
				Estimated Cost	**$ 146,520**
2023 Dollars	**Total Estimated Project Cost (Rounded)**				**$ 147,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include acquiring rights of entry, public engagement and communication with property owners, future escalation, financing, or O&M costs. If escalation is required, we recommend including 3% per year.

STUDY SUMMARY SHEET—CIP-102

Study Title: Middle Fork of Southgate Creek – Stream and Slope Stability Study

Study Extents: Middle Fork of Southgate Creek from headwaters near 44th Avenue S to discharge into a stormwater system at the intersection of S 134th Pl and S 133rd St

Issue Description:

Issue	Description
Flooding, Erosion, Landslide	Alteration of stream by development coupled with natural degradation processes in the steep upper reaches is transporting sediment downstream and causing erosion and flooding on a commercial development on the east side of Macadam Rd S
Habitat	Two Fish Passage Barriers: WDFW Site ID 922644 and Site ID 922641

Middle Fork of Southgate Creek:
The Middle Fork of Southgate Creek (Middle Fork) has its headwaters in the Foster Heights neighborhood in Tukwila where it is fed by piped stormwater runoff and precipitation. It flows in a northerly direction to the Duwamish River, passing through City rights-of-way, state rights-of-way, and a substantial amount of private property. From its headwaters, it has a steep gradient as it flows through a ravine and crosses Macadam Rd S in a 48-in wide concrete box culvert where the flow splits in two directions – one continuing along Macadam Rd S and the other east through a business park. The first channel alignment is along Macadam Rd S; the stream continues north and then takes a 90-degree bend and travels through ditches along S 133rd St. The second channel alignment is through the business park east of Macadam Rd S. Based on comparing aerial imagery between 2007 and 2009, the stream may have been altered when development occurred around 2008, and it is probable that flows were directed through a pipe which drains into the ditches along S 134th Pl. The two alignments confluence at the intersection of S 133rd St and S 134th Pl before being piped across the SR 599 highway in a 72-in diameter pipe along Interurban Avenue South. Then the Middle Fork confluences with the main stem of Southgate Creek downstream of a 66-in diameter Washington State Department of Transportation (WSDOT) culvert before discharging into the Duwamish River. The Middle Fork is classified by Washington State Department of Fish and Wildlife (WDFW) as a fish-bearing stream.

Known Issues:
Lack of accurate information on the stream's alignment is a known issue. Available information about the alignment of the Middle Fork is inconsistent. The above description is based on institutional knowledge of City staff. Other land managers and agencies document different alignments. Another key issue is whether the Middle Fork should be classified as a salmon bearing stream; it is piped for a long stretch downstream of the intersection of S 133rd St and S 134th Pl.

In recent years, the City has received numerous reports of flooding and erosion in the business park. Near 44th Avenue S a landslide was first documented in 1982 by King County. The landslide was also discussed in the 2013 Tukwila Surface Water Comprehensive Plan (table 7 -issue ID 10) with a recommendation to monitor the issue and review during the next planning period. Based on comparing aerial imagery from 1998 and 2005 a short plat was developed near the slide in the early 2000s. More recently, the City vacated the right-of-way on 43rd Avenue S, which is now closed to public traffic and located on private property. Since then, City staff have observed the former 43rd Avenue S collapsing just north of S 137th St, which may be caused by recurrence or reactivation of the landslide. The collapsing

roadway appears to be contributing debris to the stream, which travels downstream and is deposited behind the business park east of Macadam Rd S. A tenant of the business park has installed ecology blocks to prevent the stream from eroding and flooding onto their property.

WDFW assumes a different stream alignment, in which the Middle Fork confluences with the mainstem of Southgate Creek at the intersection of S 133rd St and S 134th Pl and flows into WSDOT's culvert. The WDFW Fish Passage and Diversion Screening Inventory Database documents two barriers to fish passage on the Middle Fork.

Table 1 Fish Passage Barriers, WDFW Fish Passage and Diversion Screening Inventory Database

Site ID	Existing Structure	Barrier Description
922644	36-in Diameter Concrete Pipe @ 6.4% Slope	Slope Barrier, 0% Passable
922641	48-in Wide Concrete Box Culvert @ 7.2% Slope	Slope Barrier, 0% Passable

Based on a desktop assessment of the topography, reviewing aerial imagery, and gathering anecdotal evidence, it appears that the Middle Fork channel may be eroding in the reaches upstream of Macadam Rd S. There may also be slope stability issues contributing to the landslide which has caused the roadway to collapse. Both the erosion and the landslide may be contributing debris to the Middle Fork, which transports the sediment downstream. It is unknown how the channel cross section changes going from upstream to downstream and whether sediment is deposited in locations where slopes are gentler. The flow split at Macadam Rd S is not well documented, and capacity of the eastern alignment through the business park has not been evaluated by the City. The causes of the reported flooding and stream channel erosion at the business park are unknown but could be related to channel size, channel configuration, sediment deposition, or insufficient capacity in the eastern alignment.

Project Description:
A preliminary study is proposed to identify the causes of the known issues and assess solutions. The City's Department of Community Development (DCD) is working on stream classifications, and DCD's findings, if available, can be used for this project.

The proposed stream and slope stability study will include the following elements:

1. Obtaining right of entry from private properties.
2. Field reconnaissance for a preliminary geomorphic, geotechnical, and environmental investigation. The geomorphic investigation will document existing conditions of the stream, changes in stream slope, and changes in channel cross sections observed by walking the stream channel. It will identify stream channel instability issue locations and causes. The geotechnical investigation will document any observations of slope stability and causes under existing conditions. The environmental investigation will assess stream typing in coordination with DCD's stream classification project and document existing conditions of regulated critical areas such as wetlands. The environmental reporting will form the baseline for calculating environmental impacts caused by solutions and identifying mitigation needs for the solutions.
3. Confirmation through discussion with WDFW and Muckleshoot Indian Tribe whether the Middle Fork should be classified a fish bearing stream. This determination is key to understanding what type of solution options are feasible and permittable for addressing the landslide, erosion, flooding, and fish barrier issues.
4. Performing geotechnical borings to determine the vertical profile of the soil, if needed, as determined by the geotechnical investigation in item #2.
5. Developing up to four concept solutions to address the causes of the issues identified under items #2 and #3. It is anticipated that solutions will focus on (a) controlling sources of sediment

and (b) maintaining ditches where deposition may be occurring if permissible and (c) fish passage improvements if determined the stream has fish use. Source control options include stream and bank stabilization of the upper reaches with elements such as large woody debris and wattles. Depending on the findings of the geotechnical reconnaissance, slope stabilization solutions may also be evaluated. If fish passage structures are needed, an important consideration will be length of stream regrading needed through private property. For all solutions, a qualitative assessment of downstream impacts will be completed. Any additional studies needed to design the solution will be noted. Also, a preliminary assessment of order of magnitude environmental impacts, anticipated mitigation needs and permitting strategy will be documented for each solution.

6. Develop planning level implementation costs for solutions determined under item #5.
7. Compile a planning document that will support the City in obtaining funds to address the issues.

Scope Items and Estimated Cost in 2023 Dollars:

Scope	Cost
Preliminary Geomorphic Study	$30,000
Preliminary Geotechnical Study	$50,000
Preliminary Environmental Study	$20,000
Coordinating with private property owners, WDFW, and Muckleshoot Indian Tribe	$20,000
Preparing three concept solutions and planning level cost estimates (assumes two fish passage structures with habitat uplift and two additional concepts)	$50,000
Report	$30,000

The estimate does not include engineering design or site specific studies for the preferred alternative.

Estimated Study Cost: $200,000

Future Considerations:
Much of the Middle Fork is on private property, and the preferred alternative selected in the study may require right-of-way acquisition and/or permanent and temporary construction easements. Therefore, successful negotiations with private property owners could determine the feasibility of implementing many solutions assessed during the study.

In the next phase, alternatives will be hydraulically modeled to assess sediment and habitat impacts of the solutions and a preferred alternative will be chosen. The preferred alternative may be one or a combination of alternatives evaluated.

Related Projects:
The City currently has a contract with a consultant to study the main stem of Southgate Creek and address sediment transport and flooding along S 131st St.

The City's Department of Community Development (DCD) is working on a project to classify streams in the City.

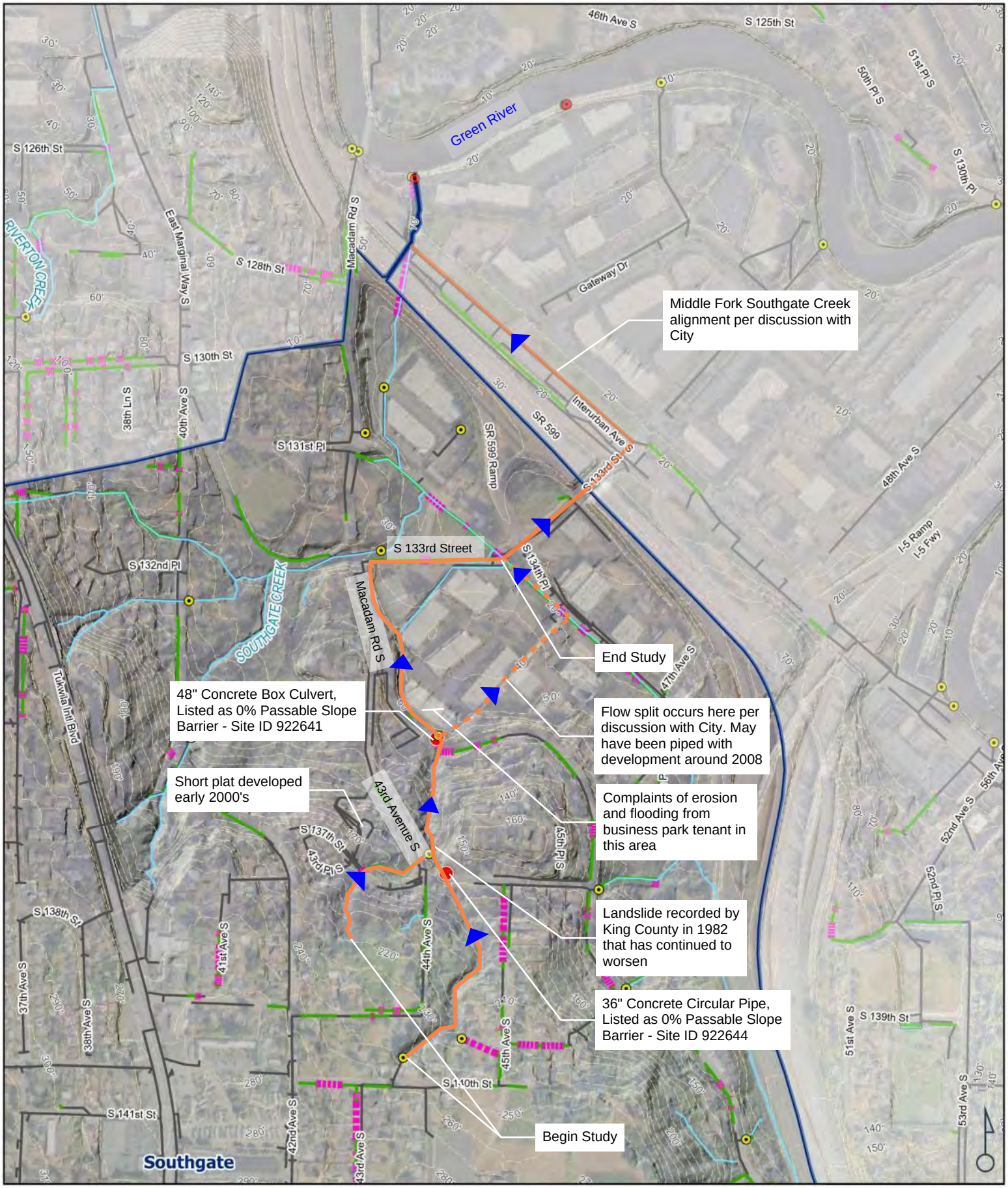
Photographs:



Photo taken at the location of the landslide by the City in 2022– shows the undercut banks of Middle Fork Southgate Creek



Photo taken at the location of the landslide by the City in 2022– shows the collapsing former 43rd Avenue S



MIDDLE FORK SOUTHGATE CREEK STUDY

GEOTECHNICAL AND GEOMORPHIC ASSESSMENT

TUKWILA SURFACE WATER COMP PLAN

TUKWILA, WA

Data Sources:
Date: 11/20/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

O:\PROJECT\33300\33383\CADD\GIS\APRXs\33383 Tukwila Base Data BK.aprx

Legend

- City Boundary
- Basins
- Stream
- Stormwater Detention
- Outfall
- Private Outfall
- Closed Pipe
- Culvert
- Ditch
- Anecdotal Stream Alignment
- Fish Passage Barrier
  - Yes

ft
0
600

Otak

PROJECT SUMMARY SHEET—CIP-103

Project Title: P17 Pond and Southcenter Subarea Hydraulic Study

Location: The vicinity of Southcenter Mall, between I-5 and the Green River, and from I-405 to approximately S 200th St

Issue and Benefit Summary:

Issue	Benefit
Drainage	Ensure adequate capacity of the S 180th St Stormwater Pump Station.
Other	The City would like to discontinue use of its Minkler Public Works Maintenance Facility and relocate the P17 Pond (see figure), which currently occupies the property, in order to support a King County Flood Control District project to set back a portion of a levee on the Green River to provide salmon habitat.

Issues:

The Southcenter subarea of City of Tukwila (City) is served by a complex drainage system. One element of the Southcenter subarea's drainage system is the P17 Pond on Minkler Blvd near the Green River at river mile 13.75. The pond is on the City's Minkler Public Works Maintenance Facility property and is utilized for stormwater storage capacity before the King County Flood Control District P17 Pump Station, which pumps stormwater over the Tukwila 205 Levee into the Green River. The City is studying the feasibility of discontinuing use of the maintenance facility and selling the property. The King County Flood Control District may express an interest in purchasing the property and setting back the levee, consistent with project LG-35 identified in the WRIA 9 Salmon Recovery Plan approved on February 11, 2021. LG-35 would be a future project and is not currently in King County's Capital Improvement Program.



Existing Conditions near (Minkler) Public Works Maintenance Facility, from WRIA 9 Salmon Recovery Plan

The Southcenter subarea's drainage system includes three stormwater pump stations. Two failed pumps at the S 180th St pump station (also referred to as the Lift Station No. 15) have not been replaced, and City staff have recently observed ponding of the drainage system in the vicinity.

Project Description:

Before confirming feasibility of decommissioning the P17 Pond and the P17 Pump Station to support a setback of the levee for habitat uplift, the City must ensure that the detention and conveyance capacity they provide can be provided elsewhere in the Southcenter subarea. The City will study hydraulics in the Southcenter subarea, including most of the P17 Basin and the interrelated portions of the Gilliam Creek basin, Green/Duwamish basin, and Johnson Creek basin to determine alternatives for providing the needed detention storage and discharge of stormwater runoff to the Green River.

P17 Pond and Southcenter Regional Hydraulic Study

The study area encompasses approximately 1,150 acres from I-5 on the west to the Green River on the east and from I-405 on the north to about 1,500 feet north of S 200th St on the south. The study limits include Tukwila Pond, P17 Pond, closed pipes, open channels, slide gates, flap gates, three publicly operated stormwater pump stations, and outfalls to both the Green River and Gilliam Creek. The limits of the study are indicated on the map (page 5). These limits are based on the modeling work completed by Northwest Hydraulic Consultants (NHC) described further below. It is anticipated that the limits may need to be refined during the study.

The study goals include:

- Evaluating the Southcenter subarea stormwater system capacity, including excess or constraints on the three pump stations, under existing conditions.
- Evaluating stormwater system capacity, including excess or constraints of two pump stations, under a future conditions scenario after removal of the P17 Pond and P17 Pump Station.
- Evaluating need to replace two currently failed pumps in the S 180th St Pump Station.
- Identifying alternatives for relocating detention storage and pumping functions in the Southcenter subarea.
- Assessing costs for replacing conveyance and detention capacity in the Southcenter subarea.

The proposed study will require development of a hydraulic model or models capable of evaluating the complex hydraulics of the stormwater system within the Southcenter subarea. The system consists primarily of closed conduits which are connected to various open channels, storage ponds, pump stations, and flap gates. The system also includes manual controls such as a slide gate to divert flow to different zones within the system depending on flow conditions. The flap gate for flood protection at the confluence of Gilliam Creek and the Green River is a 9-foot diameter top-hinge gate that closes when river stage is high and prevents backup of river flow into Gilliam Creek. If the gate closes during a storm event, the stage within Gilliam Creek also rises, which in turn impacts conveyance in the Southcenter subarea. For example, the discharge from Tukwila Pond flows through different basins depending on the stage in Gilliam Creek, which is impacted by the river stage and flap gate at the confluence, pump station operations, and slide gate settings. The hydraulic model(s) will need to be calibrated to reflect the operation of the pumps and flap gates and will need to include storage nodes and slide gate controls. Further, the Green River is both tidally influenced in this area and impacted by the operation of the Howard A Hanson Dam upstream. The study will need to be capable of assessing an unsteady state flow regime because operation of the system is heavily influenced by the coincidence of the stage of the Green River and the stage in Gilliam Creek. The hydraulic model(s) developed for the study will need to be compatible with the HEC RAS 1D effective Federal Emergency Management Agency (FEMA) model which is being used to certify the levee.

NHC prepared an unsteady HEC RAS hydraulic model of the proposed study area in 2015 for the first phase of the levee accreditation process. As part of a separate fish passage and habitat enhancement project that proposes to modify the flood protection flap gate at Gilliam Creek and the Green River, Otak conducted a preliminary review of the model for evaluation of changes to flooding with proposed improvements. Due to the complexity of the Southcenter subarea stormwater system, Otak determined that the existing NHC model may not be appropriate to use directly as the basis of the proposed P17 Pond and Southcenter Subarea Hydraulic Study.

Next Steps:
Conduct desktop analysis of hydrologic and hydraulic information available in the NHC model, City GIS, and system operation manuals to identify re-usable information and data needs. An existing conditions hydraulic model will be developed and calibrated. Confirm or acquire crucial invert elevations with a survey and document the triggers for changing slide gate settings and activation of the pump systems by

interviewing City staff. Potential locations for a replacement of the P17 Pond and P17 Pump Station will be identified. Hydraulic analysis will evaluate the feasibility and compare the following solution elements:

- Relocating the P17 Pond to another location or multiple locations within the basin.
- Increasing pump capacity to decrease reliance on a pond for storage.
- Adjusting system hydraulics to utilize other pump stations with the Southcenter subarea.

It is likely that a combination of the solution elements will become the preferred alternative needed to address the issue. Up to three alternative configurations will be developed to a concept level including preliminary cost estimates.

If the King County Flood Control District proceeds with the LG-35 levee setback project, the FEMA HEC RAS model will need to be updated. An update of the FEMA HEC RAS model is not included in this project.

Opportunities and Challenges:

- It is possible there is some redundancy and excess capacity in the Southcenter subarea conveyance system, including within the pump stations, which could be utilized to compensate for removal of the P17 Pump Station and P17 Pond.
- The City strongly supports the fish habitat enhancements that would result from the LG-35 project identified in the WRIA 9 Salmon Recovery Plan.
- The City is currently working on the replacement of the flap gate at the confluence of Gilliam Creek and the Green River. The project is currently in the preliminary alternatives analysis phase. If that project is completed first, there may be cost savings for this study as the Gilliam Creek project will model impacts from the improvements on hydraulics in the Southcenter subarea.
- It is assumed that hydrology data from past modeling is available and is still applicable, since the study area is fully developed.
- The Southcenter subarea is highly developed, and identifying feasible locations to site the P17 Pond replacement may be challenging. Coordination with property owners and a siting analysis including property valuations will be needed.
- The City is aware that the GIS map of the storm sewer system has inaccuracies. For example, outfalls from the Southcenter subarea to the Green River are not accurately documented in the GIS data set currently in use by City staff. The study lead will need to use care in representing the existing conveyance system in the hydraulic model(s).
- There may be a limited number of consulting firms with the capability of developing an effective hydraulic model to represent the complex hydraulics of the Southcenter subarea and the relationship to the flow regimes of the Green River and Gilliam Creek.

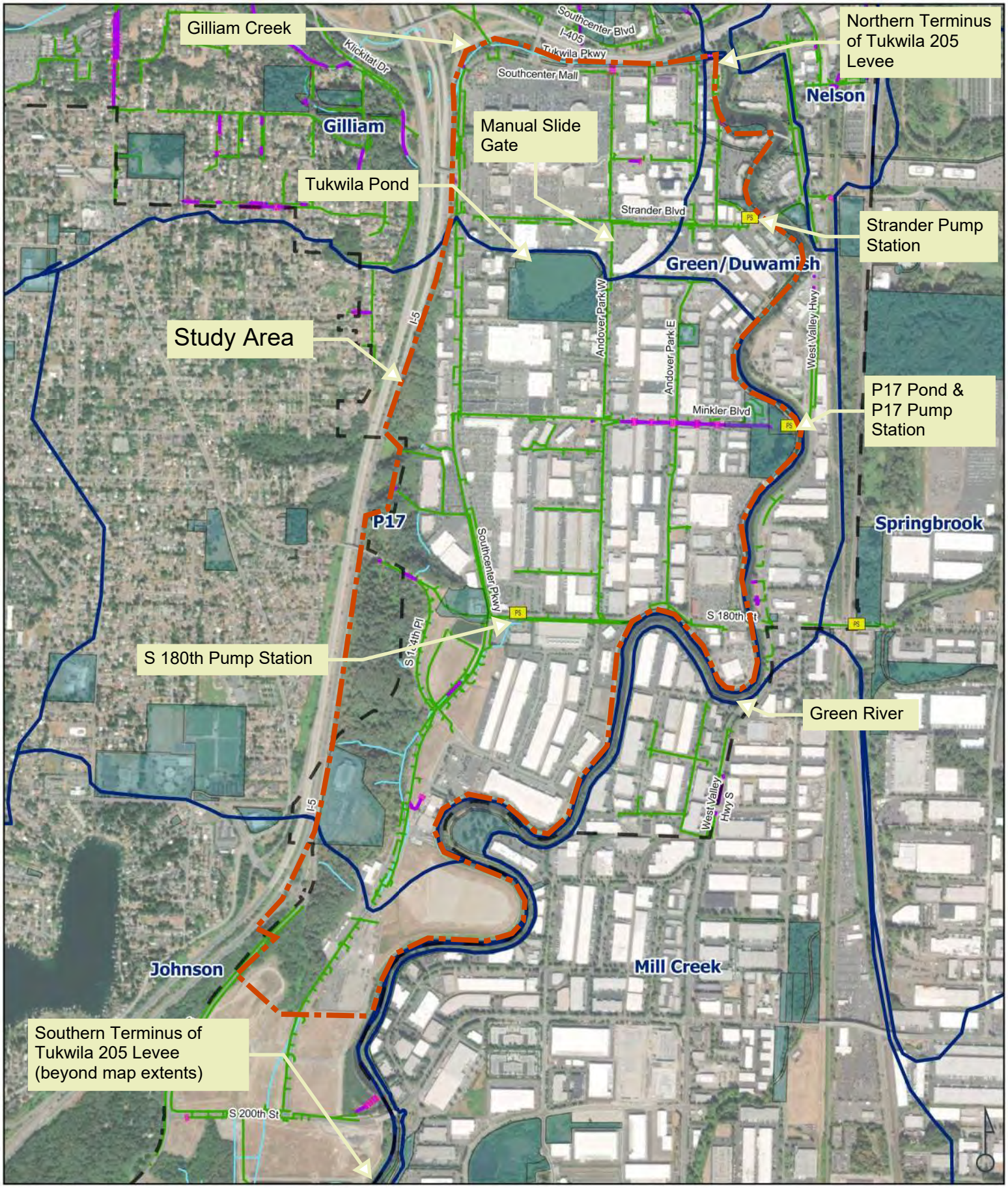
P17 Pond and Southcenter Regional Hydraulic Study

Scope Items and Estimated Cost in 2023 Dollars:

Scope	Cost
Desktop analysis of existing system and survey of critical inverts	$40,000
Meetings with interested parties including major project partners, property owners, and King County	$20,000
Review alternative pond locations and property valuation	$40,000
Hydraulic analysis of existing conditions	$50,000
Hydraulic analysis of proposed conditions (see alternatives described above)	$80,000
Peer review and technical reporting of hydraulic analysis	$40,000
Preparing three solution concepts and cost estimates	$30,000

The estimate does not include engineering design of the preferred alternative.

Estimated Project Cost: $300,000



P17 POND & SOUTHCENTER REGIONAL HYDRAULIC STUDY

TUKWILA SURFACE WATER COMP PLAN

TUKWILA, WA

Data Sources:
Date: 11/9/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

K:\Project\33300\33383\CADD\GIS\MXDs\33383 Tukwila Known Issues Data.aprx

Legend

- City Limits
- Drainage Basins
- Public Parcels
- Stream
- Study Area
- Closed Pipe
- Culvert
- Ditch
- Storm Pump Station

0 2,000 ft

Otak

P17 Pond and Southcenter Regional Hydraulic Study

References and annotations:

City of Tukwila P-17 Basin Study, prepared by KCM, 1989

- Not reviewed for preparation of this fact sheet. Recommend study lead review this document and its references.

Development Agreement by and between the City of Tukwila and La Pianta LLC, for the Tukwila South development (Ordinance 2233), 2009 and First Amendment to Development Agreement by and between the City of Tukwila and Segale LLC, for the Tukwila South development (Ordinance 2289), 2010

- An agreement was made between the City and Segale LLC (earlier La Pianta LLC) to master plan and construct the Tukwila South Project, which comprises 512 acres located between the boundaries of South 178th Street/South 180th Street on the north; South 204th Street on the south; Orillia Road and I-5 to the on the west; and the Green River on the east. Part of the development includes realigning of roadway corridors as well as stormwater management through detention ponds and water quality facilities. Two detention ponds/water quality facilities were to be constructed: the North Facility which would drain to the S 180th St pump Station, which would route the water to either the Green River or into the P-17 drainage basin; the South Facility which would outflow into the Green River or overflow into the Johnson Creek basin. It is unknown to what extent the development and associated stormwater facilities were implemented. The terms of this agreement, code modifications etc. proposed are valid to December 31st, 2024.

P17 Pumping Plan Plans, prepared by USDA SCS, 1973

- Reviewed detail drawings of construction of the pump station.

P17 Pump Station Pump Operation Plan (POP) and O&M Manual, 1974

- Purpose of pump is to remove stormwater from 1.13 square miles drainage area behind the dike. P17 plant includes 4 pumps that provide capacity ranging from 10 cfs to 110 cfs.
- Storage capacity of the forebay impacts the degree of protection of the pump plant. At elevation 20-ft the designed forebay area is 8.79 acres and volume if 54.2 ac-ft. Maximum 1% water surface is elevation 19.6-ft.

Storm Lift Station No. 15 Improvements Drainage Study

- This study evaluates impacts to the S 180th St pump station due to the additional flows (29.1 cfs being the 100-year flow) from the Tukwila South project in the event of pump failures caused by a power outage, equipment failure or other factors. The study notes that the hydraulic modeling associated with the pump station was completed by David Evans and Associates Inc. in 2010 as part of the Hydraulic Review and Assessment of the Southcenter Parkway Extension Project.
- It is unknown whether the Southcenter Parkway Extension Project was implemented, and analysis associated with the project was not reviewed. Recommend study lead review this document and its references.
- Lift Station No. 15 is a 27-foot diameter vault, 18-feet deep with a wetwell volume of approximately 5,430 cf and consists of four pumps: one 6.2 cfs pump and three 12.5 cfs pumps. Stormwater runoff is conveyed to the lift station through a 36-inch concrete pipe. The lift station pumps flow into a 30-inch pipe that further discharges into a 66-inch pressure pipe that conveys flows from surrounding areas and I-5 into the Green River. Pumped flows are allowed only when the Green River flow is less than 12,000 cfs at the Auburn gage.
- The study recommends sealing the pump station and installing a standby generator. It is unknown whether the recommended alternatives were implemented.

Tukwila Levee Accreditation Phase 1 – Engineering Analyses and Improvement Identification, prepared by Northwest Hydraulic Consultants, 2015

- The study was an internal drainage analysis to evaluate existing conditions landward of the Tukwila 205 levee in order to meet FEMA requirements for levee accreditation.
- This study models the capabilities of the pump stations in the Southcenter subarea.

Tukwila Pond Park Master Plan, prepared by J.B. Brennan, February 2022

- Contains a description and figure of the hydraulics related to Tukwila Pond, reproduced below.

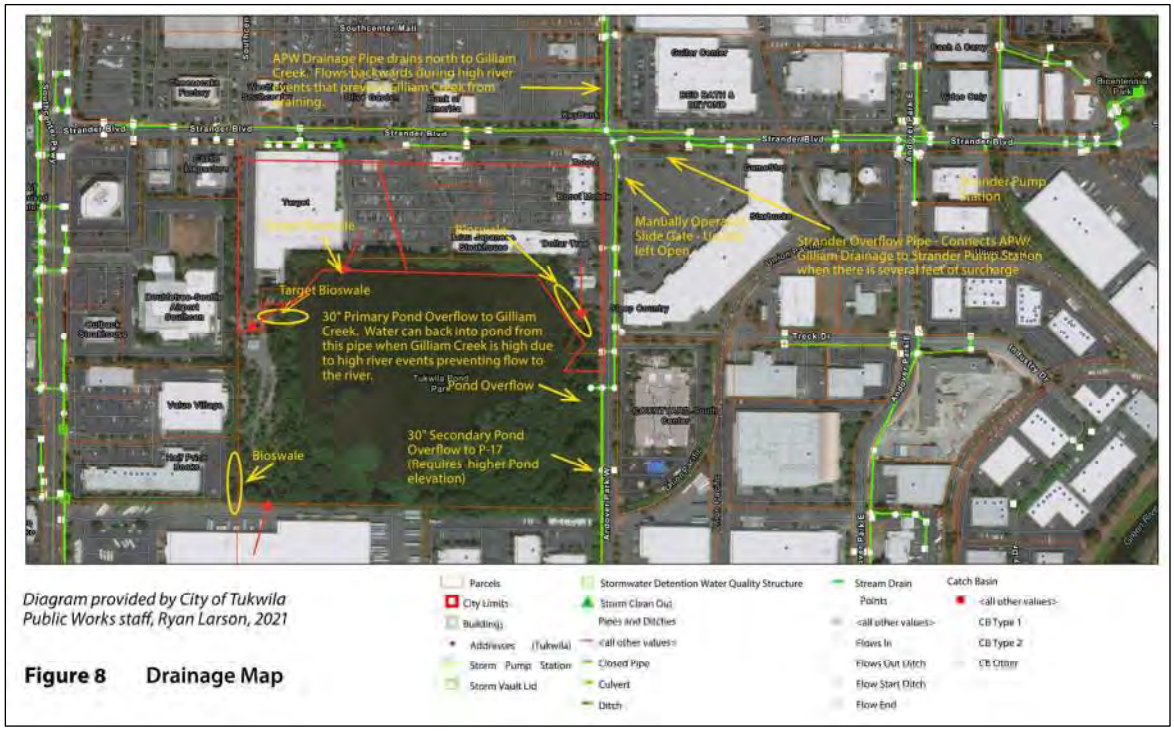


Figure 8 Drainage Map

Drainage Routing Associated with Tukwila Pond, from Tukwila Pond Park Master Plan

Tukwila Surface Water Management Comprehensive Plan, September 2003

- Identified Project No 03-DR09 to provide storm drain route on Strander Blvd to route Gilliam Creek outflow to Christensen Road Storm Drain Pump when Gilliam Creek outlet flap gates are closed.
- Conversations with the City indicate that this was complete in 2005 with a pump station upgrade.

STUDY SUMMARY SHEET—CIP-104

Study Title: Tukwila Master Plan for the Lower Green River Levee Projects

Study Extents: The length of various levees protecting both the right and left banks of the Green River through the City of Tukwila, from S 204th St to S 144th St

Issue Description:

Issue	Description
Local Influence on Flood Control Project Execution	City of Tukwila wishes to develop a master plan to guide how levee improvements and flood control protection projects implemented within the City limits by other entities could enhance a community vision for improvements to properties, public spaces, and public access to the river within the river corridor.

Known Issues:
The Lower Green River is at risk of severe flooding. To protect people, properties, and the environment along the Lower Green River, the King County Flood Control District (KCFCD) is developing a Lower Green River Corridor Flood Hazard Management Plan and has included several projects in Tukwila in its Capital Improvement Program (CIP).

The City expresses its priorities for levee project selection to the KCFCD on a regular basis. While the City may have some influence over levee protection project selection within the City limits, it has little influence over the ultimate forms of the upgraded levee sections or the levee's impacts on public spaces, transportation, recreation, and properties.

Project Description:
The Tukwila Master Plan for the Lower Green River Levee Projects (Levee MP) is intended to develop a strategic community vision that integrates adjacent properties with the shoreline into a welcoming multi-benefit space for the community. With the FCD making a historic investment in our Tukwila's levees along the Lower Green River it is important the City develop a shared vision of what the look, feel, and features should consist of across 12 flood protection projects to guide and facilitate preferred alternative(s) project selection and design.

The foundation of a successful planning project is inclusive public outreach. The Levee MP will engage project stakeholders and community members to solicit guidance, feedback, and support for levee enhancements. The outreach process will help inform the community about the levee history, existing conditions, and essential factors guiding the project. The outreach will use creative and engaging tools and tactics to facilitate this process with the community, including online surveys, community meetings, website updates, social media, and direct outreach to organizations and businesses.

The Levee MP will consider the design, function, and location of project features such as site lighting, walls and structures, compatible recreation features, trail network and trail heads, signage/wayfinding, and water access, along with integration with the adjacent properties. The Levee MP will identify priority investments in adjoining property and/or acquisitions to achieve multiple benefits with each project. The Levee MP will also identify connections with transportation corridors (roads, bike paths, and trails) and public parks. The planning work will prepare conceptual design for project features along with costs, project priorities, and timelines.

The Levee MP will also identify fish barriers for removal within these CIPs and identify opportunities for habitat enhancement along the levees and associated drainage pathways extending landward of the levees. Fish barrier coordination will build upon the findings of CIP-101, Fish Passage Barrier Prioritization Study.

The Levee MP will also build upon the findings of CIP-103, P17 Pond and Southcenter Subarea Hydraulic Study, to expand upon options for beneficial uses of the Minkler Maintenance Shop property after the City vacates it. The Levee MP will evaluate opportunities for this property to be redeveloped with multiple benefits, including flood protection and fish habitat.

Finally, the Levee MP will also assist the KCFCD in identifying historic and active tribal cultural resource sites along the river which may be impacted by flood protection projects. The City will work with the Duwamish Tribe and Muckleshoot Indian Tribe to document options to preserve or restore affected tribal cultural resource sites.

Scope Items and Estimated Cost in 2023 Dollars:

Scope	Cost
Desktop Analysis of levees, water courses, adjacent properties, critical areas, cultural resource sites, and transportation features	$30,000
Community Visioning and Public Involvement	$40,000
Public Use and Accessibility Priority Sites and Concepts	$50,000
Fish Passage Priority Sites and Concepts	$25,000
Minkler Maintenance Site Redevelopment Concepts	$35,000
Tribal Cultural Resource Protection Priorities	$30,000
Implementation Plan and Master Plan Report	$40,000
Planning Contingency (10%)	$25,000

Estimated Study Cost: $275,000

Related Projects:
KCFCD is planning 12 projects in the City of Tukwila, including the five on its 2024 Six-Year CIP shown below:

Project	Scope Notes
Desimone Levee Major Repair USACE	This project will assess the damaged section of Desimone Levee between the two new floodwall segments and recommend possible options for repair. Only the conditions assessment is and some contribution to the project design by the US Army Corps of Engineers is proposed for funding at this time.
Fort Dent Levee 2020 Repair	This project will repair several damaged sections of the Fort Dent Levee at approximately river mile 11.

Tukwila Master Plan for the Lower Green River Levee Projects

Project	Scope Notes
Tukwila-205 Gunter Floodwall	This project will construct a floodwall to bring the Gunter segment of the Tukwila 205 levee into compliance with certification requirements for structural stability and raise the levee to roughly the 500 year event.
Tukwila-205 Levee Ratolo Segment Floodwall	This project will construct a 0.15 mile floodwall and sloped embankment to protect adjacent businesses from flooding. The floodwall alignment (including embankment slope, factors of safety, and necessary real estate) will be finalized during the project design phase.
Tukwila-205 Levee USACE Gaco-Segale Segment	This is a US Army Corps led project to replace 3500 feet of Tukwila 205 levee in-place replacement to bring up to 500-year level of protection per the approved interim SWIF. The USACE will share remaining 2/3 of the cost; this allocation is the local share of 1/3 of total cost. Requires cooperation agreement with USACE.

ATTACHMENT E-3

2024 Annual Small Drainage Program

Memorandum

To: Sherry Edquid; Josh Hopkins

From: Trista Kobluskie

Copies: File

Date: February 12, 2024

Subject: Tukwila 2024 Annual Small Drainage Project List

Project No. : 33383

Otak compiled a 2024 Annual Small Drainage (ASD) project list as part of the Surface Water Comprehensive Plan (SWCP) update. The majority of the ASD project list comprises small projects from the 2022 Small Drainage Project List which have not yet been completed.

Project priority has been established using the following criteria:

Priority 1	• Incomplete projects from the 2022 Small Drainage Project List with a priority of 2, unless otherwise mentioned.
Priority 2	• Incomplete projects from the 2022 Small Drainage Project List with a priority of 3, unless otherwise mentioned.
Priority 3	• Incomplete projects from the 2022 Small Drainage Project List with any priority that appear to be primarily private property issues or issues not directly associated with the storm sewer; or • Projects that are new to the ASD list.

2024 Annual Small Drainage Project List[1]

Priority	Problem Statement	Project Description	Cost[2]	SWCP Known Issue No.
1	Resident at 10349 Beacon Ave S. has roadway runoff entering her property causing damage to her septic system. Surveyed in 2008.	There are two possible solutions to resolve this issue; either obtain easements from private property owners to construct new drainage system to the west or construct a deep storm line to Ryan Way. The preferred method will need to be determined during design.	Construction $ 80,000 Eng/Cont 15% $ 16,000 Total $ 96,000	KI-9
1	On 34th & Military Road – Root plugged, old culvert tile pipe.	Replace 18" pipe from Military Road to 34th at old gas station to corner of S. 144th Street.	TBD	KI-10
1	Old broken pipe from ditch on 45th to S. 137th – Mismatched pipe, junk system.	Replace approximately 450' of 12" pipe and add (8) catch basins on east side of 45th.	Total $ 70,000	KI-11 (Also PP-9)
1	At the NE corner of 33rd and S. 132nd, 3306 S. 132nd manufactured home has 12" CMP/concrete culvert tile pipe running through yard to manhole under deck and then out to pond in neighbor's yard then to 34th, live stream.	Replace/re-route system, HPA needed.	TBD	KI-12
1	38th Ave & S. 130th to dead end – Needs new drainage system. Old mismatched pipe, deep ditches, steep driveways. Water running into home on lower side of road.	Install new 12" storm system with catch basins and thickened edges to get water to new catch basins.	TBD	KI-13

[1] Otak Recommendation Only – Not Approved by City Administration or Council – Subject to Change
[2] When costs are provided, they are from the 2022 Small Drainage Projects List. Costs were not developed for additional projects, nor updated from 2022.

Priority	Problem Statement	Project Description	Cost[2]	SWCP Known Issue No.
2	S. 150th creek outfall to catch basin on S. 150th (off Macadam Road). Undersized inlet "debris plugs", south of Baptist church.	Install new cone grate and Type II manhole.	Construction $ 15,000 Eng/Cont 15% $ 6,000 Total $ 21,000 *Design completed in 2016	KI-70
2	56th Ave S & S. 141st to S. 139th problem area – Problem ditch. Long berms need new drainage system to prevent homes from being flooded.	Install approx. 600' of 12" storm main and (4-6) catch basins from S. 141st to S. 139th. Fill ditch, both sides of 56th Ave South.	Total $100,000	KI-71
2	West Valley Hwy at the CAT Rental Store – Railroad tracks to the ditch.	Replace 650' of 12" pipe and install (5) Type I catch basins. Crossing OK, need R-O-W survey.	Construction $100,000 Eng/Cont 15% $ 15,000 Total $115,000	KI-15
2	On S. 130th at East Marginal Way on west side – Old mismatched pipe is broken, junk system etc. From East Marginal Way to 34th – Both sides of road, new system.	Replace pipe from ditch on north side crossing with 950' of 12" pipe and (15) catch basins, including angle across street.	TBD	KI-17 (Also PP-10)
2	Large Contech pot style vault at Gilliam Creek crossing on S. 154th – vault needs better access for pot cleaning and replacement.	Pull lid from vault and add 2-3 foot riser section asphalt area. Add fences and gates for vehicle access for cleaning.	TBD	KI-72
2	10831 TIB – Downstream pipe was abandoned (no idea when) and is now slowing to north through pipes at reverse grade.	Replace 5 type-1 CBs and 330' of 12" storm pipe from DR00037 to DR00020	TBD	KI-73 (Also PP-5)

Priority	Problem Statement	Project Description	Cost[2]	SWCP Known Issue No.
3	13601 40th Ave S. Old brick built CB2s and 18" CMP pipe are completely impacted with roots. Sections of the pipe have rusted away, and water is scouring the ground around the pipe depositing sediment into Southgate Creek	90' of 18" CMP; 80' of 12" concrete; two CB2s and one CB1 need to be replaced. Recommend waiting until the ongoing study of Southgate Creek has been completed to see if proposed solutions will address this problem. Existing design may need to be changed.	TBD	KI-87
3	S. 133rd & S. 134th – Clean rocks and other debris out of 30" CMP pipe on west branch of Southgate Creek.	Debris plugs low flow pipe, hard to keep clean. NPDES issue and private property issue. Recommend assessing again after Middle Fork Southgate Stream and Slope Stability Study has been completed.	TBD	KI-14
3	Off S. 135th between 37th and 35th – Local crawl space flooding due to no drainage in private alley.	Install drainage and hook up homes. Need petition from property owners.	TBD	KI-18
3	42nd Avenue Detention Pond, storm structure ID=DR01878, frequent or difficult maintenance; City checks during all storms. City would also like to consider adding shade and making the facility available for public access.	Detention pond outfalls to Category IV wetland. Structure ID=DR01878 is a catch basin within wetland. Update inlet of ID=DR01878 to reduce clogging. Evaluate placing trash rack or pipe screen on structure ID=DR06845, an approximately 12-in diameter pipe flowing out of detention pond. Evaluate northwest corner of parcel 0042000355 for suitability to plant a shade tree.	TBD	KI-52

2022 & Prior Annual Small Drainage Projects, Disposition Table

2022 Priority Ranking	Problem Statement	Project Description	Disposition
1	14811 42nd Ave South – Inlet to pipe on this property frequently plugs up with leaves and sticks, then overflows onto 42nd Ave South, creating localized flooding. The preacher's house.	Two options for repair: 1) Reroute the flow from the outfall on S. 148th Street by connecting storm pipes DR13199 and DR13246 to a new type 2 CB, then 90' of new storm main from CB to the east to a new type 2 installed on the 18" main that flows south through the intersection of S. 148th & 42nd Ave South. 2) Install a type 2 CB on storm pipe DR13258 (the inlet pipe for the flow running across this property) with a beehive rack on top and trash rack on the inlet pipe to the new structure.	Completed 2021
1	Klickitat Ave at 53rd Ave S. 18" CMP is rusting out and a sink hole is forming in the shoulder above it.	Replace 180' of CMP pipe between structures DR06858 and DR02254	Completed 2021
1	13601 40th Ave S. Old brick built CB2s and 18" CMP pipe are completely impacted with roots. Sections of the pipe have rusted away, and water is scouring the ground around the pipe depositing sediment into Southgate Creek	90' of 18" CMP; 80' of 12" concrete; two CB2s and one CB1 need to be replaced.	SWCP KI-87; 2024 ASD, Priority 3
1	S 124th St from 42nd Ave to 45th Ave – Allentown There is no drainage on the north side of S. 124th so the stormwater is running off the road into residents' yards and driveways.	Install asphalt berms and catch basins along the north side of S 124th St. New drains will either be connected to the existing main on the south side of S 124th St or to existing drains on 43rd, 44th & 45th. Possible utility conflict on S 124th	Completed 2021
1	57th Ave South off Interurban Ave behind the Golden Nugget.	Bring Type II manhole up to grade by removing 8' of 24" riser rings. Add 48" riser sections and new manhole ring & cover	Completed 2021
1	53rd Ave S from 166th Lane in SeaTac	Install new Type 1 CB behind 16625 53rd Ave S, repair and line approx. 345' of 12" conc. storm line. All work in easement on private property.	Completed 2021

2022 Priority Ranking	Problem Statement	Project Description	Disposition
1	Allentown – 48th, 49th, S. 124th – These streets have no formal drainage and have always had problems with runoff into yards and homes from right-of-way	Install new pipe one street at a time.	Completed 2022
2	Rip rap has been washed out from the end of outfalls at flapgates #27, #28 and #29 in Gateway Park. Add root wads	Replace rip rap, add root wads, HPA needed.	Unknown
2	Resident at 10349 Beacon Ave S. has roadway runoff entering her property causing damage to her septic system. Surveyed in 2008.	There are two possible solutions to resolve this issue; either obtain easements from private property owners to construct new drainage system to the west or construct a deep storm line to Ryan Way. The preferred method will need to be determined during design.	SWCP KI-9; 2024 ASD, Priority 1
2	Trail #14 at S. 168th & 53rd – Install storm system under sidewalk to get rid of deep ditch to residence there. From dead end of S. 168th to storm line on 53rd.	Install (2) Type I catch basins and 400' of 12" pipe. Remove deep ditch on north side of home's property.	Problem solved. Property at 16665 built; no longer an issue.
2	On 34th & Military Road – Root plugged, old culvert tile pipe.	Replace 18" pipe from Military Road to 34th at old gas station to corner of S. 144th Street.	SWCP KI-10; 2024 ASD, Priority 1

2022 Priority Ranking	Problem Statement	Project Description	Disposition
2	Old broken pipe from ditch on 45th to S. 137th – Mismatched pipe, junk system.	Replace approximately 450' of 12" pipe and add (8) catch basins on east side of 45th.	SWCP KI-11; 2024 ASD, Priority 1
2	At the NE corner of 33rd and S. 132nd, 3306 S. 132nd manufactured home has 12" CMP/concrete culvert tile pipe running through yard to manhole under deck and then out to pond in neighbor's yard then to 34th, live stream	Replace/re-route system, HPA needed.	SWCP KI-12; 2024 ASD, Priority 1
2	38th Ave & S. 130th to dead end – Needs new drainage system. Old mismatched pipe, deep ditches, steep driveways. Water running into home on lower side of road.	Install new 12" storm system with catch basins and thickened edges to get water to new catch basins.	SWCP KI-13; 2024 ASD, Priority 1
3	S. 150th creek outfall to catch basin on S. 150th (off Macadam Road). Undersized inlet "debris plugs" south of Baptist church.	Install new cone grate and Type II manhole.	SWCP KI-70; 2024 ASD, Priority 2
3	56th Ave S & S. 141st to S. 139th problem area – Problem ditch. Long berms need new drainage system to prevent homes from being flooded.	Install approx. 600' of 12" storm main and (4-6) catch basins from S. 141st to S. 139th. Fill ditch, both sides of 56th Ave South.	SWCP KI-71; 2024 ASD, Priority 2
3	S. 133rd & S. 134th – Clean rocks and other debris out of 30" CMP pipe on west branch of Southgate Creek.	Debris plugs low flow pipe, hard to keep clean. NPDES issue and private property issue.	SWCP KI-14; 2024 ASD, Priority 3
3	West Valley Hwy at the CAT Rental Store – Railroad tracks to the ditch.	Replace 650' of 12" pipe and install (5) Type I catch basins. Crossing OK, need R-O-W survey.	SWCP KI-15; 2024 ASD, Priority 2

2022 Priority Ranking	Problem Statement	Project Description	Disposition
3	On 37th Ave South from S. 126th to S. 128th, then down S. 126th to creek – Old mismatched pipe is broken, junk system etc.	Replace 750' of 12" pipe and install (12) catch basins.	SWCP KI-16; Solved, per City staff interviews for SWCP
3	On S. 130th at East Marginal Way on west side – Old mismatched pipe is broken, junk system etc. From East Marginal Way to 34th – Both sides of road, new system.	Replace pipe from ditch on north side crossing with 950' of 12" pipe and (15) catch basins, including angle across street.	SWCP KI-17; 2024 ASD, Priority 2
3	Off S. 135th between 37th and 35th – Local crawl space flooding due to no drainage in private alley.	Install drainage and hook up homes. Need petition from property owners.	SWCP KI-18; 2024 ASD, Priority 3
3	Large Contech pot style vault at Gilliam Creek crossing on S. 154th – vault needs better access for pot cleaning and replacement.	Pull lid from vault and add 2-3 foot riser section asphalt area. Add fences and gates for vehicle access for cleaning.	SWCP KI-72; 2024 ASD, Priority 2
None	10831 TIB – Downstream pipe was abandoned (no idea when) and is now slowing to north through pipes at reverse grade.	Replace 5 type-1 CBs and 330' of 12" storm pipe from DR00037 to DR00020	SWCP KI-73; 2024 ASD, Priority 2
N/A	Trail #11 at S. 162nd & 48th – Need new storm system for 47th from the trail to S. 160th Street. East side of road, homes gets lots of run off.	Install (8-10) Type I catch basins and 1,000 feet of 12" pipe to replace old broken mismatched junk pipe. Add thickened edge whole eastside with catch basins crossing to main line on west side.	Completed 2017
N/A	14423 to 14455 58th Ave S. between S. 144th and S. 147th – Plugged under drains and rotten pipe. Sub-standard catch basins creating icing and washing problems. Broken sunken sidewalks.	Remove 200' of sidewalk and curb. Replace under drains and install new drainage system. Replace concrete driveway aprons, sidewalks and curbs hook up all yard drains to system. Install Type 3 catch basin and pipe to collect water.	Completed 2017

2022 Priority Ranking	Problem Statement	Project Description	Disposition
N/A	Sidewalk at the Target Store – north end of building along Strander Blvd has no drainage. This leads to large puddles affecting customers.	Install drainage pipe and catch basins to get water in low spot to drainage system in Strander Blvd.	Completed 2017
N/A	Outfall headwall at the 109" Gilliam Outfall – Needs railing, catwalk, and ladder to access pad for inspection. Also, RDF has an unsafe access issue from the parking pad to inflow pipe.	Install railing, stairs, catwalk, and ladder to bottom pad at structure for safer access. HPA? Install a platform and stairs from parking pad to bottom. Build on the south side of structure.	Completed 2018
N/A	Rotten CMP pipe and manhole in levee at Overmeyer Drive, CBD – Storm out fall system, block south of Strander Blvd.	Lined 100' with CIPP	Completed 2018
N/A	Abandon storm manhole in front of Sabey Server farm. Manhole next to power pole out front of gen sets.	Add (1) Type I catch basin and pipe to downstream system. Grout pipe under highway.	Completed 2018
N/A	Gilliam Creek & S. 154th – Replace and improve drainage structure DR05540, "the cone". This is the structure at the inlet to the culvert that carries Gilliam Creek under Southcenter Blvd.	Rebuild needs to have something similar to the rack on the Gilliam Creek inlet that goes to the river and also improve access to this structure so the crew can maintain it. There might have been some design work started already.	Completed 2019
N/A	Stairs at the Gilliam Creek Control Structure – Install new stairs for access to the debris grate	Possibly designed in 2016 but the Crystal Springs project prevented it from being done.	Completed 2019

CIPP Lining Projects, Disposition

Problem Statement	Project Description	Disposition
Southcenter Blvd @ 61st Ave South – Storm main needs to be lined between DR04298 and DR04276 to prevent root intrusion.	Approximately 110' of 18" pipe. There is also a repair that needs to be made 20' from the south end of this pipe where a guardrail post punctured the top of the pipe.	Completed 2019
S. 140th Street @ 38th Ave South – Storm main needs to be lined between DR04742 and DR04743 and DR04744 to prevent root intrusion.	Approximately 200' of 12" pipe.	Completed 2019
S. 152nd Street @ 42nd Ave South – Storm main needs to be lined between DR02222 and DR02223 and DR01867 to prevent root intrusion	Approximately 170' of 12" pipe.	Completed 2019
S. 130th Street @ 33rd Place South – Storm main needs to be lined between DR04373 and DR04372 and DR04371 and DR04370 to prevent root intrusion.	Approximately 120' of 12" pipe.	Completed 2019
40th Ave South @ Southcenter Blvd – Storm main needs to be lined between DR01533 and DR01532 to prevent root intrusion.	Approximately 45' of 8" pipe.	Completed 2019
Behind Thorndyke Elementary School –Storm main needs to be lined from DR0174 to DR0175 to DR05784	Approximately 285' of 24" pipe	Completed 2021
53rd Ave S from 166th Lane in SeaTac (listed above for repairs)	Approximately 345' of 12" conc. pipe	Completed 2021

ATTACHMENT E-4

Public Involvement Materials



Rain is inevitable. Stormwater pollution is not.

CITY OF TUKWILA

Surface Water Comprehensive Plan Update

The City of Tukwila is updating its Surface Water Comprehensive Plan for the next 10 years. We are working on fixing stormwater drainage issues and improving stormwater quality and fish habitat.

Projects are funded by the Surface Water Utility Fees paid by property owners in Tukwila along with grants or partnerships. We need your help to identify which projects and studies are the most important to you.

What is your priority for managing stormwater runoff?

Your opinion matters!

We will use feedback from the community to help select which projects and studies to implement first.

TUKWILA SURFACE WATER

Tukwila Surface Water Comprehensive Plan Update Project Prioritization

September 20, 2023

TUKWILA SURFACE WATER

SEAL OF TUKWILA WASHINGTON 1908

Introduction & History

- Public Works Department – Surface Water Program
- Updating the Surface Water Comprehensive Plan
- Strategic framework for managing surface water
  - Conserve and enhance streams, ponds, rivers
  - Protect public health and safety
  - Protect private property and public infrastructure
  - Maintain compliance with regulations
- First plan in 2003
- Second plan in 2013



Duwamish River in Tukwila

What are we doing?

- The plan will work to fix stormwater drainage issues and improve stormwater quality and fish habitat
- We need your help to identify which projects and studies are the most important to you!
- The online survey has four types of projects:
  - Drainage
  - Water Quality
  - Fish Barrier Removal
  - Studies



Stormwater Manhole Lid

Drainage Projects



Flooding in Tukwila



New catch basin in Tukwila

Water Quality Projects



Tukwila Pond



Bioretention cell in Tukwila

Fish Barrier Removal Projects



Gilliam Creek fish barrier in Tukwila



Riverton Creek fish barrier removal project in Tukwila

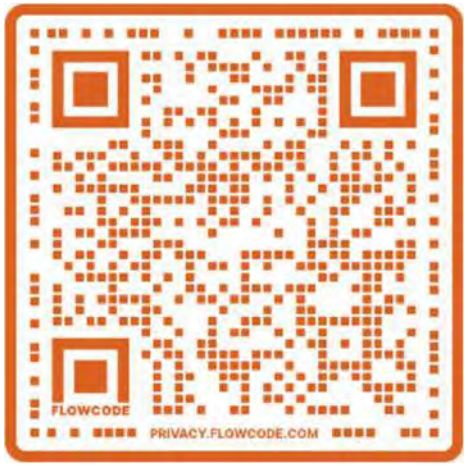
Studies



Minkler Public Works Maintenance Facility in Tukwila



Minkler Pond in Tukwila

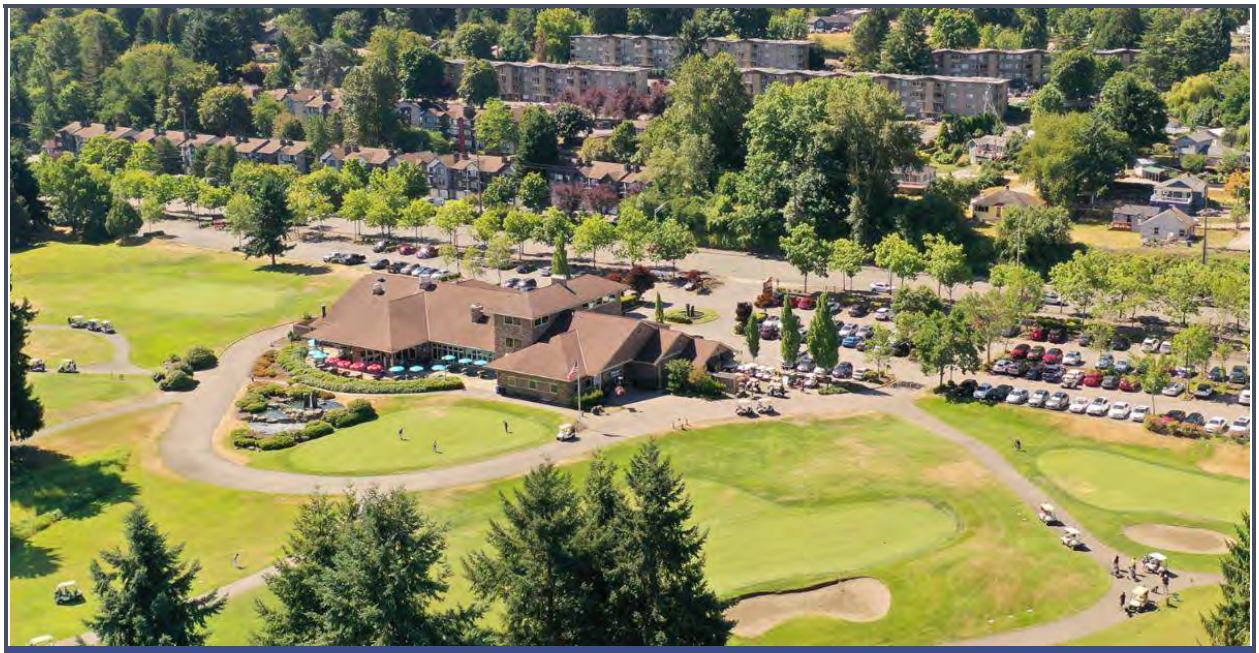


What is your priority for managing stormwater runoff?

The survey is open until October 11th!

Recipients

From: City of Tukwila <scott.kirby@tukwilawa.gov>
Sent: Monday, September 25, 2023 4:59 PM
To: Recipients
Subject: City of Tukwila E-Hazelnut Newsletter for September 2023



City of Tukwila E-Hazelnut Newsletter - September 2023

Quick Links

- City of Tukwila Website
- City Employment Opportunities
- Experience Tukwila
- TukTV

Tukwila Elected Officials

Hear from your Tukwila candidates!



To help Tukwila residents get to know the candidates for the Mayor and Council positions in the upcoming election, the City of Tukwila offers a **2023 Video Voters' Guide** as a resource for

Which stormwater projects and studies are important to you in Tukwila?



Rain is inevitable. Stormwater pollution is not. What is your priority for managing stormwater runoff?

The City of Tukwila is updating its Surface Water Comprehensive Plan for the next 10 years. We are working on fixing stormwater drainage issues and improving stormwater quality and fish habitat. Projects are funded by the Surface Water Utility Fees paid by property owners in Tukwila along with grants or partnerships.

We need your help to identify which projects and studies are the most important to you! We will use feedback from the community to help select which projects and studies to implement first. Use our online survey to submit your priority projects by **October 11, 2023**!

- **View the Online Survey**

City of Tukwila | 6200 Southcenter Blvd, Tukwila WA 98188 | 206 433-1800

City of Tukwila | 6200 Southcenter Blvd, Tukwila, WA 98188

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Tukwila Surface Water Comp Plan Project Prioritization Survey

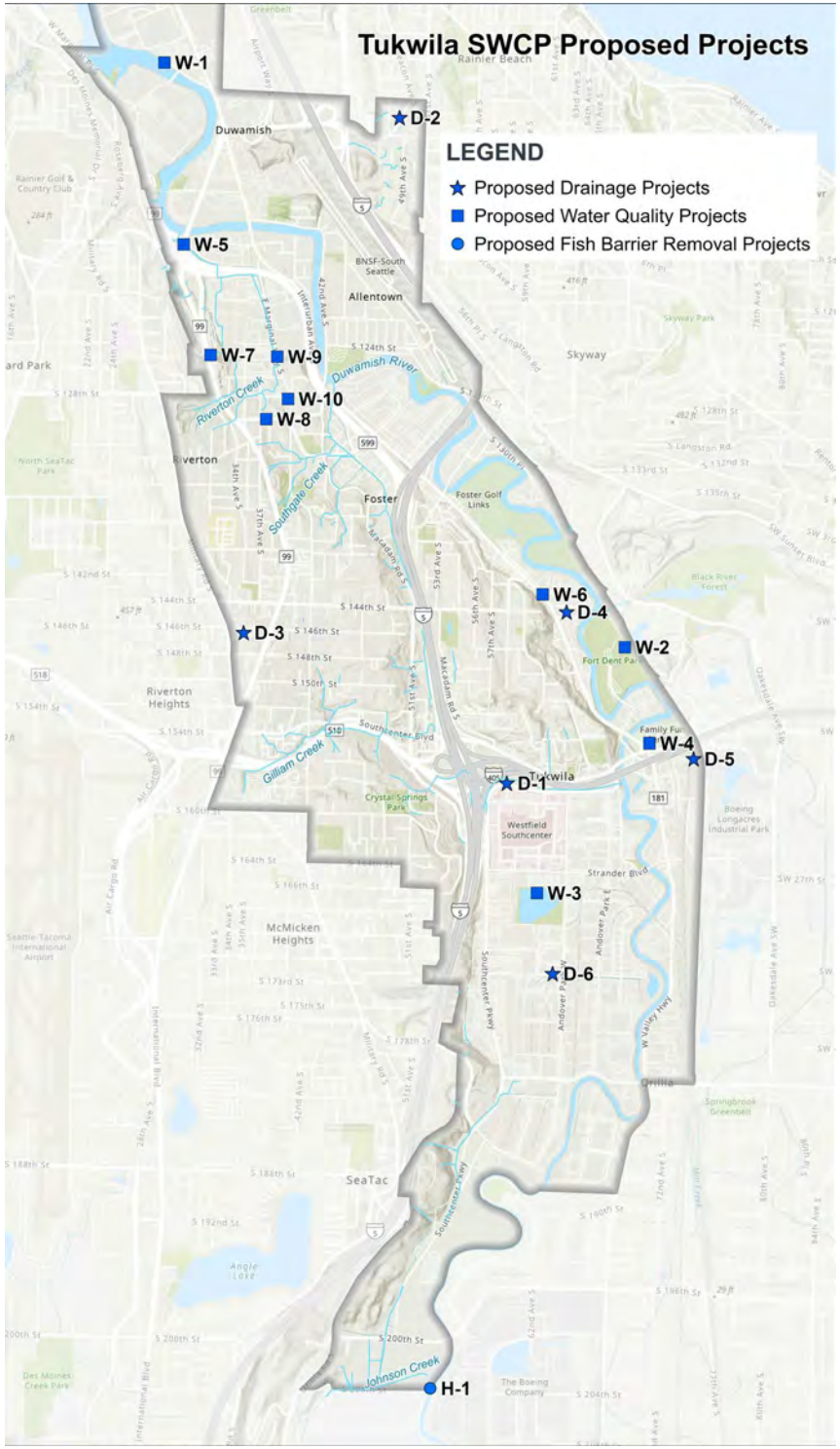
Welcome! Please **help the City of Tukwila prioritize projects and studies** to address stormwater drainage, improve quality of runoff, and restore fish habitat. The storm sewer system is designed to gather stormwater runoff and discharge it to local streams and the Green/Duwamish River. How we manage runoff and design stream and river crossings such as culverts can affect ponding on streets and properties, water quality in streams, rivers, and the Puget Sound, and availability of habitat for fish.

The City has identified 17 surface water capital projects to fix lack of stormwater infrastructure, aging infrastructure, or older designs that may be contributing to ponding, poor water quality, or degraded fish habitat. See the reference map below for project locations. **The City has also identified four studies** where we need to learn more about the problems before deciding on solutions.

To help us prioritize future projects, **please tell us about your preferences in the survey below the map**. The projects we are asking you about today are for the future. If you would like to see our recent and ongoing construction projects, see the completed projects and the surface water projects lists on our City Construction Projects and Transportation Impacts web page.

The survey will be open until October 11, 2023.

Optional: Open Map in New Tab **Optional: Open Survey in New Tab**


Tukwila SWCP Proposed Projects
LEGEND
Proposed Drainage Projects
Proposed Water Quality Projects
Proposed Fish Barrier Removal Projects
W-1
D-2
W-5
W-7
W-9
W-10
W-8
D-3
W-6
D-4
W-2
W-4
D-5
D-1
W-3
D-6
H-1
Duwamish
Allentown
Skyway
Riverton
Foster
Riverton Heights
Tukwila
McMicken Heights
SeaTac
Duwamish River
Riverton Creek
Southgate Creek
Gilliam Creek
Johnson Creek

Tukwila SWCP Project Preference Survey

Survey Page 1

Which are your preferred drainage projects?

Drainage projects address ponding on streets from stormwater runoff, repair or replacement of aging stormwater pipes, or re-routing stormwater pipes when safety or water quality are a concern. Please select **up to two** options below. Drainage projects are shown on the map above as blue stars.

- [ ] **D-1: Tukwila Parkway Drainage and Water Quality Improvement**
  Issue : The 48-inch diameter stormwater pipe on Andover Park W connects to a state stormwater pipe under I-405 without maintenance access. Runoff from busy roads discharging at three outfalls does not receive treatment.
  Project: Re-route the stormwater pipe on Andover Park W. Ensure both maintenance access to new pipe and positive drainage to the downstream system. Add a runoff treatment facility to remove pollutants from runoff which currently connects to a stormwater pipe under I-405 without maintenance access. Ensure both maintenance access to new pipe and positive drainage to the downstream system. Add runoff treatment facilities to remove pollutants from runoff.
  Benefits: Improves maintainability, ensures drainage, removes pollutants from urban runoff, and completes a project that was identified in the 2013 Surface Water Comprehensive Plan.

- [ ] **D-2: S. Ryan Way Pipe Rehabilitation**
  Issue: Stormwater pipes in S Ryan Way are aging, in poor condition, and are at risk of failure.
  Project: Replace aging stormwater pipes and improve runoff collection. Coordinate efforts with potential pedestrian safety or re-paving projects in same location.
  Benefits: Avoids potential road safety hazards from sheet flow on a steep street if aging stormwater pipes were to fail.

- [ ] **D-3: S 146th St and 35th Ave S Drainage Improvement**
  Issue: Stormwater runoff ponds along S 146th Street and a portion of 35th Ave S and adjacent private property.
  Project: Install curbs and replace stormwater pipes along S 146th Street and a

Benefits: Reduces ponding on streets and property and completes a project that was identified in the 2013 Surface Water Comprehensive Plan.

☐ **D-4: S 143rd St Drainage and Water Quality Improvement**

Issue: Stormwater runoff ponds along S 143rd Place and S 143rd Street and adjacent private properties. River water may back up into stormwater pipes when the river is high. Stormwater runoff is untreated.

Project: Install curbs and replace stormwater pipes along S 143rd Place and S 143rd Street. Convert an existing ditch to a bioswale and construct a runoff treatment facility to remove pollutants from runoff. Install a flapgate at the river.

Benefits: Reduces ponding on streets and property and removes pollutants from runoff and completes a project that was identified in the 2013 Surface Water Comprehensive Plan.

☐ **D-5: Nelsen/Longacres Drainage Improvement Phase II**

Issue: Stormwater runoff ponds on Longacres Way and adjacent properties. The 24-inch diameter stormwater pipe draining east under the Burlington Northern Santa Fe railroad tracks is too small. A previous project phase to install stormwater pipe from West Valley Highway was finished in 2015.

Project: Install a 48-in stormwater pipe from ditch west of railroad tracks using trenchless technique underneath tracks connecting to existing P-1 interceptor pipe to the east. The project addresses ponding in the road and adjacent properties. The previous project phase to install stormwater pipe from West Valley Highway to Nelsen was finished in 2015.

Benefits: Reduces ponding on streets and property and completes a drainage project first identified in 1993 Surface Water Management Comprehensive Plan.

☐ **D-6: Tukwila Urban Center Conveyance Inspections**

Issue: The stormwater pipe system in the Tukwila Urban Center is relatively flat and may tend to fill with sediment. The system is aging, and the repair, rehabilitation, and assessment needs are unknown.

Project: Clean and inspect stormwater pipes in Tukwila Urban Center to assess condition and identify next steps.

Benefits: Proactively manages drainage and pipe condition in busy area before serious problems arise.

☐ **None:** I do not support drainage projects

Other:

Please write in a drainage issue and location.

1000

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Tukwila SWCP Project Preference Survey

Survey Page 2

Which are your preferred water quality projects?

Water quality projects remove pollutants from stormwater before discharging runoff to streams or the Green/Duwamish River. Please select **up to two** options below. Water quality projects are shown on the map above as blue squares.

- [ ] **W-1: Norfolk Trunkline Sewer Separation**
  Issue: The City inherited a 84-inch diameter sewer trunkline from King County Wastewater division in 1994. Some of City's stormwater, Boeing stormwater, and City of Seattle stormwater is flowing into the trunkline.
  Project: Disconnect City-owned stormwater pipes from sanitary sewer trunkline in 27th Ave S. Install new stormwater pipes and construct a new stormwater outfall to the Duwamish River. Assess system hydraulics and pipe alignments in a pre-design alternatives analysis.
  Benefits: Reduces risk of City involvement in a sanitary sewer outfall combined sewer overflow (CSO) from stormwater overflow in a big storm.

- [ ] **W-2: Fort Dent Park/Starfire Water Quality Retrofit**
  Issue: Developed areas of the park, including sports fields, discharge urban runoff to the Duwamish River and may discharge an emerging pollutant of concern from tire particles that is known to kill coho salmon.
  Project: Construct a new runoff treatment facility to remove pollutants from developed areas of the park.
  Benefits: Removes pollutants from urban runoff.

- [ ] **W-3: Tukwila Pond Enhancement and Water Quality Retrofit**
  Issue: Tukwila Pond suffers from high levels of nutrients such as phosphorus, low oxygen, and high temperature in summer.
  Project: No specific project has yet been identified. The Surface Water Program could participate with the Parks & Recreation Department to improve the ecosystem and water quality in Tukwila Pond. The Parks & Recreation Department may study and select a water quality improvement intervention with a future implementation phase of the 2021 Tukwila Pond Park Master Plan, and the Surface Water Program will support a resulting water quality improvement project.

dense urban area.

- [ ] **W-4: City Gateway at Grady Way Stormwater Facility Rehabilitation and Water Quality Improvement**
  Issue: A 1970's era transfer of ownership of a stormwater facility from the state department of transportation to the City of Tukwila is incomplete, and the older stormwater swale may not remove to the most toxic pollutants from urban road runoff.
  Project: Complete the paperwork to transfer ownership of the facility. Expand and improve the facility to remove more pollutants from urban runoff. Install landscaping and City gateway signage on the site.
  Benefits: Clarify ownership, improve pollutant removal, and support placemaking.

- [ ] **W-5: Tukwila International Blvd Water Quality Improvement with Underground Structures**
  Issue: Urban runoff from 2.2 acres of Tukwila International Blvd near SR-599 is untreated.
  Project: Install underground runoff treatment structures to remove pollutants from runoff from Tukwila International Blvd. The location is Treatment Site #8 from the City's 2021 study of stormwater retrofit sites.
  Benefits: Remove pollutants from urban stormwater runoff.

- [ ] **W-6: Interurban Avenue South Water Quality Improvement with Underground Structures**
  Issue: Urban runoff from 1.5 acres of Interurban Ave S near S 143rd St is untreated.
  Project: Install an underground runoff treatment structure to remove pollutants from stormwater. The location is Treatment Site #5 from the City's 2021 study of stormwater retrofit sites.
  Benefits: Remove pollutants from urban stormwater runoff.

- [ ] **W-7: Tukwila International Blvd Bus Stop 30983 Water Quality Improvement with Underground Structures**
  Issue: Urban runoff from 0.6 acres of runoff from Tukwila International Blvd is untreated.
  Project: Install an underground runoff treatment structure to remove pollutants from stormwater. The location is one of four sites prioritized in the City's 2023 Stormwater Management Action Plan (SMAP) for Riverton Creek Basin.
  Benefits: Remove pollutants from urban stormwater runoff.

- [ ] **W-7: Tukwila International Blvd Bus Stop 30983 Water Quality Improvement with Underground Structures**
Issue: Urban runoff from 0.6 acres of Tukwila International Blvd is untreated.
Project: Install an underground runoff treatment structure to remove pollutants from stormwater. The location is one of four sites prioritized in the City's 2023 Stormwater Management Action Plan (SMAP) for Riverton Creek Basin.
Benefits: Remove pollutants from urban stormwater runoff.

- [ ] **W-8: S 130th St Right-of-Way Water Quality Improvement with Stormwater Planters (Bioretention)**
Issue: Urban runoff from 1.8 acres of S 130th Street and nearby streets is untreated.
Project: Install above-ground vegetated bioretention planters to remove pollutants from runoff. The location is one of four sites prioritized in the City's 2023 Stormwater Management Action Plan (SMAP) for Riverton Creek Basin.
Benefits: Remove pollutants from stormwater runoff.

- [ ] **W-9: E Marginal Way S Water Quality Improvement with Distributed Underground Structures**
Issue: Urban runoff from 3.5 acres of E Marginal Way S is untreated.
Project: Replace 22 catch basins with runoff treatment catch basins to remove pollutants from runoff. The location is one of four sites prioritized in the City's 2023 Stormwater Management Action Plan (SMAP) for Riverton Creek Basin.
Benefits: Remove pollutants from stormwater runoff.

- [ ] **W-10: Tukwila School District Stormwater Pond Retrofit and Sanitary Sewer Connection**
Issue: Tukwila School District previously washed school buses at the bus barn. Wash water from the school buses likely contains pollutants, and the school district stopped washing activity at the site until wash water can be directed away from the stormwater system. Stormwater runoff from the 1.2-acre property is collected and sent to the School District's stormwater pond, which provides treatment and flow control to older standards that could be improved.
Project: Replace existing stormwater pond with a more effective vegetated bioretention pond and upgrade the flow control structure. Install a diversion valve and oil/water separator to protect stormwater facilities from wash water. The location is one of four sites prioritized in the City's 2023 Stormwater Management Action Plan (SMAP) for Riverton Creek Basin.

Tukwila School District.

- [ ] **None:** I do not support water quality projects

Other:

Please write in a water quality issue and location

1000

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Tukwila SWCP Project Preference Survey

Survey Page 3

Which is your preferred fish barrier removal project?

Fish passage barrier removal projects increase access to good stream habitat for fish, especially salmon. Please **select one** option below. Fish passage barrier removal projects are shown on the map above as blue circles.

- [ ] **H-1: Johnson Creek Fish Barrier Mitigation**
  Issue:
  As salmon migrate through the Green River to and from the Puget Sound, a flapgate and debris rack prevent them from entering Johnson Creek, which provides important stream habitat for rearing and flood refuge.
  Project: Replace or update the flapgate and debris rack to allow salmon to access stream habitat for rearing and flood refuge. Coordinate with private property owner.
  Benefits: Improves fish access to difficult to find salmon rearing habitat, especially in spring.

- [ ] **None:** I do not support fish barrier removal projects

Other:

Please write in a fish barrier issue or habitat restoration project location. You may refer to the Water Resource Inventory Area (WRIA) 9 2021 Salmon Habitat Plan if you wish.

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Tukwila SWCP Project Preference Survey

Survey Page 4

Which are your preferred studies?

Studies allow the City to learn more about a drainage, water quality, or fish habitat problem before deciding on solutions. Please select **up to two** options below.

- [ ] **Citywide Fish Passage Barrier Inventory Update and Prioritization Study**
  Issue: The presence of fish passage barriers in creeks and streams is a critical risk to salmonids. Several types of barriers that result from human-made modifications such as dams and culverts can be corrected.
  Study proposal: The existing fish passage barrier inventory appears to be incomplete and needs to be updated. The study would inventory barriers throughout the City and would develop a process for prioritizing fish passage barrier removal projects, in coordination with the Duwamish Tribe.

- [ ] **Southgate Stream Restoration Study**
  Issue: Southgate Creek suffers from sedimentation throughout its lower reaches and erosion of streambanks that threaten properties.
  Study proposal: This study would perform a geomorphic assessment and geotechnical analysis of the stream and slope conditions in Southgate Creek basin to discover causes. From the study, the City would develop and prioritize solution concepts such as stream restoration, installation of a stormwater park, and others solutions.

- [ ] **Pump Station #15 at S 180th St Capacity Study**
  Issue: Five stormwater pumps at this station caught fire, and only two are now operating.
  Study proposal: This study would assess capacity of this station and system to determine if replacement pumps or upgrades are needed.

- [ ] **Minkler Facility, P17 Basin, and Levee Setback Study**
  Issue: The City is planning to discontinue use of the Minkler Public Works maintenance facility and sell the property. The King County Flood Control District has expressed interest in purchasing the property and setting back the adjacent levee, consistent with a project identified in the Water Resource Inventory Area

Pond and associated stormwater pump station operated by King County.
Study proposal: This study would assess the conveyance and detention needs in the P17 basin, including identifying potential locations for replacing the P17 Pond and providing cost estimates.

☐ **None**

Other

Please write in a study description

1000

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Submit (please submit one survey per person)

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Tukwila SWCP Project Preference Survey Results

The survey was open from September through October 2023.

The survey included projects under consideration for the SWCP as well as water quality projects that had been identified in previous studies. For the purposes of the survey, projects were given alphanumeric IDs corresponding to their type - "D" for drainage, "W" for water quality, and "H" for habitat. Studies were listed in the survey with no ID.

Drainage Projects				
ID	**Name**	**Votes**	**Other ID**	**Notes**
D-1	Tukwila Parkway Drainage and Water Quality Improvement	4	CIP-4	Remains in CIP from prior Plan, with new concept
D-2	S Ryan Way Pipe Rehabilitation	1	CIP-2	New CIP
D-3	S 146th St and 35th Ave S Drainage Improvement	2	90341214	Remains in CIP from prior plan
D-4	S 143rd St Drainage and Water Quality Improvement	2	98641222	Remains in CIP from prior plan. Final project concept does not include water quality portion.
D-5	Nelsen/Longacres Drainage Improvement Phase II	0	98741202	Remains in CIP from prior Plan
D-6	Tukwila Urban Center Conveyance Inspections	0	91241203	Remains in CIP from prior Plan
None	I do not support drainage projects	0		
Other	Write ins	0		

Water Quality Projects				
ID	**Name**	**Votes**	**Other ID**	**Notes**
W-1	Norfolk Trunkline Sewer Separation	2	CIP-1	New CIP
W-2	Fort Dent Park/Starfire Water Quality Retrofit	0	CIP-3	New CIP
W-3	Tukwila Pond Enhancement and Water Quality Retrofit	2	CIP-5	New CIP
W-4	City Gateway at Grady Way Stormwater Facility Rehabilitation and Water Quality Improvement	0	N/A	Later removed from list because of low feasibility
W-5	Tukwila International Blvd. Water Quality Improvement with Underground Structures	4	Site 8	Treatment Site from Stormwater Outfall Water Quality Retrofit Project, Design Report, Revised 2021
W-6	Interurban Avenue South Water Quality Improvement with Underground Structures	0	Site 5	Treatment Site from Stormwater Outfall Water Quality Retrofit Project, Design Report, Revised 2021
W-7	Tukwila International Blvd. Bus Stop 60983 Water Quality Improvement with Underground Structures	0	SMAP-4	One of four sites prioritized in Riverton Creek Basin from 2023 SMAP.
W-8	S 130th St Right-of-Way Water Quality Improvement	1	SMAP-5	One of four sites prioritized in
W-9	E Marginal Way S Water Quality Improvement with Distributed Underground Structures	1	SMAP-12	One of four sites prioritized in Riverton Creek Basin from 2023 SMAP.
W-10	Tukwila School District Stormwater Pond Retrofit and Sanitary Sewer Connection	0	SMAP-14	One of four sites prioritized in Riverton Creek Basin from 2023 SMAP.
None	I do not support water quality projects	0		
Other	Write ins	0		

Tukwila SWCP Project Preference Survey Results

Habitat Improvement Projects				
ID	**Name**	**Votes**	**Other ID**	**Notes**
H-1	Johnson Creek Fish Barrier Mitigation	1	CIP-6	
Other	Write ins	0		

Studies				
ID	**Name**	**Votes**	**Other ID**	**Notes**
1	City-wide Fish Passage Barrier Inventory Update and Prioritization Study	5	CIP-101	New Study
2	Southgate Stream Restoration Study	1	CIP-102	New Study
3	Pump Station #15 at S 180th St Capacity Study	1	N/A	Combined with CIP-103
4	Minkler Facility, P17 Basin, and Levee Setback Study	2	CIP-103	New Study
None	None			
Other	Write ins			

Appendix F

Supporting Studies for Programmatic CIPs



City of Tukwila

Stormwater Management Action Plan

Revised Final

Submitted to:

City of Tukwila
6200 Southcenter Blvd
Tukwila, WA 98188

Prepared by:

Otak, Inc.
11241 Willows Road NE, Suite 200
Redmond, WA 98052

January 15, 2024

Project No. 33383

Submitted to

Project Manager: Sherry Edquid, Project Manager

Project Sponsor: Mike Perfetti, Surface Water Senior Program Manager

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Team Role: Nate Robinson, P.E., Senior Project Engineer

Team Role: Brandon Teetsel, P.E. Project Engineer

Team Role: Madeline Pommier, Water Resources Designer

Team Role: Cara Donovan, Stormwater Planner

Team Role: John Rogers, Senior GIS Specialist

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Team Role: Emelie Crumbaker, GIS Analyst

Team Role: Bryan Berkompas, Hydrologist

Aspect CONSULTING

Funded by

This project is funded in part by the Washington State Department of Ecology.

DEPARTMENT OF ECOLOGY State of Washington

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APPENDICES

Appendix A Receiving Waters Assessment
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Section 1. Introduction

The City of Tukwila (the City) is located in the Duwamish River Valley at the intersection of two interstate highways, I-5 and I-405. The Lower Green River, Duwamish River, and their tributaries which flow through the City are highly important for salmon migration. The population of salmon, including Chinook, coho, chum, and steelhead, has declined since the late 1800s. Chinook, coho, chum, and steelhead have been listed as threatened under the Endangered Species Act. There are many reasons for the decline, among them are the land use and land cover changes associated with the City's population growth. Historically, forests and wetlands infiltrated rain where it fell. As Tukwila developed the City became more impervious and land uses became more industrial and commercial. Now when it rains, the chemicals and particles from vehicle tires, roofs, lawns, and outdoor storage areas, some of which are harmful to fish populations, get swept quickly into the nearest stream by stormwater runoff. Urban stormwater runoff is rain and snowmelt that does not infiltrate due to impervious surfaces, such as paved streets, parking lots, and buildings.

The City is authorized to discharge stormwater runoff to surface water by the State of Washington Department of Ecology (Ecology) under the National Pollutant Discharge Elimination System (NPDES) Western Washington Phase II Municipal Stormwater Permit (Permit). Ecology reissued the Permit, effective August 1, 2019 through July 31, 2024.

Purpose

The purpose of the Stormwater Management Action Plan (SMAP) is to further the City's goals of protecting shorelines, streams, and natural amenities (City of Tukwila, 2015). The City has implemented several important water quality retrofits and fish passage improvements over the past several years, and the SMAP expands upon that valuable work. This SMAP is intended to direct the City on the most effective and efficient plan to take action for the greatest benefit to one stream system. It also meets a Permit requirement and aligns with regional goals.

Stormwater Management Action Planning is a new requirement under the current Permit. SMAP intends to help cities prioritize, invest, and plan stormwater retrofits along with targeted planning actions that accommodate future growth while minimizing impacts to receiving waters. Ecology uses SMAP as both a verb for the planning process and as a noun for the resulting plan. This document complies with Permit condition S5.C.1.d, by following, in large part, Ecology's 2019 Stormwater Management Action Planning Guidance (SMAP Guidance). This document also serves to meet the goals of the City's 2023 grant to prepare a basin plan, funded by Ecology through the Water Quality Combined Financial Assistance program. This document may also be used to partner with basin-protection stakeholders and to secure funding from Ecology to implement elements of the SMAP.

The SMAP is also aligned with VISION 2050, the region's growth strategy led by the Puget Sound Regional Council (PSRC) (Puget Sound Regional Council, 2020). VISION 2050 was adopted in 2020 and establishes the following regional vision, "The central Puget Sound region provides an exceptional quality of life and opportunity for all, connected communities, a spectacular natural environment, and an innovative, thriving economy." Vision 2050 imagines that by 2050 the region's natural environment, including the City of Tukwila, will be restored, protected, and sustained by preserving and enhancing natural functions and wildlife habitats. VISION 2050 also supports the work that Puget Sound Partnership does to promote a coordinated approach to watershed planning and restoring the health of Puget Sound (Puget Sound Regional Council, 2020).

SMAP is focused on addressing effects of cumulative development on a watershed both under existing and future conditions. A successful SMAP strategically identifies approaches to alleviate existing stormwater problems and to protect and improve receiving water conditions while meeting future population and density targets. This SMAP identifies stormwater retrofits, land management and development strategies, customized stormwater management actions, and instream improvements to protect and restore water quality in the selected high-priority receiving water, Riverton Creek. The basin and stormwater management action selection processes both included stakeholder outreach. Feedback from both stakeholder outreach efforts was used to develop this SMAP.

Document Organization

The SMAP requirements are established in the Permit and described in more detail in the SMAP Guidance. The SMAP process consists of three major phases:

- Phase 1 – Receiving Water Assessment (Section S5.C.1.d.i).
- Phase 2 – Receiving Water Prioritization (Section S5.C.1.d.ii).
- Phase 3 – SMAP (Section S5.C.1.d.iii).

Each phase includes several steps which are outlined in this document. Section 2 and Section 3 describe how the requirements of the Receiving Water Assessment and Receiving Water Prioritization are respectively fulfilled. Section 4 details the retrofit plan for the prioritized receiving water, Riverton Creek. The implementation schedule, budget sources, and adaptive management approach to SMAP are described in Section 5, Section 6, and Section 7 respectively.

Section 2. Summary of Receiving Waters Assessment

The receiving waters assessment followed the steps outlined in Ecology's SMAP Guidance and included input from the Building Cities in the Rain guidance (State of Washington Department of Commerce, 2016). The City completed a preliminary assessment of the receiving waters (Otak, 2021) that compiled much of the data used in the final assessment. Aspect and Otak, consultants, worked with City staff to gather additional data to complete the final receiving waters assessment in 2022. The Receiving Waters Assessment is available as Appendix A.

The receiving waters assessment was completed in four steps:

Step 1-Delineate Drainage Basins

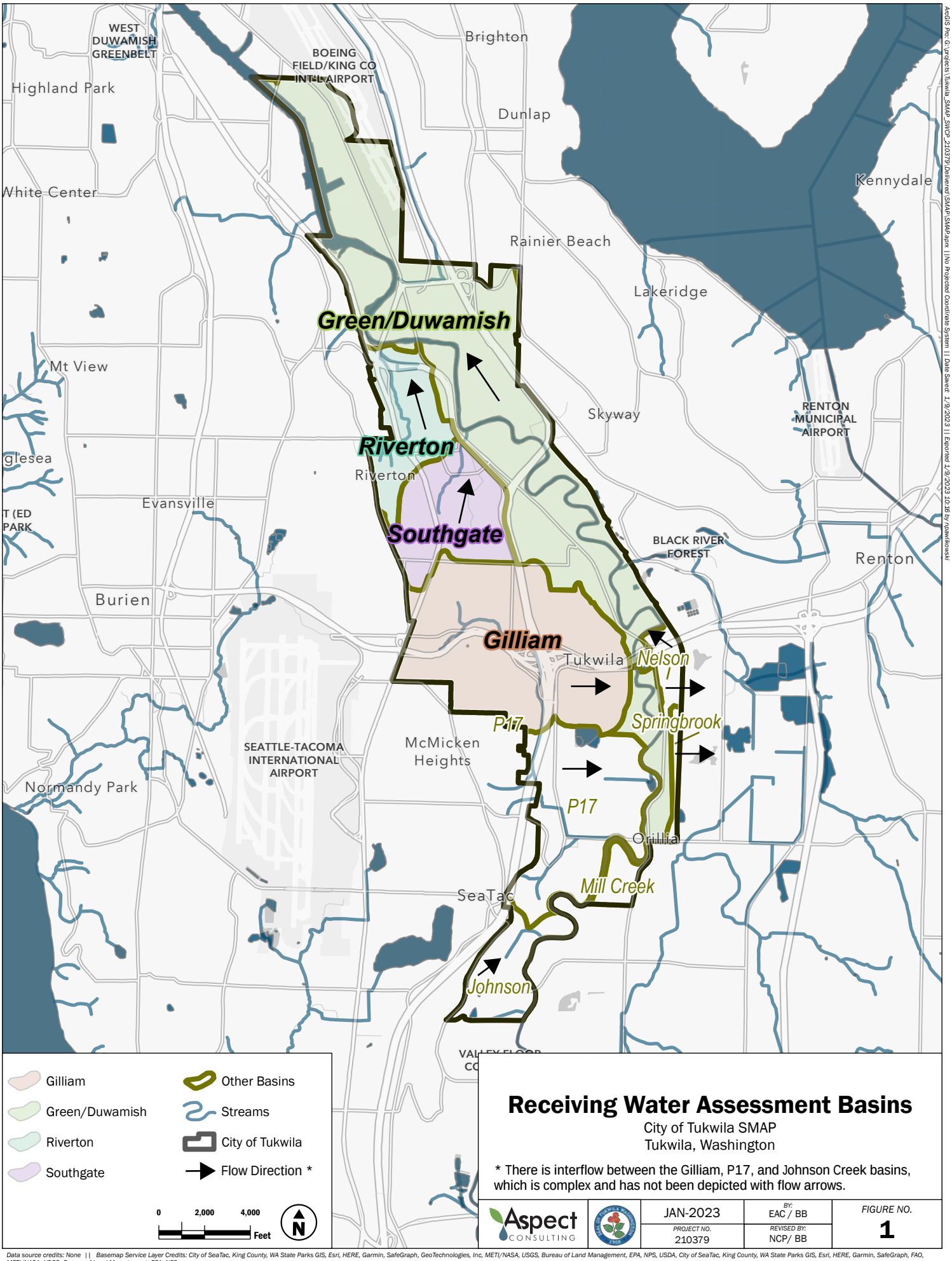
Aspect reviewed and confirmed the nine drainage basins previously delineated by the City (Figure 1). Per Ecology's SMAP Guidance, the total drainage areas and drainage areas within the city limits, herein called basins, were determined. The receiving waters for each basin were also determined and documented. The results are shown in Table 1.

Table 1 Tukwila Drainage Basins

Basin Name	Receiving Waters within Basin	Basin Area (Sq. Mi.)	Basin Area in Tukwila (Sq. Mi.)	Percent Basin in Tukwila	Direct Discharge to Puget Sound
Gilliam Creek	Green River, Gilliam Creek, Cottage Creek	2.9	2.1	70.8	No
Green/ Duwamish River	Green/ Duwamish Rivers, Duwamish Waterway, Ryan Hill Creek	465.0	4.0	0.9	Yes
Johnson Creek	Green River, Johnson Creek, Ditches J2 (probable), and Ditch C (probable)	2.7	0.5	16.5	No
Mill Creek	Green River	8.0	0.1	1.7	No
Nelsen*	Springbrook Creek, Green River**	0.2	0.2	98.7	No
P17	Green River, Stream E, E1, E2	2.4	1.3	53.3	No
Riverton Creek	Duwamish River, Riverton Creek	0.8	0.6	78.3	No
Southgate Creek	Duwamish River, Southgate Creek	0.8	0.8	99.6	No
Springbrook Creek	Green River, Black River, Springbrook Creek	3.6	0.1	2.0	No

** The value in this cell has changed since completion of the Receiving Water Assessment and Prioritization memoranda, which referred to this basin as "Nelson." The basin name has been changed to "Nelsen" in this document to reflect City staff's knowledge of the basin.*

*** The value in this table differs from the information given in Appendix A, Receiving Waters Assessment, Table 1, which states that Green River is the only receiving water in the Nelsen basin.*



Receiving Water Assessment Basins

City of Tukwila SMAP
Tukwila, Washington

* There is interflow between the Gilliam, P17, and Johnson Creek basins, which is complex and has not been depicted with flow arrows.

Aspect CONSULTING		JAN-2023	BY: EAC / BB	FIGURE NO.
		PROJECT NO. 210379	REVISED BY: NCP/ BB	1

Data source credits: None || Basemap Service Layer Credits: City of SeaTac, King County, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, City of SeaTac, King County, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS

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Step 2-Determine Designated Uses

The designated uses for aquatic life and recreation were determined for each basin following Washington Administrative Code (WAC) 173-201A. All basins are designated for "Salmonid Spawning, Rearing, and Migration" and for "Primary Contact." Portions of the Green/Duwamish basin are designated for "Salmonid Rearing and Migration Only" and for "Shellfish Harvesting." The water quality standards that are associated with these designated uses are shown in Appendix A.

Step 3-Assess the Overall Receiving Water Condition

Data to assess overall receiving water conditions came from many sources, including the Washington Department of Fish and Wildlife, Ecology, King County, the Washington State Department of Health, and the City. These data sets were used to assess the overall conditions of the receiving waters based on the following categories:

- **Extent to which desired conditions are being met**. This category looked at habitat and known water quality impairments. Habitat was assessed using known fish presence data and the percentage of the basin with 100-foot to 300-foot vegetative buffers. Water quality was assessed using Benthic Index of Biotic Integrity (B-IBI) data, 303d (impaired waterbodies) and 305b listings, Total Maximum Daily Load (TMDL) Plans (water quality improvement projects), and City data.
- **Landscape Areas**. This category assessed landscape-scale data using geographic information systems (GIS) to determine impervious area, vegetative cover, land use (industrial, commercial, and residential), high average daily traffic (ADT) roads, road areas adjacent to the stream, fish barriers, and culverts.
- **Development Pressures within the basin**. This category examined hazardous areas (landslide, seismic, etc.), the number of planned developments or redevelopments, and the amount of environmental protection already in place due to zoning and critical area designations.
- **Discharge to basins with impaired waters**. This category looked at the types of impairments within each basin, including known contaminated sites, areas already being treated or covered under other permits (such as the Industrial Stormwater General Permit (ISGP)), sources of contamination based on land use, the extent and location of impairments in the basin, and opportunities or availability to treat impairments.
- **Overburdened communities**. This category assessed the burden on communities within each basin by documenting the percentage of residents of color, those living in poverty, English language learner households, free and reduced school lunch usage, and the proximity of residential areas near high ADT roads.

These categories were used to develop a qualitative overall assessment of the condition of each delineated basin. The summary results are presented in Table 2. The full analysis can be found in Appendix A.

Table 2 Basin Conditions

Basin	Receiving Water Condition Summary
Gilliam Creek	▪ One 303(d) listing ▪ Relatively large Washington State Department of Transportation (WSDOT) influence (251.4 acres, 19% of basin) ▪ Relatively high percentage of pollution-generating surface (PGS) area ▪ More than 70% of the basin is in Tukwila ▪ City data from lower reach in 2018-2020 indicate concerns with pH, turbidity, and total suspended solids

Basin	Receiving Water Condition Summary
Green/Duwamish River	▪ Multiple 303(d) listing and current TMDLs ▪ Less than 1% of the basin is in Tukwila ▪ Relatively high percentage of PGS area in basin
Johnson Creek	▪ Within city limits, largely owned by one landowner which has a developer agreement with the City regulating stormwater control. Additionally, Agricultural Drainage District # 2 manages stormwater in the majority of Johnson Creek basin in Tukwila (King County, 2022). ▪ One 303(d) listing in the headwaters in the City of SeaTac, not in Tukwila ▪ Less than 20% of the basin is in Tukwila
Mill Creek	▪ Basin has multiple 303(d) listings but none in Tukwila ▪ Less than 2% of the total basin is in Tukwila
Nelsen	▪ No surface waters* ▪ Discharges to Springbrook Creek and Green River**
P17	▪ The area of the basin that is in Tukwila may redevelop under current stormwater regulations ▪ Almost 50% of the basin is in the City of SeaTac
Riverton Creek	▪ Noted fish presence ▪ One 303(d) listing ▪ Improving water quality would align with other projects in the basin ▪ City data from 2019 indicates concerns with dissolved oxygen but temperature and pH levels meet standards
Southgate Creek	▪ Relatively small PGS area ▪ Noted sediment issues in the basin due to steep slopes ▪ City data from 1994-1995 indicate moderate concerns with dissolved oxygen and pH
Springbrook Creek	▪ Area in Tukwila already likely being addressed by ISGP ▪ Very small percentage of the basin is in Tukwila (2%) ▪ Several 303(d) listings

** There is an old stream channel in the basin, however, surface water and stormwater are piped and there are currently no open channels except for a ditch parallel to the BNSF rail tracks north of Longacres Way.*

*** The value in this table differs from the information given in Appendix A, Receiving Waters Assessment, Table 1, which states that Green River is the only receiving water in the Nelsen basin.*

Step 4-Assess the Stormwater Management Influence (SMI) Potential

The Stormwater Management Influence (SMI) assessment focused on the ability of the City to improve the receiving water conditions in each delineated basin. The SMI potential for each basin was assessed for both flow and water quality and divided into three categories:

- **Hydrologic Stormwater Management Influence**. The hydrologic SMI was based on the percentage of the drainage basin within the city limits and the position of the City within the basin. Basins with a greater percentage of area within the city limits and basins where the city limits extended higher in the

watershed have greater potential SMI. SMI was not considered for flow in flow-exempt receiving waters.

- **Pollutant Stormwater Management Influence.** Pollutant SMI was determined using the percentage of impervious area, areas already being treated by stormwater facilities, areas already being addressed under other regulations like the ISGP, high ADT roads, and the density of stormwater outfalls per 1,000 feet of stream. Basins with greater pollution-generating area that directly connect to streams and with lower percent areas already under treatment were deemed to have greater potential SMI.
- **Effects of Future Growth**. Basins with more publicly owned land area were considered to have a greater SMI potential due to greater land available for retrofits. Basins with less publicly owned land area would likely require purchasing land for retrofits.

These categories were used to develop a qualitative assessment of the SMI for each basin. Results are shown in Table 3. To see the full analysis, see Appendix A.

Table 3 Stormwater Management Influence Assessment

Basin	Hydrologic SMI		Pollutant SMI			Effects of Future Growth
	Hydrologic Impact	Reason for Hydrologic Impact Rating	Pollutant Loading Impact	Reason for Pollutant Loading Rating	Expected Pollutant Loading Change with Future Land Use	
Gilliam Creek	Medium-Low	Almost half of the basin is impervious but the entire basin east of I-5 is flow control exempt. 70% of the basin is in Tukwila but many jurisdictions involved within city limits.	Medium	Highest percentage of high ADT roads. Large percentage of commercial and high-density residential land use (10.4 %). 70% of the basin is in Tukwila but many jurisdictions involved within city limits.	Likely little change	Moderate/high growth planned**
Green/ Duwamish River	Low	Flow control exempt	Low	Percentage of basin in Tukwila is less than 1%.	Likely little change	Minimal growth planned
Johnson Creek	Low	Only 16% of the basin is in Tukwila. Only 16% of the area in Tukwila is impervious. Area within Tukwila already under development agreement (set to expire in 2024).	Low	Largely undeveloped or low density residential. Only 16% of basin in Tukwila and mostly already under development agreement.	Runoff durations may increase because a development agreement locks in older flow control standards; however, this has not been confirmed though modeling.	Significant development expected, and development standards locked in under older agreement. Future growth may impact conditions.
Mill Creek	Low	Basin almost entirely impervious but less than 2% of the basin is in Tukwila.	Low	Relatively large portion is commercial/ light industrial but only 2% of basin is in Tukwila.	Likely little change	Minimal growth planned
Nelsen	Low	Discharge to flow control exempt water body.	High	Relatively large percentage of high ADT roads. Large percentage of commercial and industrial land use (54.1%).	Likely little change	Minimal growth planned

Basin	Hydrologic SMI		Pollutant SMI			Effects of Future Growth
	Hydrologic Impact	Reason for Hydrologic Impact Rating	Pollutant Loading Impact	Reason for Pollutant Loading Rating	Expected Pollutant Loading Change with Future Land Use	
P17	Low	Almost the entire portion of the basin within Tukwila has a modified flow control requirement based on the 40/20 criterion.* Relatively high impervious area (62.4%).	Medium	Relatively large percentage of high ADT roads (17.7%). Commercial and industrial. Tukwila is only half of basin and the lower half.	Pollutant loads may decrease when planned redevelopment meets newer stormwater standards.	If redevelopment meets treatment requirements.
Riverton Creek	High	Large portion of the basin is impervious (47.5%). More than 78% of the basin is in Tukwila.	High	Upper basin largely low-density residential, lower basin largely commercial/ light industrial. More than 78% of basin in Tukwila.	Likely little change	Minimal growth planned
Southgate Creek	Medium/ High	Basin almost entirely within Tukwila (99.6%). Less impervious area than other basins.	Medium/ High	Basin almost entirely within City (99.6%). Less PGS area than other basins.	Pollutant loads may decrease when planned redevelopment meets newer stormwater standards.	Minimal growth planned
Springbrook Creek	Low	Tukwila only makes up 2% of the basin and much of that is a forested median between railroad tracks.	Low	City only makes up 2% of basin even if largely PGS.	Likely little change	Minimal growth planned

**Flow control facilities designed to the "40/20 criterion" only have to mitigate for the added impervious surface. The 40/20 criterion can be applied to areas that had at least 40% total impervious surface area for the 20 years preceding Ecology's adoption of the 2005 Stormwater Management Manual for Western Washington.*

***The value in this cell has changed since completion of the Receiving Waters Assessment and Prioritization memoranda, which indicated minimal growth planned in the Gilliam Creek basin. The majority of the City's growth is expected in the Southcenter area. Redevelopment in the Southcenter subarea is expected to increase building heights in the southeast corner of the Gilliam Creek basin (City of Tukwila, 2014) over the next 20 years. Tukwila's Comprehensive Plan is under development and may change the growth expected in the Gilliam Creek basin. The change did not change the selection of Riverton Creek basin for the SMAP.*

Section 3. Summary of Basin Prioritization

Four basins which could benefit from a SMAP were selected to continue into the prioritization phase: Gilliam Creek, Southgate Creek, Riverton Creek, and the Green/Duwamish River. Prioritization criteria were developed to compare the four candidate basins (Appendix B). The criteria considered were as follows:

- Receiving water conditions (water quality impairments, aquatic life, fish barriers).
- SMI (hydrologic condition, pollutants, potential partnerships, basin management strategy).
- Community factors (public and stakeholder feedback, overburdened communities).

Each basin was given an overall qualitative rating for each category and an overall rating based on the combination of the results (Table 4). See Appendix B for more information.

Table 4 Receiving Water Prioritization Rating Summary

Basin	Overall Receiving Water Conditions Rating	Overall SMI Rating	Overall Community Rating	Overall Rating
Gilliam Creek	**Low/Medium** ▪ Water quality concerns ▪ High ADT roads ▪ Fish barriers above lower basin	**Medium** ▪ Portions flow control exempt ▪ Highest percentage of high ADT roads ▪ Would score higher with more partnership with WSDOT and SeaTac	**Medium/High** ▪ One public vote ▪ Likely most overburdened community	**Medium***
Green/Duwamish River	**Medium** ▪ High aquatic life rating ▪ Low Water Quality rating	**Low** ▪ Mostly flow control exempt ▪ Very small percentage of basin in Tukwila ▪ TMDL and other plans already in place ▪ Could rate higher with larger basin partnerships	**Medium** ▪ Most public votes ▪ Relatively low overburdened community	**Medium/Low**
Southgate Creek	**Medium/Low** ▪ Water quality concerns ▪ Sediment concerns ▪ Fish barriers above lower basin	**Medium/High** ▪ Almost all basin is in Tukwila ▪ Less impervious/PGS than other basins ▪ Much of lower basin is piped	**Medium** ▪ No public votes ▪ Relatively high overburdened community ▪ Fewer residents than Gilliam Creek basin	**Medium**
Riverton Creek	**Medium/Low** ▪ Water quality concerns ▪ Sediment concerns** ▪ Fish barriers above lower basin ▪ Observed urban runoff mortality	**High/Medium** ▪ Large portion of basin in Tukwila ▪ Higher PGS/impervious than Southgate Creek ▪ More potentially available public right-of-way ▪ Some large fish barriers in lower basin	**Low/Medium** ▪ No public votes ▪ Likely third highest overburdened community ▪ Fewest residents of the four basins	**Medium/ High**

** The value in this cell has changed since completion of the Receiving Waters Assessment and Prioritization memoranda, which classified Gilliam Creek basin as medium/low. Gilliam Creek basin was later recategorized to have a medium overall rating. The change did not change the selection of Riverton Creek basin for the SMAP.*

*** Following discussion with City staff and further review of the City of Tukwila 2013 Surface Water Comprehensive Plan (CH2MHill, 2013), sediment concerns for Riverton Creek have been added since the completion of the Receiving Waters Assessment and Prioritization memoranda.*

The Riverton Creek basin was selected to move forward for the development of a SMAP. Riverton Creek basin was rated “Medium/Low” for receiving water conditions based on concerns for water quality, observations of fish mortality, and fish barriers in the lower basin. It was rated “High/Medium” for SMI because a large portion of the basin is within the city limits, it has more pollution-generating and impervious surfaces than other basins, and it has more potential available area in the public right-of-way for retrofits. Riverton Creek basin was rated “Low/Medium” for community factors as it received no public feedback and has a smaller population than other basins, but it has the highest percent rate of poverty and support from stakeholders like Water Resource Inventory Area (WRIA) 9 for fish habitat. These led to an overall rating of “Medium/High” for Riverton Creek basin, which was the highest rating of the four basins.

The SMAP for Riverton Creek basin seeks to reduce the pollutant-loading impacts caused by the relatively large pollution-generation areas. The relatively large available area for retrofits and low percentage of current stormwater treatment facilities should provide opportunities for both water quality and hydrologic improvements within the Riverton Creek basin.

Section 4. Retrofit Plan

This section describes a 20-year retrofit plan to improve conditions in the Riverton Creek basin. The implementation plan is divided into two stages where short-term actions will be implemented in the first six years and long-term actions will be implemented in years 7 to 20.

Riverton Creek Basin

Riverton Creek is located in northwest Tukwila and has two forks (Figure 2). The western fork originates at wetlands along the western city limits, passes under Tukwila International Blvd, and flows north before draining into the Duwamish River. The wetlands in the northwest portion basin between the SR 99 entrance ramp and Tukwila International Blvd drains to the western fork following heavy precipitation events. The eastern fork originates at the same wetlands as the western fork. The eastern fork also crosses Tukwila International Blvd and is largely piped until it meets the western fork just south of SR-599. Riverton Creek then passes beneath SR-599 and flows a short distance before joining the Duwamish River. Riverton Creek is designated for salmonid spawning, rearing, and migration and is classified as a fish bearing stream.

Approximately 78% of the 514-acre basin is located in Tukwila while the rest of the basin is in the City of Burien. Land use in the upper portion of Riverton basin is largely low-density residential while the lower portion is largely commercial and industrial land uses. Half of the basin is made up of pollution generating surfaces and 48% of the basin is impervious. The Puget Sound Watershed Characterization project has assigned the Riverton Creek basin the “restoration with development” basin management strategy for overall water flow (Puget Sound Partnership, 2016). This management strategy indicates degradation has already occurred in the Riverton Creek basin.

The following fish are present in Riverton Creek: coho, fall Chinook, fall chum, resident coastal cutthroat, and winter steelhead. City staff have witnessed urban runoff mortality at least once in Riverton Creek following the removal of a flap gate at the mouth. This indicates conditions may not be favorable for fish in some circumstances.

Riverton Creek has a Category 5 listing for bioassessment, and data collected in 2019 indicates dissolved oxygen in the stream are at concerning levels. There are also sedimentation concerns throughout the basin (CH2MHill, 2013). There are landslide concerns in the upper basin and accumulated sediment in

the lower basin that needs to be removed annually (City of Tukwila, 2022). Finally, there are seven total fish barriers on Riverton Creek and two partial barriers. There are also 80 culverts, manmade waterfalls (on private property just north of S 126th Street), and an abandoned dam upstream of the waterfalls (on private property just south of S 126th Street). The City and other organizations have invested in improving conditions in Riverton Creek. The City recently removed a flap gate at the mouth of the stream, a private business has daylit a portion of the western fork of the stream and operates a small salmon hatchery (Sabey Corporation, 2022), and King County Metro is planning to daylight a portion of the eastern fork of the stream.

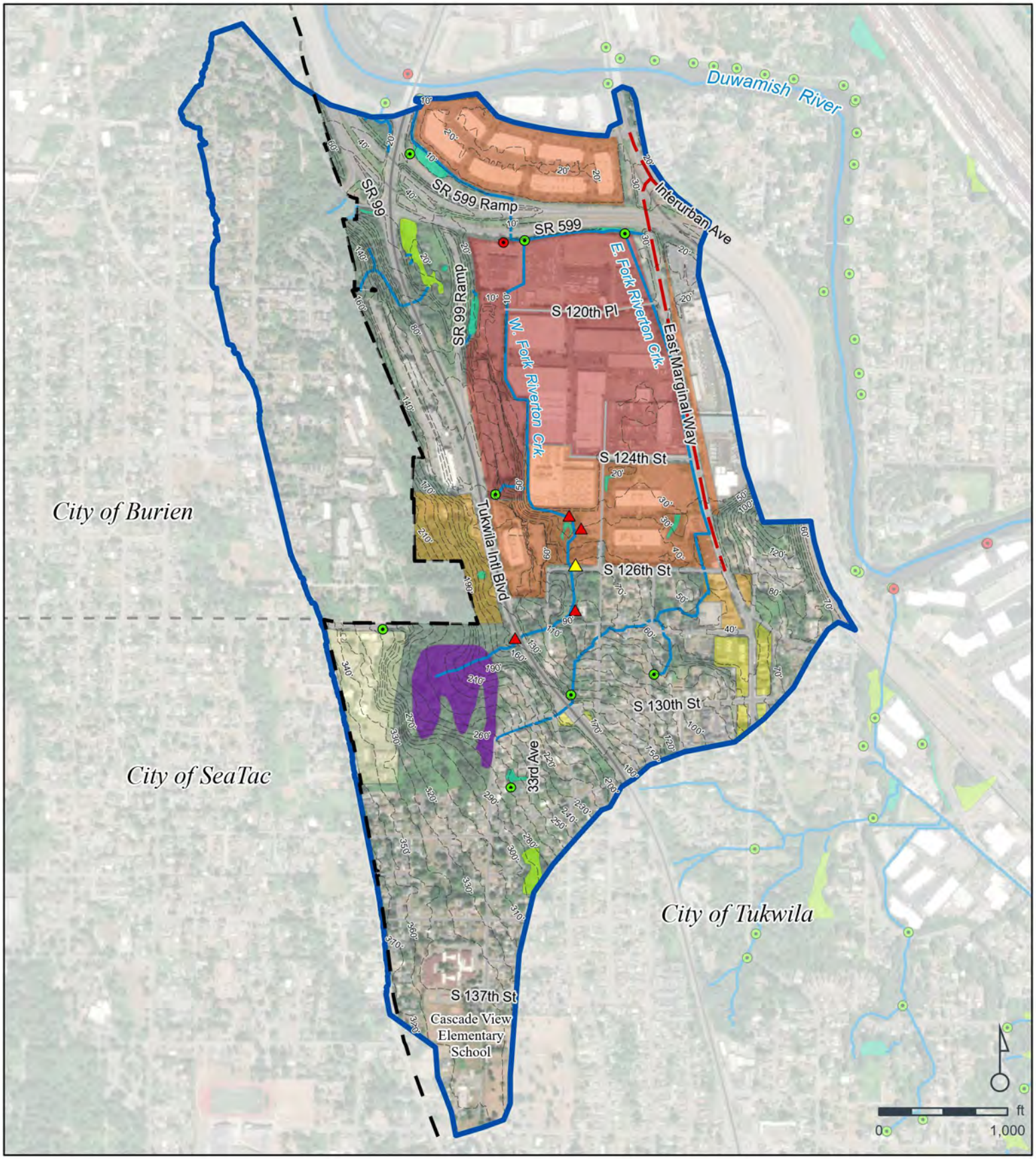


FIGURE 2

RIVERTON CREEK BASIN

TUKWILA SMAP | 33383

TUKWILA, WASHINGTON

- Tukwila City Limits
- Riverton Creek Basin
- Total Fish Passage Blockage
- Partial Fish Passage Blockage
- Stream / Watercourse
- Streets
- Contours

Pollution Generating Land Use

- Manufacturing Industrial Center/Heavy
- Manufacturing Industrial Center/Light
- Commercial Light Industrial
- Neighborhood Commercial Center
- Office
- High ADT Roads

Wetlands

- Category II
- Category III
- Category IV

Outfalls

- Outfall
- Private Outfall

Data Sources:
Date: 1/31/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

K:\Project\33300\33383\CADD\GIS\MXDs\33383 Tukwila Known Issues Data.aprx

Otak

Methodology

Ecology's SMAP Guidance indicates that different stormwater management actions (SMAs) should be implemented depending on the conditions in the receiving water (Ecology, 2019). Based on the basin management strategy for Riverton Creek, the receiving water needs improvement, as opposed to protection. SMAs in basins that are degraded, such as Riverton Creek, should focus on reducing pollutant loads, tailoring maintenance activities, and reducing stormwater flows to allow stream habitat conditions to improve.

Stormwater Management Action Development

The first step in developing SMAs for Riverton Creek basin was a review of the water quality, flow, and habitat concerns outlined in the previous sections. These concerns were discussed with City staff. A desktop review of Riverton Creek basin was conducted using aerial imagery and the City's GIS data to determine potential site locations. While Riverton Creek basin has a significant amount of public right-of-way, through the desktop review and discussions with City staff, Otak found much of the public right-of-way cannot accommodate retrofit projects due to topography and existing infrastructure. On October 17, 2022, the multidisciplinary SMAP team conducted a site visit in Riverton Creek basin to review stormwater management needs and assess potential project sites. After the site visit, several sites were eliminated from further consideration due to existing utility infrastructure and other considerations.

After the desktop analysis and site visit, the team developed ten SMA concepts consisting of eight retrofit concepts and two program concepts.

Stakeholder Outreach

The project concepts were brought to stakeholders for review and input. The goal of stakeholder engagement for this phase of the SMAP was to determine which SMA concepts stakeholders would like to see in the Riverton Creek basin.

This stakeholder engagement effort built on the process used in the previous engagement efforts during the receiving water assessment and receiving water prioritization phases of SMAP. The City's SMAP storymap was updated to reflect this phase of the project, and a survey was developed. For this phase, input was requested from the general public, tribal agencies, and internal stakeholders (representatives from the City's Administrative, Maintenance, Engineering, and Surface Water Program Divisions of the Department of Public Works, the Urban Forestry and Long-Range Planning Divisions of the Department of Community Development, and the Parks and Recreation Department).

Stakeholders were asked to select their top three retrofit concepts in question one and their top program concept in question two of the survey. The information presented to stakeholders, other than example photos, is presented in Table 5. The survey and a printout of the storymap can be seen in Appendix C. The general public was informed through an e-Hazelnut notice and a news release on the City's website. The survey was open between November 3, 2022 to November 11, 2022.

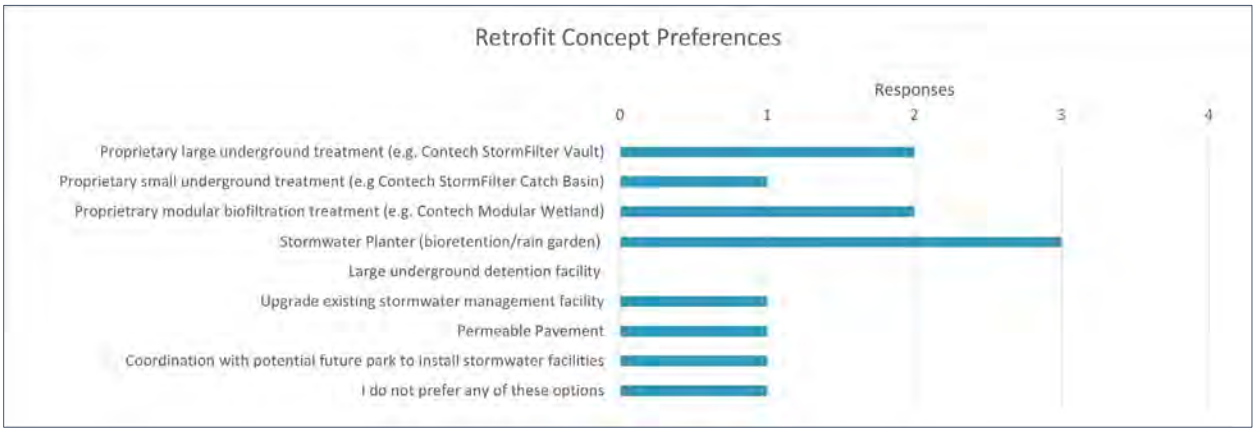
Table 5 Record of Stormwater Management Action Concept Information Presented for Stakeholder Outreach

Solution	Stormwater Management Action Concept	Description	Environmental Goals Addressed	Relative Initial Cost	Relative Maintenance Required	Other Considerations
1	Proprietary large underground stormwater treatment facility (such as a Contech StormFilter® Vault)	Cartridges in an underground storage vault that treat stormwater runoff.	Water quality	Low	Moderate	
2	Proprietary small underground stormwater treatment facility (such as a Contech StormFilter® Catch Basin)	Underground cartridges installed in existing catch basins in the public right-of-way to treat stormwater runoff from highly-traveled roads and capture large debris before it reaches the stormwater system.	Water quality	Moderate	Moderate/High	
3	Proprietary modular biofiltration (such as a Contech Modular Wetland®)	In-ground planted facility that manages stormwater from highly-traveled roads belowground in the public right-of-way.	Water quality	High	Moderate/High	
4	Stormwater Planter (bioretention/rain garden)	In-ground planters that manage stormwater in the public right-of-way.	Water quality and flow control	Moderate	High Note: Possible for public to assist upkeep	Vegetated facility
5	Large underground detention facility	Underground chamber that temporarily stores stormwater to reduce harmful effects such as erosion and flooding.	Flow control	High	Low	
6	Upgrade existing stormwater management facility	Rehabilitation of an existing detention facility to provide water quality treatment for runoff from highly-traveled roads and retrofit to prevent vehicle washing runoff from entering stormwater system.	Water quality and flow control	Moderate	Moderate	Project would include partnership with another government agency.

Solution	Stormwater Management Action Concept	Description	Environmental Goals Addressed	Relative Initial Cost	Relative Maintenance Required	Other Considerations
7	Permeable Pavement	Alternative pavement that infiltrates stormwater in the public-right-of way (sidewalks, bike lanes, parking spaces). This program would be a consideration when transportation and/or parks improvement projects have construction projects that could utilize permeable pavement.	Flow control	High	Moderate	This program would require purchase of special maintenance equipment or a maintenance contract.
8	Coordination with potential future park to install stormwater facilities	The 2020 City of Tukwila Parks, Recreation and Open Space Plan identifies the Cascade Neighborhood Search Area as a possible location for a new park, part of which is within Riverton Creek basin. If the City identifies a site within Riverton Creek basin to develop a new park, then stormwater facilities could be sited on the property, likely underground to maximize useable space.	Water quality and flow control			
9	Targeted Source Control Program	Program focused in a particular area to reduce sediment and pollution in stormwater runoff from City owned and operated areas including the public right-of-way.	Water quality	Moderate	Moderate/High	This will include an enhanced outreach element which will highlight Riverton to businesses/residents (multi-lingual).
10	Community Rain Garden Stewardship Program	Program for volunteers to help maintain rain gardens, ditches, and/or streams in their neighborhood.	Water quality	Low	Low	Considerations include access and safety.

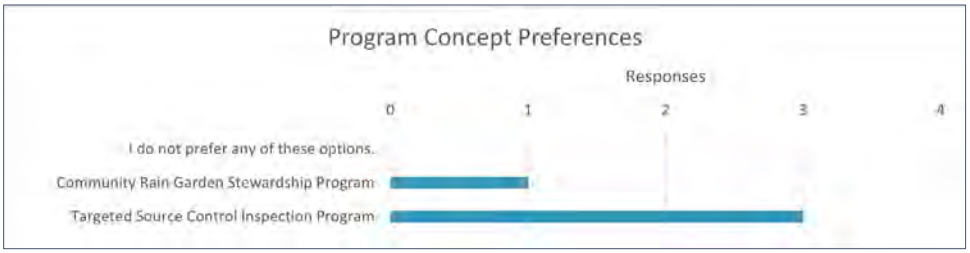
The City received five responses for the first question of the survey and four responses for the second question from external stakeholders. Only one of the ten SMA concepts received zero votes. Results can be seen in Figure 3 and Figure 4 below.

Figure 3 Stormwater Management Action Survey Results for Question 1*



**Values are based on respondents selecting up to three options*

Figure 4 Stormwater Management Action Survey Results for Question 2



Stormwater Management Action Ranking

After gaining input from the public on the generic SMA concepts, the team proposed SMAs at specific locations using Ecology's SMAP Guidance, information obtained during the site visit, and engineering judgment. Nine retrofit projects were proposed where space is available. These retrofit projects and three programs were considered during the SMA ranking process. While only two programs were considered during the stakeholder outreach process, an additional program for installing permeable pavement sidewalks was added during the ranking process. Descriptions of each of the SMAs considered during the ranking process can be seen in Table 6.

SMA ranking relied on qualitative assessments. Ranking factors included stakeholder feedback, planning level technical feasibility, impact, partnerships, and potential funding opportunities. Factors associated with technical feasibility included compatibility with existing infrastructure, area readily available for siting a facility, and long-term maintenance requirements. Impact was based on the area that could be treated, the type of pollutants that could be treated, the land use that could be treated, location of the project in the basin, and whether water quality treatment, flow control, or both could be provided. The main consideration associated with partnerships was whether a SMA could include a partnership opportunity for implementation. Potential funding opportunities included the grant worthiness of the SMA.

The consultant team and Public Works staff determined the SMA ranking criteria for the SMAs during a meeting on November 21, 2022. SMAs in the lower basin, SMAs that would treat large areas, and SMAs that would treat PGS areas were ranked high due to their impact. Given the stakeholder support for bioretention facilities these projects were highly ranked. Finally, SMAs that had a high potential for

partnership and grant funding were ranked high. Flow control facilities and a flow control requirement were ranked lower because the relative cost to benefit in the Riverton Creek basin is lower than runoff treatment facilities. SMAs in the upper basin, SMAs that would treat small areas, and SMAs that do not treat PGS areas were ranked low due to the relative impact they would have on water quality.

Table 6 Stormwater Management Actions Considered During Project Ranking

SMA-ID	SMA Name	Description	Environmental Goals Addressed	Total Drainage Basin Area (Ac) or Area Served	Contributing Impervious Area (Ac)	Maintenance Effort	Benefit Provided	Relative Capital Cost	Public Input on Solution Type
SMAP-2	S 130th St & 34th Ave S Water Quality Vaults	Media filter units in S 130th St & 34th Ave S intersection at existing catch basin locations. Install up to 68 cartridges in water quality treatment vaults. Potentially paired with flow control (SMAP-3).	Water Quality	22.5	8.6	Moderate	Basic Runoff Treatment[1]	Low	Three votes for "proprietary large underground treatment"
SMAP-3	S 130th & 34th Detention Pipes	Underground stormwater detention in S 130th St & 34th Ave S intersection. Potentially paired with water quality treatment (SMAP-2).	Flow Control	22.5	8.6	Low	Flow Control	Moderate	No votes for "large underground detention"
SMAP-4	Tukwila Intl Blvd: Bus Stop 60983	Underground proprietary runoff treatment system adjacent to the bus stop in front of 12500 Tukwila International Blvd (Stop ID 60983).	Water Quality	0.6	0.6	Moderate	Enhanced Runoff Treatment[2]	Moderate	Three votes for “proprietary modular biofiltration”
			Flow Control	0.6	0.6	Low	Flow Control	Moderate	No votes for “large underground detention”
SMAP-4.1	USCIS ASC Roundabout Public/Private Partnership	Alternate location to SMAP-4 on private property.	Water Quality	2.1	2.1	Moderate	Enhanced	Moderate	Three votes for "proprietary modular biofiltration"
			Flow Control	2.1	2.1	Low	Flow Control	Moderate	No votes for "large underground detention"
SMAP-5	S 130th Right-of-Way Planters	Install right-of-way bioretention planters in existing conveyance ditch locations along S 130th St.	Water Quality and Flow Control	4.8	4.8	High	Enhanced and 6PPD-q[3]	High	Five votes for "stormwater planters"
SMAP-12	E Marginal Way Distributed Water Quality Treatment	Install media filter units along E Marginal Way, locations determined based on existing stormwater infrastructure. Install up to 43 cartridges in water quality treatment vaults.	Water Quality	3.5	3.5	Moderate	Basic Runoff Treatment	Low	Two votes for "proprietary small underground treatment at existing catch basins"
SMAP-13	Cascade Elementary School Area Right-of-Way Planters	Install right-of-way bioretention planters in neighborhoods surrounding Cascade View Elementary School. Consider partnering with School District to use planter maintenance as an educational opportunity.	Water Quality and Flow Control	0.5-16.8	0.5-16.8	High	Enhanced and 6PPD-q[3]	Moderate	Five votes for "stormwater planters"
SMAP-14	School Bus Depot Rehab	Partnership with Tukwila School District. Rehabilitate existing detention facility to provide water quality treatment and install a sanitary sewer bypass valve to prevent washing runoff from entering stormwater system.	Water Quality and Flow Control	1.2	1.2	Moderate	Basic Runoff Treatment	Low	Two votes for "upgrade existing facilities"
SMAP-16	Co-Located Regional Stormwater Control in New Park	Stormwater retrofit associated with planned park located in southern area of Riverton Creek basin. Stormwater features consist of cartridges in water quality treatment vaults and underground stormwater detention.	Flow Control	20	7.6	Low	Flow Control	Moderate	No votes for "large underground detention"
			Water Quality	20	7.6	Moderate	Basic Runoff Treatment	Low	Three votes for "proprietary large underground treatment"

SMA-ID	SMA Name	Description	Environmental Goals Addressed	Total Drainage Basin Area (Ac) or Area Served	Contributing Impervious Area (Ac)	Maintenance Effort	Benefit Provided	Relative Capital Cost	Public Input on Solution Type
SMAP-17	Co-Located Cascade View Elementary Stormwater Facility	Cascade View Elementary School was constructed in 1958 and modernized in 1996. It will be eligible for State-assisted funding for additional modernization/expansion in 2026 (2015 Bond Committee Report, p. 12). The School District is in the midst of bond-funded upgrades to the school now, which appear to be interior and equipment improvements. There were no stormwater treatment or detention requirements when Cascade View Elementary School was constructed in 1958. The City proposed to partner with Tukwila School District to install runoff treatment and, if warranted, flow control facilities on the school site.	Water Quality and Flow Control	9	3	To be determined	To be determined	To be determined	This option was not presented to the public.
SMAP-18	Permeable Pavement Sidewalk Program	Permeable pavement is an alternative to traditional asphalt and concrete which allows water to percolate through to the ground. The proposal is for the City to consider permeable pavement in the public right-of way for sidewalks, bike lanes, and parking spaces whenever a transportation project or park improvement project is developed in Riverton Creek basin.	Water Quality and Flow Control	Permeable pavement on sidewalks, bike lanes, parking, and parks could be distributed anywhere within the basin but may be most feasible in residential areas and where grades are less than 6%.	To be determined with each project, each project is likely to have a small area served by permeable pavement.	Moderate	Incremental reduction in stormwater flows in basin as projects are constructed.	N/A	One vote for "permeable pavement"
SMAP-19	Targeted Source Control Program	The Riverton Creek basin is home to numerous large industrial and commercial parcels where materials are stored and handled that may potentially contaminate stormwater runoff. Many of these sites do not have stormwater treatment best management practices on site. The targeted source control program would focus required source control inspections the City is already required to perform across the City in the Riverton Creek basin, helping to minimize pollutants in stormwater runoff from private business through regulation and enforcement.	Water Quality	The industrial area is concentrated in the lower basin over roughly 100 acres.	90	High	Prevents pollutants from coming in contact with stormwater runoff, which is more effective than removing pollutants from runoff using treatment devices.	N/A	Three votes for "targeted source control"
SMAP-20	Community Rain Garden Stewardship Program	Program for volunteers to help maintain rain gardens, ditches, and/or streams in their neighborhood.	Water Quality	The community rain garden stewardship could work in residential areas, the school zone, or along high visibility roads where businesses may be enticed to adopt a rain garden.	To be determined with each project, each project is likely to improve a small area.	Low	Maintenance of existing function.	N/A	One vote for "community rain garden stewardship"

Notes:

1. *Basic runoff treatment facilities remove total suspended solids (TSS).*
2. *Enhanced runoff treatment facilities remove TSS and dissolved metals.*
3. *6PPD-Quinone is an emerging pollutant of concern, causing fish mortality. The pollutant is deposited in the environment primarily via tire wear particles, and early studies show that bioretention effectively captures the pollutant.*

The following retrofit projects were prioritized and selected to be developed further in this plan: SMAP-4, SMAP-5, SMAP-12, and SMAP-14. SMAP-4 was favored by the City because it would treat a highly traveled road and it would provide enhanced treatment. SMAP-5 was selected as it would treat a neighborhood collector road, provide enhanced treatment, and treat 6PPD-q. Survey results also indicate stakeholders support stormwater planters, and City staff would like to have a bioretention demonstration project. Finally, installing stormwater planters may present an opportunity to implement SMAP-20, the Community Rain Garden Stewardship Program. SMAP-12 was also selected because it would treat a highly traveled road. Additionally, King County Metro will be daylighting Riverton Creek slightly downstream, and the newly opened fish habitat could benefit from cleaner water. SMAP-14 was selected as it would be an opportunity to develop a relationship with the Tukwila School District which could be a valuable project partner in the future. More information on these retrofit projects can be found in the next section and Appendix D.

The City determined that the programs, SMAP-18, 19, and 20, could be implemented as City-wide programs which would benefit Riverton Creek if implemented. The programs are briefly described in the next section.

In addition to the SMAs in Table 6, instream SMAs were also discussed during the meeting on November 21, 2022. Habitat conditions are documented to be poor, and projects that improve conditions for aquatic life are supported by this SMAP. Information on these SMAs can be found in the next section.

Recommended Stormwater Management Actions

Ecology's SMAP Guidance recommends that the City categorize SMAs as follows: stormwater facility retrofits, land management and/or development strategies, and targeted or customized stormwater actions. Ecology states that stormwater facility retrofits are projects that either retrofit (add new service to) existing treatment or flow control facilities or construct new treatment or flow control facilities to address impacts from existing development. Retrofit runoff treatment facilities should be designed to filter pollutants such as TSS, metals, and hydrocarbons from unmitigated existing development before discharging runoff into a receiving water. Retrofit flow control facilities should be designed to reduce the volume and duration of erosive flow discharges, which could help reduce channel and streambank erosion resulting from unmitigated or inadequately mitigated existing development.

Land management and/or development strategies entail identification of land that should be conserved or protected and the strategies to achieve this. For example, a watershed may benefit if the City protects several undeveloped parcels from impervious surface conversion, and the strategy to protect these parcels may be land use policy changes. Ecology's SMAP Guidance notes these strategies are most beneficial to undeveloped catchments which drain to a small stream or lake with good water quality and habitat conditions. The guidance notes that for developed catchments, like the Riverton Creek basin, an increase in canopy cover may be beneficial.

Targeted or customized stormwater actions are related to the stormwater management program (SWMP), S5.C in the 2019-2024 Permit. Ecology's SMAP Guidance specifies the following S5.C programs may be included in the SMAP:

- Focused or more frequent illicit discharge detection and elimination (IDDE) field screening.
- Prioritization of source control inspections.
- Operations and maintenance (O&M) inspections or enhanced maintenance of facilities the City owns or operates.
- Maintenance that requires capital construction of more than $25,000.

- Public Education and Outreach behavior change programs to support SMAP actions for the receiving water overall, or for the catchment area in particular

Instream strategies are not outlined by Ecology's SMAP Guidance. However, the City supports improving conditions for aquatic life by removing fish passage barriers and daylighting Riverton Creek.

Stormwater Facility Retrofit Projects

Four stormwater facility retrofit projects were prioritized and developed into short-term retrofit projects. Table 7 briefly describes these short-term retrofit projects, and their locations can be seen in Figure 5. The solution fact sheets for the short-term retrofit projects include a conceptual design and planning level cost opinion and are attached in Appendix D. Figure 6 depicts the approximate catchment of each short-term retrofit project.

Table 7 Short-Term Retrofit Projects in the Riverton Creek Basin

ID	Project Name	Project Description	Issues Addressed	Cost Opinion[1]
SMAP-4	Tukwila Intl Blvd: Bus Stop 60983 Water Quality Retrofit.	Modular Wetlands® would treat stormwater collected from Tukwila International Blvd. The project is only the treatment portion of the SMA, which also includes a detention portion.	Sediment and dissolved metals.	$440,000
SMAP-5	South 130th St Right-Of-Way Bioretention Planters.	Bioretention planters would replace existing storm ditches along S 130th St, 37th Ave S, and 38th Ave S to treat stormwater runoff.	Sediment, dissolved metals, and 6PPD-q[2]	$1,340,000
SMAP-12	E Marginal Way S Distributed Water Quality Treatment.	22 existing catch basins would be replaced with catch basins that contain Contech StormFilter® Cartridges to treat stormwater runoff from E Marginal Way S.	Sediment	$1,420,000
SMAP-14	Tukwila School District Stormwater Pond Retrofit and Sanitary Sewer Connection.	A bioretention facility would replace the existing stormwater pond to treat stormwater runoff and provide flow control; An oil/water separator and diversion valve would be installed to redirect wash water from school buses to the sewer system.	Sediment, dissolved metals, oil, illicit discharge from washing operations, and flow control.	$440,000[3]
			Total	**$3,640,000**

Notes:

1. *Appendix D includes a memorandum that describes the methodology used to develop these cost opinions.*
2. *6PPD-Quinone is an emerging pollutant of concern, causing fish mortality. The pollutant is deposited in the environment primarily via tire wear particles, and early studies show that bioretention effectively captures the pollutant.*
3. *Project cost would be shared between the City of Tukwila and the Tukwila School District. The City would be expected to pay 54% of the total project cost ($236,000) and the School District would be expected to pay 46% of the total project cost ($204,000).*

The City may choose to reconsider implementing any of the remaining six proposed long-term retrofit projects after completing the short-term retrofit projects. The following long-term retrofit project locations can be seen in Figure 5.

- SMAP-2
- SMAP-3
- SMAP-4 (underground detention portion) (shown as a short-term retrofit project on Figure 5)
- SMAP-13
- SMAP-16
- SMAP-17

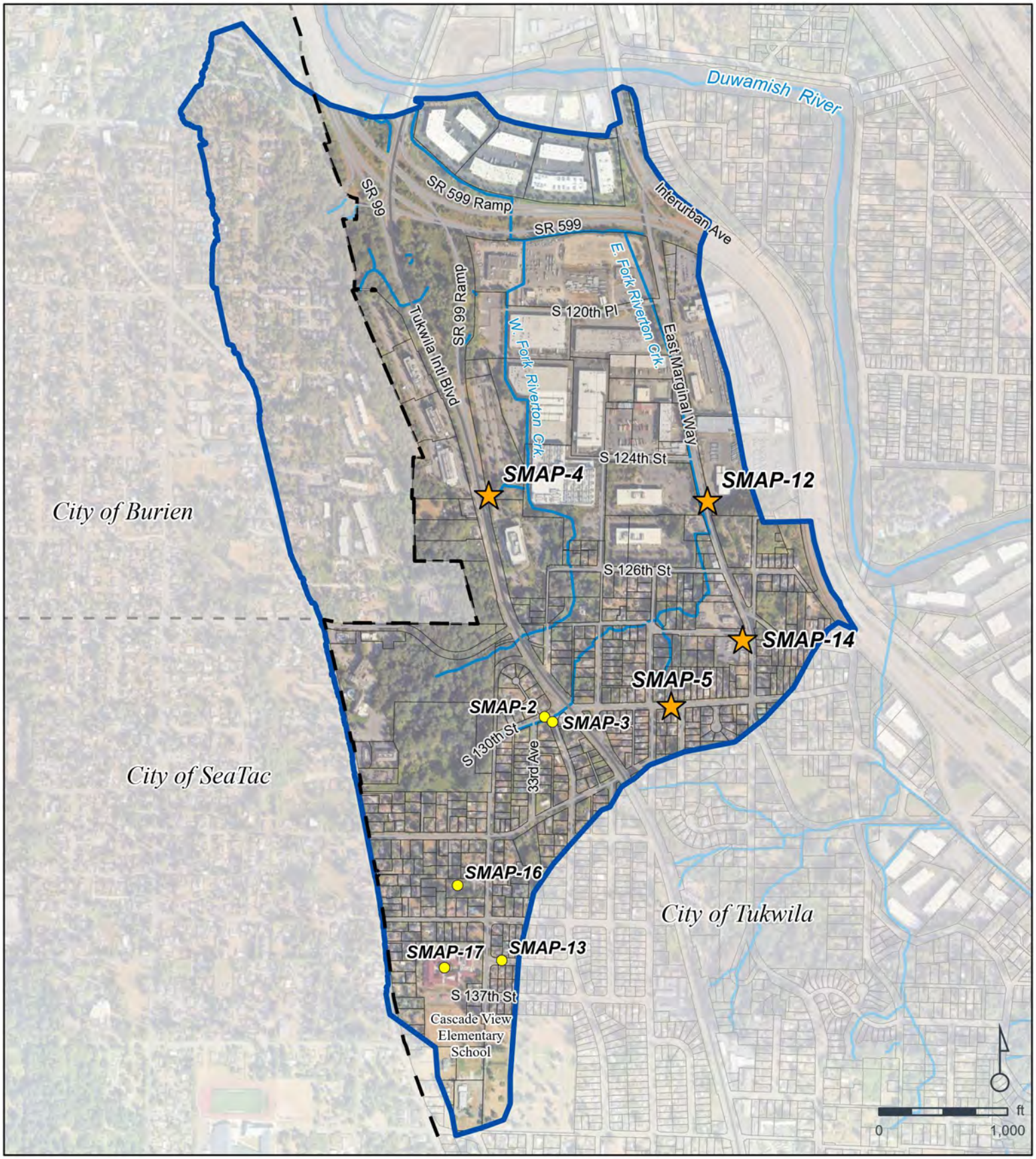


FIGURE 5
RETROFIT PROJECTS

TUKWILA SMAP | 33383
TUKWILA, WASHINGTON

- Tukwila City Limits
- Riverton Creek Basin
- Parcels
- Short-Term Retrofit Projects
- Long-Term Retrofit Projects
- Stream / Watercourse
- Streets

Data Sources:
Date: 12/19/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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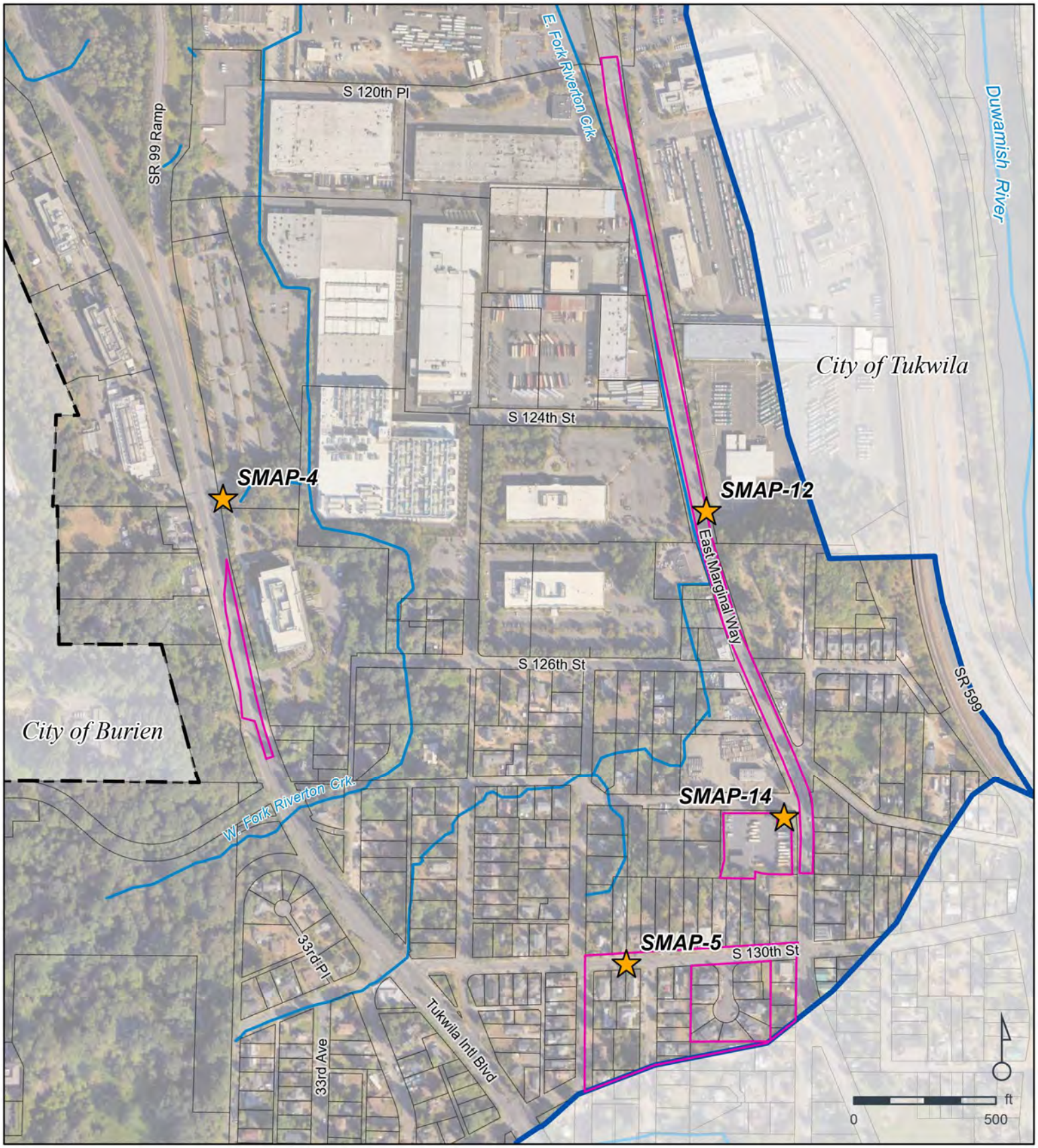

FIGURE 6

SHORT-TERM RETROFIT PROJECT CATCHMENTS

TUKWILA SMAP | 33383

TUKWILA, WASHINGTON

- Riverton Creek Basin
- Catchment Boundaries
- Tukwila City Limits
- Stream / Watercourse
- Parcels
- Short-term Retrofit Projects

Data Sources: King County, City of Tukwila, Google Maps.
Date: 12/22/2023
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Land Management and/or Development Strategies

Only one land management/development strategy was considered for this SMAP: the Permeable Pavement Sidewalk Program (SMAP-18).

The Permeable Pavement Sidewalk Program could be implemented City-wide in partnership with transportation, park, school, Public Works, and other municipal projects. Permeable pavement allows stormwater to infiltrate as opposed to traditional, impervious asphalt or concrete. The program would result in an incremental reduction in stormwater flows in the Riverton Creek basin as projects are constructed. This SMAP recommends installing permeable pavement in the Riverton Creek basin in areas that are considered low-grade (6% or less) and low-traffic locations such as sidewalks, bike lanes, angled parking stalls, and parks. Low traffic locations have a lower presence of fine sediments and other materials that would decrease the amount to infiltration through the permeable pavement. There is also a lower likelihood of a spill occurring or frequent tire rotation in low-traffic locations. Therefore, permeable pavement in low traffic locations, as opposed to high traffic areas, is likely to decrease the amount of maintenance required and increase the longevity of the permeable pavement. The City does not currently have the equipment to maintain permeable pavement, therefore, this project would be implemented over the long-term.

The City considered a targeted version of the Permeable Pavement Sidewalk Program when developing SMAs for this SMAP. Due to the slow pace of transportation and other pertinent improvement projects in Tukwila, the City determined it would better to implement the program City-wide, including in the Riverton Creek basin. It is expected that if implemented this program would benefit Riverton Creek.

Customized Stormwater Management Actions

Under the NPDES Permit, the City implements a required Stormwater Management Program (SWMP) throughout the city limits. For SMAP, the City has examined whether it could customize the implementation of its SWMP within Riverton Creek basin to improve water quality in Riverton Creek. Ecology's SMAP Guidance notes that the following aspects of the SWMP could be customized in the priority basin:

- IDDE field screening.
- Source control inspections.
- O&M inspections or enhanced maintenance of City owned or operated facilities.
- Maintenance that requires capital construction of more than $25,000.
- Public Education and Outreach behavior change programs.

After considering several options for customizing the SWMP in Riverton Creek basin, the team determined that the SMAP does not need to specifically recommend these actions. The City expects that focus on Riverton Creek will increase organically due to the new Source Control Inspection permit requirement and as more City-owned facilities are installed, including those recommended by this SMAP. A review of the SMAs that were considered is provided below.

One customized SMA considered for this SMAP was a Targeted Source Control Inspection Program (SMAP-19). The City is already increasing source control inspections by adding staff to this effort due to the flap gate removal, the Sabey fish hatchery, a landslide concern in the upper basin, illicit discharge complaints, routine IDDE inspection, and private facility inspections. Source control inspections in Riverton Creek basin will help to minimize pollutants in stormwater runoff from private business in the industrial and commercial areas through regulation and enforcement. The Riverton Creek basin is home to numerous large industrial and commercial parcels where materials are stored and handled that may potentially contaminate stormwater runoff. Many of these sites do not have runoff treatment best

management practices on site. The City could also take steps to reduce sediment in stormwater runoff from City owned and managed properties.

The City also considered developing a targeted Community Rain Garden Stewardship Program (SMAP-20) which would be considered a Public Education and Outreach program. After consideration, the City determined it would be better to implement the program City-wide, including in the Riverton Creek basin. It is expected that if implemented this program would benefit Riverton Creek. Volunteers would help the City maintain rain gardens, ditches, and/or streams to ensure they are functioning properly. This program would help protect aquatic habitat and beautify neighborhoods. The program could operate City-wide in residential areas, school zones, and along high visibility roads where businesses may be enticed to adopt a rain garden. Volunteers would be organized by the Public Works department and would receive an initial orientation which would include safety information.

Instream Strategies

Riverton Creek is designated for salmonid spawning, rearing, and migration and is classified as a fish-bearing stream. There have been several efforts to improve habitat conditions in Riverton Creek basin including removal of a flap gate at the mouth of Riverton Creek and daylighting portions of the stream. Large portions of the stream remain piped, and 80 culverts remain on Riverton Creek. Upper sections of Riverton Creek are likely too steep for fish migration (CH2MHill, 2013). There are also several remaining fish passage barriers: seven full barriers, two partial barriers, manmade waterfalls (on private property north of S 126th Street), and an abandoned dam (on private property south of S 126th Street). This SMAP recommends removing fish passage barriers along both the east and west forks of Riverton Creek. On the west fork, only barriers up to S 126th Street need to be considered because “fish would likely not be able to pass upstream of S 126th Street because of the steep gradient” (CH2MHill, 2013). This SMAP also recommends daylighting the stream as much as possible. Riverton Creek flows through private property, so the City would need to work with property owners to remove barriers or to daylight the stream. The City will consider fish barrier removal projects in the update to the Surface Water Comprehensive Plan, expected to be completed later in 2023.

Section 5. Implementation Schedule

Implementation of this SMAP will take place over a 20-year period which is divided into two stages. The schedule depicted in **Figure 7** is intended to depict the relative timing of project phases and of recommended implementation of SMAs with respect to one another. This schedule depicts a best-case scenario for implementation. Implementation will cover both capital projects and programmatic initiatives in the Riverton Creek basin. It is important to note that staff availability, availability of funding, and the involvement of the public, partner jurisdictions, Tribes, agencies, and non-governmental organizations (NGOs) will be integral to successfully implement this SMAP on the proposed schedule. Stormwater retrofit projects are anticipated to span four years each from grant application to completion of construction. Plant establishment in vegetated facilities may continue for another one to two years.

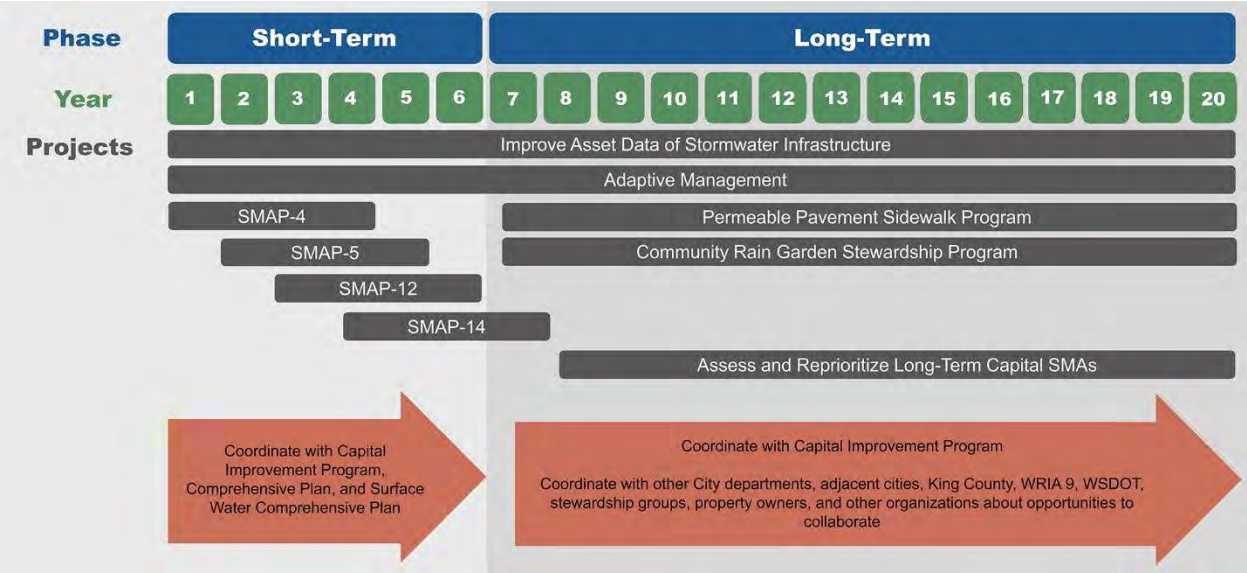


Figure 7 Proposed Implementation Schedule

Short-Term Actions

Short-term actions will take place in years one through six of implementation during the initiation and early action stage. The four short-term stormwater facility retrofit projects are intended to be implemented during this phase: SMAP-4, SMAP-5, SMAP-12, and SMAP-14. To help with siting of future stormwater retrofits it is recommended that the City begin to collect data about stormwater facility age and service areas. Both the City's Comprehensive Plan and the Surface Water Comprehensive Plan are scheduled to be completed in 2024. Both documents should integrate SMAP recommendations where feasible.

As the short-term retrofit projects are constructed in Riverton Creek basin and as the required Source Control Inspection Program ramps up, the City will organically focus more maintenance work and pollution prevention activities in the basin.

Long-Term Actions

Implementation of long-term actions will occur in years 7 through 20. Short-term actions that were not implemented during the first six years of SMAP implementation should be completed in years 7 to 20. Listed below are additional recommended long-term actions listed in order of priority:

- Permeable Pavement Sidewalk Program.
- Community Rain Garden Stewardship Program.
- Long-term stormwater facility retrofit projects.
- Stormwater facility retrofit projects identified through adaptive management or coordination with other City departments and property owners.
- Improved asset data on stormwater infrastructure facility age and service areas in GIS and Lucity Asset Management.
- Discussions with adjacent cities, King County, WRIA 9, WSDOT, stewardship groups, and other organizations about opportunities to collaborate.

Section 6. Budget Sources

The ability to fully implement SMAs identified in the SMAP is contingent upon obtaining funding. Major sources of funding for the City's surface water management projects and programs include revenues from the Storm and Surface Water Utility Fund and grant revenues from external sources (Table 8).

The City anticipates the need to work in partnership with federal, regional, other local government agencies, and other organizations to implement SMAP recommendations. Due to the cost and scale of short-term retrofit projects and programs outlined in this SMAP, the availability and timing of grants and other outside funding will largely determine the actual timeframe for implementation.

Each short-term retrofit project was developed to be eligible for at least one grant program, and this SMAP recommends the City apply for up to one grant per year. The City should investigate and evaluate potential funding sources and collaborative options further in the short-term stage of the SMAP.

Ecology has been a significant source of funding in the past for Tukwila stormwater projects and should be considered for SMAP implementation. Ecology's Water Quality Combined Funding Program is considered the most likely source of funding for the stormwater retrofit projects. WRIA 9's Salmon Habitat Plan also provides funding sources for projects and programs suggested. The three funding sources include the Salmon Recovery Funding Board, the Puget Sound Acquisition and Restoration Fund, and the King County Flood Control District Cooperative Watershed Management grants (WRIA 9, 2021). WRIA 9 may also support the City in seeking funding for other local, state, and federal sources.

Table 8 External Revenue Sources

Revenue Source	Description
Real Estate Excise Tax (REET)	Washington State authorizes cities to levy two taxes on the sales of real estate, providing guidance on the specific uses for each. REET 1 funds may be used for any purpose identified in a Capital Improvement Plan. REET 2 funds are primarily used for transportation improvements but may also be utilized for sidewalks, traffic signals, and some utility projects.
King County Flood Control District, Opportunity Fund	Funds projects or activities for flood control and stormwater improvements and may fund watershed management activities such as habitat conservation if such projects are linked to flood control or stormwater activities.
King County Flood Control District, Flood Reduction Grants	Funds small to medium local flood reduction projects, including stormwater retrofit, slope stabilization, drainage improvements, urban flood risk reduction, and culvert replacement / fish passage restoration.
King County Flood Control District, Cooperative Watershed Grants	Implementation of Water Resource Inventory Area (WRIA) Forum priorities - WRIA 9: Green/Duwamish and Central Puget Sound Watershed Ecosystem Forum.

Revenue Source	Description
Puget Sound Partnership and Recreation and Conservation Office, Puget Sound Recovery and Acquisition Fund Grant	The Puget Sound Acquisition and Restoration (PSAR) fund supports projects that recover salmon and protect and recover salmon habitat in Puget Sound. PSAR is co-managed by the Puget Sound Partnership and the Recreation and Conservation Office. Local entities identify and propose projects, and the Salmon Recovery Funding Board prioritizes projects for funding.
Washington State Department of Ecology, Water Quality Combined Funding Program	Provides grants and loans on a competitive basis for high priority water quality projects throughout Washington State. The City has obtained several grants through this program and will plan to seek funding for SMAP-recommended retrofit projects.
Washington State Department of Ecology, Watershed Plan Implementation & Flow Achievement Planning Grants	For improving instream and riparian zone conditions, reorganizing or concentrating existing points of diversion, studying surface or groundwater storage feasibility.
Washington State Department of Ecology, Flood Control Assistance Account Program	Funds comprehensive flood hazard management planning and implementing actions to control flooding.
Washington State Department of Ecology, Streamflow Restoration Competitive Grants	Funds to implement local plans and projects to improve stream flows to levels necessary to support robust, healthy, and sustainable salmon populations.
Washington State Recreation and Conservation Office, Salmon Recovery Grant - Urban Wildlife Habitat Category Grant	Conservation of habitat in cities via land acquisition, development, and restoration.
Washington State Fish and Wildlife, Brian Abbott Fish Barrier Removal Board Grant	Design and construction to correct fish passage barriers that impact salmonids and are in coordination with other fish passage investments.
Washington Public Work Board, Construction Loan Program Grant	Low-interest loans for local governments to finance public infrastructure construction and rehabilitation. Eligible projects must improve public health and safety, respond to environmental issues, promote economic development, or upgrade system performance.
Washington State Department of Ecology et. al., Floodplains by Design Grant	Studies, design, construction, and monitoring to address flood hazards and improve natural floodplain conditions.

Revenue Source	Description
Federal Emergency Management Agency, Flood Mitigation Assistance Grant Program Grant	Design and construction of projects that reduce or eliminate long-term risk of flood damage to structures insured under the National Flood Insurance Program.
United States Department of Transportation, Rebuilding America Infrastructure with Sustainability and Equity Grant Program	RAISE (Rebuilding America Infrastructure with Sustainability and Equity) discretionary grants help project sponsors complete critical freight and passenger transportation infrastructure projects. Stormwater or culvert projects which alleviate flooding of primary transportation routes may be eligible for this program.

Section 7. Adaptive Management

The City plans to adaptively manage the SMAP. Adaptive management will allow goals and methods to change in response to new information, feedback on progress, changing technologies, and new or updated regulatory and community goals. In short, adaptive management will allow for a more nimble response to new information, and lead to a more efficient use of resources in the long-term. Therefore, adaptive management will help in refining long-term strategies for the Riverton Creek basin.

The City will track implementation by maintaining a spreadsheet and/or map of the planned projects and programs that have taken place, and how much of the basin area has been managed for runoff treatment or for flow control. The City has published a Tukwila SMAP Public Engagement web site to track the ongoing implementation of the SMAP; see the Implementation Tracking tab at https://arcg.is/WubnS. Improved GIS data on stormwater infrastructure facility age and service areas would assist in tracking. The City will document progress toward meeting SMAP goals and report progress to the funders, the public, and Ecology.

As SMAP is implemented, the City expects to adapt its approach to SMAP over time as lessons are learned from implementation of various strategies. Typical adaptations may include choosing different BMPs for runoff treatment as the City operations staff gains experience handling a growing inventory of public facilities or changing the sequence of project implementation if an opportunity arises that makes one of the lower priority options more cost effective.

Adaptive management has been incorporated into WRIA 9's Salmon Habitat Plan with which the City intends to coordinate. The Salmon Habitat Plan states that adaptive management ensures prioritization and sequencing of investments that reflect the best available science and maximizing benefits for Chinook salmon. A key component to the WRIA 9's adaptive management approach is monitoring.

If monitoring or anecdotal information about culvert sedimentation occurrences indicate that sediment is still a water quality concern following implementation of the short-term actions, the City could consider conducting a sediment study in Riverton basin. Although Riverton Creek is known to have sediment issues (CH2MHill, 2013), the reasons have not been closely studied. It is not well understood whether additional flow control in the basin would reduce sediment in Riverton Creek. A sediment study could indicate if existing conditions are a natural state of Riverton Creek, if development has altered the

condition of the stream, and if landslides in the upper basin are contributing to degraded water quality. The results of a sediment study would assist the City in determining whether flow control retrofits would be useful in improving conditions for fish in Riverton Creek or if non-stormwater management actions, such as landslide control or remediation, would be necessary to improve sediment conditions. Proposed flow control retrofits could be removed from the list of SMAs if other strategies are found to be more effective or if sediment in Riverton Creek is found to be a natural condition. Because flow control facilities tend to have a high initial capital cost, this study could assist the City in focusing resources on the most effective solutions.

Finally, this SMAP recommends the City monitor research on 6PPD-q. Numerous studies are expected in the near future, and study findings could impact the approach the City will take to improving Riverton Creek, including selecting stormwater facility types that remove 6PPD-q from runoff. The City may choose to monitor 6PPD-q in Riverton Creek, implement SMAs that reduce 6PPD-q in stormwater runoff, or make other changes to the urban landscape.

SMAP implementation may be assessed annually with the City's NPDES Annual Report. In addition, the City may consider incorporating retrofit projects from this plan into the Water Quality Retrofit Capital Improvement Program if funding is available.

Section 8. Conclusion

The City of Tukwila has identified Riverton Creek basin to strategically invest in making stormwater improvements which will improve water quality while allowing for future population growth. The City is committed to providing a safe and livable community and being a good steward of the environment. The City is actively making steps to improve water quality in the City's receiving waters and will include the community as the SMAP is implemented. During the SMAP process, the City built relationships with stakeholders and the public. As retrofit projects and programs move closer to implementation the City will continue to have ongoing conversations with the community. This SMAP will also be an appendix of the City's Surface Water Comprehensive Plan update which is currently being developed.

The short-term retrofit projects developed for this SMAP will be implemented through either the existing Water Quality Retrofit Capital Improvement Program or the small drainage program, so projects will be reviewed annually to determine which projects will be implemented in the coming year. Additionally, the recommendations in this SMAP were designed to be eligible for grants. Thus, it would be beneficial for the City of Tukwila to take steps to implement the short-term recommendations. The first step in implementing this SMAP will include applying for retrofit project funding. Next, the City will explore the feasibility of the recommended land management strategy and, as feasible, implement the suggested customized SWMP, the Targeted Source Control Program, and Community Rain Garden Stewardship Program.

Riverton Creek is an important water resource for the City of Tukwila. Poor water quality inflicts harm on endangered species, including Chinook, Coho, chum, and steelhead, which define the character of the City and region. As recommendations are implemented, this SMAP will guide the City's continuing work to restore Riverton Creek.

Section 9. References

CH2MHill. (2013). *City of Tukwila 2013 Surface Water Comprehensive Plan*. Retrieved from https://www.tukwilawa.gov/wp-content/uploads/PW-Surface-Water-Comprehensive-Plan.pdf.

City of Tukwila. (June 2, 2014). *Southcenter Subarea Plan.* Retrieved from https://www.tukwilawa.gov/wp-content/uploads/DCD-Planning-Southcenter-Subarea-Plan.pdf.

City of Tukwila. (2015). *City of Tukwila Comprehensive Plan*. Retrieved from https://www.tukwilawa.gov/wp-content/uploads/DCD-Comprehensive-Plan.pdf.

City of Tukwila. (October 2022). Personal Communication from R. Betteridge.

King County. (December 2021). *Ordinance 19384*.

King County. (August 2022). *King County Signature Report Motion 16184.*

Otak. (2021). *Preliminary Receiving Waters Assessment and Stormwater Management Influence Memorandum*.

Puget Sound Partnership. (2016). *Puget Sound Characterization. Volume 1: The Water Resources Assessments: Water Flow and Water Quality*. Publication No. 11-06-016. Retrieved from https://apps.ecology.wa.gov/publications/summarypages/1106016.html.

Puget Sound Regional Council. (October 2020). *Vision 2050: A Plan for the Central Puget Sound Region.*

Sabey Corporation. (March 16, 2022). *SabeyStories: Return of the Salmon*. Retrieved from https://sabey.com/sabeystories-return-of-the-salmon/.

State of Washington Department of Commerce. (2016). *Building Cities in the Rain*.

State of Washington Department of Commerce. (2022). *Periodic Update Checklist for Fully-Planning Cities.*

Washington Department of Ecology (Ecology). (2010). *Frequently Asked Questions Water Quality Program: Implementing the Flow Control Standard in Ecology's Western Washington Municipal Stormwater Permits*. Retrieved from https://apps.ecology.wa.gov/publications/documents/1010024.pdf.

Washington Department of Ecology (Ecology). (2019). Stormwater Management Action Planning Guidance. Retrieved from https://fortress.wa.gov/ecy/ezshare/wq/permits/StormwaterMgmtActionPlanning.pdf.

Washington Department of Ecology (Ecology). (October 2022). *6PPD in Road Runoff: Assessment and Mitigation Strategies*. Publication 22-03-020. Retrieved from https://app.leg.wa.gov/ReportsToTheLegislature/Home/GetPDF?fileName=ECY%206PPD%20in%20Road%20Runoff%20Report_32dc8c92-b98a-4023-97f2-d6d2ec19b390.pdf.

Water Resource Inventory Area 9 (WRIA 9). (February 11, 2021). Salmon Habitat Plan 2021 Update. Available at: https://www.govlink.org/watersheds/9/pdf/2021_PlanUpdate.pdf.

Appendix A
Part I

Receiving Waters Assessment

April 2022

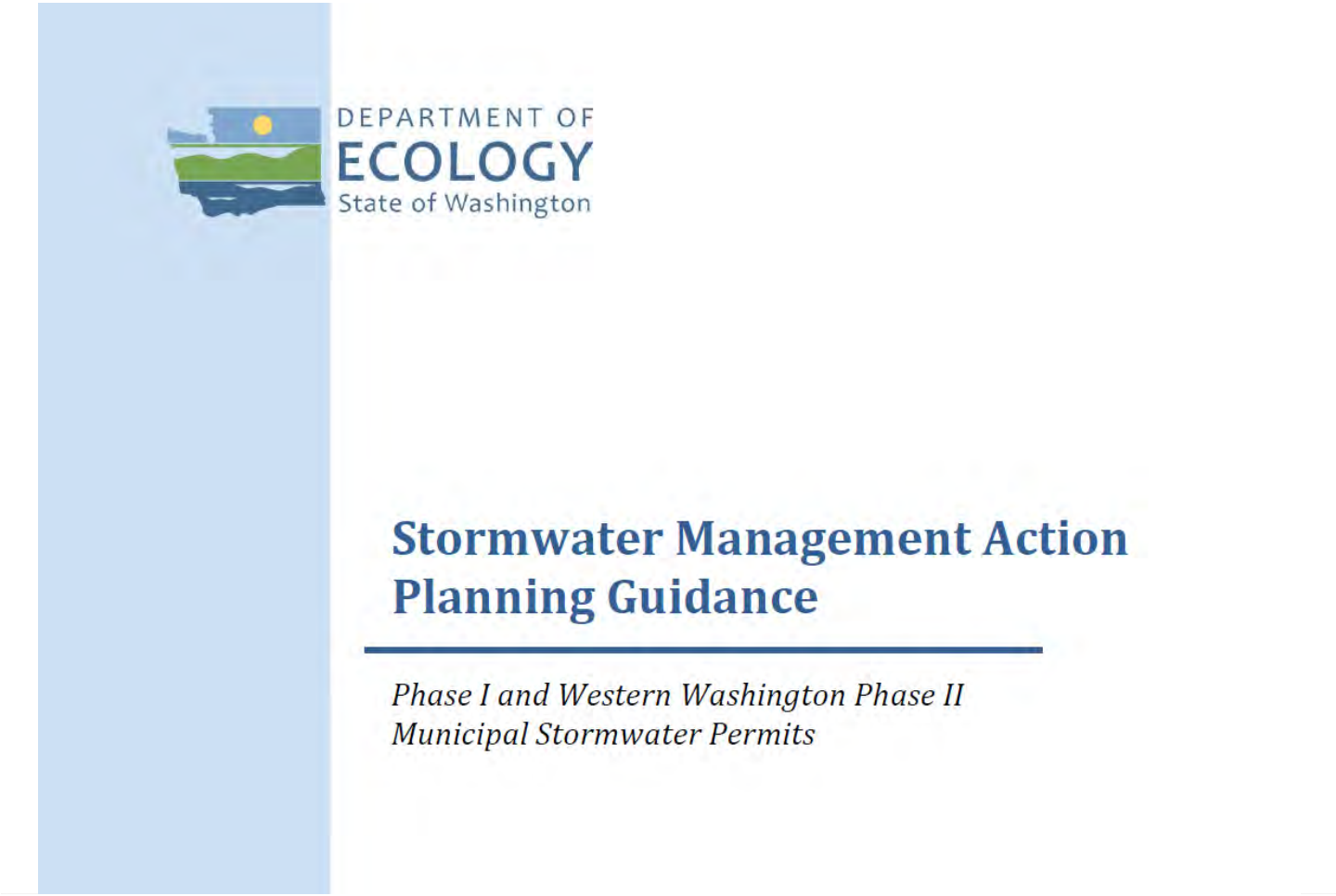
Find the archived Tukwila Watershed Inventory interactive web page at:

tukwilawa.gov/SMAPWatershedInventory

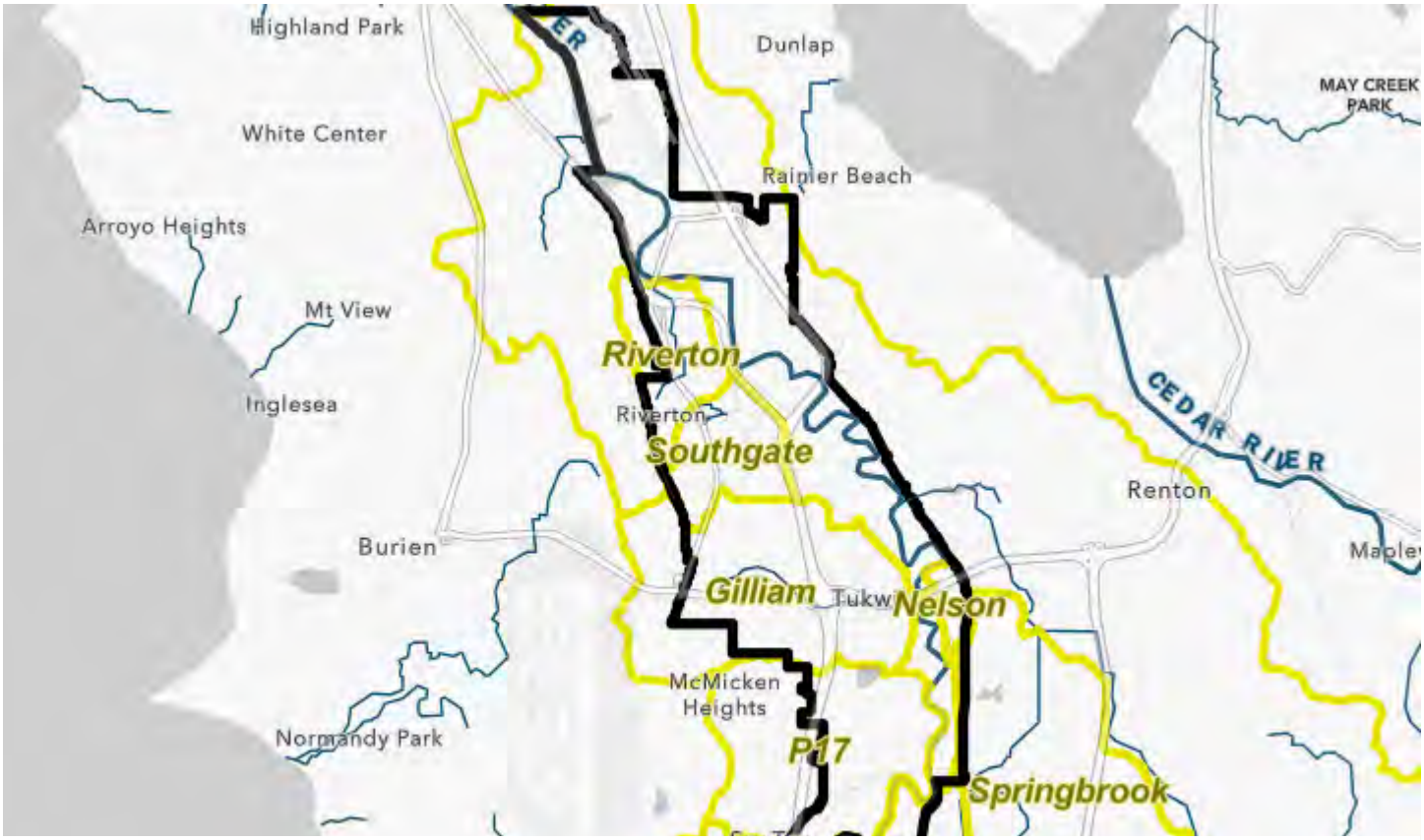
Otak

City of Tukwila - SMAP

Appendix to Watershed Inventory Table



This set of webmaps is an Appendix to the Receiving Water Inventory (Table) required by the Western Washington Phase II Municipal Stormwater Permit. Steps in the Stormwater Management Action Planning Guidance require a Watershed Inventory Table to be submitted to Washington State Department of Ecology by March 31, 2022. The following webmaps capture GIS information to be submitted by the City of Tukwila.



Step 1: Delineate Basins and Identify Receiving Waters

Aspect reviewed the existing basin delineation from the 2013 Surface Water Comprehensive Plan which was based on field visits, the City Geographic Information System (GIS), and previously developed basin plans. Aspect also compared Ecology's Assessment Units (AUs), LiDAR-derived basins, and the City stormwater data. Using this information, Aspect updated basin boundaries as shown on the webmap here.

Link to Step 1 Table.



Step 2: Assess Receiving Water Conditions

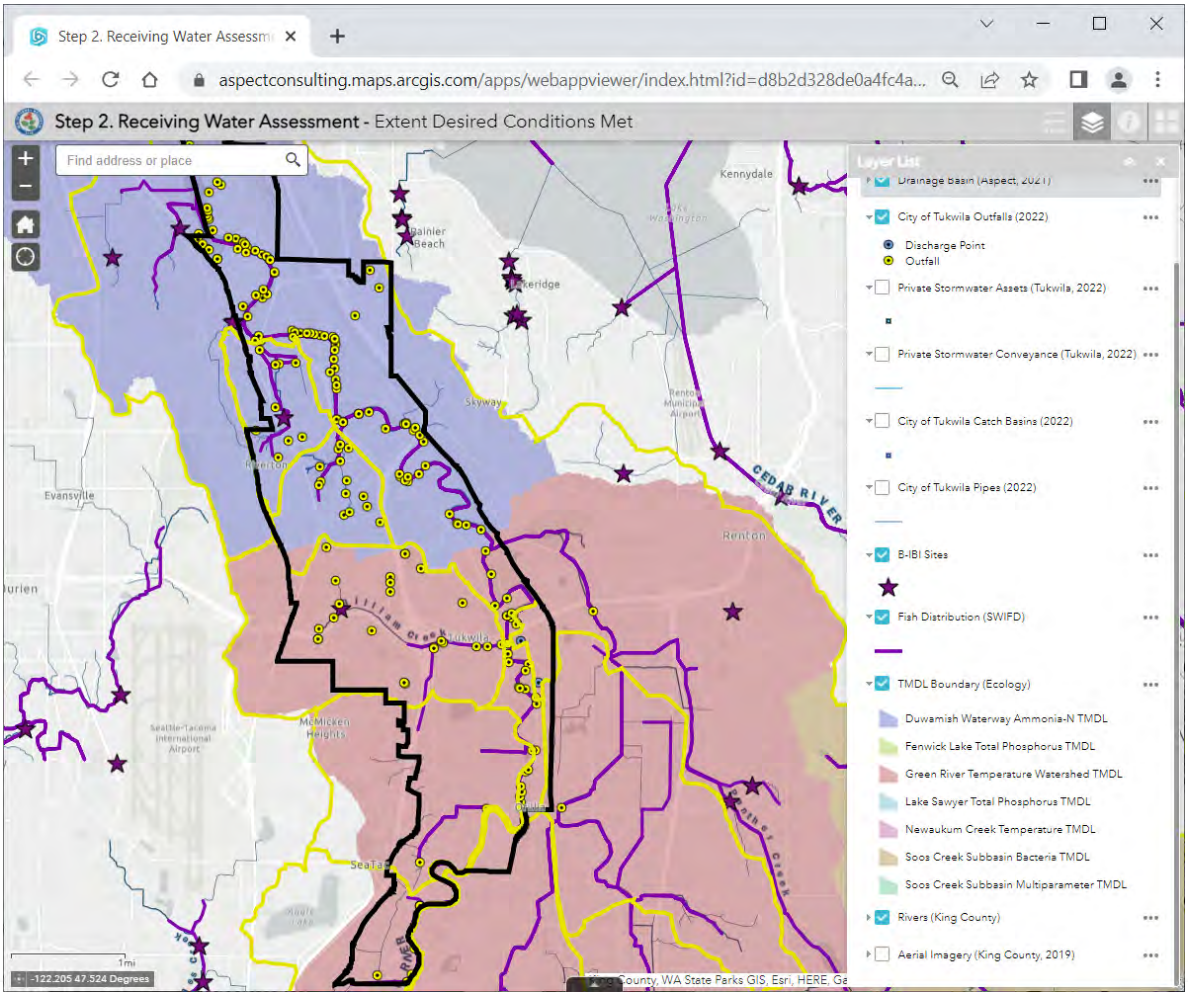
Data from the next six sections, as outlined in the SMAP guidance, was used to assess receiving water conditions within the City of Tukwila.

Receiving Water Conditions Assessment_Step ...

Step 2 Table

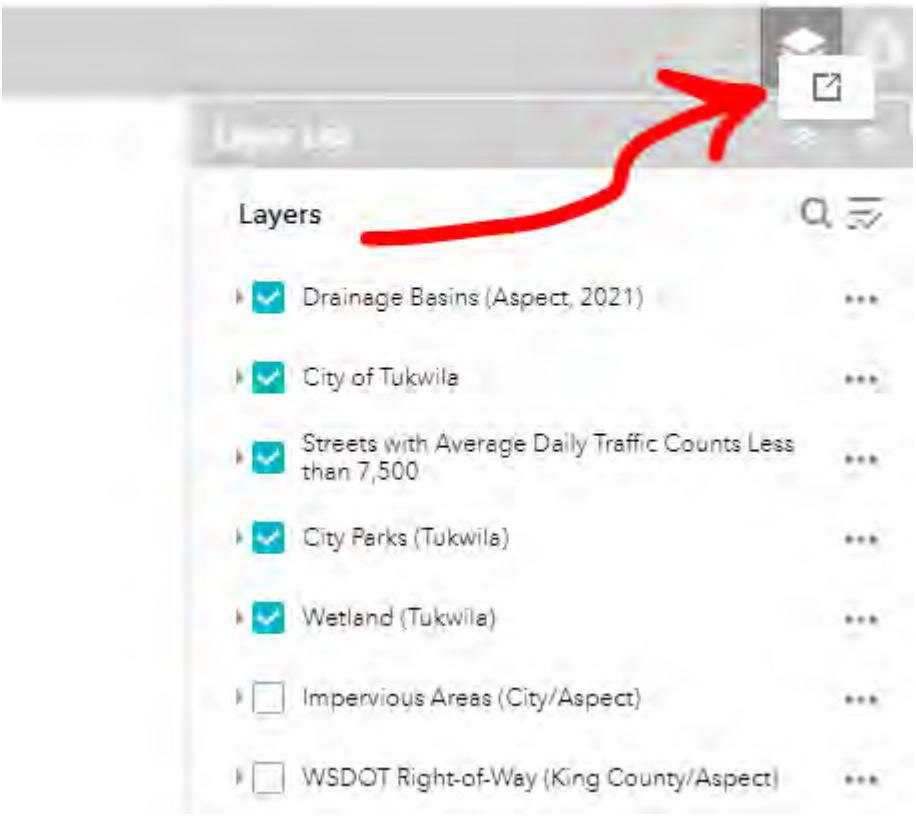
a) Identify designated uses and desired WQ conditions to support uses

Link to Step 2 Table.



b) determine available information and assess extent desired conditions are being met

Link to Step 3 Table.

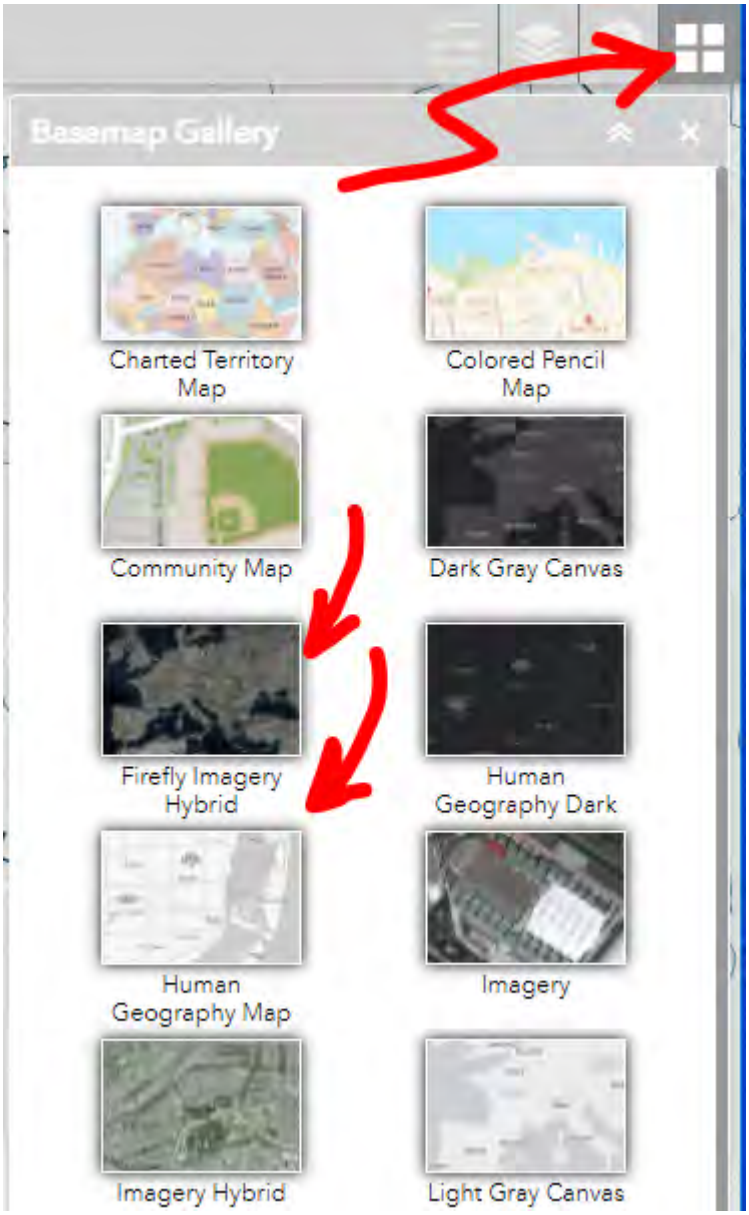


To best view information in the webmaps open in a new browser tab by clicking on the icon above.

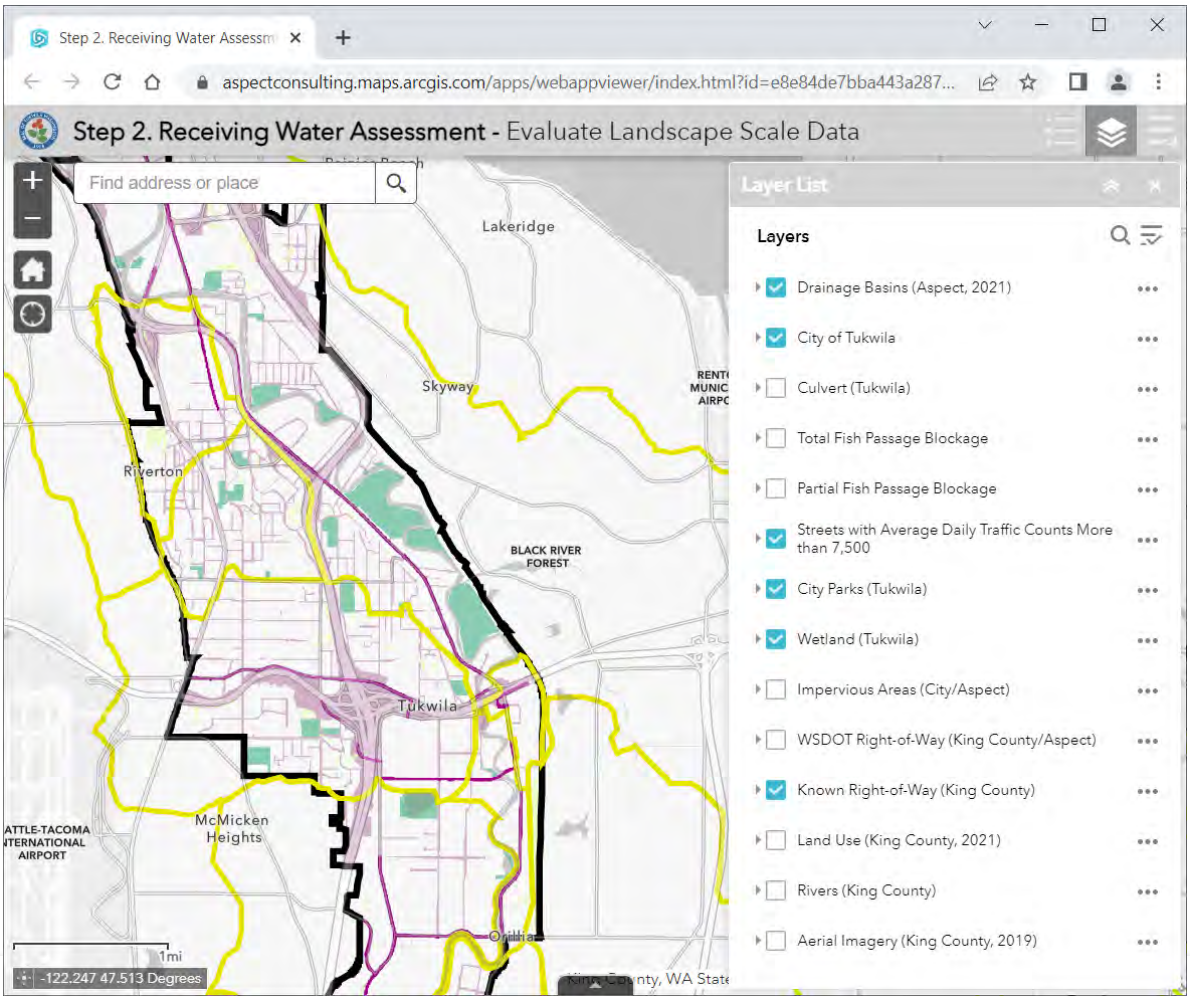
Having trouble seeing the basemap?

Use the Basemap Gallery button to choose a specific basemap, for example *Human Geography* or *Firefly Imagery*, and keep working within the StoryMap.

Alternatively, you can open the map in a separate browser tab as shown above.

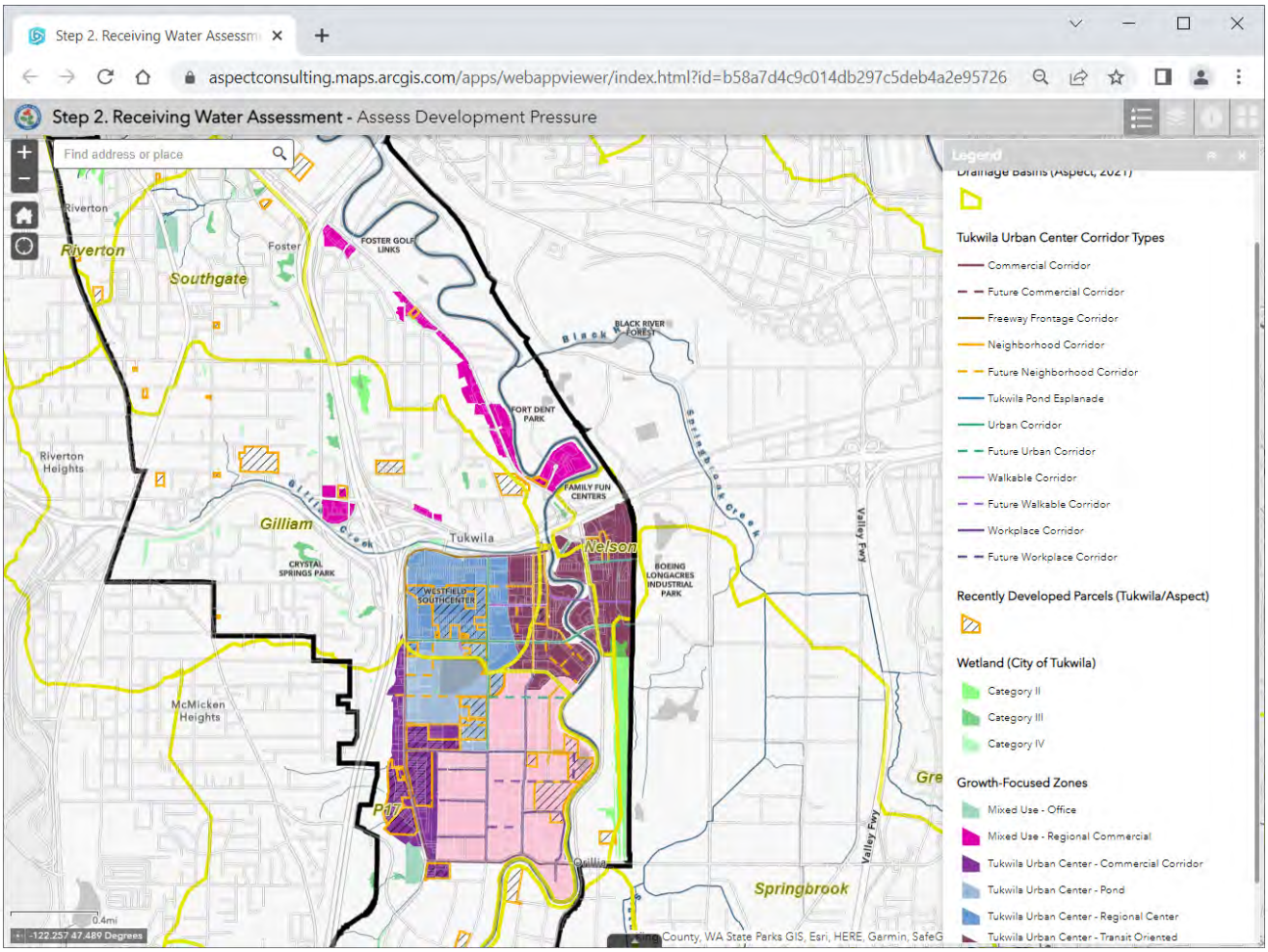


Click on the basins to pop up summary information.



c) Gather and evaluate landscape-scale data that help explain and predict receiving water conditions.

Click on the basins to pop up summary information.



d) assess development pressure in the basin

1. How much growth is being directed toward this area?
2. How is transportation planning likely to affect this basin?
3. In addition to watershed-scale implementation of Low Impact Development techniques, are headwaters, riparian areas, and other sensitive portions of the basin likely to be protected under current zoning and plans?

Urban Growth Capacity Report (King County, 2021) (see Exhibit 13, page 32)

Tukwila's Comprehensive Plan lays out focus areas for growth. All of these elements, goals and policies contribute to the implementation of the Plan's following four major objectives, which are listed in priority order:

1. To improve and sustain residential neighborhood quality and livability.

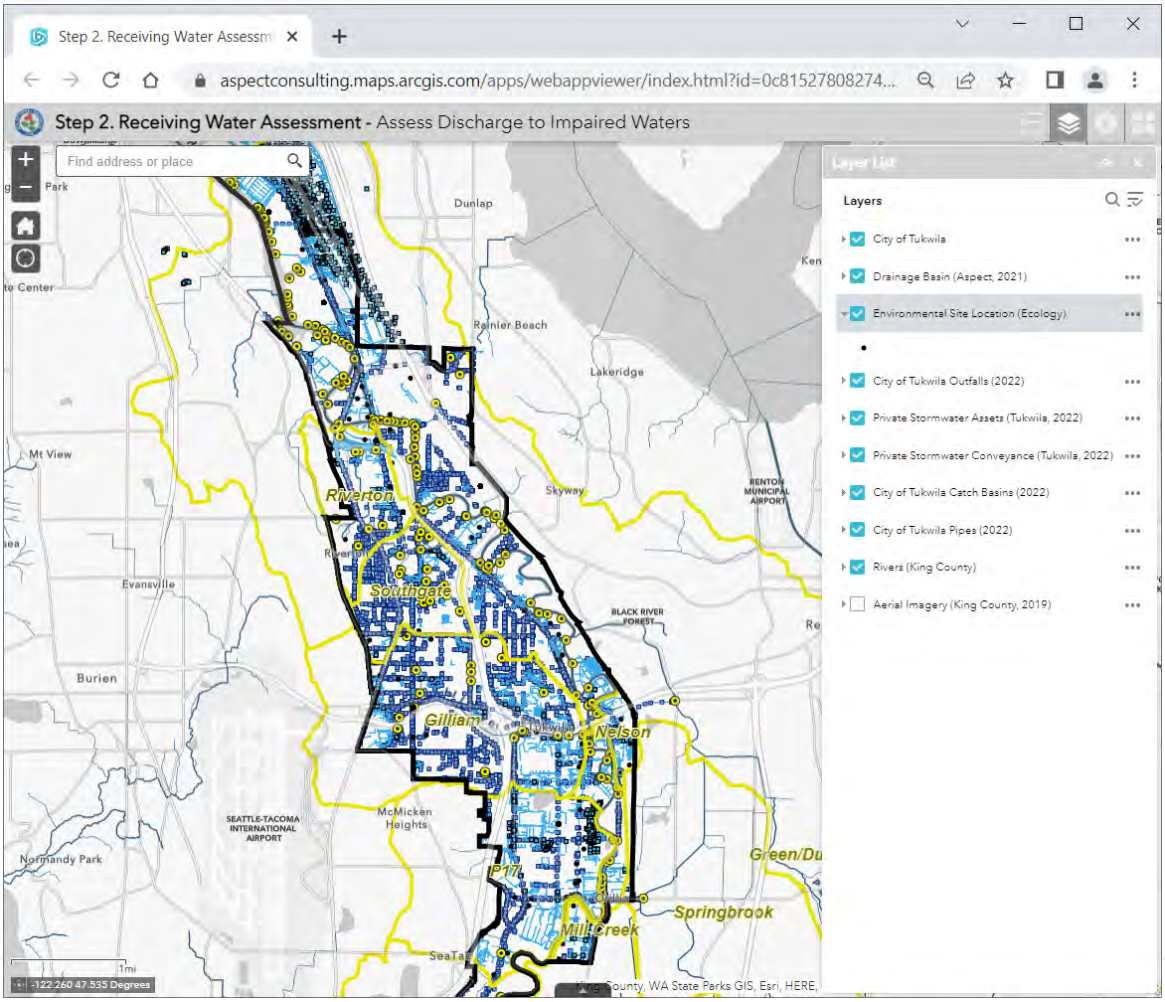
2. To redevelop and reinvigorate the **Tukwila International Boulevard District** both economically and residentially.

3. To redevelop and reinvigorate the **industrial uses in the Manufacturing/Industrial Center along East Marginal Way.**

4. To **further develop a thriving Urban Center** as a true regional concentration of employment, housing, shopping and recreational opportunities.

The plan also states that with little available vacant land other than the Tukwila South subarea, much of Tukwila's future residential population growth will occur in mixed use commercial areas.

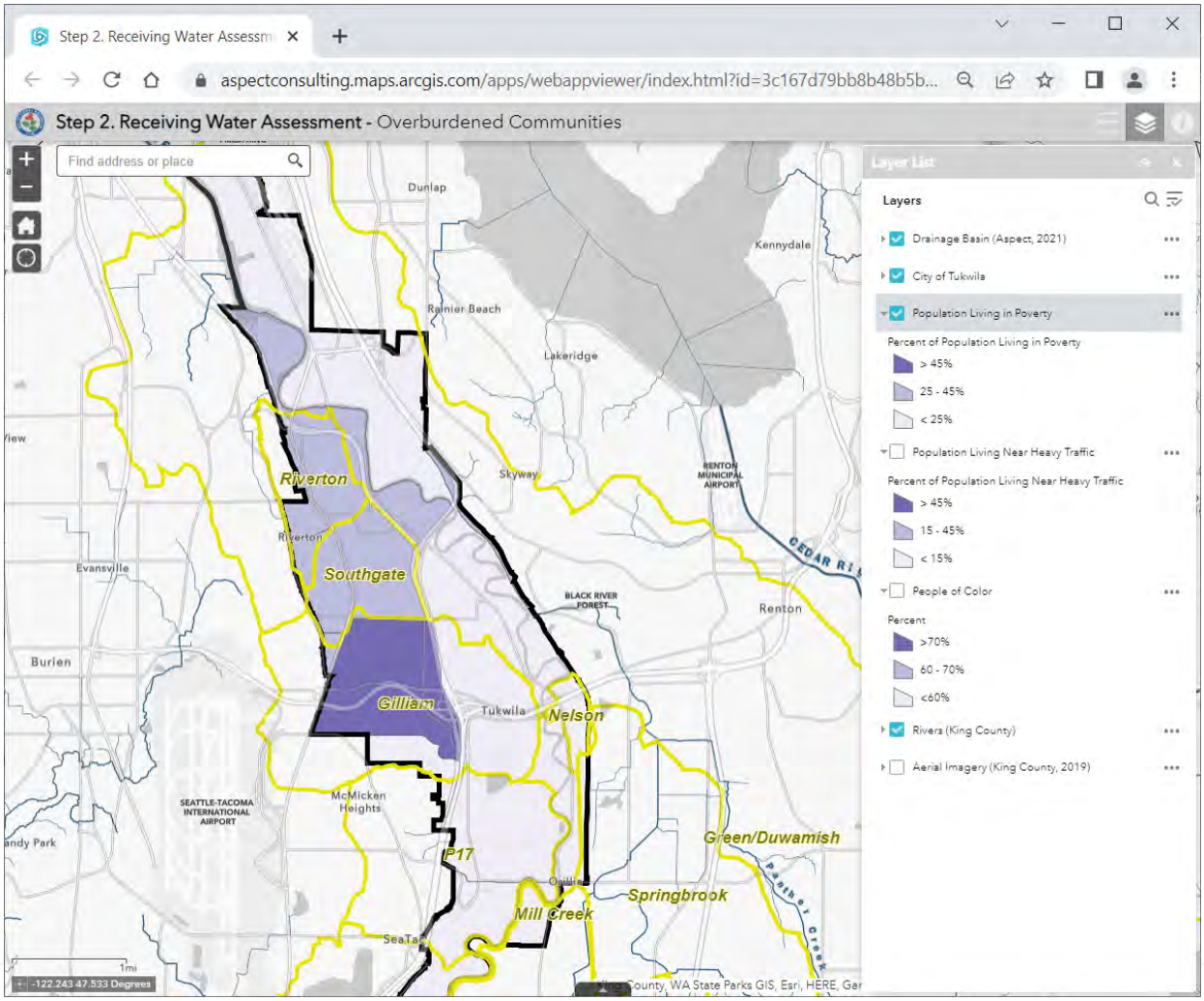
Click on the basins to pop up summary information.



e) assess basins that discharge to impaired waters

1. What sources/activities are the main contributors to the pollutant load targeted for reduction (e.g., polluting activities associated with particular land use or land cover types)?
2. When does the impairment occur? Is it seasonal, or flow-dependent?
3. Can these sources be addressed (or are they already being addressed) through BMPs found in the SWMMWW and applied through your SWMP?
4. Will enhanced municipal stormwater management actions result in meeting loading targets?
5. Are substantial non-stormwater management actions needed to address the impairment?
6. What combination of additional stormwater management actions will most effectively reduce current and future loadings?

Click on the basins to pop up summary information.

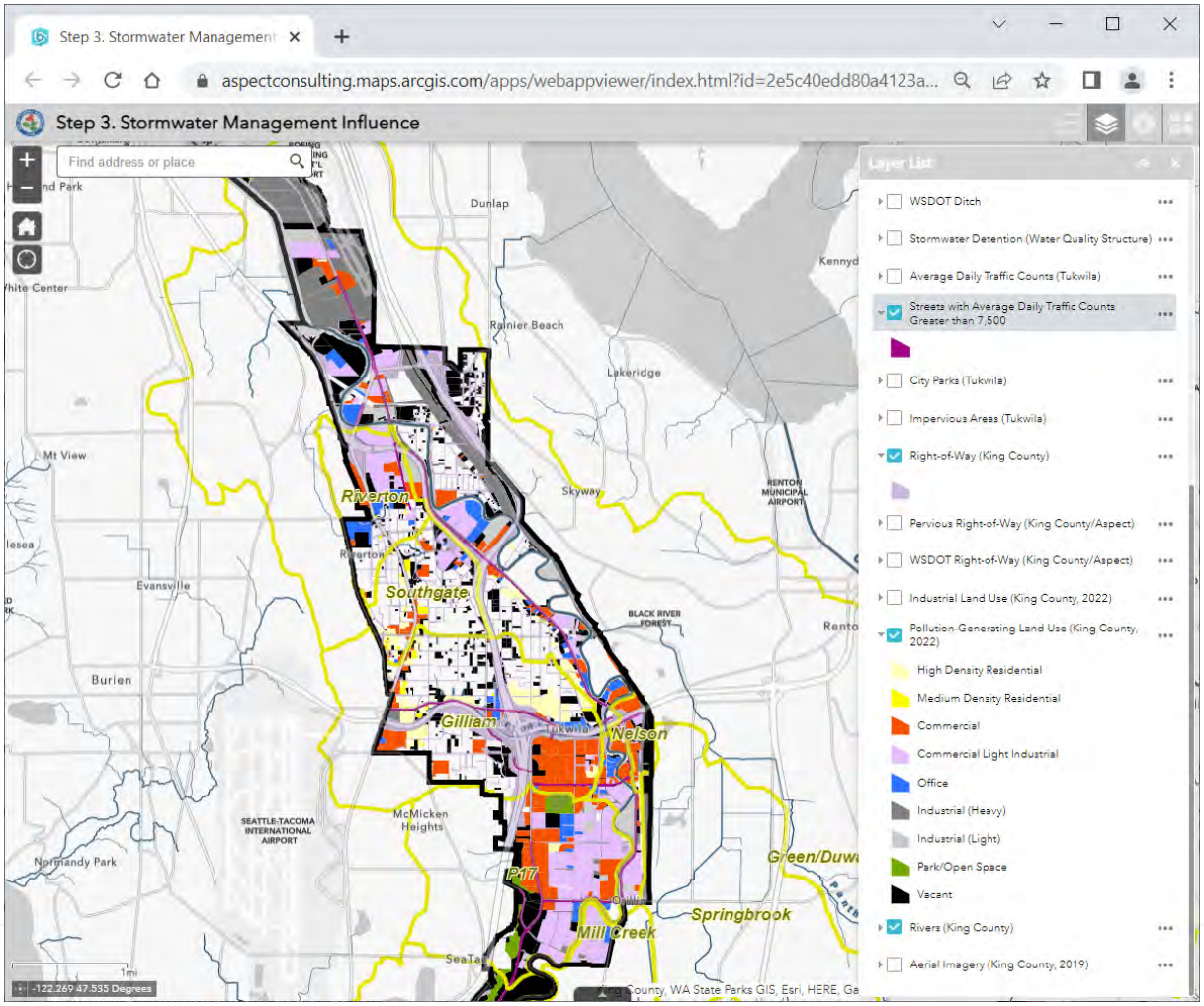


Overburdened Communities

Lastly, evaluate information related to overburdened communities within the contributing areas to help determine where overlap may exist with improving receiving water conditions for water quality and human health.

Sources of information for overburdened communities include, but are not limited to: USEPA's EJ Screen and the Washington State Department of Health Washington State's Health Disparity Map.

Click on the basins to pop up summary information that includes free and reduced lunches and ELL.



Step 3: Assess Stormwater Management Influence

Link to Step 4 Table.

A basin with relatively low expected Stormwater Management Influence for SMAP is defined as having both “low expected hydrologic impacts” and “low expected pollutant loadings”.

Low expected hydrologic impacts are from MS4s that drain directly to:

- Flow-control exempt receiving waters as defined in the 2019 SWMMWW, or
- Ephemeral streams (generally, streams having less than one square mile of contributing watershed area), or

- Receiving waters primarily influenced by groundwater flows.

Low expected pollutant loadings are from MS4s receiving runoff from only:

- Non-pollutant generating surfaces as defined in the 2019 SWMMWW; and/or
- Low density residential land uses; and/or
- Parking areas with up to 100 total trip ends or for up to 300 employees; and/or
- Roads with ADT up to 7,500, fully and partially controlled limited access highways with ADT up to 15,000; and/or
- Roads with ADT up to 7,500, fully and partially controlled limited access highways with ADT up to 15,000; and/or
- Other land uses where runoff is already being treated using stormwater BMPs designed in accordance with the SWMMWW (or equivalent), and in particular, roads with higher ADT, parking areas for buildings with more total trip ends, and on-street parking areas of municipal streets in commercial and industrial areas (see the 2019 SWMMWW).

For each basin, document your answers to the following questions:

1. What are the major pollutants and/or flow impacts associated with individual point sources versus non-point sources? Will the loadings and/or runoff volumes increase under expected future land use conditions?
2. Can these sources be addressed through other land management strategies, including policies, code, or development standards?
3. Can future growth be managed to minimize adverse stormwater impacts?

Flow Control Standards From Tukwila's Infrastructure and Design Guidance

Click on the basins to pop up summary information.

Table 1

Table 2

Table 3

Table 4

Draft Watershed Inventory Table - Appendix

City of Tukwila

Basins and Receiving Waters - City of Tukwila

Basin Name	Receiving Waters within Basin	Basin Area (Acres)	Basin Area inside Tukwila (Acres)	Basin Area (Sq. Miles)	Basin Area inside Tukwila (Sq. Miles)	% of Basin in Tukwila	Direct Discharge to Puget Sound? (refer to SMAP)
Gilliam	**Green River, Gilliam Creek, Cottage Creek**	**1,858**	**1,315**	**2.9**	**2.1**	**70.8**	**No**
Green/ Duwamish	**Green/Duwamish Rivers, Duwamish Waterway, Ryan Hill Creek**	**297,608**	**2,589**	**465.0**	**4.0**	**0.9**	**Yes**
Johnson	Green River, Johnson Creek, Ditches J2 (probable), and Ditch C (probable)	1,753	289	2.7	0.5	16.5	No
Mill Creek	Green River	5,122	86	8.0	0.1	1.7	No
Nelson	Green River	112	110	0.2	0.2	98.7	No
P17	Green River, Stream E, E1, E2	1,516	808	2.4	1.3	53.3	No
Riverton	**Duwamish River, Riverton Creek**	**514**	**402**	**0.8**	**0.6**	**78.3**	**No**
Southgate	**Duwamish River, Southgate Creek**	**506**	**504**	**0.8**	**0.8**	**99.6**	**No**
Springbrook	Green River, Black River, Springbrook Creek	2,311	47	3.6	0.1	2.0	No

Designated Uses - City of Tukwila

Receiving Water Name	Designated Uses	Use Category	Parameter	Water Quality Standard (WAC 173-201A)
Gilliam Creek Johnson Creek Mill Creek[A] P17 **Riverton Creek** **Southgate Creek** Springbrook Creek	Aquatic Life	Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax[1]: 17.5°C (63.5°F)
			DO	Lowest 1-Day Minimum: 8.0 mg/L
			pH	6.5 - 8.5 pH units, with a human-caused variation within the range of less than 0.5 units
			Turbidity	< 5 NTU[2] over background[3] when the background is 50 NTU or less; or A 10 percent increase in the turbidity when the background turbidity is more than 50 NTU
	Recreation (Primary Contact)		Bacteria	Fecal coliform[4] organism levels within an averaging period[5] must not exceed a geometric mean value of 100 CFU[6] or MPN[6] per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL
				E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL
Green/Duwamish	Aquatic Life	Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax1: 17.5°C (63.5°F)
			DO	Lowest 1-Day Minimum: 8.0 mg/L
			pH	6.5 - 8.5 pH units, with a human-caused variation within the range of less than 0.5 units
			Turbidity	< 5 NTU2 over background3 when the background is 50 NTU or less; or A 10 percent increase in the turbidity when the background turbidity is more than 50 NTU
	Aquatic Life	Salmonid Rearing, and Migration Only	Temperature	Same as above
			DO	Lowest 1-Day Minimum: 6.5 mg/L
			pH	Same as above
			Turbidity	< 10 NTU over background when the background is 50 NTU or less; or A 20 percent increase in the turbidity when the background turbidity is more than 50 NTU
	Recreation (Primary Contact)		Bacteria	Fecal coliform4 organism levels within an averaging period5 must not exceed a geometric mean value of 100 CFU6 or MPN6 per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL
				E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL
	Other (Shellfish Harvesting)		Bacteria	Fecal coliform must not exceed a geometric mean value of 14 CFU or MPN per 100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 CFU or MPN per 100mL
Nelson	N/A - Nelson basin has no identified surface water, City MS4 system discharges to Green River			

[A] Mill Creek basin has no identified surface water within City of Tukwila, City MS4 discharges into Mill Creek which is designated as Salmonid Spawning, Rearing, and Migration and for Primary Contact Recreation

[1] 7-DADMax: the 7-day average of the daily maximum temperatures

[2] NTU—unit of measurement for turbidity; Nephelometric Turbidity Units

[3] Background means turbidity level of a waterbody which is outside the area of influence of the discharge under consideration.

[4] Fecal Coliform standard was expired on 12/31/2020.

[5] The averaging period of bacteria sample data shall be ninety days or less

[6] CFU and MPN—units of measurement for number of bacteria; Colony Forming Unit and Most Probable Number, respectively

Watershed Inventory - City of Tukwila

		1. Designated Uses and Desired WQ	2. Extent to which desired conditions are being met							
			Fish Presence and Habitat Conditions			*Known WQ Impairment*				*Summary of Extent Conditions are Being Met*
Basin/Receiving Water Name	**% of Basin in Tukwila**	**Designated Uses and Desired WQ Conditions to Support (WAC 173-201A)**	**Fish Presence (SWIFD)**	**Percent Vegetated 100' Buffer of Stream with Fish Presence**	**Percent Vegetated 300' Buffer of Stream with Fish Presence**	**B-IBI (Score out of 100)**	**Waterway (303d- or 305b-Listing)* (ECY)**	**TMDLs***	**Local Knowledge of Receiving Water Conditions**	**Give higher priority to RW with low to moderate levels of impairment.**
Gilliam	**70.8**	**(See Step 2. Designated Uses)**	**Coho (P); Resident Coastal Cutthroat (P)**	**54.9**	**40.7**	**09LOW0325: Very Poor (9.1)**	**Unnamed Creek - Tributary to Green River - Other:** (CAT5 - bioassessment)	**Green River Temperature Watershed TMDL**	**City data from lower reach in 2018-2020 indicate concerns with pH, turbidity and total suspended solids. Metals, DO and temperature met standards.**	**Creek runs along mall parking lot and under I-405/I-5 intersection and overpass.**
Green/Duwamish	**0.9**	**(See Step 2. Designated Uses)**	**Coho(P)(R); Dolly Varden/Bull Trout (P); Fall Chinook (P)(R); Fall Chum (P)(R); Pink Odd Year (P); Resident Coastal Cutthroat (P); Sockeye (P); Summer Steelhead (R); Winter Steelhead (P)**	**94.9**	**61.5**	**--**	**Duwamish River - Water:** (CAT5 - Temperature, CAT5 - Alpha-BHC, CAT5 - pH) **Duwamish River - Tissue:** (CAT5 - PCBs, CAT5 - 4,4'-DDE, CAT5 - 4,4'-DDT, CAT5 - 4/4'-DDD) **Green River - Water:** (CAT5 - DO, CAT4A - Temperature)	**Green River Temperature Watershed TMDL and Duwamish Waterway Ammonia-N TMDL**	**Homeless encampments along river bank are prone to winter flooding and could contribute unknown debris and contaminants, Synthetic turf fields at Ft. Dent might be possible source of 6-PPD-quinone, further research needed**	**Multiple TMDL's already in place**
Johnson	16.5	(See Step 2. Designated Uses)	Coho (P); Fall Chinook (P); Fall Chum (P); Resident Coastal Cutthroat (P); Winter Steelhead (P)	89.8	82.3	--	Angle Lake - Water: (CAT5 - Bacteria)	Green River Temperature Watershed TMDL	Fecal Coliform from Agriculture in Kent. King County flap gate does not work and fish are not present.	Basin within City already under development agreements
Mill Creek	1.7	(See Step 2. Designated Uses)	Coho (P)(S)(R); Fall Chinook (P); Fall Chum (P); Resident Coastal Cutthroat (P); Winter Steelhead (P)	69.8	22.1	These stations are outside of the City boundary. 09BLA0675: Poor (20.2) 09BLA0716: Poor (30.5) 09BLA0756: Very Poor (14.5)	Springbrook (Mill) Creek - Water: (CAT5 - Bacteria, CAT5 - Zinc, CAT5 - DO, CAT4A - Temperature) Springbrook (Mill) Creek - Other: (CAT5 - Bioassessment)	Green River Temperature Watershed TMDL		The reaches with 303d/305b-listed waters and the B-IBI stations are outside City boundary. The percentage of basin in Tukwila is <2%.
Nelson	98.7	(See Step 2. Designated Uses)	--	97.3	62.6	--	--	Green River Temperature Watershed TMDL		No identified surface waters
P17	53.3	(See Step 2. Designated Uses)	Coho (P); Fall Chinook (P); Fall Chum (P); Resident Coastal Cutthroat (P); Winter Steelhead (P)	61.4	40.4	--	--	Green River Temperature Watershed TMDL		PSWCP indicates high concern for Metals, nutrients and bacteria

Watershed Inventory - City of Tukwila

		1. Designated Uses and Desired WQ	2. Extent to which desired conditions are being met							
			Fish Presence and Habitat Conditions			*Known WQ Impairment*				*Summary of Extent Conditions are Being Met*
Basin/Receiving Water Name	**% of Basin in Tukwila**	**Designated Uses and Desired WQ Conditions to Support (WAC 173-201A)**	**Fish Presence (SWIFD)**	**Percent Vegetated 100' Buffer of Stream with Fish Presence**	**Percent Vegetated 300' Buffer of Stream with Fish Presence**	**B-IBI (Score out of 100)**	**Waterway (303d- or 305b-Listing)* (ECY)**	**TMDLs***	**Local Knowledge of Receiving Water Conditions**	**Give higher priority to RW with low to moderate levels of impairment.**
Riverton	**78.3**	**(See Step 2. Designated Uses)**	**Coho (P); Fall Chinook (P); Fall Chum (P); Resident Coastal Cutthroat (P); Winter Steelhead (P)**	**68.1**	**52.4**	**09DUW0277: Poor (28.9)**	**Unnamed Creek (Trib to Duwamish River) - Other:** (CAT5 - Bioassessment)	**Duwamish Waterway Ammonia-N TMDL**	**Highly developed area with fish present - opportunity for significant impact. Urban runoff mortality has been observed. Data from 2019 indicates concerns with DO but Temp and pH are ok**	**Concerns with DO and bioassessment scores. Observed pre-spawn mortality but creek is also largely accessible to fish**
Southgate	**99.6**	**(See Step 2. Designated Uses)**	**Coho (P); Fall Chinook (P); Fall Chum (P); Resident Coastal Cutthroat (P); Winter Steelhead (P)**	**82.0**	**69.6**	**--**	**--**	**Duwamish Waterway Ammonia-N TMDL**	**Sediment issues. Bank stabilization and dredging maintenance often required. City data from 1994-1995 indicate moderate concern with DO and pH**	**Concerns with sediment, DO and pH and much of creek is piped**
Springbrook	2.0	(See Step 2. Designated Uses)	Coho (P)(R); Fall Chinook (P); Fall Chum (P); Resident Coastal Cutthroat (P); Winter Steelhead (P)	--	--	--	Springbrook (Mill) Creek - Other: (CAT5 - Bioassessment,	Green River Temperature Watershed TMDL		The reaches with 303d/305b-listed waters are outside City boundary.

*TMDLs, 303d, and 305b were considered as part of water quality assessment but no stormwater-related listings are included in Appendix 2 of the NPDES municipal stormwater permit for Tukwila.

(P) indicates presence of salmonid species
(S) indicates spawning of salmonid species
(R) indicates rearing of salmonid species

Watershed Inventory - City of Tukwila

	3. Evaluate landscape-scale data															
	Information on Existing Land Cover in Tukwila															
Basin/Receiving Water Name	**Basin Area inside Tukwila (Acres)**	**Impervious Surface (Acres)**	**Impervious Surface (%)**	**Wetland or Park (%)**	**Other Vegetated/ Forested (%)**	**Road Density (% Impervious Trans-portation)**	**High Vehicle Traffic Areas (AADT >7,500) (%)**	**Approximate Industrial Land use (Regrouped from King County Parcels, 2022) (%)**	**Approximate Commercial Land use (Regrouped from King County Parcels, 2022) (%)**	**Approximate Single-Family Land use (Regrouped from King County Parcels, 2022) (%)**	**Approximate Multi-Family Land use (Regrouped from King County Parcels, 2022) (%)**	**Percentage Road Surface within 100' of Stream**	**Percentage High Traffic Road Surface within 100' of Stream**	**Culverts (Quantity)**	**Fish Passage Barriers (Total Block)**	**Fish Passage Barriers (Partial Block)**
Gilliam	**1315**	**616.7**	**46.9**	**4.4**	**48.7**	**14.4**	**16.7**	**0.7**	**17.6**	**32.9**	**9.7**	**84.2**	**25.4**	**68**	**13**	**5**
Green/Duwamish	**2589**	**1227.9**	**47.4**	**8.0**	**44.6**	**12.0**	**47.1**	**24.6**	**16.4**	**19.0**	**1.2**	**54.7**	**14.9**	**130**	**2**	**0**
Johnson	289	45.9	15.9	9.1	75.0	7.5	6.7	0.0	0.0	0.2	0.0	30.6	11.6	7	0	0
Mill Creek	86	69.6	80.6	0.0	19.4	10.8	3.3	5.3	78.3	0.0	0.0	35.1	89.2	1	0	0
Nelson	110	49.0	44.5	1.2	54.3	14.0	4.5	19.4	34.7	2.7	0.0	93.7	81.2	2	0	0
P17	808	504.8	62.4	4.1	33.5	8.8	17.7	4.1	55.0	5.8	0.5	52.1	20.6	16	0	0

Watershed Inventory - City of Tukwila

	3. Evaluate landscape-scale data															
	Information on Existing Land Cover in Tukwila															
Basin/Receiving Water Name	**Basin Area inside Tukwila (Acres)**	**Impervious Surface (Acres)**	**Impervious Surface (%)**	**Wetland or Park (%)**	**Other Vegetated/ Forested (%)**	**Road Density (% Impervious Trans-portation)**	**High Vehicle Traffic Areas (AADT >7,500) (%)**	**Approximate Industrial Land use (Regrouped from King County Parcels, 2022) (%)**	**Approximate Commercial Land use (Regrouped from King County Parcels, 2022) (%)**	**Approximate Single-Family Land use (Regrouped from King County Parcels, 2022) (%)**	**Approximate Multi-Family Land use (Regrouped from King County Parcels, 2022) (%)**	**Percentage Road Surface within 100' of Stream**	**Percentage High Traffic Road Surface within 100' of Stream**	**Culverts (Quantity)**	**Fish Passage Barriers (Total Block)**	**Fish Passage Barriers (Partial Block)**
Riverton	**402**	**191.0**	**47.5**	**3.5**	**49.0**	**10.0**	**4.7**	**2.1**	**36.8**	**26.4**	**0.3**	**46.1**	**8.7**	**80**	**4**	**1**
Southgate	**504**	**212.1**	**42.1**	**5.7**	**52.3**	**11.8**	**--**	**0.3**	**11.0**	**49.5**	**7.0**	**60.8**	**0.0**	**83**	**0**	**0**
Springbrook	47	3.8	8.1	49.6	42.3	1.8	--	79.9	3.7	0.0	0.1	30.6	0.0	0	0	0

*TMDLs, 303d, and 305b were considered as part of water quality assessment but no stormwater-related listings are included in Appendix 2 of the NPDES municipal stormwater permit for Tukwila.

(P) indicates presence of salmonid species
(S) indicates spawning of salmonid species
(R) indicates rearing of salmonid species

Watershed Inventory - City of Tukwila

	4. Assess Development Pressure in the Basin									5. Information on Basins that Discharge to Impaired Waters						
	Information on Development Pressure							*Summary of Development Pressure in the Basin*		*Pollution Sources and Stormwater Management*				*Summary of Impairment to Water*		
Basin/Receiving Water Name	**Mapped Landslides (King County)**	**Very High Landslide Hazard Area (City) (%)**	**High Landslide Hazard Area (City) (%)**	**Mine Hazard Areas (City) (%)**	**Seismic Hazard Area (City) (%)**	**Mapped Erosion Areas (King County) (%)**	**Major Redevelopment Projects (list of projects from City)**	**How much growth is being directed toward this area?**	**In addition to watershed-scale implementation of LID techniques, are headwaters, riparian areas, and other sensitive portions of the basin likely to be protected under current zoning and plans?**	**Number of Environmental Sites (Ecology)**	**Number of Outfalls per 1000 linear feet of River**	**Known issues (flooding, erosion, etc.) (King County)**	**Approximate Treated Area (%) (See Step 4. SMI)**	**What sources and activities contribute to pollution?**	**Where does impairment occur?**	**Can/are sources addressed through BMPs?**
Gilliam	--	3.2	6.7	--	--	--	16	McMicken neighborhood expecting redevelopment because of recent sewer upgrades. Redevelopment is around south center mall in Gilliam and P17. Community plan in that area and expecting redevelopment.	Portion of Gilliam along 518 and Southcenter boulevard West of I-5 are not designated as watercourse on Critical Areas maps. Much of this might be in WSDOT RoW	24	2.30	WQ issues reported.	Low-only 9 of 500 acres likely treated under ISGP and only a few City and private facilities shown in the data	High ADT roads, commercial land use, high-density residential	Throughout basin	Potentially
Green/Duwamish	--	0.4	7.0	One 16 acre mine hazard area near Foster Golf Links.	8.0	--	21	New Amazon warehouse on west side of Duwamish in far north Tukwila	Entire shoreline covered but Shoreline Jurisdiction under Shoreline Master Program	118	2.03	WQ/FC issues reported.	Med-maybe 40% of PGS treated under ISGP, City data shows only 3 City treatment facilities	Commercial land use, roads, agriculture, industrial	throughout basin	Upstream area likely too large for City to have impact
Johnson	--	--	0.7	--	61.5	9.4	Segale development	Tukwila South just adopted some multi-family design guidelines, and mixed use employment is expected north of 200th	Wetlands and watercourses appear to be identified and buffers are in place under Critical Areas Ordinance	1	0.23		Low, all PGS assumed untreated, City data show no treatment facilities	Agriculture.	Throughout lower basin	Already locked-in under development agreement
Mill Creek	--	--	0.0	--	--	--	1		No surface waters identified.	0	0.00		Low-small percentage under ISGP, City data shows no treatment facilities	Commercial/light industrial	Entire basin within City	Potentially
Nelson	--	--	2.2	--	--	--	--		Wetlands and watercourses appear to be identified and buffers are in place under Critical Areas Ordinance	3	0.00		Med-maybe 25% of PGS treated under ISGP, City data shows no treatment facilities	Commercial/light industrial	Entire basin within City	Potentially
P17	--	0.4	6.8	--	1.2	2.0	14	Redevelopment is around south center mall in Gilliam and P17. Community plan in that area and expecting redevelopment.	Wetland between Minkler BLVD and Green River not shown in CAO data. Most other drainages are piped or have appropriate designated buffer	38	0.09		Low-small percentage under ISGP, City data shows 1 treatment facility and there are indications of a couple private detention facilities	Commercial/ light industrial/High ADT roads	Lower portion of basin	Potentially

Watershed Inventory - City of Tukwila

	4. Assess Development Pressure in the Basin									5. Information on Basins that Discharge to Impaired Waters						
	Information on Development Pressure							*Summary of Development Pressure in the Basin*		*Pollution Sources and Stormwater Management*				*Summary of Impairment to Water*		
Basin/Receiving Water Name	Mapped Landslides (King County)	Very High Landslide Hazard Area (City) (%)	High Landslide Hazard Area (City) (%)	Mine Hazard Areas (City) (%)	Seismic Hazard Area (City) (%)	Mapped Erosion Areas (King County) (%)	Major Redevelopment Projects (list of projects from City)	How much growth is being directed toward this area?	In addition to watershed-scale implementation of LID techniques, are headwaters, riparian areas, and other sensitive portions of the basin likely to be protected under current zoning and plans?	Number of Environmental Sites (Ecology)	Number of Outfalls per 1000 linear feet of River	Known issues (flooding, erosion, etc.) (King County)	Approximate Treated Area (%) (See Step 4. SMI)	What sources and activities contribute to pollution?	Where does impairment occur?	Can/are sources addressed through BMPs?
Riverton	--	0.3	6.0	--	4.5	--	11		Wetlands and watercourses appear to be identified and buffers are in place under Critical Areas Ordinance	27	1.18	WQ issues reported. Highly developed fish present and WQ upgrades could make a positive impact.	Low-med-small percentage under ISGP, City data shows 4 treatment facilities (low in basin) and several small private facilities within basin	Commercial/light industrial/High ADT roads	Lower portion of basin	Potentially
Southgate	--	--	3.8	--	--	--	6	Development near Tukwila Village on Tukwila Int'l Blvd (Urban Renewal Zone) and also South of 144th on Tukwila Int'l Blvd.	Wetlands and watercourses appear to be identified and buffers are in place under Critical Areas Ordinance	3	1.45	WQ issues reported. Sediment issues require frequent dredging and bank stabilization. Flooding.	Low-small percentage under ISGP, City data shows several vaults in upper portions of basin	Commercial, high density residential,	Commercial in lower basin, high-density residential in upper basin	Potentially
Springbrook	--	--	0.0	--	--	--	1		Wetlands appear to be identified and buffers are in place under Critical Areas Ordinance	0	0.00		Low-almost entire basin is vegetated rail corridor within City, KC data classifies as industrial	Industrial/ heavy industrial	Entire basin within City	Potentially

*TMDLs, 303d, and 305b were considered as part of water quality assessment but no stormwater-related listings are included in Appendix 2 of the NPDES municipal stormwater permit for Tukwila.

(P) indicates presence of salmonid species
(S) indicates spawning of salmonid species
(R) indicates rearing of salmonid species

Watershed Inventory - City of Tukwila

	6. Overburdened Communities						Overall Assessment
	Evaluate information related to overburdened communities within contributing areas to determine where overlap may exist with improving RW Conditions for WQ and human health.					Summary of Overburdened Communities	Basin Condition Summary
Basin/Receiving Water Name	Approximate % of Parcels with Free or Reduced School Lunch (City WiFi Project, 2021)	Approximate % of Parcels with Public School Student Homes Speaking ELL (City WiFi Project, 2021)	Approximate Percentage of Population Living in Poverty (DOH)	Approximate Percentage of Populations near Heavy Traffic Roadways (DOH)	Approximate Percentage of People of color (DOH)		
Gilliam	**10.8**	**10.4**	**34.0**	**42.3**	**66.3**	**Gilliam is likely the most overburdened basin. Essentially the same percentages for poverty, ELL, free and reduced lunch, and People of Color as Southgate. Gilliam likely has more people than Southgate.**	**-one 303(d) listing -relatively large WSDOT influence -Relatively high % of pollution generating area -more than 70% of basin in Tukwila -City data from lower reach in 2018-2020 indicate concerns with pH, turbidity and total suspended solids**
Green/Duwamish	**1.6**	**1.6**	**21.6**	**33.8**	**66.0**	**DOH data shows lower poverty, ELL, and Free and Reduced lunch relative to other basins with residential areas**	**-Multiple 303(d) or current TMDL -Less than 1% of basin in Tukwila -Relatively high % of pollution generating surface in basin**
Johnson	0.0	0.0	19.2	22.4	56.8	King County data shows no residential area within city limits. Likely very few residents relative to other basins	-Largely locked off by Segale development -303(d)for bacteria in headwaters in Seatac less than 20% of basin in Tukwila
Mill Creek	0.0	0.0	20.1	22.9	57.0	King County data shows no residential area within city limits. Likely very few residents relative to other basins	-Basin has multiple 303(d) listings but none in Tukwila -Less than 2% of total basin in Tukwila
Nelson	0.0	0.0	21.5	40.1	62.1	Basin has almost no residential area within city limits. Likely very few residents relative to other basins	-No surface waters -Discharges to Green River
P17	0.0	0.0	20.7	33.8	60.2	King County data shows only a single residential area within city limits. Likely very few residents relative to other basins	-Area in Tukwila potentially redeveloping -almost 50% of basin is in SeaTac

Watershed Inventory - City of Tukwila

	6. Overburdened Communities						Overall Assessment
	Evaluate information related to overburdened communities within contributing areas to determine where overlap may exist with improving RW Conditions for WQ and human health.					Summary of Overburdened Communities	Basin Condition Summary
Basin/Receiving Water Name	Approximate % of Parcels with Free or Reduced School Lunch (City WiFi Project, 2021)	Approximate % of Parcels with Public School Student Homes Speaking ELL (City WiFi Project, 2021)	Approximate Percentage of Population Living in Poverty (DOH)	Approximate Percentage of Populations near Heavy Traffic Roadways (DOH)	Approximate Percentage of People of color (DOH)		
Riverton	**2.1**	**2.0**	**39.9**	**14.7**	**64.5**	**Riverton is likely the 3rd most overburdened basin. It has the highest poverty but relatively low ELL and free and reduced lunch and lower population than Gilliam or Southgate.**	**-Noted fish presence -303(d) listing for bioassessment -Improving wq would align with other projects in basin -City data from 2019 indicates concerns with DO but temp and pH are ok**
Southgate	**10.2**	**9.2**	**39.3**	**14.0**	**65.0**	**Southgate is likely the 2nd most overburdened basin. Essentially the same percentages for poverty, ELL, free and reduced lunch, and People of Color as Gilliam. Gilliam likely has more people than Southgate.**	**-Relatively small pollution generating area -Noted sediment issues in basin due to steep slopes -City data from 1994-1995 indicate moderate concern with DO and pH**
Springbrook	0.0	0.0	21.7	40.1	62.1	Basin has almost no residential area within city limits. Likely very few residents relative to other basins	-Area in Tukwila all likely under ISGP -Very small % of basin in Tukwila Springbrook has several 303(d) listings

*TMDLs, 303d, and 305b were considered as part of water quality assessment but no stormwater-related listings are included in Appendix 2 of the NPDES municipal stormwater permit for Tukwila.

(P) indicates presence of salmonid species
(S) indicates spawning of salmonid species
(R) indicates rearing of salmonid species

Stormwater Management Influence - City of Tukwila

Step 3 - Assess Stormwater Management Influence														
Basin Characteristics					*Pollution-Generating Land Use*									
Basin/ Receiving Water Name	**Basin Area inside Tukwila (Acres)**	**Flow Control Exempt Receiving Water**	**Location in the Basin**	**% of Basin in Tukwila**	**Approx. Area with Pollution-Generating Surface (Acres)**	**Approx. Percentage of Area with Pollution-Generating Surface (%)**	**Number of CBs inside Pollution-Generating Surface/ Acre**	**Approx. Area of Industrial Area (Indicates treatment exists per permitted activities) (Acres)**	**Approx. Percentage of Industrial Land Use (Indicates treatment exists per permitted activities) (%)**	**Number of CBs inside Industrial Surface/ Acre***	**Impervious Surface (%)**	**% Pollution-generating Land Use Treated by Existing SW Facility (High/Med/Low)**	**High Vehicle Traffic Areas (AADT >7,500) (Acres)**	**Outfall Density (Number of Outfalls per 1,000 linear feet of River)**
Gilliam	**1315**	**Basin east of I-5 falls under 40/20 rule for flow control due to 40% impervious since 1985**	**Lower 70% of basin in City. Upper 30% is mix of WSDOT, Seattle-Tacoma International Airport and SeaTac. WSDOT ROW around I-5, I405, 518 are moderate portion of basin within City**	**70.8**	**500.1**	**38.0**	**0.42**	**9.16**	**0.70**	**UNK**	**46.9**	**Low-only 9 of 500 acres likely treated under ISGP and only a few City and private facilities shown in the data**	**16.7**	**2.30**
Green/ Duwamish	**2589**	**Yes**	**Lower end, almost entire basin is upstream of City**	**0.9**	**1400.3**	**54.1**	**0.37**	**637.72**	**24.63**	**0.50**	**47.4**	**Med-maybe 40% of PGS treated under ISGP, City data shows only 3 City treatment facilities**	**47.1**	**2.03**
Johnson	289	No	Only the lowest portion of basin within City. Upper portions in Kent and SeaTac	16.5	202.9	70.1	0.11	0.00	0.00	0.00	15.9	low, all PGS assumed untreated, City data show no treatment facilities	6.7	0.23
Mill Creek	86	No	The part of Mill Creek inside Tukwila is 0.13 sq. mi. and 1.7% of the total basin area. It is the confluence area and the opportunity for impact here is limited.	1.7	73.8	85.6	0.07	4.54	5.26	0.00	80.6	Low-small percentage under ISGP, City data shows no treatment facilities	3.3	0
Nelson	110	Yes	Almost entire basin in City	98.7	82.7	75.0	0.56	21.44	19.45	0.84	44.5	Med-maybe 25% of PGS treated under ISGP, City data shows no treatment facilities	4.5	0
P17	808	**Large portions of the basin fall under 40/20 rule for flow control due to 40% impervious since 1985**	Lower half in Tukwila, upper half and on opt of bluff all within SeaTac	53.3	594.0	73.5	0.60	33.36	4.13	0.51	62.4	Low-small percentage under ISGP, City data shows 1 treatment facility and there are indications of a couple private detention facilities	17.7	0.09

Stormwater Management Influence - City of Tukwila

Step 3 - Assess Stormwater Management Influence														
Basin Characteristics					*Pollution-Generating Land Use*									
Basin/ Receiving Water Name	**Basin Area inside Tukwila (Acres)**	**Flow Control Exempt Receiving Water**	**Location in the Basin**	**% of Basin in Tukwila**	**Approx. Area with Pollution-Generating Surface (Acres)**	**Approx. Percentage of Area with Pollution-Generating Surface (%)**	**Number of CBs inside Pollution-Generating Surface/ Acre**	**Approx. Area of Industrial Area (Indicates treatment exists per permitted activities) (Acres)**	**Approx. Percentage of Industrial Land Use (Indicates treatment exists per permitted activities) (%)**	**Number of CBs inside Industrial Surface/ Acre***	**Impervious Surface (%)**	**% Pollution-generating Land Use Treated by Existing SW Facility (High/Med/Low)**	**High Vehicle Traffic Areas (AADT >7,500) (Acres)**	**Outfall Density (Number of Outfalls per 1,000 linear feet of River)**
Riverton	**402**	**No**	**All identified surface waters within City, upper northwest corner of basin (22%) within Burien is mixed high and low density residential**	**78.3**	**197.3**	**49.0**	**0.26**	**8.50**	**2.11**	**0.12**	**47.5**	**Low-med-small percentage under ISGP, City data shows 4 treatment facilities (low in basin) and several small private facilities within basin**	**4.7**	**1.18**
Southgate	**504**	**No**	**Almost entire Basin within City**	**99.6**	**142.1**	**28.2**	**0.32**	**1.37**	**0.27**	**0.00**	**42.1**	**Low-small percentage under ISGP, City data shows several vaults in upper portions of basin**	**--**	**1.45**
Springbrook	47	No	The part of Springbrook Creek inside Tukwila is less than 0.07 sq. mi. and 2.0% of the total basin area. It is the confluence area and the opportunity for impact here is limited.	2.0	46.0	98.3	0.09	37.44	79.92	0.11	8.1	Low-almost entire basin is vegetated rail corridor within City, KC data classifies as industrial	--	0

* Catch basin information inside industrial areas is sparce. Summary calculations may not be reliable.

Lack of info on private facilities for commercial land use limits assessment

Stormwater Management Influence - City of Tukwila

	Step 3 - Assess Stormwater Management Influence												
	Available Area for Retrofit								*Documented Answers to Stormwater Management Influence Questions*				
Basin/ Receiving Water Name	**ROW (Acres)**	**Pervious ROW (Acres)**	**ROW Area as Percent of Total Area (%)**	**Percent of ROW that is Pervious (%)**	**WSDOT ROW Area (Acres)**	**Approximate Number of City/Public Owned Parcels***	**Park (Tukwila) (Acres)**	**Hydrologic Impact? (Low, Medium, High**	**Reason for Hydrologic Impact Rating?**	**Pollutant Loading Impact?**	**Reason for expected pollutant loading rating?**	**Will the loadings and/or runoff volumes increase under expected future land use conditions?**	**Can future growth be managed to minimize adverse stormwater impacts?**
Gilliam	**383.4**	**178.4**	**29.2**	**46.51**	**251.36**	**30 Parcels -several are large parks in SW and N portions of basin. -Large areas of WSDOT ROW along interstates**	**38.10**	**Medium-Low**	**-Almost half of basin is impervious but the entire basin east of I-5 is flow exempt, -70% of basin in Tukwila but many jurisdictions involved**	**Medium**	**Highest percentage of high ADT roads, large percentage of commercial or high-density residential- 70% of basin in Tukwila but many jurisdictions involved**	**Likely little change**	**Minimal growth planned**
Green/ Duwamish	**448.9**	**195.4**	**17.3**	**43.54**	**217.81**	**80 Parcels -Several large parks but much of public land is KC airport and other County facilities in lower basin that are already built out**	**179.02**	**Low**	**Flow-exempt**	**Low**	**Percentage of basin in Tukwila is less than 1%**	**Likely little change**	**Minimal growth planned**
Johnson	33.7	12.2	11.7	36.31	2.72	0	0.00	Low	-Only 16% of basin in City -Only 16% of the area in City is impervious -Area within City already under development agreement	Low	Largely undeveloped or low density residential-only 16% of basin in City and mostly already under development agreement	Runoff durations may increase because a development agreement locks in older flow control standards; however this has not been confirmed though modeling.	Significant development expected, and development standards locked in under older agreement. Future growth may impact conditions.
Mill Creek	12.0	2.0	13.9	17.02	0.00	0	0.00	Low	Basin almost entirely impervious but less than 2% of basin in Tukwila	Low	Relatively large portion is commercial/light industrial but only 2% of basin is in Tukwila	Likely little change	Minimal growth planned
Nelson	24.0	7.5	21.8	31.18	17.60	1	0.00	Low	Discharge to Flow-Exempt water body	High	Relatively large percentage of high ADT roads, commercial and industrial	Likely little change	Minimal growth planned
P17	93.5	34.8	11.6	37.24	36.38	13 Parcels -2 are ponds -1 is KC flood control area	28.38	Low	-Almost entire portion within City is Flow exempt based on 40/20 rule -Relatively high impervious area	Medium	Relatively large percentage of high ADT roads, commercial and industrial but Tukwila is only half of basin and the lower half	Potential change if redevelopment meets treatment thresholds	If redevelopment meets treatment requirements

Stormwater Management Influence - City of Tukwila

	Step 3 - Assess Stormwater Management Influence												
	Available Area for Retrofit								*Documented Answers to Stormwater Management Influence Questions*				
Basin/ Receiving Water Name	**ROW (Acres)**	**Pervious ROW (Acres)**	**ROW Area as Percent of Total Area (%)**	**Percent of ROW that is Pervious (%)**	**WSDOT ROW Area (Acres)**	**Approximate Number of City/Public Owned Parcels***	**Park (Tukwila) (Acres)**	**Hydrologic Impact? (Low, Medium, High**	**Reason for Hydrologic Impact Rating?**	**Pollutant Loading Impact?**	**Reason for expected pollutant loading rating?**	**Will the loadings and/or runoff volumes increase under expected future land use conditions?**	**Can future growth be managed to minimize adverse stormwater impacts?**
Riverton	**99.8**	**54.0**	**24.8**	**54.12**	**28.72**	**5 Parcels -Most are County or Metro facilities**	**0.00**	**High**	**Large portion of basin is impervious and more than 78% of basin in Tukwila**	**High**	**Upper basin largely low-density residential, lower basin largely commercial/light industrial, more than 78% of basin in Tukwila**	**Likely little change**	**Minimal growth planned**
Southgate	**107.0**	**39.7**	**21.2**	**37.09**	**19.67**	**22 Parcels Mix of Tukwila Schools, Parks and Playfields mostly in lower basin**	**19.54**	**Medium/ High**	**Basin almost entirely within City, less impervious area than other basins**	**Medium/ High**	**Basin almost entirely within City, less likely PGS area than other basins**	**Potential change from urban renewal development**	**Minimal growth planned**
Springbrook	0.8	0.3	1.7	34.13	0.00	1 Parcel -pond between railroad tracks	0.00	Low	City only makes up 2% of basin and much of that is forested median between railroad tracks	Low	City only makes up 2% of basin even if largely PGS	Likely little change	Minimal growth planned

*Data is based on King County and City of Tukwila Public Parks and Parcel datasets.

Appendix A
Part II

Preliminary Receiving Waters Assessment and Stormwater Management Influence

June 2021

Otak

Memorandum

To:	Greg Villanueva
From:	Sara Mardani and Trista Kobluskie
Copies:	Ryan Larson, Ryan Makie, File
Date:	February 24, 2021; Appendix A revised June 29, 2021
Subject:	Preliminary Receiving Waters Assessment and Stormwater Management Influence
Project No.:	33296

Introduction

City of Tukwila (City) is authorized to discharge stormwater runoff to surface waters of the State by the Washington Department of Ecology (Ecology) under the Western Washington Phase II municipal stormwater permit. Ecology has reissued the permit, effective August 1, 2019 through July 31, 2024.

The City has requested Otak's assistance in complying with two sections of the permit: S5.C.4, MS4 Mapping and Documentation, and elements of S5.C.1., Stormwater Planning in compliance with Ecology's *Stormwater Management Action Planning Guidance* (SMAP Guidance). This memorandum is a preliminary assessment of existing conditions of the City's receiving waters. Detailed analysis of each basin, prioritization of the basins, and selection of a high priority watershed are not included in this memorandum.

This memorandum lists all receiving waters in the City, describes the methods of analysis, and finally, presents the preliminary analysis of each basin.

Basins and Receiving Waters Analyzed

The City's Surface Water Comprehensive Plan (SWCP), which was completed in 2013, delineated the nine basins that were used for the analysis in this memorandum. Table 1 lists each basin with its receiving waters, total area, area within the City, and percentage of the basin falling within the City. Figure 1, Appendix A, shows the full basin boundaries.

Four basins were selected for further analysis: Green/Duwamish River Mainstem, Gilliam Creek, P17, and Johnson Creek. Each was selected because its total drainage area is between one and 20 square miles, which is the size suggested for study in the SMAP Guidance.

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Table 1: Tukwila Drainage Basin Areas

Basin Name	Receiving Waters	Total Drainage Area (acres[1] [square miles])	Area of Basin in City of Tukwila (acres)[1]	Percent of Basin in City of Tukwila (%)[1]
Green/Duwamish River Mainstem	Green/Duwamish Rivers, Duwamish Waterway, & Ryan Hill Creek	4,250 [6.64]	2,613	61
Gilliam Creek	Green River, Gilliam Creek, Cottage Creek	1,774 [2.77]	1,314	74
Nelson Place / Long Acres	Green River	93 [0.15]	94	100
P17	Green River, Stream E, E1, E2	1,348 [2.11]	777	58
Riverton Creek	Duwamish River	452 [0.71]	393	87
Springbrook Creek	Green River	23 [0.04]	23	100
Southgate Creek	Duwamish River	546 [0.85]	484	89
Johnson Creek	Green River, Johnson Creek, Ditches J2 (probable) and Ditch C (probable)	1,833 [2.86]	309	17
Mill Creek	Green River	87 [0.14]	87	100

[1] From Table 1 of the 2013 SWCP

Methodology

The analysis methodology is based on the first two steps in the Receiving Water Conditions Assessment section of the SMAP Guidance. A simplified and preliminary version of each step has been taken. The goals are to document the desired water quality conditions in each basin based on regulatory objectives and to make a preliminary assessment as to how well such goals have been attained. The primary focus is on receiving water conditions that are influenced by stormwater runoff and may be influenced by stormwater management, although the presence of other pollutants has been noted.

Preliminary Assessment of Receiving Waters

The following analysis steps were completed for each basin.

Step 1 – Delineate Basins and Identify Receiving Waters

Basin boundaries were provided by the City from the 2013 SWCP. Receiving waters were defined as surface waters to which Tukwila's storm sewer system discharges directly. This step resulted in a list of receiving waters (Table 1) and a map of the basins (Figure 1, Appendix A). The remaining steps of this process were applied to the four selected basins.

Step 2 – Assess Receiving Water Conditions

Step 2.1 Designated Uses and Desired Water Quality Conditions

The designated uses and desired water quality conditions of each receiving water were documented using Chapter 173-201A of the Washington Administrative Code (WAC), Water Quality Standards for Surface Waters of the State of Washington. After determining the desired water quality conditions, the memorandum documents how well each water has achieved these conditions.

Step 2.2 Assessment

We compiled and reviewed available information to understand the likely condition of each receiving water. The following references listed below were consulted.

1. **Ecology's Water Quality Assessment and 303(d) List:** this source lists water bodies that do not meet water quality standards. Segments of waters assigned Category 5 are considered impaired by the State and were identified in this memo.
2. **Ecology's Water Quality Atlas Map:** this source provides information regarding any Total Maximum Daily Loads (TMDLs) or Water Quality Improvement (WQI) project plans in the basin. Where available, TMDLs and WQI projects were documented in this assessment.
3. **Puget Sound Stream Benthos-Benthic Index of Biotic Integrity (B-IBI):** this source provides B-IBI scores for some streams. A higher B-IBI score indicates better stream ecological health. B-IBI sample locations and scores were documented where available and used to represent ecological health of streams in this assessment.
4. **Ecology's Puget Sound Watershed Characterization Project (PSWCP):**
    a. **Ecology's PSWCP, Assessment Units (AUs):** this source provides the relative value of small watersheds, referred to as "Assessment Units" (AU's), throughout the Puget Sound basin. For this assessment, all AUs comprising each basin within the city limits were identified, but if there were more than one AU representing the basin within the city limits, only the largest AU (dominant) was chosen and documented in this assessment. The largest AU is identified as the dominant AU in this memorandum. This information was used to collect other data from PSWCP.
    b. **Ecology's PSWCP, Degradation of Water Quality Parameters:** this source provides a map indicating the relative degradation of AUs for sediments, phosphorus, metals, nitrogen, and pathogens. The levels of degradations are categorized as High (H), Moderate High (MH), Moderate (M), and Low (L). This data was collected and documented for the dominant AU in each basin for all the pollutants because they, in excess quantities, negatively affect the designated uses of the State's aquatic ecosystems (PSWCP, 2016).
    c. **Ecology's PSWCP, Water Flow Overall Degradation:** This source provides a map indicating the relative overall degradation of AUs for water flow processes. The levels of degradations are categorized as High (H), Moderate High (MH), Moderate (M), and Low (L). Since the PSWCP does not directly analyze degradation associated with bioassessment, water flow overall degradation data for the dominant AU in each basin was collected and documented to be used as a degradation indicator for bioassessment.
    d. **Ecology's PSWCP, Local Salmonid Habitat Index:** this source provides a map indicating the local Salmonid habitat index. The main components of this index are the density of wetlands and undeveloped floodplains, local salmonid habitats, and accumulative downstream habitats, and it is ranked from 0 with "no freshwater lotic Salmonid habitat" to 10 with "highest value of Salmonid habitats." Since the PSWCP does not directly analyze degradation associated with water quality impairments such as temperature and dissolved oxygen (DO), this Index was collected and documented as a degradation indicator of these parameters for the dominant AU in each basin. The degradation was assumed as high or low based on whether the index is less than or equal to five or more than five, respectively.
5. **Water Quality Monitoring Data**
    a. **Ecology's Environmental Information Management (EIM) Database:** this source provides water and sediment quality data from studies conducted across the State by various entities. Where available, study data were reviewed for this assessment.
    b. **King County Water Quality Monitoring (WQM) Database:** this source documents water quality monitoring data. Where available, study data were evaluated for this assessment.
    c. **United States Geological Survey (USGS) Database/Studies:** this source provides water quality and quantity data. Where available, study water quality data were evaluated for this assessment.

6. **2013 SWCP Report:** this source contains a variety of information on each basin. If water quality information which was not included in the above data search was available from this source, then it was extracted and summarized in this assessment.

Select Indicator Pollutants

All the studies and data collected in the previous step were summarized and tabulated in a Table. This Table was used to understand the likely condition of receiving waters in each basin, and select two appropriate indicators of water quality conditions for each basin. Indicator pollutants were modeled to estimate the pollutant loads that are generated within the City under the existing conditions. In future phases of SMAP, the City may choose to model future conditions.

Model Existing Conditions

Indicator pollutants were modeled to understand the influence of urban land uses within the City. The Long-Term Hydrologic Impact Analysis (L-THIA) spreadsheet model was used to provide a planning level analysis of expected pollutant loadings for indicators based on existing land uses.

The L-THIA spreadsheet model is a quick and straightforward analysis tool to estimate runoff, recharge, and nonpoint source pollution resulting from past or proposed land use changes. It produces long-term average annual runoff, and associated nitrogen, phosphorus, suspended sediment, bacteria, metal, biological oxygen demand (BOD), chemical oxygen demand (COD), and oil and grease loads for a given land use configuration based on long-term climate data for that area (Engel, 2003).

Model inputs include:

- location data;
- land use data;
- hydrologic soil groups; and
- land area.

Land use options that are selectable within the model include:

- commercial;
- industrial;
- high density residential;
- low density residential;
- water/wetlands;
- grass/pasture;
- agricultural; and
- forest.

To get the input data, land use information from the City's GIS layer was classified. Hydrologic soil groups were collected from the Soil Survey Geographic Database (SSURGO).

Green/Duwamish River Mainstem Basin Receiving Waters Assessment

The majority of the Green/Duwamish River Mainstem basin (61%) is located inside the City of Tukwila. This basin is almost entirely developed. The Green/Duwamish River Mainstem basin map is presented in Figure 2, Appendix A.

Step 1 – Identify Receiving Waters

The receiving waters in this basin are Green/Duwamish River, Duwamish Waterway, and Ryan Hill Creek. Ryan Hill Creek is a perennial stream flowing east approximately 0.5 miles along the South Boeing Road and then flowing north along I-5. The Green/Duwamish River meanders from the southeast to northwest through the City and is significantly changed from its natural condition along most reaches in the City (SWCP, 2013). The Green/Duwamish River is named the Duwamish below the confluence with the Black River and is named the Green River upstream of that point (SWCP, 2013). The industrialized estuary of Duwamish River is known as the Duwamish Waterway and is located in the northern-most portion of the City of Tukwila. This part of the City lies within the lower Duwamish Waterway superfund site, designated by the 2001 United States Environmental Protection Agency (USEPA) due to high levels of chemicals in the river sediments, water, and fish (SWCP, 2013). (Note that we did not review any study/data related to the superfund site inside the City because stormwater management is not a primary tool for clean-up of the site.)

Step 2 – Assess Receiving Water Conditions

Step 2.1 Designated Uses and Desired Water Quality Conditions

The receiving waters are protected for aquatic life uses, recreational uses, and other uses which include shellfish harvesting (exists only for Duwamish Waterway), water supply uses (i.e., domestic, industrial, agricultural, and stock), and miscellaneous uses (i.e., wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics). Note that Duwamish River and Duwamish Waterway are classified for all water supply uses except domestic water. State water quality criteria that are designed to protect aquatic life, recreational, and other uses in the Green/Duwamish River Mainstem basin are shown in Table 2.

Table 2: Green/Duwamish River Mainstem Basin – Water Quality Standards

Designated Use	Use Category	Parameter	Water Quality Standard (WAC 173-201A)
Aquatic Life	Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax[1]: 17.5°C (63.5°F)
		DO	Lowest 1-Day Minimum: 8.0 mg/L
		pH	6.5 - 8.5 pH units, with a human-caused variation within the range of less than 0.5 units
		Turbidity	< 5 NTU[2] over background[3] when the background is 50 NTU or less; or A 10 percent increase in the turbidity when the background turbidity is more than 50 NTU
	Salmonid Rearing and Migration Only	Temperature	Same as above
		DO	Lowest 1-Day Minimum: 6.5 mg/L
		pH	Same as above
		Turbidity	< 10 NTU over background when the background is 50 NTU or less; or A 20 percent increase in the turbidity when the background turbidity is more than 50 NTU
Recreation	Primary Contact Recreation	Bacteria	Fecal coliform[4] organism levels within an averaging period[5] must not exceed a geometric mean value of 100 CFU[6] or MPN[6] per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL
			E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL

Designated Use	Use Category	Parameter	Water Quality Standard (WAC 173-201A)
Other	Shellfish Harvesting	Bacteria	Fecal coliform must not exceed a geometric mean value of 14 CFU or MPN per 100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 CFU or MPN per 100mL

[1]7-DADMax: the 7-day average of the daily maximum temperatures
[2]NTU—unit of measurement for turbidity; Nephelometric Turbidity Units
[3]Background means turbidity level of a waterbody which is outside the area of influence of the discharge under consideration.
[4]Fecal Coliform standard expired on 12/31/2020.
[5]The averaging period of bacteria sample data shall be ninety days or less
[6]CFU and MPN—units of measurement for number of bacteria; Colony Forming Unit and Most Probable Number, respectively

The Duwamish Waterway is unique among Tukwila's receiving waters because it is listed in the State Water Quality Standards for brackish waters. For the brackish portions of freshwaters, the marine criteria associated with the freshwater use category is applied (Ecology, 2015). Table 3 shows the marine criteria associated with the freshwater use category in Duwamish Waterway and State water quality criteria that are designed to protect marine water and recreational uses.

Table 3: Green/Duwamish River Mainstem Basin – Water Quality Standards for Brackish Waters

Designated Use	Fresh-water Use Category	Equivalent Marine Use Category	Parameter	Water Quality Standard (WAC 173-201A)
Aquatic Life	Salmonid Rearing and Migration Only	Good Quality	Temperature	Highest 1-DADMax[1]:19°C (66.2°F)
			DO	Lowest 1-Day Minimum: 5.0 mg/L
			pH	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.5 units
			Turbidity	< 10 NTU[2] over background[3] when the background is 50 NTU or less; or A 20 percent increase in the turbidity when the background turbidity is more than 50 NTU
Recreation	Primary Contact Recreation	Primary Contact Recreation	Bacteria	Fecal coliform[4] organism levels within an averaging period[5] must not exceed a geometric mean value of 14 CFU[6] or MPN[6] per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 43 CFU or MPN per 100 mL
				Enterococci organism levels within an averaging period must not exceed a geometric mean value of 30 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample values exist) obtained within the averaging period exceeding 110 CFU or MPN per 100 mL

[1]1-DADMax: the daily maximum temperatures
[2]NTU—unit of measurement for turbidity; Nephelometric Turbidity Units
[3]Background means turbidity level of a waterbody which is outside the area of influence of the discharge under consideration.
[4]Fecal Coliform standard expired on12/31/2020.
[5]The averaging period of bacteria sample data shall be ninety days or less
[6]CFU and MPN—units of measurement for number of bacteria; Colony Forming Unit and Most Probable Number, respectively

Since there are no State criteria for total suspended solids (TSS), and the State criteria for turbidity requires background data, criteria based on a high level of protection for salmonids were selected and used in this assessment (Lloyd, 1987; Lloyd et al. 1987). They are <7 NTU for turbidity and <25mg/L for TSS.

Step 2.2 Assessment

Ecology's Water Quality Assessment and 303(d) List

Receiving waters do not meet surface water quality standards for a variety of physical and chemical parameters; however, the focus of this assessment is mainly on conventional and biological parameters and includes the physical water characteristics for the support of aquatic organisms such as fish. Duwamish Waterway is on Ecology's 303(d) list for DO, temperature, sediment bioassay, and bacteria. Duwamish River is on Ecology's 303(d) list for pH and temperature. Duwamish River and Duwamish Waterway are also on Ecology's 303(d) list for several chemical substances (such as Polychlorinated Biphenyls (PCBs), Benzo(a)pyrene etc.). Green River is on Ecology's 303(d) list only for DO. Black River is not among the receiving waters in the Green/Duwamish River Mainstem basin; however, a small part of this river is located within the basin and is on Ecology's 303(d) list for bacteria, DO, and bioassessment.

TMDL/WQI Projects

There are two approved TMDLs, called the Duwamish Waterway Ammonia-N TMDL and the Green River Temperature Watershed TMDL. There is one WQI project which is under development, called the Puget Sound Nutrient Source Reduction Project.

Puget Sound Stream Benthos: B-IBI Scores

No B-IBI sample locations were found inside the Green/Duwamish River Mainstem Basin. However, there are a few sample locations with very poor scores located just outside the city limits on streams that confluence with the Duwamish River.

Ecology's PSWCP Data

Out of five AUs that include the basin, the dominant AU (9068) was chosen for this assessment. The level of degradation was high for sediment and moderate high for phosphorus, metals, nitrogen, and pathogens. The local salmonid habitat index was "5," indicating high degradation related to temperature and DO. Degradation of overall water flow processes was high, indicating high degradation related to bioassessment.

Water Quality Monitoring Data

a. Ecology's EIM Database
   One monitoring station is located in the basin. The freshwater quality index of this station for the Water Years (WYs) between 1997 and 2019 indicates that water quality is good for pH, DO, and temperature, meeting standards to protect aquatic life. However, it is moderate for fecal coliform, suspended solids, turbidity, total phosphorus, and total nitrogen, as water quality does not meet expectations in some of the WYs.

b. King County WQM Database
   Three monitoring stations were/are located in the basin. Table 4 summarizes the exceedances of the water quality standards at each King County WQM station and calculates percentage of samples exceeding the standard. All stations met water quality standards for DO and pH nearly all the time. Temperature and bacteria criteria were exceeded in all stations. Temperature is of moderate concern at the station that was located on Duwamish River. Since no background data was available to compare turbidity data, and there is no State criteria for TSS, a criterion based on a high level of protection for salmonids were used in this evaluation. Based on the turbidity criterion, turbidity is of moderate concern at all sampling stations.

c. USGS Database/Studies
   Three monitoring stations were/are located in the basin. Table 4 summarizes the exceedances of the water quality standards at each USGS station and calculates percentage of samples exceeding the standard. The stations located on Duwamish River exceeded water quality criteria for temperature and turbidity. Temperature is of moderate concern at these stations. The station located on Green River

exceeded water quality criteria for suspended solids. Turbidity and suspended solid levels are of high concern at all the USGS stations.

The USGS conducted a study and collected representative samples of water and suspended sediment at USGS stream gauge 12113390 during 13 periods of differing flow conditions from August 2016 to March 2017 (USGS, 2018). The sampling data provided in this study indicates that the water quality standards were met for pH, DO, and temperature all the times; however, turbidity and suspended sediment concentrations exceeded the criteria for a high level of protection for salmonids.

Table 4: Green/Duwamish River Mainstem Basin, Summary of Exceedances

Summary of Exceedances of Water Quality Standards[1]								
Stations	**Type of Flow-Data**	**Period of Study**	**DO**	**Temperature**	**Fecal Coliform**	**pH**	**Total Suspended Solids (TSS)[3]**	**Turbidity[3]**
King County WQM 0309 (on Duwamish River)	Mostly Baseflow – Monthly	1998-2008	1/132[2] (1%)	20/134[2] (15%)	11/135 (8%)	2/132 (2%)	8/141 (6%)	20/134 (15%)
King County WQM 3106 (on Green River)	Baseflow and Stormflow – Monthly	1998-2020	1/314[2] (0.3%)	36/318[2] (11%)	37/316 (12%)	5/316 (2%)	28/335 (8%)	64/273 (23%)
King County WQM 0311 (on Green River)	Baseflow and Stormflow – Monthly	1998-2008 & 2014-2020	0/205[2] (0%)	27/206[2] (12%)	16/204 (8%)	1/204 (0.5%)	10/204 (0.5%)	34/205 (17%)
USGS 12113390 (on Duwamish River)	Baseflow and Stormflow – Daily	2014-2020	-	408/2064 (19%)	-	-	-	877/2064 (42%)
USGS 12113415 (on Duwamish River)	Baseflow and Stormflow – Daily	2015-2019	-	386/1515 (25%)	-	-	-	533/750[4] (71%)
USGS 12113350 (on Green River)	Baseflow and Stormflow – Daily	1963-1966	-	-	-	-	840/998 (84%)	-

Color coding: Green 0-15% (low concern); Yellow 15%-35% (moderate concern); Red ≥35% (high concern) of time the standard was not met. The color coding is based on the color coding used in the exceedance table of the 2011 *State of Our waters* document (Issaquah, 2011).

[1]The water quality standards that we used for this table are either based on State freshwater quality criteria or a high level of protection for salmonids.

[2]Because instantaneous grab samplings were used in collecting samples, and they were not suitable for direct comparison to the State criteria, the applied standard is based on 1-day Maximum for temperature and 1-day Minimum for DO.

[3]Since no background data was available to compare turbidity data to and there is no State water quality standard for TSS, criteria based on a high level of protection for salmonids were used in this evaluation, for turbidity (< 7NTU) and for TSS (<25 mg/L).

[4]There were some missing turbidity data between 2015-2019.

2013 SWCP Report

This source provides a review of King County WQM data located at Duwamish River and Green River for the period of 2003 through 2008. During the six-year study period, water quality standards were met for pH and fecal coliform in both stations; however, the temperature standard was exceeded mostly during the months of July and August. In addition, DO from the Green River station failed to meet the standard. Relatively clear water conditions were reported for both stations nearly all the time.

Data Summary and Indicator Pollutants

Table 5 summarizes all studies and data described above. These sources indicate that the water quality is poor in the Green/Duwamish River Mainstem basin. Impairments include the following parameters that can be impacted by stormwater management: bacteria, metals, and sediment. Sediment and metals were selected as indicators of pollutants to be used for modeling.

Table 5: Green/Duwamish River Mainstem, Summary of Data

Sources	Parameter / Pollutant								
	Bio-assessment	Bacteria	DO	Temperature	pH	Sediment/Turbidity/ TSS	Metals	Nutrients[1]	Chemical Substances[2]
Ecology's Water Quality 303(d) List & Data									
303(d) List	Yes	Yes	Yes	Yes	Yes	Yes-Only Sediment	-	-	Yes
EIM Database	-	Moderate	Good	Good	Good	Moderate	-	Moderate	
King County Data									
King County Database	-	Low concern	Low concern	Moderate concern	Low concern	Moderate concern for Turbidity[3]	-	-	-
USGS Data/Studies									
Review of data represented in the 2018 USGS Report	-	-	Met the standard	Met the standard	Met the standard	Did not meet the standard for Turbidity and TSS[3]	-	-	-
USGS Database	-	-	-	Moderate concern	-	High Concern for Turbidity and suspended solids[3]	-	-	-
2013 SWCP Report									
Review of King County WQM Data between 2003-2008	-	Met the standard	Did not meet the standard	Did not meet the standard	Met the standard	Relatively clear water conditions	-	-	-
Ecology's PSWCP Data									
Local Salmonid Habitats Index Value (AU 9068)	-	-	High	High	-	-	-	-	-
Water Flow Overall Degradation (AU 9068)	High	-	-	-	-	-	-	-	-
Degradation of Water Quality Parameters (AU 9068)	-	Moderate High	-	-	-	High	Moderate High	Moderate High	-
Puget Sound Stream Benthos									
B-IBI Condition	Not data	-	-	-	-	-	-	-	

[1]Nutrients including phosphorus and nitrogen
[2]Chemical Substances including PCBs, Arsenic (inorganic), Bis(2-Ethylhexyl)phthalate, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene, Alpha-BHC, 4, 4'-DDE, 4, 4'-DDT, and 4, 4'-DDD
[3]Criteria based on a high level of protection for salmonids were used for turbidity and TSS in this evaluation

Model Existing Conditions

L-THIA was used to model sediment and metal loads for the existing conditions of urban land uses. Table 6 contains the data input to the L-THIA model.

Table 6: Green/Duwamish Mainstem Basin, Model Inputs

	Hydrologic Soil Type			
Land use Areas (Acres)	**A**	**B**	**C**	**D[4]**
Commercial[1]	63.74	-	-	326.74
Industrial[2]	2.40	0.80	-	947.37
High Density Residential[3]	-	-	-	40.08
Low Density Residential	23.90	-	-	529.02

[1]Commercial areas include Commercial Light Industrial, Regional Commercial Mixed Use, Transit Oriented Development, Office, Regional Center, Residential Commercial Center, and Workplace areas
[2]Industrial areas include Heavy Industrial, Light Industrial, Manufacturing Industrial Center/Heavy, and Manufacturing Industrial Center/Light areas
[3]High Density Residential areas include High Density Residential and Medium Density Residential areas
[4]The areas with a dual hydrologic soil group of C/D were considered as the areas with D soil group. For the areas with no identified hydrologic soil types, we assumed these areas are all impervious or mostly impervious with D soil characteristics.

The estimated annual sediment and metal loads in the Green/Duwamish River Mainstem basin within the City were 395,265 lbs. and 1712.9 lbs., respectively (Table 7). Industrial and commercial areas generate higher pollutant loads compared to other land uses in the basin. The results indicate high influence of urban land uses within the City on the selected pollutants.

Table 7: Green/Duwamish Mainstem Basin, Model Results

Loads	Suspended Solids (lbs)	Metals (lbs)					
		Lead	Copper	Zinc	Cadmium	Chromium	Nickel
Commercial	102795.0	23.0	26.0	332.0	1.2	17.0	21.0
Industrial	238998.0	59.1	59.1	967.5	7.0	27.0	32.1
High Density Residential	6510.0	1.0	1.0	12.0	0.1	0.3	1.0
Low Density Residential	46962.0	10.0	10.0	91.4	0.9	2.0	11.1
Total	**395265.0**	**93.1**	**96.1**	**1402.9**	**9.2**	**46.4**	**65.1**

Gilliam Creek Basin Receiving Waters Assessment

The majority of the Gilliam Creek basin (74%) is located within the central region of the City of Tukwila and the remainder is located in the City of SeaTac. This basin is almost fully developed except for the steep slopes above the I-5 Corridor (SWCP, 2013). This basin has a single outlet to the Green River via an outfall and flap gate located to the south of I-405 (SWCP, 2013). The Gilliam Creek basin map is presented in Figure 3, Appendix A.

Step – 1 Identify Receiving Waters

The receiving waters in this basin are Green River, Gilliam Creek, and Cottage Creek. Gilliam Creek is a perennial stream that enters the Green River upstream of the confluence with the Black River. Cottage Creek (not shown on Figure 3) is a tributary of the Gilliam Creek that flows south from a hillside above Southcenter Boulevard east of I-5 and north of I-405; Gilliam Creek is mostly piped and discharges to Gilliam Creek south of I-405. Gilliam Creek flows into a section of the Green River that is on Ecology's 303(d) list for DO.

Step 2 – Assess Receiving Water Conditions

Step 2.1 Designated Uses and Desired Water Quality Conditions

The receiving waters are protected for aquatic life uses, recreational uses, and other uses which include water supply uses (i.e., domestic, industrial, agricultural, and stock) and miscellaneous uses (i.e., wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics). State water quality criteria that are designed to protect freshwater aquatic life and recreational uses in the Gilliam Creek basin are shown in Table 8.

Table 8: Gilliam Creek Basin, Water Quality Standards

Designated Use	Freshwater Use Category	Parameter	Water Quality Standard (WAC 173-201A)
Aquatic Life	Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax[1]: 17.5°C (63.5°F)
		DO	Lowest 1-Day Minimum: 8.0 mg/L
		pH	6.5 - 8.5 pH units, with a human-caused variation within the range of less than 0.5 units
		Turbidity	< 5 NTU[2] over background[3] when the background is 50 NTU or less; or A 10 percent increase in the turbidity when the background turbidity is more than 50 NTU

Designated Use	Freshwater Use Category	Parameter	Water Quality Standard (WAC 173-201A)
Recreation	Primary Contact Recreation	Bacteria	Fecal coliform[4] organism levels within an averaging period[5] must not exceed a geometric mean value of 100 CFU[6] or MPN[6] per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL
			E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL

[1]7-DADMax: the 7-day average of the daily maximum temperatures
[2]NTU—unit of measurement for turbidity; Nephelometric Turbidity Units
[3]Background means turbidity level of a waterbody which is outside the area of influence of the discharge under consideration.
[4] Fecal Coliform standard was expired on 12/31/2020.
[5]The averaging period of bacteria sample data shall be ninety days or less
[6] CFU and MPN—units of measurement for number of bacteria; Colony Forming Unit and Most Probable Number, respectively

Step 2.2 Assessment

Ecology's Water Quality Assessment and 303(d) List

Receiving waters do not meet surface water quality standards for DO (in Green River) or for bioassessment (in Gilliam **Creek).**

TMDL/WQI Projects

There is one approved TMDL, called the Green River Temperature Watershed TMDL. No WQI project was located.

Puget Sound Stream Benthos: B-IBI Scores

One B-IBI sample location located at Gilliam Creek (called lower Green River tributary) with a very poor score (7.2 out of 100) was found inside the Gilliam Creek Basin.

Ecology's PSWCP Data

Out of two AUs that include the basin, the dominant AU (9039) was chosen for this assessment. The level of degradation was high for sediment, phosphorus, metals, nitrogen, and pathogens. The local salmonid habitat index was "1," indicating high degradation related to temperature and DO. Degradation of overall water flow processes was also high, indicating high degradation related to bioassessment.

Water Quality Monitoring Data

a. Ecology's EIM Database: No water quality data/study was located for this basin.
b. King County WQM Database: No data/study was located for this basin.
c. USGS Database/Studies: No data/study was located for this basin.

2013 SWCP Report

This source provides information about a study that had been conducted in 1997 where several samples were collected from the Gilliam Creek during summer baseflow conditions. The results of that study indicated that during June and September, the samples did not meet the State DO standard. The samples also fell slightly below the pH and temperature standards.

This report also summarized the water quality data from a stormwater management plan prepared for Gilliam Creek in 2001 (Herrera, 2001). Gilliam Creek was sampled at eight locations during three different storm runoff

events in the fall of 1999. The results were that temperature, DO, and pH almost met State water quality standards all the times. Turbidity and suspended solids were somewhat elevated. Dissolved lead almost met applicable water quality criteria all of the time. However, about half of the samples failed to meet the dissolved copper criteria. Finally, nearly all the fecal coliform samples exceeded the State water quality standards.

Data Summary and Indicator Pollutants

Table 9 summarizes all studies and data described above. These sources indicate that the water quality is poor in the Gilliam Creek basin. Impairments include the following parameters that can be impacted by stormwater management: bacteria, metals, and sediment. Bacteria and metals were selected as indicators to be used for modeling.

Table 9: Gilliam Creek Basin, Summary of Data

	Parameter / Pollutant							
Sources	**Bioassessment**	**Bacteria**	**DO**	**Temperature**	**pH**	**Sediment/ Turbidity/TSS**	**Metals**	**Nutrients[1]**
Ecology's Water Quality 303(d) List & Data								
303(d) List	Yes		Yes	-	-	-	-	-
EIM Database	-	-	-	-	-	-	-	-
King County Data								
King County Database	-	-	-	-	-	-	-	-
USGS Data/Studies								
USGS Data/Studies	-	-	-	-	-	-	-	-
2013 SWCP Report								
Referred Data to the Stormwater Management Plan (2001)	-	Elevated	Almost met the standard	Almost met the standard	Almost met the standard	Elevated for Turbidity and TSS	Almost met the standard for lead, but elevated for Copper	-
Referred to a study that had been conducted in 1997	-	-	Did not meet the standard during Summer	Fell slightly below the standard	Fell slightly below the standard	-	-	-
Ecology's PSWCP Data								
Local Salmonid Habitats Index Value (AU 9039)	-	-	High	High	-	-	-	-
Water Flow Overall Degradation (AU 9039)	High	-	-	-	-	-	-	-

	Parameter / Pollutant							
Sources	**Bioassessment**	**Bacteria**	**DO**	**Temperature**	**pH**	**Sediment/ Turbidity/TSS**	**Metals**	**Nutrients[1]**
Degradation of Water Quality Parameters (AU 9039)	-	High	-	-	-	High	High	High
Puget Sound Stream Benthos								
B-IBI Condition	Very poor condition	-	-	-	-	-	-	-

[1]Nutrients including phosphorus and nitrogen

Model Existing Conditions

L-THIA was used to model bacteria and metal loads for the existing conditions of urban land uses. Table 10 contains the data input to the L-THIA model.

Table 10: Gilliam Creek Basin, Model Inputs

	Hydrologic Soil Type			
Land use Areas (Acres)	**A**	**B**	**C**	**D[3]**
Commercial[1]	-	0.32	-	294.58
High Density Residential[2]	-	-	-	137.83
Low Density Residential	-	-	48.31	459.60

[1]Commercial areas include Commercial Corridor, Neighborhood Commercial Center, Pond, Office, Regional Center, Residential Commercial Center, Regional Commercial Mixed Use, Residential Commercial Center, and Transit Oriented Development areas
[2]High Density Residential areas include High Density Residential and Medium Density Residential areas
[3]The areas with a dual hydrologic soil group of C/D were considered as the areas with D soil group. For the areas with no identified hydrologic soil types, we assumed these areas are all impervious or mostly impervious with D soil characteristics.

The estimated annual fecal coliform and metal loads in the Gilliam Creek basin within the City were 193,816 millions of colony forming units (CFU) and 515.8 lbs., respectively (Table 11). The highest bacteria and metal loads are generated from low density residential and commercial areas in the basin, respectively. The results indicate high influence of urban land uses within the City on the selected pollutants.

Table 11: Gilliam Creek Basin, Model Results

Loads	**Bacteria (millions of CFU)**		**Metals (lbs)**					
	Fecal Coliform	**Fecal Strep**	**Lead**	**Copper**	**Zinc**	**Cadmium**	**Chromium**	**Nickel**
Commercial	47133.0	122959.0	19.0	21.0	270.2	1.0	15.0	17.0
High Density Residential	49644.0	139005.0	4.0	4.0	43.0	0.4	1.0	5.0
Low Density Residential	97039.0	271708.0	8.7	8.7	85.0	0.8	2.2	9.8
Total	**193816.0**	**533672.0**	**31.7**	**33.7**	**398.2**	**2.2**	**18.2**	**31.8**

P17 Basin Receiving Waters Assessment

The majority of the P17 basin (58%) is located within the City of Tukwila with the remainder located in the City of SeaTac. This basin is almost fully developed except for the steep slopes above the I-5 Corridor (SWCP, 2013). The P17 basin map is presented in Figure 4, Appendix A.

Step 1 – Identify Receiving Waters

The receiving waters in this basin are Green River and streams (not shown on Figure 4) E, E1, and E2. Streams E1 and E2 are intermittent streams flowing east and entering Stream E. Stream E is a perennial stream that first flows northeast and then east, finally entering the Green River through the outlets.

Step 2 – Assess Receiving Water Conditions

Step 2.1 Designated Uses and Desired Water Quality Conditions

The receiving waters are protected for aquatic life uses, recreational uses, and other uses which include water supply uses (i.e., domestic, industrial, agricultural, and stock) and miscellaneous uses (i.e., wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics). State water quality criteria that are designed to protect freshwater aquatic life and recreational uses in the P17 basin are shown in Table 12.

Table 12: P17 Basin, Water Quality Standards

Designated Use	Freshwater Use Category	Parameter	Water Quality Standard (WAC 173-201A)
Aquatic Life	Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax[1]: 17.5°C (63.5°F)
		DO	Lowest 1-Day Minimum: 8.0 mg/L
		pH	6.5 - 8.5 pH units, with a human-caused variation within the range of less than 0.5 units
		Turbidity	< 5 NTU[2] over background[3] when the background is 50 NTU or less; or A 10 percent increase in the turbidity when the background turbidity is more than 50 NTU
Recreation	Primary Contact Recreation	Bacteria	Fecal coliform[4] organism levels within an averaging period[5] must not exceed a geometric mean value of 100 CFU[6] or MPN[6] per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL
			E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL

[1] 7-DADMax: the 7-day average of the daily maximum temperatures
[2] NTU—unit of measurement for turbidity; Nephelometric Turbidity Units
[3] Background means turbidity level of a waterbody which is outside the area of influence of the discharge under consideration.
[4] Fecal Coliform standard was expired on 12/31/2020.
[5] The averaging period of bacteria sample data shall be ninety days or less
[6] CFU and MPN—units of measurement for number of bacteria; Colony Forming Unit and Most Probable Number, respectively

Step 2.2 Assessment

Ecology's Water Quality Assessment and 303(d) List

Receiving waters do not meet surface water quality standards for DO (in Green River).

TMDL/WQI Projects

There is one TMDL, called the Green River Temperature Watershed TMDL. No WQI project was located.

Puget Sound Stream Benthos: B-IBI Scores

No B-IBI sample locations were found inside the P17 basin.

Ecology's PSWCP Data

The P17 basin consists of one AU (9042). The level of degradation was moderate high for sediment and high for other constituents (i.e., phosphorus, metals, nitrogen, and pathogens). The local salmonid habitat index was "4," indicating high degradation related to temperature and DO. Degradation of overall water flow processes was also high, indicating high degradation related to bioassessment.

Water Quality Monitoring Data

a. Ecology's EIM Database: no water quality data/study was located for this basin.
b. King County WQM Database: no data/study was located for this basin.
c. USGS database/Studies: no data/study was located for this basin.

2013 SWCP Report

No water quality data/study was reported for this basin.

Data Summary and Indicator Pollutants

Little information is available for the P17 basin. Table 13 summarizes all studies and data described above. These sources indicate that the water quality is poor in the P17 basin. Impairments include some parameters that can be impacted by stormwater management, including bacteria, metals, and sediment. DO and metals were selected as indicators of pollutants to be used for modeling.

Table 13: P17 Basin, Summary of Data

Sources	Parameter / Pollutant							
	Bioassessment	Bacteria	DO	Temperature	pH	Sediment	Metals	Nutrients[1]
Ecology's Water Quality 303(d) List & Data								
303(d) List	-	-	Yes	-	-	-	-	-
EIM Database	-	-	-	-	-	-	-	-
King County Data								
King County Database	-	-	-	-	-	-	-	-
USGS Data/Studies								
USGS Data/Studies	-	-	-	-	-	-	-	-
2013 SWCP Report								
Referred to Any Data/Studies	-	-	-	-	-	-	-	-
Ecology's PSWCP Data								
Local Salmonid Habitats Index Value (AU 9042)	-	-	High	High	-	-	-	-
Water Flow Overall Degradation (AU 9042)	High	-	-	-	-	-	-	-
Degradation of Water Quality Parameters (AU 9042)	-	High	-	-	-	Moderate High	High	High
Puget Sound Stream Benthos								
B-IBI Condition	No data	-	-	-	-	-	-	-

[1] Nutrients including phosphorus and nitrogen

Model Existing Conditions

L-THIA was used to model Biological Oxygen Demand (BOD) and metal loads for the existing conditions of urban land uses. BOD was selected as a proxy for DO because L-THIA does not model DO and because BOD directly affects the amount of DO in rivers and streams. Table 14 contains the data input to the L-THIA model.

Table 14: P17 Basin, Model Inputs

	Hydrologic Soil Type			
Land use Areas (Acres)	**A**	**B**	**C**	**D[4]**
Commercial[1]	4.78	15.09	-	417.61
Industrial[2]	0.02	25.31	-	83.52
Grass/Pasture[3]	2.95	12.67	-	32.44
Low Density Residential	-	46.45	11.52	14.74

[1] Commercial areas include Commercial Corridor, Mixed Use Office, Pond, Regional Center, Workplace, and Transit Oriented Development areas
[2] Industrial areas include Heavy Industrial areas
[3] Grass/Pasture areas include Tukwila Valley South areas
[4] The areas with a dual hydrologic soil group of C/D were considered as the areas with D soil group. For the areas with no identified hydrologic soil types, we assumed these areas are all impervious or mostly impervious with D soil characteristics.

The estimated annual BOD and metal loads in the P17 basin within the City were 58,760.5 lbs. and 633 lbs., respectively (Table 15). The highest BOD and metal loads are generated from commercial areas in the basin. This indicates that commercial areas have the highest impacts on DO degradation and metal loads in the basin. The results indicate high influence of urban land uses within the City on the selected pollutants.

Table 15: P17 Basin, Model Results

		Metals (lbs)					
Loads	**BOD (lbs)**	**Lead**	**Copper**	**Zinc**	**Cadmium**	**Chromium**	**Nickel**
Commercial	50656.0	28.0	31.1	395.0	2.1	21.7	25.9
Industrial	5868.5	6.0	6.0	102.0	0.8	2.5	2.6
Grass/Pasture	27.1	0.3	0.6	0.3	0.1	0.4	0.0
Low Density Residential	2209.0	0.8	0.8	5.0	0.1	0.2	0.9
Total	**58760.5**	**35.0**	**38.4**	**502.3**	**3.0**	**24.8**	**29.3**

Johnson Creek Basin Receiving Waters Assessment

The majority of the Johnson Creek basin (83%) is located in the Cities of Kent and SeaTac, and only 17% of this basin is located in the City of Tukwila. Around 50% of the Tukwila South commercial development site is located in this basin (SWCP, 2013). The Johnson Creek basin map is presented in Figure 5, Appendix A.

Step 1 – Identify Receiving Waters

The receiving waters in this basin are Green River, Johnson Creek, and (not shown on Figure 5) Ditches C (probable) and J2 (probable). Ditches C and J2 are tributaries of the Johnson Creek that both flows south. Johnson Creek is an intermittent stream that flows east and discharges to the Green River. Johnson Creek flows into a section of the Green River that is on Ecology's 303(d) list for DO.

Step 2 – Assess Receiving Water Conditions

Step 2.1 Designated Uses and Desired Water Quality Conditions

The receiving waters are protected for aquatic life uses, recreational uses, and other uses which include water supply uses (i.e., domestic, industrial, agricultural, and stock) and miscellaneous uses (i.e., wildlife habitat,

harvesting, commerce/navigation, boating, and aesthetics). State water quality criteria that are designed to protect freshwater aquatic life and recreational uses in the Gilliam Creek basin are shown in Table 16.

Table 16: Johnson Creek Basin, Water Quality Standards

Designated Use	Freshwater Use Category	Parameter	Water Quality Standard (WAC 173-201A)
Aquatic Life	Salmonid Spawning, Rearing, and Migration	Temperature	Highest 7-DADMax[1]: 17.5°C (63.5°F)
		DO	Lowest 1-Day Minimum: 8.0 mg/L
		pH	6.5 – 8.5 pH units, with a human-caused variation within the range of less than 0.5 units
		Turbidity	< 5 NTU[2] over background[3] when the background is 50 NTU or less; or A 10 percent increase in the turbidity when the background turbidity is more than 50 NTU
Recreation	Primary Contact Recreation	Bacteria	Fecal coliform[4] organism levels within an averaging period[5] must not exceed a geometric mean value of 100 CFU[6] or MPN[6] per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 100 mL
			E. coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL

[1] 7-DADMax: the 7-day average of the daily maximum temperatures
[2] NTU—unit of measurement for turbidity; Nephelometric Turbidity Units
[3] Background means turbidity level of a waterbody which is outside the area of influence of the discharge under consideration.
[4] Fecal Coliform standard was expired on 12/31/2020.
[5] The averaging period of bacteria sample data shall be ninety days or less
[6] CFU and MPN—units of measurement for number of bacteria; Colony Forming Unit and Most Probable Number, respectively

Step 2.2 Assessment

Ecology's Water Quality Assessment and 303(d) List

Receiving waters do not meet surface water quality standards for DO (in Green River).

TMDL/WQI Projects

There is one TMDL, called the Green River Temperature Watershed TMDL. No WQI project was located.

Puget Sound Stream Benthos: B-IBI Scores

No B-IBI sample location was found inside the Johnson Creek basin.

Ecology's PSWCP Data

Out of three AUs that include the basin, the most dominant AU (9042) was chosen for this assessment. The level of degradation was moderate high for sediment and high for other constituents (i.e., phosphorus, metals, nitrogen, and pathogens). The local salmonid habitat index was "4," indicating high degradation related to temperature and DO. Degradation of overall water flow processes was also high, indicating high degradation related to bioassessment.

Water Quality Monitoring Data

a. Ecology's EIM database: no EIM water quality data/study was located for this basin.
b. King County WQM database: no data/study was located for this basin.
c. USGS database: no data/study was located for this basin.

2013 SWCP Report
No water quality data/study was reported for this basin.

Data Summary and Indicator Pollutants

Table 17 summarizes all studies and data described above. These sources indicate that the water quality is poor in the Johnson Creek basin. Impairments include some parameters that can be impacted by stormwater management, including bacteria, metals, and sediment. DO and metals were selected as indicators of pollutants to be used for modeling.

Table 17: Johnson Creek Basin, Summary of Data

Sources	Parameter / Pollutant							
	Bioassessment	Bacteria	DO	Temperature	pH	Sediment	Metals	Nutrients[1]
Ecology's Water Quality 303(d) List & Data								
303(d) List	-	-	Yes	-	-	-	-	-
EIM Database	-	-	-	-	-	-	-	-
King County Data								
King County Database	-	-	-	-	-	-	-	-
USGS Data/Studies								
USGS Data/Studies	-	-	-	-	-	-	-	-
2013 SWCP Report								
Referred to Any Data/Studies	-	-	-	-	-	-	-	-
Ecology's PSWCP Data								
Local Salmonid Habitats Index Value (AU 9042)	-	-	High	High	-	-	-	-
Water Flow Overall Degradation (AU 9042)	High	-	-	-	-	-	-	-
Degradation of Water Quality Parameters (AU 9042)	-	High	-	-	-	Moderate High	High	High
Puget Sound Stream Benthos								
B-IBI Condition	Not data	-	-	-	-	-	-	-

[1]Nutrients including phosphorus and nitrogen.

Model Existing Conditions

L-THIA was used to model Biological Oxygen Demand (BOD) and metal loads for the existing conditions of urban land uses. BOD was selected as a proxy for DO because L-THIA does not model DO and because BOD directly affects the amount of DO in rivers and streams. Table 18 contains the data input to the L-THIA model.

Table 18: Johnson Creek Basin, Model Inputs

	Hydrologic Soil Type			
Land use Areas (Acres)	**A**	**B**	**C**	**D[3]**
Commercial[1]	-	6.60	5.66	6.5
Grass/Pasture[2]	77.15	111.76	5.68	14.56
Low Density Residential	6.33	16.66	8.25	-

[1]Commercial areas include Mixed Use Office areas.
[2]Grass/Pasture areas include Tukwila Valley South areas.
[3]The areas with a dual hydrologic soil group of C/D were considered as the areas with D soil group. For the areas with no identified hydrologic soil types, we assumed these areas are all impervious or mostly impervious with D soil characteristics.

The estimated annual BOD and metal loads in the Johnson Creek basin within the City were 2,729 lbs. and 22.6 lbs., respectively (Table 19). The highest BOD and metal loads are generated from commercial areas in the basin. This indicates that commercial areas have the highest impacts on DO degradation and metal loads in the basin. The results indicate high influence of urban land uses within the City on the selected pollutants.

Table 19: Johnson Creek Basin, Model Results

Load	**BOD (lbs)**	**Metals (lbs)**					
		Lead	**Copper**	**Zinc**	**Cadmium**	**Chromium**	**Nickel**
Commercial	1988.0	1.1	1.3	13.0	0.1	0.9	1.0
Grass/Pasture	38.0	0.4	0.8	0.5	0.1	0.6	0.0
Low Density Residential	703.0	0.2	0.2	2.1	0.0	0.1	0.3
Total	**2729.0**	**1.8**	**2.3**	**15.6**	**0.2**	**1.5**	**1.3**

Results Summary

This assessment indicates that the water quality is poor in the City of Tukwila. The receiving waters are on Ecology's 303(d) list for a variety of parameters including sediment, pH, temperature, dissolved oxygen, bacteria, and bioassessment. Impairments include some parameters that can be impacted by stormwater management, including bacteria, metals, and sediment. Modeling results indicate high influence of urban land uses within the City. Green Duwamish/Green River Mainstem basin generates the highest metal loads in the City.

Next Steps

The next step is a more detailed study of the influence of the basins on the receiving waters following all of the steps in the SMAP Guidance, including procuring stakeholder feedback on this analysis, collecting known water quality issues directly from the City, and evaluating information related to overburdened communities within the contributing areas. Figures 6 through 9 in Appendix A are maps of Green/Duwamish River, Gilliam Creek, P17, and Johnson Creek, respectively, presenting the primary factors contributing to the City's MS4's influence on receiving water conditions. These maps will be useful in assessing relative stormwater management influence. Finally, a ranking system will be established to prioritize the basins, and one or more basins will be chosen for a detailed analysis to meet the SMAP requirement.

References

City of Tukwila. *Surface Water Comprehensive Plan (SWCP)*. 2013.

City of Issaquah Public Works Engineering Department and Resource Conservation Office. 2011. *State of Our Waters*. Available at: https://www.issaquahwa.gov/DocumentCenter/View/925/State-of-Our-Waters-Fourth-Report-2011-Stream-Monitoring?bidId=

Engel, B. 2003. *Long-term hydrologic impacts assessment and non-point source pollutant model*. Version-2.3 Manual, 7.

Herrera Environmental Consultants, Inc. 2001. *Gilliam Creek Basin: Stormwater Management Plan*. Prepared for the City of Tukwila.

King County. 2015. *Strategies for Protecting and Restoring Puget Sound B-IBI Basins*. Available at: https://benthos.kingcounty.gov/Projects/Restoration_Priorities_2014/documents/ProtectRestorePS_BIBI_Basins.PDF

King County Website. 2016. *Stream Report. King County Water Quality Monitoring*. Last updated on November 2016. Available at: https://green2.kingcounty.gov/streamsdata/watershedinfo.aspx?Locator=X438.

Lloyd, D.S. 1987. *Turbidity as a water quality standard for salmonid habitats in Alaska*. North American Journal of Fisheries Management 7:34-45.

Lloyd, D. S., Koenings, J. P., & Laperriere, J. D. 1987. *Effects of turbidity in fresh waters of Alaska*. *North American Journal of Fisheries Management*, *7*(1), 18-33

Puget Sound Stream Benthos. Available at: https://pugetsoundstreambenthos.org/

United States Geological Survey (USGS) database. Available at: https://waterdata.usgs.gov/nwis/qw

United States Geological Survey (USGS). 2018. *Chemical Concentrations in Water and Suspended Sediment, Green River to Lower Duwamish Waterway near Seattle, Washington, 2016-2017.*

Washington State Department of Ecology. 2019. *Stormwater Management Action Planning Guidance.* Publication 19-10-010. August 2019. Available at: https://fortress.wa.gov/ecy/publications/summarypages/1910010.html

Washington State Department of Ecology. 2015. *Application of Water Quality Criteria in Brackish Waters*. Available at: https://ecology.wa.gov/DOE/files/44/443c3b9d-ddc7-44ba-9980-5b2588d9a9ba.pdf

Washington State Department of Ecology's EIM database. Available at: https://apps.ecology.wa.gov/eim/search/default.aspx

Washington State Department of Ecology's Puget Sound Watershed Characterization Project. Available at: https://apps.ecology.wa.gov/coastalatlas/wc/landingpage.html

Washington State Department of Ecology's Water Quality Assessment and 303(d) List. Available at: https://apps.ecology.wa.gov/waterqualityatlas/wqa/map

Washington State Department of Ecology's Water Quality Atlas Map. Available at: https://apps.ecology.wa.gov/waterqualityatlas/wqa/map

Washington State Department of Ecology's Puget Sound Watershed Characterization Project. https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Watershed-characterization-project

Washington State Department of Ecology's Puget Sound Watershed Characterization Project (PSWCP). 2016. *Appendix C: Assessing Water Quality Processes in Puget Sound and Western Washington*. Available at: https://apps.ecology.wa.gov/publications/parts/1106016part4.pdf

Appendix A

Maps

FIGURE 1
TUKWILA BASIN BOUNDARIES
PRELIM STORMWATER PLAN
TUKWILA, WA

River/Stream
Waterbody
Tukwila City Limits
Other City Limits

Drainage Basin

Gilliam
Green/Duwamish
Johnson
Mill Creek
Nelson
P17
Riverton
Southgate
Springbrook

mi
0 1 2

DISCLAIMER:
THE INFORMATION IN THIS MAP IS ASSEMBLED GIS DATA CREATED AND ACQUIRED BY OTAK INC.THIS DATA IS NOT TO SURVEY ACCURACY AND IS MEANT FOR PLANNING PURPOSES ONLY.

NOTE: DATA IS PROVIDED BY ESRI, CITY OF TUKWILA, KING COUNTY, AND WA DEPARTMENT OF ECOLOGY.

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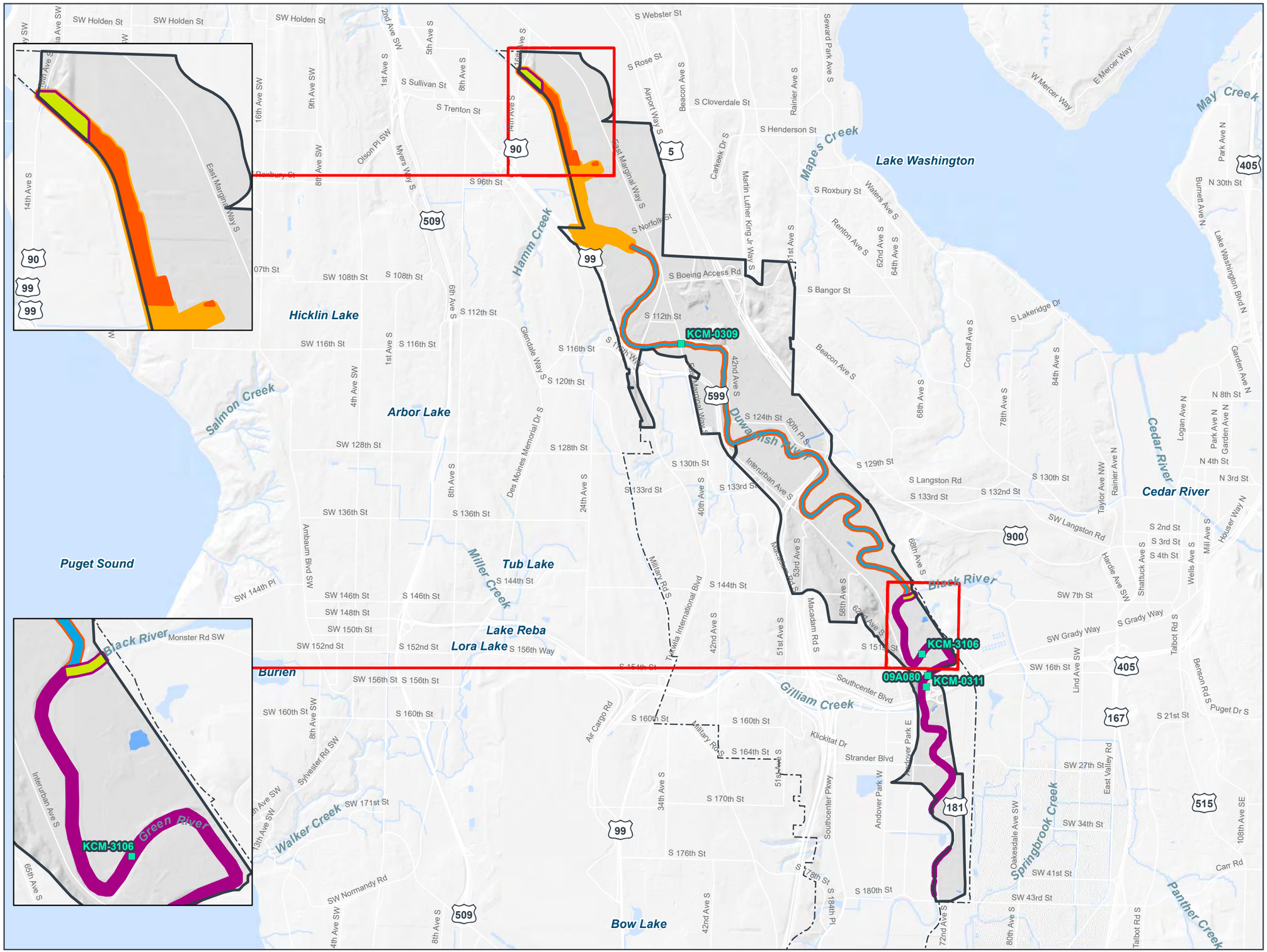
K:\PROJECT\33300\33335\CADD\GIS\MXDS\33296_FIG1_BASINBOUNDARIES TMK.MXD

DATE: 2/21/2021

FIGURE 2
GREEN/DUWAMISH USES + IMPAIRMENTS
PRELIM STORMWATER PLAN
TUKWILA, WA



- River/Stream
- Waterbody
- Tukwila City Limits
- Green/Duwamish Basin
- Water Quality Monitoring Station

Receiving Water Impairment

- Bacteria
- Dissolved Oxygen
- pH
- Temperature
- Sediment Bioassay

* Not shown: USGS Gages

0 4,000 8,000 ft

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NOTE: DATA IS PROVIDED BY ESRI, CITY OF TUKWILA, KING COUNTY, AND WA DEPARTMENT OF ECOLOGY.

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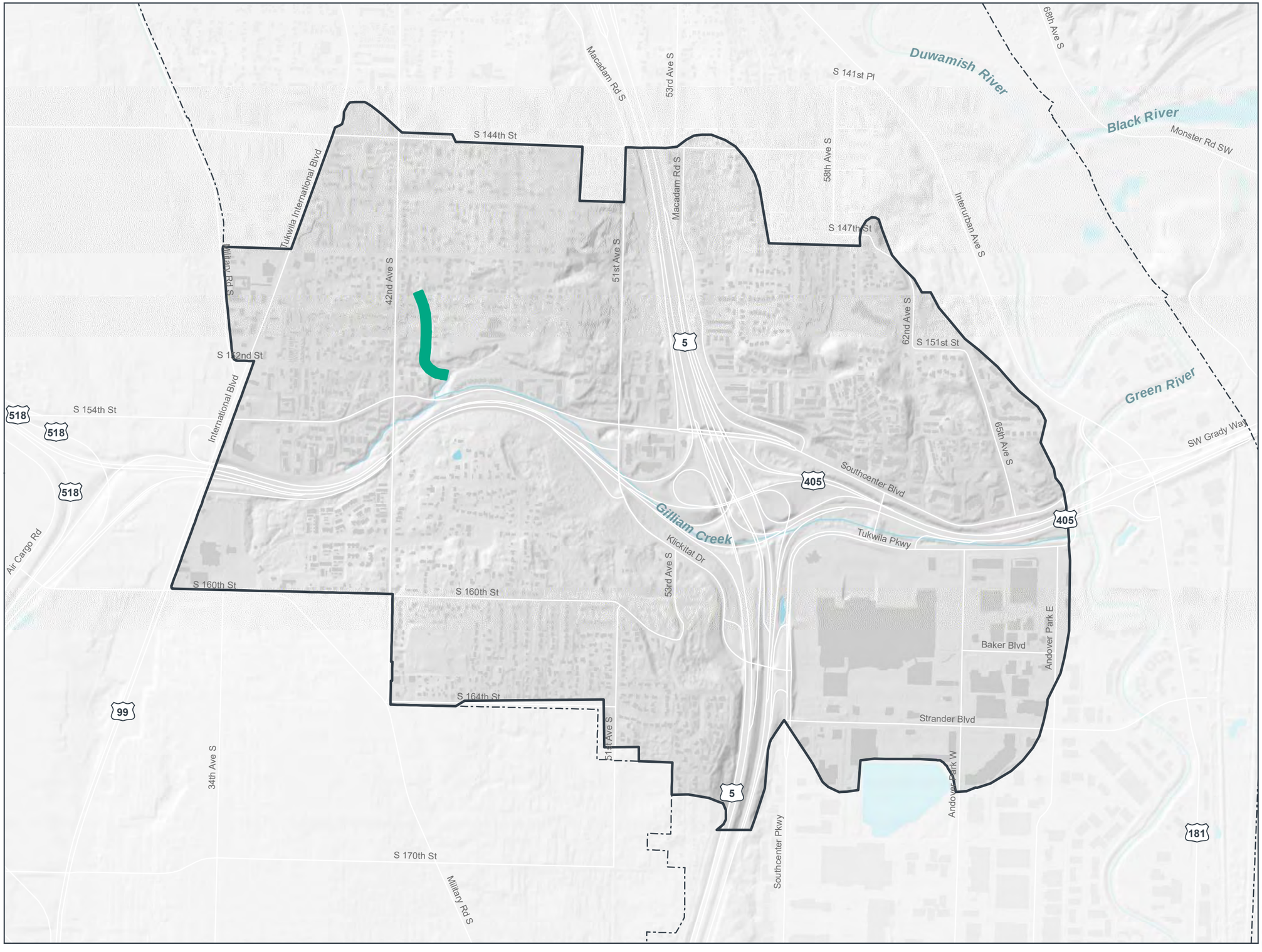
DATE: 2/21/2021

FIGURE 3
GILLIAM BASIN IMPAIRMENTS
PRELIM STORMWATER PLAN
TUKWILA, WA



River/Stream
Waterbody
Tukwila City Limits
Gilliam Basin

Receiving Water Impairment

Bioassessment

0 1,100 2,200 ft

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NOTE: DATA IS PROVIDED BY ESRI, CITY OF TUKWILA, KING COUNTY, AND WA DEPARTMENT OF ECOLOGY.

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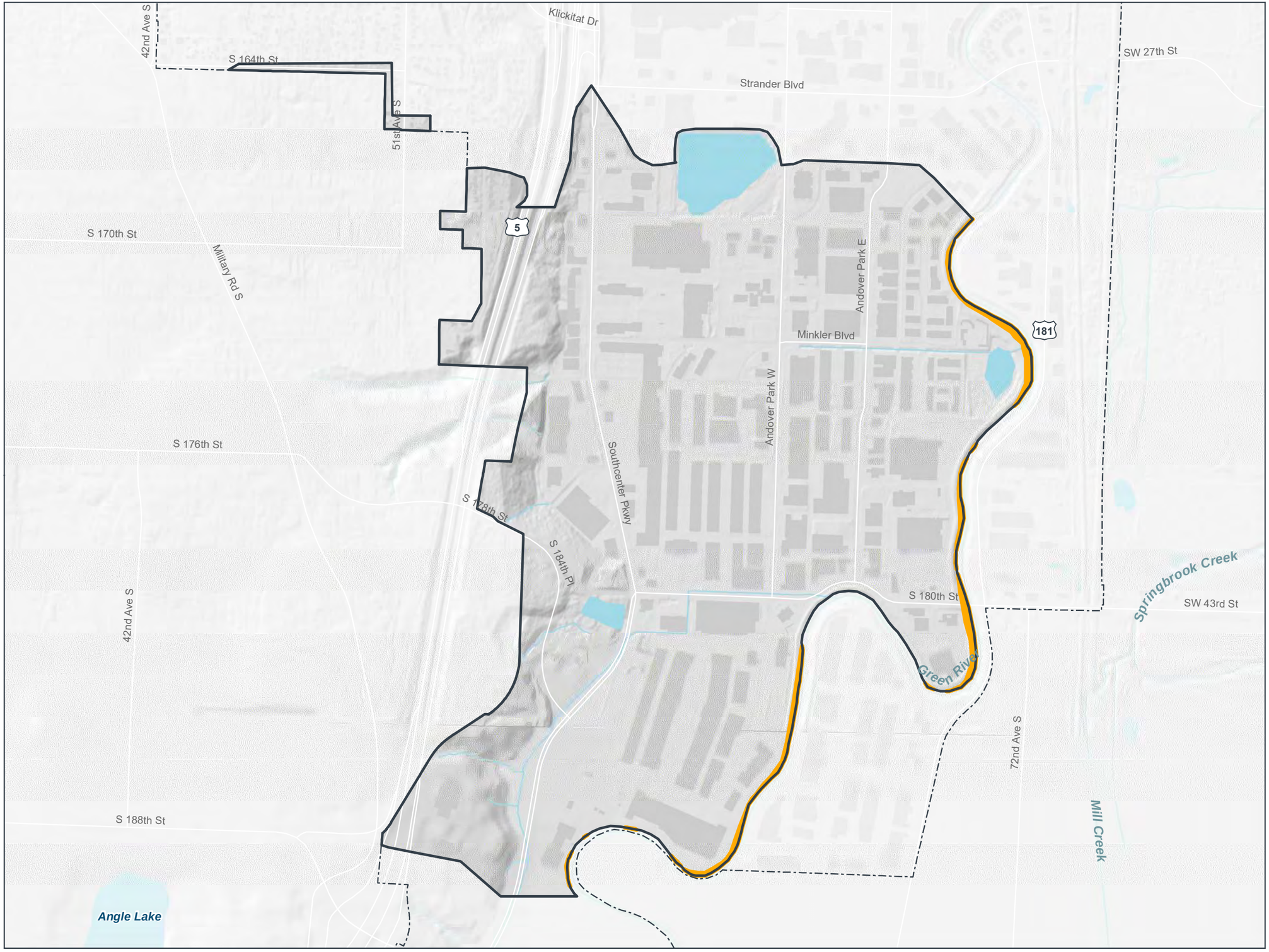
K:\PROJECT\33200\33296\CADD\GIS\MXDS\33296_FIG2_GILLIAM.MXD

DATE: 12/30/2020

FIGURE 4
P17 BASIN IMPAIRMENTS
PRELIM STORMWATER PLAN
TUKWILA, WA



River/Stream
Waterbody
Tukwila City Limits
Johnson Creek Basin

Receiving Water Impairment

Dissolved Oxygen

ft
0 1,000 2,000

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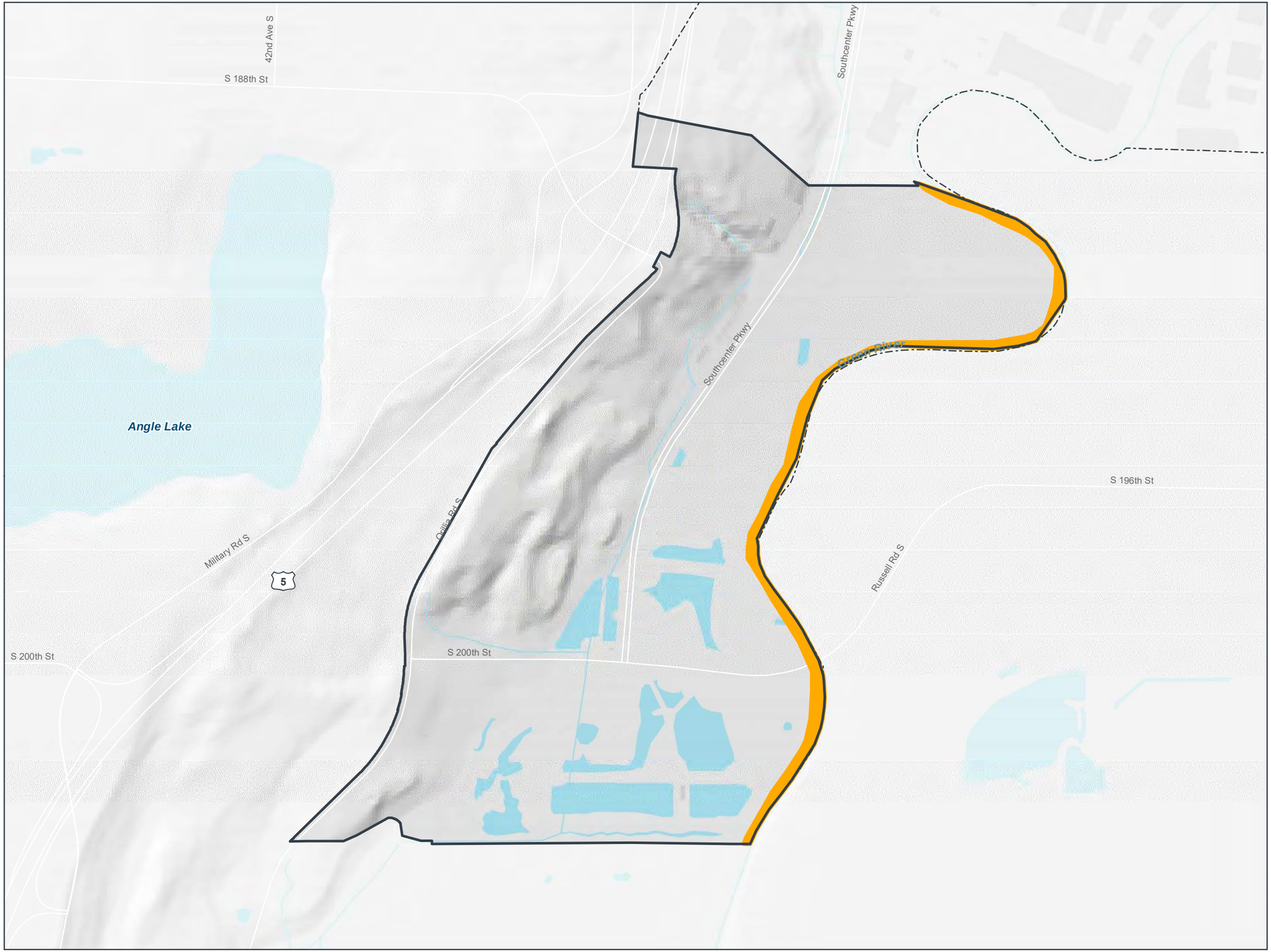
DATE: 12/30/2020

FIGURE 5
JOHNSON CREEK IMPAIRMENTS
PRELIM STORMWATER PLAN
TUKWILA, WA



- River/Stream
- Waterbody
- Tukwila City Limits
- Johnson Creek Basin

Receiving Water Impairment

- Dissolved Oxygen

0 700 1,400 ft

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DATE: 12/30/2020

Green/Duwamish River below River Mile 6 (S. Boeing Access Road) is among major receiving watres and exempt from the flow control facility requirement.

FIGURE 6

GREEN/DUWAMISH

STORMWATER MANAGEMENT INFLUENCE

PRELIM STORMWATER PLAN

TUKWILA, WA

- River/Stream
- Waterbody
- Tukwila City Limits
- Green/Duwamish Basin
- Outfall (Public)
- Water Quality Sampling Location
- Flow Control Facility
- Water Quality Facility
- Stormwater Mains (>=16")
- ADT* (>7,500)

Receiving Water Impairment

- Bacteria
- Sediment Bioassay

Pollution-Generating Zoning

- Commercial
- High Density Residential
- Industrial

*ADT = Average Daily Traffic Count

ft

0 4,000 8,000

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DATE: 4/22/2021

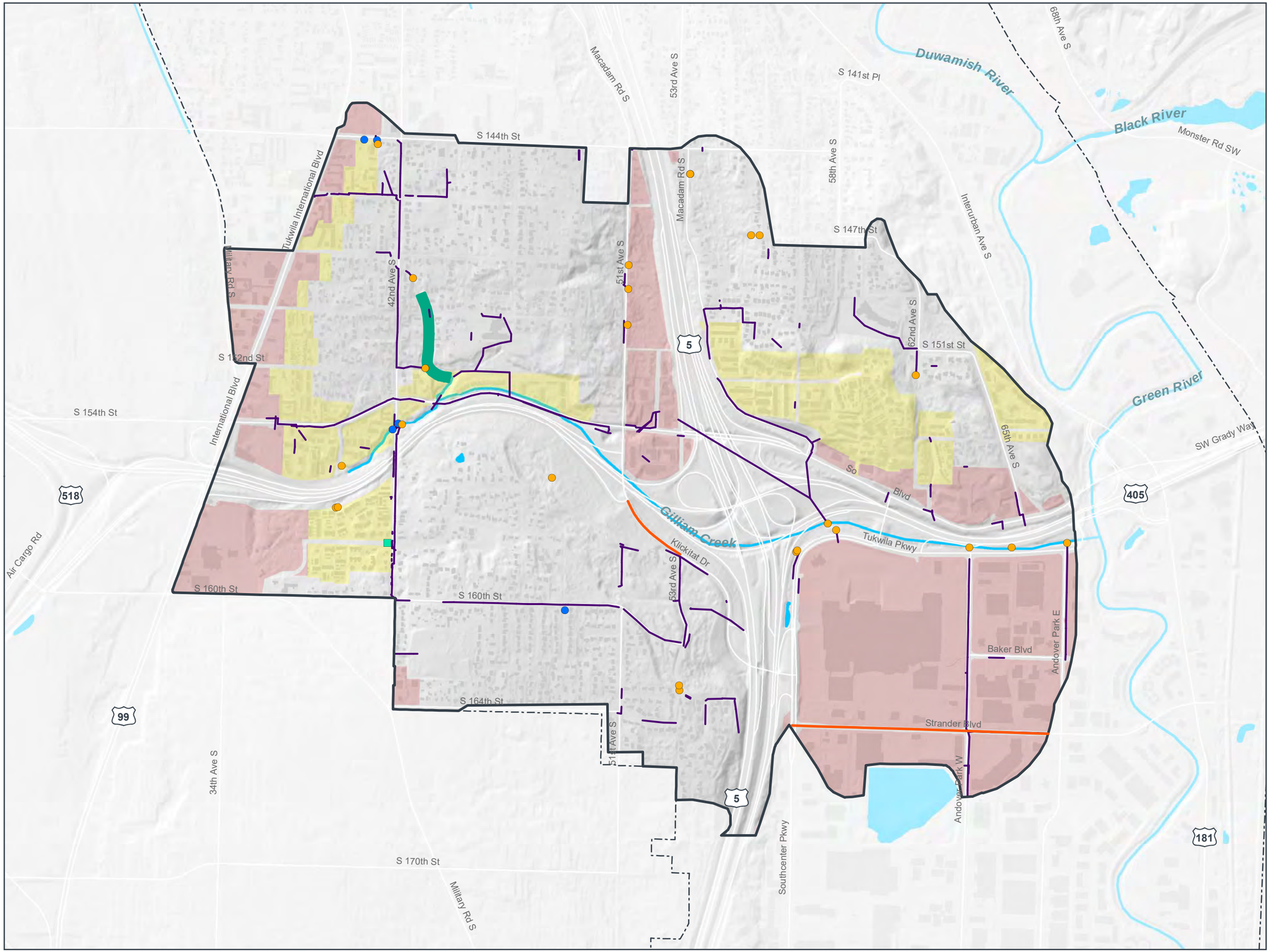
FIGURE 7

GILLIAM BASIN

STORMWATER MANAGEMENT INFLUENCE

PRELIM STORMWATER PLAN

TUKWILA, WA



- River/Stream
- Waterbody
- Tukwila City Limits
- Gilliam Basin
- Outfall (Public)
- Flow Control Facility
- Water Quality Facility
- Stormwater Mains (>=16")
- ADT* (>7,500)

Receiving Water Impairment

- Bioassessment

Pollution-Generating Zoning

- Commercial
- High Density Residential

*ADT = Average Daily Traffic Count

0 1,100 2,200 ft

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DATE: 4/22/2021

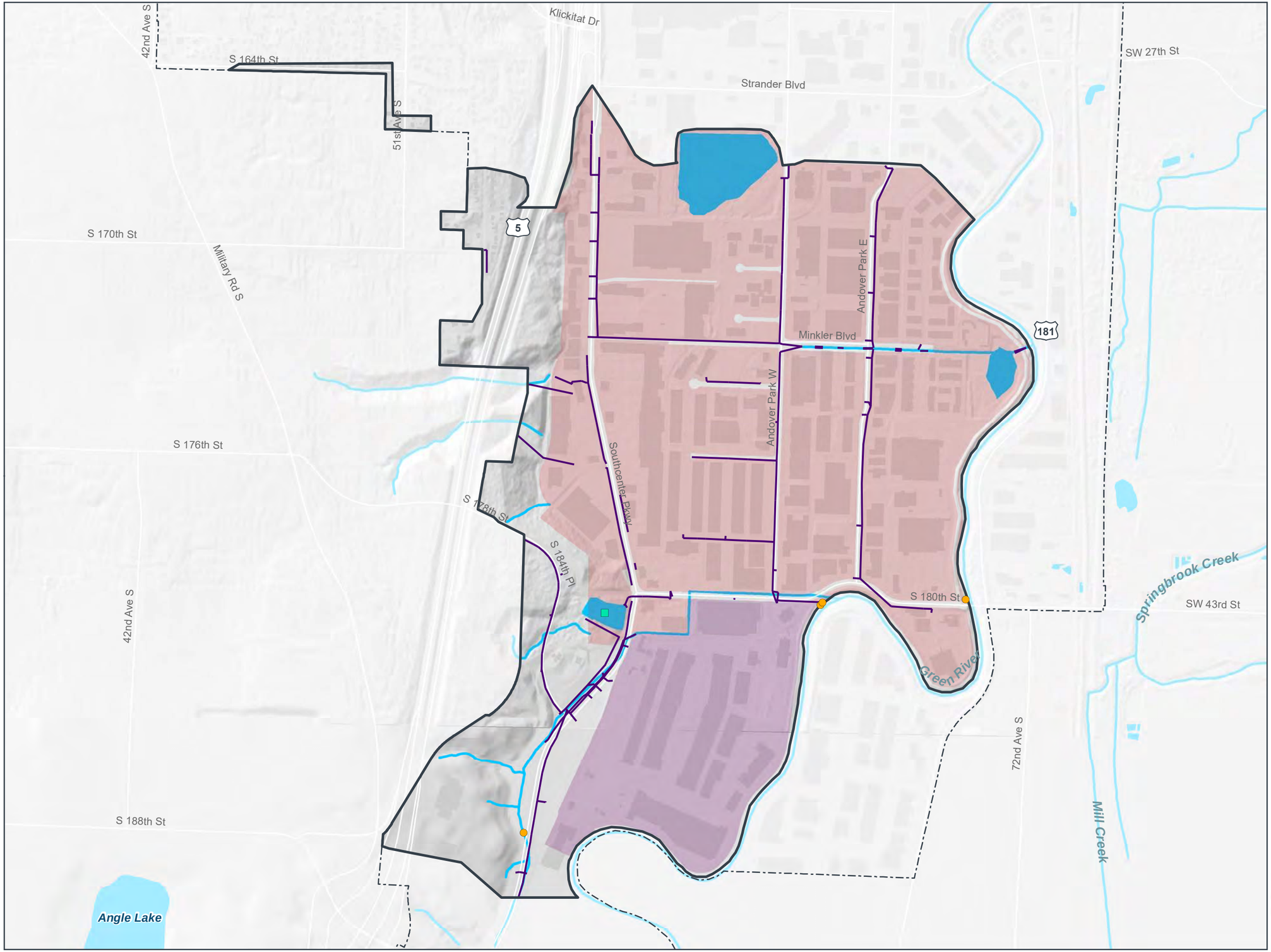
FIGURE 8

P17 BASIN

STORMWATER MANAGEMENT INFLUENCE

PRELIM STORMWATER PLAN

TUKWILA, WA



- River/Stream
- Waterbody
- Tukwila City Limits
- Johnson Creek Basin
- Outfall (Public)
- Flow Control Facility
- Stormwater Mains (>=16")

Pollution-Generating Zoning

- Commercial
- Industrial

0 1,000 2,000 ft

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DATE: 4/22/2021

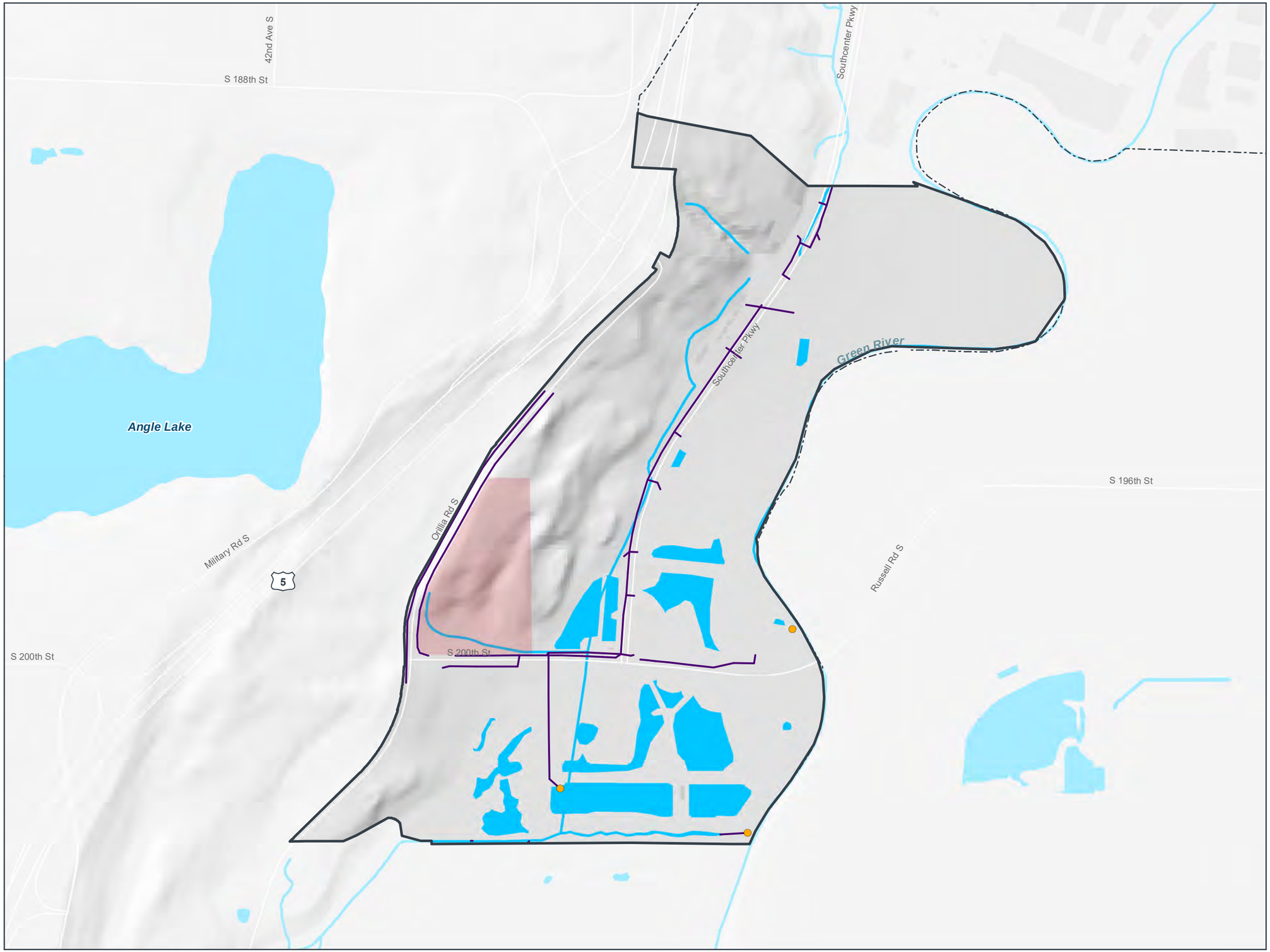
FIGURE 9

JOHNSON CREEK

STORMWATER MANAGEMENT INFLUENCE

PRELIM STORMWATER PLAN

TUKWILA, WA



- River/Stream
- Waterbody
- Tukwila City Limits
- Johnson Creek Basin
- Outfall (Public)
- Stormwater Mains (>=16")

Pollution-Generating Zoning

- Commercial

0 700 1,400 ft

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DATE: 4/22/2021

Appendix B

Basin Prioritization – Memorandum and Outreach Summary

Memorandum

To: Sherry Edquid (City of Tukwila)

From: Trista Kobluskie, Cara Donovan (Otak, Inc.)
Bryan Berkompas, Emelie Crumbaker (Aspect, Inc.)

Date: June 30, 2022

Subject: City of Tukwila SMAP Receiving Water Prioritization and Catchment Selection

Project No.: 33383

1. Introduction

The goal of the Receiving Water Prioritization and Catchment Selection is to select a receiving water and catchment within the priority receiving water's basin where stormwater management action planning (SMAP) will be applied. The four candidate receiving waters in Tukwila were Gilliam Creek, the Green/Duwamish River, Riverton Creek, and Southgate Creek (Table 1).

Table 1 Candidate Receiving Waters for SMAP Prioritization

Receiving Water	Total Basin Area (Acres)	Basin Area Inside Tukwila (Acres)	Percent of Basin in Tukwila (%)
Gilliam Creek	1,858	1,315	70.8
Green/Duwamish River	297,608	2,589	0.9
Riverton Creek	514	402	78.3
Southgate Creek	506	504	99.6

2. Receiving Water Prioritization and Catchment Selection Methodology

The goal of selecting a receiving water and catchment where SMAP will be applied is to focus the City's resources for stormwater improvements in an area where it can make a difference. Prioritization criteria were selected from among numerous factors assessed for each basin in the receiving waters assessment phase of SMAP. Attachment A shows the selected prioritization criteria and rating concepts.

Stakeholder feedback was considered during the prioritization. An online storymap and survey were available to inform and solicit input from tribal agencies, WRIA 9, and the general public. The survey asked which receiving water the City should prioritize for the SMAP. The survey was open between May 30, 2022, and June 13, 2022. The general public was informed about the webpage and survey through an article in the eHazelnut, a Facebook post, a Twitter post, the City's NPDES webpage, and the City's news webpage. City staff shared the storymap and survey at the City's monthly Allentown meeting, which is focused on the Truck Reroute Environmental Impact Statement (EIS) and the 42nd Avenue South Bridge

Replacement. City staff invited stakeholders from WRIA 9, the Muckleshoot Indian Tribe, and the Duwamish Indian Tribe to participate by email.

The general public and external stakeholders were not asked to prioritize a catchment because the scale of all the analyses in the receiving water assessments was at the basin level. Instead, only internal stakeholders were consulted for catchment prioritization based on their knowledge of planned development and projects in these areas.

3. Receiving Water Prioritization and Catchment Selection

The City received seven responses from the general public and one responses from invited stakeholders.

Results of the public and invited stakeholder feedback are presented in Attachment B.

The project's consultants and City staff from the Departments of Public Works and Community Development held an internal stakeholder meeting on June 16, 2022, to discuss the candidate basins, the prioritization assessment, and external feedback. Riverton Creek was selected for the SMAP as a result of this discussion.

City staff agreed with external stakeholders that the Green/Duwamish River is a high priority receiving water. However, based on the other prioritization factors, particularly the City's influence on the receiving water, the City first removed the Green/Duwamish from consideration. City staff noted that by selecting any of the other three candidate basins the Green/Duwamish River will benefit as the downstream receiving water.

Gilliam Creek was eliminated due to a lower score in the prioritization analysis than the other two remaining candidate receiving waters.

Riverton Creek and Southgate Creek have similar traits which were discussed by City staff. The City has a similar hydrologic impact on the Riverton and Southgate basins, and both basins have similar watershed management strategies. There are also several differences between Riverton Creek and Southgate Creek basins. A fish passage barrier was recently removed near the outlet of Riverton Creek at the Duwamish River, and there is a fish passage barrier remaining in the lower portion of Southgate Creek with no plans for removal. Riverton basin has nearly double the percentage of pollution-generating surface as Southgate basin, which indicates there is more opportunity to improve water quality in the Riverton basin. Finally, there is an upcoming sediment and hydraulic study for Southgate Creek that will give the City a better idea of projects that will have a benefit to the conditions in the basin. The City recognizes that investment in Southgate Creek would be more effective once this study is completed. Riverton Creek was selected by City staff as the priority receiving water.

Once Riverton Creek was selected, City staff discussed a catchment for the SMAP. SMAP guidance states that the prioritized catchment should be between 400 and 600 acres, or a catchment scale that is appropriate for the jurisdiction. In the case of Riverton Creek, the total basin area is 514 acres and the City controls 402 acres of this basin. The City intends to focus efforts on the lower basin where there is a high concentration of industrial land use for short-term stormwater management actions and include the upper basin where there is a high concentration of residential land use for long-term actions.

Attachment C shows the results of the prioritization rating applied to the four candidate basins.

3.1. Conclusion

The receiving water prioritization and catchment selection process resulted in prioritization of Riverton Creek. Investments in the Riverton Creek basin will have a positive downstream effect on the Green/Duwamish River, which the general public indicated is an important waterbody. This process will be explained in further detail in the SMAP document.

Attachments to this memorandum include:

A. Prioritization Criteria
B. Outreach Results
C. Prioritization Analysis
D. Map of Riverton Basin

Attachment A

Prioritization Criteria

Otak

Tukwila Basin Prioritization Criteria

Consideration	Reasoning	Influence / Score	Data Source	Notes
Receving Water Conditions				
Water quality impairment	Included in SMAP guidance and Building Cities in the Rain	Low/Moderate impairment = high score	Aspect RWA Table 3	Considers water quality data, B-IBI, habitat surveys
Aquatic Life	BCiTR emphasizes existing species/habitat	salmonid presence=high score	Aspect RWA Table 3	
Fish passage barriers	Building Cities in the Rain	Downstream barriers (with no removal plan) = low score	Aspect RWA Table 3 and local knowledge of barrier removals	
Ability to Influence (SMI)				
Hydrologic Impact	Heavily impacted basins should have stormwater mitigation	Medium/High impact = high score	Aspect RWA Table 4	Considers impervious surfaces, flow control exemption, portion/location of the basin in the City, existing treatment, and ~forested area Assessment follows the SMI categories and weighting agreed upon by City and Consultant Team
Pollutant loading impact	High pollutant loading should be mitigated	Medium/High impact = high score	Aspect RWA Table 4	Considers polluting land uses, high ADT roads, portion/location of the basin in the City, existing development agreements, available area for treatment, and existing treatment/opportunities for retrofit. Assessment follows the SMI categories and weighting agreed upon by City and Consultant Team
Regional and local rehabilitation and restoration efforts	Included in SMAP guidance and Building Cities in the Rain	Presence of existing rehabilitation effort = high score	WRIA plans, salmon recovery plans, MTCA/Superfund cleanups, ESA listings, critical habitat designations , local efforts	
Watershed management strategy	Building Cities in the Rain	Restoration/Protection = high score	Puget Sound Watershed Characterization	
Community Factors				
Stakeholder feedback	Stakeholder support for basin	High support = high score	Stakeholder feedback	
Overburdened communities overlap with water quality issues	Included in SMAP guidance and Building Cities in the Rain	Human health impacts that can be addressed through stormwater management improvements = high score	EJScreen	Use as a tiebreaker between similar receiving waters

Attachment B

Outreach Results

Tukwila Outreach Results

Basin	Why	Focus	Comment	Resid_Emp
Green Duwamish	It looks like the largest watershed and borders many other neighboring watersheds	Stormwater		Resident
Green Duwamish	Fish habitat restoration.	Habitat		Resident
Green Duwamish	It is the sink for the other basins and their pollutants. Being the last line of defense before entering the Puget Sound, the Duwamish/Green basin should get improved methods of capturing contaminants for future cleanup before entering the sound. There also appears to be a lot single family homes in the basin that would likely counter construction proposals.	Stormwater	Reach out to me for any stormwater related positions the city will have open in the future.	Resident
Green Duwamish	The proximity to the Duwamish river	Stormwater	Current storm drains aren't getting the water, and in turn a lot of runoff goes straight into the river. Being so close to the river in the Allentown neighborhood the whole of the riverbank needs to be preserved to protect and restore the habitat for salmon and other wildlife	Resident
Gilliam	Plants and Soil	Incentivize	Perhaps the City can offer local perennial plant seeds or starts to residents to plant on their property.	Resident
Green Duwamish	The Duwamish River runs directly thru this neighborhood and the debris on the shore is heartbreaking.		All the options listed would serve the river.	Resident
Green Duwamish	Critical Salmon habitat	Habitat	Start to implement phase 3 changes at the Duwamish Hill Preseve, shoreline enhancemtent and restoration.	Resident

Basin	Why	Focus	Comment	Resid_Emp
Riverton or Gilliam	From a fish habitat perspective the Green/Duwamish subwatershed would be the highest priority basin; however, I also understand that the ability to drive measurable stormwater benefit is limited by the extent of Tukwila jurisdiction. I think both Riverton and Gilliam would provide good opportunities to improve water quality associated with recently completed/planned habitat projects near the stream mouths. However, opportunities for synergies with habitat enhancement may be more limited. Either way, all these basin drain in to the Green/Duwamish and focus should be made based on magnitude of potential on reducing priority pollutants.	Habitat	This is not my area of expertise, but it would be great to expand integration of green infrastructure investments with restoring riparian habitats. Given the growing evidence of impact of 6PPD-Q, it would be great to ensure integration of roadway runoff treatment options into stormwater goals. Also, the Habitat Plan identified the T17 Stormwater Pond as a potential opportunity to integrate stormwater retrofits with salmon habitat restoration. If the right project was identified that integrated stormwater and salmon recovery (e.g., T17 Pond), there is the potential to look at funding support via the WRIA. Given Gilliam Creek restoration project will be in design process, there could be a potential to integrate stormwater and salmon investments.	WRIA 9

Attachment C

Prioritization Analysis

Receiving Water Prioritization – City of Tukwila

6/30/2022

Basin	Receiving Water Conditions							Ability to Influence (SMI)						Community Factors			Overall Rating
	Water Quality Impairment[1]	WQ Rating	Aquatic Life	Aquatic Life Rating	Fish Passage Barriers	Fish Passage Rating	Overall WQ Rating	Hydrologic Impact[2]	Pollutant Loading Impact[3]	Available Area for Retrofit[4]	Regional & Local Rehabilitation & Restoration Efforts[5]	Watershed Management Strategy[6]	Overall SMI Rating	Stakeholder Feedback	Overburdened Communities Overlap with Water Quality Issues[7]	Overall Community Rating	
Gillam Creek	Poor B-IBI, WQ concerns for pH, turbidity, TSS. DO Temp. and metals ok	**Low/ Medium** - Multiple WQ concerns - High ADT roads throughout	Coho (P); Resident Coastal Cutthroat (P) 55% with 100 ft buffer	**Medium/ Low** - Limited fish use	- 14 total barriers, 5 partial, 68 culverts - Multiple blocking culverts under portions of I-5 and I-405 interchange	**Low/ Medium** - Plans to open lower basin	**Low/Medium** - Water quality concerns, - High ADT roads - Fish barriers above lower basin	**Medium/Low** - Almost half of basin is impervious (46.9%) - Entire basin east of I-5 is flow exempt - 70% of basin in Tukwila but many jurisdictions involved	**Medium** - Highest percentage of high ADT roads - Large percentage of commercial or high-density residential - 70% of basin in Tukwila but SeaTac (headwaters) and WSDOT (lower basin) involved - 38% estimated PGS	- 29% or 383.4 acres of ROW - 19% or 251.4 acres of WSDOT ROW - 30 parcels owned by City or WSDOT - 46.51% of ROW is pervious - Several parks in N and SW portion of basin	- WSDOT working to fix 4 culverts under I-405 - City working to open 1/4 mile of lower stream to fish	PSWC rating - Flow = Develop/ Restoration - WQ = Restoration of sources except for sediment = restoration of sinks	**Medium** - Portions flow exempt - Highest percentage of high ADT roads - Would score higher with more partnership with WSDOT and SeaTac	- One public comment in support. Comment related to plants and soil - Support from WRIA 9 because of synergies with upcoming habitat project at mouth	Gilliam is likely the most overburdened basin. Essentially the same percentages for poverty, ELL, free and reduced lunch, and People of Color as Southgate. Gilliam likely has more people than Southgate.	**Medium/High** - 1 public vote - Likely most overburdened community	**Medium/Low** - Low/Medium WQ rating - Medium SMI rating - Medium/High Community rating+K3:T3
Green/Duwamish River	Duwamish River - Water: (CAT5 - Temperature, CAT5 - Alpha-BHC, CAT5 - pH) Duwamish River - Tissue: (CAT5 - PCBs, CAT5 - 4,4'-DDE, CAT5 - 4,4'-DDT, CAT5 - 4/4'-DDD) Green River - Water: (CAT5 - DO, CAT4A - Temperature) TMDL's for temp and Ammonia-N	**Low** - Multiple TMDL's	Coho(P)(R); Dolly Varden/Bull Trout (P); Fall Chinook (P)(R); Fall Chum (P)(R); Pink Odd Year (P); Resident Coastal Cutthroat (P); Sockeye (P); Summer Steelhead (R); Winter Steelhead (P) 95% with 100 ft buffer	**High** - Mainstem used for rearing	- 4 total barriers (in side channels?) - 0 partial barriers - 130 culverts	**High** - Lower basin largely open - Small unnamed tributaries have barriers	**Medium** - High aquatic life rating - Low WQ rating	**Low** - Small percentage of basin in City (<1%) - Flow exempt in this reach	**Low** - Small percentage of basin in City (<1%)	- 17% or 448.9 acres of ROW - 8% or 217.8 acres of WSDOT ROW - 80 gov. parcels but much is KC airport or County facilities in lower basin and built out - 43% of ROW is pervious	- TMDL in place - City planning for local retrofits	PSWC rating - Flow = Restoration - WQ = restoration of sources except for N and pathogens = restoration of sinks	**Low** - Mostly flow exempt - Very small percentage of basin in Tukwila - TMDL and other plans already in place - Could rate higher with larger basin partnerships	- Seven public comments in support. comments related to size of watershed, essential for habitat, opportunity to integrate (from King County), local drainage and pollution concerns - Support from WRIA 9 because of the importance of river for fish habitat but awareness that City's ability to directly impact is low	DOH data shows lower poverty, ELL, and free and reduced lunch relative to other basins with residential areas	**Medium** - Most public votes - Relatively low overburdened community	**Medium/Low** - Low/Medium WQ rating - Medium SMI rating - Medium/High Community rating
Riverton Creek	Unnamed Creek (Trib to Duwamish River) - Other: (CAT5 - Bioassessment) Highly developed area with fish present - opportunity for significant impact. Urban runoff mortality has been observed. Data from 2019 indicates concerns with DO but Temp and pH are ok	**Medium/ Low** - B-IBI and DO concerns	Coho (P); Fall Chinook (P); Fall Chum (P); Resident Coastal Cutthroat (P); Winter Steelhead (P) 68% with 100 ft buffer	**Medium** - Some fish use	- 7 total barriers - 2 partial barriers - 80 culverts - Manmade waterfalls largely separate lower commercial from upper low density residential and wetlands - Abandoned dam just upstream of waterfalls	**Low/ Medium** - Plans to address lowest fish barriers	**Medium/Low** -Water quality concerns, - Observed urban runoff mortality - Fish barriers above lower basin	**High** - Large portion of basin is impervious (47.5%) - More than 78% of basin in Tukwila	**High** - Upper basin largely low-density residential - Lower basin largely commercial/light industrial - More than 78% of basin in Tukwila - 49% estimated PGS	- 25% or 99.8 acres of ROW - 7% or 28.7 acres of WSDOT ROW - 5 parcels County or Metro facilities - 54% of ROW is pervious	- King County considering fish passage as part of metro base update but timeline uncertain	PSWC rating - Flow = Develop/ Restoration - WQ = restoration of sources except for sediment = restoration of sinks	**High/Medium** - Large portion of basin in City - Higher PGS/impervious than Southgate - More potentially available ROW - Some large fish barriers lower down	- Support from WRIA 9 because of synergies with recent flapgate removal	Riverton is likely the 3rd most overburdened basin. It has the highest poverty but relatively low ELL and free and reduced lunch and lower population than Gilliam or Southgate.	**Low/Medium** - No public votes - Fewer residents than other basins but higher poverty rates	**Medium/High** - Medium/Low WQ rating - High/Medium SMI rating - Low/Medium Community rating
Southgate Creek	Sediment issues. Bank stabilization and dredging maintenance often required. City data from 1994-1995 indicate moderate concern with DO and pH	**Medium/ Low** - Sediment and DO concerns	Coho (P); Fall Chinook (P); Fall Chum (P); Resident Coastal Cutthroat (P); Winter Steelhead (P) 82% with 100 ft buffer	**Medium** - Some fish use	- 8 total barriers - 1 partial barrier - 83 culverts - lowest blockage at S 131st Pl - City anecdotal info that flapgate at mouth is total barrier with no plans to remove - CSWP mentions low flow fish barrier at SR599 culvert near base and frequent sediment constriction in culverts	**Low/ Medium** - City anecdotal info there are no plans to remove flapgate at mouth - Plans to address some fish barriers - Sediment a concern	**Medium/Low** - Water quality concerns - Sediment concerns - Fish barriers above lower basin	**Medium/High** - Basin almost entirely within City (99.6%) - Slightly less impervious area than other basins (42.1%)	**Medium/High** - Basin almost entirely within City - Less likely PGS (28%)area than other basins	- 21% or 107 acres of ROW - 4% or 19.7 acres of WSDOT ROW - 22 parcels, school, parks, playfields, mostly in lower basin - 37% or ROW is pervious	- City redoing S 131st Street culvert	PSWC rating - Flow = Restoration/ Develop - WQ = restoration of sources except for sediment = restoration of sinks	**Medium/High** - Almost all basin is in city - Less impervious/PGS than other basins - Much of lower basin is piped	None	Southgate is likely the 2nd most overburdened basin. Essentially the same percentages for poverty, ELL, free and reduced lunch, and People of Color as Gilliam. Gilliam likely has more people than Southgate.	**Medium** - No public votes - Relatively high overburdened community - Fewer residents than Gilliam	**Medium** - Medium/Low WQ rating - Medium/High SMI rating - Medium Community Rating
Reasoning	Included in SMAP guidance and Building Cities in the Rain		BCITR emphasizes existing species/habitat		Building Cities in the Rain			Heavily impacted basins should have stormwater mitigation	High pollutant loading should be mitigated	City owned property more cost effective for retrofitting	Included in SMAP guidance and Building Cities in the Rain	Building Cities in the Rain		Stakeholder support for basin	Included in SMAP guidance and Building Cities in the Rain		
Influence / Score	Low/Moderate impairment = high score		Salmonid presence=high score		Downstream barriers (with no removal plan) = low score			Medium/High impact = high score	Medium/High impact = high score	More ROW = higher score	Presence of existing rehabilitation effort = high score	Restoration/ Protection = high score		High support = high score	Human health impacts that can be addressed through stormwater management improvements = high score		
Data Source	Aspect RWA Table 3		Aspect RWA Table 3		Aspect RWA Table 3 and local knowledge of barrier removals			Aspect RWA Table 4	Aspect RWA Table 4		WRIA plans, salmon recovery plans, MTCA/Superfund cleanups, ESA listings, critical habitat designations , local efforts	Puget Sound Watershed Characterization		Stakeholder feedback	EJScreen (Recommend combining)		

Notes:

1. Considers water quality data, B-IBI, habitat surveys
2. Considers impervious surfaces, flow control exemption, portion/location of the basin in the City, existing treatment, and ~forested areaAssessment follows the SMI categories and weighting agreed upon by City and Consultant Team
3. Considers polluting land uses, high ADT roads, portion/location of the basin in the City, existing development agreements, available area for treatment, and existing treatment/opportunities for retrofit
   Assessment follows the SMI categories and weighting agreed upon by City and Consultant Team
4. SMI
5. Almost all MTCA sites identified are clean or in process in all basins, ESA is for Puget sound affects all, critical hab migrating or occurrence of Coho in Riverton and Southgate, coastal cutthroat in Gilliam, many in green local efforts?
6. This information has not been collected yet
7. Use as a tiebreaker between similar receiving waters

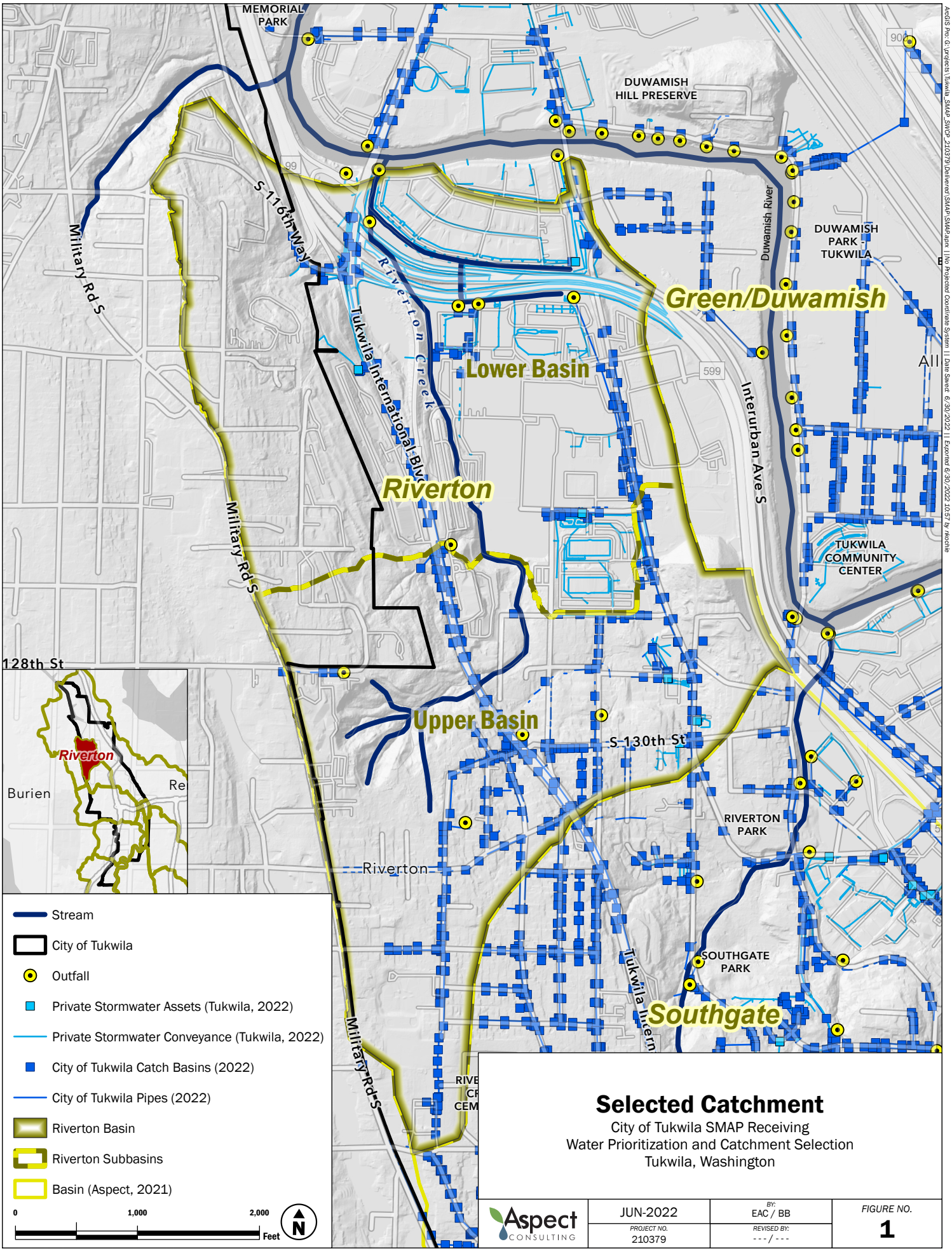
Acronym List:

B-IBI = Benthic Index of Biotic Integrity
WQ = Water Quality
TSS = Total Suspended Solids
DO = Dissolved Oxygen
TMDL = Total Maximum Daily Load
RWA = Receiving Water Assessment
ADT = Average Daily Traffic
BCITR = Building Cities in the Rain (Ecology guidance)
CSWP = Comprehensive Stormwater Plan
PGS = Pollutant-Generating Surface
SMI= Stormwater Management Influence
ROW = Right-Of-Way
WSDOT = WA Department of Transportation
ESA = Environmentally Sensitive Area
PSWC = Puget Sound Watershed Characterization
EJ = Equity and Justice
DOH = Department of Health
ELL = English Language Learner

Aspect Consulting Otak

Attachment D

Map of Riverton Basin



Selected Catchment

City of Tukwila SMAP Receiving
Water Prioritization and Catchment Selection
Tukwila, Washington

Aspect CONSULTING	JUN-2022	BY: EAC / BB	FIGURE NO.
	PROJECT NO. 210379	REVISED BY: --- / ---	1

ArcGIS Pro: G:\projects\Tukwila_SMAP_SWCP_210379\Delivered\SMAP\SMAP.aprx || No Projected Coordinate System || Date Saved: 6/30/2022 || Exported 6/30/2022 10:57 by nkochie

Data source credits: None || Basemap Service Layer Credits: City of SeaTac, King County, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, Esri Community Maps Contributors, City of Burien, WA, City of SeaTac, King County, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA

Appendix C

Stormwater Management Action Outreach Material

Find the regularly updated Tukwila SMAP Public Engagement Interactive web site here:
https://arcg.is/WubnS

Find the archived Watershed Prioritization web page here:
tukwilawa.gov/SMAPStormwaterPlanning

Tukwila Stormwater Management Solutions for Riverton Creek Basin

Question 1. Which types of stormwater retrofit solutions do you prefer? Please select your three favorite solutions from the eight options listed below. To help you decide, we have listed some key details for each option.

☐ **1) Proprietary large underground stormwater management facility (such as a Contech StormFilter Vault)**

Description: Cartridges in an underground vault that remove pollutants from stormwater runoff coming from large areas, including runoff from highly-traveled roads and commercial areas
Environmental Goals Addressed: Water quality
Relative Initial Cost: Low
Relative Maintenance Required: Moderate
Other Considerations: No above-ground components



Photo provided by Contech Engineered Solutions

☐ **2) Proprietary small underground stormwater management facility (such as a Contech StormFilter Catch Basin)**

Description: Cartridges installed in existing catch basins in highly-traveled City streets that remove pollutants from stormwater runoff coming from small areas
Environmental Goals Addressed: Water quality
Relative Initial Cost: Moderate

Relative Maintenance Required: Moderate/High
Other Considerations: No above-ground components, uses existing catch basin locations to add water quality in locations where larger facilities are difficult to fit in



Photo sourced from the City of Seattle Public Utilities

☐ **3) Proprietrary modular biofiltration (such as a Contech Modular Wetland)**

Description: In-ground planted facility that removes pollutants from stormwater runoff coming from small, medium, or large areas, including from highly-traveled roads and commercial areas
Environmental Goals Addressed: Water quality
Relative Initial Cost: High
Relative Maintenance Required: Moderate/High
Other considerations: Planted for aesthetics, but treatment is provided underground, can sometimes be sited where other proprietary devices do not fit, can provide neighborhood beautification



Photo provided by Contech Engineered Solutions

☐ **4) Stormwater Planter (bioretention/rain garden)**

Description: In-ground planter with native plants that removes pollutants and infiltrates or temporarily stores stormwater runoff from public streets to reduce harmful effects such as erosion and flooding
Environmental Goals Addressed: Water quality and flow control
Relative Initial Cost: Moderate
Relative Maintenance Required: High
Other Considerations: Vegetated facility; facilities can collect trash if not maintained; can

provide neighborhood beautification





Photo sourced from Statewide LID Training Program, Inspection and Maintenance Staff (Ecology, 2021)

☐ **5) Large underground detention facility**

Description: Underground chamber that temporarily stores stormwater to reduce harmful effects such as erosion and flooding
Environmental Goals Addressed: Flow control
Relative Initial Cost: High
Relative Maintenance Required: Low





Photo provided by Contech Engineered Solutions

☐ **6) Upgrade existing stormwater management facility**

Description: Rehabilitate and upgrade existing detention pond to remove pollutants from runoff from heavy vehicle storage area
Environmental Goals Addressed: Water quality and flow control
Relative Initial Cost: Moderate
Relative Maintenance Required: Moderate
Other Considerations: Project would include partnership with another government agency

and additional water quality elements provided by the agency





Photo sourced from City of Redmond

☐ **7) Permeable Pavement**

Description: Alternative pavement that infiltrates stormwater in the public-right-of way (sidewalks, bike lanes, parking spaces); this program would be a consideration when transportation and/or park improvement projects have construction projects that could utilize permeable pavement

Environmental Goals Addressed: Flow control

Relative Initial Cost: High

Relative Maintenance Required: Moderate

Other Considerations: This program would require purchase of special maintenance equipment or a maintenance contract



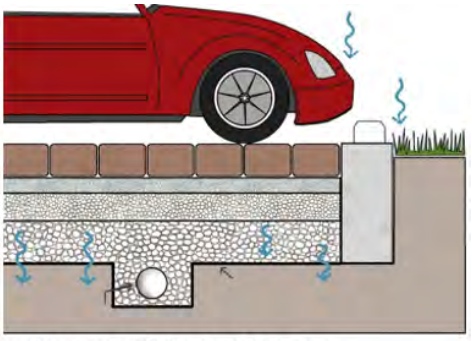


Photo sourced from the City of Columbus

☐ **8) Coordination with potential future park to install stormwater facilities**

Description: The 2020 City of Tukwila Parks, Recreation and Open Space Plan identifies the Cascade Neighborhood Search Area as a possible location for a new park, part of which is within Riverton Basin. If the City identifies a site within Riverton Basin to develop a new park then stormwater facilities could be sited on the property, likely underground to maximize useable space.

Environmental Goals Addressed: Water quality and flow control

Relative Initial Cost: Moderate

Relative Maintenance Required: Moderate



Photo sourced from 2020 City of Tukwila Parks, Recreation and Open Space Plan



☐ **I do not prefer any of these options.**

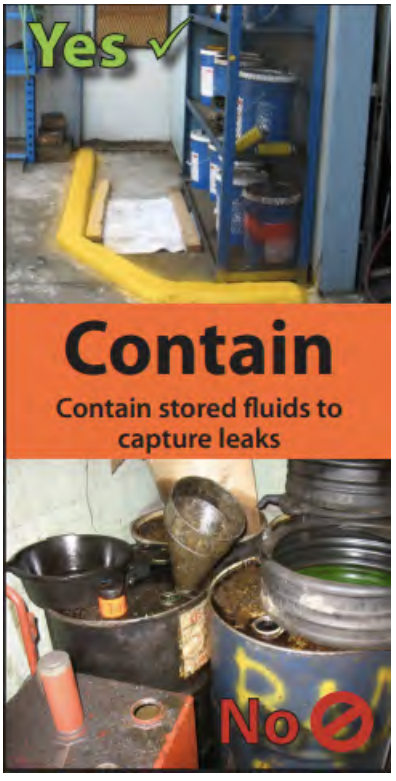
Next

Tukwila Stormwater Management Solutions for Riverton Creek Basin

Question 2. Which type of operational or policy solution do you prefer? Please select one preferred stormwater program from the two options listed below. To help you decide, we have listed some key details for each option.

☐ **1) Targeted Source Control Inspection Program**

Description: The City would inspect businesses in the Riverton Creek basin to help them manage their outdoor storage areas in ways that would prevent spills and polluted runoff from reach the storm system or the stream
Environmental Goals Addressed: Water quality
Relative Cost: Low
Other Considerations: The City is required to perform these inspections on a portion of businesses. This concept would focus on inspecting business that drain to Riverton Creek



☐ **2) Community Rain Garden Stewardship Program**

Description: Program for volunteers to help maintain rain gardens, ditches, and/or streams in

their neighborhood

Environmental Goals Addressed: Water quality

Relative Cost: Low





Photo sourced from Anoka Conservation District

☐ **I do not prefer any of these options.**

Thank you for taking time to respond to this survey. Please press the "Next" button below for your answers to be recorded.

If you have additional comments about stormwater solutions in Riverton Basin, please email Sherry Edquid at sherry.edquid@tukwila.wa.gov.

Prev Next

City of Tukwila SMAP

Tukwila is growing and lies at the intersection of two major freeways. As more people come to call our City home and work here, the river and streams that we enjoy face new pressures. The City is developing a stormwater management action plan (SMAP) to improve water conditions. We need your input to prioritize targeted stormwater actions to reduce pollution and improve overall water quality. To go directly to the survey see the "Step 3: Solutions" page.

SMAP is a State-required process that asks for local resident input on the decision-making process. Tukwila evaluated several factors impacting the present and future health of local streams and has selected Riverton Creek as the stream that is likely to benefit most from targeted stormwater management actions. Now we need your input and ideas as we develop Tukwila's SMAP.

See the "Frequently Asked Questions" page to learn about stormwater and targeted stormwater management actions.

SMAP Steps

The first step of developing the SMAP is to assess the conditions of the streams and rivers in Tukwila. The second step is to ask the community and stakeholders to help staff prioritize one watershed that could benefit most from reducing the harmful effects of urban runoff. The third step is to develop solutions for mitigating stormwater runoff in the priority watershed. During the third step the community will be asked to help prioritize projects and policies that could improve the condition of the stream or river. The fourth step is to write the SMAP for the selected watershed, which will outline the timeline, resources, and funding needed to implement the water quality improvement projects and policies.

Developing a SMAP is a new state requirement from the Washington State Department of Ecology (Ecology). To learn more, see the SMAP Guidance.




Assess Streams
Prioritize One Stream
Develop Solutions
SMAP

Need for SMAP

The Lower Green River, Duwamish River, and their tributaries which flow through the City of Tukwila are highly important for salmon migration. The population of salmon, including Chinook, Coho, chum, and steelhead, has declined since the late 1800s. Chinook, Coho, chum, and steelhead have been listed as threatened under the Endangered Species Act. There are many reasons for the decline, and among them is the change in land cover from forests and prairies to urban and suburban buildings and infrastructure. Historically, forests and wetlands soaked up rain where it fell. As more people moved here, lands were cleared, and wetlands were filled. Now when it rains, the chemicals and particles from our vehicle tires, roofs, lawns, and outdoor storage areas, some of which are harmful to fish populations, get swept quickly into the nearest stream by stormwater runoff. This change continues today as Tukwila grows.

Washington State Department of Ecology (Ecology) is asking more than 80 cities and counties in western Washington to be a part of the solution. Under a permit from Ecology, Tukwila and other jurisdictions have looked at how our own development patterns have affected the ability of streams and rivers to support fish and have water quality that is safe for activities like recreation and fishing. Each jurisdiction has identified a priority watershed and is creating an action plan to reduce the harmful effects of stormwater runoff.

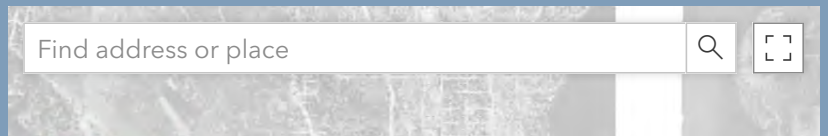
Stormwater action planning can help the City focus its efforts, align resources, and apply for grants to improve stream health.

SMAP aims to benefit Tukwila by:

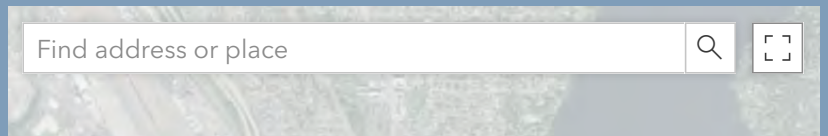
- Improving water quality in Riverton Creek
- Protecting fish habitat
- Complying with a permit from the state

Please take a moment to review two maps of Tukwila below to see how the landscape from 1936 (first map) has changed to roads, neighborhoods, and businesses today (second map):

1936 Tukwila Land Cover



2021 Tukwila Land Cover



Duwamish River
Duwamish River
Duwamish River
Green River
Green River
Green River
Green River
DITCH D

Duwamish River
Duwamish River
SR 99
I-5
Tukwila International Blvd
SR 599
Duwamish River
SR 518
I-405
Green River
Green River
Green River
DITCH D

Completed SMAP Steps

Steps 1 and 2 of Tukwila's SMAP are complete. Read this page to see what we did, or skip to the next page (Step 3: Solutions) to help us prioritize our solutions.

Step 1: Basin Assessment

The Receiving Water Conditions Assessment compared the conditions of streams and rivers in Tukwila to each other. The watersheds assessed were Gilliam Creek, the Green/Duwamish Rivers, Johnson Creek, Mill Creek, Nelson, P17, Riverton Creek, Southgate Creek, and Springbrook Creek. The relative assessment helped inform which stream or river could benefit from stormwater management action planning (SMAP). Each watershed in Tukwila was assessed to understand its water quality and to locate areas where there are opportunities for the City to install stormwater projects.

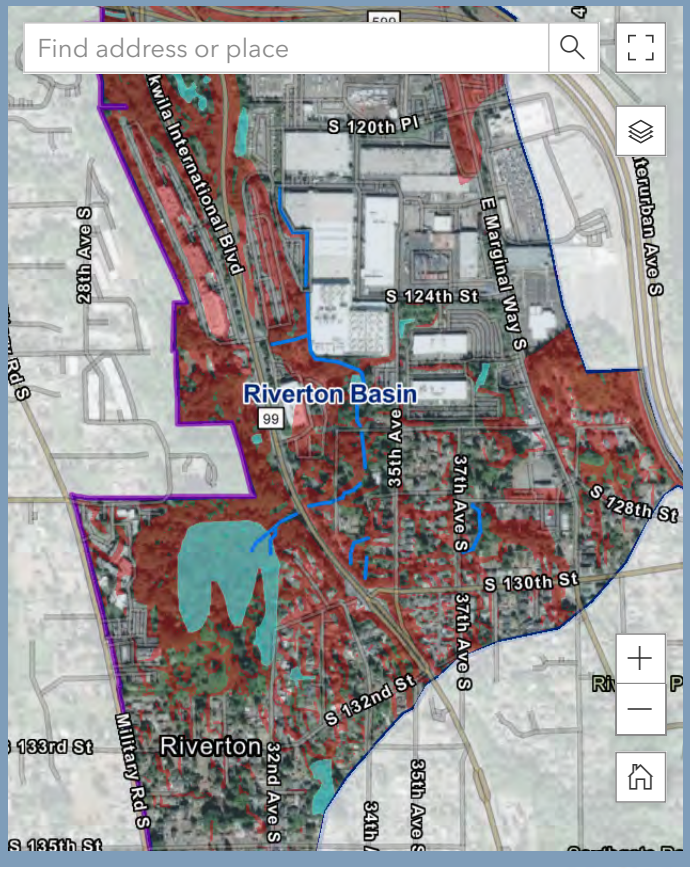
The Green/Duwamish River and Riverton, Southgate, and Gilliam Creek watersheds were candidates for improvements.

To learn more about the receiving water conditions assessment please see this StoryMap.

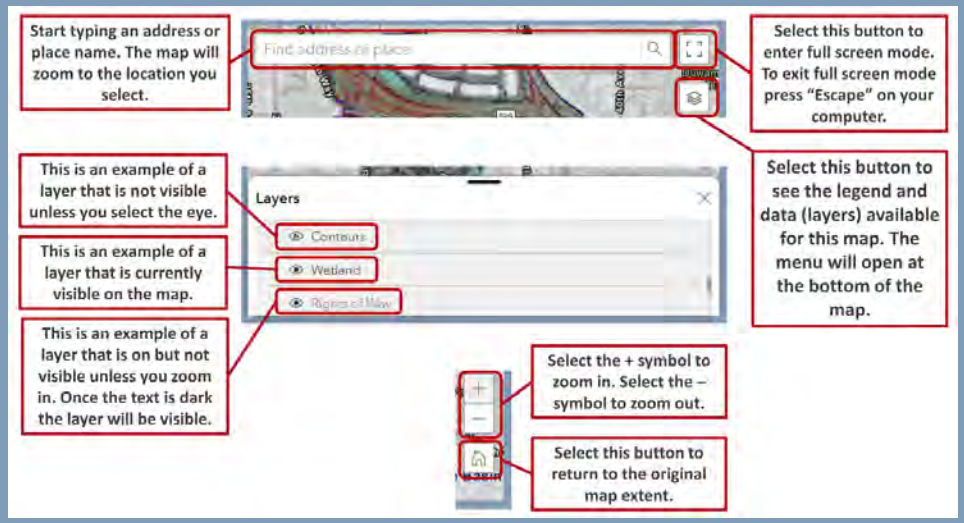
Step 2: Prioritize

The purpose of the receiving water prioritization was to decide whether the Green and Duwamish Rivers, Riverton Creek, Southgate Creek, or Gilliam Creek would receive the most benefit from a stormwater management action plan (SMAP).

We selected Riverton Creek basin because it is important for fish, has new fish habitat due to the recent removal of the flapgate at the mouth, has older areas of development without modern stormwater management, and has both the need and the opportunity for stormwater investments. Riverton Creek basin received support from the public when we asked for help prioritizing a basin in June 2022 (Visit the StoryMap here). The Green/Duwamish basin also received public support. Since Riverton Creek flows into the Duwamish River, improvements to Riverton Creek will also improve water quality in the river.



The interactive map depicts information in Riverton Basin. For help on how to use the interactive map refer to the instructions below.



Step 3: Solutions

We invite you to help us prioritize actions the City can take to improve water quality in Riverton Creek.

There are two categories of proposed stormwater management solutions in the survey below. The first category is a retrofit project, which means the City will construct new infrastructure to manage stormwater from an area that is not currently managed. The second category is a stormwater program, which means the City will change its operations or change policy to improve water quality.

The first question asks you to select your top three types of retrofit projects. The second question asks you to select your preferred program. To help you decide, we have provided key details for each solution. Please answer the survey only once. The survey will be open until November 11th, 2022.

If the survey on this page has any trouble loading on your mobile device, please follow this link to open the survey in another browser window.

Tukwila Stormwater Management Solutions for Riverton Creek Basin

Question 1. Which types of stormwater retrofit solutions do you prefer? Please select your three favorite solutions from the eight options listed below. To help you decide, we have listed some key details for each option.

☐ 1) Proprietary large underground stormwater management facility (such

Next Steps for the Tukwila SMAP

What's next after the City prioritizes stormwater solutions for Riverton Creek Basin? The City will develop a stormwater management action plan that will guide the timeline, resources, and funding needed to implement the water quality improvement projects and programs.



Return to Survey

If you have any questions, please contact Sherry Edquid at sherry.edquid@tukwilawa.gov

Frequently Asked Questions

What is stormwater runoff?
Stormwater runoff is generated from rain and snowmelt that flow over land or impervious surfaces, such as paved streets, parking lots, and buildings, and does not soak into the ground. The runoff picks up pollutants like trash, chemicals, oils, and dirt/sediment that can harm our rivers, streams, lakes, and coastal waters (also known as receiving waters).

What is stormwater infrastructure?
Stormwater infrastructure is designed to collect, convey, and manage stormwater. The infrastructure (physical facilities) can take many forms including catch basins, pipes, ditches, ponds, vaults, and more.

What is a watershed?
A watershed is an area of land where all rainfall and snow melt drains to a common stream or waterbody, such as a lake, river, or Puget Sound. All of the watersheds in the City of Tukwila drain to the Green/Duwamish River.

What is a basin?
For our purposes, a basin is the portion of a watershed located within the City limits.

What is stormwater management?
Stormwater management is the process of controlling stormwater runoff, most often using facilities that slow down, detain, or remove pollutants from stormwater, with the goal of mitigating changes to the amount and timing of runoff and reducing harmful impacts on water quality.

What is a stormwater retrofit?
Stormwater retrofits are construction projects which reduce or delay stormwater runoff or prevent chemicals and sediment from coming into contact with our local bodies of water.

What is stormwater management action planning (SMAP)?
SMAP is a State required comprehensive stormwater planning process. The SMAP process prioritizes stormwater investments and actions in a selected basin to accommodate future growth in a way that minimizes impacts to receiving waters such as Riverton Creek or the Green/Duwamish Rivers.



Appendix D

Short-Term Retrofit Project Fact Sheets and Cost Opinion Memorandum

PROJECT SUMMARY SHEET—SMAP-4

Project Title: Tukwila Intl Blvd: Bus Stop 60983 Water Quality Retrofit

Location: In front of the bus stop at 12500 Tukwila International Blvd (bus stop ID 60983)

Issue Description:

Issue	Description
Water Quality	Stormwater runoff from Tukwila International Blvd is collected and directed to Riverton Creek. Runoff from this heavily traveled road likely contains high concentrations of pollutants, including fine sediment and dissolved metals. The polluted runoff is currently piped to Riverton Creek without treatment.

Project Description:
Tukwila International Blvd is one of the most highly traveled roads in the City of Tukwila, frequently used by buses, commercial trucks, and personal vehicles. Stormwater runoff is collected along both sides of the road and directed to Riverton Creek. Under existing conditions there is no water quality treatment for stormwater runoff from Tukwila International Blvd in Riverton Creek Basin.

This project will install an underground proprietary runoff treatment system along Tukwila International Blvd to provide runoff treatment from 0.63 acres of impervious surface. The proposed facility location is in the public right-of-way between an existing bus stop (bus stop ID 60983) and the driveway to 12500 Tukwila International Blvd. This project will install conveyance pipes in the right-of-way along Tukwila International Blvd to re-route the existing conveyance network to the new facility before reconnecting to the existing network. This project also proposes replacing one pipe to route stormwater to the facility and abandoning another pipe that will no longer be used. The new proprietary underground biofiltration facility will collect stormwater from approximately 800 feet of existing conveyance pipes.

Contech Engineered Solutions' Modular Wetlands® Linear Stormwater Treatment System was used to calculate the estimated project cost and facility size. The facility size was calculated using the basin size, peak flow rate, and other considerations such as available space. The facility is sized to provide enhanced treatment (removal of fine sediment and dissolved metals) in accordance with the Washington Department of Ecology's General Use Level Designation (GULD) for Contech Engineered Solutions' Modular Wetlands® Linear Stormwater Treatment System. Other GULD approved technologies that provide enhanced treatment may be considered during final design. The City currently owns Modular Wetlands® facilities and has experience in their operation and maintenance.

Pollutants Addressed: The project will remove sediment and dissolved metals from stormwater runoff.

Future Considerations: A detailed topographic and utility survey is needed at the proposed facility location and drainage basin. If the project cannot be constructed in the public-right-of way the City of Tukwila can consider a public-private partnership with the private property owner to install the facility at 12500 Tukwila International Blvd. Access to businesses will be disrupted although not halted during construction. Construction will disrupt traffic on Tukwila International Blvd, including pedestrians, through traffic, vehicles entering businesses on the east side of Tukwila International Blvd, and buses. Bus Stop 60983 may need to be relocated temporarily during construction. If construction extends outside of the public right-of-way a pedestrian path will be constructed between parking lots and buildings. The City of

SMAP-4: Tukwila Intl Blvd: Bus Stop 60983 Water Quality Retrofit

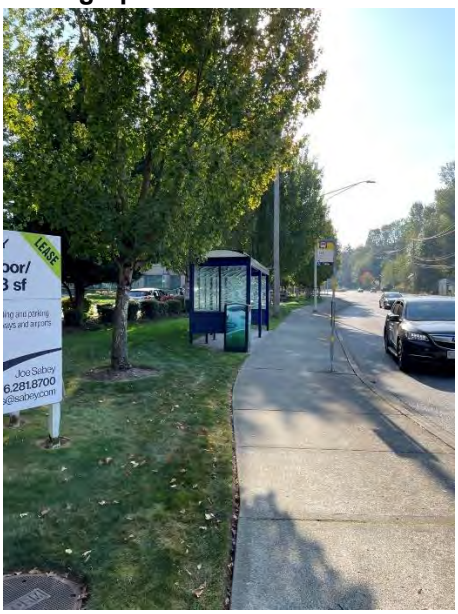
Tukwila will provide early notice to the property owners, tenants, and public transit users that will be affected by construction.

Estimated Project Cost: $440,000

Related Projects:

None.

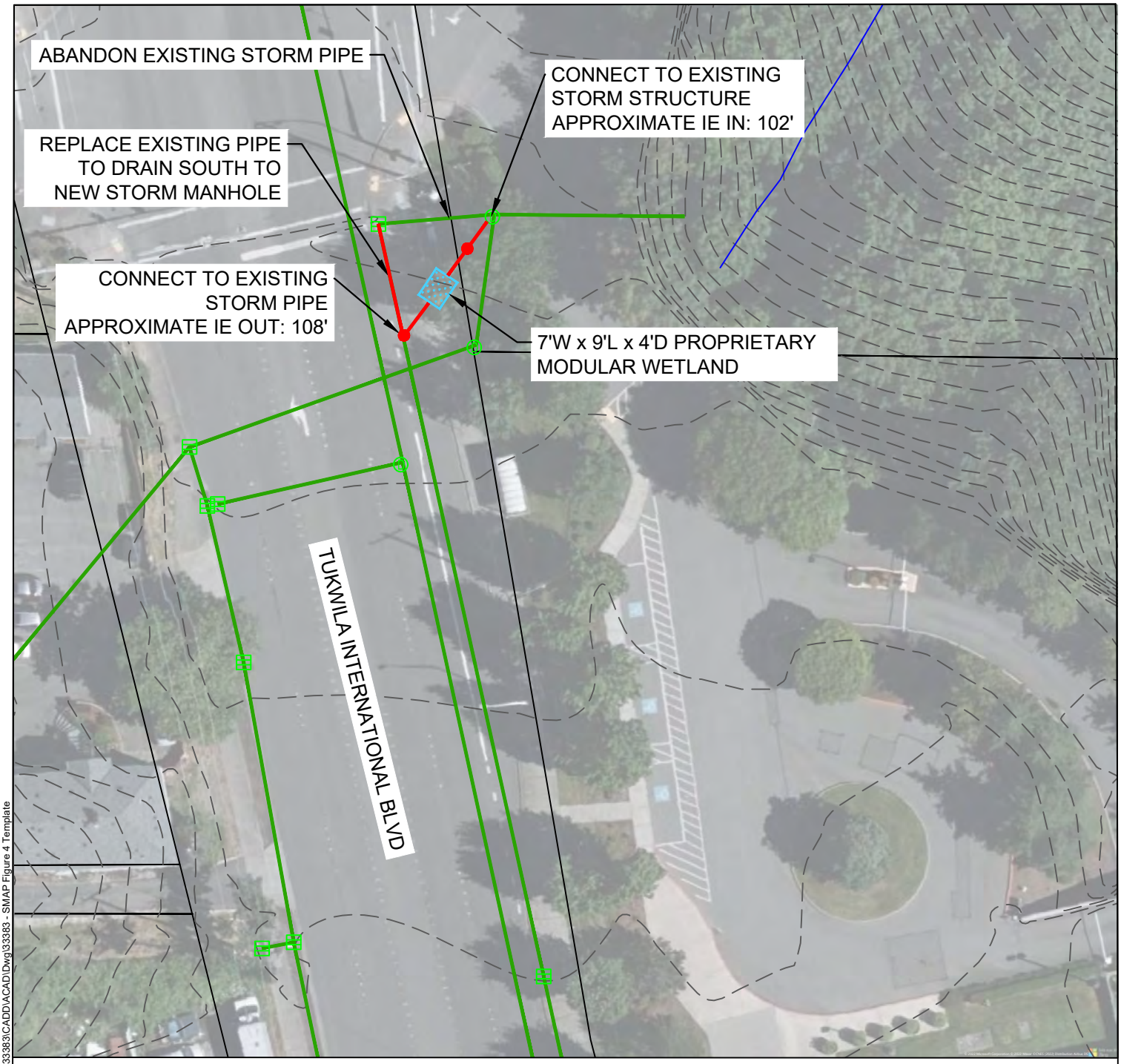
Photographs:



Looking south along Tukwila International Blvd



Looking south along Tukwila International Blvd and private driveway



LEGEND

- 2 FT CONTOURS
- TAXLOTS
- STREAM/CREEK
- EXISTING STORM PIPE
- SD — PROPOSED STORM PIPE
- EXISTING STORM CATCH BASIN
- EXISTING STORM MANHOLE
- PROPOSED MANHOLE
- PROPOSED PROPRIETARY MODULAR BIOFILTRATION

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SMAP 4

Tukwila Stormwater Management Action Plan

PLANNING LEVEL PROJECT COST OPINION

LOCATION: TUKWILA INTL BLVD: BUS STOP 60983 WATER QUALITY I
BY: MEP
PROJ. ID: SMAP-4
DATE: 2/13/2023
DESC. CONSTRUCT UNDERGROUND PROPRIETARY RUNOFF TREATMENT SYSTEM ADJACENT TO BUS STOP IN FRONT OF 12500 TUKWILA INTERNATIONAL BLVD (STOP ID 60983)

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
DESIGN					
1	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
2	ENGINEERING	25%	Of Total Construction		$ 74,000
3	SURVEY	2%	Of Total Construction		$ 6,000
4	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 14,800
				Total Design	**$ 109,800**
LAND (R/W)					
5	EASEMENTS	600	SF	$ 6	$ 3,600
				Total Land (R/W)	**$ 3,600**
CONSTRUCTION MANAGEMENT					
6	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 29,590
				Total Construction Management	**$ 29,590**
CONSTRUCTION					
Construction Elements					
7	STORM SEWER PIPE, 12 IN. DIAM	60	LF	$ 190	$ 11,400
8	MANHOLE 48 IN. DIAM. TYPE 1	2	EA	$ 8,240	$ 16,500
9	PROPRIETARY UNDERGROUND STORMWATER VAULT*	1	EA	$ 108,500	$ 108,500
			Subtotal Construction Elements		*$ 136,400*
Required Ancillary Construction Items					
10	MOBILIZATION	10%	Of Construction Elements		$ 13,700
11	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 6,900
12	TRAFFIC CONTROL	15%	Of Construction Elements		$ 20,500
13	PLANNING LEVEL CONSTRUCTION CONTINGENCY	40%	Of Total Construction		$ 118,400
			Subtotal Ancillary Items		*$ 159,500*
				Total Construction	**$ 295,900**
				Total Project Cost	**$ 438,890**
				2023 Dollars Total Estimated Project Cost (Rounded)	**$ 440,000**

* For estimating purposes, a Contech Modular Wetlands® 7'x9'x4' Linear Stormwater Bioretention Unit is assumed.

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.

PROJECT SUMMARY SHEET—SMAP-5

Project Title: South 130th St Right-Of-Way Bioretention Planters

Location: S 130th St, 37th Ave S, and 38th Ave S

Issue Description:

Issue	Description
Water Quality	Stormwater runoff from S 130th St, 37th Ave S, and 38th Ave S is collected in storm ditches and storm pipes and directed to Riverton Creek. Runoff from these roads and residential properties likely contains pollutants, including fine sediment, dissolved metals, and 6PPD-q[1]. The polluted runoff is currently sent to Riverton Creek without treatment.
Flow Control	S 130th St, 37th Ave S, and 38th Ave S are hilly and stormwater is sent downhill quickly. Quick moving stormwater has led to erosion and incising of the storm ditches.

Project Description:
S 130th St is a highly traveled road in the City of Tukwila, frequently used by buses and commercial vehicles. 37th Ave S and 38th Ave S are residential roads that are mainly used by personal vehicles. Stormwater runoff is collected along both sides of the roads and is directed to Riverton Creek. Under existing conditions, the storm ditches are heavily incised, there are some blockages at the culverts, and there is no water quality treatment for stormwater runoff.

This project will replace existing storm ditches with a series of bioretention planters to provide runoff treatment from 1.75 acres of right-of-way impervious surface and 3 acres of residential properties. The bioretention planters will include native plants and will also slow stormwater down before it is directed to conveyance pipes. The planters, totaling 1,400 square feet, will be installed on the east side of 37th Ave S, both sides of 38th Ave S, the north side of S 130th St, and the south side of S 130th St between 37th Ave S and 38th Ave S. Planter locations are preliminary. This project will install a new conveyance pipe and five manholes in the center of S 130th St between 37th Ave S and E Marginal Way S. New conveyance pipes will also be constructed to route stormwater between the bioretention planters and the new central conveyance pipe. The existing conveyance pipes will be abandoned where the bioretention planters will be installed.

The volume of stormwater runoff directed to the project area determined the estimated project cost and facility size. The bioretention planters will provide enhanced treatment (removal of fine sediment and dissolved metals) in accordance with the Washington Department of Ecology's design criteria outlined in the 2019 Stormwater Management Manual for Western Washington. Bioretention is also known to remove the tire wear pollutant 6PPD-q, which is emerging as a concern in the Puget Sound region. The City currently owns bioretention planters and has experience in their operation and maintenance.

Pollutants Addressed: The project will remove sediment, dissolved metals, and 6PPD-q from stormwater runoff. Preliminary research indicates that dispersion, infiltration, and biofiltration facilities that use bioretention soil media including bioretention planters are anticipated to capture 6PPD-q.

[1] 6 p-Phenylenediamine quinone

SMAP-5: South 130th St Right-Of-Way Bioretention Planters

Future Considerations: A detailed topographic and utility survey is needed at the proposed facility locations. Prior to construction, the City may need to discuss property lines with property owners. The City will gather community concerns through public engagement efforts prior to final design of the project and construction. Construction will disrupt traffic on S 130th St, 37th Ave S, and 38th Ave S, including pedestrians, through traffic, and school buses. Street parking will be impacted during construction and depending on the final design of the project street parking could be reduced to accommodate some bioretention planters. The City of Tukwila will provide early notice to the property owners, tenants, and public transit users that will be affected by construction.

Estimated Project Cost: $1,340,000.

Related Projects:
There could be opportunities to partner with the City's Transportation Planning division to install sidewalks along with bioretention planters on S 130 St.

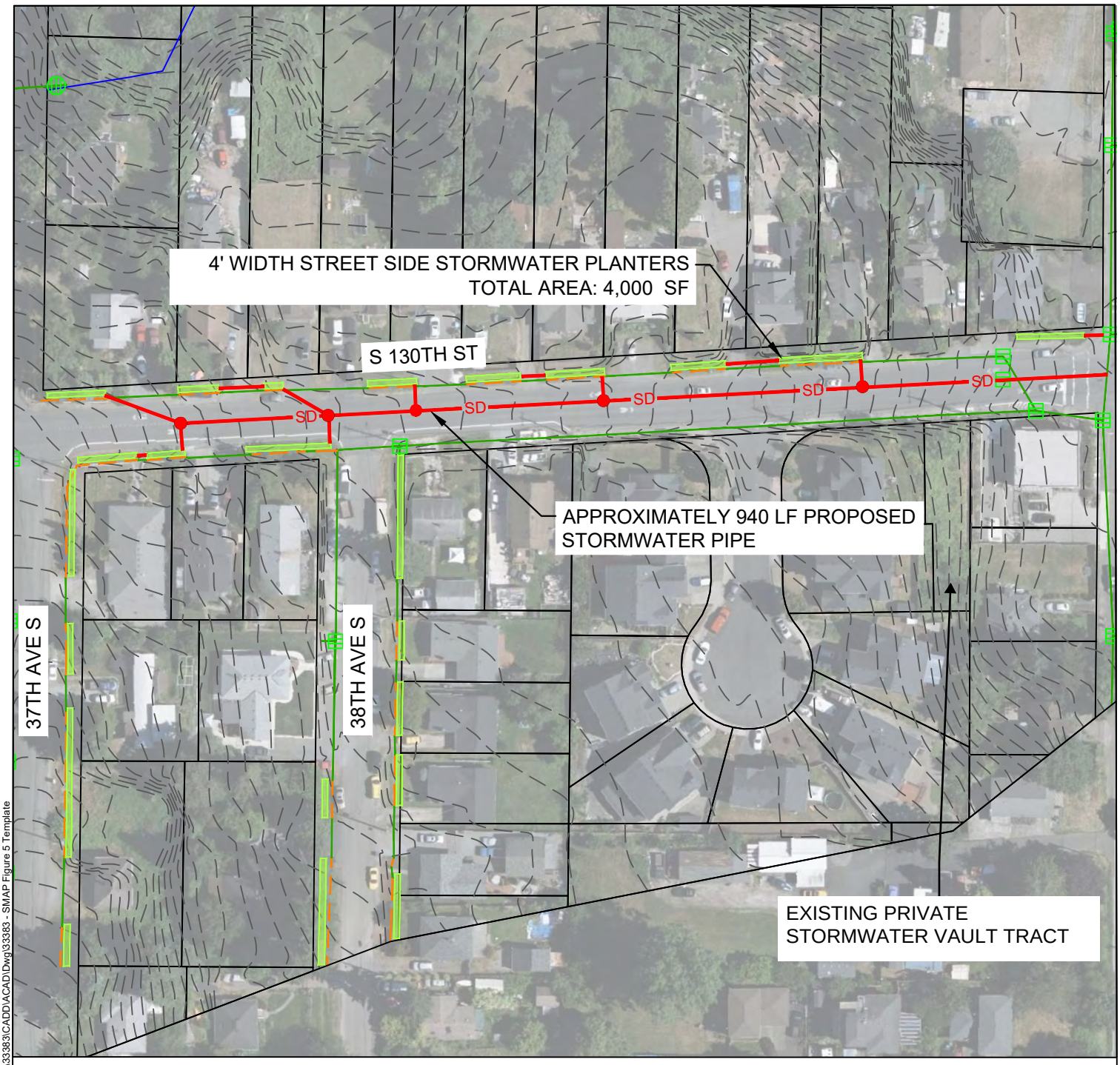
Photographs:



Looking east on the south side of S 130th St at 37th Ave S



Looking east on the north side of S 130th St near 38th Ave S



LEGEND

- 2 FT CONTOURS
- TAXLOTS
- EXISTING STORM DITCH
- EXISTING STORM PIPE
- SD — PROPOSED STORM PIPE
- EXISTING STORM CATCH BASIN
- EXISTING STORM MANHOLE
- PROPOSED MANHOLE
- PROPOSED STORMWATER PLANTER (BIORETENTION)

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SMAP 5

Tukwila Stormwater Management Action Plan

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SEAL OF TUKWILA WASHINGTON 1908

PLANNING LEVEL PROJECT COST OPINION

LOCATION:	**SOUTH 130TH ST RIGHT-OF-WAY BIORETENTION PLANTERS**	**BY:**	**MEP**
PROJ. ID:	**SMAP-5**	**DATE:**	**2/13/2023**
DESC.	**INSTALL RIGHT-OF-WAY BIORETENTION PLANTERS IN EXISTING CONVEYANCE DITCH LOCATIONS ALONG S 130TH ST. AND CROSS STREETS**		

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
DESIGN					
1	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
2	ENGINEERING	15%	Of Total Construction		$ 150,400
3	SURVEY	2%	Of Total Construction		$ 20,100
4	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 50,200
				Total Design	**$ 235,700**
LAND (R/W)					
5	EASEMENTS	0	SF	$ 6	**$ -**
				Total Land (R/W)	**$ -**
CONSTRUCTION MANAGEMENT					
6	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 100,300
				Total Construction Management	**$ 100,300**
CONSTRUCTION					
Construction Elements					
7	STORM SEWER PIPE, 12 IN. DIAM	1,000	LF	$ 190	$ 190,000
8	MANHOLE 48 IN. DIAM. TYPE 1	5	EA	$ 8,240	$ 41,200
9	STORMWATER PLANTER	4,100	SF	$ 85	$ 348,500
			Subtotal Construction Elements		*$ 579,700*
Required Ancillary Construction Items					
10	MOBILIZATION	10%	Of Construction Elements		$ 58,000
11	TEMPORARY WATER MANAGEMENT	5%	Of Construction Elements		$ 29,000
12	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 29,000
13	TRAFFIC CONTROL	1%	Of Construction Elements		$ 5,800
14	PLANNING LEVEL CONSTRUCTION CONTINGENCY	30%	Of Total Construction		$ 300,700
			Subtotal Ancillary Items		*$ 422,500*
				Total Construction	**$ 1,002,200**
				Total Project Cost	**$ 1,338,200**
				2023 Dollars Total Estimated Project Cost (Rounded)	**$ 1,340,000**

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.

PROJECT SUMMARY SHEET—SMAP-12

Project Title: E Marginal Way S Distributed Water Quality Treatment

Location: E Marginal Way S between S 120th Pl and slightly south of S 128th St

Issue Description:

Issue	Description
Water Quality	Stormwater runoff from E Marginal Way S is collected and directed to Riverton Creek. Runoff from this heavily traveled road likely contains high concentrations of pollutants, including fine sediment. The polluted runoff is currently piped to Riverton Creek without treatment.

Project Description:
E Marginal Way S is a highly traveled road in the City of Tukwila, frequently used by buses, commercial trucks, and personal vehicles. Stormwater runoff is collected in catch basins along both sides of the road and directed to Riverton Creek in conveyance pipes. Under existing conditions there is no water quality treatment for stormwater runoff from this section of E Marginal Way in Riverton Creek Basin.

This project will replace 22 catch basins with proprietary underground stormwater catch basins. The 22 new catch basins will hold a total of 44 cartridges that treat stormwater. The new catch basins will capture and treat stormwater runoff from 3.5 acres of impervious surface. Selection of catch basins for replacement during design of this project will depend on invert elevations, topography, location, and size of area draining to each catch basin.

Contech Engineered Solutions' Stormwater Management StormFilter® Catch Basins were used to calculate the estimated project cost and the number of facilities. The number of catch basins that will be replaced was calculated using the basin size, peak flow rate, and the capacity of each StormFilter® cartridge. The facilities are designed to provide basic treatment (removal of fine sediment) in accordance with the Washington Department of Ecology's General Use Level Designation (GULD) for Contech Engineered Solutions' Stormwater Management StormFilter® with ZPG Media at 1 gpm/sq ft media surface area. Other GULD approved technologies may be considered during final design. The City currently owns Contech StormFilter® facilities and has experience in their operation and maintenance.

Pollutants Addressed: The project will remove sediment from stormwater runoff.

Future Considerations: A detailed topographic and utility survey is needed of the existing catch basins that will be replaced. Construction will disrupt traffic on E Marginal Way S, including through traffic, buses, and possibly pedestrians and vehicles entering businesses.

The project could be phased to limit cost in any one year. To reduce overall project cost, the project extents could be reduced during final design.

Estimated Project Cost: $1,420,000

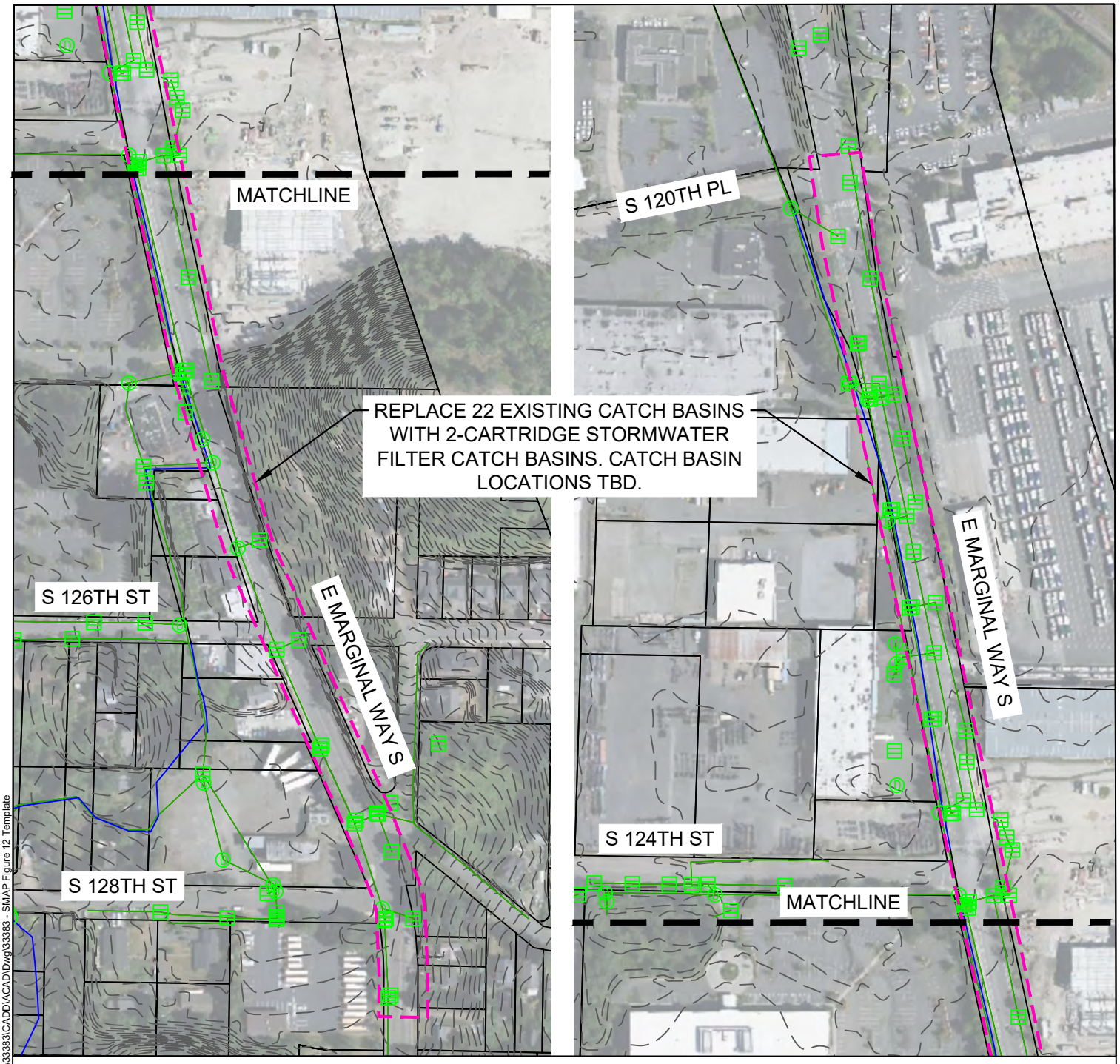
Related Projects:
None identified.

SMAP-12: E Marginal Way S Distributed Water Quality Treatment

Photograph:



Looking south along E Marginal Way S



PROJECT EXTENT - SOUTH

PROJECT EXTENT - NORTH

LEGEND

- 2 FT CONTOURS
- TAXLOTS
- CIP BOUNDARY
- EXISTING STORM PIPE
- EXISTING STORM CATCH BASIN
- EXISTING STORM MANHOLE

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SMAP 12

Tukwila Stormwater Management Action Plan

PLANNING LEVEL PROJECT COST OPINION

LOCATION: E MARGINAL WAY DISTRIBUTED WATER QUALITY TREATMENT
BY: MEP
PROJ. ID: SMAP-12
DATE: 2/13/2023
DESC. INTALL UP TO 44 CONTECH STORMFILTER CARTRIDGES IN CATCH BASIN STUCTURES TO PROVIDE RUNOFF TREATMENT ON E MARGINAL WAY S. LOCATIONS DETERMINED BASED ON EXISTING STORMWATER INFRASTRUCTURE.

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
DESIGN					
1	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
2	ENGINEERING	15%	Of Total Construction		$ 159,200
3	SURVEY	2%	Of Total Construction		$ 21,300
4	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 53,100
				Total Design	**$ 248,600**
LAND (R/W)					
5	EASEMENTS	0	SF	$ 6	**$ -**
				Total Land (R/W)	**$ -**
CONSTRUCTION MANAGEMENT					
6	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 106,100
				Total Construction Management	**$ 106,100**
CONSTRUCTION					
Construction Elements					
7	PROPRIETARY UNDERGROUND STORMWATER CATCHBASIN*	22	EA	$ 28,600	$ 629,200
			Subtotal Construction Elements		*$ 629,200*
Required Ancillary Construction Items					
8	MOBILIZATION	10%	Of Construction Elements		$ 63,000
9	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 31,500
10	TRAFFIC CONTROL	3%	Of Construction Elements		$ 18,900
11	PLANNING LEVEL CONSTRUCTION CONTINGENCY	30%	Of Total Construction		$ 318,300
			Subtotal Ancillary Items		*$ 431,700*
				Total Construction	**$ 1,060,900**
				Total Project Cost	**$ 1,415,600**
				2023 Dollars Total Estimated Project Cost (Rounded)	**$ 1,420,000**

* For estimating purposes, a Contech 2-Cartridge Stormfilter® Catch Basin with 27-inch cartridges is assumed.

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.

PROJECT SUMMARY SHEET—SMAP-14

Project Title: Tukwila School District Stormwater Pond Retrofit and Sanitary Sewer Connection

Location: E Marginal Way S and S 128th St

Issue Description:

Issue	Description
Water Quality	Tukwila School District used to wash school buses in the parking lot of its bus barn. Wash water from the school buses likely contains pollutants including oil, surfactants or soaps, dissolved metals, suspended solids, and other pollutants. The polluted wash water used to be directed to the School District's stormwater pond before being piped to Riverton Creek without water quality treatment. Stormwater runoff from this 1.2-acre property is collected and sent to the School District's stormwater pond. The stormwater pond may provide some treatment; however, it is expected that the treatment provided is not up to current standards.
Flow Control	Stormwater runoff from the Tukwila School District's property is directed to the stormwater pond in the northeast corner of the property before being routed to the City of Tukwila's stormwater conveyance system, and ultimately Riverton Creek. It is unclear if the stormwater pond provides flow control or to what standard.

Project Description:
Tukwila School District operates a bus barn at E Marginal Way S and S 128th St. Two existing catch basins capture stormwater from the site, which is then piped to a stormwater pond at the northeast corner of the bus barn. The existing pond was built to a previous standard, and its current effectiveness in managing stormwater runoff is unknown. It is in poor condition with trees growing in the bottom and invasive vegetation often covering it. In the past, district personnel would wash buses in the parking lot, and wash water would enter the district's storm system and then the City's municipal storm system. Because the City of Tukwila prohibits illicit discharges such as wash water from entering its storm system, the School District now must drive the school buses to another location to get washed. The City will partner with the School District to reconfigure the drainage system on the property to separate wash water from stormwater runoff and to provide water quality treatment for stormwater runoff from the site.

This project will convert the existing stormwater pond to a large bioretention cell to provide both runoff treatment and flow control for stormwater runoff from the site. An existing flow control structure downstream of the outlet will be replaced to manage stormwater flows. The bioretention cell will provide enhanced treatment for stormwater runoff (removal of fine sediment and dissolved metals) from 1.2 acres of impervious surface which is currently managed in the stormwater pond with unknown efficacy in removing pollutants.

This project will also add a diversion valve downstream of the two primary catch basins that collect stormwater from the parking lot. The diversion valve will allow School District staff to direct wash water to the sanitary sewer system operated by Valley View Sewer District. When school buses are no longer being washed staff will turn the diversion valve to the bioretention cell to manage stormwater runoff.

An oil/water separator and clean out will be installed after the diversion valve along a new sewer line. The new six-inch sewer line will direct the wash water from the diversion valve to an existing sanitary sewer line in the parking lot.

Pollutants Addressed: The project will prevent illicit discharges from washing operations and remove sediment, dissolved metals, and oil from stormwater runoff.

Future Considerations: A detailed topographic and utility survey is needed at the proposed facility installation locations. An infiltration test will need to be performed for the bioretention cell. The School District will need to work with Valley View Sewer District to permit school bus wash water discharges to the sanitary sewer system.

Estimated Project Cost: $440,000. The City would pay for 54% of the total estimated project cost ($236,000). The School District would pay for 46% of the total estimated project cost ($204,000).

Related Projects:

None.

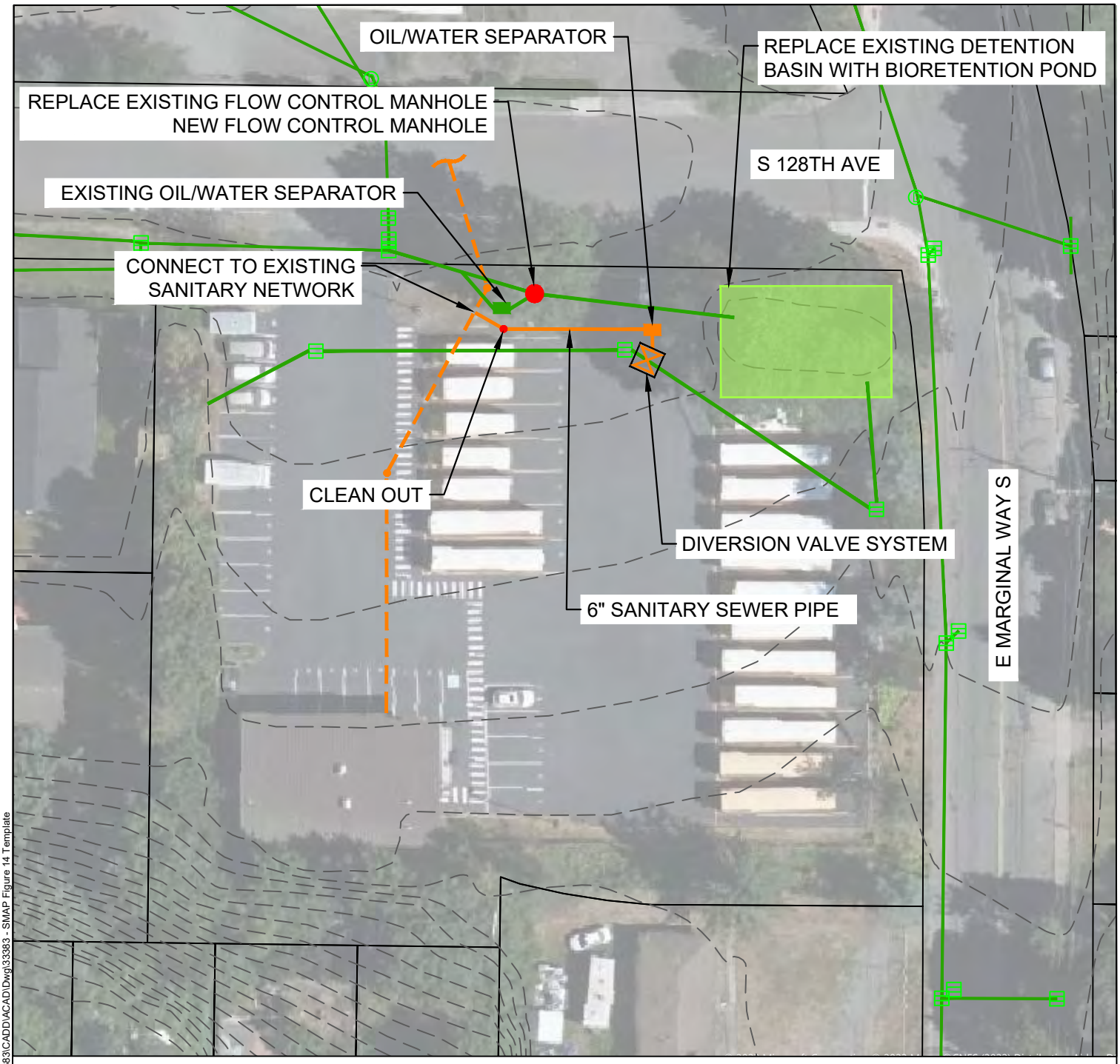
Photographs:



Looking southwest across the stormwater pond



Looking east along S 128th St



LEGEND

- 2 FT CONTOURS
- TAXLOTS
- EXISTING SANITARY PIPE
- PROPOSED SANITARY PIPE
- EXISTING STORM PIPE
- SD — PROPOSED STORM PIPE
- EXISTING STORM CATCH BASIN
- EXISTING STORM MANHOLE
- EXISTING CLEANOUT
- PROPOSED DIVERSION VALVE SYSTEM
- PROPOSED CLEANOUT
- PROPOSED STORMWATER POND (BIORETENTION)
- OIL/WATER SEPARATOR

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SMAP 14

Tukwila Stormwater Management Action Plan

Otak

PLANNING LEVEL PROJECT COST OPINION

LOCATION: TUKWILA SCHOOL DISTRICT STORMWATER POND RETROFIT AND SANITARY SEWER CONNECTION
PROJ. ID: SMAP-14
DESC. PARTNERSHIP WITH TUKWILA SCHOOL DISTRICT. RETROFIT EXISTING STORMWATER POND TO PROVIDE ADDITIONAL TREATMENT, AND INSTALL A SANITARY SEWER DIVERSION VALVE TO PREVENT WASH WATER FROM ENTERING STORM SYSTEM.
BY: MEP
DATE: 2/13/2023

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
DESIGN					
1	BASIC PERMITTING	1	LS	$ 15,000	$ 15,000
2	ENGINEERING	25%	Of Total Construction		$ 73,600
3	SURVEY	2%	Of Total Construction		$ 5,900
4	PROJECT ADMINISTRATION	5%	Of Total Construction		$ 14,800
				Total Design	**$ 109,300**
LAND (R/W)					
5	EASEMENTS	0	SF	$ 6	$ -
				Total Land (R/W)	**$ -**
CONSTRUCTION MANAGEMENT					
6	CONSTRUCTION MANAGEMENT	10%	Of Total Construction		$ 29,500
				Total Construction Management	**$ 29,500**
CONSTRUCTION					
Construction Elements					
7	CLEAN OUT	2	EA	$ 2,000	$ 4,000
8	PVC SANITARY SEWER PIPE 6 IN. DIAM	70	LF	$ 130	$ 9,100
9	PROPRIETARY OIL WATER SEPARATOR	1	EA	$ 49,000	$ 49,000
10	DIVERSION VALVE SYSTEM	1	EA	$ 15,000	$ 15,000
11	BIORETENTION CELL (RETROFIT OF POND)	2,350	SF	$ 25	$ 58,800
13	FLOW CONTROL MANHOLE	1	EA	$ 11,000	$ 11,000
			Subtotal Construction Elements		*$ 146,900*
Required Ancillary Construction Items					
14	MOBILIZATION	10%	Of Construction Elements		$ 14,700
15	TEMPORARY WATER MANAGEMENT	5%	Of Construction Elements		$ 7,400
16	EROSION & SEDIMENTATION CONTROL	5%	Of Construction Elements		$ 7,400
17	PLANNING LEVEL CONSTRUCTION CONTINGENCY	40%	Of Total Construction		$ 117,700
			Subtotal Ancillary Construction		*$ 147,200*
				Total Construction	**$ 294,100**
				Total Project Cost	**$ 432,900**
			2023 Dollars Total Estimated Project Cost (Rounded)		**$ 440,000**

* For estimating purposes, a Contech Modular Wetlands® 7'x9'x4' Linear Stormwater Bioretention Unit is assumed.

Notes:

1. The above cost opinion is in 2023 dollars and does not include future escalation, financing, or O&M costs.
2. The order-of-magnitude cost opinion has been prepared for guidance in project evaluation from the information available at the time of preparation and for the assumptions stated. The final costs of the project will depend on actual labor and material.
3. Assumes Tukwila School District retains ownership and responsibility for maintenance of the storm facilities on the property.

COST SHARING

The project is a partnership between City of Tukwila and Tukwila School District, and costs will be shared. The City will fund pipes and upgrades to the pond. The School District will fund the oil/water separator, electrified diversion value, and any items related to the sanitary sewer connection.

CITY PORTION	54%	$	236,324
SCHOOL DISTRICT PORTION	46%	$	203,676

Memorandum

To: Sherry Edquid (City of Tukwila)

From: Trista Kobluskie, Brandon Teetsel, PE

Copies: File

Date: February 15, 2023

Subject: City of Tukwila SMAP Project Cost Opinion Methodology

Project No.: 33383

For the City of Tukwila Stormwater Management Action Plan (SMAP), Otak developed planning-level cost opinions for four retrofit projects. This memorandum summarizes the assumptions made in formulating each element of the cost opinion.

1. Project Scope

Cost opinions are based on conceptual project scopes and engineering and are presented in 2022 dollars. Conceptual project scopes and designs are developed with limited detail about permit requirements, existing system attributes (e.g. invert elevations), utility conflicts, and external impacts. Conceptual engineering includes preliminary engineering calculations or uses information from recent similar work. All concepts and costs should be considered preliminary.

It is assumed that projects will meet engineering requirements of the King County Surface Water Design Manual in effect when the project is permitted. Cost estimates are based on assumptions derived from current engineering standards.

2. Design

Design costs consist of permitting, engineering, survey, and project administration.

Type of Cost	Includes	How Applied	How Calculated
Basic Permitting*	▪ Basic municipal permits	All projects	$15,000

Type of Cost	Includes	How Applied	How Calculated
Engineering	▪ Engineering design ▪ Preparation of SWPPP and erosion & sediment control plans ▪ Geotechnical studies (if needed) ▪ Archaeological survey (if needed) ▪ Other special studies when described in fact sheet	All projects	Varied percentage of total construction cost ▪ 25% for construction under $500,000 ▪ 20% for construction over $500,000 ▪ 15% for construction over $1 million
Survey	▪ Survey	All projects	2% of total construction
Project Administration	▪ City's staffing cost to manage the project and related grants, if any	All projects	5% of total construction

* Basic Permitting cost is applied to all sites. Based on desktop analysis, no sites trigger federal or state environmental permits or environmental mitigation, which would entail additional cost.

3. Land (Right of Way)

Land costs consists of permanent easements, if needed, which are calculated at $6 per square foot.

4. Construction Management

Construction management consists of either the City's staffing or a contractor to oversee construction and is calculated as 10% of total construction for all projects.

5. Construction

Construction consists of construction elements and required ancillary construction pay items.

5.1. Construction Elements

Construction elements are the necessary significant pay items to construct the project. Items are usually presented as a package that includes labor and a variety of materials. For example, the unit cost for a right-of-way bioretention planter is a package based on a typical design and includes labor and materials such as Portland cement, pipe, bioretention soils, plants, and other needed materials. Otak civil engineers researched unit prices from recently completed local and regional construction projects to estimate project costs. Each project includes an engineer's assumption for preliminary unit quantities.

5.2. Required Ancillary Construction Items

Required ancillary construction items include mobilization, temporary water management, erosion & sedimentation control, traffic control, and a planning level construction contingency. Each of these is calculated based on a percentage of project costs as described in the table below.

Type of Cost	Includes	How Applied	How Calculated
Mobilization	▪ Contractor's mobilization	All projects	10% of construction elements subtotal
Temporary Water Management	▪ Contractor's temporary water management costs	If needed based on desktop analysis of site conditions	Percentage based on engineering judgement
Erosion & Sedimentation Control	▪ Contractor's erosion control costs	All projects	5% of construction elements subtotal
Traffic Control	▪ Contractor's traffic control costs	If needed based on desktop analysis of site conditions	Percentage based on engineering judgement
Planning Level Construction Contingency	▪ Expected costs that are not specified at the planning level	All projects	Percentage of total construction cost ▪ 40% for less than $500,000 construction ▪ 30% for over $500,000 construction

6. Escalation and Future Estimation

Costs were estimated in 2022 dollars. Cost opinions in the SMAP do not include escalation. Otak recommends escalating a cost opinion using an established index when the City adds a project to its capital improvement program. After the project design phase is complete, the construction cost opinion should be replaced by the engineers' estimate.

STORMWATER OUTFALL
WATER QUALITY RETROFIT PROJECT

Design Report

Prepared for:

City of Tukwila
6200 Southcenter Boulevard
Tukwila WA 98188

Prepared by:

KPG
Interdisciplinary Design

3131 Elliott Ave, Suite 400
Seattle, WA 98121
206-286-1640



October 2020
January 2021 (Revision No. 1)

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B – Alternative Analysis
C – Soils Information
D – Probable Cost Estimate
E – Design Plans
F – GULD & Operation and Maintenance Information Documents

1. Introduction

This report documents the stormwater design for the City of Tukwila Stormwater Outfall Water Quality Retrofit Project. The project is a part a City program to provide water quality treatment to the Duwamish Waterway. The City has identified outfalls to the river for a water quality retrofit. An alternative analysis evaluated and ranked eight outfalls. Four projects have been selected for final design. The following are included in this design report:

- Site No. 4 – Starfire Way
- Site No. 5 – Interurban Avenue South
- Site No. 7 – E Marginal Way South
- Site No. 8 – TIB at Riverton Creek

Water quality treatment facilities will consist of GULD approved media filter units for Enhanced Water Quality . As retrofit projects, storm drainage conveyance piping will be constructed to convey stormwater runoff to and from the treatment facilities with site restoration for all disturbed areas. See Figure 1 for project locations.

The design is being funded by the State of Washington Department of Ecology (Ecology) Water Quality Combined Financial Assistance Program, through Agreement No. WQC-2017-Tukwil-00158 (Grant Agreement). This report is intended to satisfy the Design Report submittal requirement described in Task 2D of the Grant Agreement scope of work.

The Grant Agreement states that the project will “improve water quality in the Green-Duwamish River through the design of runoff treatment Best Management Practices included in Ecology's Stormwater Management Manual for Western Washington, at a minimum of two outfalls in the city of Tukwila.” Media filter units in will be installed to capture and remove total suspended solids from surface runoff.

The project elements have been designed in accordance with the 2016 King County Surface Water Design Manual and the 2019 City of Tukwila Infrastructure Design and Construction Standards.

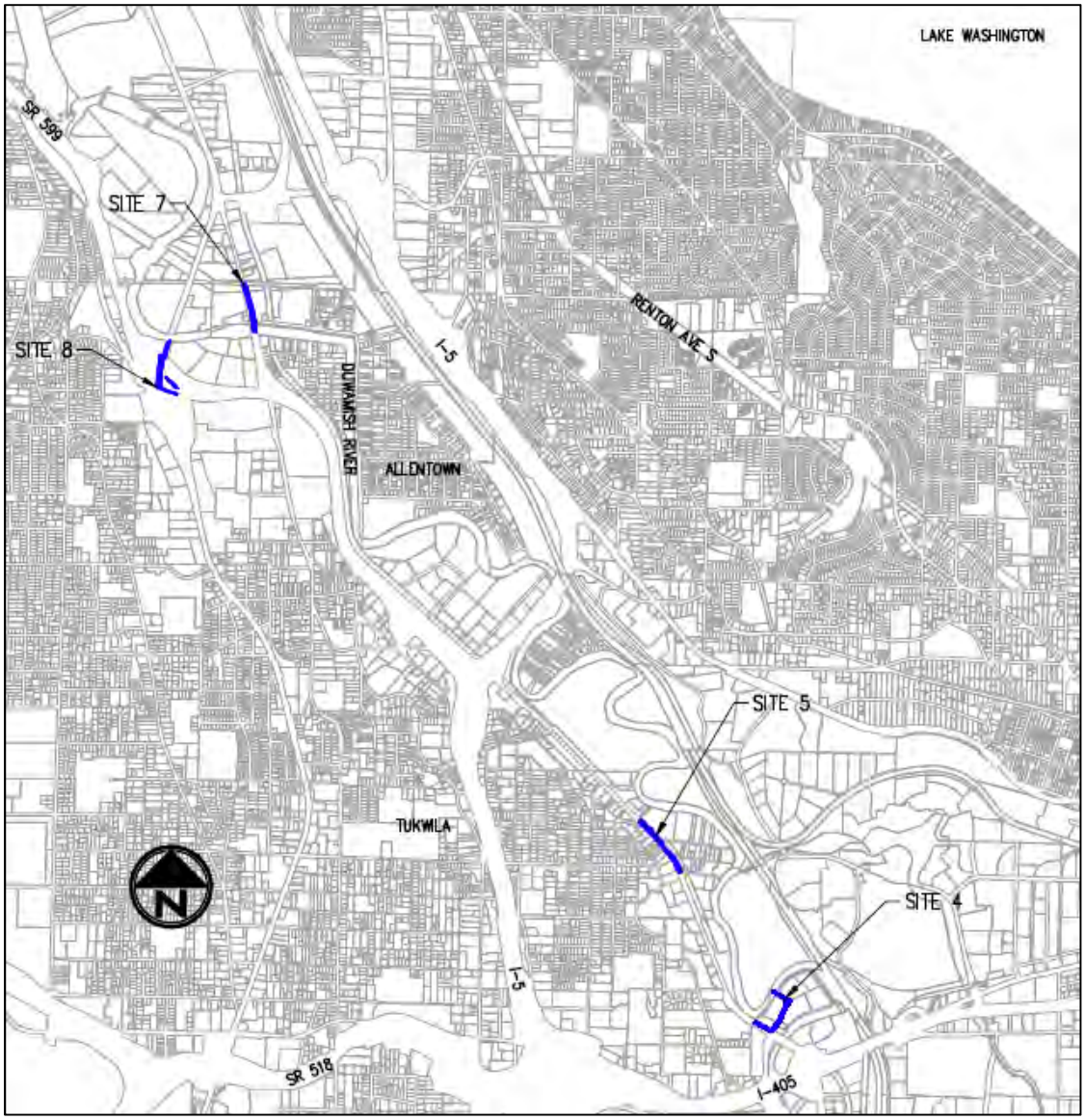

Figure 1 – Vicinity Map

2. Basin Description

The sites are located within the Duwamish River watershed. The river discharges into the Lower Duwamish Waterway and into Elliot Bay.

Under historic conditions, based on surface topography it appears that runoff from the projects flowed directly to the Duwamish River via sheet flow, with the exception of Site 8 which drains to Riverton Creek before out letting into the Duwamish River.

Site 4
The existing storm drainage system at Site 4 consists of a 12-inch diameter system predominantly directing runoff northward to Fort Dent Way, from Interurban Avenue. Runoff from a portion of Starfire Way to also collects in this system, and enters the system at a manhole junction before traveling west.

Site 5
The existing storm drainage system at Site 5 is a 12-inch diameter pipe that conveys runoff from the site and upstream areas in an westward direction along Interurban Avenue.

Site 7
At Site 7, the existing storm drainage system conveys runoff from the site and upstream areas from southward to the outlet to the Duwamish River.

Site 8
The existing storm drainage system at Site 8 conveys runoff from a portion of the roadway in a northward direction to Riverton Creek and eventually the Duwamish-Green River.

The Duwamish-Green River has Category 5 303(d) listings for dissolved oxygen, temperature, pH, and fecal coliform. The Duwamish-Green River is a salmonid bearing river within the City of Tukwila limits, and Riverton Creek provides salmonid spawning habitat.

Under proposed conditions, the project sites existing drainage patterns will not change. The installation of water quality treatment facilities will seek to improve the quality of runoff within the Duwamish-Green River Basin drainage basin.

Soils within the project site are discussed in Section 3.2. The Natural Resources Conservation Service online mapping (websoilsurvey.nrcs.usda.gov) shows the project site as predominantly Urban land and Alderwood complex, with moderately rapid permeability. The soils report is provided in Appendix C.

All four sites in the project area are located within the public right-of-way and encompass roadway, sidewalk, and lawn. The land use adjacent to Site 4, Site 5, and Site 7 is predominately commercial areas. The land use adjacent to Site 8 is roadway and shoulder in the right of way and within WSDOT limited access area.

3. Site Description

3.1 Existing and Proposed Site Conditions

The project area consists of public right-of-way along Interurban Avenue S at the Intersection of 58th Avenue S, Fort Dent Way at the Intersection of Interurban Avenue S, East Marginal Way S between S 112th Street and S 115th Street, and on Tukwila International Boulevard at SE-599 interchange. See Figures 2 through Figure 5.

Within the project area, land cover is mostly impervious, consisting of the roadway, sidewalk, lawn, and adjacent paved driveways and parking lots. Topography and existing site conditions at the sites are as follows:

- Site 4 is generally flat, slopes south to north, and consists of a 47-feet wide two lane asphalt roadway with center turn lane and two 5-foot wide concrete sidewalks with curbs and grassed planter strips.

- Site 5 is generally flat but slope east to west, and consists of a four-lane street with 63-feet wide asphalt roadway pavement ant two 6-foot wide sidewalk on both sides of the street with curbs.

- Site 7 is generally flat, sloping north to south, and is 47-feet wide two lane asphalt roadway with center turn lane and two 6-foot wide concrete sidewalks with curbs.

- Site 8 is generally flat, sloping south to north, and consists of a 77-foot wide 6-lane asphalt roadway with no curbs. The northbound side of the road is flush with a concrete Jersey barrier as the road approaches the SR-599 overpass.

The proposed site conditions will maintain the existing roadway patterns, and new storm drainage structures to convey runoff for water quality treatment. Proposed stormwater drainage structures include new catch basins to capture surface flows for treatment.

3.2 Soils

The NRCS Web Soil Survey was used to determine the soil conditions at the sites. The soils reports from NRCS Web Soil Survey are provided in Appendix C. The soil types at the sites are as follows:

- Site 4 is predominantly silt loam

- Site 5 lies entirely on urban land soils, and the areas adjacent to the site are predominantly Alderwood.

- Site 7 is entirely on urban land.

- Site 8 is predominantly Alderwood-Everett-Urban land complex.

3.3 Threshold Discharge Areas

The four sites consists of four separate Threshold Discharge Areas (TDAs). TDAs are defined as on-site areas draining to a single natural discharge location or multiple natural discharge locations that combine within ¼ mile downstream from the site. The project TDAs and their downstream paths are described as follows:

TDA A consists of Site 4 at Fort Dent Way between Interurban Avenue S and Starfire Way.

TDA B consists of Site 5 along Interurban Avenue S near the Intersection of S 141st Street.

TDA C consists of Site 7 on East Marginal Way S between S 112th Street and S 115th Street.

TDA D consists of Site 8 on Tukwila International Boulevard at the SE-599 interchange.

The following downstream drainage system descriptions were developed by reviewing drainage system information available from the on-line City of Tukwila GIS mapping application, site visits, as-built records provided by the City of Tukwila, and research of drainage complaint records.

TDA A (Site 4)
The downstream flow path for TDA A begins in a storm drain manhole on the southbound side of Fort Dent Way, near the intersection with Starfire Way. From this storm drain manhole, an 18-inch concrete pipe conveys TDA A runoff northwest for 170 feet before entering 24-inch pipe. From there, runoff travels northwest for approximately 50 feet before discharging into the Green River. No drainage complaints have been recorded within this downstream drainage system. Existing problems or problems developing as a result of this project are unlikely.

TDA B (Site 5)
The downstream flow path for TDA B begins in a storm drain manhole on the westbound side of Interurban Avenue S, near the intersection with South 141st Street. From this storm drain manhole, a 24-inch concrete pipe conveys TDA B runoff northeast for 240 feet before discharging into the Duwamish River. No drainage complaints have been recorded within this downstream drainage system. Existing problems or problems developing as a result of this project are unlikely.

TDA C (Site 7)
The downstream flow path for TDA C begins in a storm drain manhole on the southbound side of East Marginal Way, near the intersection with South 115th Street. From this storm drain manhole, a 24-inch concrete pipe conveys TDA C runoff south for 53 feet before discharging into the Duwamish River. No drainage complaints have been recorded within this downstream drainage system. Existing problems or problems developing as a result of this project are unlikely.

TDA D (Site 8)
The downstream flow path for TDA D begins in a vegetated channel near the offramp from SR-599 to Tukwila International Boulevard. From this vegetated channel, runoff from TDA D enters

a double barrel pipe before discharging into Riverton Creek. From there it travels northwest for approximately 3,800 feet before ultimately discharging into Green River. It is in Riverton Creek that the 0.25-mile point is reached. No drainage complaints have been recorded within this downstream drainage system. Existing problems or problems developing as a result of this project are unlikely.



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FIGURE 2. SITE 4: STARFIRE WAY

CITY OF TUKWILA STORMWATER QUALITY OUTFALL RETROFIT PROJECT

KPG
Interdisciplinary Design
3131 Elliott Ave
Suite 400
Seattle, WA 98121
(206) 286-1640
2502 Jefferson Ave
Tacoma, WA 98402
(253) 627-0720
www.kpg.com



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FIGURE 3. SITE 5: INTERURBAN AVE S

CITY OF TUKWILA STORMWATER QUALITY OUTFALL RETROFIT PROJECT

KPG
Interdisciplinary Design
3131 Elliott Ave
Suite 400
Seattle, WA 98121
(206) 286-1640
2502 Jefferson Ave
Tacoma, WA 98402
(253) 627-0720
www.kpg.com



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FIGURE 4. SITE 7: EAST MARGINAL WAY S

CITY OF TUKWILA STORMWATER QUALITY OUTFALL RETROFIT PROJECT

KPG
Interdisciplinary Design
3131 Elliott Ave
Suite 400
Seattle, WA 98121
(206) 286-1640
2502 Jefferson Ave
Tacoma, WA 98402
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FIGURE 5. SITE 8: TIB AT RIVERTON CREEK

CITY OF TUKWILA STORMWATER QUALITY OUTFALL RETROFIT PROJECT

KPG
Interdisciplinary Design
3131 Elliott Ave
Suite 400
Seattle, WA 98121
(206) 286-1640
2502 Jefferson Ave
Tacoma, WA 98402
(253) 627-0720
www.kpg.com

4. Applicability of Core Requirements

The type of drainage review and the applicability of the Core and Special Requirements of the 2016 KCSWDM is dependent on the size and type of project. The project is a water quality retrofit project, and all replaced pavement is associated to utility work. Each site will trigger a drainage review since replaced pavement restoration will be over the 2,000 square foot threshold of new and replaced hard surfaces. There will be no additional roadway or infrastructure improvements associated with the project. Therefore, the project will not trigger Flow Control, Water Quality Treatment, or On-Site Stormwater BMPs. Erosion control plans will be developed as a part of the final design.

5. Alternatives Considered

An alternative analysis evaluated eight outfalls to be considered for water quality improvements. The first step in the evaluation was to determine if "end-of-pipe" treatment was feasible. This task is dependent on an investigation of the existing drainage systems to determine sufficient hydraulic drop required for all GULD media filter devices without the use of stormwater lift stations. The task also considered known river data to determine if the pipe outfalls are surcharged during peak flows. Almost all sites lacked hydraulic drop in the existing system; therefore, end of pipe treatment may not be achieved for this project. Site 5 appears to be feasible; however, the City will need to acquire private property to locate the necessary facilities for a large basin retrofit. This outfall will be further evaluated under the City's program for future development.

Since end of pipe treatment is not feasible entirely by gravity, the analysis focused on located untreated roadway right-of-way that is tributary to each outfall for all eight sites. Since the goal of this project is to remove TSS from runoff going to a minimum of two outfalls in the Duwamish-Green River basin, possible locations for treatment were evaluated on the amount of area that may be treated and the anticipated pollution generated by that roadway. See Table 1 for the decision matrix analysis and Appendix B for the associated work.

The alternative analysis was presented to City Staff on January 23, 2020. Based on the meeting, the following four sites were selected to continue to a 90% Plans, Specification & Estimate per the Ecology Grant Agreement:

- Priority Rank No. 1: Site 5 – Interurban Avenue South (Roadway Only)
- Priority Rank No. 2: Site 8 – Tukwila International Boulevard (TIB) at Riverton Creek
- Priority Rank No. 3: Site 7 – East Marginal Way S
- Priority Rank No. 5: Site 4 – Starfire Way

Site 6, 48th Avenue S, ranked No. 4 in priority; however, a future roadway improvement project may include providing treatment for the roadway. As discussed above, a full basin retrofit may be feasible for Site 5; however, the evaluation to separately treat a large arterial roadway such as Interurban Avenue ranked high in the alternative selection. This project will be designed to consider the future plans to retrofit the basin's outfall.

City of Tukwila
Stormwater Outfall Water Quality Retrofits

Site/Alternatives Evaluation

Site/Alternative Number	Title	Description	Potential Treatment Tributary Area (ac)	Land Use / Expected Pollutant Loading (High/Med/Low)	% Runoff Treated	Planning-Level Construction Cost (Total)	Construction Cost (Cost per Imp. Acre Treated)	Maintenance Cost (Annualized)	Pros	Cons	Prelim. Prioritization /conclusions
Alternatives			Areas			Costs			Analysis (Qualitative)		
Site 1 -West Valley Highway											**4**
Feasibility of end of pipe treatment: *Not feasible without pump station*											
1A	Media filter units at existing CB locations except where existing conveyance geometry allows for a single unit downstream of several CBs	Install up to 16 Filterra, Modular Wetland, or BioPod filters upstream of existing catch basins within tributary area and 1 "Shallow" 4x15 Modular Wetland in the existing shoulder	2.5 ac	Arterial Road, Industrial / High	91%	$870,000	$348,000	$8,000	Provides full treatment for roadway retrofit with changes to the existing conveyance system. Minimal roadway, sidewalk, and curb and gutter restoration. Single unit serving several CBs on west side makes this alternative most cost effective than 1B.	Due to existing catch basin spacing, does not efficiently utilize WQ facility full capacity for each unit. However, offsite run-on from commercial property driveways will provide additional water quality benefit. Treatment systems limited to underground (no plantings). Congestion of sewer and water near existing CBs.	*High cost, high benefit.*
1B	Media filter units at existing CB locations	Install up to 23 Filterra, Modular Wetland, or BioPod filters upstream of existing catch basins within tributary area	2.5 ac	Arterial Road, Industrial / High	91%	$940,000	$376,000	$10,000	Provides full treatment for roadway retrofit with minor changes to the existing conveyance system. Minimal roadway, sidewalk, and curb and gutter restoration.	Due to existing catch basin spacing, does not efficiently utilize WQ facility full capacity for each unit. However, offsite run-on from commercial property driveways will provide additional water quality benefit. Treatment systems limited to underground (no plantings). Congestion of sewer and water near existing CBs.	*High cost, high benefit.*
Site 2 - Christensen Road 1											**8**
Feasibility of end of pipe treatment: *Not feasible without pump station*											
2A	Media filter units at existing CB locations	Install up to 11 Filterra, ModWet, or BioPod filters upstream of existing catch basins within tributary area	0.55 ac	Low Volume Roadway / Low	91%	$460,000	$836,364	$5,000	Provides full treatment for roadway retrofit with minor changes to the existing conveyance system. Minimal roadway, sidewalk, and curb and gutter restoration.	Low volume roadway, area is mostly used for hotel parking or trail access. Treatment systems limited to underground (no plantings). Recently developed sidewalk with curb and gutter on east side of Christensen road. Assisted Living Development currently in Construction on west side of road.	*High cost, low benefit*
Site 3 - Christensen Road 2											**7**
Feasibility of end of pipe treatment: *Feasible with conveyance revision*											
3A	Single Modular Wetland facility	Install 1 "Shallow" 4x6 Modular Wetland unit on east side of Christensen at landscape island	0.50 ac	Parking / Med	91%	$200,000	$400,000	$600	Treatment of entire area with one unit. Unit may be placed in landscaping and may utilize open top systems.	Low volume roadway, area is mostly used for hotel parking or trail access. Requires conveyance modifications. Recently developed area. Assisted Living Development currently in Construction on west side of road.	*High cost, medium benefit*
3B	Media filter units at existing CB locations	Install up to 5 Filterra, Modular Wetland, or BioPod filters upstream of existing catch basins within tributary area	0.50 ac	Parking /Med	91%	$190,000	$380,000	$2,300	Provides full treatment of roadway.	Low volume roadway, area is mostly used for hotel parking or trail access. Due to existing catch basin spacing, does not efficiently utilize WQ facility full capacity for each unit. Treatment systems limited to underground (no plantings). Assisted Living Development currently in Construction on west side of road.	*High cost, medium benefit*

Site/Alternative Number	Title	Description	Potential Treatment Tributary Area (ac)	Land Use / Expected Pollutant Loading (High/Med/Low)	% Runoff Treated	Planning-Level Construction Cost (Total)	Construction Cost (Cost per Imp. Acre Treated)	Maintenance Cost (Annualized)	Pros	Cons	Prelim. Prioritization /conclusions
Alternatives			Areas			Costs			Analysis (Qualitative)		
Site 4 - Starfire Way											**6**
Feasibility of end of pipe treatment: *Not feasible without pump station.*											
4A	Single Modular Wetland Unit upstream from outfall except where Media filter units are required at existing CB locations to pick up runoff not collected by single unit	Install 1 "Shallow" 6x8 Modular Wetland west of Starfire access road and new conveyance in cul-de-sac. Install up to 2 Filterra, ModWet, or BioPod filters at catch basins within tributary area not treated within larger Mod Wetland Unit.	1.6 ac	Access Road, Commercial, Parking / Med	91%	$240,000	$150,000	$1,600	Treatment of major area with one unit. Unit may be placed in landscaping and may utilize open top systems. Unit may be placed in cul-de-sac area for decreased storm conveyance connection lengths and reduced impact to existing trees. Adjacent properties may be connected to roadway system which may increase the size of the facility.	Requires conveyance modifications and upstream flow splitter with bypass system. If one unit placed in landscape area existing trees will need to be removed for trenching. Existing CB near intersection in left lane may have existing flow diversion to different outfall which may decrease size treatment are for 6 x 8 units, and require dditional unit(s) for Interuruban Ave.	*Low cost, medium benefit*
4B	Media filter units at existing CB locations	Install up to 14 Filterra, ModWet, or BioPod filters upstream of existing catch basins within tributary area.	1.6 ac	Access Road, Commercial, Parking / Med	91%	$540,000	$337,500	$6,300	Provides full treatment of roadway.	Due to existing catch basin spacing, does not efficiently utilize WQ facility full capacity for each unit. Catch basin locations area near existing curb ramps.	*High cost, medium benefit*
Site 5 - Interurban Ave S											**1**
Feasibility of end of pipe treatment: *Feasible with conveyance revisions*											
5A	Media filter units for Interurban Ave only	Install 1 - 4' x 21' Modular Wetland unit in existing sidewalk (closed top) or extend bulb out for open top (planted) configuration.	1.80 ac	Arterial, Commercial / High	91%	$250,000	$138,889	$1,000	Provides treatment of up to 1.80 acres of arterial roadway.	Additional costs for curb and sidewalk modifications and restoration within intersection. Shortened bus pullout if curb bulb is extended. Utility coordination consists of existing water and King County Metro sewer force mains.	*Med cost, high benefit*
5B	Modular Wetland units for entire basin	Install 4 8' x 20' Modular Wetland units in existing landscaped area adjacent to the Green River Trail for 58th Ave S basin and 1 4' x 19' unit for Interurban Avenue S. Property or easement acquired at 14220 Interurban Ave. So. (Location 1) or at 14101 Interurban Ave. So. (Location 2).	63.5 ac (approx. 4 DU/GA (42% effective impervious))	Arterial, Commercial, Residential / Med	91%	$980,000	$16,333	$12,000	Large basin end of pipe, water quality retrofit. Units may be planted. Facility Location 1 is adjacent to the existing trail which may provide a tool for stormwater educational outreach.	Property acquisition or easement may be required for both locations. Unclear if existing drainage line easement would include this type of facility. Modification to conveyance system to provide flow splitter and high flow bypass.	*High value, but may require prop. acquisition*
5C	Bioretention for treatment of 50% of entire basin	Install 1 115' x 20' bottom bioretention area for 50% infiltrated treatment of 63.5 acres (58th Avenue basin) and 4' x 21' Modular Wetland unit for Interurban Avenue S. Property or easement acquired at 14220 Interurban Ave. So. (Location 1) or at 14101 Interurban Ave. So. (Location 2).	63.5 ac (approx. 4 DU/GA (42% effective impervious)	Arterial, Commercial, Residential / Med	50%	$500,000	$8,333	$6,000	Open space treatment, with potential infiltration capacity that is adjacent to trail. Potential to create a "park" amenity and a tool for stormwater educational outreach.	Does not provide full treatment of basin. Vertical walls required to provide necessary treatment bottom area. Existing trail will need to be relocated. Property acquisition or easement required. Easement does not allow for new parking per 1995 agreement. Geotechnical evaluation needed for separation of groundwater and soil suitability.	*High value, but requires prop. acquisition*

Site/Alternative Number	Title	Description	Potential Treatment Tributary Area (ac)	Land Use / Expected Pollutant Loading (High/Med/Low)	% Runoff Treated	Planning-Level Construction Cost (Total)	Construction Cost (Cost per Imp. Acre Treated)	Maintenance Cost (Annualized)	Pros	Cons	Prelim. Prioritization /conclusions
Alternatives			Areas			Costs			Analysis (Qualitative)		
Site 6 - 48th Ave S											**5**
Feasibility of end of pipe treatment: *Not feasible without pump station*											
6A	Media filter units at existing CB locations.	Install up to 6 Filterra, ModWet, or BioPod filters upstream of existing catch basins within tributary area and 3 4x6 Modular Wetland Units in travel lane or sidewalk	2 ac	Industrial, Commercial / High	91%	$410,000	$205,000	$6,400	Adds treatment to industrial/arterial roadway near river.	Potential complications due to existing utility congestion. May require more storm conveyance pipe and excavation.	*Med cost, high benefit*
Site 7 - E Marginal Way S (112th to Bridge over Duwamish)											**3**
Feasibility of end of pipe treatment: *Not feasible without pump station*											
7A	Media filter units at existing CB locations and utilize existing bioretention at Duwamish Gardens.	Install up to 4 Filterra, ModWet, or BioPod filters upstream of existing catch basins within tributary area, and 2 4x6 Modular Wetland Units in sidewalk. Propose existing storm conveyance modifications to make connection to existing bioretention at Duwamish Gardens.	1.5 ac	Industrial, Commercial / High	91%	$330,000	$220,000	$2,900	May be able to utilize existing Bioretention area at Duwamish Gardens. Adds treatment to industrial/arterial roadway near river.	Potential complications due to existing utility congestion.	*High cost, high benefit*
Site 8 - TIB at Riverton Creek											**2**
Feasibility of end of pipe treatment: *Feasible*											
8A	Modular Wetland units for entire basin (TIB and SR 599 treatment)	Install 1 4' x 17' and 1 4' x 6' Modular Wetland unit. Will need to tv, flush, inspect storm conveyance upstream along Tukwila International Blvd. May need to extend and add extruded curb to capture runoff.	2 ac	Aterial, freeway / High	91%	$200,000	$100,000	$1,500	This is a high-value retrofit opportunity because runoff from 2 acres of high-traffic roadway can be treated using only two units.	Potential complications due to WSDOT review and extra coordination with adjacent project.	*High value*

6. Design Analysis

This chapter documents the design of stormwater quality retrofit improvements for the four sites associated with this project, which include GULD approved media filters for Enhanced Basics Water Quality Treatment and storm drainage systems to convey stormwater to and from these BMPs. The approach to the design of is described in the following sections. Appendix A contains WWHM 2012 sizing calculations. Design plans are included in Appendix E.

6.1 MWS Unit Sizing

The basis of design uses BioClean Linear Modular Wetlands Units and design requirements per the GULD. Other GULD approved technologies may be considered for the 90% PS&E. The City has implemented existing Modular Wetlands facilities and experience in their operation and maintenance. Five linear modular wetland units are proposed: one in TDA A, TDA B, and TDA C, and two in TDA D. Coordination review with BioClean per GULD will conducted prior to the 90% PS&E which will include developed details by BioClean and confirmation of unit costs for construction.

MWS unit sizing is consistent with the requirements of the GULD and modeled using the water quality design flow rate. This design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model. A sizing matrix provided by BioClean is used for preliminary sizing and is based on the flow rate and available hydraulic head in the proposed system. Typically, it is difficult to achieve the standard unit 3.4 feet of head. Therefore facilities maybe sized larger and/or allow the upstream pipes to surcharge. The configuration will be refined with the vendor for the 90% submittal.

WWHM sizing calculations are provided in Appendix A. Additionally, Appendix F contains a copy of the Department of Ecology's GULD Approval and operation & maintenance guidelines.

6.2 Conveyance System Design

Per the KCSWDM, new pipe systems are required to be designed with sufficient capacity to convey and contain the 25-year peak flow. In addition, overflows resulting from the 100-year runoff event are required to be analyzed to verify that any such overflows will not create or aggravate a severe flooding problem or severe erosion problem. The project will add additional collection and conveyance systems to capture the targeted roadway areas for treatment and then reconnect to the existing outfall. Existing drainage systems appear to be adequate and any new pipes will match existing conveyance sizings.

XP-Storm software by XP Solutions may be used for hydrologic and hydraulic modeling of the proposed drainage system. If warranted for City review, these calculations will be performed and provided in future submittals for the project.

Flow splitter manholes may be required if internal flow splitting from the GULD devices cannot be achieved. The design of the flow splitter will be a part of the 90% PS&E submittal.

7. Water Quality Benefit

Treatment ratios have been calculated for the proposed MWS units funded by the Ecology stormwater grant. Detailed calculations are attached in Appendix B and are summarized below.

Runoff Treatment Benefit

As discussed in Section 6 and shown in the facility sizing calculations included in Appendix A, the proposed runoff treatment facilities have been designed to meet or exceed new and redevelopment design criteria, in that all proposed MWS facilities are sized to treat the water quality design flow rate. As a result, the flow control ratio is one. Therefore, the Equivalent New/Redevelopment Runoff Treatment Areas are as shown in Table 2.

Table 2 – Runoff Treatment Benefit

Site	Runoff Treatment BMP	PGIS Area Tributary to Treatment BMP	New/Redevelopment Treatment Ratio	Equivalent New/Redevelopment Treatment Area
4	8 x 12 Linear MWS Unit	1.158 ac	1	1.158 ac
5	4 x 19 Linear MWS Unit	1.526 ac	1	1.526 ac
7	4 x 4 & 4 x 17 Linear MWS Unit	0.923 ac	1	0.923 ac
8	4 x 8 Linear MWS Unit	1.884 ac	1	1.884 ac
8	4 x 4 Linear MWS Unit	0.358 ac	1	0.358 ac
	Total	**5.85 ac**		**5.85 ac**

As a result, a total of 5.85 acres of existing pollution-generating impervious surfaces (PGIS) will be mitigated by this project.

8. Cost Estimate

A construction cost estimate has been prepared based on the current level of design (attached in Appendix D). The probable cost option for the project is currently estimated to be $1,975,500. The individual cost per site is as follows:

- Site 4 – Starfire Way: $ 450,057
- Site 5 – Interurban Avenue S: $ 674,102
- Site 7 – East Marginal Way: $ 778,985
- Site 8 – TIB at Riverton Creek: $ 587,730

9. Proposed Schedule

At this time the proposed schedule for completion of this project and fulfillment of the Ecology Grant Agreement is as follows:

- Design Report Submittal: January 2021
- Design Report Review (45 days): January-March 2021
- 90% PS&E Submittal: March 2021
- Ecology Review of 90% PS&E (45 days): March-May 2021
- Final Submittal of 90% PS&E: May-June 2021
- Construction TBD

The City may apply for future Department of Ecology Construction Grant Funding. Project construction schedule will be based on available funding (City or State).

10. Operation & Maintenance

Operation and Maintenance information for the BioClean Linear Modular Wetland Stormwater Treatment System Units are included in Appendix F of this report. City of Tukwila maintenance crews will be responsible for the inspection and maintenance of all stormwater management facilities installed within the right of way for this project.

APPENDIX A – Stormwater Calculations

City of Tukwila Water Quality Retrofits Project
Runoff Treatment and Flow Control Ratio and Equivalent New/Redevelopment Area Calculations
7/30/2020 (Based on 30% Submittal)

Runoff Treatment Ratio Calculation

(methodology per Section D of D*esign Deliverables for Stormwter Projects with Ecology Funding* , Revised June 2018)

TDA A

Treatment Ratio (for manufactured treatment device) =

$$\frac{\text{Design Flow Rate for proposed retrofit bioretention BMP}}{\text{Design Flow Rate to meet runoff treatment new/redevelopment criteria}}$$

Tributary Area - Modular Wetlands (Total)	1.158 ac
Tributary Area - Modular Wetlands (PGIS)	1.158 ac
Flow rate treated for proposed retrofit:	0.188 cfs (see attached calcs)
Flow rate to meet new/redevelopment criteria:	0.188 cfs (as designed, meets new/redevel. criteria)
Treatment Ratio:	0.188 cfs/0.188 cfs = 1
Equivalent New/Redevelopment Area:	1.158 ac x 1 = **1.158 ac**

TDA B

Treatment Ratio (for manufactured treatment device) =

$$\frac{\text{Design Flow Rate for proposed retrofit bioretention BMP}}{\text{Design Flow Rate to meet runoff treatment new/redevelopment criteria}}$$

Tributary Area - Modular Wetlands (Total)	1.526 ac
Tributary Area - Modular Wetlands (PGIS)	1.526 ac
Flow rate treated for proposed retrofit:	0.248 cfs (see attached calcs)
Flow rate to meet new/redevelopment criteria:	0.248 cfs (as designed, meets new/redevel. criteria)
Treatment Ratio:	0.248 cfs/0.248 cfs = 1
Equivalent New/Redevelopment Area:	1.526 ac x 1 = **1.526 ac**

City of Tukwila Water Quality Retrofits Project
Runoff Treatment and Flow Control Ratio and Equivalent New/Redevelopment Area Calculations
7/30/2020 (Based on 30% Submittal)

Runoff Treatment Ratio Calculation

(methodology per Section D of D*esign Deliverables for Stormwter Projects with Ecology Funding* , Revised June 2018)

TDA C

Treatment Ratio (for manufactured treatment device) =

$$\frac{\text{Design Flow Rate for proposed retrofit bioretention BMP}}{\text{Design Flow Rate to meet runoff treatment new/redevelopment criteria}}$$

Tributary Area - Modular Wetlands (Total)	1.045 ac
Tributary Area - Modular Wetlands (PGIS)	1.045 ac
Flow rate treated for proposed retrofit:	0.170 cfs (see attached calcs)
Flow rate to meet new/redevelopment criteria:	0.170 cfs (as designed, meets new/redevel. criteria)
Treatment Ratio:	0.17 cfs/0.17 cfs = 1
Equivalent New/Redevelopment Area:	1.045 ac x 1 = **1.045 ac**

TDA D - MWS 1

Treatment Ratio (for manufactured treatment device) =

$$\frac{\text{Design Flow Rate for proposed retrofit bioretention BMP}}{\text{Design Flow Rate to meet runoff treatment new/redevelopment criteria}}$$

Tributary Area - Modular Wetlands (Total)	1.884 ac
Tributary Area - Modular Wetlands (PGIS)	1.884 ac
Flow rate treated for proposed retrofit:	0.306 cfs (see attached calcs)
Flow rate to meet new/redevelopment criteria:	0.306 cfs (as designed, meets new/redevel. criteria)
Treatment Ratio:	0.306 cfs/0.306 cfs = 1
Equivalent New/Redevelopment Area:	1.884 ac x 1 = **1.884 ac**

TDA D - MWS 2

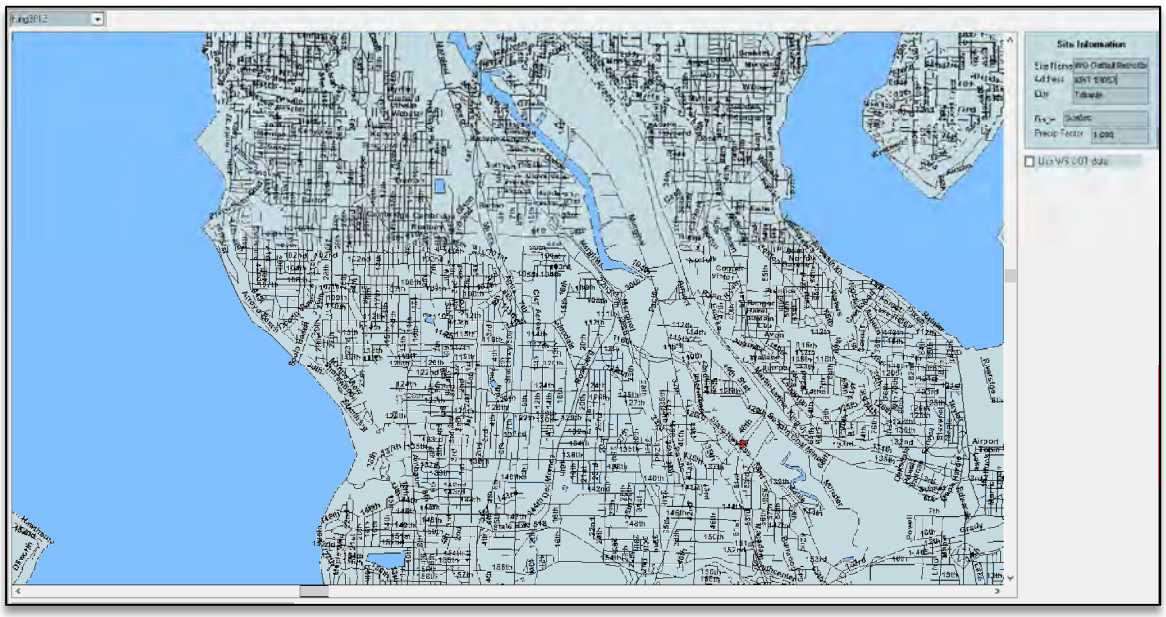
Treatment Ratio (for manufactured treatment device) =

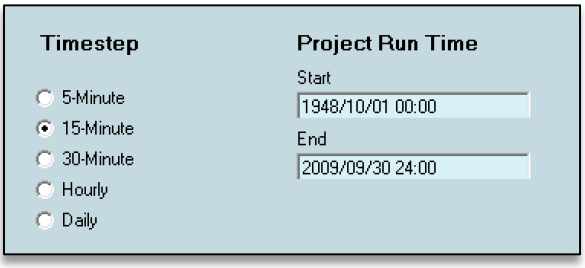
$$\frac{\text{Design Flow Rate for proposed retrofit bioretention BMP}}{\text{Design Flow Rate to meet runoff treatment new/redevelopment criteria}}$$

Tributary Area - Modular Wetlands (Total)	0.358 ac
Tributary Area - Modular Wetlands (PGIS)	0.358 ac
Flow rate treated for proposed retrofit:	0.033 cfs (see attached calcs)
Flow rate to meet new/redevelopment criteria:	0.033 cfs (as designed, meets new/redevel. criteria)
Treatment Ratio:	0.033 cfs/0.033 cfs = 1
Equivalent New/Redevelopment Area:	0.358 ac x 1 = **0.358 ac**

Total Equivalent New/Redevelopment Area for TDA D : 1.884 ac + 0.356 ac = **2.243 ac**

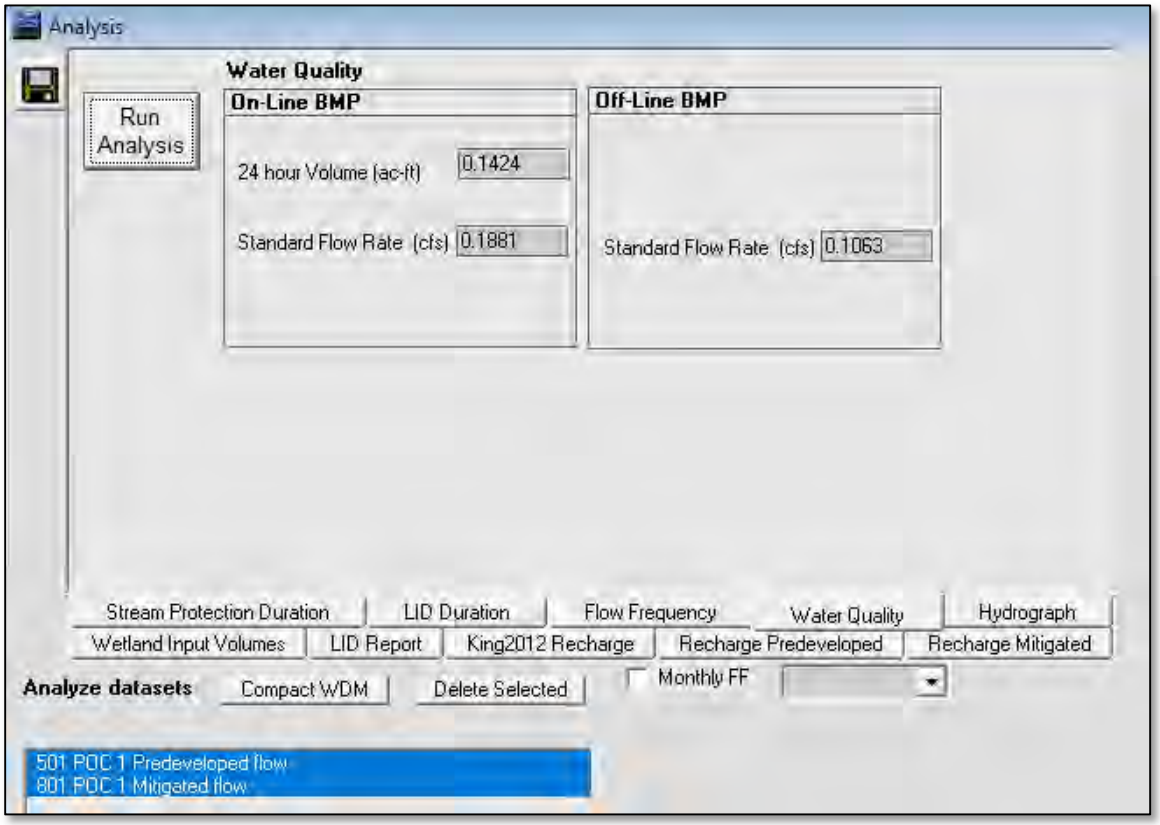
WWHM 2012 Calculations



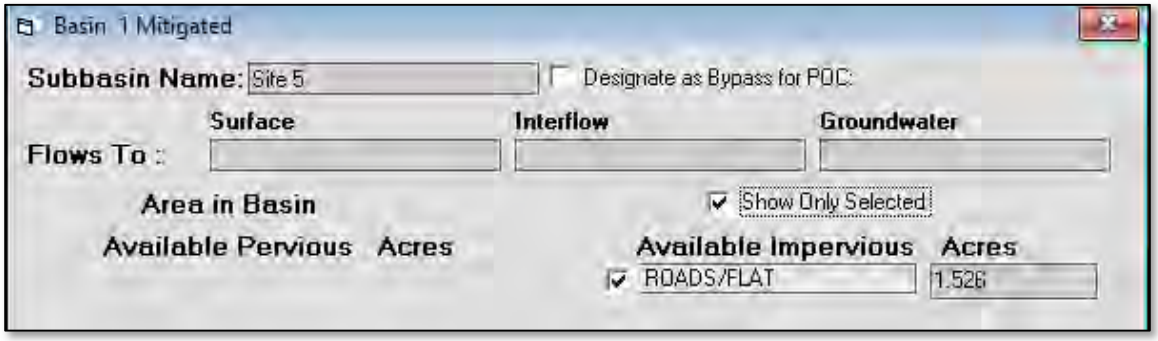


Site 4: TDA A


Site 4A Mitigated
Subbasin Name: Site 4
Designate as Bypass for POC:
Surface
Interflow
Groundwater
Flows To :
Area in Basin
Show Only Selected
Available Pervious Acres
Available Impervious Acres
ROADS/FLAT
1.158


Analysis
Water Quality
On-Line BMP
Off-Line BMP
Run Analysis
24 hour Volume (ac-ft) 0.1424
Standard Flow Rate (cfs) 0.1881
Standard Flow Rate (cfs) 0.1063
Stream Protection Duration
LID Duration
Flow Frequency
Water Quality
Hydrograph
Wetland Input Volumes
LID Report
King2012 Recharge
Recharge Predeveloped
Recharge Mitigated
Analyze datasets
Compact WDM
Delete Selected
Monthly FF
501 POC 1 Predeveloped flow
801 POC 1 Mitigated flow

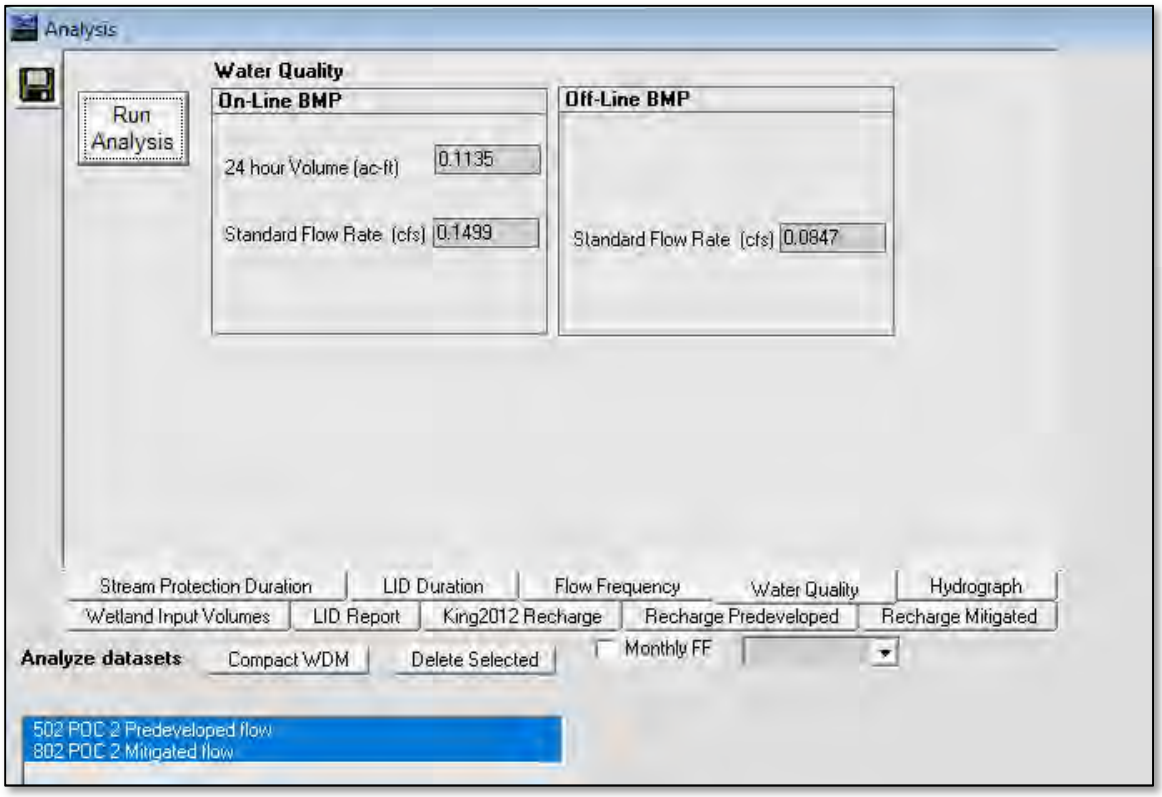
Site 5: TDA B


Basin 1 Mitigated
Subbasin Name: Site 5
Designate as Bypass for POC:
Flows To :
Suface
Interflow
Groundwater
Area in Basin
Available Pervious Acres
Show Only Selected
Available Impervious Acres
ROADS/FLAT
1.526

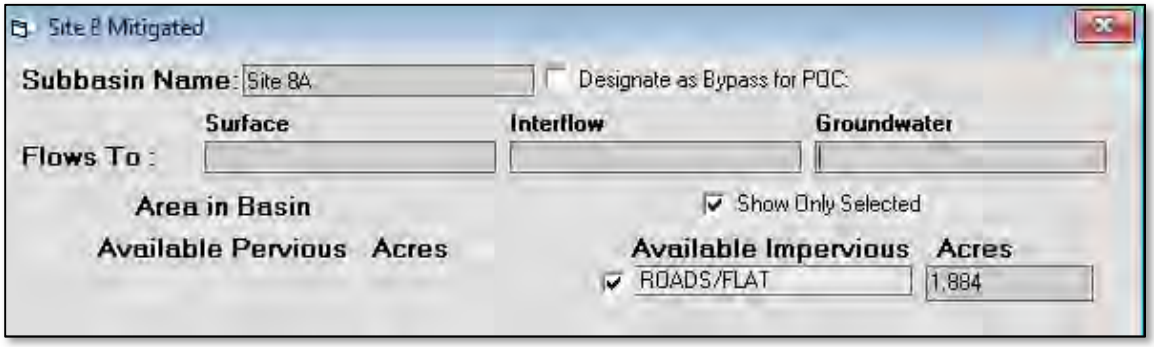

Analysis
Water Quality
Run Analysis
On-Line BMP
24 hour Volume (ac-ft) 0.1876
Standard Flow Rate (cfs) 0.2479
Off-Line BMP
Standard Flow Rate (cfs) 0.1400
Stream Protection Duration
LID Duration
Flow Frequency
Water Quality
Hydrograph
Wetland Input Volumes
LID Report
King2012 Recharge
Recharge Predeveloped
Recharge Mitigated
Analyze datasets
Compact WDM
Delete Selected
Monthly FF
501 POC 1 Predeveloped flow
801 POC 1 Mitigated flow

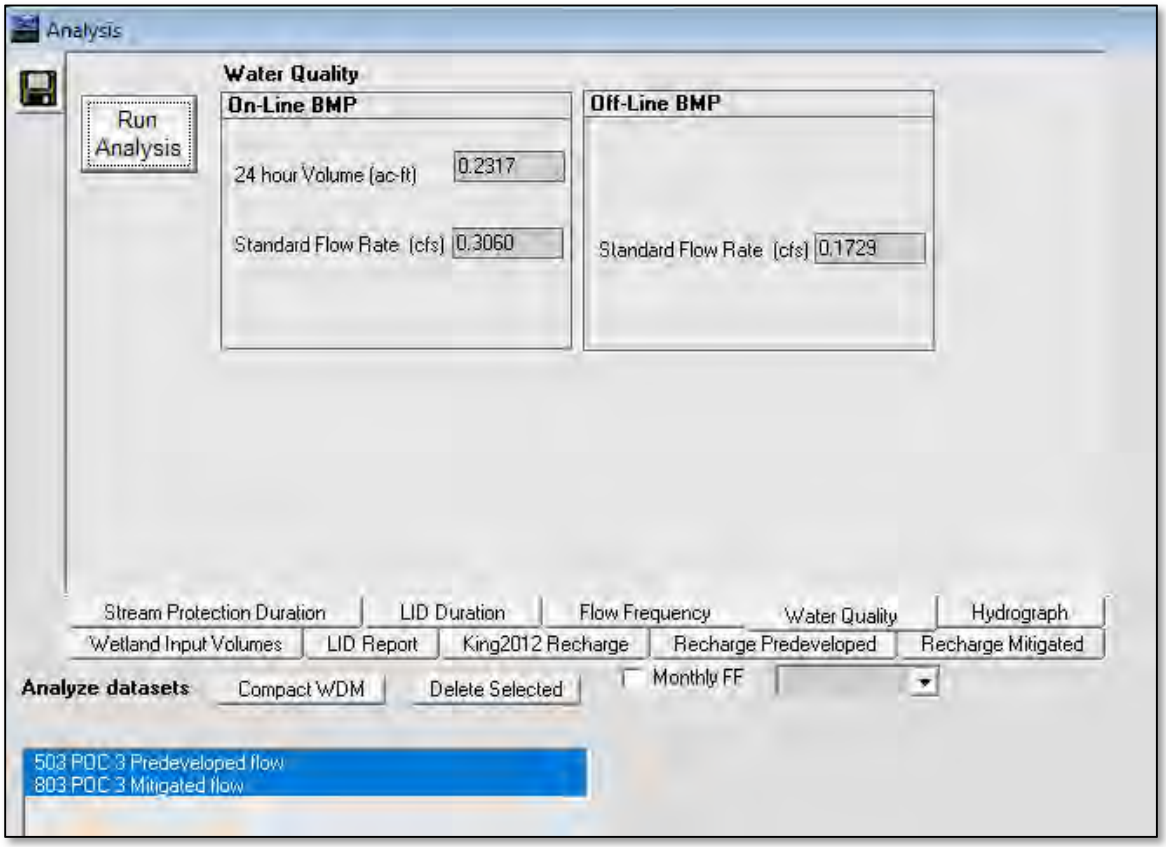
Site 7: TDA C


Site 7 Mitigated
Subbasin Name: Site 7A
Designate as Bypass for POC:
Surface
Interflow
Groundwater
Flows To :
Area in Basin
Show Only Selected
Available Pervious Acres
Available Impervious Acres
ROADS/FLAT
.923


Analysis
Water Quality
On-Line BMP
Off-Line BMP
Run Analysis
24 hour Volume (ac-ft) 0.1135
Standard Flow Rate (cfs) 0.1499
Standard Flow Rate (cfs) 0.0847
Stream Protection Duration
LID Duration
Flow Frequency
Water Quality
Hydrograph
Wetland Input Volumes
LID Report
King2012 Recharge
Recharge Predeveloped
Recharge Mitigated
Analyze datasets
Compact WDM
Delete Selected
Monthly FF
502 POC 2 Predeveloped flow
802 POC 2 Mitigated flow

Site 8: TDA C


Site 8 Mitigated
Subbasin Name: Site 8A
Designate as Bypass for POC
Surface
Interflow
Groundwater
Flows To :
Area in Basin
Show Only Selected
Available Pervious Acres
Available Impervious Acres
ROADS/FLAT
1.884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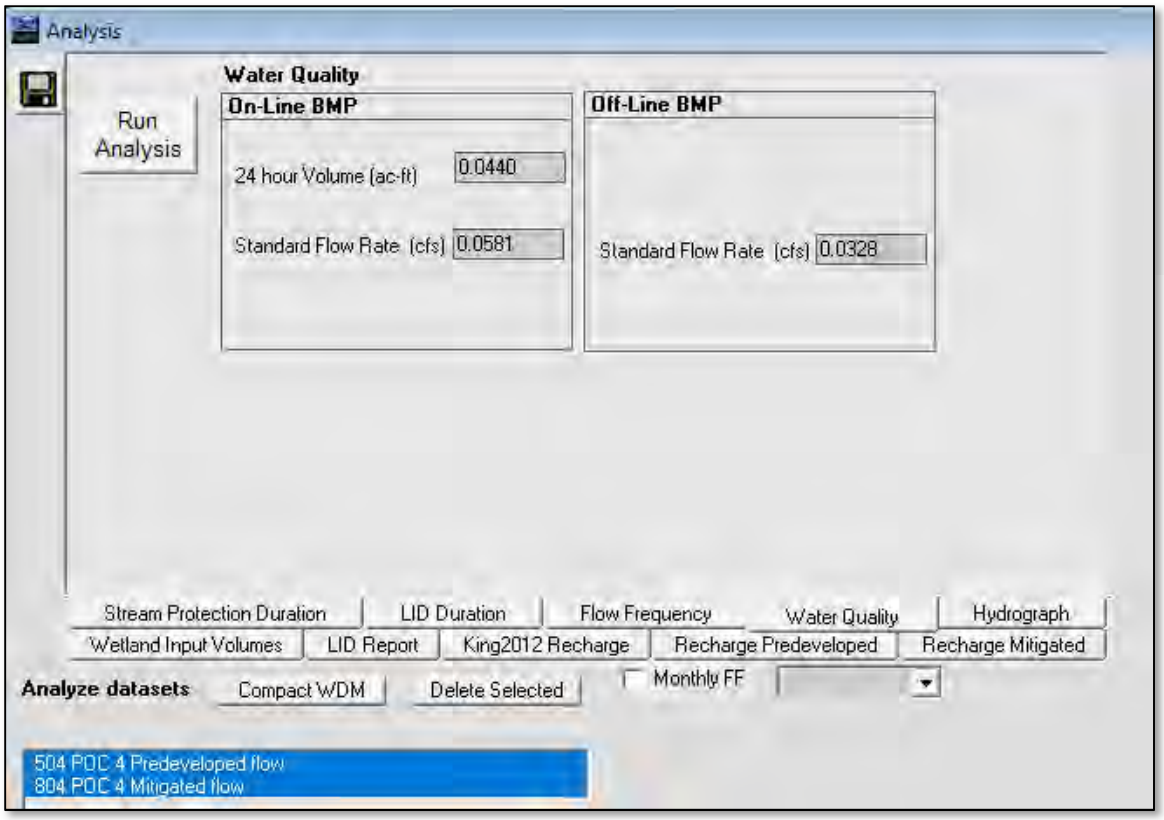
Water Quality
Run Analysis
On-Line BMP
24 hour Volume (ac-ft) 0.2317
Standard Flow Rate (cfs) 0.3060
Off-Line BMP
Standard Flow Rate (cfs) 0.1729
Stream Protection Duration
LID Duration
Flow Frequency
Water Quality
Hydrograph
Wetland Input Volumes
LID Report
King2012 Recharge
Recharge Predeveloped
Recharge Mitigated
Analyze datasets
Compact WDM
Delete Selected
Monthly FF
503 POC 3 Predeveloped flow
803 POC 3 Mitigated flow


Site 8b Mitigated
Subbasin Name: Site 8b
Designate as Bypass for POC
Flows To :
Surface
Interflow
Groundwater
Area in Basin
Show Only Selected
Available Pervious Acres
Available Impervious Acres
ROADS/FLAT
.358


Analysis
Water Quality
Run Analysis
On-Line BMP
24 hour Volume (ac-ft)
0.0440
Standard Flow Rate (cfs)
0.0581
Off-Line BMP
Standard Flow Rate (cfs)
0.0328
Stream Protection Duration
LID Duration
Flow Frequency
Water Quality
Hydrograph
Wetland Input Volumes
LID Report
King2012 Recharge
Recharge Predeveloped
Recharge Mitigated
Analyze datasets
Compact WDM
Delete Selected
Monthly FF
504 POC 4 Predeveloped flow
804 POC 4 Mitigated flow

MWS Linear 2.0 HGL Sizing Calculations

MWS MODEL SIZE	WETLAND PERMITER LENGTH	LOADING RATE GPM/SF	HGL HEIGHT																												
			SHALLOW MODELS																			STANDARD HEIGHT MODEL	HIGH CAPACITY MODELS								
			1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.65	3.70	3.75	3.80	3.85	3.90	3.95
MWS-L-4-4	6.50	1.0000	0.020	0.022	0.023	0.025	0.026	0.028	0.029	0.030	0.032	0.033	0.035	0.036	0.038	0.039	0.041	0.042	0.043	0.045	0.046	0.048	**0.049**	0.052	0.054	0.054	0.055	0.056	0.057	0.057	0.058	0.059
MWS-L-3-6	10.06	1.0000	0.031	0.034	0.036	0.038	0.040	0.043	0.045	0.047	0.049	0.052	0.054	0.056	0.058	0.061	0.063	0.065	0.067	0.069	0.072	0.074	**0.076**	0.078	0.081	0.082	0.085	0.087	0.088	0.089	0.090	0.091
MWS-L-4-8	14.80	1.0334	0.048	0.051	0.055	0.058	0.061	0.065	0.068	0.072	0.075	0.078	0.082	0.085	0.089	0.092	0.095	0.099	0.102	0.106	0.109	0.112	**0.116**	0.119	0.123	0.124	0.126	0.127	0.129	0.131	0.132	0.134
MWS-L-4-13	18.40	1.0310	0.059	0.063	0.068	0.072	0.076	0.080	0.085	0.089	0.093	0.097	0.101	0.106	0.110	0.114	0.118	0.123	0.127	0.131	0.135	0.139	**0.144**	0.148	0.152	0.154	0.156	0.158	0.160	0.163	0.165	0.167
MWS-L-4-15	22.40	1.0307	0.072	0.077	0.082	0.087	0.093	0.098	0.103	0.108	0.113	0.118	0.123	0.129	0.134	0.139	0.144	0.149	0.154	0.159	0.165	0.170	**0.175**	0.180	0.185	0.188	0.190	0.193	0.195	0.198	0.200	0.203
MWS-L-4-17	26.40	1.0305	0.085	0.091	0.097	0.103	0.109	0.115	0.121	0.127	0.133	0.139	0.145	0.152	0.158	0.164	0.170	0.176	0.182	0.188	0.194	0.200	**0.206**	0.212	0.218	0.221	0.224	0.227	0.230	0.233	0.236	0.239
MWS-L-4-19	30.40	1.0255	0.097	0.104	0.111	0.118	0.125	0.132	0.139	0.146	0.153	0.160	0.167	0.174	0.181	0.188	0.194	0.201	0.208	0.215	0.222	0.229	**0.236**	0.243	0.250	0.254	0.258	0.262	0.265	0.269	0.272	0.276
MWS-L-4-21	34.40	1.0260	0.110	0.118	0.126	0.134	0.142	0.149	0.157	0.165	0.173	0.181	0.189	0.197	0.204	0.212	0.220	0.228	0.236	0.244	0.252	0.260	**0.267**	0.275	0.283	0.287	0.292	0.296	0.300	0.304	0.308	0.312
MWS-L-8-12	44.40	1.0300	0.143	0.153	0.163	0.173	0.183	0.194	0.204	0.214	0.224	0.234	0.245	0.255	0.265	0.275	0.285	0.296	0.306	0.316	0.326	0.336	**0.346**	0.357	0.367	0.372	0.377	0.382	0.387	0.392	0.397	0.402
MWS-L-8-16	59.20	1.0300	0.190	0.204	0.217	0.231	0.245	0.258	0.272	0.285	0.299	0.312	0.326	0.340	0.353	0.367	0.380	0.394	0.408	0.421	0.435	0.448	**0.462**	0.476	0.489	0.496	0.503	0.509	0.516	0.523	0.530	0.537

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APPENDIX B – Alternative Analysis

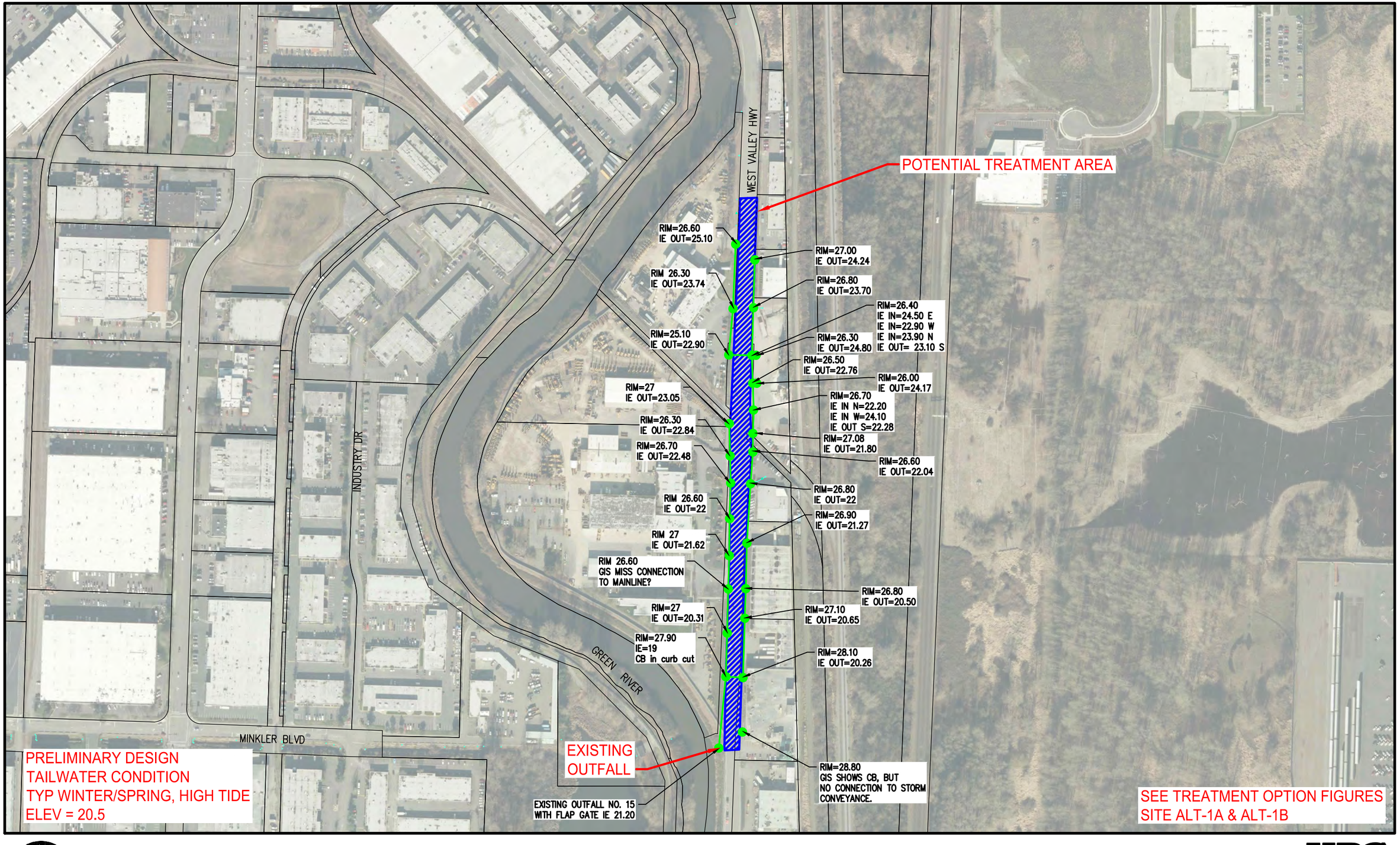
City of Tukwila
Stormwater Outfall Water Quality Retrofits

Site/Alternatives Evaluation

Site/Alternative Number	Title	Description	Potential Treatment Tributary Area (ac)	Land Use / Expected Pollutant Loading (High/Med/Low)	% Runoff Treated	Planning-Level Construction Cost (Total)	Construction Cost (Cost per Imp. Acre Treated)	Maintenance Cost (Annualized)	Pros	Cons	Prelim. Prioritization /conclusions
Alternatives			Areas			Costs			Analysis (Qualitative)		
Site 1 -West Valley Highway											**4**
Feasibility of end of pipe treatment: *Not feasible without pump station*											
1A	Media filter units at existing CB locations except where existing conveyance geometry allows for a single unit downstream of several CBs	Install up to 16 Filterra, Modular Wetland, or BioPod filters upstream of existing catch basins within tributary area and 1 "Shallow" 4x15 Modular Wetland in the existing shoulder	2.5 ac	Arterial Road, Industrial / High	91%	$870,000	$348,000	$8,000	Provides full treatment for roadway retrofit with changes to the existing conveyance system. Minimal roadway, sidewalk, and curb and gutter restoration. Single unit serving several CBs on west side makes this alternative most cost effective than 1B.	Due to existing catch basin spacing, does not efficiently utilize WQ facility full capacity for each unit. However, offsite run-on from commercial property driveways will provide additional water quality benefit. Treatment systems limited to underground (no plantings). Congestion of sewer and water near existing CBs.	*High cost, high benefit.*
1B	Media filter units at existing CB locations	Install up to 23 Filterra, Modular Wetland, or BioPod filters upstream of existing catch basins within tributary area	2.5 ac	Arterial Road, Industrial / High	91%	$940,000	$376,000	$10,000	Provides full treatment for roadway retrofit with minor changes to the existing conveyance system. Minimal roadway, sidewalk, and curb and gutter restoration.	Due to existing catch basin spacing, does not efficiently utilize WQ facility full capacity for each unit. However, offsite run-on from commercial property driveways will provide additional water quality benefit. Treatment systems limited to underground (no plantings). Congestion of sewer and water near existing CBs.	*High cost, high benefit.*
Site 2 - Christensen Road 1											**8**
Feasibility of end of pipe treatment: *Not feasible without pump station*											
2A	Media filter units at existing CB locations	Install up to 11 Filterra, ModWet, or BioPod filters upstream of existing catch basins within tributary area	0.55 ac	Low Volume Roadway / Low	91%	$460,000	$836,364	$5,000	Provides full treatment for roadway retrofit with minor changes to the existing conveyance system. Minimal roadway, sidewalk, and curb and gutter restoration.	Low volume roadway, area is mostly used for hotel parking or trail access. Treatment systems limited to underground (no plantings). Recently developed sidewalk with curb and gutter on east side of Christensen road. Assisted Living Development currently in Construction on west side of road.	*High cost, low benefit*
Site 3 - Christensen Road 2											**7**
Feasibility of end of pipe treatment: *Feasible with conveyance revision*											
3A	Single Modular Wetland facility	Install 1 "Shallow" 4x6 Modular Wetland unit on east side of Christensen at landscape island	0.50 ac	Parking / Med	91%	$200,000	$400,000	$600	Treatment of entire area with one unit. Unit may be placed in landscaping and may utilize open top systems.	Low volume roadway, area is mostly used for hotel parking or trail access. Requires conveyance modifications. Recently developed area. Assisted Living Development currently in Construction on west side of road.	*High cost, medium benefit*
3B	Media filter units at existing CB locations	Install up to 5 Filterra, Modular Wetland, or BioPod filters upstream of existing catch basins within tributary area	0.50 ac	Parking /Med	91%	$190,000	$380,000	$2,300	Provides full treatment of roadway.	Low volume roadway, area is mostly used for hotel parking or trail access. Due to existing catch basin spacing, does not efficiently utilize WQ facility full capacity for each unit. Treatment systems limited to underground (no plantings). Assisted Living Development currently in Construction on west side of road.	*High cost, medium benefit*

Site/Alternative Number	Title	Description	Potential Treatment Tributary Area (ac)	Land Use / Expected Pollutant Loading (High/Med/Low)	% Runoff Treated	Planning-Level Construction Cost (Total)	Construction Cost (Cost per Imp. Acre Treated)	Maintenance Cost (Annualized)	Pros	Cons	Prelim. Prioritization /conclusions
Alternatives			Areas			Costs			Analysis (Qualitative)		
Site 4 - Starfire Way											**6**
Feasibility of end of pipe treatment: *Not feasible without pump station.*											
4A	Single Modular Wetland Unit upstream from outfall except where Media filter units are required at existing CB locations to pick up runoff not collected by single unit	Install 1 "Shallow" 6x8 Modular Wetland west of Starfire access road and new conveyance in cul-de-sac. Install up to 2 Filterra, ModWet, or BioPod filters at catch basins within tributary area not treated within larger Mod Wetland Unit.	1.6 ac	Access Road, Commercial, Parking / Med	91%	$240,000	$150,000	$1,600	Treatment of major area with one unit. Unit may be placed in landscaping and may utilize open top systems. Unit may be placed in cul-de-sac area for decreased storm conveyance connection lengths and reduced impact to existing trees. Adjacent properties may be connected to roadway system which may increase the size of the facility.	Requires conveyance modifications and upstream flow splitter with bypass system. If one unit placed in landscape area existing trees will need to be removed for trenching. Existing CB near intersection in left lane may have existing flow diversion to different outfall which may decrease size treatment are for 6 x 8 units, and require dditional unit(s) for Interuruban Ave.	*Low cost, medium benefit*
4B	Media filter units at existing CB locations	Install up to 14 Filterra, ModWet, or BioPod filters upstream of existing catch basins within tributary area.	1.6 ac	Access Road, Commercial, Parking / Med	91%	$540,000	$337,500	$6,300	Provides full treatment of roadway.	Due to existing catch basin spacing, does not efficiently utilize WQ facility full capacity for each unit. Catch basin locations area near existing curb ramps.	*High cost, medium benefit*
Site 5 - Interurban Ave S											**1**
Feasibility of end of pipe treatment: *Feasible with conveyance revisions*											
5A	Media filter units for Interurban Ave only	Install 1 - 4' x 21' Modular Wetland unit in existing sidewalk (closed top) or extend bulb out for open top (planted) configuration.	1.80 ac	Arterial, Commercial / High	91%	$250,000	$138,889	$1,000	Provides treatment of up to 1.80 acres of arterial roadway.	Additional costs for curb and sidewalk modifications and restoration within intersection. Shortened bus pullout if curb bulb is extended. Utility coordination consists of existing water and King County Metro sewer force mains.	*Med cost, high benefit*
5B	Modular Wetland units for entire basin	Install 4 8' x 20' Modular Wetland units in existing landscaped area adjacent to the Green River Trail for 58th Ave S basin and 1 4' x 19' unit for Interurban Avenue S. Property or easement acquired at 14220 Interurban Ave. So. (Location 1) or at 14101 Interurban Ave. So. (Location 2).	63.5 ac (approx. 4 DU/GA (42% effective impervious))	Arterial, Commercial, Residential / Med	91%	$980,000	$16,333	$12,000	Large basin end of pipe, water quality retrofit. Units may be planted. Facility Location 1 is adjacent to the existing trail which may provide a tool for stormwater educational outreach.	Property acquisition or easement may be required for both locations. Unclear if existing drainage line easement would include this type of facility. Modification to conveyance system to provide flow splitter and high flow bypass.	*High value, but may require prop. acquisition*
5C	Bioretention for treatment of 50% of entire basin	Install 1 115' x 20' bottom bioretention area for 50% infiltrated treatment of 63.5 acres (58th Avenue basin) and 4' x 21' Modular Wetland unit for Interurban Avenue S. Property or easement acquired at 14220 Interurban Ave. So. (Location 1) or at 14101 Interurban Ave. So. (Location 2).	63.5 ac (approx. 4 DU/GA (42% effective impervious)	Arterial, Commercial, Residential / Med	50%	$500,000	$8,333	$6,000	Open space treatment, with potential infiltration capacity that is adjacent to trail. Potential to create a "park" amenity and a tool for stormwater educational outreach.	Does not provide full treatment of basin. Vertical walls required to provide necessary treatment bottom area. Existing trail will need to be relocated. Property acquisition or easement required. Easement does not allow for new parking per 1995 agreement. Geotechnical evaluation needed for separation of groundwater and soil suitability.	*High value, but requires prop. acquisition*

Site/Alternative Number	Title	Description	Potential Treatment Tributary Area (ac)	Land Use / Expected Pollutant Loading (High/Med/Low)	% Runoff Treated	Planning-Level Construction Cost (Total)	Construction Cost (Cost per Imp. Acre Treated)	Maintenance Cost (Annualized)	Pros	Cons	Prelim. Prioritization /conclusions
Alternatives			Areas			Costs			Analysis (Qualitative)		
Site 6 - 48th Ave S											**5**
Feasibility of end of pipe treatment: *Not feasible without pump station*											
6A	Media filter units at existing CB locations.	Install up to 6 Filterra, ModWet, or BioPod filters upstream of existing catch basins within tributary area and 3 4x6 Modular Wetland Units in travel lane or sidewalk	2 ac	Industrial, Commercial / High	91%	$410,000	$205,000	$6,400	Adds treatment to industrial/arterial roadway near river.	Potential complications due to existing utility congestion. May require more storm conveyance pipe and excavation.	*Med cost, high benefit*
Site 7 - E Marginal Way S (112th to Bridge over Duwamish)											**3**
Feasibility of end of pipe treatment: *Not feasible without pump station*											
7A	Media filter units at existing CB locations and utilize existing bioretention at Duwamish Gardens.	Install up to 4 Filterra, ModWet, or BioPod filters upstream of existing catch basins within tributary area, and 2 4x6 Modular Wetland Units in sidewalk. Propose existing storm conveyance modifications to make connection to existing bioretention at Duwamish Gardens.	1.5 ac	Industrial, Commercial / High	91%	$330,000	$220,000	$2,900	May be able to utilize existing Bioretention area at Duwamish Gardens. Adds treatment to industrial/arterial roadway near river.	Potential complications due to existing utility congestion.	*High cost, high benefit*
Site 8 - TIB at Riverton Creek											**2**
Feasibility of end of pipe treatment: *Feasible*											
8A	Modular Wetland units for entire basin (TIB and SR 599 treatment)	Install 1 4' x 17' and 1 4' x 6' Modular Wetland unit. Will need to tv, flush, inspect storm conveyance upstream along Tukwila International Blvd. May need to extend and add extruded curb to capture runoff.	2 ac	Aterial, freeway / High	91%	$200,000	$100,000	$1,500	This is a high-value retrofit opportunity because runoff from 2 acres of high-traffic roadway can be treated using only two units.	Potential complications due to WSDOT review and extra coordination with adjacent project.	*High value*



TREATMENT SITE #1

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

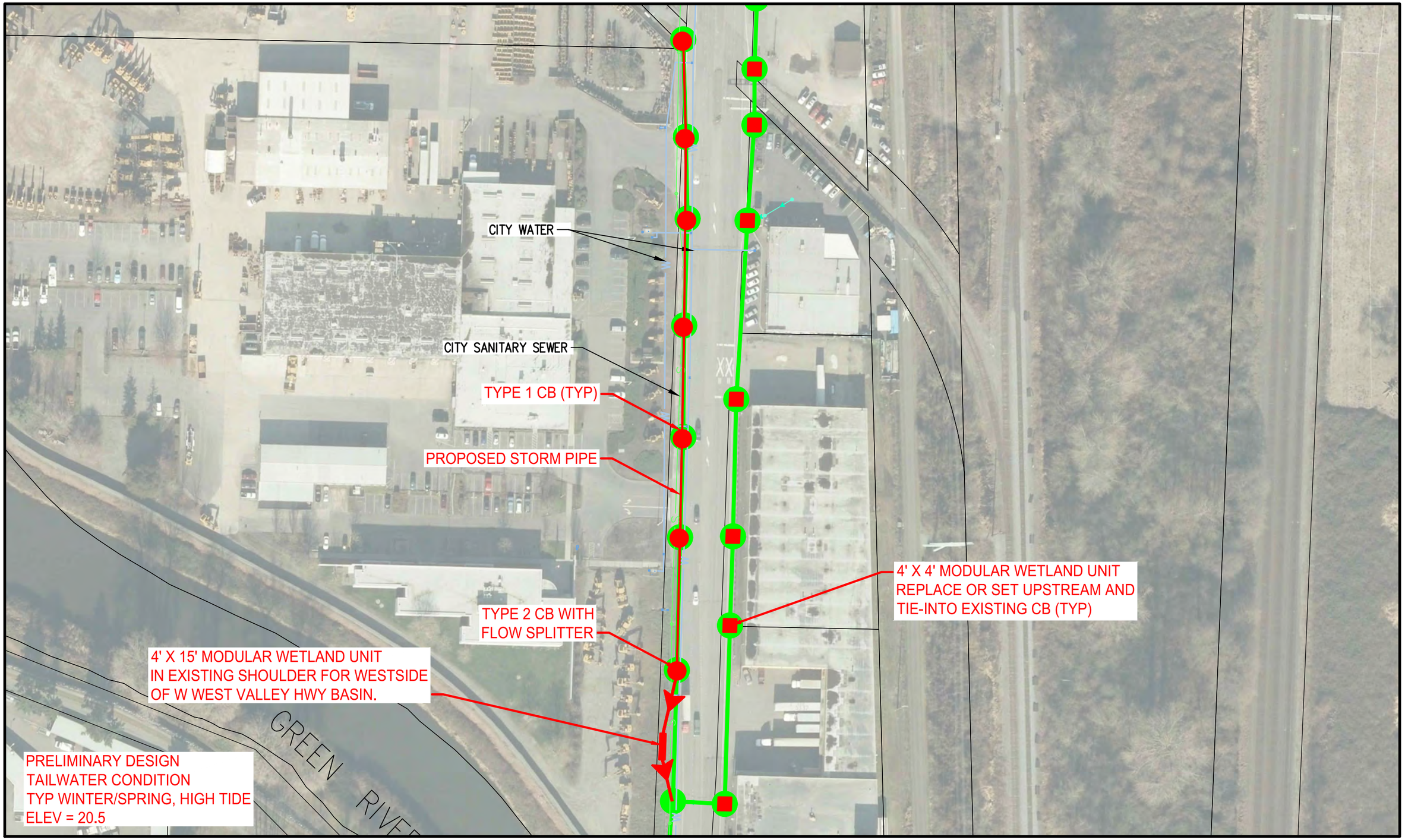
- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 50 150 300 450

N

SITE #1	
TREATMENT AREA:	2.5 AC

KPG
Interdisciplinary Design
3131 Elliott Ave
Suite 400
Seattle, WA 98121
(206) 286-1640
23 S Wenatchee Ave
Suite 223
Wenatchee, WA 98801
(509) 663-2711
www.kpg.com



TREATMENT SITE #1 - ALT 1A

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 25 50 100 150

N

SITE #1	
TREATMENT AREA:	2.5 AC

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Seattle, WA 98121
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23 S Wenatchee Ave
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Wenatchee, WA 98801
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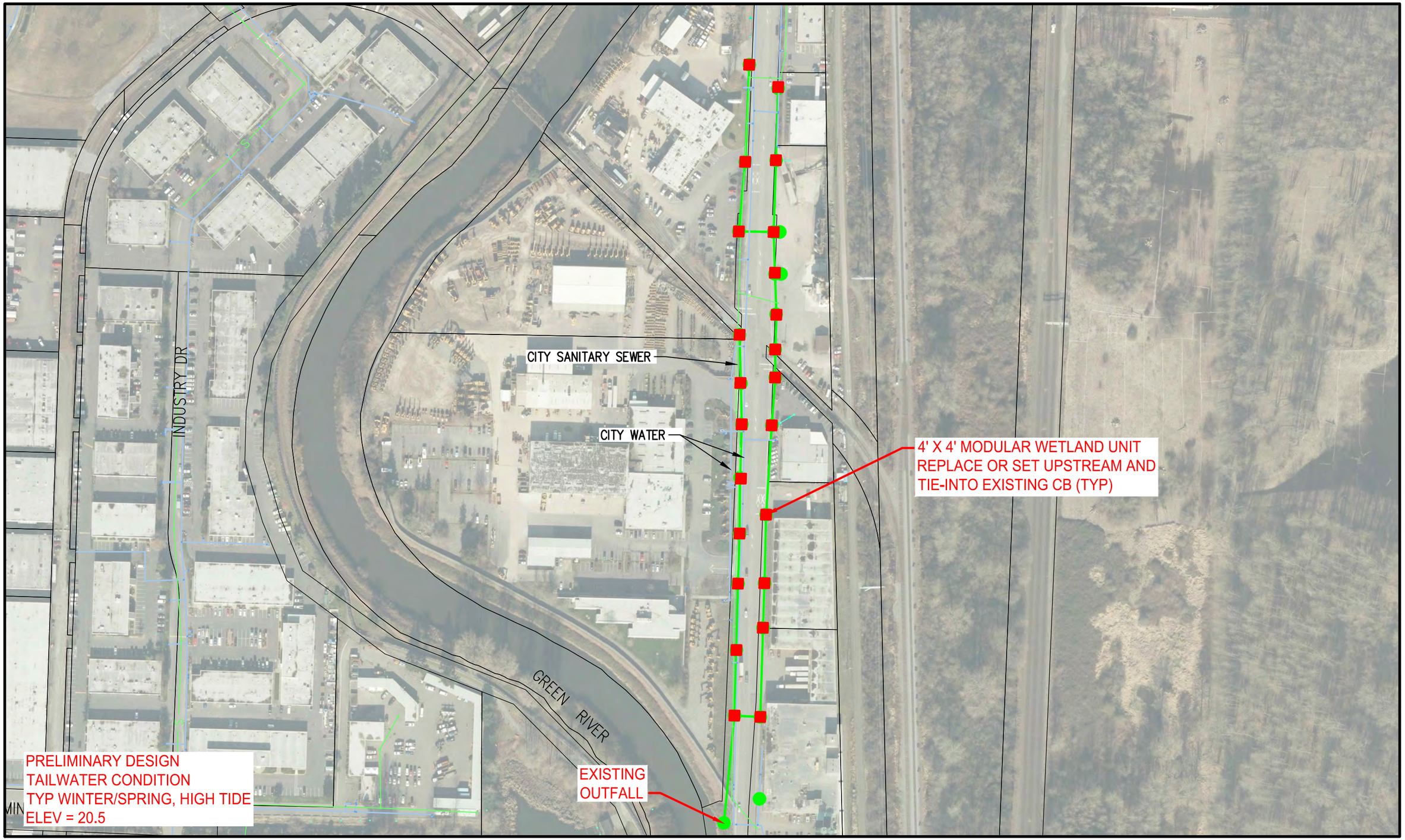

TREATMENT SITE #1 - ALT 1B

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 50 100 200 300

N

SITE #1	
TREATMENT AREA:	2.5 AC

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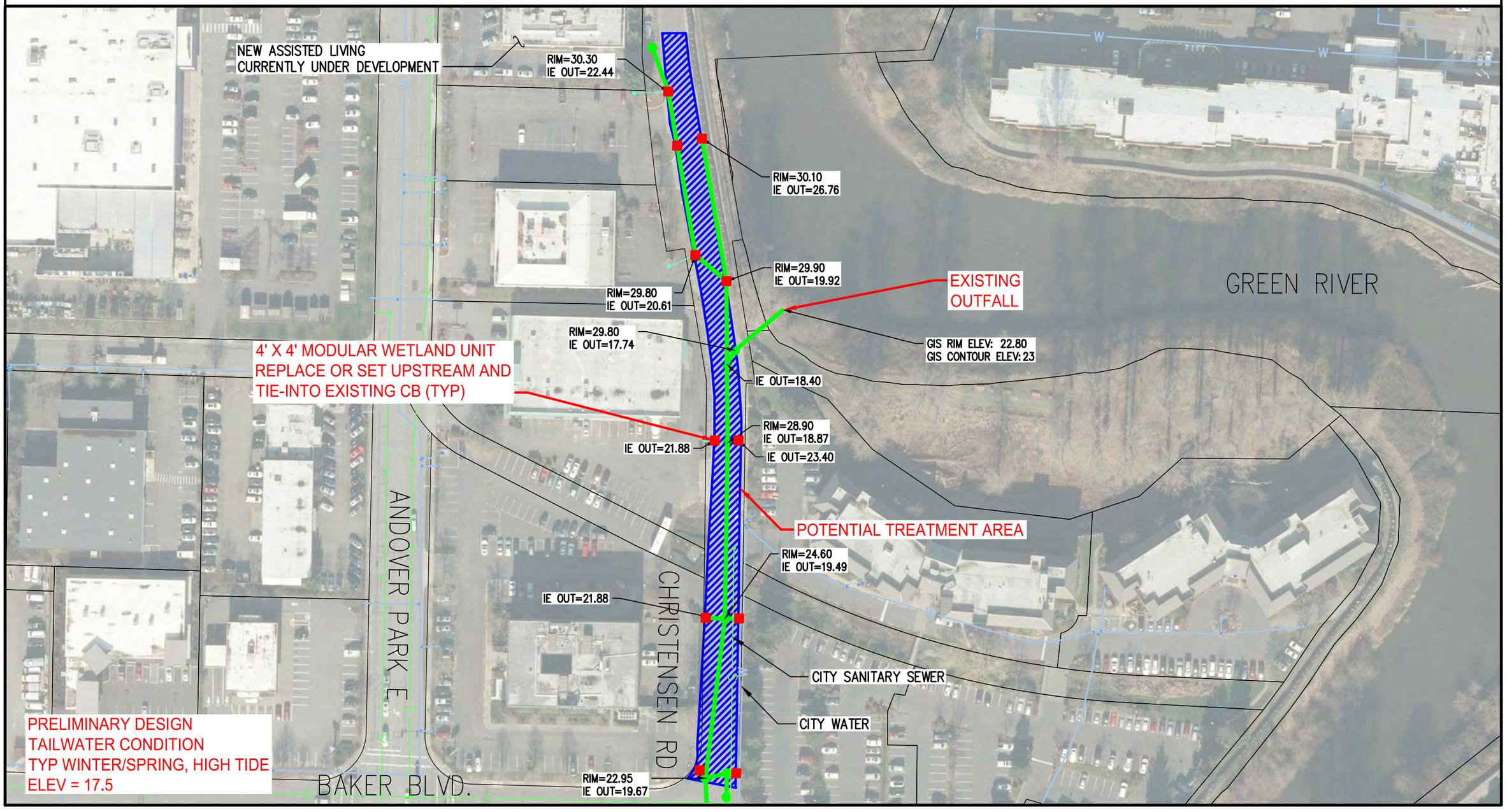

TREATMENT SITE #2 - ALT2A

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 25 50 100 150

N

SITE #2	
TREATMENT AREA:	0.55 AC

KPG
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3131 Elliott Ave
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23 S Wenatchee Ave
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Wenatchee, WA 98801
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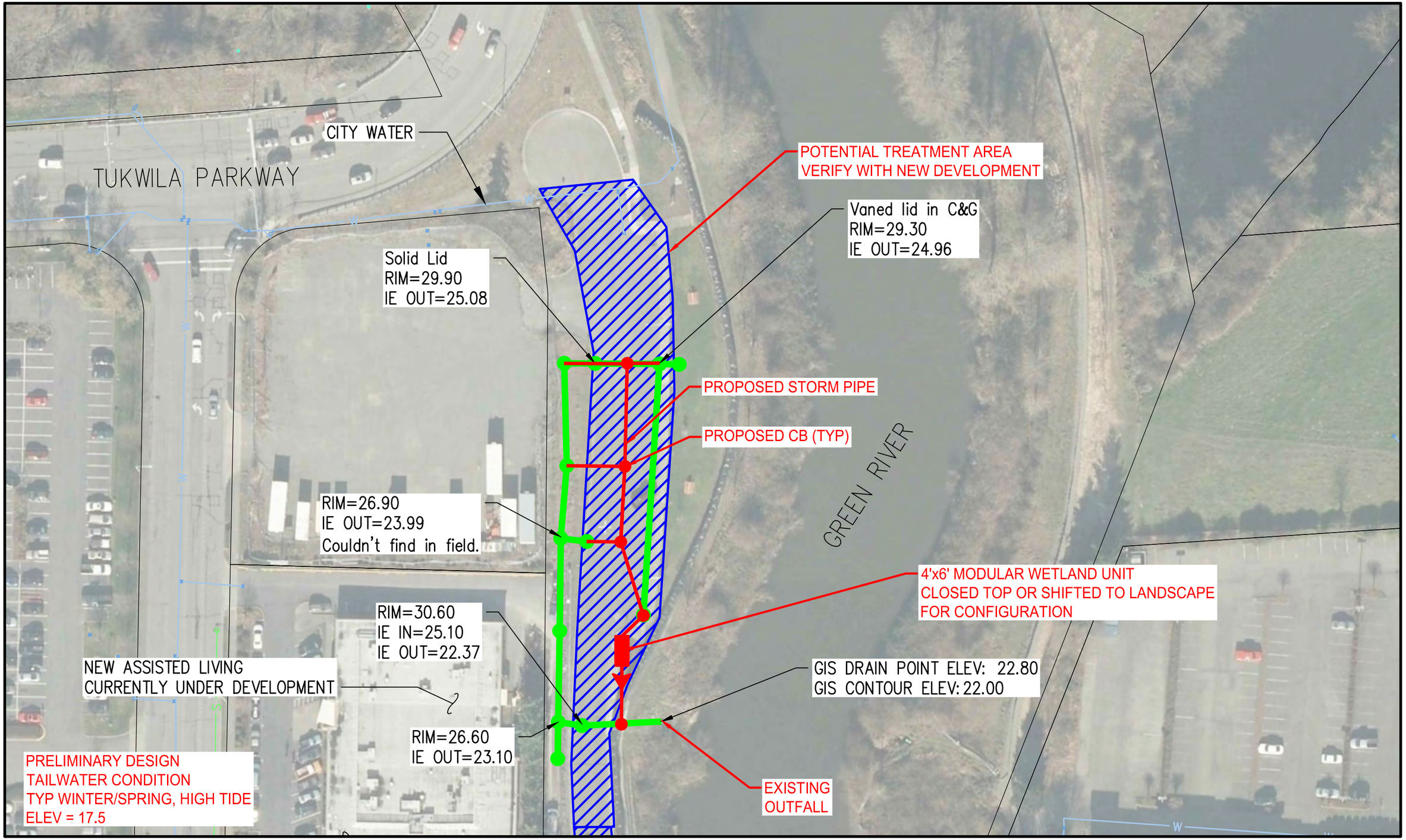

TREATMENT SITE #3 - ALT3A

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 30 60 90

N

SITE #3	
TREATMENT AREA:	0.50 AC

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3131 Elliott Ave Suite 400 Seattle, WA 98121 (206) 286-1640
23 S Wenatchee Ave Suite 223 Wenatchee, WA 98801 (509) 663-2711
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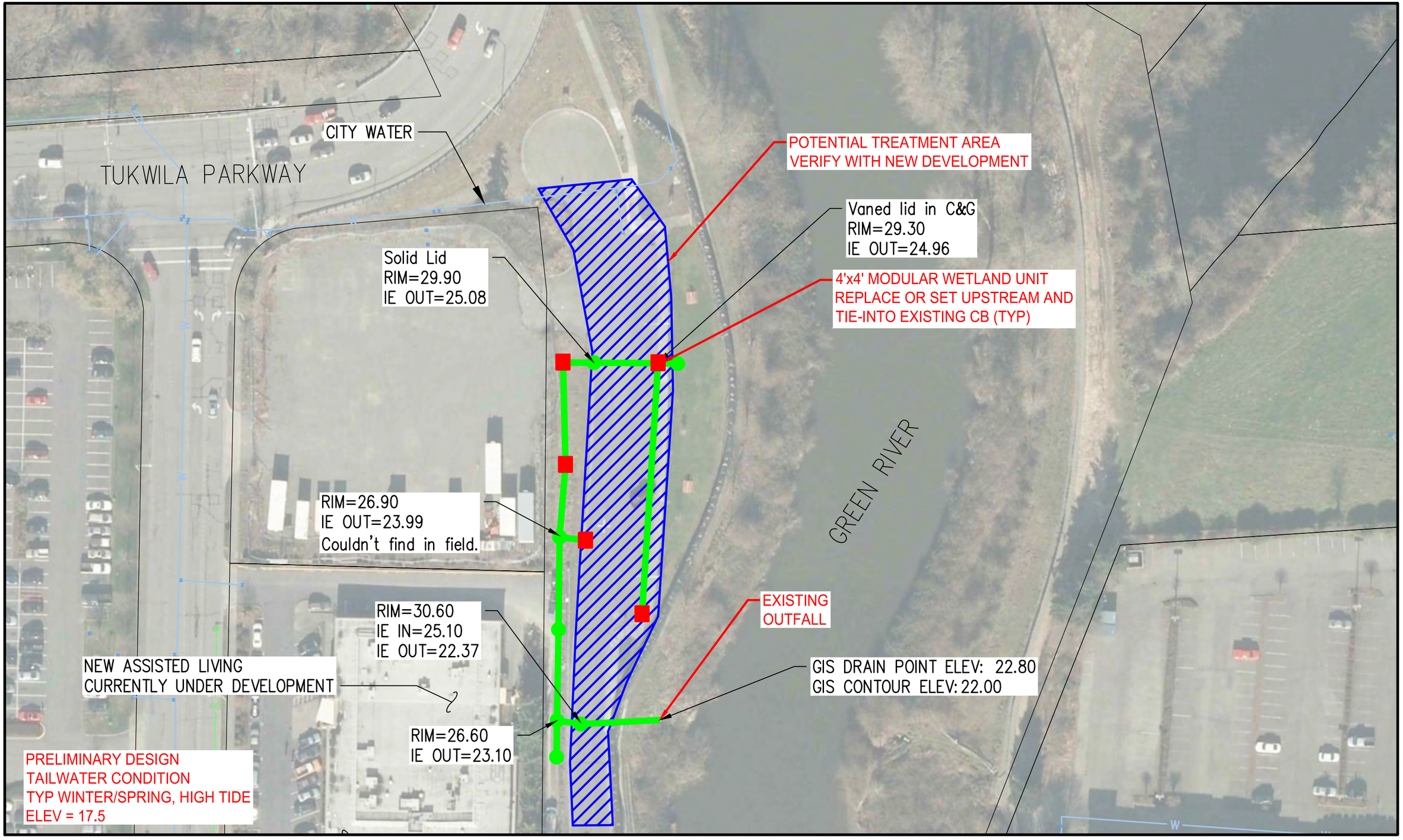

TREATMENT SITE #3 - ALT3B

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 30 60 90

N

SITE #3	
TREATMENT AREA:	0.50 AC

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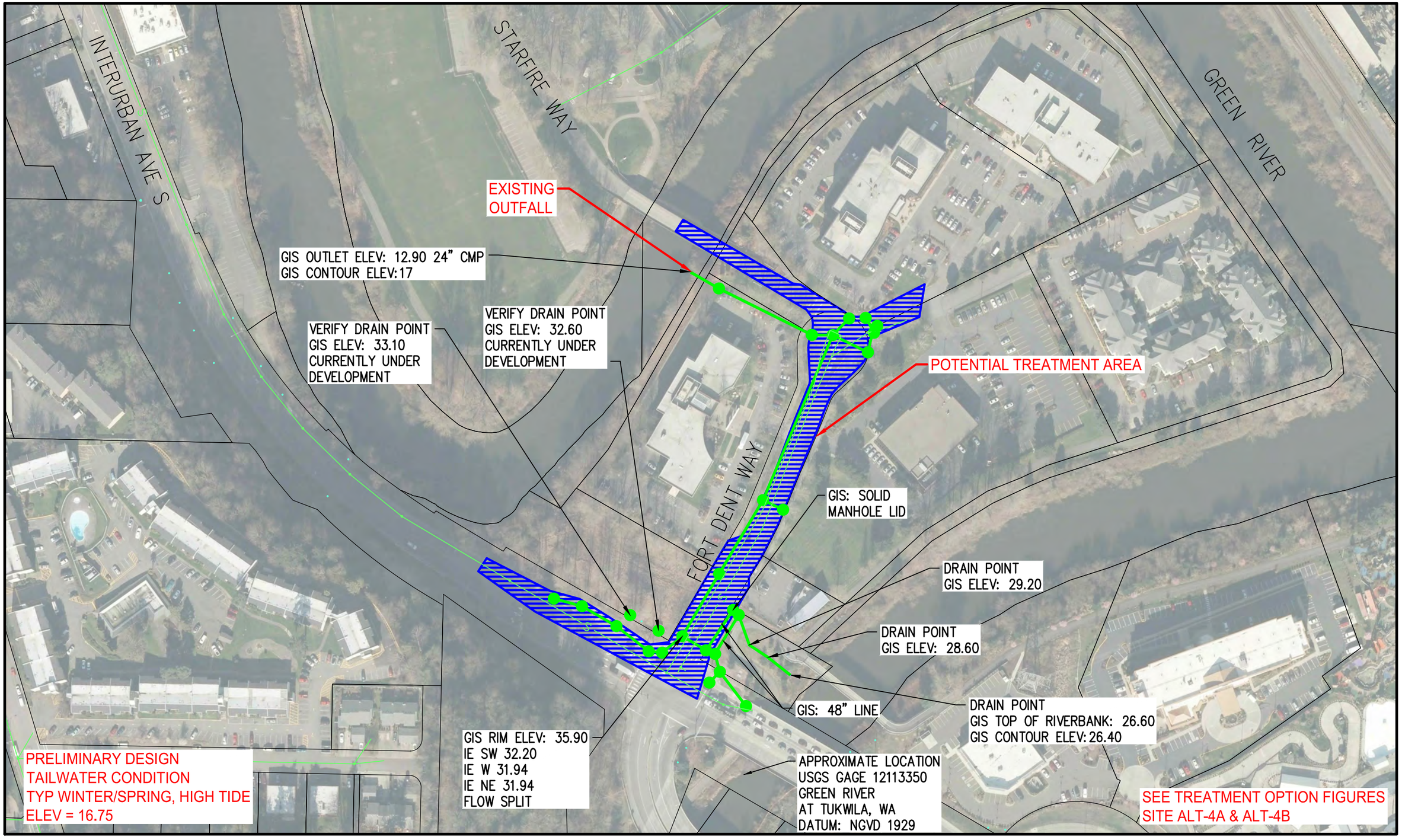

TREATMENT SITE #4

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 75 150 300

N

SITE #4	
TREATMENT AREA:	1.6 AC

KPG
Interdisciplinary Design
3131 Elliott Ave Suite 400 Seattle, WA 98121 (206) 286-1640
23 S Wenatchee Ave Suite 223 Wenatchee, WA 98801 (509) 663-2711
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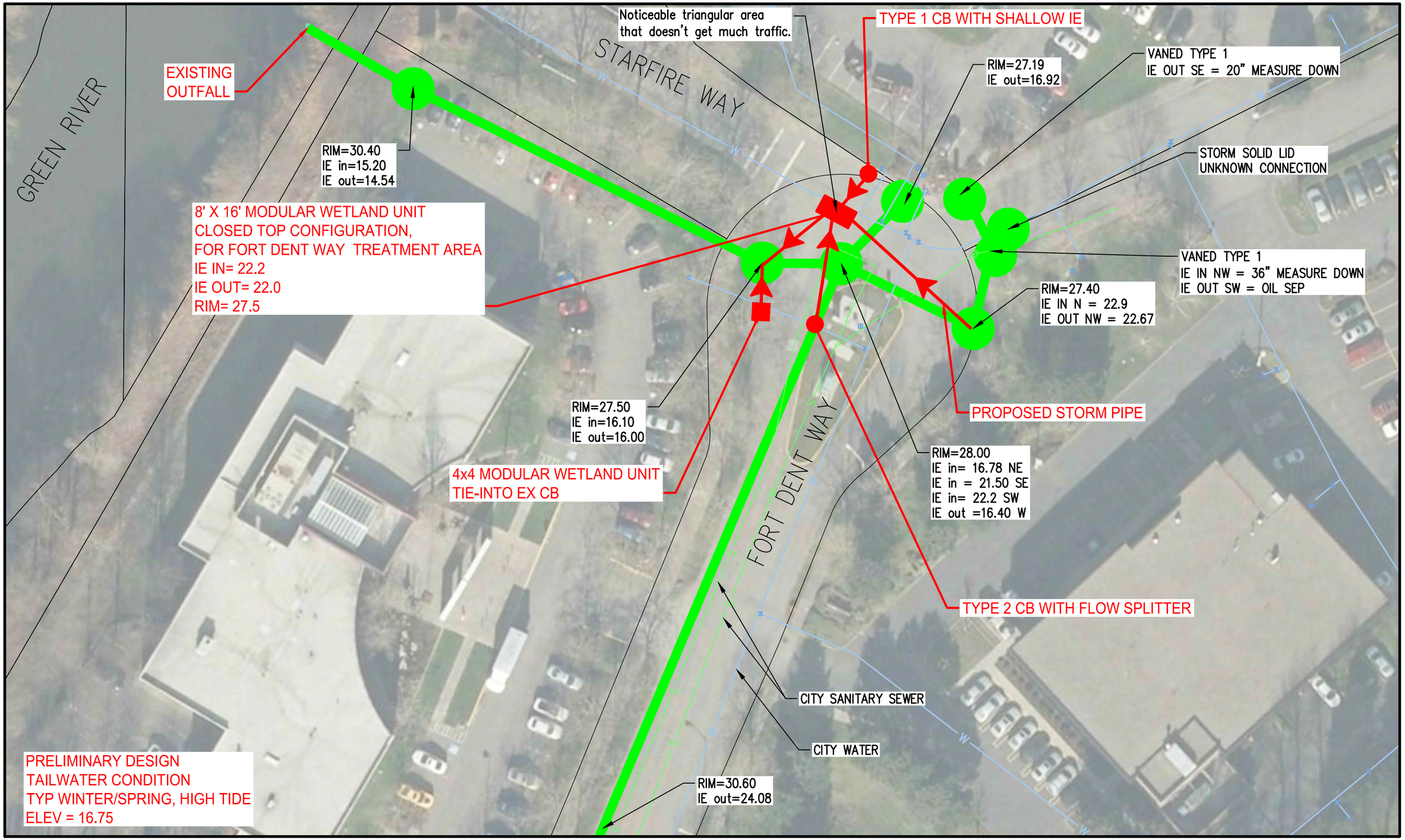

TREATMENT SITE #4 - ALT4A

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 10 20 40 60

N

SITE #4	
TREATMENT AREA:	1.6 AC

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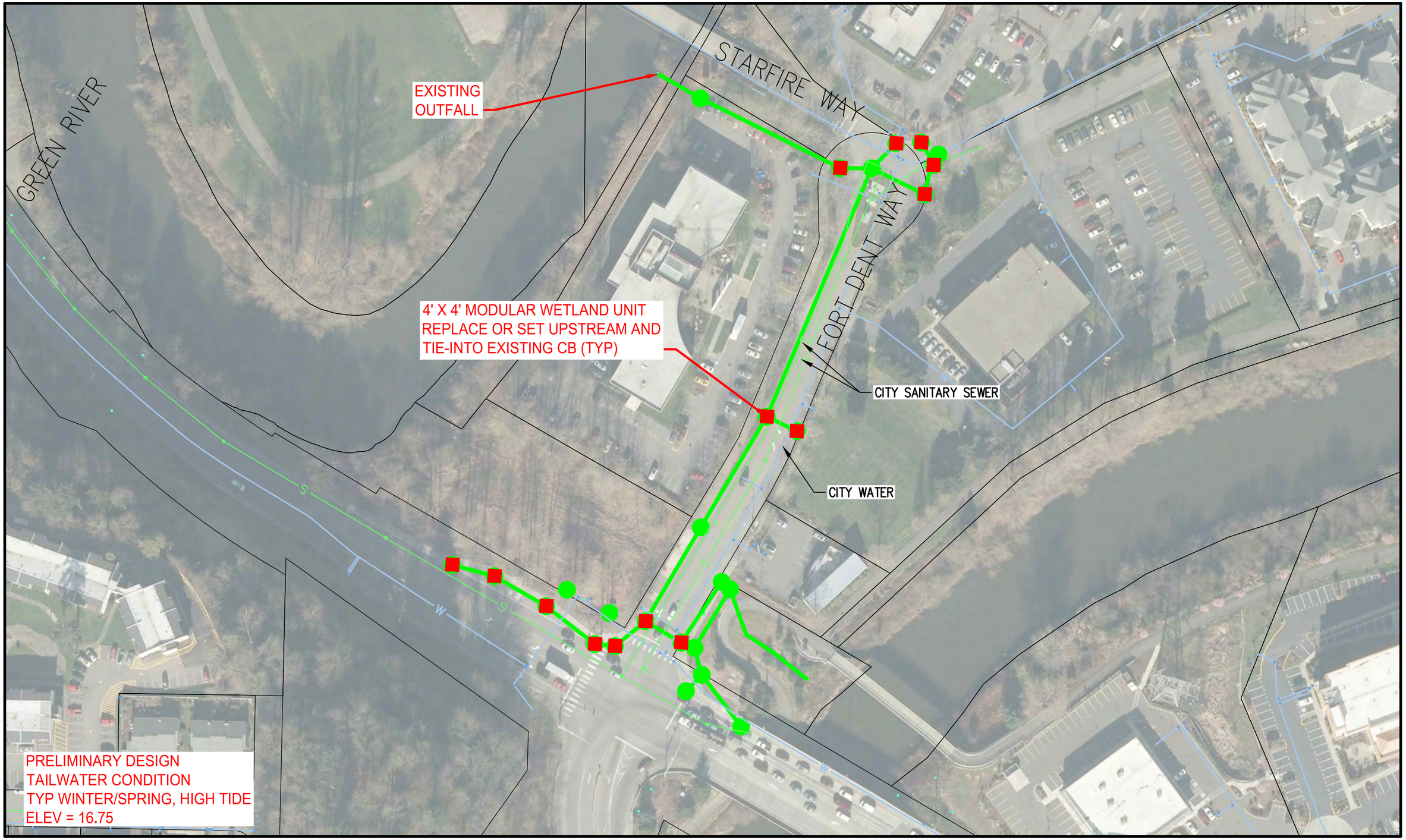

TREATMENT SITE #4 - ALT4B

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 25 50 100 150

N

SITE #4	
TREATMENT AREA:	1.6 AC

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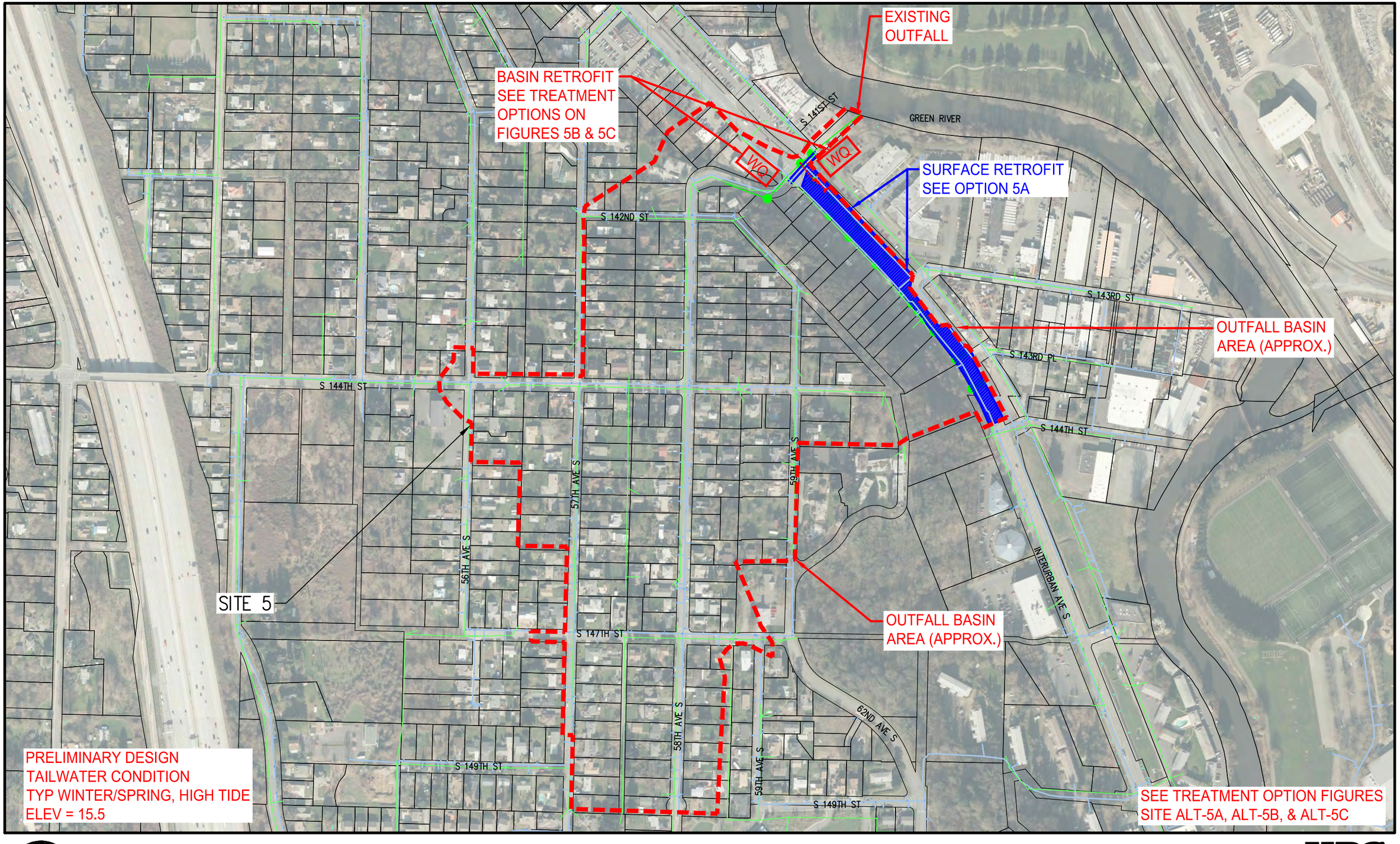

TREATMENT SITE #5

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 50 150 300 450

SITE #5	
TOTAL BASIN AREA:	63.6 AC

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TIDEFLEX VALVE AT OUTFALL TO EXISTING STORM DRAIN

RIVERSIDE CASINO

RIM=22.90
IE OUT = 14.09

INTERURBAN AVE S

24" SD

LOCATION OPTION 1
4 - 8' X 20' MODULAR WETLAND UNITS (PLANTED) IN EXISTING LANDSCAPE AREA OR CLOSED TOP CONFIGURATION IN EXISTING PARKING LOT, FOR 58TH AVE S SUB-BASIN

GREEN RIVER TRAIL

LOCATION OPTION 2
4 - 8' X 20' MODULAR WETLAND UNITS PLANTED OR CLOSED TOP CONFIGURATION IN EXISTING PARKING LOT, FOR 58TH AVE S SUB-BASIN

24" SD

REALIGN GRAVEL PATH

4' X 19' MODULAR WETLAND UNIT (PLANTED) IN EXISTING LANDSCAPE AREA OR CLOSED TOP CONFIGURATION IN EXISTING PARKING LOT, FOR INTERURBAN AVE SUB-BASIN

FAIRWAY CENTER

58TH AVE S

REINSTALL 24" SD WITH 0.5% SLOPE

18" SD

FLOW SPLITTER

FLOW SPLITTER

4' X 21' MODULAR WETLAND UNIT FOR INTERURBAN AVE SAME AS ALTERNATIVE 5A

PRELIMINARY DESIGN
TAILWATER CONDITION
TYP WINTER/SPRING, HIGH TIDE
ELEV = 15.5

TREATMENT SITE #5B

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 10 20 40 60

N

SITE #5	
TOTAL BASIN AREA:	63.6 AC
TREATMENT AREA:	60.0 AC

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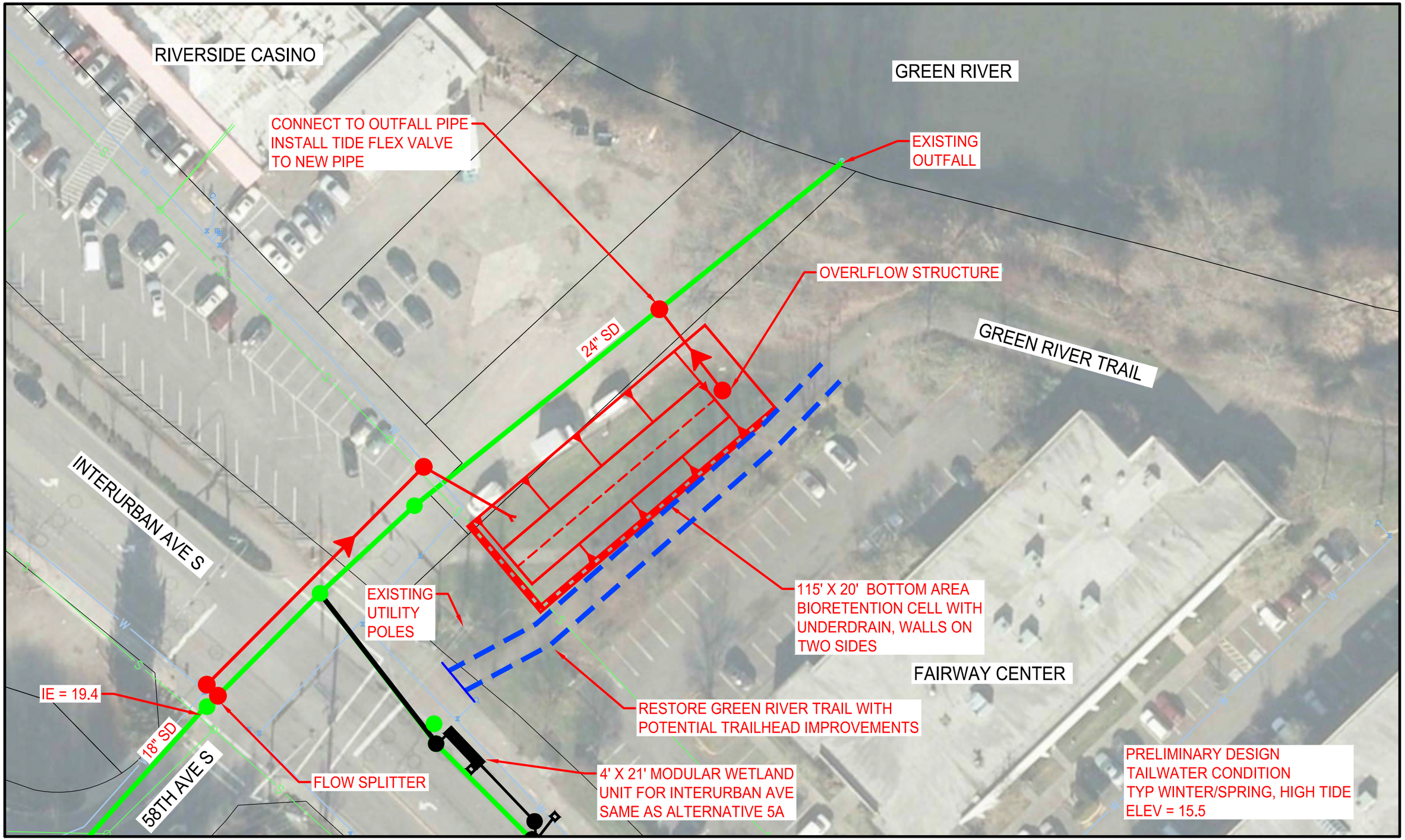

TREATMENT SITE #5C

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 10 20 40 60

N

SITE #5	
TOTAL BASIN AREA:	63.6 AC
TREATMENT AREA:	32.0 AC

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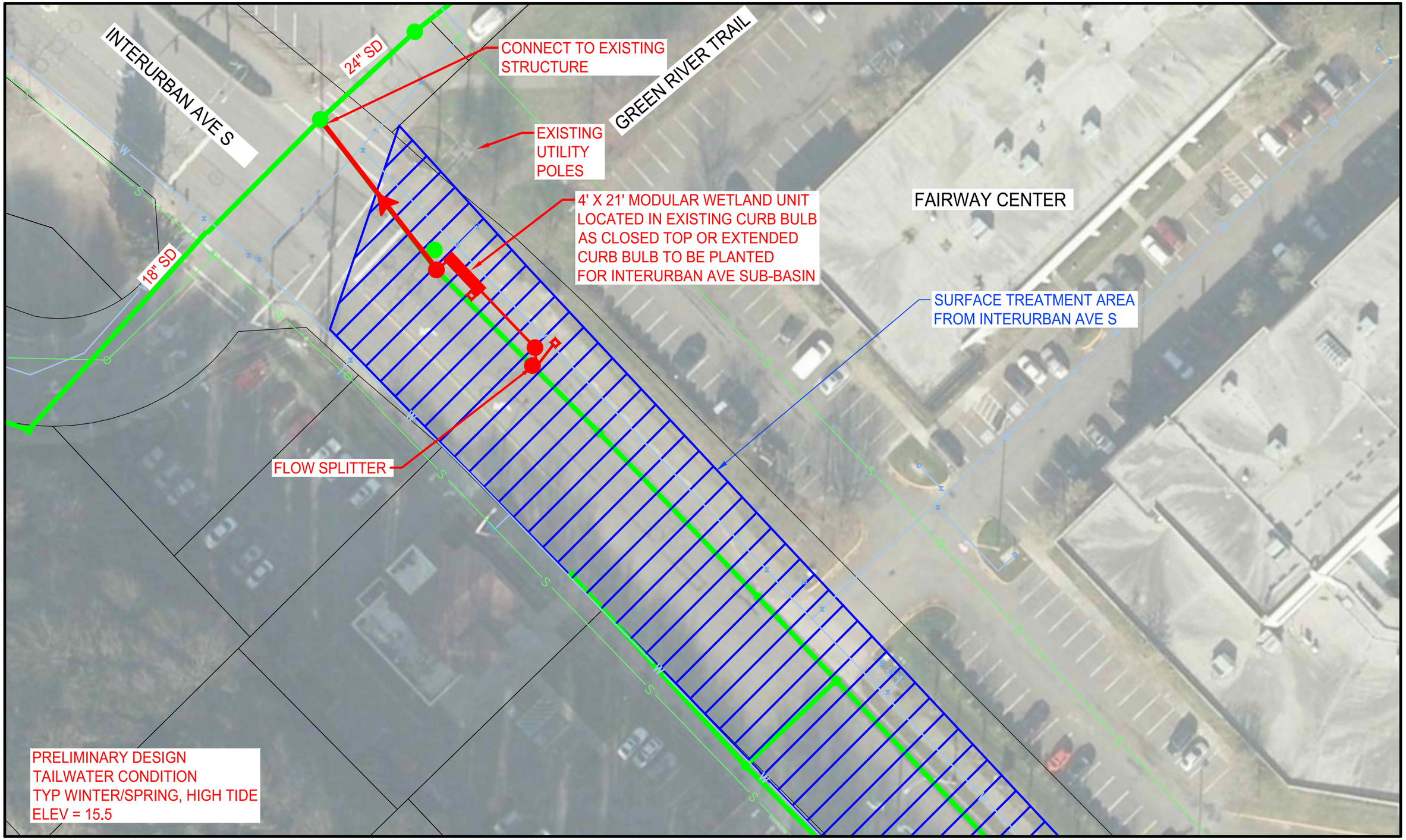

TREATMENT SITE #5A

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 10 20 40 60

N

SITE #5	
TOTAL BASIN AREA:	63.6 AC
TREATMENT AREA:	1.8 AC

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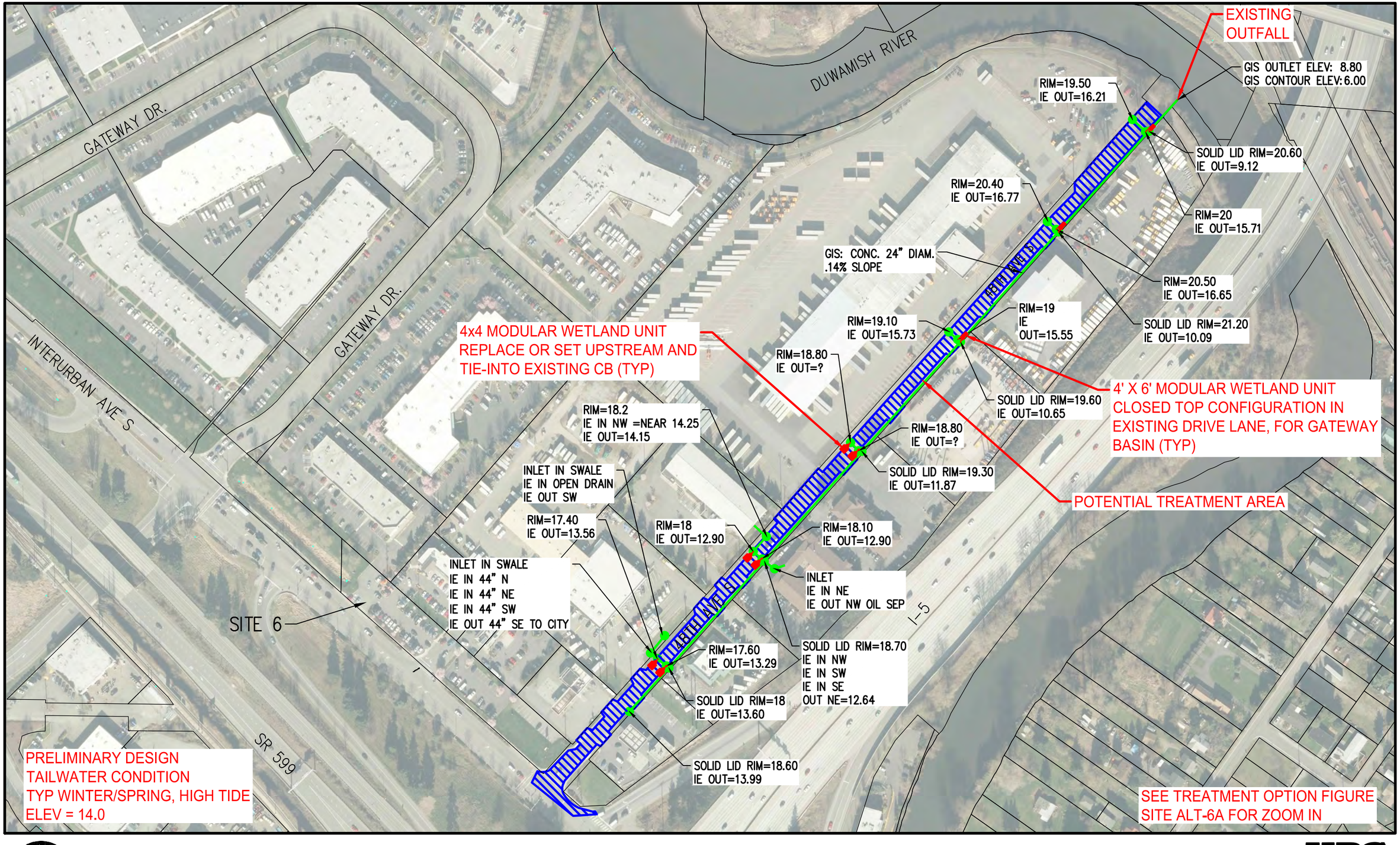

TREATMENT SITE #6

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 50 100 200 300

N

SITE #6	
TREATMENT AREA:	2.0 AC

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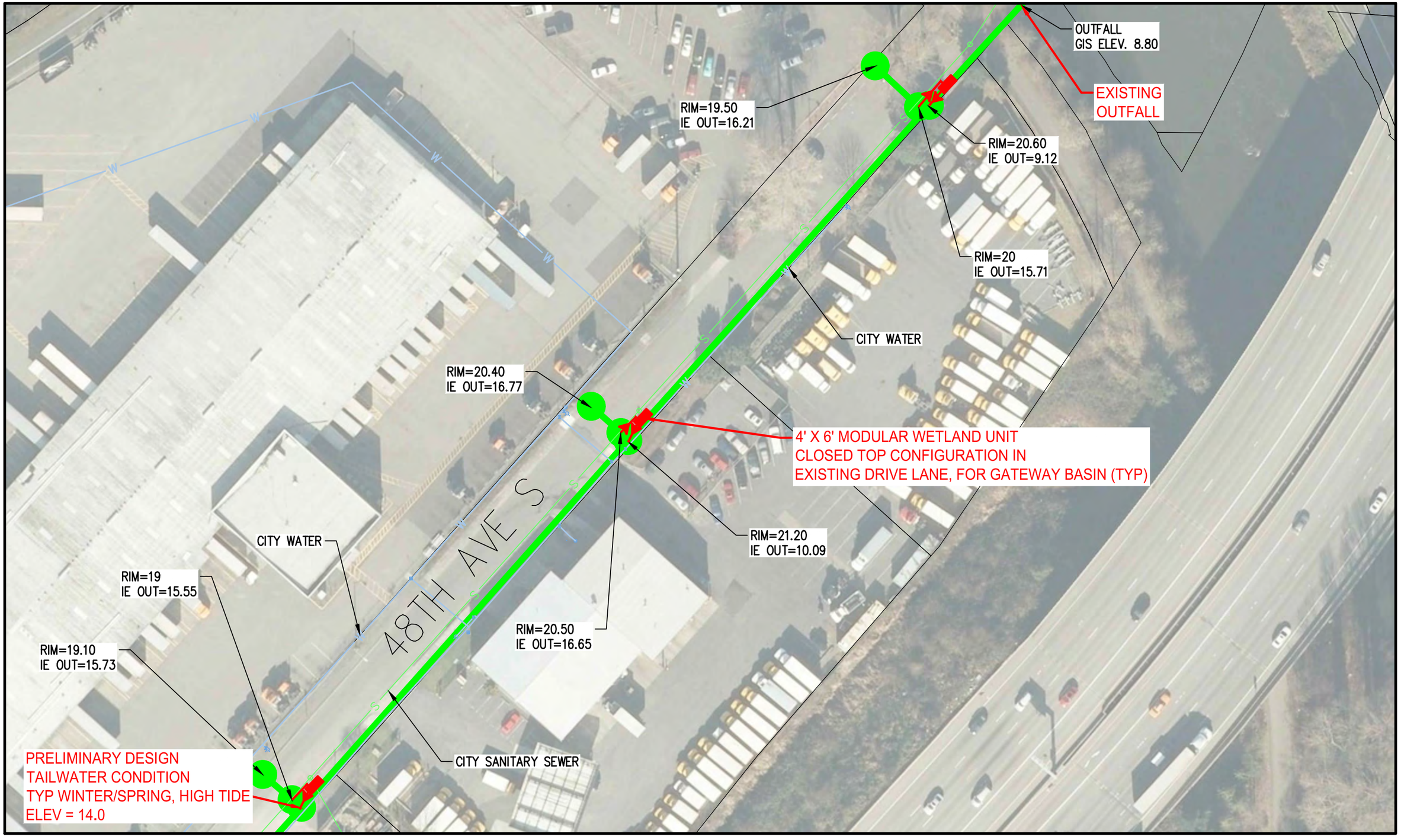

TREATMENT SITE #6 - ALT6A

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 30 60 90

N

SITE #6	
TREATMENT AREA:	2.0 AC

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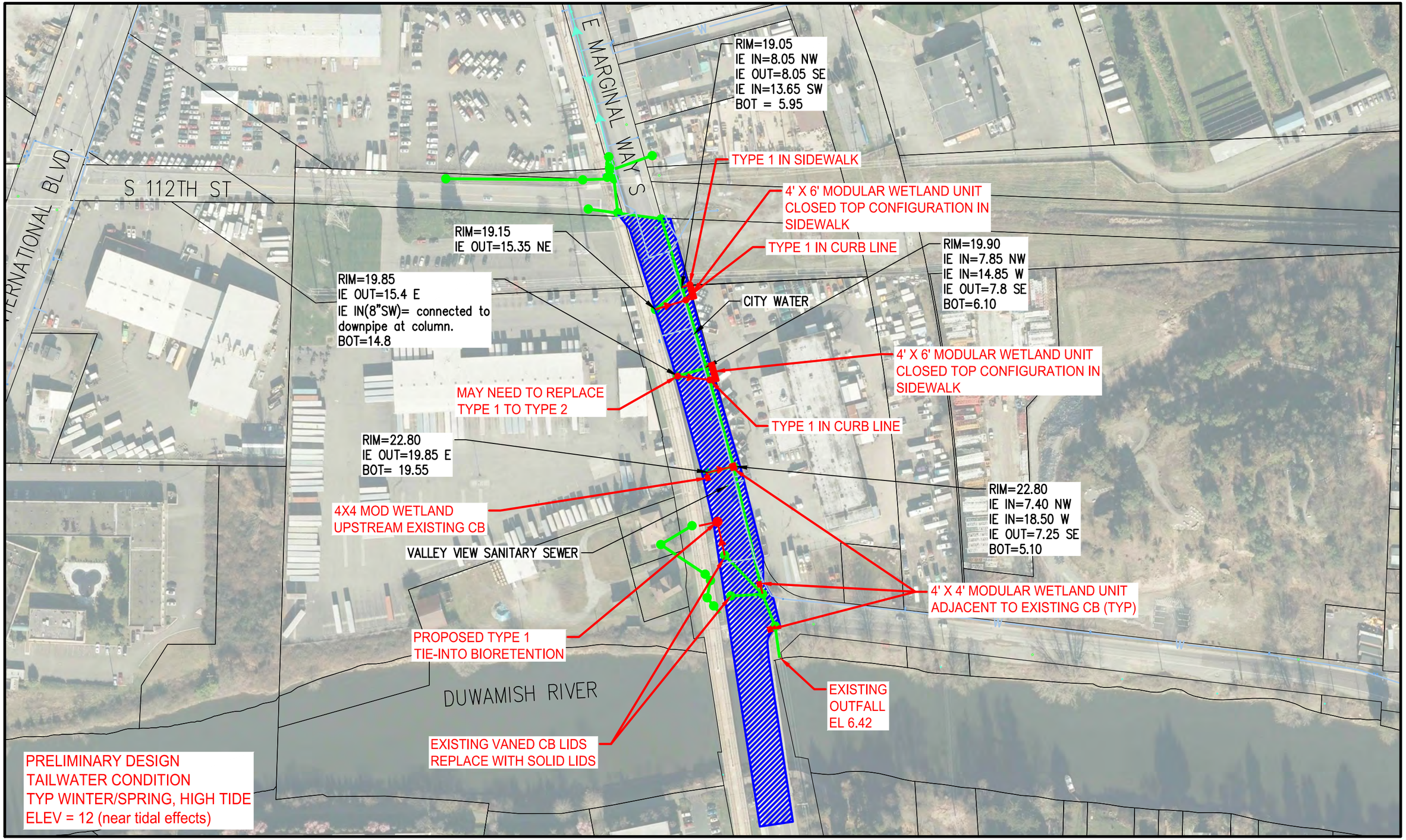

TREATMENT SITE #7 - ALT7A

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 75 150 225

N

SITE #7	
TREATMENT AREA:	1.57 AC

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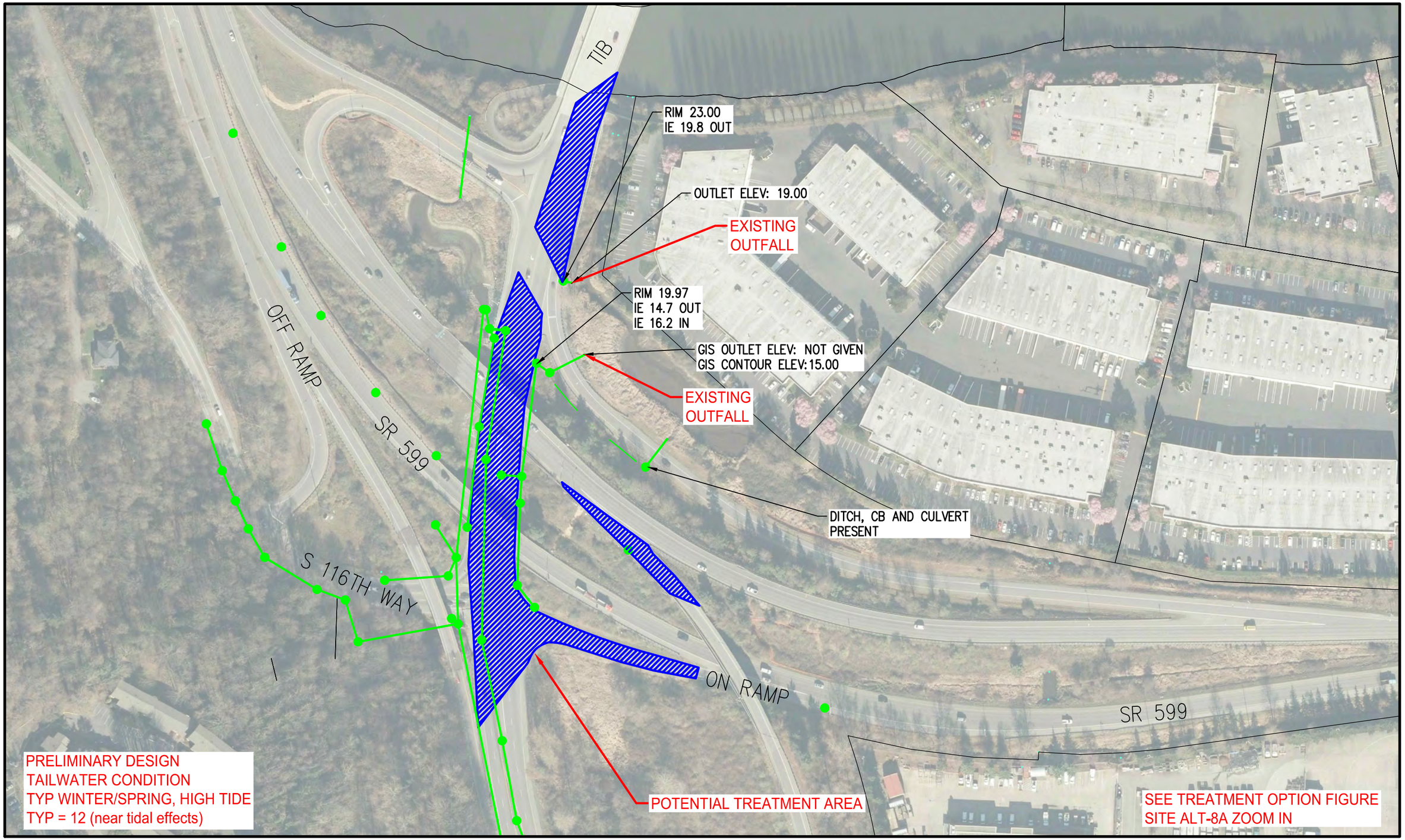

TREATMENT SITE #8

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 75 150 225

N

SITE #8	
TREATMENT AREA:	2.0 AC

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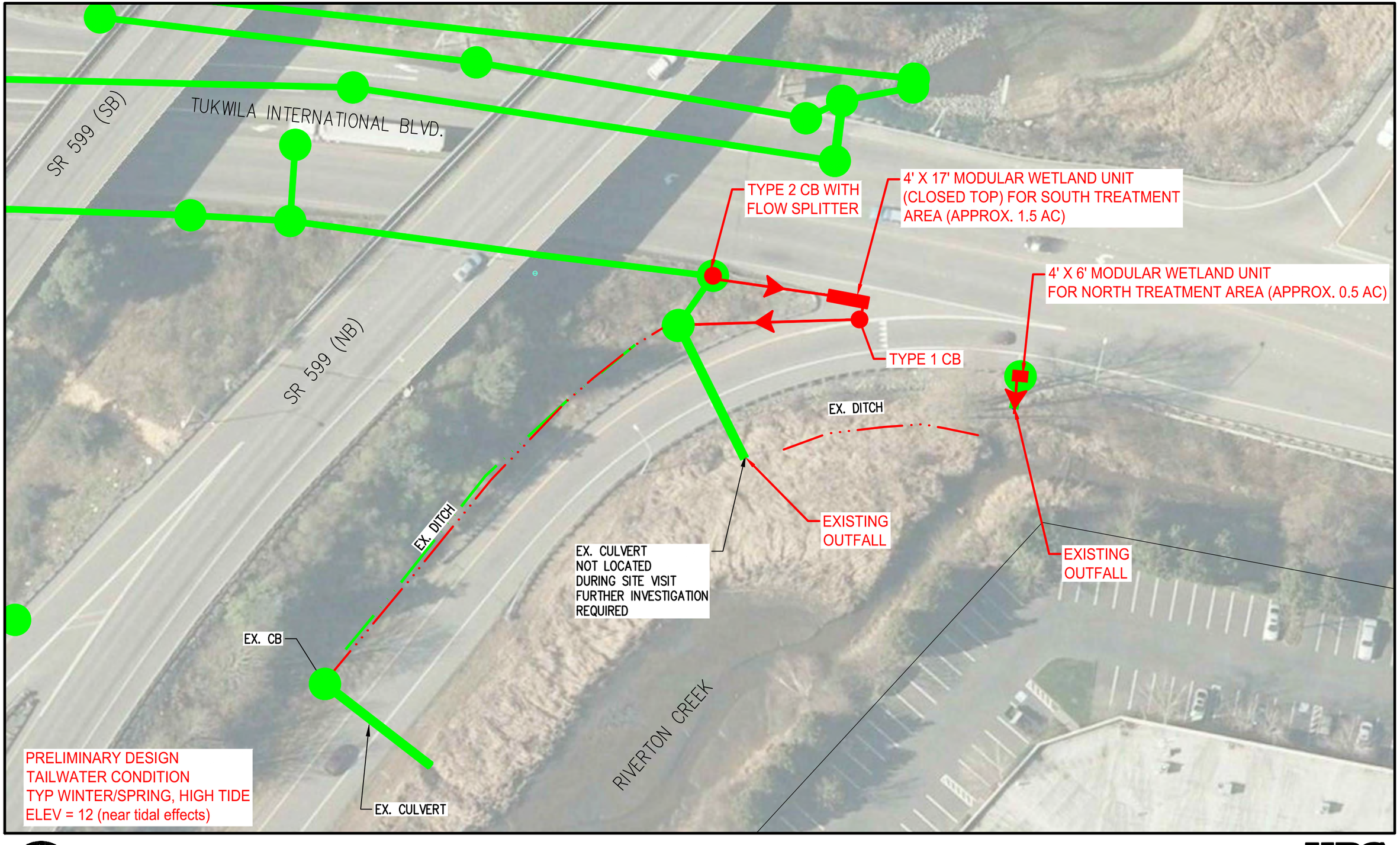

TREATMENT SITE #8 - ALT8A

TUKWILA WATER QUALITY RETROFIT PLANNING

LEGEND

- EXISTING CATCH BASIN
- EXISTING STORM PIPE
- PROPOSED CATCH BASIN
- PROPOSED STORM PIPE
- PROPOSED TREATMENT

0 20 40 60

SITE #8	
TREATMENT AREA:	2.0 AC

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APPENDIX C – Soils Information

Soil Map—King County Area, Washington
(Site 4)



Map Scale: 1:2,410 if printed on A landscape (11" x 8.5") sheet.

N

0 35 70 140 210 Meters

0 100 200 400 600 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: King County Area, Washington
Survey Area Data: Version 15, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

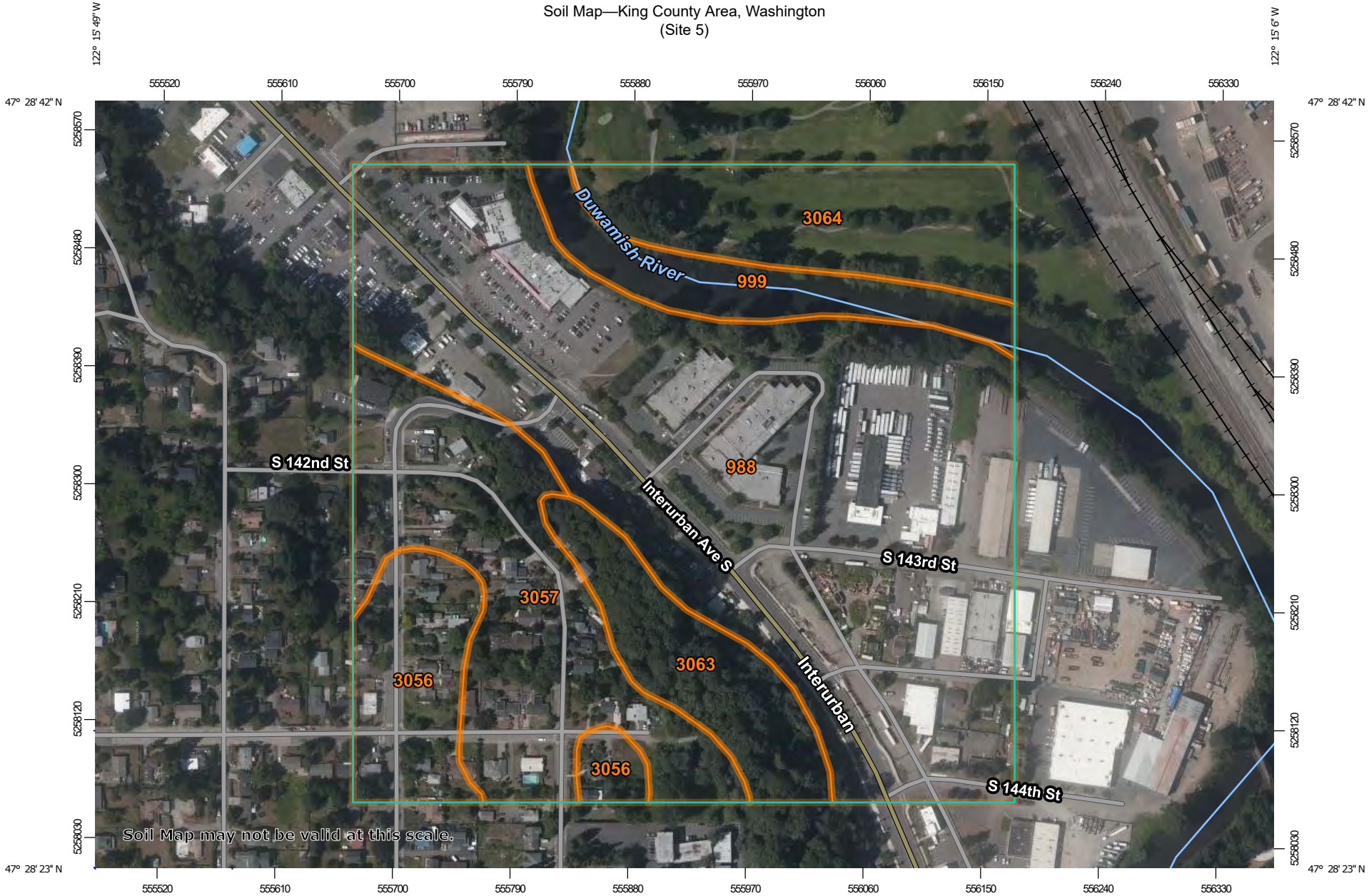
Date(s) aerial images were photographed: Jun 29, 2019—Jul 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3056	Urban land-Alderwood complex, 5 to 12 percent slopes	0.0	0.2%
3057	Urban land-Alderwood complex, 12 to 35 percent slopes	1.3	5.5%
3063	Alderwood-Everett complex, 35 to 60 percent slopes	1.8	7.8%
Ng	Newberg silt loam	15.0	64.0%
Ur	Urban land	1.9	8.2%
W	Water	3.3	14.2%
Wo	Woodinville silt loam	0.0	0.2%
Totals for Area of Interest		**23.5**	**100.0%**

Soil Map—King County Area, Washington
(Site 5)



Map Scale: 1:4,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: King County Area, Washington
Survey Area Data: Version 15, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 29, 2019—Jul 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
988	Urban land, 0 to 5 percent slopes	31.3	51.2%
999	Water, fresh	3.7	6.0%
3056	Urban land-Alderwood complex, 5 to 12 percent slopes	4.7	7.7%
3057	Urban land-Alderwood complex, 12 to 35 percent slopes	10.7	17.5%
3063	Alderwood-Everett complex, 35 to 60 percent slopes	4.4	7.2%
3064	Anthraltic Xerorthents gravelly sandy loam, 0 to 12 percent slopes	6.4	10.5%
Totals for Area of Interest		**61.2**	**100.0%**

Soil Map—City of Seattle, Washington
(Site 7)



Map Scale: 1:5,920 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: City of Seattle, Washington
Survey Area Data: Version 3, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

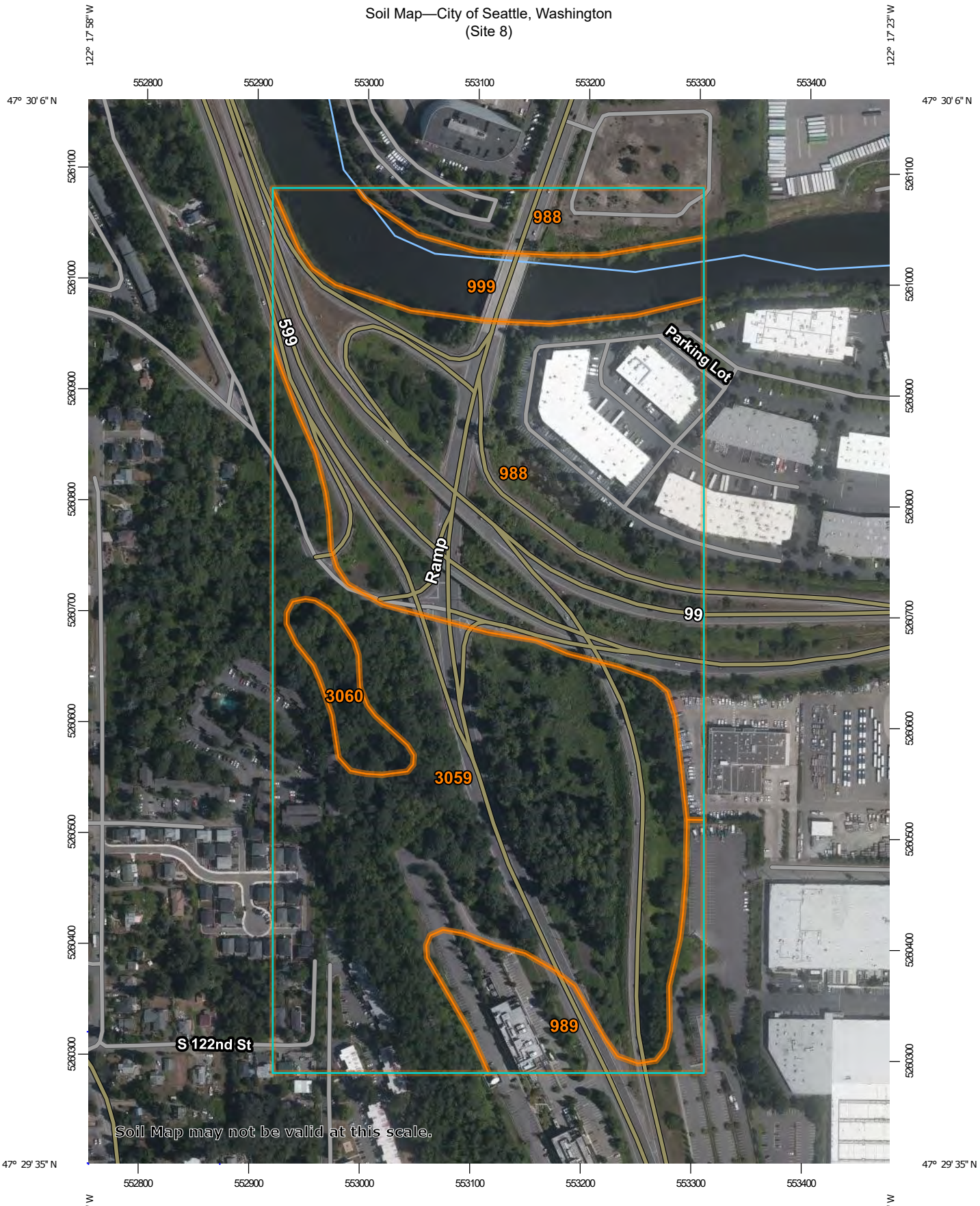
Date(s) aerial images were photographed: Jun 29, 2019—Jul 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
988	Urban land, 0 to 5 percent slopes	153.3	87.8%
999	Water, fresh	15.7	9.0%
3055	Urban land-Alderwood complex, 0 to 5 percent slopes	5.6	3.2%
Totals for Area of Interest		**174.6**	**100.0%**

Soil Map—City of Seattle, Washington
(Site 8)



Map Scale: 1:4,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: City of Seattle, Washington
Survey Area Data: Version 3, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 29, 2019—Jul 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
988	Urban land, 0 to 5 percent slopes	31.3	40.5%
989	Urban land, 5 to 20 percent slopes	4.9	6.3%
999	Water, fresh	6.2	8.0%
3059	Alderwood-Everett-Urban land complex, 12 to 35 percent slopes	33.1	42.8%
3060	Alderwood-Everett-Urban land complex, 35 to 60 percent slopes	1.8	2.3%
Totals for Area of Interest		**77.2**	**100.0%**

APPENDIX D – Probable Cost Opinion

CITY OF TUKWILA - DEPARTMENT OF PUBLIC WORKS
2020 Water Quality Retrofits
Engineer's Cost Opinion - October Submittal
Project No. 19057

Date: Oct. 2020
By: WRE

KPG

			Site 4 - Fort Dent & Starfire Way			
No.	**Section No.**	**Item**	**Qty**	**Unit**	**Unit Cost**	**Total Cost**
ROADWAY						
1	1-04	Unexpected Site Changes	1	FA	$10,000	$ 10,000
2	1-09	Mobilization (10%)	1	LS	$38,000	$ 38,000
3	1-10	Project Temporary Traffic Control	1	LS	$5,000	$ 5,000
4	2-01	Clearing and Grubbing	1	LS	$5,000	$ 5,000
5	2-02	Pavement Removal Incl. Haul	160	SY	$15	$ 2,400
6	2-03	Unsuitable Foundation Excavation Incl. Haul	150	CY	$35	$ 5,250
7	4-04	Crushed Surfacing Top Course	200	TN	$45	$ 9,000
8	5-04	HMA Cl. 1/2" PG 64-22	50	TN	$160	$ 8,000
9	8-01	Temporary Water Pollution / Erosion Control	1	LS	$10,000	$ 10,000
10	8-04	Cement Conc. Traffic Curb and Gutter	50	LF	$80	$ 4,000
11	8-14	Cement Conc. Sidewalk	10	SY	$100	$ 1,000
ROADSIDE DEVELOPMENT						
12	8-02	Property Restoration	1	FA	$2,500	$ 2,500
STORM DRAINAGE						
13	7-04	Storm Sewer Pipe 12 In. Diam	126	LF	$100	$ 12,600
14	7-04	Remove/Abandon Existing Storm Sewer Pipe	65	LF	$15	$ 975
15	7-05	Connection to Drainage Structure	1	EA	$1,500	$ 1,500
16	7-05	Concrete Inlet	1	EA	$1,000	$ 1,000
17	7-05	Catch Basin, Type 1	1	EA	$1,500	$ 1,500
18	7-05	Catch Basin Type 2 48 In. Diam.	3	EA	$3,500	$ 10,500
19	7-05	Adjust Utility	1	EA	$1,500	$ 1,500
20	7-15	8' x 12' Modular Wetland Unit	1	EA	$150,000	$ 150,000
21	7-20	Temporary Bypass System	1	LS	$10,000	$ 10,000
22	8-30	Resolution of Utility Conflicts	1	LS	$25,000	$ 25,000
		PROBABLE CONSTRUCTION COST				**$ 314,725**
		CONTINGENCY (30%)				**$ 94,418**
		Tax (10%)				**$ 40,914**
		TOTAL PROBABLE CONSTRUCTION COST				**$ 450,057**

CITY OF TUKWILA - DEPARTMENT OF PUBLIC WORKS
2020 Water Quality Retrofits
Engineer's Cost Opinion - October Submittal
Project No. 19057

Date: Dec. 2020
By: WRE

KPG

No.	Section No.	Item	Site 5 - Interurban Ave S Qty	Unit	Unit Cost	Total Cost
ROADWAY						
1	1-04	Unexpected Site Changes	1	FA	$10,000	$ 10,000
2	1-09	Mobilization (10%)	1	LS	$64,000	$ 64,000
3	1-10	Project Temporary Traffic Control	1	LS	$ -	$ 20,000
4	2-01	Clearing and Grubbing	1	LS	$ 1,000	$ 5,000
5	2-02	Pavement Removal Incl. Haul	115	SY	$ 15	$ 1,725
6	2-03	Unsuitable Foundation Excavation Incl. Haul	125	CY	$ 35	$ 4,375
7	4-04	Crushed Surfacing Top Course	200	TN	$ 45	$ 9,000
8	5-04	HMA Cl. 1/2" PG 64-22	125	TN	$ 160	$ 20,000
9	8-01	Temporary Water Pollution / Erosion Control	1	LS	$ 20,000	$ 20,000
10	8-04	Cement Conc. Traffic Curb and Gutter	60	LF	$ 80	$ 4,800
11	8-14	Cement Conc. Sidewalk	50	SY	$ 100	$ 5,000
ROADSIDE DEVELOPMENT						
12	8-02	Property Restoration	1	FA	$ 2,500	$ 2,500
13	11-Aug	Traffic Signal and Channelization Restoration	1	LS	$ 25,000	$ 25,000
STORM DRAINAGE						
14	7-04	Storm Sewer Pipe 12 In. Diam	115	LF	$ 100	$ 11,500
15	7-04	Storm Sewer Pipe 24 In. Diam.	100	LF	$ 130	$ 13,000
15	7-04	Remove/Abandon Existing Storm Sewer Pipe	100	LF	$ 15	$ 1,500
16	7-05	Connection to Drainage Structure	1	EA	$ 1,500	$ 1,500
17	7-05	Concrete Inlet	1	EA	$ 1,000	$ 1,000
18	7-05	Catch Basin, Type 1	1	EA	$ 1,500	$ 1,500
19	7-05	Catch Basin Type 2 48 In. Diam.	2	EA	$ 3,500	$ 7,000
20	7-05	Flow Splitter Structure	1	EA	$ 10,000	$ 10,000
21	7-05	Adjust Utility	2	EA	$ 1,500	$ 3,000
22	7-15	4' x 19' Modular Wetland Unit	1	EA	$200,000	$ 200,000
23	7-20	Temporary Bypass System	1	LS	$ 15,000	$ 15,000
24	8-30	Resolution of Utility Conflicts	1	LS	$ 15,000	$ 15,000
		PROBABLE CONSTRUCTION COST				**$ 471,400**
		CONTINGENCY (30%)				**$ 141,420**
		Tax (10%)				**$ 61,282**
		TOTAL PROBABLE CONSTRUCTION COST				**$ 674,102**

CITY OF TUKWILA - DEPARTMENT OF PUBLIC WORKS
2020 Water Quality Retrofits
Engineer's Cost Opinion - October Submittal
Project No. 19057

Date: Oct. 2020
By: WRE

KPG

No.	Section No.	Item	Site 7 - E Marginal Way Qty	Unit	Unit Cost	Total Cost
ROADWAY						
1	1-04	Unexpected Site Changes	1	FA	$25,000	$ 25,000
2	1-09	Mobilization (10%)	1	LS	$53,000	$ 53,000
3	1-10	Project Temporary Traffic Control	1	LS	$15,000	$ 15,000
4	2-01	Clearing and Grubbing	1	LS	$5,000	$ 5,000
5	2-02	Pavement Removal Incl. Haul	270	SY	$15	$ 4,050
6	2-03	Unsuitable Foundation Excavation Incl. Haul	200	CY	$35	$ 7,000
7	4-04	Crushed Surfacing Top Course	500	TN	$45	$ 22,500
8	5-04	HMA Cl. 1/2" PG 64-22	120	TN	$160	$ 19,200
9	8-01	Temporary Water Pollution / Erosion Control	1	LS	$10,000	$ 10,000
10	8-04	Cement Conc. Traffic Curb and Gutter	40	LF	$80	$ 3,200
11	8-14	Cement Conc. Sidewalk	40	SY	$100	$ 4,000
ROADSIDE DEVELOPMENT						
12	8-02	Property Restoration	1	FA	$2,500	$ 2,500
STORM DRAINAGE						
13	7-04	Storm Sewer Pipe 12 In. Diam	650	LF	$100	$ 65,000
14	7-04	Remove/Abandon Existing Storm Sewer Pipe	53	LF	$15	$ 795
15	7-05	Connection to Drainage Structure	2	EA	$1,500	$ 3,000
16	7-05	Concrete Inlet	5	EA	$1,000	$ 5,000
17	7-05	Catch Basin, Type 1	1	EA	$1,500	$ 1,500
18	7-05	Catch Basin Type 2 48 In. Diam.	5	EA	$3,500	$ 17,500
19	7-05	Flow Splitter Structure	1	EA	$10,000	$ 10,000
20	7-05	Adjust Utility	1	EA	$1,500	$ 1,500
21	7-15	4' X 4' Modular Wetland Unit	1	EA	$40,000	$ 40,000
22	7-15	4' x 17' Modular Wetland Unit	1	EA	$175,000	$ 175,000
23	7-20	Temporary Bypass System	1	LS	$10,000	$ 10,000
24	8-30	Resolution of Utility Conflicts	1	LS	$45,000	$ 45,000
		PROBABLE CONSTRUCTION COST				**$ 544,745**
		CONTINGENCY (30%)				**$ 163,424**
		Tax (10%)				**$ 70,817**
		TOTAL PROBABLE CONSTRUCTION COST				**$ 778,985**

CITY OF TUKWILA - DEPARTMENT OF PUBLIC WORKS
2020 Water Quality Retrofits
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By: WRE

KPG

			Site 8 - Tukwila International Blvd			
No.	**Section No.**	**Item**	**Qty**	**Unit**	**Unit Cost**	**Total Cost**
ROADWAY						
1	1-04	Unexpected Site Changes	1	FA	$10,000	$ 10,000
2	1-09	Mobilization (10%)	1	LS	$55,000	$ 55,000
3	1-10	Project Temporary Traffic Control	1	LS	$ 35,000	$ 35,000
4	2-01	Clearing and Grubbing	1	LS	$ 8,000	$ 8,000
5	2-02	Pavement Removal Incl. Haul	300	SY	$ 15	$ 4,500
6	2-03	Unsuitable Foundation Excavation Incl. Haul	150	CY	$ 35	$ 5,250
7	4-04	Crushed Surfacing Top Course	250	TN	$ 45	$ 11,250
8	5-04	HMA Cl. 1/2" PG 64-22	100	TN	$ 160	$ 16,000
9	8-01	Temporary Water Pollution / Erosion Control	1	LS	$ 35,000	$ 35,000
ROADSIDE DEVELOPMENT						
10	8-02	Property Restoration	1	FA	$ 1,000	$ 1,000
11	8-11	Guardrail	140	LF	$ 150	$ 21,000
12	11-Aug	Traffic Signal and Channelization Restoration	0	LS	$ 5,000	$ 5,000
STORM DRAINAGE						
13	7-04	Storm Sewer Pipe 12 In. Diam	175	LF	$ 100	$ 17,500
14	7-05	Connection to Drainage Structure	1	EA	$ 1,500	$ 1,500
15	7-05	Outfall Protection	1	EA	$ 5,000	$ 5,000
16	7-05	Catch Basin, Type 1	2	EA	$ 1,500	$ 3,000
17	7-05	Catch Basin Type 2 48 In. Diam.	2	EA	$ 3,500	$ 7,000
18	7-05	Flow Splitter Structure	1	EA	$ 10,000	$ 10,000
19	7-15	4' X 4' Modular Wetland Unit	1	EA	$ 40,000	$ 40,000
20	7-15	4' x 8' Modular Wetland Unit	1	EA	$ 100,000	$ 100,000
21	7-20	Temporary Bypass System	1	LS	$ 10,000	$ 10,000
22	8-30	Resolution of Utility Conflicts	1	LS	$ 10,000	$ 10,000
		PROBABLE CONSTRUCTION COST				**$ 411,000**
		CONTINGENCY (30%)				**$ 123,300**
		Tax (10%)				**$ 53,430**
		TOTAL PROBABLE CONSTRUCTION COST				**$ 587,730**

APPENDIX E – Design Plans

STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

PROJECT NO. 91241202

AGREEMENT NO. WQC-2017-TUKWIL-00158

FUNDED IN PART BY THE WASHINGTON STATE DEPARTMENT OF ECOLOGY

MAYOR
ALLAN EKBERG

DIRECTOR OF PUBLIC WORKS
HENRY HASH

CITY ENGINEER
HARI PONNEKANTI, P.E.

CITY COUNCIL

DE'SEAN QUINN, PRESIDENT
VERNA SEAL
KATHY HOUGARDY
KATE KRULLER
THOMAS McLEOD
ZAK IDAN
CYNTHIA DELOSTRINOS JOHNSON

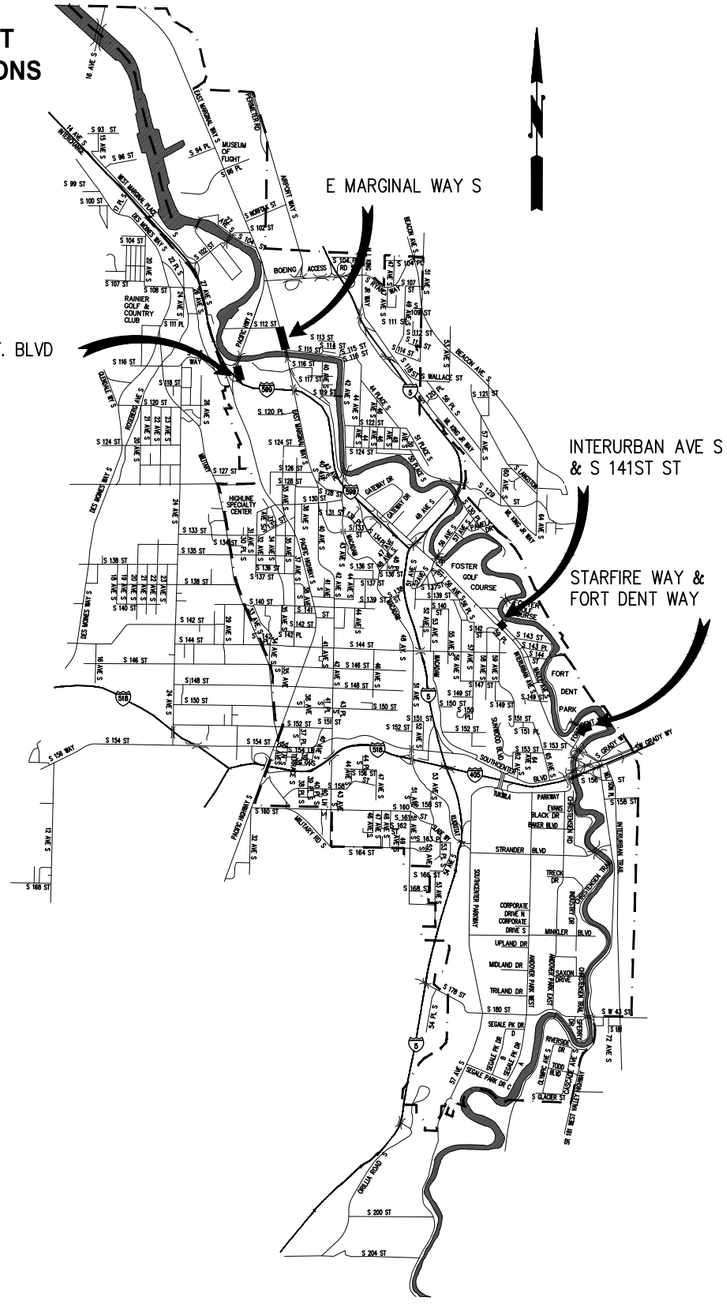
THIS PROJECT IS FUNDED IN PART BY THE WASHINGTON STATE DEPARTMENT OF ECOLOGY STORMWATER FINANCIAL ASSISTANCE PROGRAM AGREEMENT NO. WQC-2017-00158

SCHEDULE OF DRAWINGS

SHEET NO.	TITLE
1	COVER
2	LEGEND & ABBREVIATIONS
3	STARFIRE WAY
4	STARFIRE WAY PROFILES
5	INTERURBAN AVE S
6–7	E MARGINAL WAY
8	E MARGINAL WAY PROFILES
9	TUKWILA INTL BLVD
10–13	STORMWATER DETAILS

CALL 2 DAYS BEFORE YOU DIG 811

PROJECT LOCATIONS



CITY OF TUKWILA

WILLIAM R. EDRALIN
STATE OF WASHINGTON
35201
REGISTERED PROFESSIONAL ENGINEER

PUBLIC WORKS DEPT.
*ENGINEERING*STREETS*WATER*SEWER*BUILDING*

	by	date
designed	MKE	10/2020
drawn	MKE	10/2020
checked	KDA	10/2020
proj eng		
proj dir		
field bk no		

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STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

COVER

no	date	revisions

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file no 19057COV.DWG
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date 10/2020

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LEGEND

EXISTING

- MIC — MONUMENT IN CASE
- MAG NAIL/MAG SPIKE
- CATCH BASIN
- STORM DRAIN MANHOLE
- CULVERT
- SEWER MANHOLE
- POWER POLE
- POWER POLE WITH LUMINAIRE
- POWER POLE WITH LUMINAIRE AND UNDERGROUND CONNECT
- POWER TRANSFORMER
- POWER METER
- GUY ANCHOR
- JUNCTION BOX
- T — TELEPHONE MANHOLE
- FO — FIBER OPTIC MANHOLE
- GAS VALVE
- WATER VALVE
- WATER METER
- W — WATER MANHOLE
- W — WATER VAULT LID
- FIRE HYDRANT
- BLOW-OFF
- FIRE DEPARTMENT CONNECT
- HOSE BIB
- IRRIGATION CONTROL VALVE
- U — UTILITY MANHOLE (GENERIC/UNKNOWN)
- U — UTILITY VAULT LID (GENERIC/UNKNOWN)
- STAND-PIPE (GENERIC/UNKNOWN)
- GATE POST/BOLLARD
- BOULDER
- SIGN
- XX" — STUMP, DIAMETER
- XX" — DECIDUOUS TREE, DIAMETER (# OF TRUNKS)
- P — PAINTED POWER
- T — PAINTED TELEPHONE
- FO — PAINTED FIBER OPTIC
- W — PAINTED WATER
- G — PAINTED GAS
- SD — STORM
- S — SEWER
- x — x — x — FENCE
- PAINTED STRIPE
- PAINTED SKIP STRIPE
- RAISED-BUTTON SOLID STRIPE
- RAISED-BUTTON SKIP STRIPE

PROPOSED

- EDGE OF PAVEMENT
- FLOWLINE
- CONTOUR
- CONCRETE
- GRAVEL
- GRASS
- AC — ASPHALT/CONCRETE
- CHLK — CHAINLINK
- DWY — DRIVEWAY
- B&S — BARK AND SHRUB
- ORDINARY HIGH WATER LINE
- WETLAND BOUNDARY LINE
- RIGHT OF WAY LINE
- PROPERTY LINE

- STORM DRAIN LINE, WITH DIRECTION OF FLOW
- STORM DRAIN CATCH BASIN, TYPE 2
- STORM DRAIN CATCH BASIN, TYPE 1, TYPE 1L
- REMOVE/ABANDON STORM DRAINAGE PIPE
- CATCH BASIN INSERT PER WSDOT STANDARD PLAN I-40.20
- SAWCUT
- APPROX. GRADING LIMITS
- NEW HMA (IN PLAN & SECTION)
- CEMENT CONCRETE PAVEMENT (IN PLAN & SECTION)
- SIGN

GENERAL NOTES - ALL SITES

1. CONTRACTOR SHALL PROVIDE CONTINUOUS ACCESS TO ALL DRIVEWAYS AND WALKWAYS BOTH INSIDE AND OUTSIDE OF THE WORKING AREA.
2. GAS, WATER, AND SEWER SERVICES TO INDIVIDUAL HOMES OR BUSINESSES ARE TYPICALLY NOT SHOWN. THE CONTRACTOR SHALL LOCATE SERVICES AND COORDINATE WITH UTILITY OWNER TO RELOCATE SERVICES THAT CONFLICT WITH NEW STORM DRAIN AS NECESSARY.
3. HAND DIG WITHIN 2 FT OF ALL EXISTING UTILITIES. INSTALL ETHOFOAM PAD AT ALL UTILITY CROSSINGS WITH LESS THAN 6" CLEARANCE TO NEW STORM DRAIN.
4. PIPE INVERTS AND RIM ELEVATIONS ARE SPECIFIED TO THE PROJECTED CENTER OF THE STRUCTURE. CATCH BASIN STATION AND OFFSETS ARE APPROXIMATED TO THE CENTER OF STRUCTURE. PIPE LENGTHS ARE APPROXIMATED AS 2 DIMENSIONAL PLAN VIEW DIMENSIONS.
5. REMOVE EXISTING STORM DRAIN PIPE AT ALL LOCATIONS WHERE THE PROPOSED STORM DRAIN ALIGNMENT CONFLICTS WITH THE EXISTING STORM DRAIN ALIGNMENT. FILL AND ABANDON PIPE SEGMENTS LEFT IN PLACE PER SPECIFICATIONS. EXCAVATIONS FOR PIPE REMOVAL SHALL BE BACKFILLED PER COT STD DETAIL G-1.
6. CLEAR AND GRUB EXISTING VEGETATION AS NECESSARY FOR CONSTRUCTION. PRESERVE AND PROTECT TREES LARGER THAN 4" DIAMETER UNLESS OTHERWISE NOTED ON THE PLANS.
7. UNLESS OTHERWISE NOTED, PIPE PROFILES ARE SHOWN ALONG THE PIPE CENTERLINE ALIGNMENT.
8. FURNISH AND INSTALL INLET PROTECTION, SILT FENCE, WATTLES, AND OTHER EROSION CONTROL MEASURES TO MINIMIZE SEDIMENT MIGRATION INTO STREAMS AND STORM DRAINAGE SYSTEMS.
9. IF PIPE CONNECTIONS ARE DISCOVERED THAT ARE NOT NOTED ON THE PLANS, CONTRACTOR SHALL INSTALL CONNECTION OF EXISTING PIPE TO THE NEW SYSTEM.
10. MARK ALL STORM DRAIN INLETS WITH "DUMP NO WASTE" AND EITHER "DRAINS TO STREAMS", "DRAINS TO WETLANDS", OR "DRAINS TO GROUNDWATER", AS APPLICABLE. INSTALL 4 INCH RAISED PAVEMENT STORM DRAIN MARKERS AT ALL CATCH BASIN INLETS.
11. POTHOLE EXISTING UTILITY CROSSINGS. POTHOLING OF EXISTING UTILITIES SHALL BE APPROVED BY THE ENGINEER PRIOR TO POTHOLING.
12. FOGLINE AND CHANNELIZATION TO BE REPLACED IN AREAS AFFECTED BY STORM TRENCHING AND WATER QUALITY RETROFIT INSTALLATION.

SURVEY NOTES (SITES TIB, E MARGINAL WAY S, STARFIRE WAY)

1. THE PURPOSE OF THIS TOPOGRAPHIC SURVEY IS FOR CIVIL ENGINEERING DESIGN. THIS IS NOT A BOUNDARY SURVEY. SOURCES OF BOUNDARY INFORMATION AS SHOWN INCLUDE FIELD-TIED MONUMENTATION, PLATS, COUNTY RECORDS OF SURVEY, AND AUDITOR INDEXING INFORMATION.
2. THE LOCATIONS OF EXISTING UNDERGROUND UTILITY SYSTEMS, AS SHOWN HEREON, ARE TAKEN FROM UTILITY LOCATE PAINT MARKS OR AS-BUILT PLANS AND ARE SHOWN IN AN APPROXIMATE WAY ONLY.

   THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. ALL LOCATOR SERVICES SHOULD BE CONTACTED PRIOR TO ANY CONSTRUCTION OR SUBSURFACE EXPLORATION. CALL 1-800-424-5555.
3. FIELD SURVEY: KPG, MARCH, 2020. LICENSEE MICHAEL R. BOWEN, P.L.S. NO. 29294/RONALD D. REICHEL, P.L.S. NO. 38015.
4. CONTOUR INTERVAL = 1 FOOT, ±0.5 FOOT PER NATIONAL MAPPING STANDARDS. CONTOURS DERIVED FROM DIRECT FIELD OBSERVATIONS.
5. STORM AND SEWER CONNECTIONS HAVE BEEN DRAWN FROM CENTER OF LID TO CENTER OF LID.
6. THE LOCATIONS AND DIMENSIONS OF UNDERGROUND VAULTS HAVE NOT BEEN VERIFIED AND ARE APPROXIMATE.
7. DUCTS ARE NOTED AS INDICATED IN THE FIELD BY UTILITY LOCATORS. MULTIPLE LINES AND/OR UTILITIES MAY SHARE DUCT RUNS; THIS MAY NOT BE SHOWN IN THE DRAWING.

HORIZONTAL AND VERTICAL DATUM

HORIZONTAL DATUM:	NAD 83/11
VERTICAL DATUM	NAVD 88

HORIZONTAL AND VERTICAL DATUMS ESTABLISHED BY RTK GPS OBSERVATION UTILIZING WSRN (WASHINGTON STATE REFERENCE NETWORK) WITH CHECK TO WSDOT CONTROL POINT HC17-5

ABBREVIATIONS

ABND	ABANDONED
AC	ASPHALT
AC	ASBESTOS CEMENT WATER PIPE
ACP	ASPHALT CONCRETE PAVEMENT
ADA	AMERICANS WITH DISABILITIES ACT
AP	ANGLE POINT
APPROX	APPROXIMATE
AVE	AVENUE
BLDG	BUILDING
BMP	BEST MANAGEMENT PRACTICE
BOW	BACK OF WALK
CB	CATCH BASIN
CDF	CONTROLLED DENSITY FILL
COT	CITY OF TUKWILA
CI	CAST IRON
℄	CENTERLINE
CL	CLASS
CO	CLEANOUT
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTAINER
COT	CITY OF TUKWILA
CSTC	CRUSHED SURFACING TOP COURSE
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DI	DUCTILE IRON
DIA, ø	DIAMETER
DWG	DRAWING
E	EASTING/EAST
EG	EXISTING GRADE
EL	ELEVATION
ELEV	ELEVATION
EOP	EDGE OF PAVEMENT
EX	EXISTING
EXIST	EXISTING
FDC	FIRE DEPARTMENT CONNECTION
FL	FLANGE
FL	FLOWLINE
FOC	FACE OF CURB
HORIZ	HORIZONTAL
HMA	HOT MIX ASPHALT
ICV	IRRIGATION CONTROL VALVE
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
INTL	INTERNATIONAL
L	LENGTH OF CURVE
LT	LEFT
LF	LINEAR FEET
LP	LOW POINT
MAX	MAXIMUM
MIN	MINIMUM
MH	MANHOLE
MIC	MONUMENT IN CASE
MJ	MECHANICAL JOINT
MW	MONITORING WELL
N	NORTHING/NORTH
NO	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD UTILITIES
PC	POINT OF CURVATURE
PCC	POINT OF CURVE ON CURVE
PE	POLYETHYLENE
PG	PERFORMANCE GRADE
PI	POINT OF INTERSECTION
PIV	POST INDICATOR VALVE
POB	POINT OF BEGINNING
POC	POINT OF CONNECTION
POE	POINT OF ENDING
PRC	POINT OF REVERSE CURVATURE
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
R	RADIUS
RJ	RESTRAINED JOINT
RT	RIGHT
S	SLOPE/SOUTH
SD	STORM DRAIN
SDP	STORM DRAIN PIPE
SEW	SEWER
SHT	SHEET
SSMH	SANITARY SEWER MANHOLE
ST	STREET
STA	STATION
STD	STANDARD
T	TANGENT LENGTH
TIB	TUKWILA INTERNATIONAL BOULEVARD
TOC	TOP OF CURB
TOG	TOP OF GRADE
TYP	TYPICAL
VC	VERTICAL CURVE
VERT	VERTICAL
VLT	VAULT
W	WEST/WITH
WAT	WATER
WDFW	WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
WY	WAY

WILLIAM R. EDRALIN — STATE OF WASHINGTON — 45211 — REGISTERED PROFESSIONAL ENGINEER

PUBLIC WORKS DEPT.
*ENGINEERING*STREETS*WATER*SEWER*BUILDING*

	by	date
designed	MKE	10/2020
drawn	MKE	10/2020
checked	KDA	10/2020
proj eng		
proj dir		
field bk no		

KPG
Interdisciplinary Design
3131 Elliott Ave, Suite 400, Seattle, WA 98121, (206) 286-1640
2502 Jefferson Ave, Tacoma, WA 98402, (253) 627-0720, www.kpg.com

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STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

LEGEND & ABBREVIATIONS

no	date	revisions

2
13

file no 19057COV.DWG
scale 1" = 40.00'
date 10/2020

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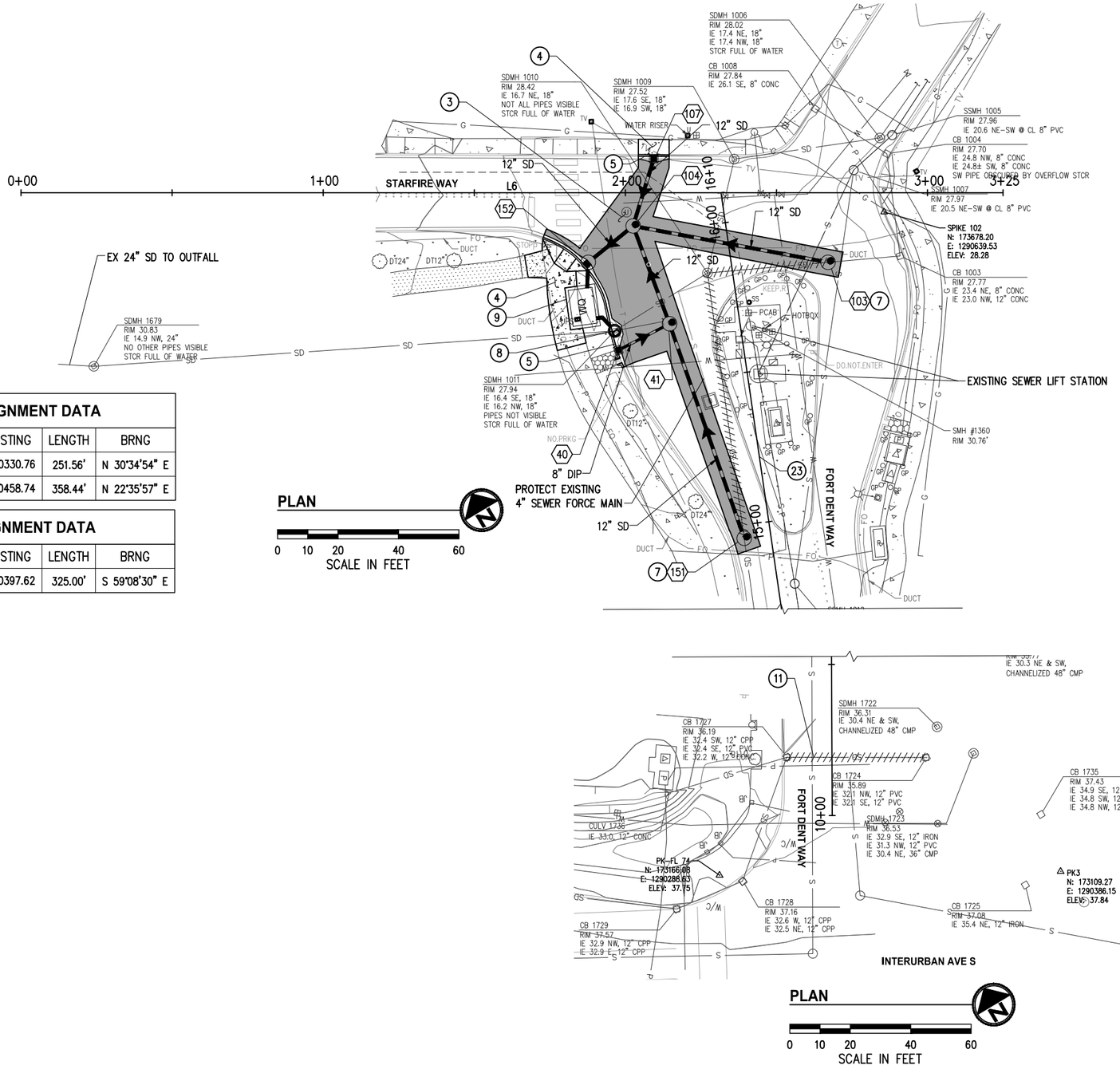

FORT DENT WAY ALIGNMENT DATA					
NUMBER	START STA	NORTHING	EASTING	LENGTH	BRNG
L4	10+00.00	173163.87	1290330.76	251.56'	N 30°34'54" E
L5	12+51.56	173380.44	1290458.74	358.44'	N 22°35'57" E

STARFIRE WAY ALIGNMENT DATA					
NUMBER	START STA	NORTHING	EASTING	LENGTH	BRNG
L6	0+00.00	173830.18	1290397.62	325.00'	S 59°08'30" E

GENERAL NOTES

1. SEE SHEET 2 FOR ADDITIONAL GENERAL NOTES.

CONSTRUCTION NOTES

(3) SAWCUT, REMOVE AND RESTORE PAVEMENT & MARKINGS TO INSTALL STORM DRAIN SYSTEM, PER COT STD PLAN RS-03.

(4) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE SIDEWALK TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-09.

(5) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE TRAFFIC CURB AND GUTTER TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-04 AND RS-15.

(7) CONNECT EXISTING STORM DRAIN PIPE TO NEW STRUCTURE.

(8) CONNECT NEW STORM DRAIN PIPE TO EXISTING STRUCTURE.

(9) INSTALL MODULAR WETLAND UNIT MWS 8' X 12' WITH INTERNAL BYPASS FOR HIGHER FLOWS. SEE STANDARD DETAIL.

(11) REMOVE STORM DRAIN STRUCTURE

(23) STORM PROFILE STA/OFF BASED UPON STARFIRE WY.

WILLIAM R. EDRALIN
STATE OF WASHINGTON
35211
REGISTERED
PROFESSIONAL ENGINEER

PUBLIC WORKS DEPT.
*ENGINEERING*STREETS*WATER*SEWER*BUILDING*

	by	date
designed	KP	10/2020
drawn	MKE	10/2020
checked	WRE	10/2020
proj eng		
proj dir		
field bk no		

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DOE DESIGN REPORT SUBMITTAL

STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

STORMWATER PLAN AND PROFILES
STARFIRE WAY

no	date	revisions

3
13

file no 19057STRMPLAN.DWG
scale 1" = 40'
date 10/2020

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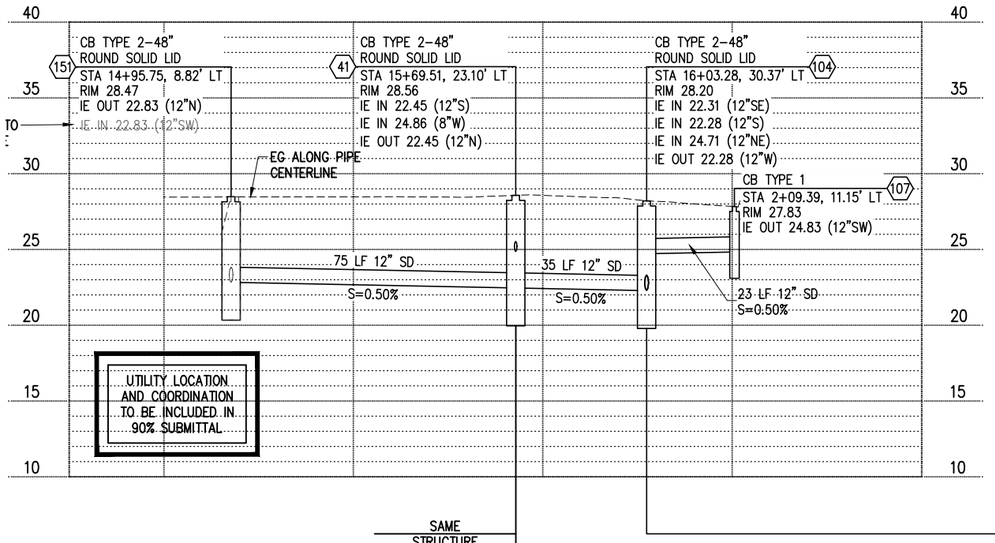
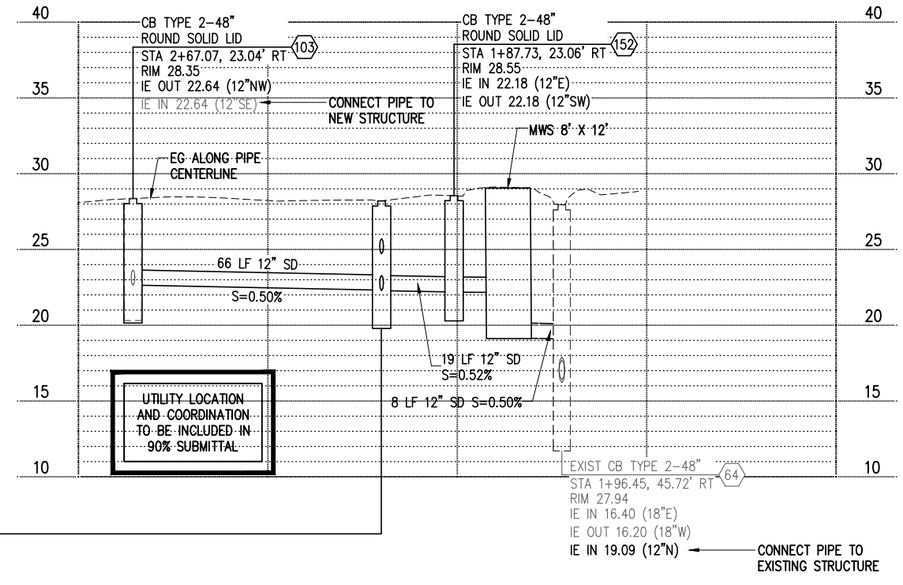
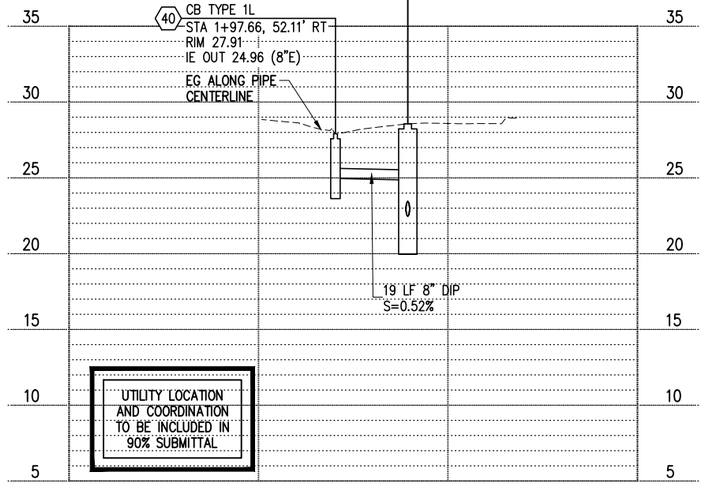




SAME STRUCTURE

SAME STRUCTURE



PROFILE
HOR: 1"=40' VER: 1"=5'

WILLIAM R. EDRALIN
STATE OF WASHINGTON
35211
REGISTERED
PROFESSIONAL ENGINEER

CITY OF TUKWILA

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CITY OF TUKWILA WASHINGTON 1908

PUBLIC WORKS DEPT.
*ENGINEERING*STREETS*WATER*SEWER*BUILDING*

	by	date
designed	XXX	10/2020
drawn	XXX	10/2020
checked	XXX	10/2020
proj eng		
proj dir		
field bk no		

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DOE DESIGN REPORT SUBMITTAL

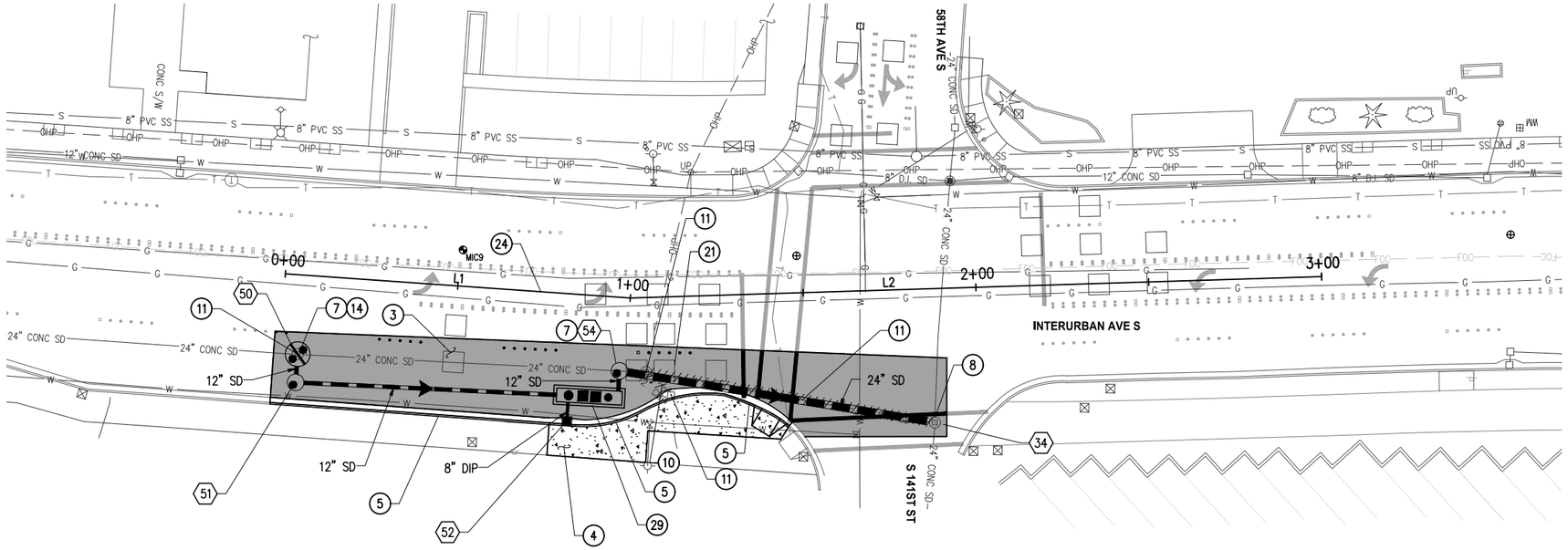
STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

STORMWATER PLAN AND PROFILES
STARFIRE WAY PROFILES

no	date	revisions

4
13

file no 19057STRMPLAN.DWG
scale 1" = 40'
date 10/2020



PLAN

0 10 20 40 60
SCALE IN FEET

INTERURBAN AVE S ALIGNMENT DATA					
NUMBER	START STA	NORTHING	EASTING	LENGTH	BRNG
L1	0+00.00	176907.13	1287968.68	100.00'	N 43°44'01" W
L2	1+00.00	176979.38	1287899.55	200.00'	N 49°31'49" W

ADDITIONAL BASEMAPPING TO BE COMPLETED PRIOR TO 90% SUBMITTAL

GENERAL NOTES

1. SEE SHEET 2 FOR ADDITIONAL GENERAL NOTES.

CONSTRUCTION NOTES

(3) SAWCUT, REMOVE AND RESTORE PAVEMENT & MARKINGS TO INSTALL STORM DRAIN SYSTEM, PER COT STD PLAN RS-03.

(4) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE SIDEWALK TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-09.

(5) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE TRAFFIC CURB AND GUTTER TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-04 AND RS-15.

(7) CONNECT EXISTING STORM DRAIN PIPE TO NEW STRUCTURE.

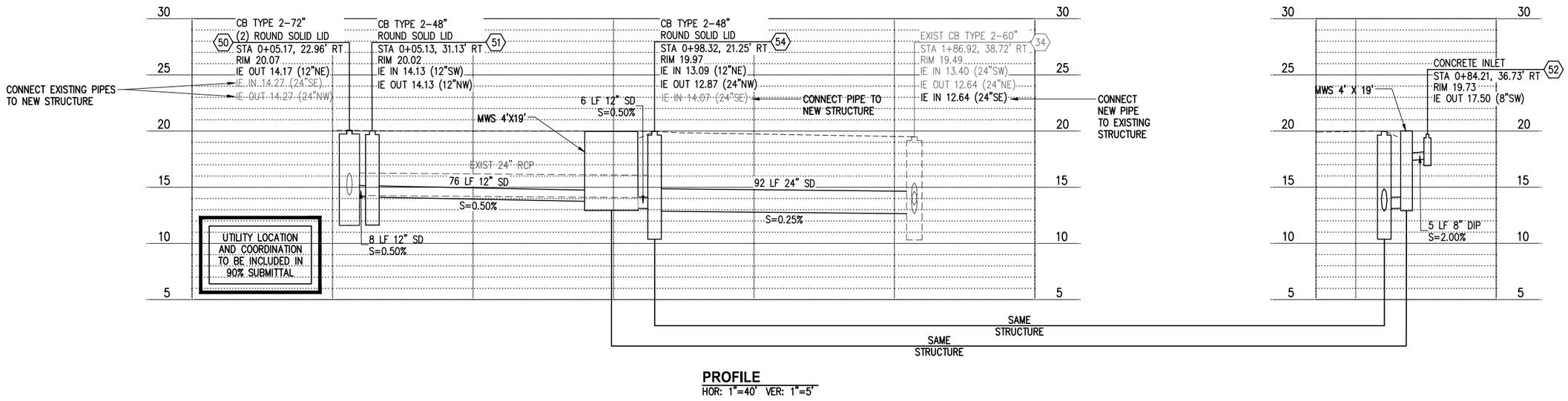
(8) CONNECT NEW STORM DRAIN PIPE TO EXISTING STRUCTURE.

(14) INSTALL FLOW SPLITTER.

(21) TRAFFIC LOOPS SHOWN ARE SCHEMATIC ONLY. CONTRACTOR TO VERIFY EXISTING LOOP LOCATION PRIOR TO EXCAVATION.

(24) STORM PROFILE STA/OFF BASED UPON INTERURBAN AVE S.

(29) INSTALL MODULAR WETLAND UNIT MWS 4' X 19'. SEE DETAIL



PROFILE
HOR: 1"=40' VER: 1"=5'

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STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

STORMWATER PLAN AND PROFILES
INTERURBAN AVE S

no	date	revisions

5
13

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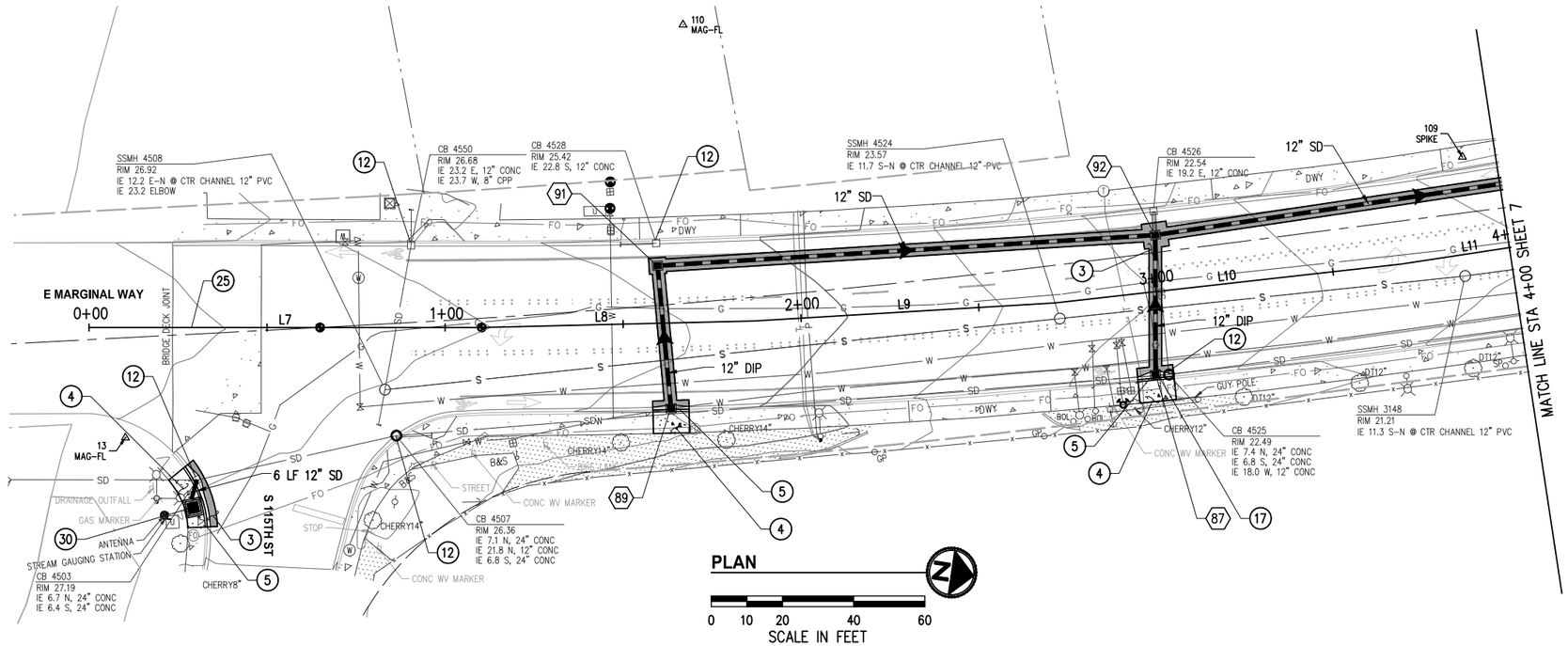
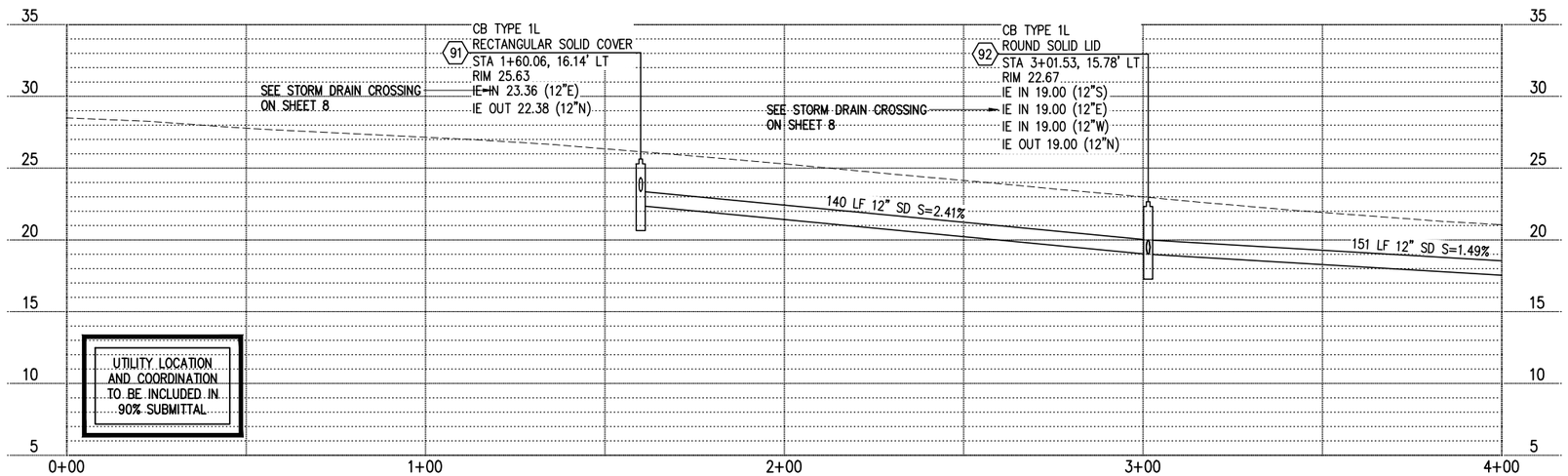


PLAN

0 10 20 40 60

SCALE IN FEET



GENERAL NOTES

1. SEE SHEET 2 FOR ADDITIONAL GENERAL NOTES.

CONSTRUCTION NOTES

(3) SAWCUT, REMOVE AND RESTORE PAVEMENT & MARKINGS TO INSTALL STORM DRAIN SYSTEM, PER COT STD PLAN RS-03.

(4) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE SIDEWALK TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-09.

(5) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE TRAFFIC CURB AND GUTTER TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-04 AND RS-15.

(12) INSTALL RECTANGULAR SOLID METAL COVER PER WSDOT STANDARD PLAN B-30.20.

(17) ADJUST WATER METER.

(22) REMOVE EXISTING CB AND CONNECT EXISTING STORM DRAINAGE PIPE TO PROPOSED MWS.

(25) STORM PROFILE STA/OFF BASED UPON E MARGINAL WY.

(30) INSTALL MODULAR WETLAND UNIT MWS 4' X 4' CLOSED VAULT WITH HIGH FLOW BYPASS.

CONTROL POINT LIST				
PT #	DESCRIPTION	NORTHING	EASTING	ELEVATION
13	MAG-FL	186136.89	1280819.34	28.51'
109	SPIKE	186497.05	1280687.24	21.29'
110	MAG-FL	186275.14	1280682.07	23.71'

E MARGINAL WAY ALIGNMENT DATA					
NUMBER	START STA	NORTHING	EASTING	LENGTH	BRNG
L7	0+00.00	186122.32	1280790.20	110.28'	N 8°17'07" W
L8	1+10.28	186231.45	1280774.30	76.54'	N 9°39'07" W
L9	1+86.82	186306.91	1280761.47	84.58'	N 11°43'00" W
L10	2+71.41	186389.73	1280744.29	97.81'	N 14°41'16" W
L11	3+69.22	186484.34	1280719.49	39.43'	N 16°55'41" W
L12	4+08.65	186522.06	1280708.01	391.36'	N 17°21'29" W

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STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

STORMWATER PLAN AND PROFILES
STA 0+00 TO STA 4+00
E MARGINAL WAY

no	date	revisions

6
13

file no 19057STRMPLAN.DWG
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date 10/2020

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GENERAL NOTES

1. SEE SHEET 2 FOR ADDITIONAL GENERAL NOTES.

CONSTRUCTION NOTES

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(4) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE SIDEWALK TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-09.

(5) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE TRAFFIC CURB AND GUTTER TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-04 AND RS-15.

(8) CONNECT NEW STORM DRAIN PIPE TO EXISTING STRUCTURE.

(10) REMOVE OR ABANDON (PLUG) STORM DRAINAGE PIPE.

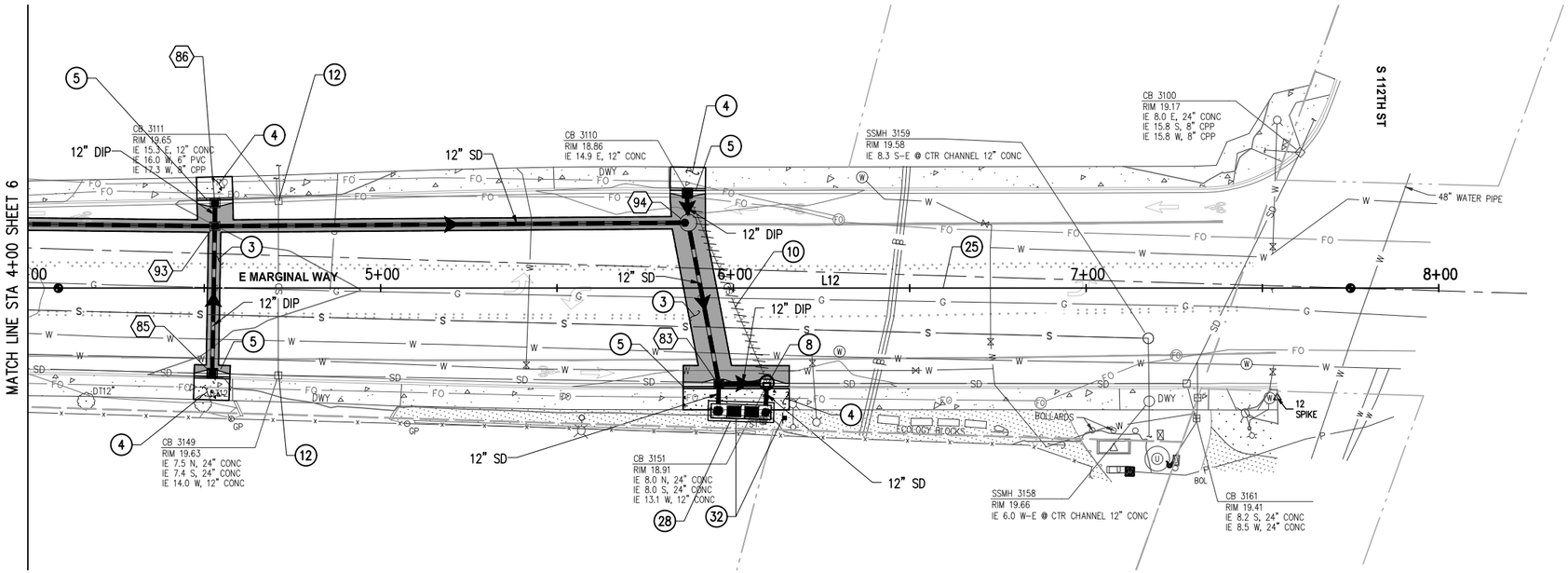
(12) INSTALL RECTANGULAR SOLID METAL COVER PER WSDOT STANDARD PLAN B-30.20.

(25) STORM PROFILE STA/OFF BASED UPON E MARGINAL WY.

(28) INSTALL MODULAR WETLAND UNIT MWS 4' X 17' CLOSED VAULT WITH HIGH FLOW BYPASS.

(32) REMOVE AND RELOCATE EXISTING NO PARKING SIGN.

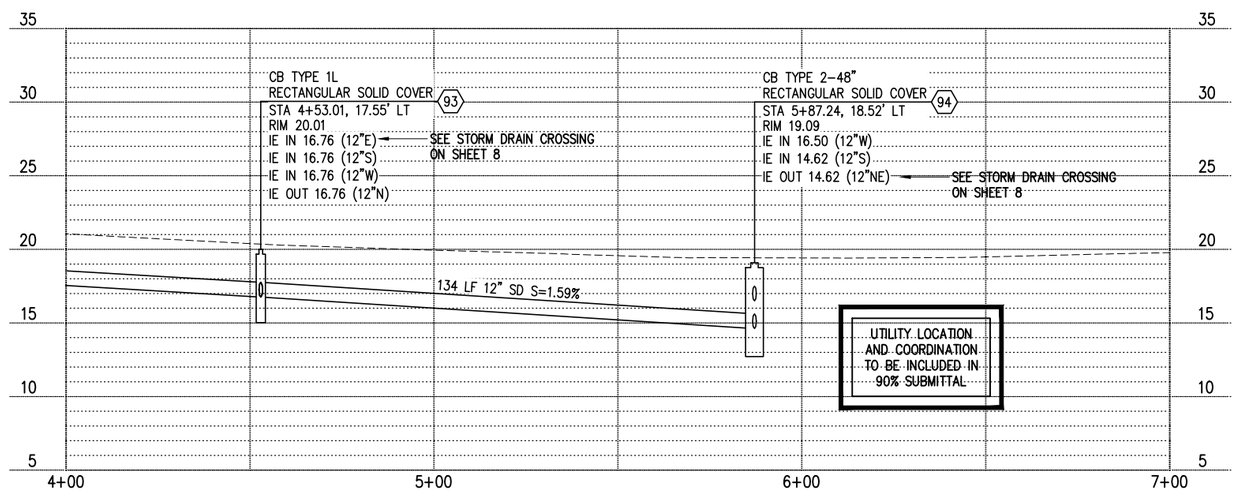
CONTROL POINT LIST				
PT #	DESCRIPTION	NORTHING	EASTING	ELEVATION
12	SPIKE	186861.15	1280634.48	20.08'



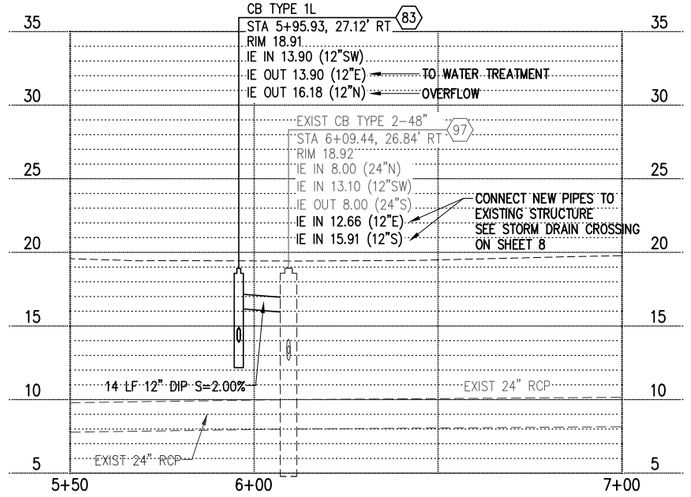
PLAN

0 10 20 40 60

SCALE IN FEET



WEST SIDE



EAST SIDE

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STORMWATER PLAN AND PROFILES
STA 4+00 TO STA 8+00
E MARGINAL WAY

no	date	revisions

7
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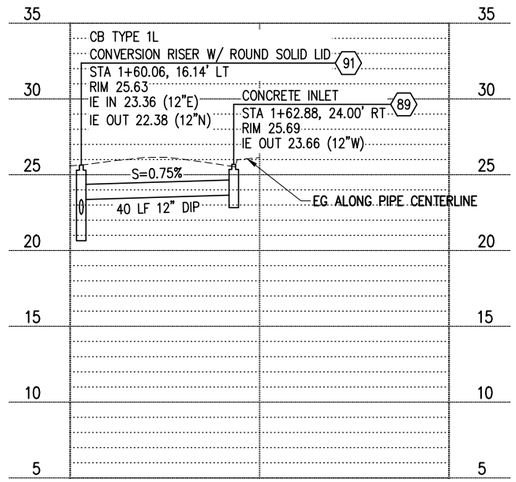

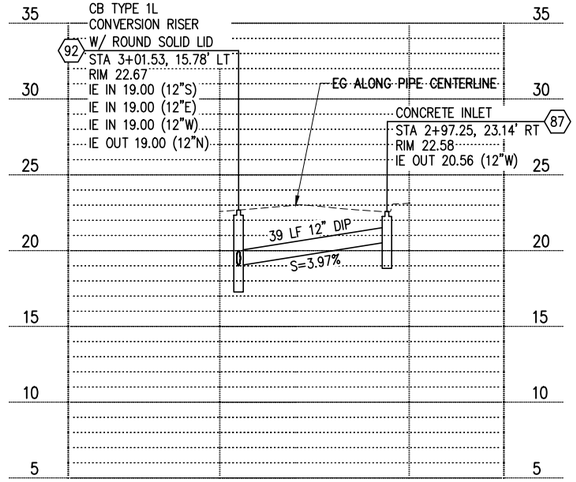

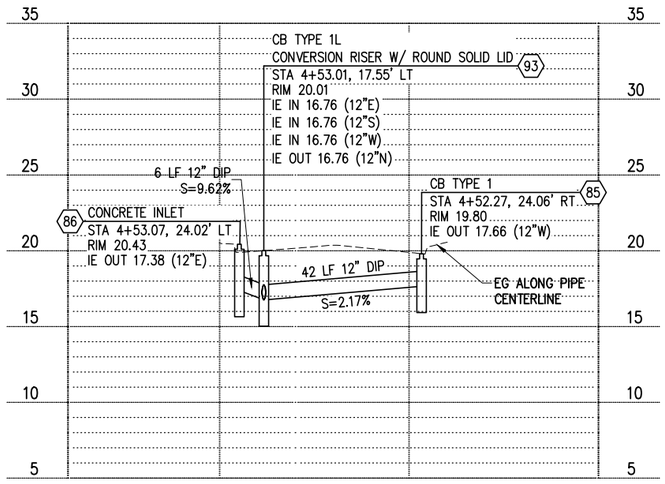

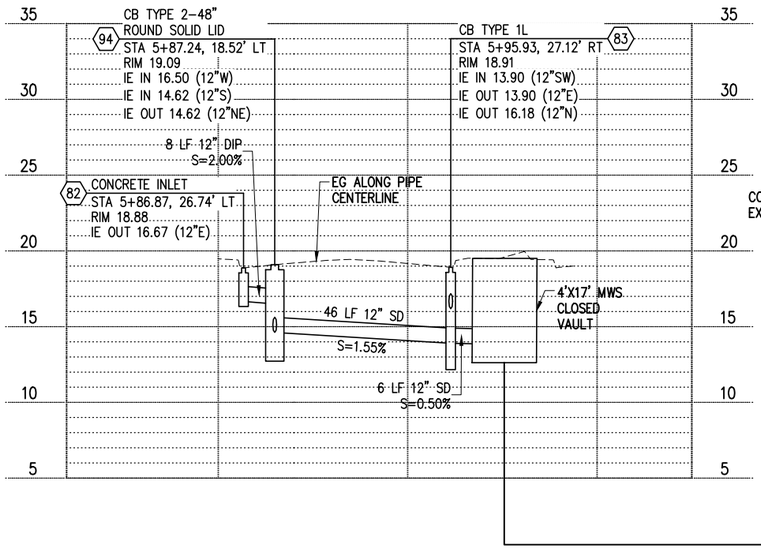

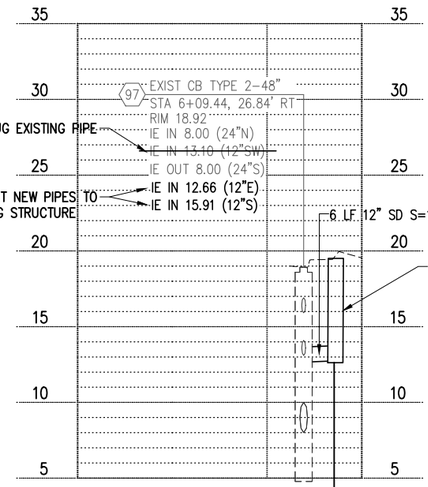

UTILITY LOCATION AND COORDINATION TO BE INCLUDED IN 90% SUBMITTAL

PROFILE
HOR: 1"=40' VER: 1"=5'

WILLIAM R. EDRALIN — STATE OF WASHINGTON — 45211 — REGISTERED PROFESSIONAL ENGINEER

CITY OF TUKWILA

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STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

STORMWATER PLAN AND PROFILES
E MARGINAL WAY PROFILES

no	date	revisions

8
13

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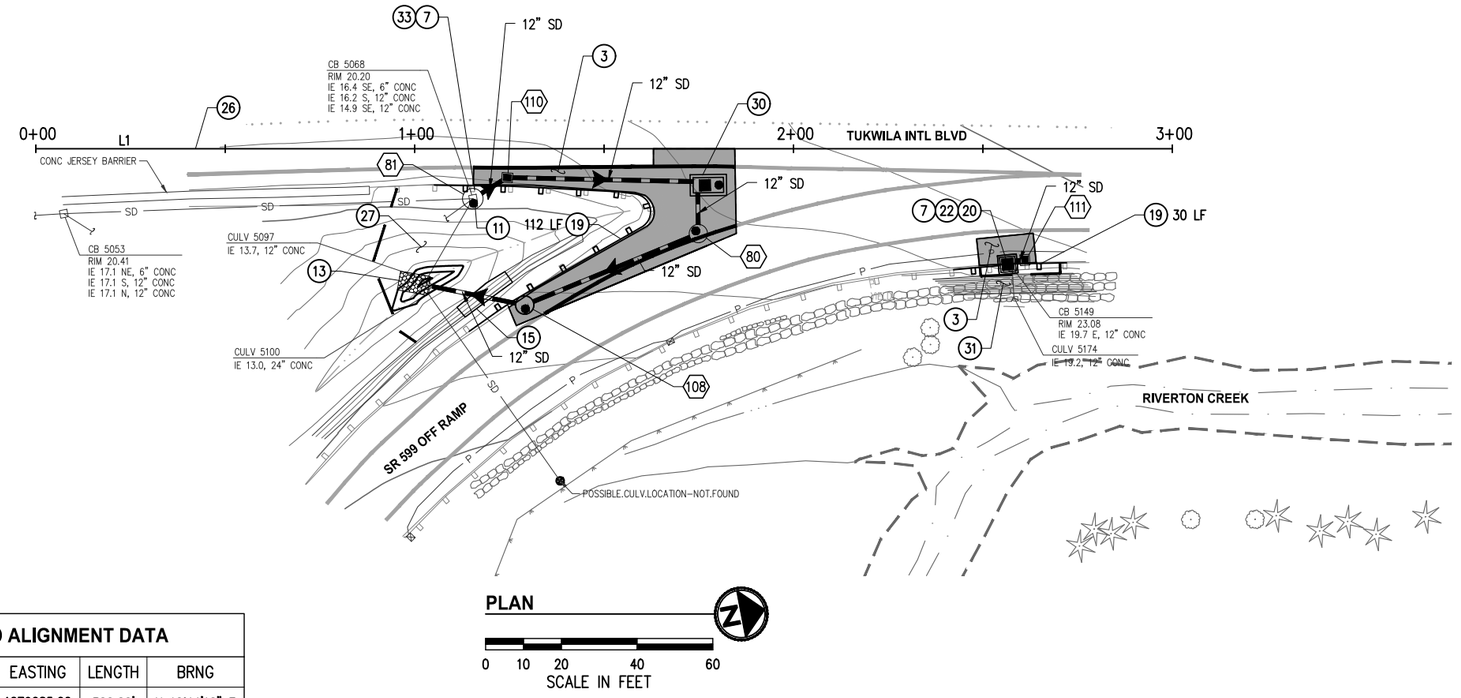
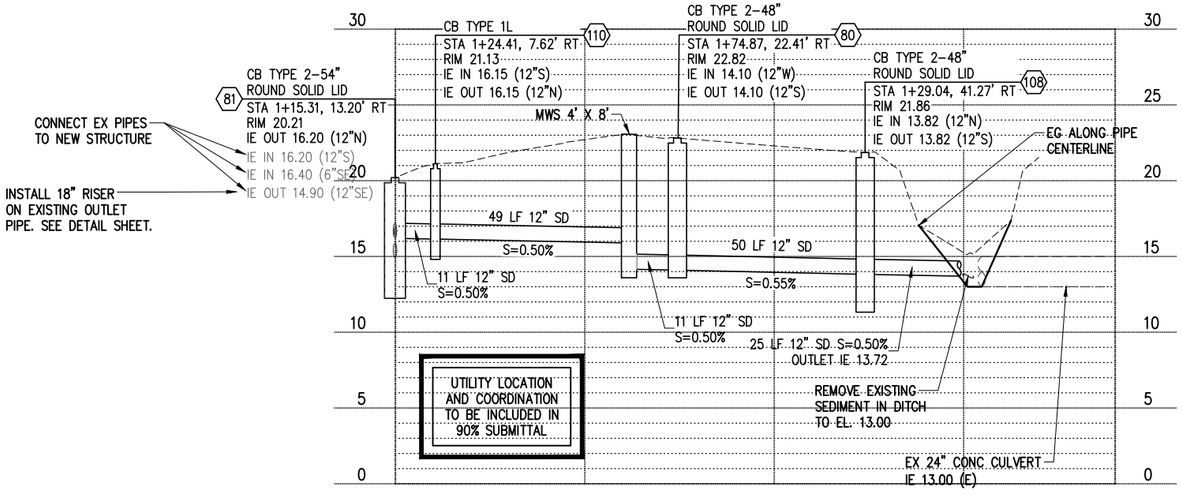


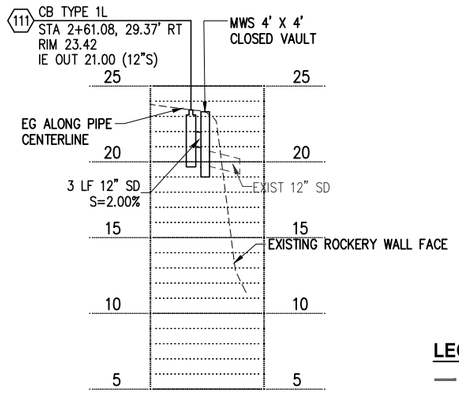
PLAN

0 10 20 40 60
SCALE IN FEET

TUKWILA INTL BLVD ALIGNMENT DATA					
NUMBER	START STA	NORTHING	EASTING	LENGTH	BRNG
L1	0+00.00	185236.62	1279085.02	300.00'	N 10°44'10" E



PROFILE
HOR: 1"=40' VER: 1"=5'



SITE SPECIFIC GENERAL NOTES

1. SEE SHEET 2 FOR ADDITIONAL GENERAL NOTES.
2. OHW, WETLAND, AND RIVERTON CREEK FLOWLINE, ARE AT APPROXIMATE LOCATIONS AS DELINEATED IN THE FIELD BY THIRD PARTY.

REVEGETATION NOTES

1. REMOVE ALL EXCESS MATERIAL AND DEBRIS FROM AREAS TO BE SEEDED. DISPOSE OF REMOVED MATERIALS OFFSITE.
2. PREPARE ROADSIDE SEEDING AREA TO A WEED FREE AND BARE CONDITION.
3. BRING AREA TO UNIFORM GRADE AND TILL 3" FINE COMPOST INTO TOP 6" OF NATIVE SOIL AREA TO BE SEEDED. ANY SLOPES 3(H) TO 1(V) OR STEEPER SHALL NOTE BE TILLED UNLESS OTHERWISE SPECIFIED.
4. COMPACT TO PROVIDE A REASONABLY FIRM BUT FRIABLE SEEDBED. CONDITION THE SOIL WITH SUFFICIENT WATER UNTIL COMPLETION OF THE SEEDING.
5. SEED WITHIN 2 DAYS OF PREPARATION PER STANDARD SPECIFICATION 9-14.3.

CONSTRUCTION NOTES

(3) SAWCUT, REMOVE AND RESTORE PAVEMENT & MARKINGS TO INSTALL STORM DRAIN SYSTEM, PER COT STD PLAN RS-03.

(4) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE SIDEWALK TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-09.

(5) SAWCUT, REMOVE, AND RESTORE CEMENT CONCRETE TRAFFIC CURB AND GUTTER TO INSTALL STORM DRAIN SYSTEM PER COT STD PLAN RS-04 AND RS-15.

(7) CONNECT EXISTING STORM DRAIN PIPE TO NEW STRUCTURE.

(11) REMOVE STORM DRAIN STRUCTURE

(13) REMOVE SEDIMENT FROM EXISTING DITCH. REPAIR OR REPLACE EXISTING PIPE OUTFALL PROTECTION.

(15) REMOVE AND RESTORE ROCKERY.

(19) REMOVE AND RESET GUARDRAIL PER WSDOT STD PLAN C-20.10.

(20) INSTALL MODULAR WETLAND UNIT MWS 4' X 8' CLOSED VAULT.

(22) REMOVE EXISTING CB AND CONNECT EXISTING STORM DRAINAGE PIPE TO PROPOSED MWS.

(26) STORM PROFILE STA/OFF BASED UPON TUKWILA INTL BLVD.

(27) RESTORE VEGETATION AROUND GRADING LIMITS IN-KIND. SEE REVEGETATION NOTES, THIS SHEET.

(30) INSTALL MODULAR WETLAND UNIT MWS 4' X 4' CLOSED VAULT WITH HIGH FLOW BYPASS.

(31) PROTECT AND MAINTAIN EXISTING ROCKERY WALL STABILITY DURING INSTALLATION OF WQ IMPROVEMENTS.

(33) INSTALL 18" CMP RISER IN EXISTING 12" OUTLET PIPE. SET TOP OF RISER AT ELEVATION EQUAL TO MODULAR WETLAND HIGH FLOW BYPASS WEIR WALL.

LEGEND

- ORGINARY HIGH WATER LINE
- WETLAND BOUNDARY LINE
- APPROX. GRADING LIMIT
- BANKWIDTH LINE

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STORMWATER PLAN AND PROFILES
TUKWILA INTL BLVD

no	date	revisions

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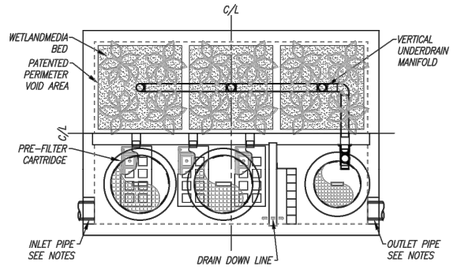
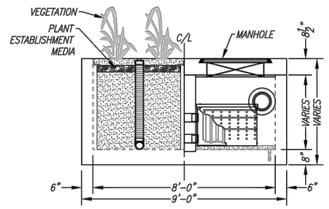
SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.346	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	2EA ø30"	OPEN PLANTER	ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



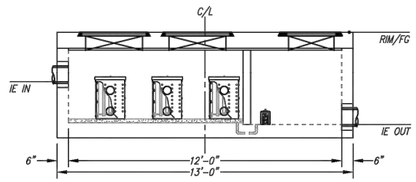
LEFT END VIEW

INSTALLATION NOTES

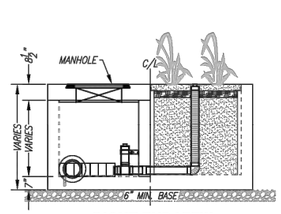
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.346
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS — THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,263; 7,470,370; 8,702,210; 9,924,612; REGARDED FOREIGN PATENTS OR OTHER PENDING PATENTS

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Bio Clean — A Forterra Company

MWS-L-8-12-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

MODULAR WETLAND SYSTEMS LINEAR 8' X 12'

NTS

NOTE: STANDARD DETAIL WILL BE REPLACED BY VENDOR PROVIDE DRAWINGS FOR 90% SUBMITTAL. BASIS OF DESIGN IS BIOCLEAN LINEAR MODULAR WETLAND UNITS AND MAY BE REPLACED BY EQUIVALENT DOE GULD APPROVED ENHANCED WATER QUALITY TREATMENT TECHNOLOGY. CONFIGURATION OF FACILITY WILL BE CLOSED TOP (NO PLANTINGS) WITH LIDS AND HATCHES RATED FOR H-20 TRAFFIC LOADING. VENDOR TO DESIGN HATCHES TO MAINTAIN MEDIA FILTER SYSTEMS.

WILLIAM R. EDRALIN — STATE OF WASHINGTON — 35211 — REGISTERED PROFESSIONAL ENGINEER

CITY OF TUKWILA

PUBLIC WORKS DEPT.
*ENGINEERING*STREETS*WATER*SEWER*BUILDING*

	by	date
designed	KP	10/2020
drawn	KP	10/2020
checked	WRE	10/2020
proj eng		
proj dir		
field bk no		

KPG — Interdisciplinary Design
3131 Elliott Ave, Suite 400, Seattle, WA 98121, (206) 286-1640
2502 Jefferson Ave, Tacoma, WA 98402, (253) 627-0720, www.kpg.com

DOE DESIGN REPORT SUBMITTAL

STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

STORMWATER DETAILS
STARFIRE WAY DETAILS

no	date	revisions

10
13
file no 19057STRMDET.DWG
scale 1" = 40'
date 10/2020

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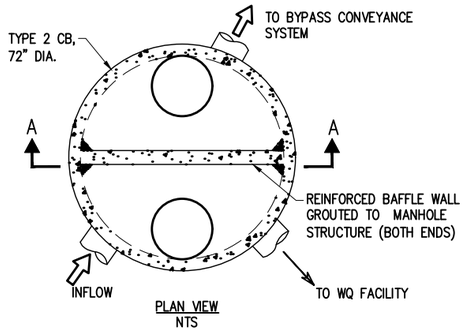
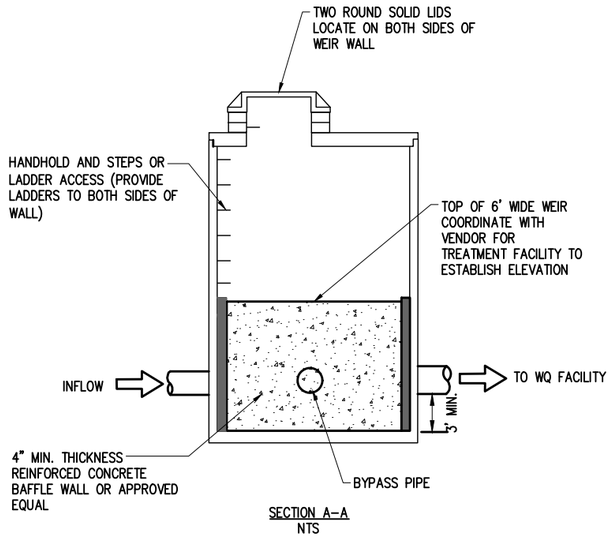


PLAN VIEW
NTS

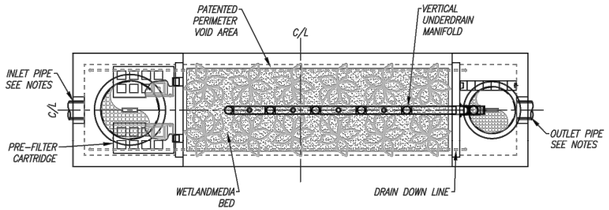


SECTION A–A
NTS

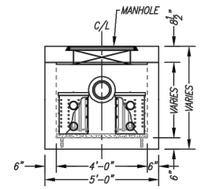
TYPICAL FLOW SPLITTER STRUCTURE DETAIL
NTS

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.237	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	ø30"	OPEN PLANTER	ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



LEFT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
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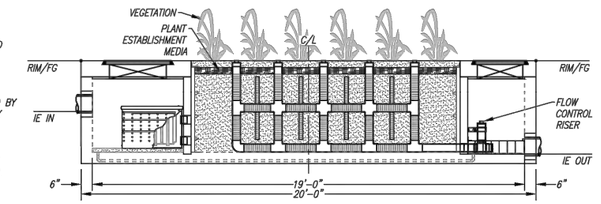
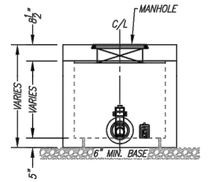
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.237
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.1
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.

*CALIFORNIA

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MWS-L-4-19-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

MODULAR WETLAND SYSTEMS LINEAR 4' X 19'
NTS

NOTE: STANDARD DETAIL WILL BE REPLACED BY VENDOR PROVIDE DRAWINGS FOR 90% SUBMITTAL. BASIS OF DESIGN IS BIOCLEAN LINEAR MODULAR WETLAND UNITS AND MAY BE REPLACED BY EQUIVALENT DOE GULD APPROVED ENHANCED WATER QUALITY TREATMENT TECHNOLOGY. CONFIGURATION OF FACILITY WILL BE CLOSED TOP (NO PLANTINGS) WITH LIDS AND HATCHES RATED FOR H–20 TRAFFIC LOADING. VENDOR TO DESIGN HATCHES TO MAINTAIN MEDIA FILTER SYSTEMS.

WILLIAM R. EDRALIN — STATE OF WASHINGTON — 25211 — REGISTERED PROFESSIONAL ENGINEER

PUBLIC WORKS DEPT.
*ENGINEERING*STREETS*WATER*SEWER*BUILDING*

	by	date
designed	KP	10/2020
drawn	KP	10/2020
checked	WRE	10/2020
proj eng		
proj dir		
field bk no		

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Interdisciplinary Design
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STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

STORMWATER DETAILS
INTERURBAN AVE S DETAILS

no	date	revisions

11
13

file no 19057STRMDET.DWG
scale 1" = 40'
date 10/2020

CITY OF TUKWILA

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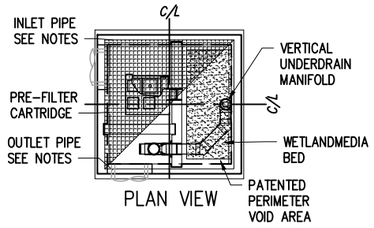
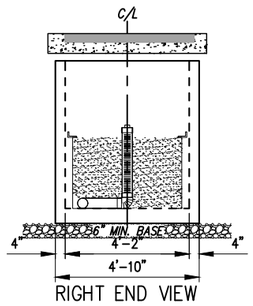
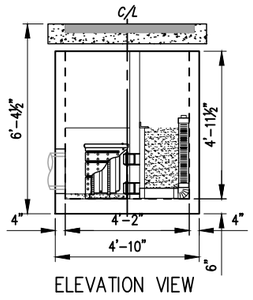


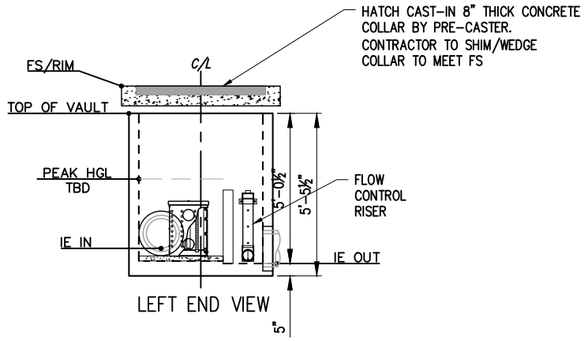
PLAN VIEW



RIGHT END VIEW



ELEVATION VIEW



LEFT END VIEW

MODULAR WETLAND SYSTEMS LINEAR 4' X 4'
NTS

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.206	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	ø30"	OPEN PLANTER	ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION

INSTALLATION NOTES

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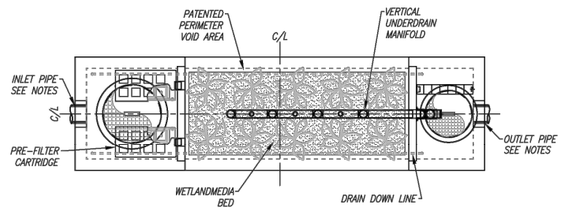
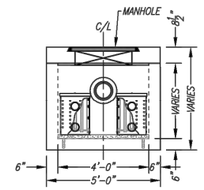
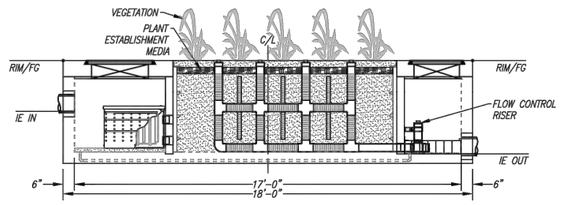


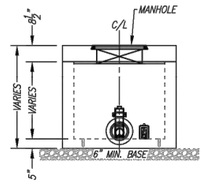
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.206
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	1.8
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

PROPRIETARY

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MWS-L-4-17-V
STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

MODULAR WETLAND SYSTEMS LINEAR 4' X 17'
NTS

NOTE: STANDARD DETAIL WILL BE REPLACED BY VENDOR PROVIDE DRAWINGS FOR 90% SUBMITTAL. BASIS OF DESIGN IS BIOCLEAN LINEAR MODULAR WETLAND UNITS AND MAY BE REPLACED BY EQUIVALENT DOE GULD APPROVED ENHANCED WATER QUALITY TREATMENT TECHNOLOGY. CONFIGURATION OF FACILITY WILL BE CLOSED TOP (NO PLANTINGS) WITH LIDS AND HATCHES RATED FOR H-20 TRAFFIC LOADING. VENDOR TO DESIGN HATCHES TO MAINTAIN MEDIA FILTER SYSTEMS.

WILLIAM R. EDRALIN — STATE OF WASHINGTON — 35211 — REGISTERED PROFESSIONAL ENGINEER

CITY OF TUKWILA

PUBLIC WORKS DEPT.
*ENGINEERING*STREETS*WATER*SEWER*BUILDING*

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proj eng		
proj dir		
field bk no		

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DOE DESIGN REPORT SUBMITTAL

STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

STORMWATER DETAILS
E MARGINAL WAY DETAILS

no	date	revisions

12
13

file no 19057STRMDET.DWG
scale 1" = 40'
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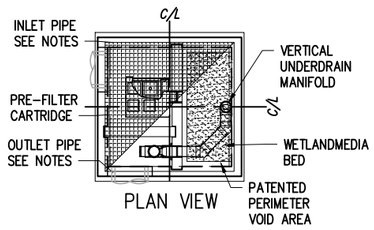
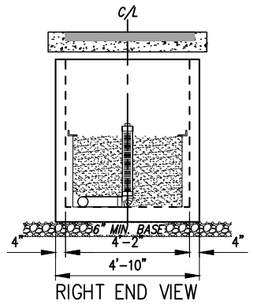
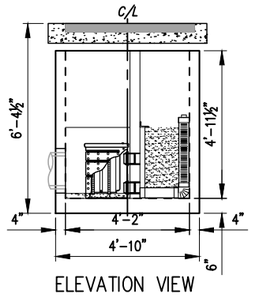
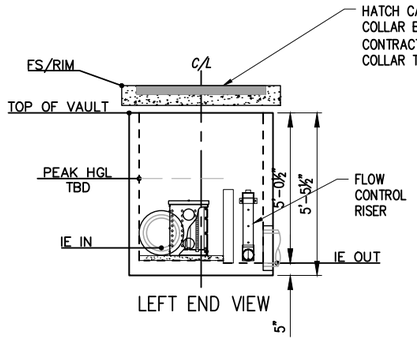


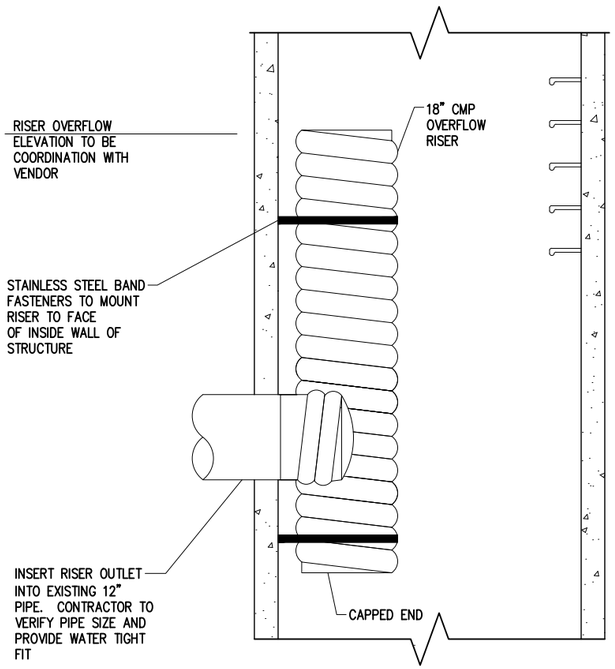






MODULAR WETLAND SYSTEMS LINEAR 4' X 4'

NTS

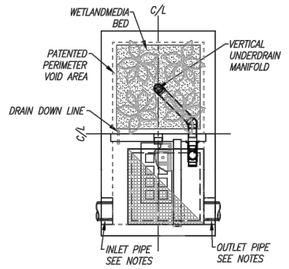


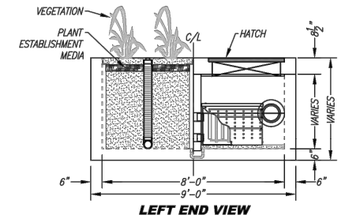
RISER OVERFLOW DETAIL FOR HIGH FLOW BYPASS

NTS

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.115	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	36" X 36"	OPEN PLANTER	N/A
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION





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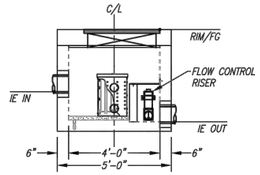

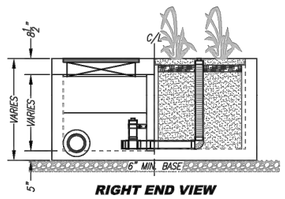

GENERAL NOTES

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TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

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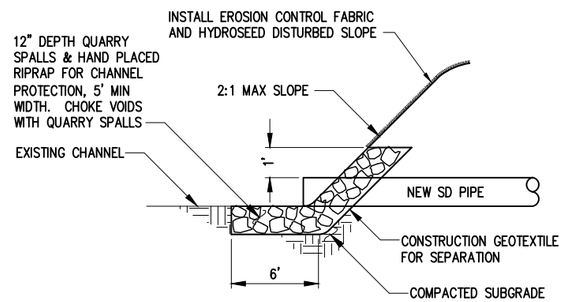
Bio Clean — A Forterra Company

MWS-L-4-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

NOTE: STANDARD DETAIL WILL BE REPLACED BY VENDOR PROVIDE DRAWINGS FOR 90% SUBMITTAL. BASIS OF DESIGN IS BIOCLEAN LINEAR MODULAR WETLAND UNITS AND MAY BE REPLACED BY EQUIVALENT DOE GULD APPROVED ENHANCED WATER QUALITY TREATMENT TECHNOLOGY. CONFIGURATION OF FACILITY WILL BE CLOSED TOP (NO PLANTINGS) WITH LIDS AND HATCHES RATED FOR H-20 TRAFFIC LOADING. VENDOR TO DESIGN HATCHES TO MAINTAIN MEDIA FILTER SYSTEMS.

MODULAR WETLAND SYSTEMS LINEAR 4' X 8'

NTS



PIPE SLOPE PROTECTION & SLOPE RESTORATION DETAIL

NTS

WILLIAM R. EDRALIN — STATE OF WASHINGTON — 45211 — REGISTERED PROFESSIONAL ENGINEER

SEAL OF TUKWILA WASHINGTON 1908

PUBLIC WORKS DEPT.
*ENGINEERING*STREETS*WATER*SEWER*BUILDING*

	by	date
designed	KP	10/2020
drawn	KP	10/2020
checked	WRE	10/2020
proj eng		
proj dir		
field bk no		

KPG
Interdisciplinary Design
3131 Elliott Ave, Suite 400, Seattle, WA 98121, (206) 286-1640
2502 Jefferson Ave, Tacoma, WA 98402, (253) 627-0720, www.kpg.com

DOE DESIGN REPORT SUBMITTAL

STORMWATER OUTFALLS WATER QUALITY RETROFIT PROJECT

STORMWATER DETAILS
TUKWILA INTL BLVD DETAILS

no	date	revisions

13
13

file no 19057STRMDET.DWG
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date 10/2020

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TUKWILA
city of

APPENDIX F – GULD & Operation and Maintenance Information

WASHINGTON STATE DEPARTMENT OF ECOLOGY

July 2017

GENERAL USE LEVEL DESIGNATION FOR BASIC, ENHANCED, AND PHOSPHORUS TREATMENT

For the

MWS-Linear Modular Wetland

Ecology's Decision:

Based on Modular Wetland Systems, Inc. application submissions, including the Technical Evaluation Report, dated April 1, 2014, Ecology hereby issues the following use level designation:

1. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Basic treatment

    - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.

2. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Phosphorus treatment

    - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.

3. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Enhanced treatment

    - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.

4. Ecology approves the MWS - Linear Modular Wetland Stormwater Treatment System units for Basic, Phosphorus, and Enhanced treatment at the hydraulic loading rate listed above. Designers shall calculate the water quality design flow rates using the following procedures:

    - Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
    - Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
    - Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.

5. These use level designations have no expiration date but may be revoked or amended by Ecology, and are subject to the conditions specified below.

Ecology's Conditions of Use:

Applicants shall comply with the following conditions:

1. Design, assemble, install, operate, and maintain the MWS – Linear Modular Wetland Stormwater Treatment System units, in accordance with Modular Wetland Systems, Inc. applicable manuals and documents and the Ecology Decision.
2. Each site plan must undergo Modular Wetland Systems, Inc. review and approval before site installation. This ensures that site grading and slope are appropriate for use of a MWS – Linear Modular Wetland Stormwater Treatment System unit.
3. MWS – Linear Modular Wetland Stormwater Treatment System media shall conform to the specifications submitted to, and approved by, Ecology.
4. The applicant tested the MWS – Linear Modular Wetland Stormwater Treatment System with an external bypass weir. This weir limited the depth of water flowing through the media, and therefore the active treatment area, to below the root zone of the plants. This GULD applies to MWS – Linear Modular Wetland Stormwater Treatment Systems whether plants are included in the final product or not.
5. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device.

    - Typically, Modular Wetland Systems, Inc. designs MWS - Linear Modular Wetland systems for a target prefilter media life of 6 to 12 months.
    - Indications of the need for maintenance include effluent flow decreasing to below the design flow rate or decrease in treatment below required levels.
    - Owners/operators must inspect MWS - Linear Modular Wetland systems for a minimum of twelve months from the start of post-construction operation to determine site-specific

maintenance schedules and requirements. You must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to SWMMEW, the wet season in eastern Washington is October 1 to June 30). After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.

- Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flowrate and/or a decrease in pollutant removal ability.
- When inspections are performed, the following findings typically serve as maintenance triggers:
    - Standing water remains in the vault between rain events, or
    - Bypass occurs during storms smaller than the design storm.
    - If excessive floatables (trash and debris) are present (but no standing water or excessive sedimentation), perform a minor maintenance consisting of gross solids removal, not prefilter media replacement.
    - Additional data collection will be used to create a correlation between pretreatment chamber sediment depth and pre-filter clogging (see *Issues to be Addressed by the Company* section below)

6. Discharges from the MWS - Linear Modular Wetland Stormwater Treatment System units shall not cause or contribute to water quality standards violations in receiving waters.

Applicant:	Modular Wetland Systems, Inc.
Applicant's Address:	*PO. Box 869* *Oceanside, CA 92054*

Application Documents:

- *Original Application for Conditional Use Level Designation*, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., January 2011
- *Quality Assurance Project Plan*: Modular Wetland system – Linear Treatment System performance Monitoring Project, draft, January 2011.
- *Revised Application for Conditional Use Level Designation*, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., May 2011
- *Memorandum: Modular Wetland System-Linear GULD Application Supplementary Data, April 2014*
- *Technical Evaluation Report: Modular Wetland System Stormwater Treatment System Performance Monitoring, April 2014.*

Applicant's Use Level Request:

General use level designation as a Basic, Enhanced, and Phosphorus treatment device in accordance with Ecology's Guidance for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE) January 2011 Revision.

Applicant's Performance Claims:

- The MWS – Linear Modular wetland is capable of removing a minimum of 80-percent of TSS from stormwater with influent concentrations between 100 and 200 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 50-percent of Total Phosphorus from stormwater with influent concentrations between 0.1 and 0.5 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 30-percent of dissolved Copper from stormwater with influent concentrations between 0.005 and 0.020 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 60-percent of dissolved Zinc from stormwater with influent concentrations between 0.02 and 0.30 mg/l.

Ecology Recommendations:

- Modular Wetland Systems, Inc. has shown Ecology, through laboratory and field-testing, that the MWS - Linear Modular Wetland Stormwater Treatment System filter system is capable of attaining Ecology's Basic, Total phosphorus, and Enhanced treatment goals.

Findings of Fact:

Laboratory Testing

The MWS-Linear Modular wetland has the:

- Capability to remove 99 percent of total suspended solids (using Sil-Co-Sil 106) in a quarter-scale model with influent concentrations of 270 mg/L.
- Capability to remove 91 percent of total suspended solids (using Sil-Co-Sil 106) in laboratory conditions with influent concentrations of 84.6 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 93 percent of dissolved Copper in a quarter-scale model with influent concentrations of 0.757 mg/L.
- Capability to remove 79 percent of dissolved Copper in laboratory conditions with influent concentrations of 0.567 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 80.5-percent of dissolved Zinc in a quarter-scale model with influent concentrations of 0.95 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 78-percent of dissolved Zinc in laboratory conditions with influent concentrations of 0.75 mg/L at a flow rate of 3.0 gpm per square foot of media.

Field Testing

- Modular Wetland Systems, Inc. conducted monitoring of an MWS-Linear (Model # MWS-L-4-13) from April 2012 through May 2013, at a transportation maintenance facility in Portland, Oregon. The manufacturer collected flow-weighted composite samples of the system's influent and effluent during 28 separate storm events. The system treated approximately 75 percent of the runoff from 53.5 inches of rainfall during the monitoring period. The applicant sized the system at 1 gpm/sq ft. (wetland media) and 3gpm/sq ft. (prefilter).
- Influent TSS concentrations for qualifying sampled storm events ranged from 20 to 339 mg/L. Average TSS removal for influent concentrations greater than 100 mg/L (n=7) averaged 85 percent. For influent concentrations in the range of 20-100 mg/L (n=18), the upper 95 percent confidence interval about the mean effluent concentration was 12.8 mg/L.
- Total phosphorus removal for 17 events with influent TP concentrations in the range of 0.1 to 0.5 mg/L averaged 65 percent. A bootstrap estimate of the lower 95 percent confidence limit (LCL95) of the mean total phosphorus reduction was 58 percent.
- The lower 95 percent confidence limit of the mean percent removal was 60.5 percent for dissolved zinc for influent concentrations in the range of 0.02 to 0.3 mg/L (n=11). The lower 95 percent confidence limit of the mean percent removal was 32.5 percent for dissolved copper for influent concentrations in the range of 0.005 to 0.02 mg/L (n=14) at flow rates up to 28 gpm (design flow rate 41 gpm). Laboratory test data augmented the data set, showing dissolved copper removal at the design flow rate of 41 gpm (93 percent reduction in influent dissolved copper of 0.757 mg/L).

Issues to be addressed by the Company:

1. Modular Wetland Systems, Inc. should collect maintenance and inspection data for the first year on all installations in the Northwest in order to assess standard maintenance requirements for various land uses in the region. Modular Wetland Systems, Inc. should use these data to establish required maintenance cycles.
2. Modular Wetland Systems, Inc. should collect pre-treatment chamber sediment depth data for the first year of operation for all installations in the Northwest. Modular Wetland Systems, Inc. will use these data to create a correlation between sediment depth and pre-filter clogging.

Technology Description:
Download at http://www.modularwetlands.com/

Contact Information:

Applicant: Zach Kent
BioClean A Forterra Company.
398 Vi9a El Centro
Oceanside, CA 92058
zach.kent@forterrabp.com

Applicant website: http://www.modularwetlands.com/

Ecology web link: http://www.ecy.wa.gov/programs/wg/stormwater/newtech/index.html

Ecology: Douglas C. Howie, P.E.
Department of Ecology
Water Quality Program
(360) 407-6444
douglas.howie@ecy.wa.gov

Revision History

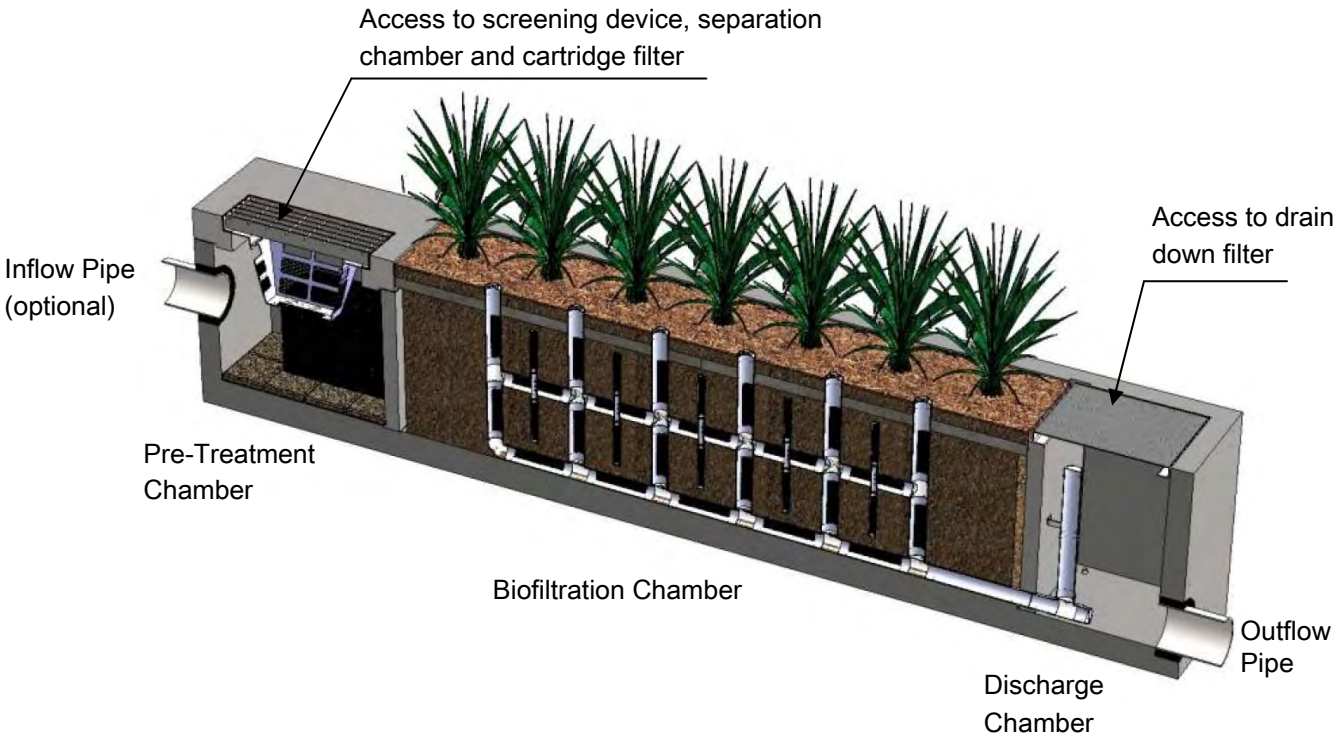
Date	**Revision**
June 2011	Original use-level-designation document
September 2012	Revised dates for TER and expiration
January 2013	Modified Design Storm Description, added Revision Table, added maintenance discussion, modified format in accordance with Ecology standard
December 2013	Updated name of Applicant
April 2014	Approved GULD designation for Basic, Phosphorus, and Enhanced treatment
December 2015	Updated GULD to document the acceptance of MWS-Linear Modular Wetland installations with or without the inclusion of plants
July 2017	Revised Manufacturer Contact Information (name, address, and email)

Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - (*5 minute average service time*).
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - (*10 minute average service time*).
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - (*10-15 minute per cartridge average service time*).
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - (*5 minute average service time*).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - (*Service time varies*).

System Diagram



Maintenance Procedures

Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

Maintenance Procedure Illustration

Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.



Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.

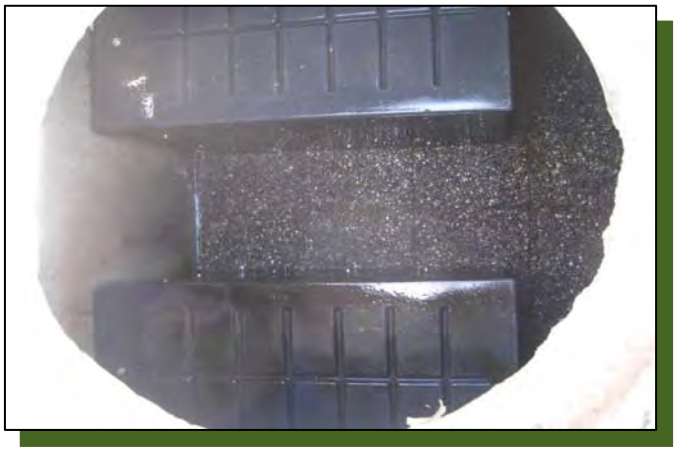






Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.







Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.



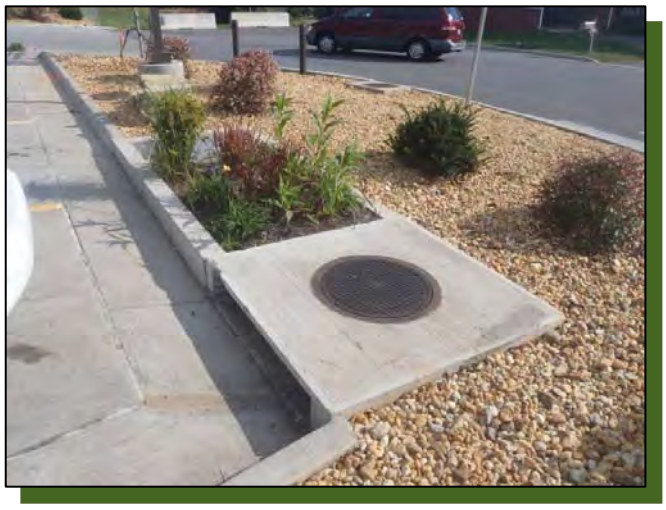
Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.









Inspection Form



Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Inspection Report
Modular Wetlands System

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	**Yes**	**No**	**Comments**
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	**Yes**	**No**
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes:

2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

Maintenance Report



Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

Memorandum

To:	Sherry Edquid
From:	Trista Kobluskie, Shailee Jain, PE
Copies:	
Date:	May 7, 2024
Subject:	Tukwila Retrofit and Maintenance Plan for WSDOT Facilities
Project No.:	33383.000

Introduction

The City of Tukwila operates a municipal storm sewer and a surface water utility which is funded primarily through rates and changes on developed surfaces authorized by Tukwila Municipal Code (TMC) Chapter 14.32, Storm and Surface Water Rates and Charges. The Washington State Department of Transportation (WSDOT) operates several limited access highways within the city limits which can be subject to the City's storm and surface water service charge under certain conditions. The conditions are itemized in the Revised Code of Washington (RCW) Chapter 90.03.525, and they include the following:

- Stormwater fees may be charged on WSDOT limited access highways.
- Rate charged is limited to 30% of rate charged on comparable property.
- The City's roads department must be charged the same rate or more.
- Use of revenue is limited solely to planning and constructing stormwater control facilities that directly reduce impacts of runoff from state limited access highways or implementing best management practices that will reduce the need for these facilities.
- The utility must submit an annual plan to WSDOT that shows how fees charged will be spent.
- The utility must provide a progress report on use of charges assessed for the prior year.
- The annual plan must be consistent with the objectives identified in former RCW 90.78.010, Stormwater Management Funding and Implementation Program for Highway-Related Problems, such as the following:
  - Greater state-wide coordination for the construction of stormwater treatment facilities;
  - Encouraging multijurisdictional projects;
  - Developing priorities and approaches for implementing activities within watersheds;
  - Identifying and prioritizing stormwater retrofit programs;
  - Evaluating methods to determine cost benefits of proposed projects;
  - Identifying ways to facilitate sharing technical resources;
  - Developing methods for evaluating activities carried out under the program; and
  - Identifying potential funding sources for continuation of the program.

The annual plan must include percent impact due to highway runoff for each proposed stormwater facility and the location and number of highway acres treated. WSDOT fees may not be used for amenities incorporated into the facilities.

The City may accumulate fees over time to fund planned larger projects.

The City would like to continue assessing an annual Surface Water fee to WSDOT, and it has incorporated identification of opportunities to retrofit runoff from WSDOT limited access highways into the Surface Water Comprehensive Plan update in 2024 (SWCP 2024). An evaluation of the set of projects selected for advancement under the SWCP 2024 determined that none of the selected projects met the stringent criteria of RCW 90.03.525 which would allow the City to assess an annual Surface Water fee to WSDOT. Therefore, the City requested a separate analysis to identify projects to retrofit and maintain WSDOT stormwater infrastructure on limited access facilities.

Project and Fee History

The City has assessed a Surface Water fee to WSDOT under the current criteria since 2019. It has planned for and used WSDOT funds for the following projects since 2020:

- Stormwater Outfall Water Quality Retrofit at Tukwila International Boulevard/State Route 599 (SR 599)
- Surface Water Comprehensive Plan
- Gilliam Creek Fish Barrier Removal and Habitat Enhancement Project
- Nelsen Side Channel Project

Table 1 contains a history of Surface Water fees charged to WSDOT.

Table 1 Annual WSDOT Billing and Fund Balance

Year	Annual Billing to WSDOT	Beginning Account Balance	WSDOT Share of Project(s)	Ending Fund Balance
2020	$141,870.44	$141,870.44	$1,763	$140,107
2021	$144,708.22	$284,815.50	$4,797	$139,912
2022	$151,943.80	$431,962.62	$1,280	$150,664
2023	$159,695.73	$590,378.38	TBD	TBD

With more than $500,000 fund balance, the City has an opportunity to implement a moderate stormwater retrofit project or continue to bank annual fees to fund a larger retrofit project.

Coordination with WSDOT Retrofit Planning

WSDOT has been engaged in planning stormwater retrofits for several years. In 2022, the Washington State Legislature passed the Move Ahead Washington funding bill to encourage WSDOT to enhance stormwater treatment from existing roads and infrastructure. The Legislature established direct goals and also prioritization criteria for projects. As a result, WSDOT is in the process of identifying and prioritizing hundreds of stormwater retrofit opportunities throughout the state. The process will result in a map indicating high and medium priority locations to address the Move Ahead Washington priority focus areas. The prioritization will consider preferred locations of tribes, cities, counties, and others. The prioritization process is expected to complete later in 2024.

The approximately $500 million in construction funding identified by the Legislature will become available beginning in the 2029-2031 biennium.

As part of the prioritization, WSDOT is identifying locations of elevated structures near water bodies in the Puget Sound region where bioretention boxes may be installed on downspouts. Elevated structures have become a priority because of the emerging research showing that 6PPD-q, a stormwater contaminant related to tire-wear, has lethal effects on coho salmon and detrimental effects on other fish, the proximity of many elevated structures to water bodies, and the typical lack of treatment of runoff from elevated structures.

The retrofit and maintenance projects selected for Tukwila's Retrofit and Maintenance Plan for WSDOT Facilities are intended to manage some of the same pollutants identified by the Legislature as a critical concern for salmon, such as 6-PPD-q.

Tukwila Retrofit and Maintenance Plan for WSDOT Facilities

Otak used the methodology described in this section to develop this Tukwila Retrofit and Maintenance Plan for WSDOT Facilities.

Eligible Highways and Project Types

Interstate 5 (I-5), Interstate 405 (I-405) and State Routes 518 (SR-518) and 599 (SR-599) are the eligible limited access highways in Tukwila (Figure 1).

Eligible projects must "directly reduce impacts of runoff." WSDOT personnel have indicated that the agency's interpretation of the phrase "directly reduce impacts of runoff" has been broad in recent years and has included fish passage projects where WSDOT has impacts on downstream conveyance and water quality and projects to restore native vegetation where temperature impairments exist. The eligible project types may be narrowed due to public input. Because WSDOT has not published guidance for the interpretation of the phrase "directly reduce impacts of runoff," this study has taken a narrow interpretation and has only considered stormwater facilities that provide runoff treatment, flow control, or a combination of these functions. Projects which use best management practices (BMPs) found in either the Stormwater Management Manual for Western Washington or the Highway Runoff Manual are considered eligible projects.

Eligible projects may be located either on City rights-of-way or WSDOT rights-of-way, and responsibility for long term maintenance can vary. Location and maintenance considerations should be negotiated during the project design phase.

Fees may also be used to compensate the City for implementing BMPs that would reduce the need for stormwater facilities. Locations identified by City staff were considered for this portion of the study, which identified one possible Maintenance Project location.

Potential Site Selection

Before identifying potential sites, City staff and Otak met with WSDOT personnel to learn about known water quality and facility maintenance problems in the two WSDOT maintenance areas that intersect Tukwila. The meeting did not reveal any potential sites with obvious water quality or maintenance issues that could be eligible for retrofit by the City. The meeting revealed some highway segments which were removed from consideration for various reasons, including:

- The segments of I-5 south of the I-5/I-405 interchange in Tukwila have numerous functioning stormwater facilities, and WSDOT personnel indicated they are in good condition. Those segments of I-5 were therefore excluded from the study.
- Two limited access highways in Tukwila will be improved pursuant to WSDOT's I-405/SR 167 Corridor Program. The improvements associated with this program will result in the construction of runoff treatment and flow control facilities serving most of the segments of I-405 within Tukwila and the I-5/I-405 interchange. As a result, the team did not consider costly permanent stormwater facilities to serve I-405 or the I-5/I-405 interchange vicinity in the study.

Subsequently, Otak conducted a rapid desktop analysis of the WSDOT highway drainage system within Tukwila to identify potential locations for retrofits. Criteria for potential sites included:

- Drains a limited access highway.
- Not located in the excluded segments of I-5, as described above.
- Existing drainage to discharge/outfall is piped.
- Discharge is at a surface water.
- Identified as untreated by WSDOT or appears untreated based on review of the drainage system in GIS.

Two sites were selected using the following preferences:

- Drainage from elevated structures without treatment. These were preferred because they have been identified as a priority by WSDOT due to emerging research on the lethal effects of a contaminant related to tire-wear on coho salmon.
- Near to City rights-of-way or property (e.g. Park) which would facilitate maintenance access.
- Feasibility of construction and maintenance, such as avoiding long duration of traffic control on the highway.

Selected Project Locations

Two retrofit project sites and a maintenance project site were selected. See Figure 1 for locations.

Site WSDOT-1 – Retrofit Project

Bioretention Boxes Under Elevated Structures, similar to the ones piloted through Stewardship Partners adopt-a-down spout program in Collaboration with WSDOT (Stewardship Partners, 2022). See Figure 2.

The bioretention boxes will be located on the Green River Trail near the Intersection of Interurban Avenue S and I-405 ramps (See Figure 2). The locations were identified as elevated structures in WSDOT's Stormwater Retrofit Prioritization Draft Web Map (WSDOT, 2024).

This project will improve water quality, including addressing 6-PPD-q, in the effluent from elevated I-405 ramps and Interurban Avenue S roadway runoff. The information relating to WSDOT stormwater infrastructure in the area is limited; known infrastructure available in GIS is mapped in Figure 2. There are three mapped WSDOT surface water outfalls near this location (GIS Discharge Point feature numbers DISC00016550, DISC00017959, and DISC00020524). Each outfall has a conveyance mode of "Open Pervious" and a feature type of "Pipe Unknown" according to their GIS attributes. It is unclear whether these outfalls are the same as down spouts from the elevated structures or whether they are a feature downstream of the down spouts with other stormwater inputs. The first step will be to verify the presence of downspouts from the I-405 ramps and Interurban S onto the Green River Trail and how they discharge into the Green River. If there are downspouts, the feasibility of installing bioretention boxes in those locations needs to be evaluated. Then, the catchment areas draining into the downspouts will be

delineated. For catchment area delineation, survey of adjacent stormwater infrastructure and/or review of WSDOT contract plans will be conducted. Based on the topography, the approximate area to be surveyed is delineated in Figure 2. Once the area draining to each downspout has been determined, the number of bioretention boxes to be installed to provide maximum benefit for the cost will be analyzed.

The bioretention boxes may be constructed from 330-gallon Intermediate Bulk Container (IBC) totes with soil/filtration media (Stewardship Partners, 2022) and could be installed by a City maintenance crew. The dimensions of a 350-gallon IBC are approximately 42-in x 48-in x 51-in. The essential components of the bioretention boxes are an inlet pipe that drains up to the water quality flow rate into a forebay with a baffle to slow velocity and collect sediment, soil media for filtration, an outlet pipe that drains into the downstream infrastructure, and a bypass pipe that conveys flows above the water quality flow rate to the downstream stormwater infrastructure. The water quality flow rate and amount of filtration media needed to treat the runoff will be determined based on Department Ecology's 2019 Stormwater Management Manual for Western Washington sizing of BMP T7.30 Bioretention for water quality treatment. Downspouts serving larger areas may require more than one bioretention box. Where there is a need for multiple boxes, the boxes will need a flow splitter upstream to divert flows so that they can function in parallel.

For one bioretention box installation, Otak estimates a total cost of $50,000 to $70,000. The cost assumes a field reconnaissance, desktop review, basic engineering design, materials, and installation using a City crew. There may be economies of scale if single units are to be installed at multiple locations, but the cost may increase at locations where more than one box needs to be set up in parallel because of a large catchment area with higher water quality flows.

Note the Green River Trail at this location forms the White Swan levee. Any permitting considerations related to construction on the levee are not accounted for in the above cost.

Table 2 WSDOT-1 - Bioretention Boxes Under Elevated Structures - Cost Opinion

Item	Cost Opinion
Field Reconnaissance and Desktop Review	$10,000
Survey and Basic Engineering	$20,000
Materials	$10,000 - $20,000
Construction	$10,000 - $20,000
Total Per Box	**$50,000 - $70,000**
Units	**3**
Total Project	**$150,000 - $210,000**

Site WSDOT-2 – Retrofit Project

Bioretention Urban Retrofit (BURito) along SR-599 east embankment between S 112th Street and Tukwila International Boulevard. See Figure 3.

BURitos are filtration devices that consist of a non-proprietary filter media wrapped in a high-density polyethylene sock. The media is composed of a compost and sand bioretention mix. Runoff is filtered as it flows horizontally through the device. BURitos were developed and tested by the City of Bellevue in

concert with Cedar Grove VIS Systems® in 2019. This solution treats 6-PPD-q, has low capital costs, uses natural materials, and supports innovation.

The project will treat highway runoff from eleven WSDOT outfalls along SR-599 (GIS Discharge Point feature numbers DISC00012138, DISC00012137, DISC00012136, DISC00011775, DISC00011774, DISC00011773, DISC00011772, DISC00011771, DISC00011770, and two features which do not have ID numbers). The outfalls discharge runoff from approximately one quarter mile of the four-lane highway into the Duwamish River. One or more of these outfalls could also be conveying a fish-bearing stream under SR-599, but the specific characteristics of each culvert were not confirmed in the desktop analysis. The first step in the project will be to complete a field reconnaissance, identify any outfalls that also are conveying streams, and omit those locations from the project plan. Because the BURitos might act as fish barriers, they should not be placed below culverts conveying streams. During the field reconnaissance it will also be important to identify the vertical elevations of the outfalls. BURitos should not be installed downstream of any outfalls discharging at or below the ordinary high-water mark of the Duwamish River.

Invasive vegetation appears to have grown on the embankment between SR-599 and the Duwamish River, based on Google Street View, which may need to be cleared prior to installation of the BURitos. The BURitos will be field fitted downstream of the outfalls and keyed into the river embankment to hold them in place. The BURitos will be installed above the Duwamish River ordinary high-water mark. The 100-year base flood elevation, regulated by the Federal Emergency Management Agency (FEMA), for the Duwamish River at this location is 12.3’ (NAVD 88) (King County, 2024). If possible, the BURitos will also be installed along contours with elevations greater than 12.3’. The length and number of BURitos will be quantified during design based on information gathered from the field reconnaissance. The installation may be completed by a City crews.

BURitos may need to be replaced every 2-3 years based on the testing at the City of Bellevue facility.

The estimated cost for this project is $100,000 which includes field reconnaissance, collaboration with Cedar Grove VIS Systems® for design, and construction using a City crew. FEMA permitting is not anticipated for this project.

Table 3 WSDOT-2 - Bioretention Urban Retrofit (BURito) along SR-599 - Cost Opinion

Item	Cost Opinion
Field Reconnaissance and Desktop Review	$30,000
Basic Engineering	$20,000
Materials	$30,000
Construction	$20,000
Total	**$100,000**

Site WSDOT-3 – Maintenance Project

City staff identified a maintenance project location just north of Southcenter Blvd. where a WSDOT culvert passes under the offramp from I-5 South. Drainage from I-5 may comingle with natural flow in a series of ditches and conveyance pipes flowing south for approximately 3,000 linear feet adjacent to I-5 South from S 144th Street to just north of Southcenter Blvd. Flows are treated through engineered dispersion. The WSDOT proportion of contribution to the issue at this site is 100%. The drainage infrastructure is

associated with the I-5 Tukwila to Lucile Street HOV and SC&DI – Stage 3 project constructed between 1995 and 1998. See Figures 4 and 5.

Due to debris blocking the inlet to the culvert, the location backs up and floods Southcenter Blvd on a regular basis. The flooding impacts traffic on Southcenter Blvd. and could mobilize roadway pollutants into runoff discharged to Gilliam Creek. City crews routinely remove blockages from the inlet to the culvert prior to storms in order to prevent flooding. The WSDOT asset identification for selected elements of the drainage system related to this flooding and water quality maintenance location is given is given in Table 4.

Table 4 WSDOT-3 - Southcenter Maintenance Project Location Details

WSDOT Feature Type	Relative Position	WSDOT Asset Reference No.	WSDOT Asset Reference Text
Ditch	North extent of drainage system	919114	WSDOT0000919114
Catch Basin	Northern extent of drainage system	N/A	WSDOT0000129596
Catch Basin	Southern extent of drainage system	928900	WSDOT0000928900
Drain Pipe	Southern extent of drainage system	987688	WSDOT0000987688
Discharge Point	Location of Clogging	965223	WSDOT0000965223

The City proposes to track and report to WSDOT the labor and equipment costs for two to three maintenance visits per year to clear blockages at the inlet to the culvert as a source control measure.

Next Steps

The City may submit the selected projects in the next annual plan to WSDOT and incorporate them into the SWCP 2024 Capital Improvement Program.

When WSDOT publishes the final retrofit prioritization study, then the City may review it and select additional stretches of highway within Tukwila where more thorough retrofit identification can be performed.

When WSDOT publishes guidance for interpreting the meaning of ”projects that directly reduce impacts of runoff”, the City should reevaluate whether vegetation restoration, habitat improvement, and fish passage projects may be included in Tukwila’s Retrofit and Maintenance Plan for WSDOT Facilities and annual report to WSDOT.

References

Cedar Grove Composting, Undated. Cedar Grove VIS Systems® web page. https://cedar-grove.com/cedar-grove-vis-stormwater-systems. Accessed March 2024.

McIntyre, Jenifer, 2021. Roads to Ruin; Will Water Quality Retrofits Save Salmon? Report to King County WaterWorks Grant Program. Washington State University. July. https://www.wastormwatercenter.org/wp-content/uploads/BURito-Report-Final-July-2021.pdf

Otak, 2024. Unpublished Summary of City of Tukwila on Stormwater Retrofit and Stormwater Fees Meeting. Prepared on behalf of City of Tukwila. February 21.

Stewardship Partners, 2022. Adopt-a-Downspout I-5 Ship Canal Bridge Pilot Project. Available at: https://www.stewardshippartners.org/just-a-box-of-rain/.

WSDOT, 2023. WSDOT Stormwater Retrofit Prioritization WORKING DRAFT Web Map. Stormwater Priority Analysis Puget Sound (Draft) (arcgis.com). Accessed December 2023, January 2024, and April 2024.

WSDOT, 2023. MOVE AHEAD WASHINGTON STORMWATER RETROFIT 2023 Legislative Report. WSDOT Environmental Services Office. September 18.

Tukwila, 2023. GIS Feature Data Set “Tukwila_SFI_Draft”. Contains DRAFT Data of WSDOT's Stormwater Management System as of 10/12/2023 within the boundaries of Tukwila City Limits. Prepared by WSDOT HQ ESO SFI Program. October 12.

Figures

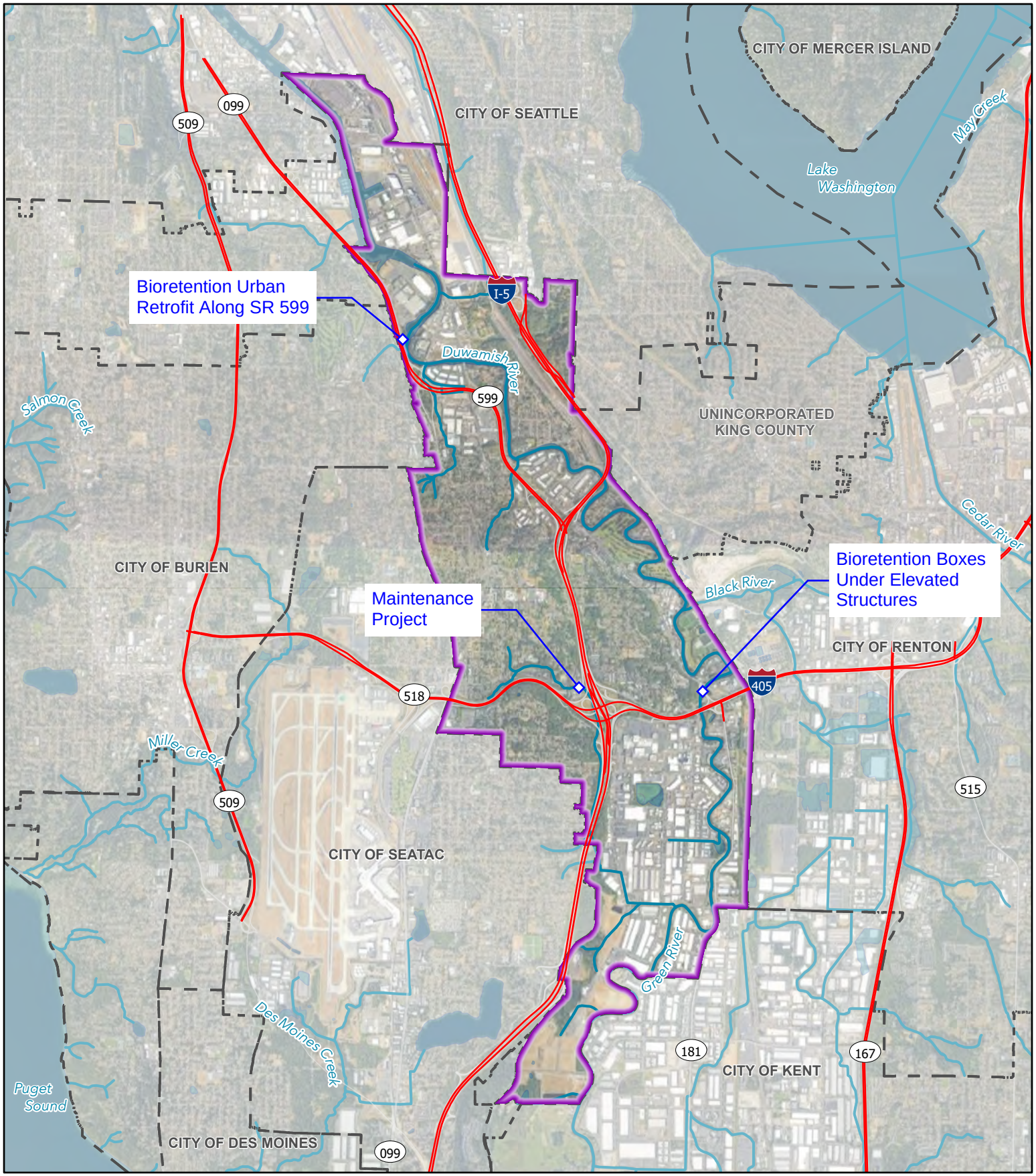


FIGURE 1
WSDOT STORMWATER RETROFIT PROJECTS

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps.
Date: 4/9/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

O:\PROJECT\33300\33383\CADD\GIS\APRXs\WSDOT Runoff Retrofits\WSDOT Runoff Retrofits.aprx

Legend
- City Boundary
- Neighboring Cities
- Streams and Rivers
- WSDOT Limited Access Highway

0 1 Mile

Otak

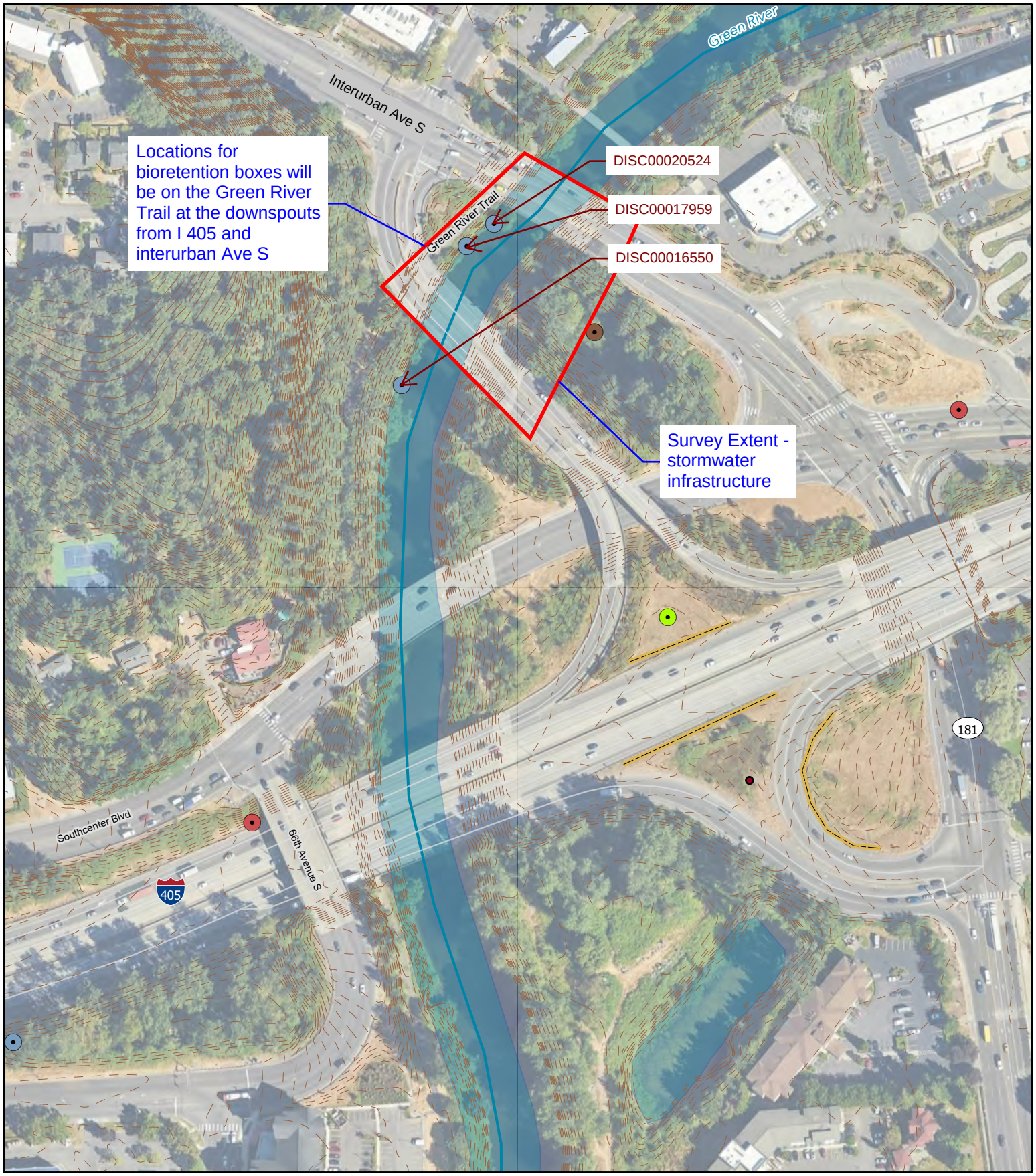


FIGURE 2
BIORETENTION BOXES UNDER ELEVATED STRUCTURES
TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps.
Date: 4/9/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Streams and Rivers
- DischargePoint
  - Incoming
  - Managed System
  - Subsurface
  - Surface Water
- Media Filter Drain
- Contours

Feet
0
200

Otak

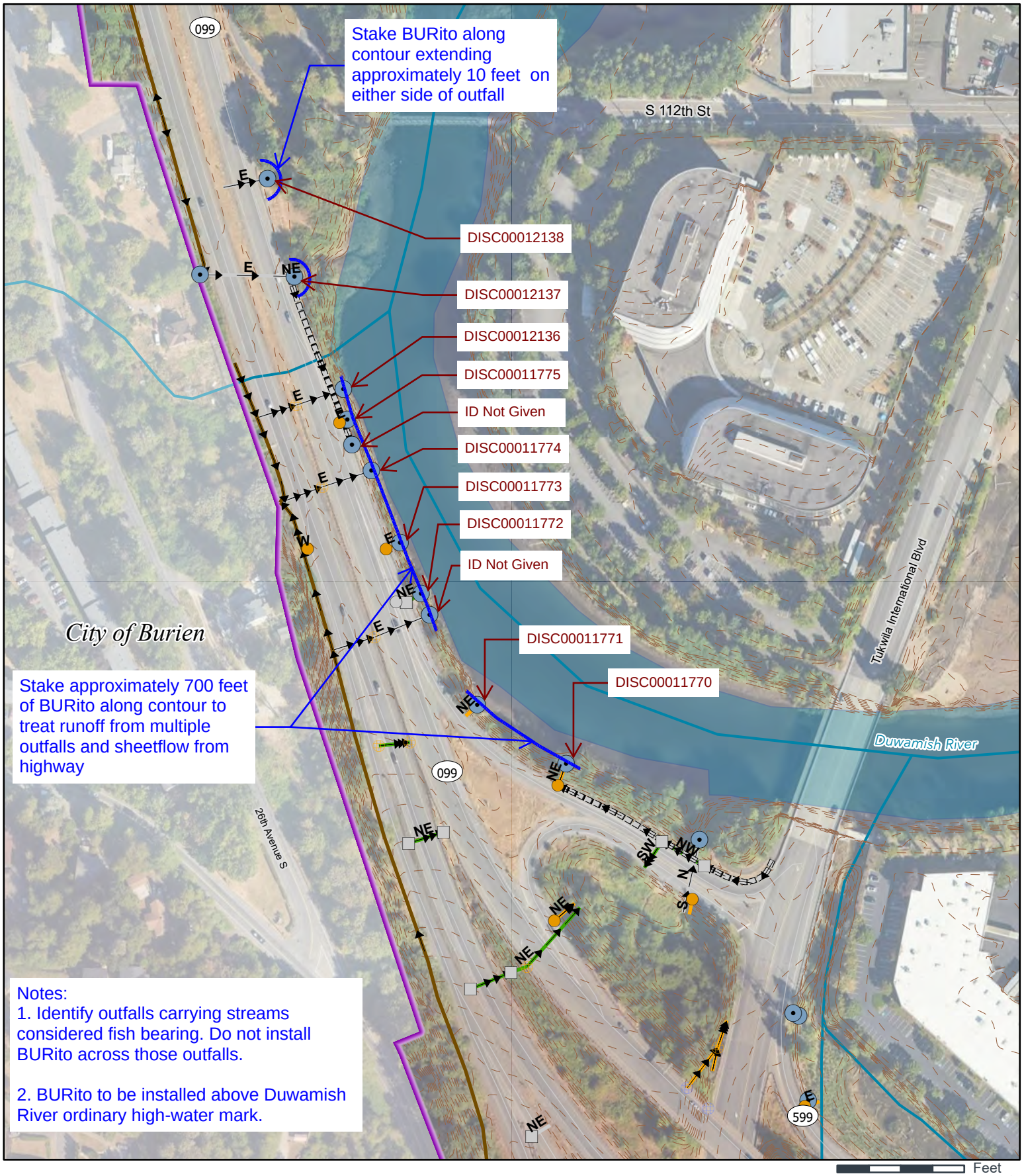

FIGURE 3

BIORETENTION URBAN RETROFIT ALONG SR 599

TUKWILA SWCP | 33383

TUKWILA, WASHINGTON

Legend

- City Boundary
- Streams and Rivers
- Stormwater Conveyance Ditches
- Culvert Pipe
- Drain Pipe
- Storm Sewer Pipe
- Unknown
- Catch Basin, Active
- Concrete Inlet, Active
- Manhole, Active
- Unknown, Active
- Other, Active
- Surface Water Outfall
- Curb
- Contours

Data Sources: King County, City of Tukwila, Google Maps.
Date: 4/11/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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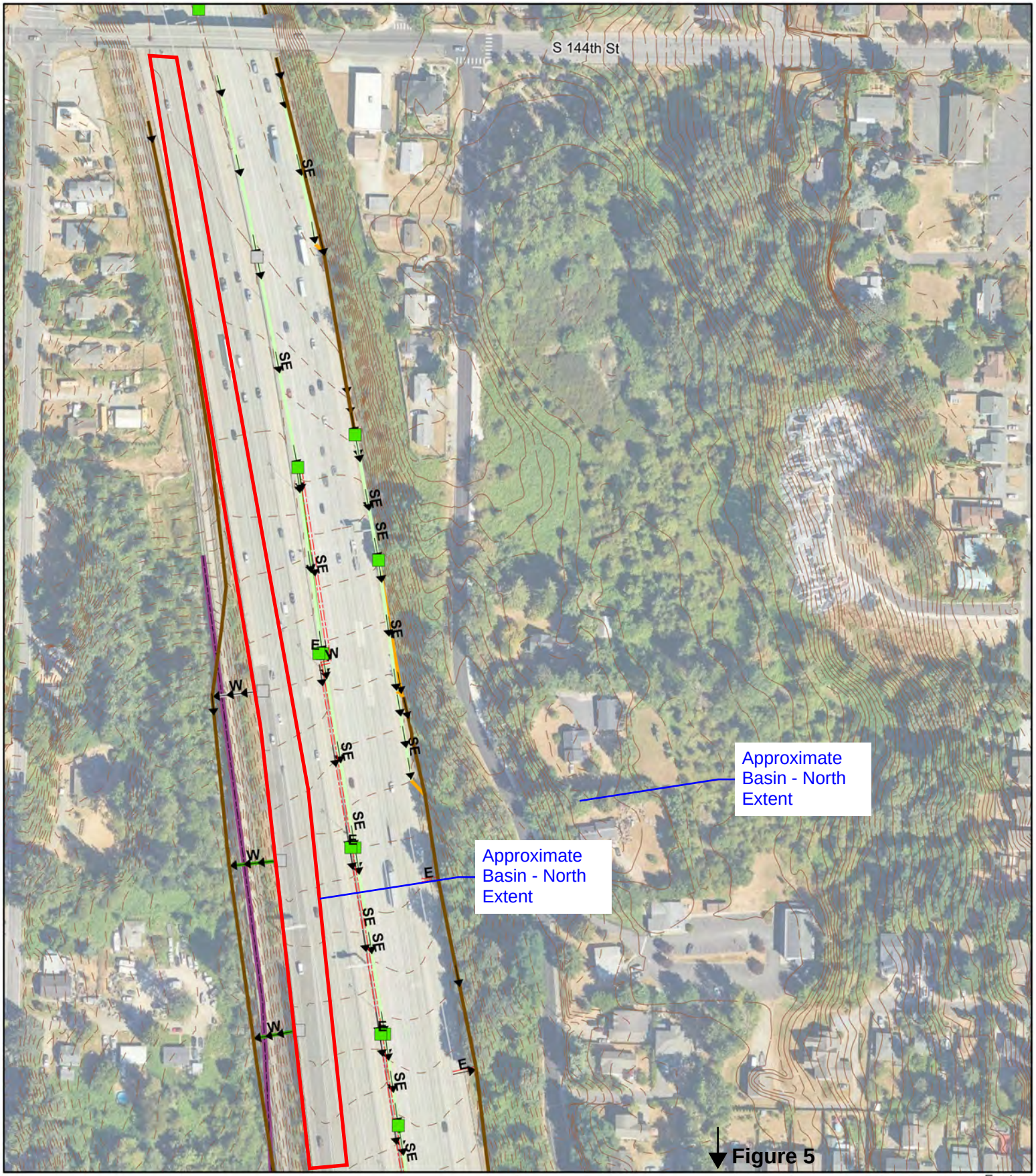

FIGURE 4
WSDOT MAINTENANCE PROJECT - NORTH EXTENT
TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps.
Date: 4/12/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Stormwater Conveyance Ditches
- Culvert Pipe
- Drain Pipe
- Storm Sewer Pipe
- Underdrain Pipe
- Not Active
- Grate Inlet, Active
- Catch Basin, Active
- Engineered Dispersion
- Contours

Otak

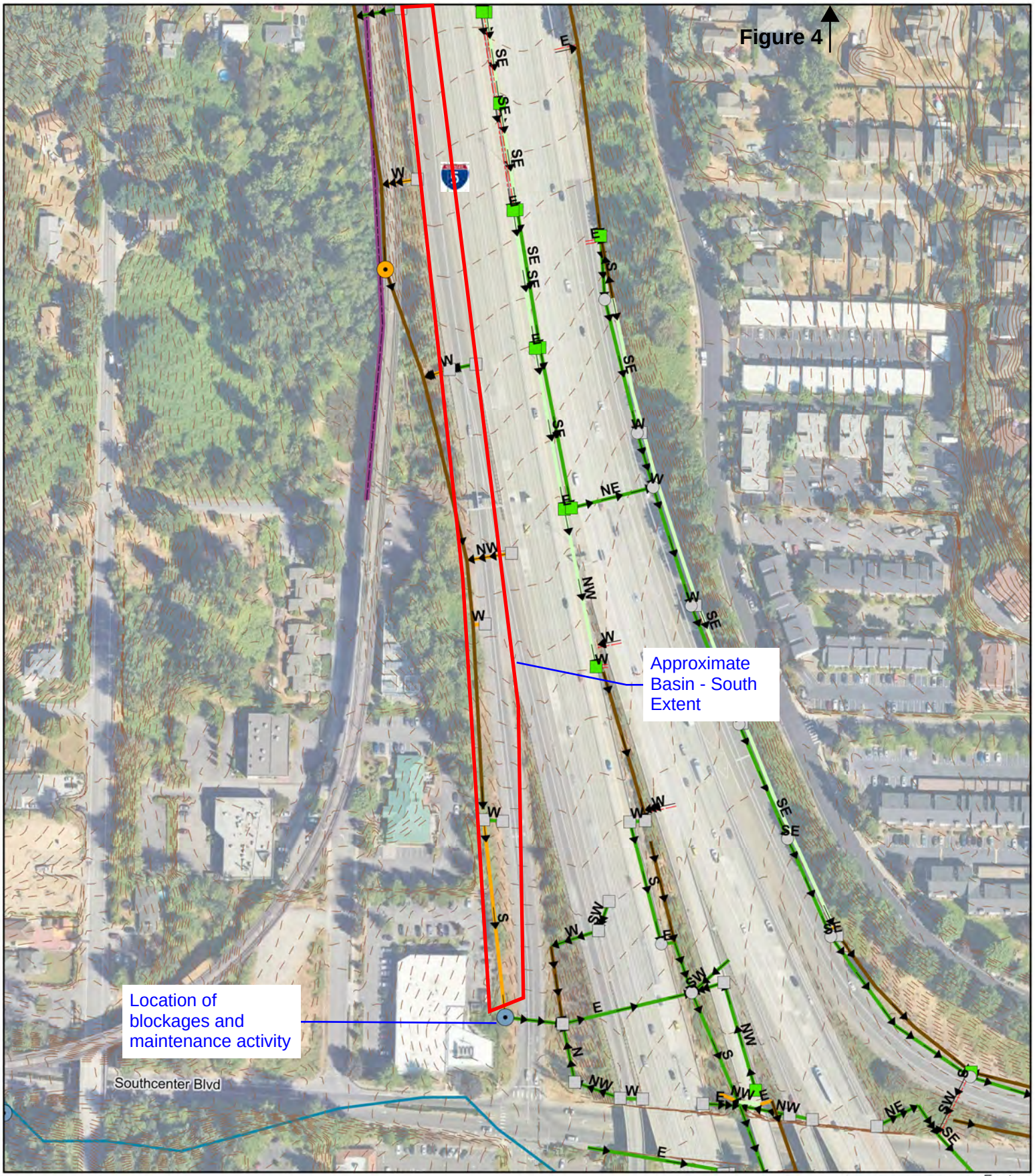

FIGURE 5
WSDOT MAINTENANCE PROJECT - SOUTH EXTENT
TUKWILA SWCP | 33383
TUKWILA, WASHINGTON

Data Sources: King County, City of Tukwila, Google Maps.
Date: 4/12/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.

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Legend

- City Boundary
- Streams and Rivers
- Stormwater Conveyance Ditches
- Drain Pipe
- Storm Sewer Pipe
- Underdrain Pipe
- Not Active
- Grate Inlet, Active
- Catch Basin, Active
- Manhole, Active
- Land Surface
- Surface Water
- Engineered Dispersion
- Contours

Feet
0
200

Otak

Appendix G

Public Comment

DUWAMISH TRIBE

dxʷdəwʔabš

6/3/2024

City of Tukwila
E24-0002

Dear Sherry Edquid,

Thank you for the opportunity to comment on the City of Tukwila's (the City) Surface Water Comprehensive Plan (SWCP). The Duwamish Tribe understands the public works department manages stormwater and protects surface water that eventually drains into the Green/Duwamish River. The Green/Duwamish and Black Rivers are vital waterways for our Tribe. The Duwamish River helped define who we are and the lands we managed for our People and the fish and wildlife within and around it. The Duwamish Tribe also understands that the surface water program plans and implements projects that manage flood hazards, improve water quality, restore habitat, and often serve as public amenities.

The Duwamish Tribe supports the City's SWCP and commends the City for stewarding the waters in our ancestral lands. We also commend the City for its partnerships with WRIA 9, the King County Flood Control District, and the Green Duwamish Partnership and non-governmental organizations like the Duwamish Alive Coalition to sustain the Duwamish River and its environment. The current city of Tukwila is home to several Duwamish sacred sites along the Duwamish River and is near our ancestral village along the Black River. Our first priority is to protect our cultural resources during any groundbreaking activities. This is an area that the Duwamish Tribe considers culturally significant and has a High probability to have unknown archaeological deposits as it is one of our usual and accustomed places that we have inhabited since time immemorial. We note that there are at least 19 historical and ancestral Duwamish place names within the City of Tukwila. The DAHP WISAARD predictive model indicates that locations near the River have a very high risk for encountering cultural resources.

The Duwamish Tribe's second priority is to protect our environment for the Tribe, the City's inhabitants and the native animals and avian life that also inhabit the land and water. One of our ancient village sites was near Fort Dent, Sqoal-qo, where the Duwamish lived near the confluence of the Duwamish and Black Rivers. With regard to surface water issue types outlined in Table 5-3, the Tribe notes the following for highest priority:

- Increase conveyance capacity
- Infiltration
- Velocity reduction
- Impervious surface reduction
- Water quality treatment
- Conveyance system cleaning and inspection
- Land acquisition
- Riparian buffer restoration/protection
- Channel stabilization
- Fish passage barrier removal

With regard to recommended solutions as outlined in Table 5-4 from the SWCP, the Tribe notes the following for highest priority:

Table 1. Recommended solution list - Duwamish Tribe's high priority. Note - order does not necessarily imply rank.

ID	Problem Description	Location
KI-6	Riverton Creek Sediment - Metals	Riverton Creek
KI-7	Riverton Creek - DO	Riverton Creek
KI-8	Fort Dent Park - 6PPD quinone	Fort Dent Park
KI-9	Runoff damaging private septic system	Beacon Ave S & S 103rd St
KI-2	Gilliam Creek - DO	Gilliam Creek
KI-74	Fish mortality in Riverton Creek	Riverton Creek
KI-75	Lack of off-channel salmon habitat along lower Duwamish River	Duwamish River near light rail crossing
KI-161	Barriers to fish passage (citywide) and Johnson Creek Flapgate Fish Passage Barrier	Frager Rd S & S 204th St
KI-168	No functional outlet to drainage network at Nelsen/Longacres	SR 181, Green River, BNRR and Strander Blvd

The Duwamish Tribe would like to make the following observations and suggestions as it relates to the SWCP:

- The Duwamish Tribe requests that under land use, the Tribe and other local community members have access to the Duwamish River for the purpose of fishing, gathering cultural resources and transportation. The Duwamish River was vital to the existence of our ancestors and other tribes for activities like fishing, gathering marine food sources, managing riparian food sources as well as textile resources. The Duwamish River was also a source of transport. The Duwamish River allowed for trade, social and spiritual activities amongst our Tribe and other local tribes.

- The Duwamish Tribe caution Tukwila to be mindful of the rate of development and its impact on water quality and the riparian environment, especially with regard to the P17 and Johnson basins. The lower reach of the Duwamish River has seen increased pollution after European contact. Preserving these undeveloped areas will help to mitigate increased water quality issues in the event of seasonal urban flooding.
- The Duwamish Tribe requests the re-establishment of the Black River to its original course and flow. The Black River had the capacity to flow both ways to regulate the waters in Lake Washington and to mitigate the seasonal King Tides that inundated the Duwamish River and still inundate the Duwamish Waterway. The Black River also housed abundant aquatic resources like salmon that sustained our ancient villages. It could again be a place for salmon and other fish to spawn and migrate. We strongly request that the City of Tukwila, the City of Renton, King County and the Army Corps of Engineers work together to achieve this goal.
- The Duwamish Tribe would request that Tukwila provide responsible outdoor lighting as outlined in DarkSky International | Protecting the night skies for present and future generations. The night sky was important to the Duwamish and allowed us to understand and verify our seasonal calendars. Darkened skies were also favorable conditions to practice traditional life pathways.
- The Duwamish Tribe strongly recommends that gas-powered watercraft are banned from Tukwila's waterways except for emergency and construction use vehicles to reduce oil based pollution, noise pollution and prop wash to create a more sustainable habitat for aquatic life. We also encourage the City, if it has not done so already, to require all municipal vehicles to be non-fossil fuel powered, except in emergencies. We would further suggest that any government entities operating in Tukwila follow suit.
- The Duwamish Tribe hopes that the City will continue to observe stream and wetland buffers and to create safe, viable passage for fish and wildlife. The City of Tukwila and its surrounding areas were and can still be a sustainable place of resources. Our ancestors and others fished and harvested plants for consumption, trade, clothing, shelter and building materials. The Duwamish encourages the City to do the same. We believe if you manage and respect your waterways and land, it will continue to provide a healthy place for its citizens to live a healthy life.
- The Duwamish Tribe recommends that woody debris be used where it makes sense in urban streams to slow down waterflow. We also recommend that natural drainage systems or street swales be implemented when reconstructing or redesigning public works like sewer or stormwater systems – see link: Green Streets. The Tribe was impressed with the Chinook Wind improvements and we support future restoration of the City's waterways.
- The Duwamish Tribe strongly recommends the ban of harmful or toxic fertilizers and insecticides. Fertilizers increase nitrate pollution and soil acidification leading to dead zones through water run-off.
- The Tribe recommends that a solution to tire pollution be addressed as this severely affects fish and aquatic wildlife during storm events. We note that the City recognizes this as an issue and we support efforts to study 6PPD-quinone and find a solution.
- The Duwamish Tribe asks that we be a part of the story and vision of Tukwila, particularly with regard to our waterways. We would like the opportunity to consult with the City on Lushootseed signage around our sacred sites and have space to practice our traditional ways. The Tribe would

also like to construct, at least once a year, a mock-up of our traditional fish weirs across the Duwamish River.

Lastly the Duwamish Tribe wishes the City of Tukwila success in adopting the Surface Water Comprehensive Plan. We hope it can be a vibrant place for aquatic life, Tukwila's citizens, visitors and its ancestral people to thrive. We hope that The Tribe can be a community partner with the City. We would also like to extend to you an invitation to meet with the Tribe at our Longhouse to discuss the SWCP or to discuss other topics at any time.

Thank you,

Nancy A Sackman
Cultural Preservation
Duwamish Tribe
preservationdept@duwamishtribe.org
Mobile - 206.856.2564

