



SEATTLE CITY COUNCIL

Governance and Utilities Committee

Agenda

Thursday, April 9, 2026

9:30 AM

Council Chamber, City Hall
600 4th Avenue
Seattle, WA 98104

Joy Hollingsworth, Chair
Debora Juarez, Vice-Chair
Robert Kettle, Member
Maritza Rivera, Member
Dan Strauss, Member

Chair Info: 206-684-8803; Joy.Hollingsworth@seattle.gov

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Council Chamber Listen Line: 206-684-8566

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SEATTLE CITY COUNCIL
Governance and Utilities Committee
Agenda
April 9, 2026 - 9:30 AM

Meeting Location:

Council Chamber, City Hall, 600 4th Avenue, Seattle, WA 98104

Committee Website:

<https://seattle.gov/council/governance-and-utilities>

This meeting also constitutes a meeting of the City Council, provided that the meeting shall be conducted as a committee meeting under the Council Rules and Procedures, and Council action shall be limited to committee business.

Members of the public may register for remote or in-person Public Comment to address the Council. Please register in advance in order to be recognized by the Chair. Details on how to register for Public Comment are listed below:

Remote Public Comment - Register online to speak during the Public Comment period at the meeting at <https://www.seattle.gov/council/committees/public-comment>. Online registration to speak will begin one hour before the meeting start time, and registration will end at the conclusion of the Public Comment period during the meeting.

In-Person Public Comment - Register to speak on the public comment sign-up sheet located inside Council Chambers at least 15 minutes prior to the meeting start time. Registration will end at the conclusion of the Public Comment period during the meeting.

Please submit written comments no later than four business hours prior to the start of the meeting to ensure that they are distributed to Councilmembers prior to the meeting. Comments may be submitted at Council@seattle.gov or at Seattle City Hall, Attn: Council Public Comment, 600 4th Ave., Floor 2, Seattle, WA 98104. Business hours are considered 8 a.m. - 5 p.m. Comments received after that time will be distributed after the meeting to Councilmembers and included as part of the public record.

Please Note: Times listed are estimated

A. Call To Order

B. Approval of the Agenda

C. Public Comment

Members of the public may address items on the agenda and matters within the purview of the committee. Please register in advance to be recognized by the Chair.

D. Items of Business

1. [Appt 03470](#) **Appointment of Evan M. Smith as member, Seattle Ethics and Elections Commission, for a term to December 31, 2027.**

Attachments: [Appointment Packet](#)

Briefing, Discussion, and Possible Vote (5 minutes)

Presenter: Wayne Barnett, Executive Director, Seattle Ethics and Elections Commission

2. [Appt 03472](#) **Appointment of Andrea Lino as member, Seattle Ethics and Elections Commission, for a term to December 31, 2028.**

Attachments: [Appointment Packet](#)

Briefing, Discussion, and Possible Vote (5 minutes)

Presenter: Wayne Barnett, Executive Director, Seattle Ethics and Elections Commission

3. [Appt 03473](#) **Appointment of Anita Khandelwal as member, Seattle Ethics and Elections Commission, for a term to December 31, 2026.**

Attachments: [Appointment Packet](#)

Briefing, Discussion, and Possible Vote (5 minutes)

Presenter: Wayne Barnett, Executive Director, Seattle Ethics and Elections Commission

4. **Homemade Food Waste Program Presentation**

Supporting Documents: [Presentation](#)

Briefing and Discussion (30 minutes)

Presenters: Joel Gamoran, CEO, and Sara Osborne, Homemade

5. [CB 121192](#) **AN ORDINANCE relating to Seattle Public Utilities; authorizing the General Manager and CEO of Seattle Public Utilities to accept slope stabilization easements within two parcels of private property identified as King County Parcel Number 6844703215 located at 3822 NE 91st Street, and King County Parcel Number 6844703295 located at 3832 NE 91st Street; placing the properties under the jurisdiction of Seattle Public Utilities; and ratifying and confirming certain prior acts.**

Attachments: [Att 1 - Slope Stabilization Easement \(Van Snellenberg\)](#)
[Att 2 - Slope Stabilization Easement \(Duchin\)](#)

Supporting Documents: [Summary and Fiscal Note](#)
[Summary Ex A - Map of Project Area](#)
[Summary Ex B - Map of Easement Areas](#)
[Presentation](#)

Briefing, Discussion, and Possible Vote (15 minutes)

Presenters: Andrew Lee, General Manager and CEO, Leana Aguila, and Isabella Schwartz, Seattle Public Utilities

6. [CB 121193](#) **AN ORDINANCE relating to Seattle Public Utilities; authorizing the acquisition of certain real property rights by negotiation or eminent domain (condemnation) of two parcels of land (Properties) identified as King County Parcel Number 4265700090 and King County Parcel Number 4265700085, both located at South Director Street; authorizing the General Manager and Chief Executive Officer of Seattle Public Utilities or designee to execute all documents and take other necessary actions to complete both Properties' fee acquisition; and ratifying and confirming certain prior acts.**

Attachments: [Att 1 – Legal Description](#)
[Att 2 – Map of Properties](#)

Supporting Documents: [Summary and Fiscal Note](#)
[Summary Ex A – Area Map](#)
[Presentation](#)

Briefing, Discussion, and Possible Vote (15 minutes)

Presenters: Andrew Lee, General Manager and CEO, Bryan Solemsaas, and Karstin Jacobson, Seattle Public Utilities

7. [CB 121190](#) **An ordinance relating to the 2026 Stormwater Code Update; updating stormwater control requirements for development, roadways, utilities, and maintenance activities; strengthening stormwater treatment and infiltration standards; clarifying vesting and review thresholds; ensuring the City’s compliance with requirements of the City’s 2024-2029 Phase 1 Municipal Stormwater Permit issued by the State Department of Ecology; and amending Chapters 22.800, 22.801, 22.802, 22.803, 22.805, and 22.807 of the Seattle Municipal Code.**

Supporting Documents:

[Summary and Fiscal Note vD3](#)

[Summary Ex A – Legislative Summary](#)

[Summary Ex B - Ecology Conditional Approval Letter](#)

[Summary Ex C - Environmentally Critical Areas](#)

[Presentation](#)

Briefing and Discussion (20 minutes)

Presenters: Andrew Lee, General Manager and CEO, and Kevin Burrell, Seattle Public Utilities

E. Adjournment



Legislation Text


File #: Appt 03470, **Version:** 1

Appointment of Evan M. Smith as member, Seattle Ethics and Elections Commission, for a term to December 31, 2027.

The Appointment Packet is provided as an attachment.



City of Seattle Boards & Commissions Notice of Appointment

Appointee Name: Evan M. Smith		
Board/Commission Name: Seattle Ethics and Elections Commission		Position Title: Member
<input checked="" type="checkbox"/> Appointment OR <input type="checkbox"/> Reappointment	City Council Confirmation required? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Appointing Authority: <input checked="" type="checkbox"/> City Council <input type="checkbox"/> Mayor <input type="checkbox"/> Other: <i>Fill in appointing authority</i>	Term of Position: * 1/1/2025 to 12/31/2027 <input checked="" type="checkbox"/> <i>Serving remaining term of a vacant position</i>	
Residential Neighborhood: Leschi	Zip Code: 98112	Contact Phone No.: [REDACTED]
Background: Evan has worked in the public, non-profit, private and political sectors and brings a wealth of knowledge to lend to discussions about ethics and elections in Seattle. Currently, Evan is the CEO and Founder of Ethosphere and previously was the Vice President of Technology Strategy and Business Transformation for Starbucks. Evan also has board and commission experience from serving on the FEPP Levy Oversight Board from 2022-2025.		
Authorizing Signature (original signature):  Date Signed (appointed): 3/16/26		Appointing Signatory: Joy Hollingsworth Seattle City Council President

*Term begin and end date is fixed and tied to the position and not the appointment date.

EVAN M. SMITH

PROFESSIONAL EXPERIENCE

Ethosphere Technologies, Seattle, WA

2024 – Present

CEO & Co-Founder

Began a voice-AI product for brick-and-mortar retailers focused on driving great retail customer and employee experiences. Took idea to incorporated company, serving as final decisionmaker, building business plans, crafting product vision, interfacing with investors and leading customer development.

- Recruited as Entrepreneur in Residence by AI2 Incubator, highly selective (~0.18% acceptance rate) business incubator
- Raised \$2.5M pre-seed round led by venture capital investors Point 72
- Built initial team including a co-founding CTO, four full-time engineers and two part-time engineers
- Created partner pipeline with major retail brands across luxury, product retail and quick serve restaurants
- Company selected as “most innovative” retail technology by National Retail Federation, along with winning numerous other awards and recognition.

STARBUCKS, Seattle, WA

2017 – 2024

Vice President, Technology Strategy and Business Transformation

2020 – 2024

CTO direct report, served as Chief of Staff, led team of 30, responsible for developing, integrating, and coordinating global technology strategy. Designed and led technology function's business operations, communications and budget allocation.

- Drove annual strategic, operational, and financial planning processes, building functional strategic plan, allocating nearly \$1B in technology spend and FTE against business and technology imperatives to direct work of 1,700+ technologists.
- Aligned Technology strategy with enterprise strategy and individual business unit needs..
- Built Inclusion and Diversity (I&D) strategy for technology function, standing up I&D council and driving forward strategy to increase URM talent pipeline and enhance current technology employee experience.

General Manager, Starbucks Delivery

2018 – 2020

Elevated to operate Starbucks delivery program, owning P&L and day-to-day execution. Directed partnership with Uber Eats, while coordinating 200+ Starbucks partners across marketing, retail operations, finance, product, packaging, product R&D, technology, data, and analytics departments to drive responsible, high-impact program footprint and revenue growth. Served larger marketing organization as strategy leader. Recognized for performance with leadership award from Starbucks CEO.

- Scaled delivery channel from one market to national scale, developing and driving technological, operational, and marketing roadmaps to optimize program for enterprise execution and business impact, ultimately growing revenues from 0 to >5% of US revenues with line of sight to \$2B annual revenues.
- Secured long-term partnership for national and international agreements as lead negotiator, establishing Starbucks Delivers team, transitioning pilot into normal course of Starbucks business.

Director, Global Corporate Strategy

2017 – 2018

Managed 14-person team, reporting directly to Global Strategy SVP, CEO direct report. Created annual strategic plan, managing team and process to develop C-suite 5-year enterprise strategy vision for Board of Directors and broader enterprise alignment.

- Owned department-level strategic plan inputs for annual enterprise strategic plan. Partnered with technology and marketing leaders to build and articulate 5-year strategic visions and corresponding plans to achieve identified outcomes.
- Identified delivery as a strategic business opportunity, building and securing approval of strategy and business case from CEO, COO, and CMO. Designed and executed end-to-end Starbucks delivery pilot from conception to launch.

EDUCENTS, San Francisco, CA

2016 – 2017

Director, Strategy and Business Operations

Drove market and customer insights, honing and articulating focused company strategy, aligning company growth targets and strategies across finance, marketing, data, and operations functions. Member of 7-person executive team with a Series A, education products, e-commerce start-up.

- Designed and orchestrated company reorganization, including facilitation of co-founders stepping away from CEO and COO roles and eliminating my own role, while building marketplace operations function.
- Developed and directed quarterly KPI and OKR planning, target-setting, and company-wide translation of goals to specific, actionable outcomes across departments and between employees.

MCKINSEY AND COMPANY, Washington, DC**2012 – 2015****Engagement Manager**

2014 – 2015

Associate

2012 – 2013

Led McKinsey teams to serve private and public sector clients, focused on strategy and operations. Managed engagements, counseled clients, built and developing teams, led problem solving, recommended solutions and planned implementation.

Strategy Development

- Developed talent strategy for a major United States Federal agency, empowering frontline employees to design with purpose a new approach to delivering services to the citizens they serve.
- Led team to develop national education system strategy, aligning public budgets with labor market needs and opportunities with senior government leaders in a major Middle Eastern country.

Operational Improvement

- Managed team of senior City and School District management teams in major urban school district to perform full operational and financial review, presenting opportunities to mayor and new superintendent.
- Led client team at large, international retail chain to develop optimized contractor purchasing strategy.

Organizational Design and Transformation

- Led executive team of new national nonprofit to design dynamic organization and financial models for organization launch.

DISTRICT OF COLUMBIA PUBLIC SCHOOLS, Washington, DC**2007 – 2010****Director, Office of School Operations**

2009 – 2010

Managed team of 50 supporting day-to-day school-level security, facilities, budget, and enrollment operations through customer service delivery model, with school principals as primary customers.

- Redesigned and drove annual budgeting process, building online system to efficiently and accurately allocate \$800M across all DC public schools aligned to district policy priorities, while balancing diverse stakeholders and communities.

Director, School Opening

2009

- Created approach to planning and executing annual fall opening of all district schools; led cross-functional working team to streamline critical operations, achieving opening described by Washington Post as “uncommonly quiet” and a 30% YoY increase in measures of school opening preparedness.

Manager, Capital Gains Program (Experimental Pilot Program, Partnered with Harvard University)

2008 – 2009

Intergovernmental Liaison

2007 – 2008

ADDITIONAL RELEVANT EXPERIENCE**MITCH LANDRIEU FOR MAYOR**, New Orleans, LA, **Deputy Press Secretary****2006****FEDERAL EMERGENCY MANAGEMENT AGENCY**, Thibodaux, LA, **Manager, Disaster Recovery Center****2005****NEW ORLEANS PUBLIC SCHOOLS / TEACH FOR AMERICA**, New Orleans, LA, **High School Social Studies Teacher****2004 – 2005****FELLOWSHIP/ ONGOING DEVELOPMENT**

- **Presidential Leadership Scholars**, Scholar 2023
 - Highly Competitive National Leadership Development Program Sponsored Jointly by President William Clinton and President George W. Bush Foundations, with 60 Americans Selected Annually.
- **Leadership Tomorrow**, Fellow. Competitive Seattle-based leadership development program. 2021 – 2022

VOLUNTEER / OTHER

- Mayoral-Appointed Member, Seattle Families, Education, Preschool and Promise (FEPP) Levy Oversight (2022 – 2025)
- Vice President, Schools First (2022 – Present). CBO focused on advocating for Seattle Public School levy passage.
- Board Director and Treasurer, College Success Foundation (2021 – Present)
- Governor-Appointed Member, Washington State STEM Education Innovation Alliance (2020 – 2025)
- Bass Guitarist and Business Manager, [Good Lettuce and the Hallpasses](#)

EDUCATION

- **Master of Business Administration**, Darden School of Business, University of Virginia, Charlottesville, VA 2010 - 2012
 - Elected by peers as Student Body President
 - Recipient of C. Stewart Sheppard Distinguished Service Award
- **Master of Philosophy**, University of Cambridge, Cambridge, England 2006 – 2007
 - Economic and Social History, High First Degree
- **Bachelor of Arts**, University of Pennsylvania, Philadelphia, PA. 2000 – 2004
 - History and Urban Studies double majors, Political Science minor, *cum laude*.

Seattle Ethics and Elections Commission

7 Members: Pursuant to Seattle Municipal Code 3.70.020, all members subject to City Council confirmation, 3-year terms:

- 3 Mayor- appointed
- 3 City Council- appointed
- 1 Other Appointing Authority: Commission

Roster:

*D	**G	RD	Position No.	Position Title	Name	Term Begin Date	Term End Date	Term #	Appointed By
			1	Member	Vacant	1/1/24	12/31/26		Mayor
6	M	3	2	Member	Evan M. Smith	1/1/25	12/31/27	1	City Council
6	M	5	3	Member	Kai Smith	1/1/25	12/31/27	1	Mayor
2	F	3	4	Member	Vivian Vassall	1/1/25	12/31/27	1	Commission
6	M	7	5	Member	Jonathan Schirmer	1/1/26	12/31/28	1	City Council
6	M	3	6	Member	Zach Pekelis	1/1/23	12/31/25	2	Mayor
2	M	3	7	Member	Bobby Forch	1/1/24	12/31/26	1	City Council

SELF-IDENTIFIED DIVERSITY CHART

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
	Male	Female	Transgender	NB/ O/ U	Asian	Black/ African American	Hispanic/ Latino	American Indian/ Alaska Native	Other	Caucasian/ Non-Hispanic	Pacific Islander	Middle Eastern	Multiracial					
Mayor	2	1								3	1							
Council	2					1				1								
Other		1				1												
Total	4	2				2				4	1							

Key:

*D List the corresponding *Diversity Chart* number (1 through 9)

**G List *gender*, M= Male, F= Female, T= Transgender, NB= Non-Binary, O= Other, U= Unknown

RD Residential Council District number 1 through 7 or N/A

Diversity information is self-identified and is voluntary.



Legislation Text

File #: Appt 03472, **Version:** 1

Appointment of Andrea Lino as member, Seattle Ethics and Elections Commission, for a term to December 31, 2028.

The Appointment Packet is provided as an attachment.



City of Seattle Boards & Commissions Notice of Appointment

Appointee Name: <i>Andrea Lino</i>		
Board/Commission Name: <i>Seattle Ethics and Elections Commission</i>		Position Title: <i>Member</i>
<input checked="" type="checkbox"/> Appointment OR <input type="checkbox"/> Reappointment	City Council Confirmation required? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Appointing Authority: <input type="checkbox"/> City Council <input checked="" type="checkbox"/> Mayor <input type="checkbox"/> Other: <i>Seattle Ethics and Elections Commission</i>	Term of Position: * 01/01/2026 to 12/31/2028 <input type="checkbox"/> <i>Serving remaining term of a vacant position</i>	
Residential Neighborhood: <i>Rainier Valley/District 2</i>	Zip Code: <i>98118</i>	Contact Phone No.: [REDACTED]
Background: Andrea Lino is a supervising attorney at the Northwest Immigrant Rights Project, where she has practiced for almost a decade. She received a Master of Laws from the University of Washington in 2015, and her law degree from the Rafael Landívar University School of Law in 2013. She is on the board of the Washington Immigrant Solidarity Network.		
Authorizing Signature (original signature): <i>Katie B. Wilson</i> Date Signed (appointed): 03/23/2026	Appointing Signatory: <i>Katie B. Wilson</i> <i>Mayor of Seattle</i>	

*Term begin and end date is fixed and tied to the position and not the appointment date.

BAR ADMISSIONS

- **Washington State Bar Association**
- **Guatemala Bar Association**

EDUCATION **University of Washington School of Law**, Seattle, WA *Master of Laws (LL.M.)*,
General Law, June 2015

- **Honors:** Top five score in Immigration Law course
- **Final Paper:** *The Intersection of the Immigration and Criminal System in the United States: Reinforcing Immigration Law Violations as Civil Offenses*

Rafael Landívar University School of Law, Guatemala City, Guatemala *Degree in Legal and Social Sciences (J.D. Equivalent)*, September 2013

- **Honors:** *Cum Laude* (2007–2009); Academic Excellence Recognition (2007–2011)
- **Published Thesis:** *International Legal Framework: The Universal System and the Inter-American System Regarding the Human Rights of Indigenous Peoples*

LEGAL EXPERIENCE **Northwest Immigrant Rights Project (NWIRP)**, Tacoma & Seattle, WA
Supervising Attorney, Detained Immigrant Advocacy (DIA) (June 2018 – Present)

- Lead NWIRP's first unrestricted, direct-representation unit for detained individuals in Tacoma.
- Supervised and mentored more than 15 legal staff members across multiple periods, including serving as Acting Directing Attorney for nine months during leadership leave.
- Oversaw and provided guidance on more than 100 immigration court hearings conducted by staff attorneys.
- Represented approximately 80 individuals in merits hearings and numerous others in diverse immigration matters, including bond hearings, parole requests, motions to terminate (based on removability and suppression grounds), motions to reopen, petitions for review, status adjustments, U-Visas, T-Visas, and affirmative asylum/refugee applications.

Staff Attorney, Legal Orientation Program (LOP) (August 2015 – May 2018)

- Conducted "Know Your Rights" presentations in English and Spanish for thousands of individuals in immigration custody.
- Provided individualized orientations, prepared applications for relief, and drafted *pro se* motions for hundreds of detainees.
- Delivered direct representation for clients in removal proceedings.

Legal Extern, Asylum Unit (January 2015 – April 2015)

- Researched legal issues, drafted appellate briefs, and prepared applications for relief.
- Managed casework for an affirmative asylum application and a T-Visa application.

New Beginnings, Seattle, WA *Bilingual Community Program Advocate* (September 2014 – January 2015)

- Supported and fiercely advocated for survivors of domestic violence.
- Prepared *pro se* documents for family law and immigration cases.
- Identified the need for, and successfully established, a Spanish-language support group.
- Facilitated weekly meetings for hundreds of Spanish-speaking survivors of domestic violence.

Justice Administration Center, Santiago Atitlán, Sololá, Guatemala *Legal Intern* (August 2012 – February 2013)

- Represented clients *pro bono*, alongside a supervising attorney, in family, property, and labor disputes within the Tz'utujil-speaking indigenous community.
- Drafted legal briefs, appeared in mediations, and accompanied domestic violence survivors to petition for protective orders.

Ministry of Education, Guatemala City, Guatemala *Legal Advocate* (2010 – 2012)

- Investigated reports of student rights violations by conducting site visits and interviewing involved parties.

PRO BONO & VOLUNTEER EXPERIENCE

- **Board Member**, Washington Immigrant Solidarity Network (WAISN) (December 2021 – January 2025)
- **Volunteer Mentor**, Big Brothers Big Sisters Program (2019 – Present)
- **Volunteer Mentor**, Seattle Public Library (2017 – 2019)
- Supported refugees in improving English proficiency and preparing for employment applications and interviews.
- **Volunteer Teacher**, Guatemalan Institute of Radio-phonetic Education (IGER) (2007 – 2012). Instructed working teenagers and adults, providing an alternative education program to earn their degrees.

SKILLS

- **Languages:** Fluent in English and Spanish (Native); Bicultural.
- **Professional:** Leadership, legal mentorship, complex problem solving, team building, and active listening.

Seattle Ethics and Elections Commission

7 Members: Pursuant to Seattle Municipal Code 3.70.020, all members subject to City Council confirmation, 3-year terms:

- 3 Mayor- appointed
- 3 City Council- appointed
- 1 Other Appointing Authority: Commission

Roster:

*D	**G	RD	Position No.	Position Title	Name	Term Begin Date	Term End Date	Term #	Appointed By
1	F	3	1	Member	Anita Khandelwal	1/1/24	12/31/26	1	Mayor
6	M	3	2	Member	Evan M. Smith	1/1/25	12/31/27	1	City Council
6	M	5	3	Member	Kai Smith	1/1/25	12/31/27	1	Mayor
2	F	3	4	Member	Vivian Vassall	1/1/25	12/31/27	1	Commission
6	M	7	5	Member	Jonathan Schirmer	1/1/26	12/31/28	1	City Council
3	F	2	6	Member	Andrea Lino	1/1/26	12/31/28	1	Mayor
2	M	3	7	Member	Bobby Forch	1/1/24	12/31/26	1	City Council

SELF-IDENTIFIED DIVERSITY CHART

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
	Male	Female	Transgender	NB/ O/ U	Asian	Black/ African American	Hispanic/ Latino	American Indian/ Alaska Native	Other	Caucasian/ Non-Hispanic	Pacific Islander	Middle Eastern	Multiracial					
Mayor	1	2			1		1			1								
Council	3					1				2								
Other		1				1												
Total	4	3			1	2	1			3								

Key:

*D List the corresponding *Diversity Chart* number (1 through 9)

**G List *gender*, M= Male, F= Female, T= Transgender, NB= Non-Binary, O= Other, U= Unknown

RD Residential Council District number 1 through 7 or N/A

Diversity information is self-identified and is voluntary.



Legislation Text

File #: Appt 03473, **Version:** 1

Appointment of Anita Khandelwal as member, Seattle Ethics and Elections Commission, for a term to December 31, 2026.

The Appointment Packet is provided as an attachment.



City of Seattle Boards & Commissions Notice of Appointment

Appointee Name: <i>Anita Khandelwal</i>		
Board/Commission Name: <i>Seattle Ethics and Elections Commission</i>		Position Title: <i>Member</i>
<input checked="" type="checkbox"/> Appointment OR <input type="checkbox"/> Reappointment	City Council Confirmation required? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Appointing Authority: <input type="checkbox"/> City Council <input checked="" type="checkbox"/> Mayor <input type="checkbox"/> Other: <i>Seattle Ethics and Elections Commission</i>	Term of Position: * 1/1/2024 to 12/31/2026 <input checked="" type="checkbox"/> <i>Serving remaining term of a vacant position</i>	
Residential Neighborhood: <i>Capitol Hill/District 3</i>	Zip Code: <i>98112</i>	Contact Phone No.: [REDACTED]
Background: Anita Khandelwal practices law with the Pacifica Law Group. Prior to joining the firm, she spent a decade as the Director of the King County Public Defenders Office. She got her bachelors degree and her law degree from Yale University.		
Authorizing Signature (original signature): <i>Katie B. Wilson</i> Date Signed (appointed): 03/23/2026	Appointing Signatory: <i>Katie B. Wilson</i> <i>Mayor of Seattle</i>	

*Term begin and end date is fixed and tied to the position and not the appointment date.

EDUCATION

YALE LAW SCHOOL, New Haven, CT

J.D., May 2005

Activities: Yale Law Journal, Senior Editor

Yale Law Women Activism Committee, Founder and Chair

Collective of Women of Color, Co-chair

YALE UNIVERSITY, New Haven, CT

B.A. in Anthropology and History, 1998

Honors: Edward J. Bouchet Undergraduate Research Fellowship

Paul Mellon Undergraduate Research Grant

Graduated *cum laude* with distinction in both majors

EXPERIENCE

PACIFICA LAW GROUP

Seattle, WA, November 2024 to present

Partner.

- Represent State and Local governments in employment matters at trial and appellate level;
- Advise non-profits on employment issues and compliance issues

KING COUNTY DEPARTMENT OF PUBLIC DEFENSE

Seattle, WA, November 2015 to October 2024

Director. (June 2018-October 2024).

- Management: Lead organization with over 400 employees and \$70 million annual budget; supervise management team; lead organization through pandemic, social change, and significant budgetary challenges.
- Legislation and policy: lead successful efforts to enact legislation on city, county, and state levels, including first-in-the-nation ordinance protecting children in custody from being interrogated without counsel.
- Litigation: supervise litigation, including civil suits and habeas actions, on issues related to indigent defense; represent individual clients; liaison with civil defense council on employment litigation.

Deputy Director/Policy Director. Second in command of 400-person government agency; audit caseloads to ensure compliance with contracts and Supreme Court standards; negotiate contracts with unions; review adequacy of internal investigations of attorney misconduct; review discipline imposed on staff; serve as general counsel; collaborate with law enforcement, prosecutors, and local government to reform criminal justice system (e.g. developing simplified *Miranda* warnings).

THE PUBLIC DEFENDER ASSOCIATION

Seattle, WA, July 2008 to December 2011, July 2013 to January 2016

Senior Attorney (July 2013 to November 2015). Identify criminal justice policies needing reform and propose and advocate for alternative policies. Litigate systemic issues facing criminal defendants, including *Trueblood v. DSHS* in the Western District and Ninth Circuit. Provide ancillary legal services to participants in pre-booking diversion program. Assist with implementing pre-booking diversion program (LEAD).

Staff Attorney (July 2008 to December 2011). Represented individuals accused of crimes, including jury trials.

FEDERAL DEFENDER FOR THE WESTERN DISTRICT OF WASHINGTON

Seattle, WA, December 2011 to July 2013

Staff Attorney. Drafted pre-trial motions, trial briefs, and appellate briefs on behalf of indigent defendants charged with federal crimes. Drafted habeas petitions on behalf of indigent defendants challenging state and federal convictions. Argued pre-trial motions in trial court and appeals before the Ninth Circuit.

HONORABLE WILLIAM WAYNE JUSTICE, WESTERN DISTRICT OF TEXAS

Austin, TX, August 2007 to July 2008

Law Clerk. Researched and drafted legal opinions with emphasis on criminal and habeas cases.

RELMAN & DANE, PLLC

Washington, D.C., September 2006 to August 2007

Civil Rights Fellow. Researched and wrote legal memoranda and briefs for civil rights firm. Involved in all aspects of litigation in federal court, including drafting complaints, motion for preliminary injunction, opposition to summary judgment, motions in limine, and other pleadings; took and second-chaired depositions.

HONORABLE DOLORES K. SLOVITER, THIRD CIRCUIT COURT OF APPEALS

Philadelphia, PA, August 2005 to August 2006

Law Clerk. Researched and drafted legal opinions.

ALTSHULER, BERZON, NUSSBAUM, RUBIN & DEMAIN

San Francisco, CA, May 2004 to July 2004

Summer Law Clerk. Researched and wrote legal memoranda and briefs for union-side labor law firm.

ACLU DRUG LAW REFORM PROJECT

Santa Cruz, CA, May 2003 to August 2004

Legal Intern. Interviewed clients and potential witnesses and drafted complaint in nationally publicized civil rights case alleging discriminatory law enforcement in South Carolina.

LANGUAGES: Hindi and Urdu, Conversational Spanish

BAR ADMISSIONS: Washington, Western District of Washington, Ninth Circuit Court of Appeals

Memberships: King County Bar Association, Federal Bar Association, South Asian Bar Association, Washington Leadership Institute

Additional Activities: Keynote speaker at SABAW annual conference (2020); graduate of and regular speaker at Washington Leadership Institute; Mentor-in-residence at Yale Law School.

Seattle Ethics and Elections Commission

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- 3 Mayor- appointed
- 3 City Council- appointed
- 1 Other Appointing Authority: Commission

Roster:

*D	**G	RD	Position No.	Position Title	Name	Term Begin Date	Term End Date	Term #	Appointed By
1	F	3	1	Member	Anita Khandelwal	1/1/24	12/31/26	1	Mayor
6	M	3	2	Member	Evan M. Smith	1/1/25	12/31/27	1	City Council
6	M	5	3	Member	Kai Smith	1/1/25	12/31/27	1	Mayor
2	F	3	4	Member	Vivian Vassall	1/1/25	12/31/27	1	Commission
6	M	7	5	Member	Jonathan Schirmer	1/1/26	12/31/28	1	City Council
3	F	2	6	Member	Andrea Lino	1/1/26	12/31/28	1	Mayor
2	M	3	7	Member	Bobby Forch	1/1/24	12/31/26	1	City Council

SELF-IDENTIFIED DIVERSITY CHART

	SELF-IDENTIFIED DIVERSITY CHART				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Male	Female	Transgender	NB/ O/ U	Asian	Black/ African American	Hispanic/ Latino	American Indian/ Alaska Native	Other	Caucasian/ Non-Hispanic	Pacific Islander	Middle Eastern	Multiracial
Mayor	1	2			1		1			1			
Council	3					1				2			
Other		1				1							
Total	4	3			1	2	1			3			

Key:

*D List the corresponding *Diversity Chart* number (1 through 9)

**G List *gender*, M= Male, F= Female, T= Transgender, NB= Non-Binary, O= Other, U= Unknown

RD Residential Council District number 1 through 7 or N/A

Diversity information is self-identified and is voluntary.



Legislation Text

File #: Inf 2874, **Version:** 1

Homemade Food Waste Program Presentation

For everyone, at every table

home
made



Introductions

Meet Homemade!

On a mission to empower the world to cook more!

Millions of students

79% class completion rate


2,500+ cooking videos in our ever-growing library

15 diverse, fun, approachable, and professional chefs

175+ partnerships with top orgs



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 City of Seattle

Video & AI Have Transformed How People Shop, Eat & Cook

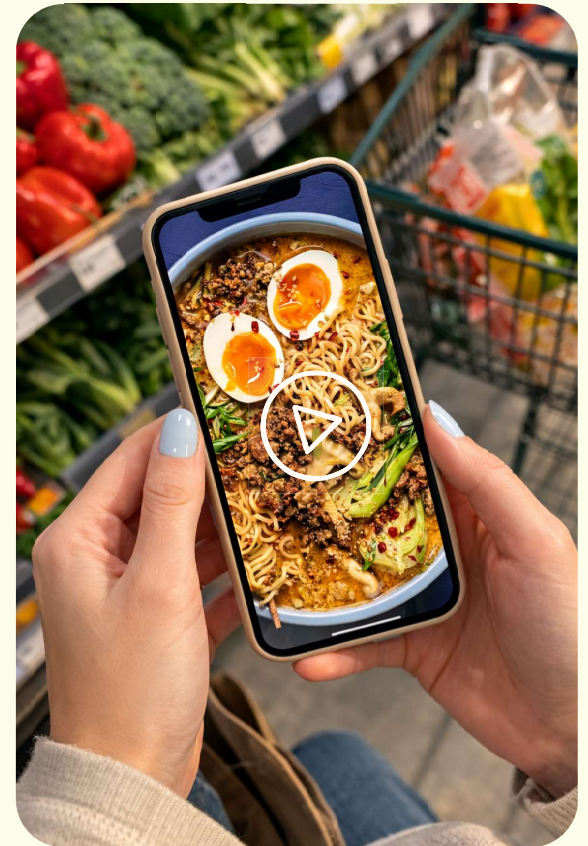
The private sector is all in on videos and AI-assisted shopping

FOOD VIDEOS

- **8/10** people say food videos drive them to cook more
- **72%** feel more confident cooking healthy meals after watching videos

AI-ASSISTED SHOPPING

- **AI is now the #2** most influential shopping source
- **70%** of consumers say AI influences what food they buy
- **\$168B+** flowing into retail media + AI



We can leverage the same behavior changing tools for public good

- **Community Food Security**
 - Awareness/use of the food assistance programs
 - Tools/skills to stretch foods and budgets
- **Improved Health**
 - Increase scratch cooking
 - Greater awareness and efficacy of produce incentive programs
 - Inspiring recipe ideas for produce and other healthful foods
- **Reduce Food Waste**
 - Tips to use what you have
 - Tips to use the entirety of what you buy
 - Guidance on date labeling/food safety



OUR FOUNDING PARTNERS



Seattle has invested millions in food.
Homemade brings measurable assistance.

Food + Assistance

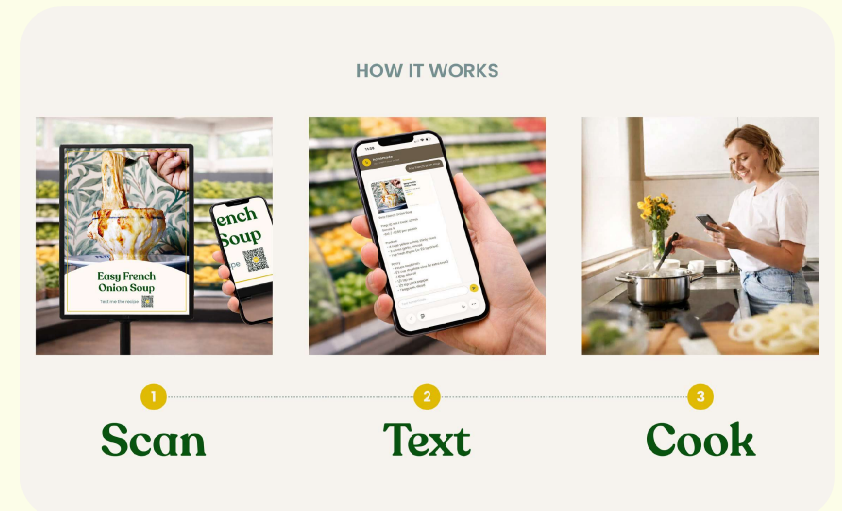
Food + Assistance

Text Support


- Free, real-time SMS food guidance
- Built for food security and everyday decisions
- Connects residents to Seattle resources
 - (Basic Food, Produce Incentives, food banks, etc)
- Culinary trained on Homemade IP
- Personalized to culture, budget, and what's on hand

Recipes act as our gateway to guidance

- 17x the engagement on social videos
- 3.2x the CTR on emails
- 6.2x open rate on SMS



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 City of Seattle

Food + Assistance

Video & Resource Hub

- Video library
- Community leaders
- Highlight cultural abundance
- Local resources

Avocados

Creamy, dreamy, and always a good idea—avocados are a kitchen MVP. **Select** ones that give just a little when you press, **store** them in the fridge once ripe, and **stretch** every last scoop by blending them into a versatile avocado crema you can drizzle, dip, and spread on just about everything.




Potatoes

Reliable, comforting, and endlessly versatile—potatoes are here for you and adaptable to your family's preferences. **Select** firm spuds with no sprouts, **store** them in a cool, dark place, and **stretch** them all week by roasting a big batch to freeze or turning one of them into the base of a comforting, flavorful soup.



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Food + Assistance

Live & Livestreamed Cooking Classes

- Schools/fieldtrips
- Community centers
- Farmers markets



How Homemade Assistance Strengthens the Seattle Food Plan

- Community Food Security
- Local Supply Chains & Equitably Purchased Food
- Food Waste
- Community-Led Nutrition Education



Community Food Security

- **Strengthen Fresh Bucks**

- **Awareness of the breadth of retailers**
- **Recipes to diversify types of produce used**
- **Assistance in "food as medicine" contexts**

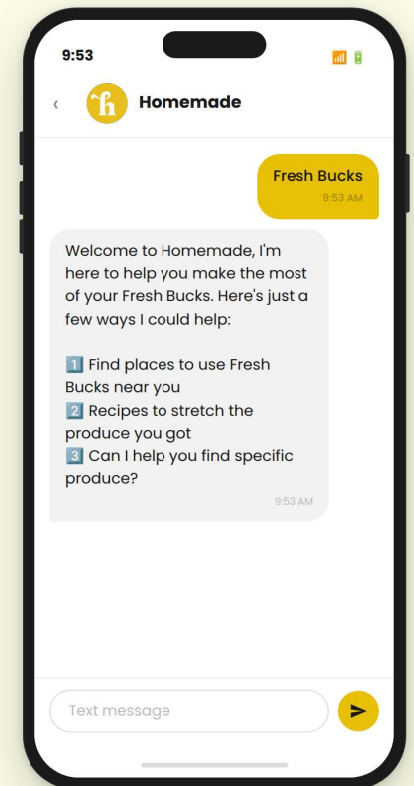
- **Uplift Food Banks**

- Assistance for food bank staff for cultural awareness/translation
- Recipe ideas for unfamiliar foods
- Assistance for pre-selected food boxes

- **Increase awareness of food assistance resources**

- In-text prompts
- Use profile for personalized suggestions

*General guidance to use food you already have and stretch budgets

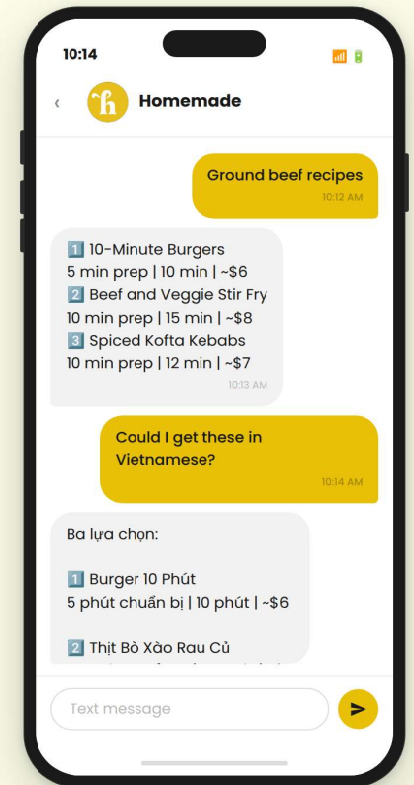
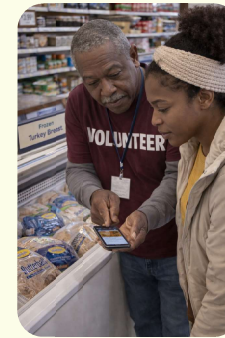


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Community Food Security

- **Strengthen Fresh Bucks**
 - Awareness of the breadth of retailers
 - Recipes to diversify types of produce used
 - Assistance in "food as medicine" contexts
- **Uplift Food Banks**
 - **Assistance for food bank staff for cultural awareness/translation**
 - **Recipe ideas for unfamiliar foods**
 - **Assistance for pre-selected food boxes**
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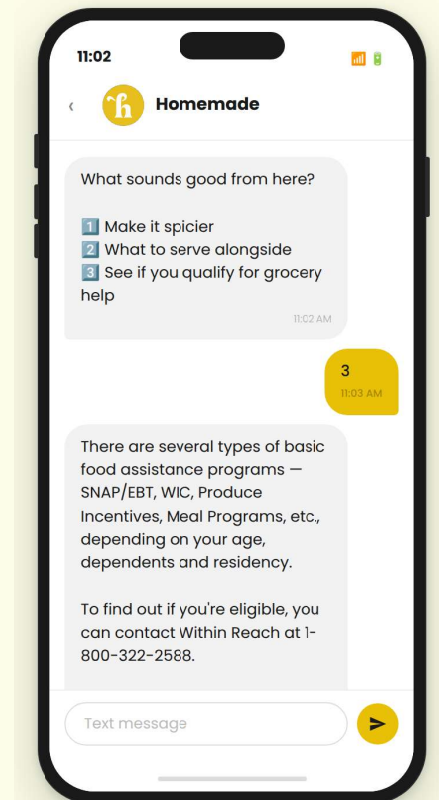


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 City of Seattle

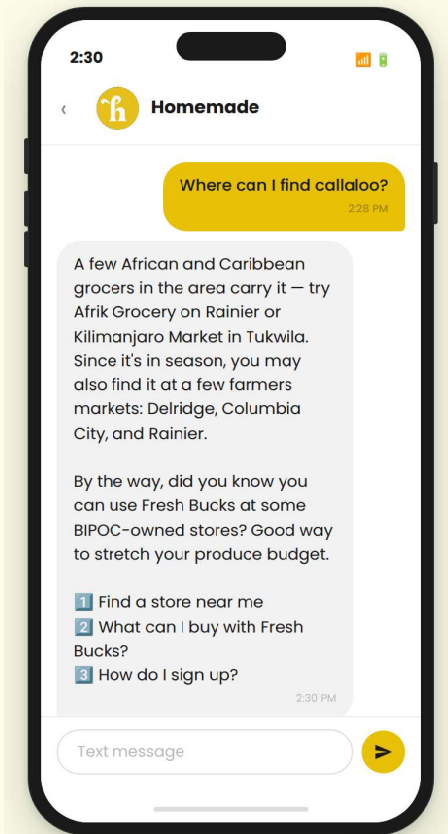
Community Food Security

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- **Increase awareness of food assistance resources**
 - **In-text prompts**
 - **Use profile for personalized suggestions**




Local Supply Chains & Equitably Purchased Food

- Level the playing field to provide promotion for local businesses
- Promotion for BIPOC-owned businesses and farms

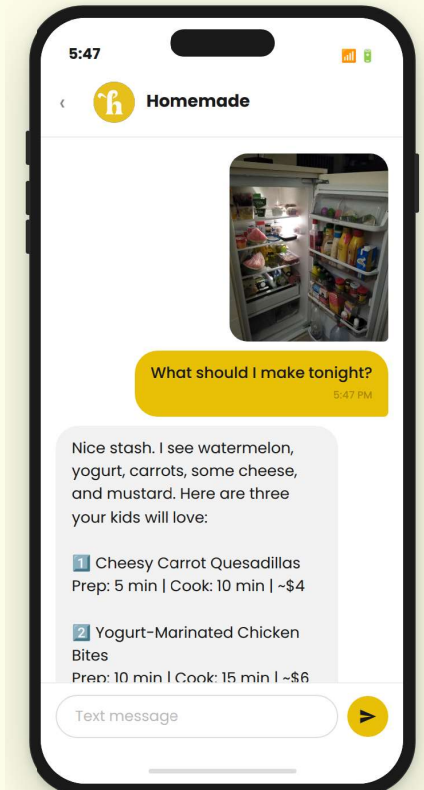


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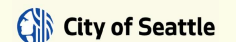
Food Waste

- Photo of ingredients you have
- Receipt scan
- Use Food Well prompts
- Shopping and cooking tips
- Can add food safety, date labeling etc...



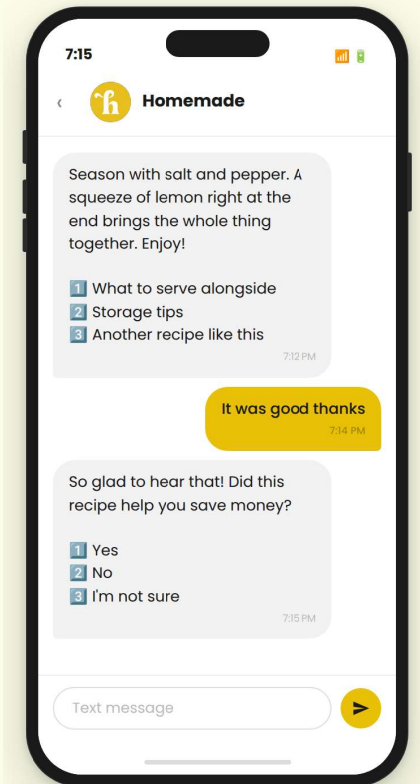
Community-Led Education and School Programs

- Live → Schools & Community Centers
- Video → resource for teachers
- Recipe Scan → onsite and digital



Measurement

- Culinary engagement data
- Surveys (self report & partner-initiated)
- Traffic to targeted programs/businesses
- World Resources Institute partnership
- Food Waste measurement



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Security & Privacy

Built for Trust

- No sale of personal data
- No surveillance or long-term tracking
- Minimal data collection
- Aggregated, anonymized insights only
- User control (opt out + delete anytime)
- Encrypted, secure infrastructure

Click to Read



Homemade

Security, Privacy & Data Principles

Prepared for Partners

Executive Summary

Homemade is a privacy-first, AI-powered food guidance platform designed for use across grocery, healthcare, and public-sector environments.

The system is built to support real-time food decisions while minimizing data collection and protecting user privacy.

Unlike traditional AI platforms and retail media networks, Homemade does not rely on surveillance-based data models. It operates on context, not long-term tracking, significantly reducing risk for partners.

As Homemade scales across retail and community environments, security and privacy are treated as foundational infrastructure—not an afterthought.

Our Approach

Homemade is designed to:

- Help people make better food decisions in the moment
- Operate safely across sensitive environments
- Protect both users and institutional partners
- Generate insights without compromising privacy

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City of Seattle

The Time is Now

- Fresh food costs continue to rise
- Processed food consumption is increasing
- Retail is shaping decisions at scale
- Incentives prioritize selling products & ads
- These tools will only get more powerful


The public food system needs to modernize and adapt to **meet people in the moment**



Seattle will lead the way in Good Food Guidance



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 City of Seattle



Legislation Text

File #: CB 121192, Version: 1

CITY OF SEATTLE

ORDINANCE _____

COUNCIL BILL _____

AN ORDINANCE relating to Seattle Public Utilities; authorizing the General Manager and CEO of Seattle Public Utilities to accept slope stabilization easements within two parcels of private property identified as King County Parcel Number 6844703215 located at 3822 NE 91st Street, and King County Parcel Number 6844703295 located at 3832 NE 91st Street; placing the properties under the jurisdiction of Seattle Public Utilities; and ratifying and confirming certain prior acts.

WHEREAS, Seattle Public Utilities (SPU) is responsible within the City for public stormwater management, including but not limited to controlling surface water runoff on steep slopes and landslide prone areas, and prioritizing maintaining drainage within natural drainage courses; and

WHEREAS, SPU has identified drainage conditions at the end of NE 91st Street that could affect roadway stability, potentially cause erosion to public property and decrease slope stability; and

WHEREAS, SPU has determined that the best course of action to resolve these drainage issues is to perform and construct certain drainage improvements including slope stabilization within the public right-of-way and on adjacent private properties; and

WHEREAS, this work requires that the City obtain easements on private property to allow SPU to install, operate, maintain, repair, and replace its infrastructure; and

WHEREAS, the property owners and SPU have agreed to terms and fair market value compensation for the easements; and

WHEREAS, the property owners of 3822 NE 91st Street and 3832 NE 91st Street have granted easements to The City of Seattle to install and operate the needed drainage improvements and slope stabilization infrastructure and such easements require approval by ordinance of the City Council; NOW,

THEREFORE,

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. The General Manager and CEO of Seattle Public Utilities, or designee, is authorized to accept for and on behalf of The City of Seattle the following permanent easements for stormwater drainage and slope stabilization purposes, described below and further documented in Attachments 1 and 2 to this ordinance.

A. Grantors: Michael Van Snellenberg and Elizabeth Van Snellenberg, a married couple; King County Recording Number 20251028000960.

B. Grantor: Linda Duchin, as her sole and separate property; King County Recording Number 20251030000396.

Section 2. The real property rights and interests conveyed by the easements referenced and accepted in this ordinance shall be placed under the jurisdiction of Seattle Public Utilities.

Section 3. Any act consistent with the authority of this ordinance taken after its passage and prior to its effective date is ratified and confirmed.

Section 4. This ordinance shall take effect as provided by Seattle Municipal Code Sections 1.04.020 and 1.04.070.

Passed by the City Council the _____ day of _____, 2026, and signed by me in open session in authentication of its passage this _____ day of _____, 2026.

President _____ of the City Council

Approved / returned unsigned / vetoed this ____ day of _____, 2026.

Katie B. Wilson, Mayor

Filed by me this _____ day of _____, 2026.

Scheereen Dedman, City Clerk

(Seal)

Attachments:

Attachment 1 - Slope Stabilization Easement (Van Snellenberg)

Attachment 2 - Slope Stabilization Easement (Duchin)

Instrument Number: 20251028000960 Document:EAS Rec: \$308.50 Page-1 of 6
Excise Docs: 3353350 Tax Amount: \$10.00 Record Date:10/28/2025 3:24 PM
Electronically Recorded King County, WA

Recorded Requested By And
When Recorded Mail To:

City of Seattle SPU – DWW
700 5th Ave, Suite 4900-RPS
PO Box 34018
Seattle WA 98124-4108

SLOPE STABILIZATION EASEMENT

Grantor (insert correct title):..... Michael & Elizabeth Van Snellenberg
Grantee (insert correct title):..... ~~THE~~ CITY OF SEATTLE, Seattle Public Utilities
Legal Description (abbreviated)..... LOTS 8-10 AND PTN LOT 7, BLK 65, PONTIAC ADD. TO
THE CITY OF SEATTLE, VOL. 6, P. 42, KING COUNTY,
WASHINGTON
Assessor’s Tax Parcel ID#:..... 684470-3215
Reference No(s):..... N/A

3822 NE 91st St **SPU File # DWW2023-0022-0002**

THIS EASEMENT made this 15th day of SEPTEMBER, 2025, by **Michael Van Snellenberg and Elizabeth Van Snellenberg**, a married couple, hereinafter called “Grantor,” and the **CITY OF SEATTLE**, a municipal corporation of the State of Washington, acting by and through its Seattle Public Utilities Department, hereinafter called the “City”; WITNESSETH;

1. That the Grantor, for and in consideration of the sum of FIVE THOUSAND FOUR HUNDRED DOLLARS (\$5,400), and under imminent threat of eminent domain, hereby conveys and grants to the City, its successors and assigns, a slope easement, including the right, privilege and authority to install, construct, reconstruct, erect, alter, improve, repair, operate and to maintain the slope and grade, connecting pipes and appurtenances, over, under, through, across, along and upon the Grantor’s property located in King County, Washington, described as follows:

Legal Description and Plan attached hereto as EXHIBIT “A” and EXHIBIT “B” and incorporated herein by reference.

2. Grantor hereby agrees that no building, fence, wall, rockery, trees, shrubbery or obstruction of any kind shall be erected or planted, or any fill material will be placed within the boundaries of said Easement Area without the written permission of the City of Seattle’s GM/CEO of Seattle Public Utilities or her/his designee. No excavation shall be made within three feet of said Slope Easement Area, and that the elevation of the earth within the Easement Area shall not be changed.

3. Grantor hereby agrees that no other utility facilities, such as conduits, cables, pipelines, vaults poles, posts, whether public or private, will be installed within five (5) horizontal feet of the Slope Easement Area.
4. Subject to the terms of this Agreement, the City or its agents shall have the right without prior institution of any suit or proceeding at law, at such times as may be necessary, to enter upon said Easement Area and such additional area immediately adjacent to said Easement Area, as shall be reasonably required for the purposes herein described, without incurring any legal obligation or liability therefore; provided, however, subject to and in accordance with the conditions and restrictions on private improvements described in paragraphs 2 and 3 herein, that in the event the City disturbs or damages private improvements on the Property in connection with its use of the easement granted herein, the City shall restore such improvements to a condition as good as or better than that which existed prior to such damage or disturbance.
5. In an emergency the City shall have the right to close the Easement Area and to excavate without prior notice.
6. Grantor shall have the right to use said property in any way and for any other legal purpose not inconsistent with the rights herein granted.
7. Grantor waives any present or future claim against the City relating to hazardous substances, pollutants, or contaminants on the Property in connection with the rights granted hereunder unless the hazardous substances, pollutants or contaminants are released as a direct result from the City's operations on the Property or the use of the Easement Area.
8. If the Property is redeveloped in such a way which eliminates the need for drainage, connecting pipes and appurtenances, property owner can request the City of Seattle's GM/CEO of Seattle Public Utilities or her/his designee, for a relinquishment of the Slope Easement and if approved Seattle Public Utilities will record a relinquishment of the Easement.
9. The City will exercise its rights under this Agreement in accordance with the requirements of all applicable statutes, orders, rules and regulations of any public authority having jurisdiction. The City will defend, indemnify, and hold Grantor harmless from and against any and all claims, costs, liabilities, and damages that arise from or relate to the exercise of the rights granted herein by the City, its agents, employees, representatives, contractors and permittees to the extent such claims, costs, liabilities and damages are caused by an act or omission of the City, its agents, employees, representatives, contractors and permittees. To the extent permitted by RCW 4.24.115, the City's obligations under this indemnity shall not apply to the extent that any such claims, costs, liabilities, and damages

arise from the negligence of Grantor or its agents, employees, representatives, contractors or permittees.

10. This agreement and each of the terms, provisions, conditions, and covenant herein, shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, successors and assigns.

Executed this 15th day of SEPTEMBER, 2025.

GRANTORS: Michael Van Snellenberg and Elizabeth Van Snellenberg, a married couple

By: *M. Van S*

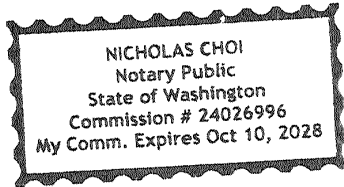
Print Name: Michael Van Snellenberg

STATE OF WASHINGTON)
) ss.
COUNTY OF King

On this 15 day of September, 2025, before me, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared **Michael Van Snellenberg**, to me known to be the individual described in and who executed the within and foregoing instrument, acknowledged that (he/she signed the same as his/her free and voluntary act and deed for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year above written.

(notary seal)



Signature: *Nicholas Choi*

Print name: Nicholas Choi
Notary Public in and for the State of Washington
Residing at: Seattle, WA
My commission expires: 10/10/2028

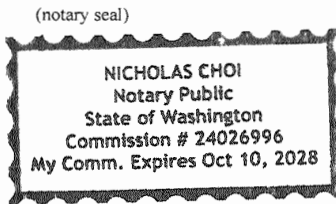
By: 

Print Name: Elizabeth Van Snellenberg

STATE OF WASHINGTON)
COUNTY OF King) ss.

On this 15 day of September, 2025, before me, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared **Elizabeth Van Snellenberg**, to me known to be the individual described in and who executed the within and foregoing instrument, acknowledged that he/she signed the same as his/her free and voluntary act and deed for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year above written.



Signature: 

Print name: Nicholas Choi

Notary Public in and for the State of Washington

Residing at: Seattle, WA

My commission expires: 10/10/2028

**EXHIBIT A
LEGAL DESCRIPTION FOR SLOPE EASEMENT
FROM TAX PARCEL NO. 6844703215**

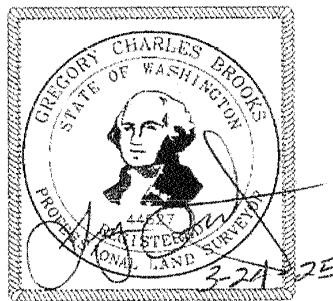
A slope easement across a portion of the Northwest quarter of the Southwest quarter of Section 34, Township 26 North, Range 4 East, W.M., King County, Washington, being described as follows:

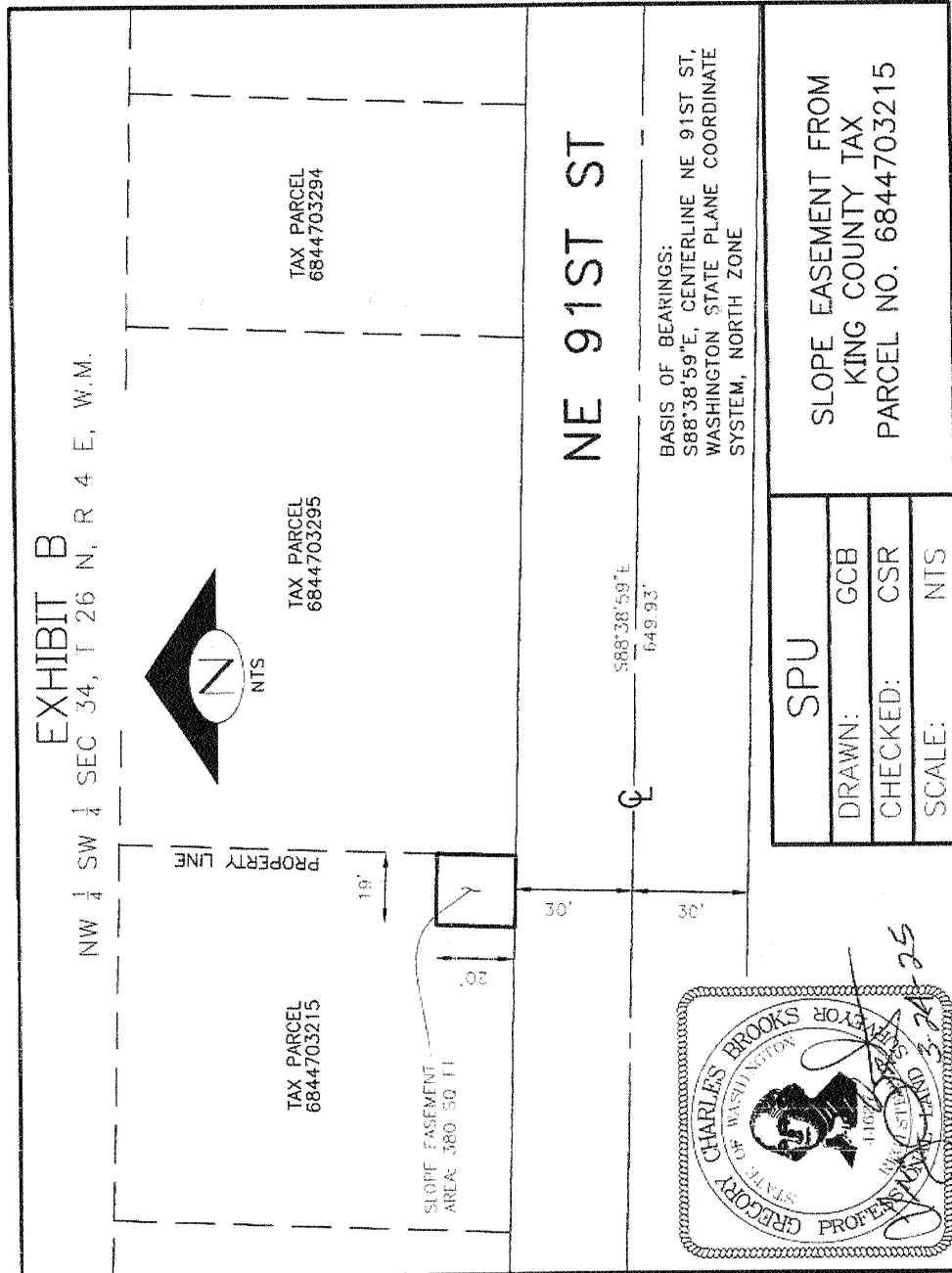
The southerly 20.00 feet of the easterly 19.00 feet of the below described PARENT PARCEL, containing 380 square feet, more or less.

PARENT PARCEL

EAST 10 FEET OF LOT 7 AND ALL OF LOTS 8, 9 AND 10, ALL IN BLOCK 65 PONTIAC ADDITION TO THE CITY OF SEATTLE, ACCORDING TO THE PLAT RECORDED IN VOLUME 6 OF PLATS, PAGE 42, IN KING COUNTY, WASHINGTON

SITUATE IN THE CITY OF SEATTLE, COUNTY OF KING, STATE OF WASHINGTON.





Instrument Number: 20251030000396 Document:EAS Rec: \$307.50 Page-1 of 5
Excise Docs: 3353633 Tax Amount: \$10.00 Record Date:10/30/2025 11:31 AM
Electronically Recorded King County, WA

Recorded Requested By And
When Recorded Mail To:

City of Seattle SPU – DWW
700 5th Ave, Suite 4900-RPS
PO Box 34018
Seattle WA 98124-4108

SLOPE STABILIZATION EASEMENT

Grantor (insert correct title):.....Linda Duchin
Grantee (insert correct title):.....THE CITY OF SEATTLE, Seattle Public Utilities
Legal Description (abbreviated):.....PONTIAC ADD PARCEL A OF CITY OF SEATTLE
SHORT PLAT NO 78-173 RECORDING NO
7809290968 SD PLAT DAF-LOTS 1 THRU 10 BLK 66
TGW LOTS 2, 3, & 4 BLK 67 LESS N 90 FT SDLOTS 2 &
3 LESS W 10 FT OF N 90 FT OF LOT 4 IN PONTIAC
ADD
Assessor's Tax Parcel ID#:.....684470-3295
Reference No(s):.....N/A

3832 NE 91st St

SPU File # DWW2023-0022-0001

THIS EASEMENT made this 28th day of August, 2025 by
Linda Duchin, hereinafter called "Grantor," and the **CITY OF SEATTLE**, a municipal
corporation of the State of Washington, acting by and through its Seattle Public Utilities
Department, hereinafter called the "City"; WITNESSETH;

1. That the Grantor, for and in consideration of the sum of FOUR THOUSAND FIVE
HUNDRED DOLLARS (\$4,500), and under imminent threat of eminent domain, hereby
conveys and grants to the City, its successors and assigns, a slope easement, including
the right, privilege and authority to install, construct, reconstruct, erect, alter,
improve, repair, operate and to maintain the slope and grade, connecting pipes and
appurtenances, over, under, through, across, along and upon the Grantor's property
located in King County, Washington, described as follows:

Legal Description and Plan attached hereto as EXHIBIT "A" and EXHIBIT "B"
and incorporated herein by reference.

2. Grantor hereby agrees that no building, fence, wall, rockery, trees, shrubbery or
obstruction of any kind shall be erected or planted, or any fill material will be placed
within the boundaries of said Easement Area without the written permission of the City of
Seattle's GM/CEO of Seattle Public Utilities or her/his designee. No excavation shall be
made within three feet of said Slope Easement Area, and that the elevation of the earth
within the Easement Area shall not be changed.

3. Grantor hereby agrees that no other utility facilities, such as conduits, cables, pipelines, vaults poles, posts, whether public or private, will be installed within five (5) horizontal feet of the Slope Easement Area.
4. Subject to the terms of this Agreement, the City or its agents shall have the right without prior institution of any suit or proceeding at law, at such times as may be necessary, to enter upon said Easement Area and such additional area immediately adjacent to said Easement Area, as shall be reasonably required for the purposes herein described, without incurring any legal obligation or liability therefore; provided, however, subject to and in accordance with the conditions and restrictions on private improvements described in paragraphs 2 and 3 herein, that in the event the City disturbs or damages private improvements on the Property in connection with its use of the easement granted herein, the City shall restore such improvements to a condition as good as or better than that which existed prior to such damage or disturbance.
5. In an emergency the City shall have the right to close the Easement Area and to excavate without prior notice.
6. Grantor shall have the right to use said property in any way and for any other legal purpose not inconsistent with the rights herein granted.
7. Grantor waives any present or future claim against the City relating to hazardous substances, pollutants, or contaminants on the Property in connection with the rights granted hereunder unless the hazardous substances, pollutants or contaminants are released as a direct result from the City's operations on the Property or the use of the Easement Area.
8. If the Property is redeveloped in such a way which eliminates the need for drainage, connecting pipes and appurtenances, property owner can request the City of Seattle's GM/CEO of Seattle Public Utilities or her/his designee, for a relinquishment of the Slope Easement and if approved Seattle Public Utilities will record a relinquishment of the Easement.
9. The City will exercise its rights under this Agreement in accordance with the requirements of all applicable statutes, orders, rules and regulations of any public authority having jurisdiction. The City will defend, indemnify, and hold Grantor harmless from and against any and all claims, costs, liabilities, and damages that arise from or relate to the exercise of the rights granted herein by the City, its agents, employees, representatives, contractors and permittees to the extent such claims, costs, liabilities and damages are caused by an act or omission of the City, its agents, employees, representatives, contractors and permittees. To the extent permitted by RCW 4.24.115, the City's obligations under this indemnity shall not apply to the extent that any such claims, costs, liabilities, and damages

arise from the negligence of Grantor or its agents, employees, representatives, contractors or permittees.

10. This agreement and each of the terms, provisions, conditions, and covenant herein, shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, successors and assigns.

Executed this 28th day of August, 2025.

GRANTOR: Linda Duchin

By: [Signature]

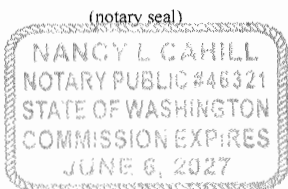
Print Name: Linda Duchin

STATE OF WASHINGTON)

COUNTY OF KING) ss.

On this 28th day of August, 2025, before me, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared **Linda Duchin**, to me known to be the individual described in and who executed the within and foregoing instrument, acknowledged that he/she signed the same as his/her free and voluntary act and deed for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year above written.



Signature: [Signature]
Print name: NANCY L. CAHILL
Notary Public in and for the State of Washington
Residing at: Seattle, Washington
My commission expires: 06/06/2027

EXHIBIT A
LEGAL DESCRIPTION FOR SLOPE EASEMENT
FROM TAX PARCEL NO. 6844703295

A slope easement across a portion of the Northwest quarter of the Southwest quarter of Section 34, Township 26 North, Range 4 East, W.M., King County, Washington, being described as follows:

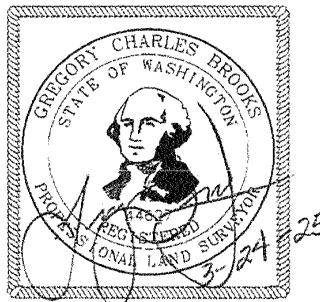
The southerly 20.00 feet of the westerly 37.00 feet of the below described PARENT PARCEL, containing 740 square feet, more or less.

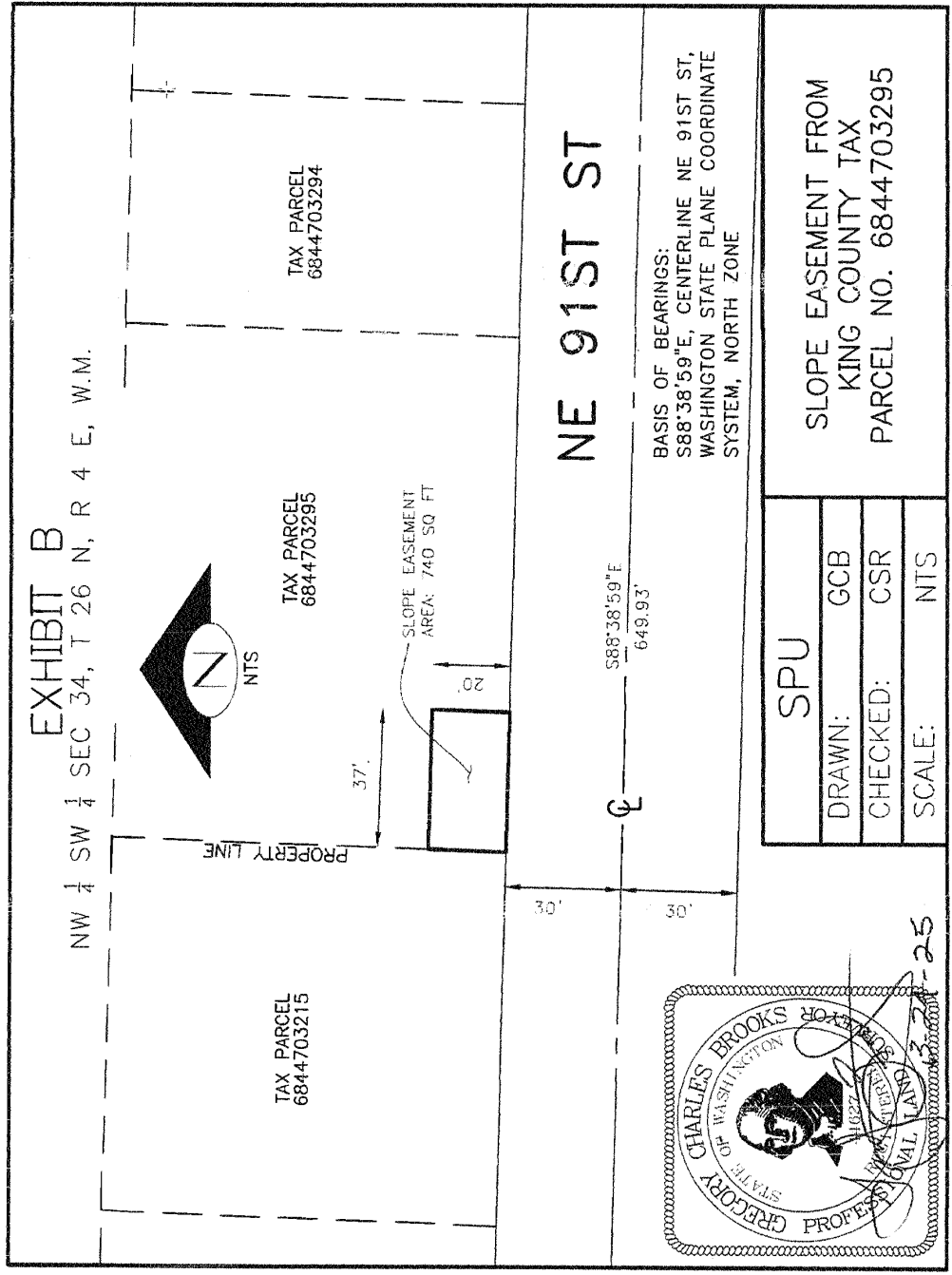
PARENT PARCEL

PARCEL A OF THE CITY OF SEATTLE SHORT PLAT NO. 78-173, RECORDED UNDER RECORDING NO. 7809290968, RECORDS OF KING COUNTY, WASHINGTON, SAID SHORT PLAT FURTHER DESCRIBED AS FOLLOWS:

LOTS 1 THRU 10, BLOCK 66, TOGETHER WITH LOTS 2, 3 AND 4, BLOCK 67, LESS THE NORTHERLY 90 FEET OF SAID LOTS 2 AND 3, BLOCK 67, AND LESS THE WESTERLY 10 FEET OF THE NORTHERLY 90 FEET OF SAID LOT 4, BLOCK 67, ALL IN PONTIAC ADDITION TO THE CITY OF SEATTLE, ACCORDING TO THE PLAT RECORDED IN VOLUME 6 OF PLATS, PAGE 42, IN KING COUNTY, WASHINGTON

SITUATE IN THE CITY OF SEATTLE, COUNTY OF KING, STATE OF WASHINGTON.





SUMMARY and FISCAL NOTE

Department:	Dept. Contact:	CBO Contact:
Seattle Public Utilities	Leana Aguila	Akshay Iyengar

1. BILL SUMMARY

Legislation Title: AN ORDINANCE relating to Seattle Public Utilities; authorizing the General Manager and CEO of Seattle Public Utilities to accept slope stabilization easements within two parcels of private property identified as King County Parcel Number 6844703215 located at 3822 NE 91st Street, and King County Parcel Number 6844703295 located at 3832 NE 91st Street; placing the properties under the jurisdiction of Seattle Public Utilities; and ratifying and confirming certain prior acts.

Summary and Background of the Legislation: This ordinance would authorize the General Manager and CEO of Seattle Public Utilities to accept permanent slope easements over two parcels of private property needed for the NE 91st Street Culvert and Slope Stabilization Project. A slope stabilization easement is a permanent property right allowing Seattle Public Utilities to construct and maintain slope stabilization and drainage infrastructure on a limited part of private property.

In 2022 SPU determined that a culvert conveying street runoff to Maple Creek at the end of NE 91st Street had partially failed at the top of a steep slope. The steep slope also exhibited signs of instability with a void extending from the top of the slope to the bottom of the ravine behind the culvert outlet and a visible one-foot drop at the top of the slope indicating ground movement and instability. In 2023, SPU installed a temporary culvert to safely convey stormwater away from the unstable slope area. The permanent solution involves construction of a Reinforced Soil Slope (RSS) to stabilize the steep slope, on portions of two adjacent properties, with easements needed from the property owners. RSS is an engineered slope reinforced for long-term stability.

The cost of the two easements is \$9,900 and is included in SPU's current budget.

2. CAPITAL IMPROVEMENT PROGRAM

Does this legislation create, fund, or amend a CIP Project? Yes No

3. SUMMARY OF FINANCIAL IMPLICATIONS

Does this legislation have financial impacts to the City? Yes No

3.d. Other Impacts

Does the legislation have other financial impacts to The City of Seattle, including direct or indirect, one-time or ongoing costs, that are not included in Sections 3.a through 3.c? If so, please describe these financial impacts.

No additional financial impacts are anticipated. Periodic maintenance will be funded through existing Drainage and Wastewater (DWW) Operations and Maintenance resources.

If the legislation has costs, but they can be absorbed within existing operations, please describe how those costs can be absorbed.

The cost of acquiring the easements totals \$9,900.

The description should clearly describe if the absorbed costs are achievable because the department had excess resources within their existing budget or if by absorbing these costs the department is deprioritizing other work that would have used these resources.

Please describe any financial costs or other impacts of *not* implementing the legislation.

The slope easements are required to provide access to City assets for long-term maintenance. Without accepting the easements, SPU would be unable to complete permanent slope stabilization improvements, which could increase maintenance and emergency repair costs, and reduce drainage system performance.

Please describe how this legislation may affect any City departments other than the originating department.

N/A.

4. OTHER IMPLICATIONS

a. Is a public hearing required for this legislation?

No.

b. Is publication of notice with The Daily Journal of Commerce and/or The Seattle Times required for this legislation?

No.

c. Does this legislation affect a piece of property?

Yes. This legislation requests approval for easements on two private parcels, maps are attached.

d. Please describe any perceived implication for the principles of the Race and Social Justice Initiative.

- i. How does this legislation impact vulnerable or historically disadvantaged communities? How did you arrive at this conclusion? In your response please consider impacts within City government (employees, internal programs) as well as in the broader community.**

The project is located within the Racial and Social Justice Initiative Map's second-lowest equity priority area. The project is important to the community as it stabilizes the utility's stormwater assets in an environmentally critical area, protects private homeowner property from erosion, and protects Maple Creek fish habitat downstream of the culvert.

- ii. Please attach any Racial Equity Toolkits or other racial equity analyses in the development and/or assessment of the legislation.**

N/A.

- iii. What is the Language Access Plan for any communications to the public?**

The Project's community engagement plan will be in alignment with OIRA's language access best practices.

e. Climate Change Implications

- i. Emissions: How is this legislation likely to increase or decrease carbon emissions in a material way? Please attach any studies or other materials that were used to inform this response.**

This easements purchase will not increase carbon emissions in a material way.

- ii. Resiliency: Will the action(s) proposed by this legislation increase or decrease Seattle's resiliency (or ability to adapt) to climate change in a material way? If so, explain. If it is likely to decrease resiliency in a material way, describe what will or could be done to mitigate the effects.**

Purchase of these permanent easements will increase Seattle's resilience to climate change. Construction of the culvert infrastructure and reinforced steep slope are improvements to stormwater conveyance infrastructure that carry stormwater out of the neighborhood to the stream to reduce flooding risk and safeguard the green space and downstream fish habitat in Maple Creek.

- f. If this legislation includes a new initiative or a major programmatic expansion: What are the specific long-term and measurable goal(s) of the program? How will this legislation help achieve the program's desired goal(s)? What mechanisms will be used to measure progress towards meeting those goals?**

N/A.

- g. Does this legislation create a non-utility CIP project that involves a shared financial commitment with a non-City partner agency or organization?**

No.

5. ATTACHMENTS

Summary Attachments:

Summary Exhibit A – Map of Project Area

Summary Exhibit B – Map of Easement Areas

Summary Ex A – Map of Project Area
V1

Exhibit A – Map of Project Area

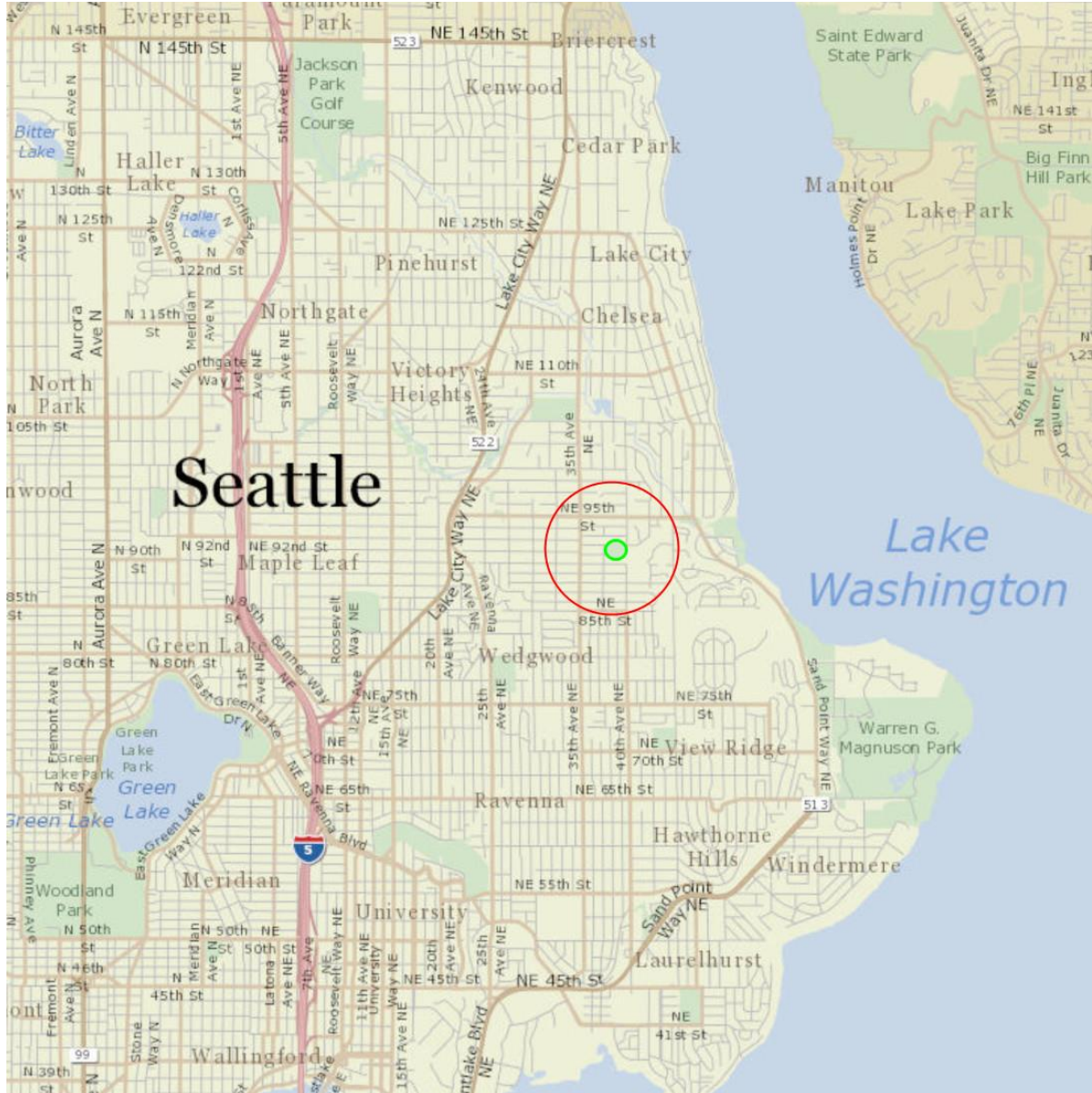
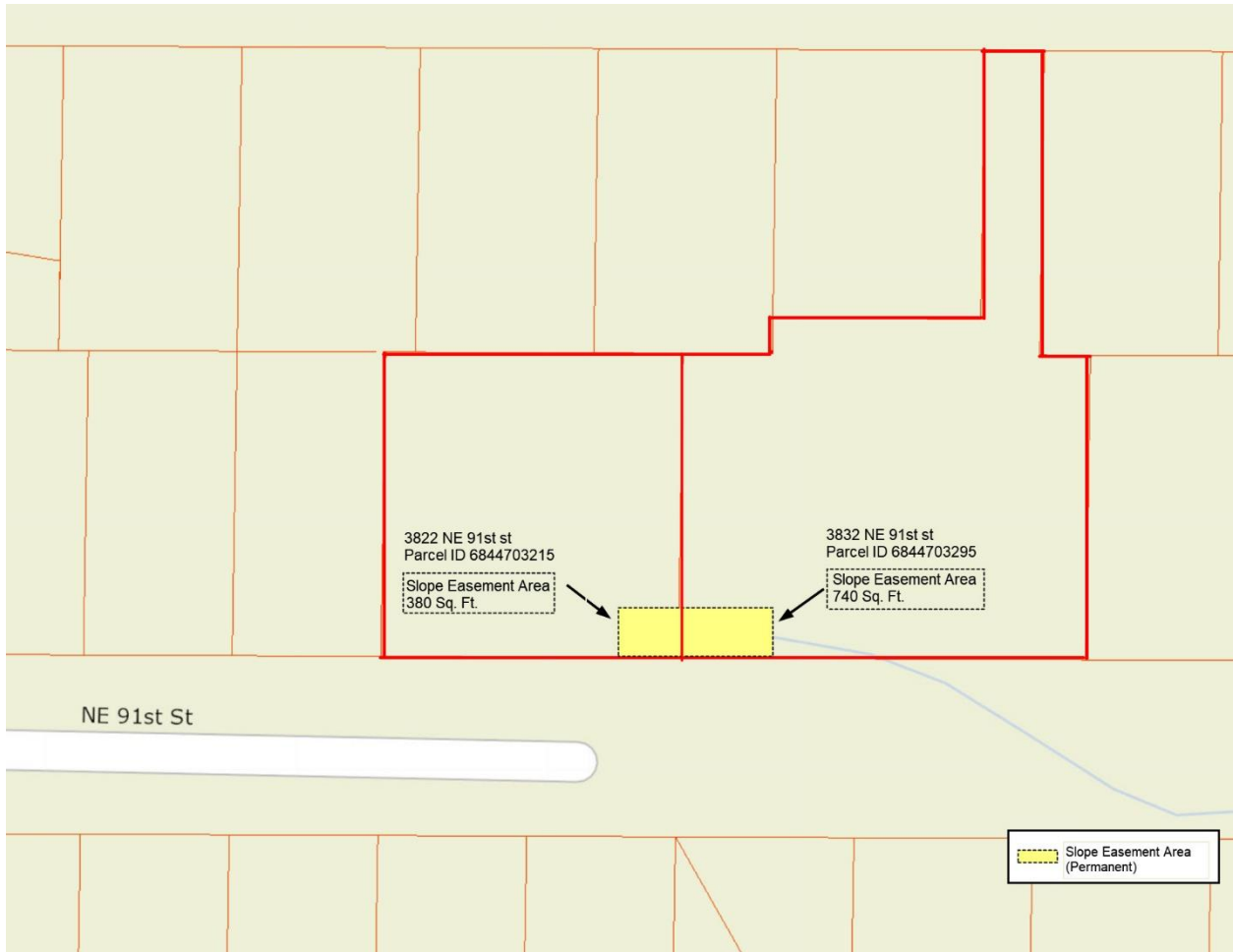


Exhibit B – Map of Easement Areas



Slope Easement Acquisition Ordinance

NE 91st St Culvert and Slope Stabilization Project

Seattle City Council

Government & Utilities Committee

April 9, 2026

Purpose of Legislation

Authorizes Seattle Public Utilities to accept two permanent slope easements on private property to ensure long-term access for drainage and slope stabilization

Location

- 3822 NE 91st Street
- 3832 NE 91st Street
- Wedgwood Neighborhood
- Council District #4



Background

- In 2022 the NE 91st street end slope showed signs of instability. The culvert also failed through the unstable slope area and eroded the toe of the slope.
- A temporary culvert was installed in 2023 to reduce immediate risk.
- Permanent repairs are needed to stabilize the slope and restore drainage
- SPU will construct a reinforced soil slope and new drainage infrastructure



NE 91st St Culvert and Slope Stabilization

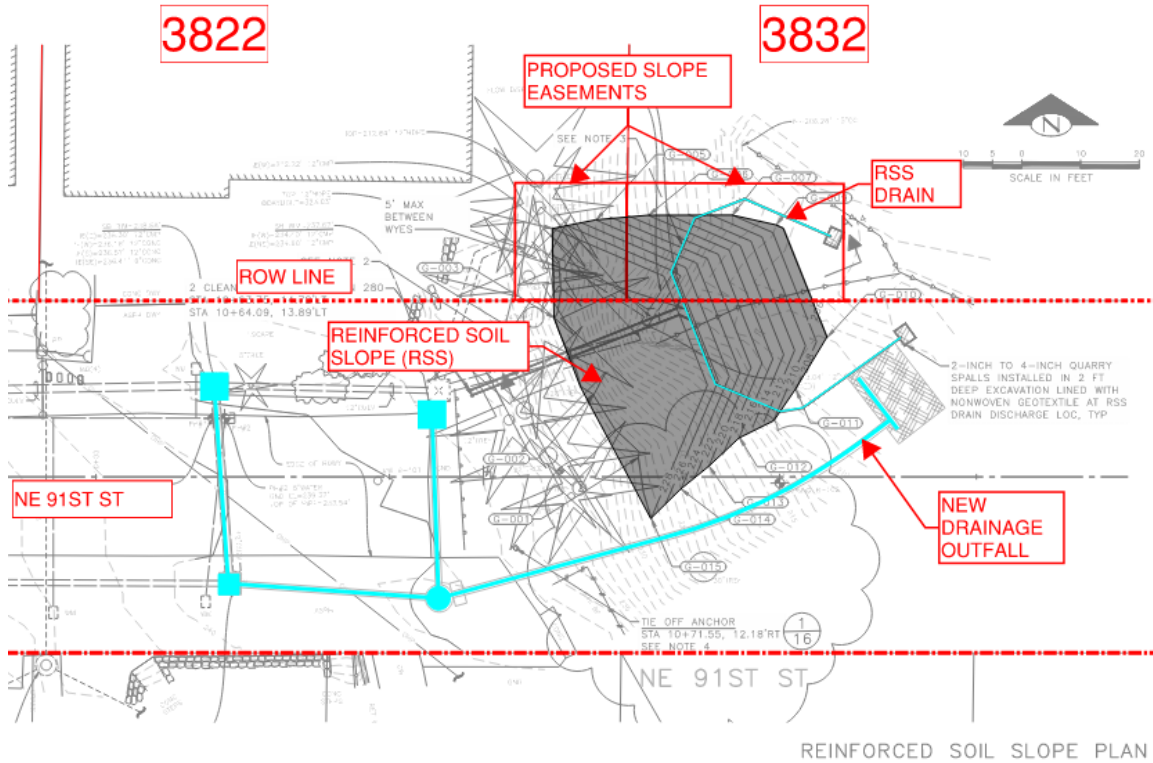
2022 – unstable slope & failing culvert



2023 – Temporary culvert installed

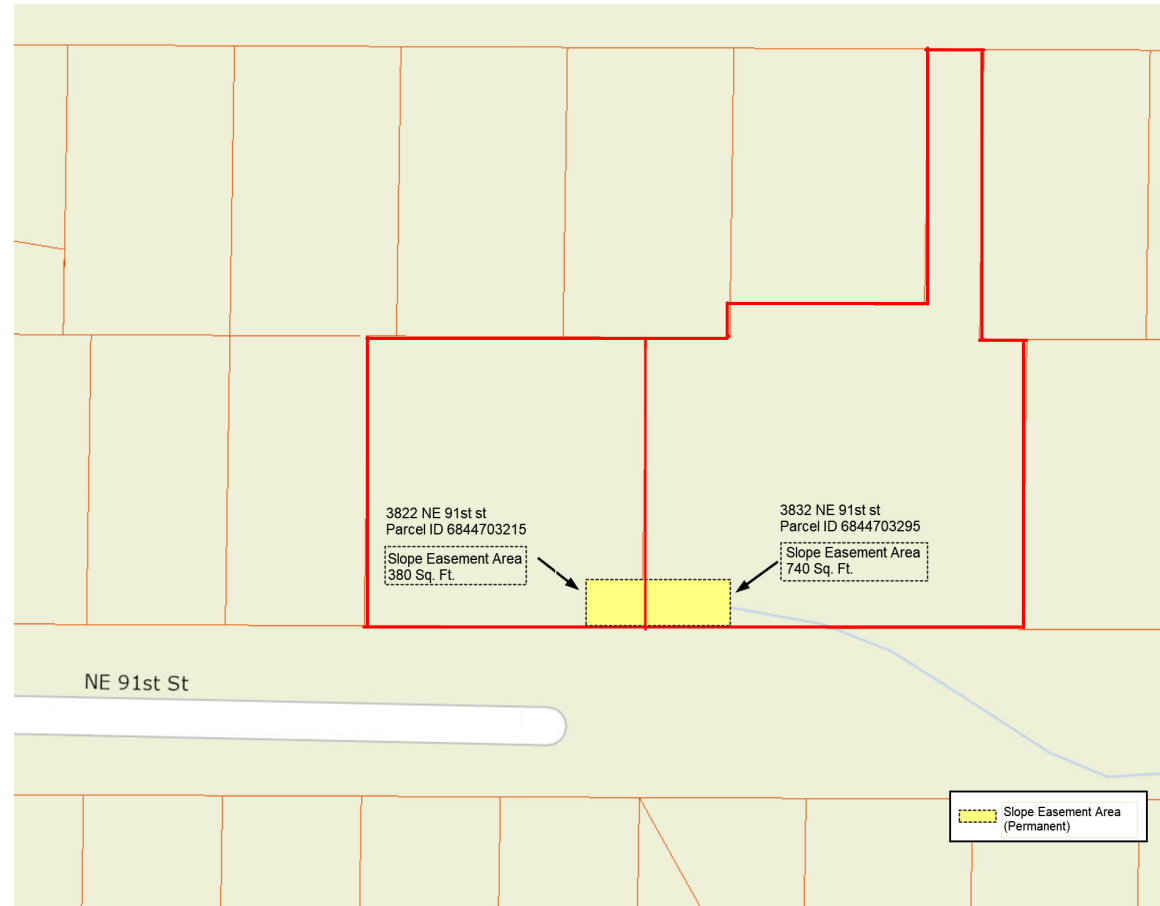


Site Plan



Property Rights Acquisition

- Parcels: 3822 and 3832 NE 91st St
- Two permanent slope stabilization easements acquired for a combined fair market value of \$9,900
- Final settlement offers accepted through amicable agreement
- Limited to portions needed for the reinforced slope



Community Engagement

- Coordinated directly with affected property owners throughout design
- Easement agreements reached following appraisal and negotiation
- Ongoing communication planned during construction



Questions?

Isabella Schwartz

Project Manager
Seattle Public Utilities

Isabella.Schwartz@seattle.gov

Leana Aguila

Senior Real Property Agent
Seattle Public Utilities

Leana.Aguila@seattle.gov



Legislation Text

File #: CB 121193, Version: 1

CITY OF SEATTLE

ORDINANCE _____

COUNCIL BILL _____

AN ORDINANCE relating to Seattle Public Utilities; authorizing the acquisition of certain real property rights by negotiation or eminent domain (condemnation) of two parcels of land (Properties) identified as King County Parcel Number 4265700090 and King County Parcel Number 4265700085, both located at South Director Street; authorizing the General Manager and Chief Executive Officer of Seattle Public Utilities or designee to execute all documents and take other necessary actions to complete both Properties' fee acquisition; and ratifying and confirming certain prior acts.

WHEREAS, the City, acting through and by Seattle Public Utilities, is planning and designing its Pump Station 4 Replacement Project (Project) to replace an existing pump station, which will help resolve current and future issues and intends to construct said Project in the vicinity of the intersection of South Director Street and 52nd Avenue South in the Rainier Beach neighborhood of Seattle; and

WHEREAS, the Project has identified these parcels that meet the Project's needs, and has secured funding to complete the purchases; and

WHEREAS, RCW 8.12.030, 35.67.020, and 35.92.020 authorize The City of Seattle to purchase or condemn property for utility or general municipal purposes; NOW, THEREFORE,

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. Public convenience and necessity require that real property interests generally shown on Attachments 1 and 2 to this ordinance, and such other property as may be necessary or convenient for the Pump Station 4 Replacement Project (Project) located in the City of Seattle, County of King, State of Washington; together with all rights, privileges, and other property interests pertaining to the real property interests, be acquired for utility and general municipal purposes through negotiations and us of eminent domain

(condemnation), if necessary, in connection with the Project.

Section 2. The General Manager and Chief Executive Officer of Seattle Public Utilities or designee is authorized to: determine the portions and interests of the properties shown on Attachments 1 and 2 to this ordinance that are necessary or convenient for the Project, and any other property interests that may be necessary or convenient for the Project, negotiate and enter into written agreements for and acquire, after paying just compensation, the real property interests that are necessary or convenient for the Project; and accept and record deeds and other written instruments on behalf of the City by attaching to the instrument the General Manager and Chief Executive Officer's written acceptance and recording the deed or other written instrument. The acquisition costs, including purchase price and transaction costs, together with relocation benefits to the extent required by law, shall be paid from the funds appropriated, or to be appropriated, for such purposes in connection with the Project.

Section 3. The City Attorney is authorized to commence and prosecute proceedings in the manner provided by law to condemn, take, damage, and appropriate in fee simple or other property interests determined by the General Manager and Chief Executive Officer of Seattle Public Utilities or designee to be necessary or convenient to the Project; provided the lands, rights, and privileges, and other property are to be appropriated and taken only after just compensation has been made or paid into court for the owners in the manner provided by law; and to stipulate for the purpose of minimizing damages.

Section 4. The real property interests referenced above include, but are not limited to deeds, easements, and temporary constructions easements that, when recorded, shall be placed under the jurisdiction of Seattle Public Utilities and designated for utility and general municipal purposes.

Section 5. Any act consistent with the authority of this ordinance taken after its passage and prior to its effective date is ratified and confirmed.

Section 6. This ordinance shall take effect as provided by Seattle Municipal Code Sections 1.04.020 and 1.04.070.

Passed by the City Council the _____ day of _____, 2026, and signed by
me in open session in authentication of its passage this _____ day of _____, 2026.

President _____ of the City Council

Approved / returned unsigned / vetoed this ____ day of _____, 2026.

Katie B. Wilson, Mayor

Filed by me this _____ day of _____, 2026.

Scheereen Dedman, City Clerk

(Seal)

Attachments:

Attachment 1 - Legal Description of Properties

Attachment 2 - Map of Properties

ATTACHMENT 1 – Legal Description of Properties

1. Parcel #4265700090

LOT 16, LENHART & LINDSAY’S RAINIER BEACH TRACTS, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 13 OF PLATS, PAGE(S) 71, RECORDS OF KING COUNTY, WASHINGTON.

2. Parcel #4265700085

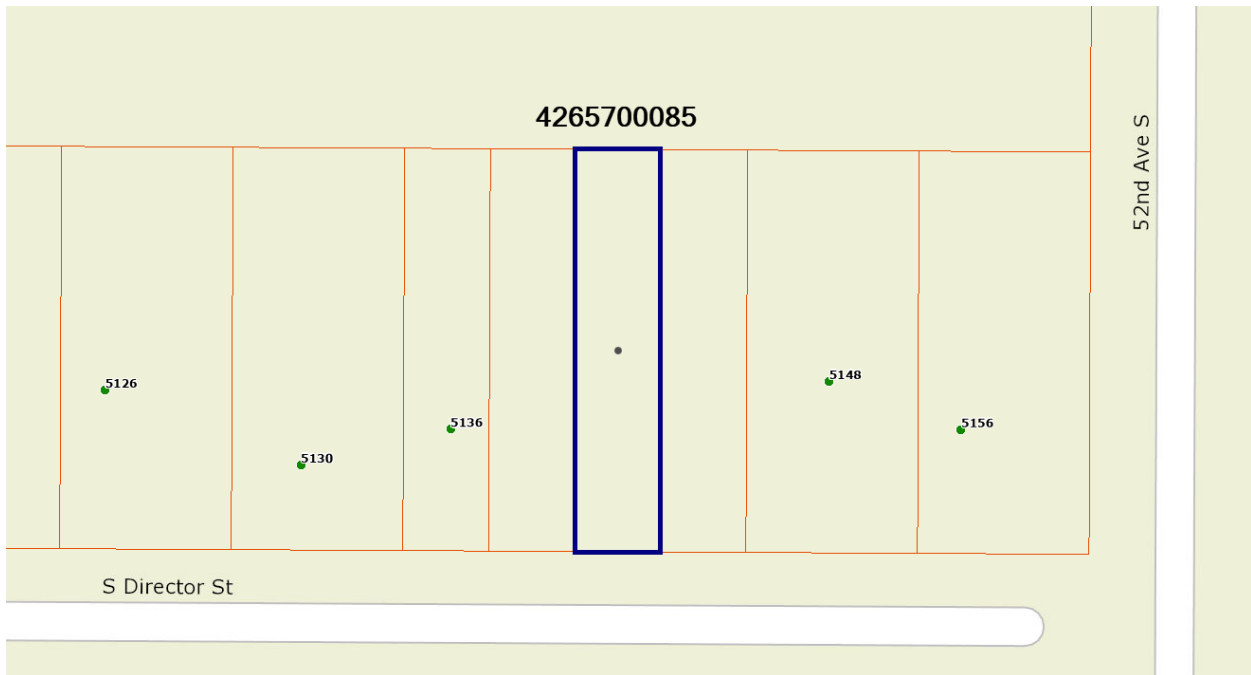
LOT 15, LENHART & LINDSAY’S RAINIER BEACH TRACTS, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 13 OF PLATS, PAGE(S) 71, RECORDS OF KING COUNTY, WASHINGTON.

ATTACHMENT 2 – Map of Properties

Parcel #4265700090:



Parcel #4265700085:



SUMMARY and FISCAL NOTE

Department:	Dept. Contact:	CBO Contact:
Seattle Public Utilities	Bryan Solemsaas	Akshay Iyengar

1. BILL SUMMARY

Legislation Title: AN ORDINANCE relating to Seattle Public Utilities; authorizing the acquisition of certain real property rights by negotiation or eminent domain (condemnation) of two parcels of land (Properties) identified as King County Parcel Number 4265700090 and King County Parcel Number 4265700085, both located at South Director Street; authorizing the General Manager and Chief Executive Officer of Seattle Public Utilities or designee to execute all documents and take other necessary actions to complete both Properties' fee acquisition; and ratifying and confirming certain prior acts.

Summary and Background of the Legislation: This ordinance would authorize Seattle Public Utilities to acquire by willing sale or condemnation two parcels of land in the Rainier Beach neighborhood for the Wastewater Pump Station 4 (PS 4) Replacement Project (C601077). The existing PS 4 does not have adequate capacity to handle projected sewer flows from anticipated redevelopment within the sewer basin, which is within the Rainier Beach Residential Urban Village, where high density redevelopment is planned. The PS 4 replacement project will build a new, permanent pump station to maintain SPU's service level for this sewer basin.

The two parcels are being sold together for the appraised value of \$760,000 and the cost will be absorbed in existing SPU budget.

2. CAPITAL IMPROVEMENT PROGRAM

Does this legislation create, fund, or amend a CIP Project? Yes No

3. SUMMARY OF FINANCIAL IMPLICATIONS

Does this legislation have financial impacts to the City? Yes No

The project budget has funds set aside for property acquisition and they are sufficient to pay the cost of these properties.

3.d. Other Impacts

Does the legislation have other financial impacts to The City of Seattle, including direct or indirect, one-time or ongoing costs, that are not included in Sections 3.a through 3.c? If so, please describe these financial impacts.

No

If the legislation has costs, but they can be absorbed within existing operations, please describe how those costs can be absorbed. The description should clearly describe if the absorbed costs are achievable because the department had excess resources within their existing budget or if by absorbing these costs the department is deprioritizing other work that would have used these resources.

SPU has governance authority to purchase the identified parcels at fair market value with funds from the Drainage and Wastewater Fund.

Please describe any financial costs or other impacts of *not* implementing the legislation.

The Pump Station 4 Replacement Project will not be able to move forward without the acquisition of this property. If this project cannot move forward, there is risk of pump station failure and/or Sanitary Sewer Overflow due to future projected sewer flows from anticipated redevelopment within the sewer basin of PS 4.

Please describe how this legislation may affect any City departments other than the originating department.

N/A

4. OTHER IMPLICATIONS

a. Is a public hearing required for this legislation?

No

b. Is publication of notice with The Daily Journal of Commerce and/or The Seattle Times required for this legislation?

Yes. Under RCW 8.25.290, the City is required to publish notice of this action in both the Daily Journal of Commerce and the Seattle Times newspaper.

c. Does this legislation affect a piece of property?

Yes.

d. Please describe any perceived implication for the principles of the Race and Social Justice Initiative.

i. How does this legislation impact vulnerable or historically disadvantaged communities? How did you arrive at this conclusion? In your response please consider impacts within City government (employees, internal programs) as well as in the broader community.

The PS 4 replacement project is located in the highest racial and social equity composite index priority area. Acquisition of this parcel allows for the replacement of PS 4, which is directly tied to the City's Comprehensive Plan for growth of urban villages.

ii. Please attach any Racial Equity Toolkits or other racial equity analyses in the development and/or assessment of the legislation.

A Racial Equity Toolkit was not developed for this project. However, the project team met with EJSE staff to consult on the necessary level of racial and service equity

analysis. Below is a summary of the key findings of equity planning that was required as part of Options Analysis development.

- Should Drainage and Wastewater rate payers or the developers pay for the new pump station?
- Should the City establish a latecomer's agreement with developers in this basin? How can this project coordinate with and work with Developers to complete this project with financial contribution?
- Above grade elements of the pump station should be integrated into the aesthetics of the community.
- Noise mitigation and odor control should be included within the project design to mitigate long-term community impacts.
- Explore opportunities to incorporate community benefits (trees and plantings, art, etc.) within the project.
- Can non-City employees use the EV charging station?

iii. What is the Language Access Plan for any communications to the public?

The Project's community engagement plan will be in alignment with the Office of Immigrants and Refugee Affairs' language access best practices.

e. Climate Change Implications

i. Emissions: How is this legislation likely to increase or decrease carbon emissions in a material way? Please attach any studies or other materials that were used to inform this response.

Given this is a replacement project, pump station operations are not expected to materially affect carbon emissions.

ii. Resiliency: Will the action(s) proposed by this legislation increase or decrease Seattle's resiliency (or ability to adapt) to climate change in a material way? If so, explain. If it is likely to decrease resiliency in a material way, describe what will or could be done to mitigate the effects.

The Wastewater Pump Station 4 Replacement project will improve the City's ability to accommodate higher peak stormwater flows from climate change. Additionally, while not a primary factor in selecting the private parcel option, the recommended approach offers potential climate change mitigation opportunities through community-centered enhancements. These enhancements, such as expanding open spaces and green spaces, could help reduce the heat island effect associated with redevelopment along S Director Street.

f. If this legislation includes a new initiative or a major programmatic expansion: What are the specific long-term and measurable goal(s) of the program? How will this legislation help achieve the program's desired goal(s)? What mechanisms will be used to measure progress towards meeting those goals?

N/A

- g. Does this legislation create a non-utility CIP project that involves a shared financial commitment with a non-City partner agency or organization?**

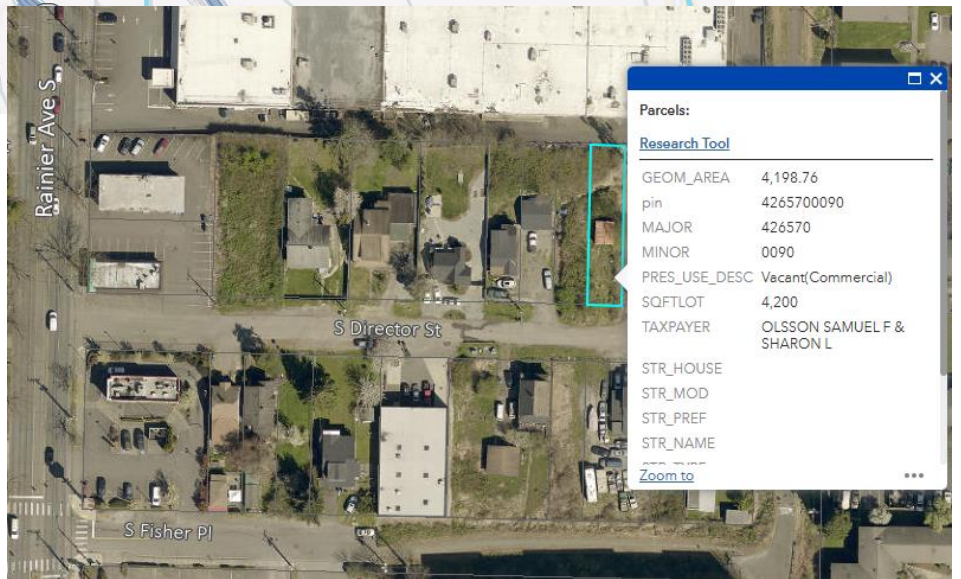
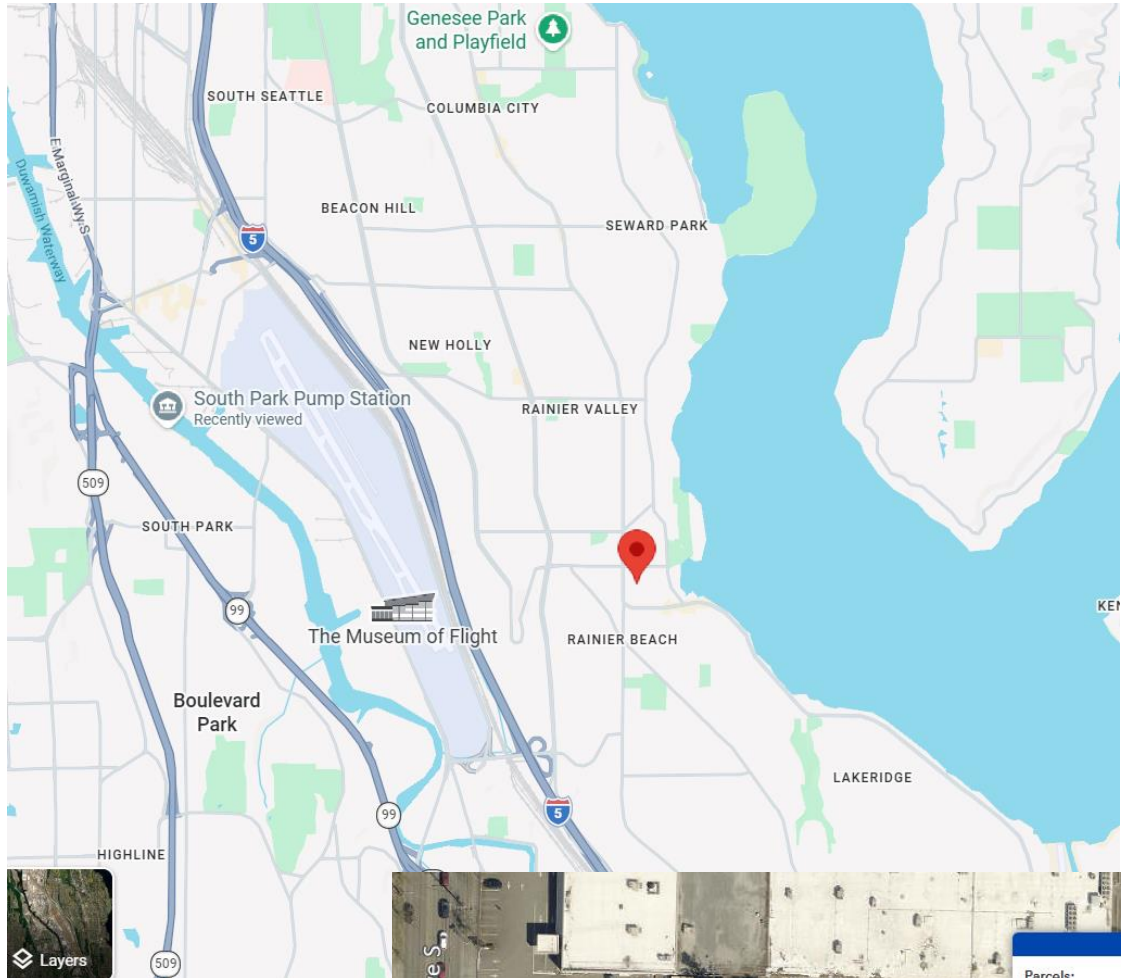
N/A

5. ATTACHMENTS

Summary Attachments:

Summary Exhibit A – Area Map

Exhibit A – Area Map



Seattle Public Utilities

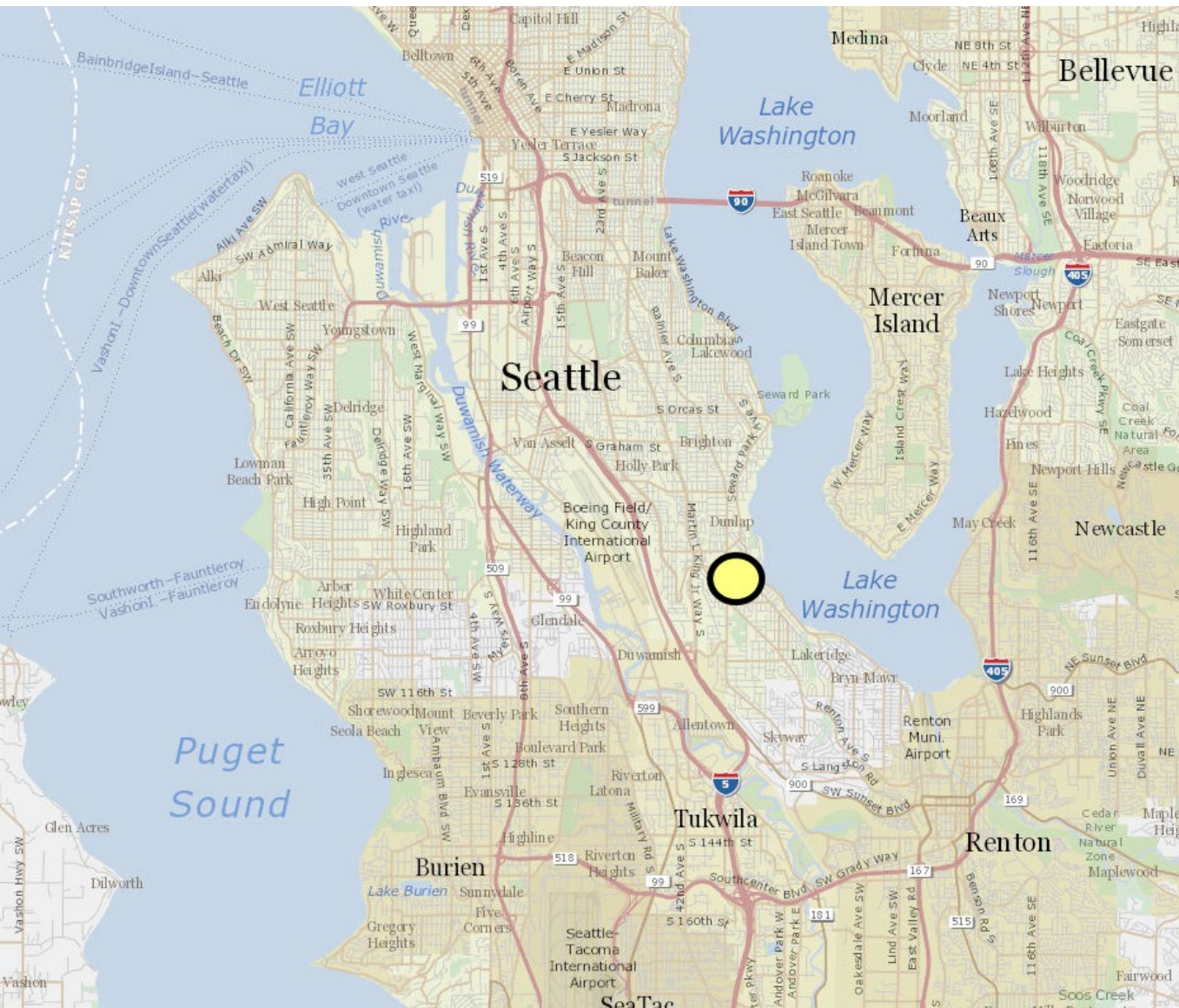
Pump Station 4 Replacement Project

Seattle City Council
Governance and Utilities Committee

April 9, 2026

Purpose of Legislation

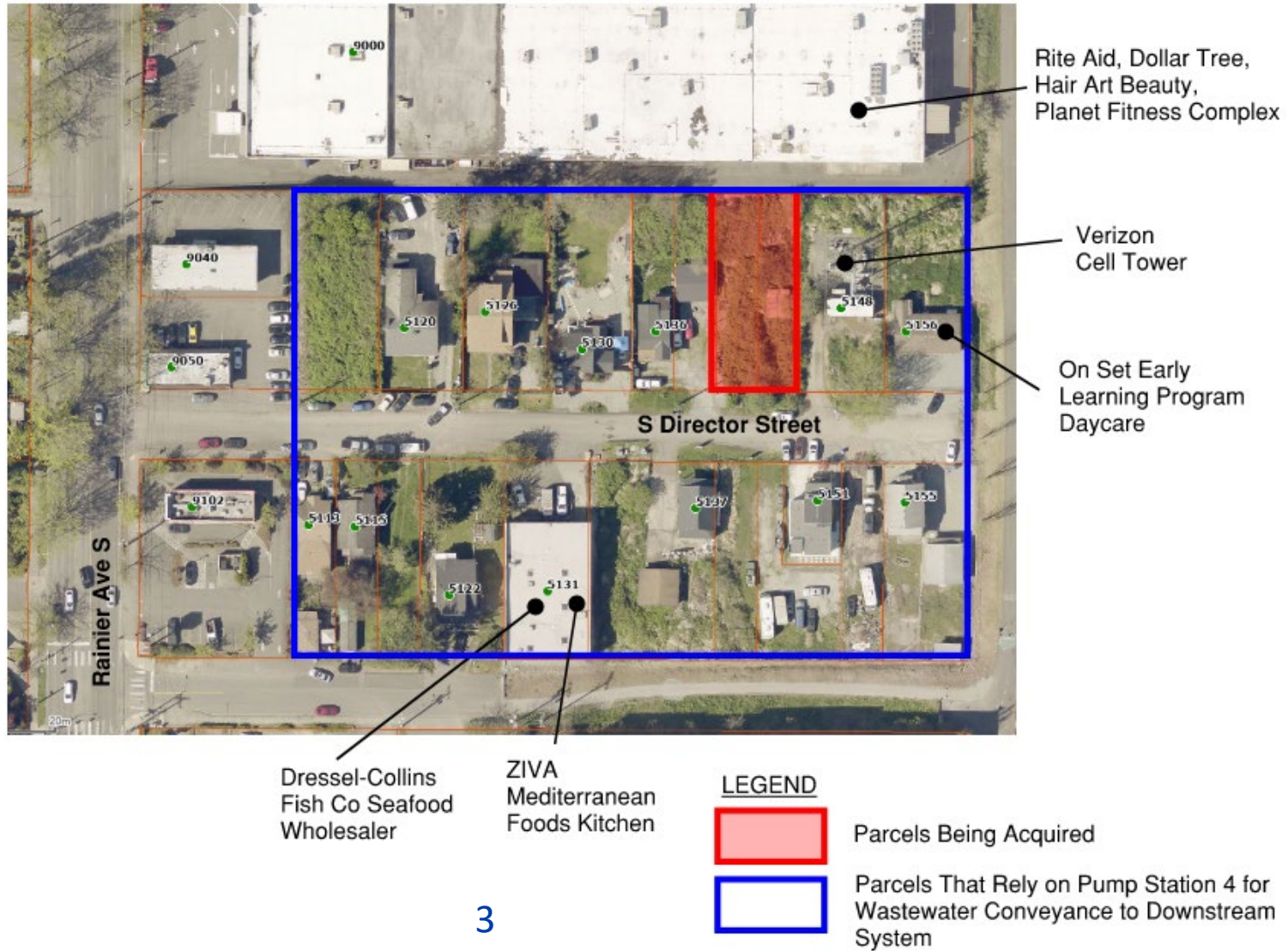
To authorize SPU to acquire, by negotiation or eminent domain, two properties required to construct the Pump Station 4 Replacement Project



Project Location

Council District #2

Parcels and Project Site



Project Site Photos



Looking North



Looking Northeast

Project Purpose

- The existing wastewater pump station requires replacement due to its age and deteriorating condition
- Pump station replacement is required to manage flows associated with future development



Existing Pump Station in Right-of-Way

Transaction Details

- Purchase Price: \$760,000 for both properties (\$380,000 each)
- Funding: SPU Drainage and Wastewater Rates

Summary

- Parcels provide the most cost-effective option to replace the existing pump station
- Both parcel owners are willing sellers
- A new, larger pump station provides the ability to support future development
- Preliminary Schedule
 - Design Complete = Q2 2029
 - Construction Notice to Proceed = Q3 2029
 - Construction Complete = Q3 2031

Questions?

Bryan Solemsaas

Sr. Real Property Agent
Seattle Public Utilities

bryan.solemsaas@seattle.gov



Additional Maps & Photos of Project Site



Additional Maps & Photos of Project Site



Additional Maps & Photos of Project Site





Legislation Text

File #: CB 121190, **Version:** 1

Screen Reader Users: Make sure settings include reading (1) strikethrough and underline font attributes, and (2) superscripts and subscripts.

The City of Seattle

Ordinance

Council Bill

An ordinance relating to the 2026 Stormwater Code Update; updating stormwater control

requirements for development, roadways, utilities, and maintenance activities; strengthening stormwater treatment and infiltration standards; clarifying vesting and review thresholds; ensuring the City's compliance with requirements of the City's 2024-2029 Phase 1 Municipal Stormwater Permit issued by the State Department of Ecology; and amending Chapters 22.800, 22.801, 22.802, 22.803, 22.805, and 22.807 of the Seattle Municipal Code.

Recitals:

Recital 1. The City of Seattle is committed to protecting local creeks and lakes, the Duwamish River, and Puget Sound.

Recital 2. The City fosters a healthy people, environment, and economy by partnering with the community to equitably manage water and waste resources for today and for future generations, including but not limited to the reduction of pollutants and contaminants of emerging concern from stormwater runoff that can harm local water bodies.

Recital 3. The City is aware that emerging contaminants from stormwater runoff, such as 6PPD-q, a chemical in tire dust, adversely affect local salmon populations, and supports greater water quality treatment where possible.

Recital 4. The City is working to address urgent housing needs and must balance protecting people, property, and the environment with increased development.

Recital 5. The City uses stormwater regulations to protect people, property, and the environment from damage related to stormwater runoff, for the purposes stated in Section 22.800.020 of the Seattle Municipal Code.

Recital 6. The City has committed to achieve thirty percent tree canopy coverage by 2037, and the amendments to the Stormwater Code adopted by this ordinance reflect that commitment by expanding opportunities for tree planting.

Recital 7. The City is subject to the 2024-2029 Phase I Municipal Stormwater Permit (National Pollutant Discharge Elimination System and State Waste Discharge General Permit for Discharges from Large and Medium Municipal Separate Storm Sewer Systems) issued July 1, 2024 (the “MS4 Permit”), by the State of Washington Department of Ecology (“Ecology”) in compliance with the federal Clean Water Act and state law, as effective August 1, 2024.

Recital 8. The MS4 Permit requires the City’s Stormwater Code and associated technical manual include minimum requirements, thresholds, definitions, and other specified requirements, limitations and criteria that are equivalent to Appendix 1 (Minimum Technical Requirements for New Development and Redevelopment) of the MS4 Permit and Ecology’s Stormwater Management Manual for Western Washington, 2024 edition.

Recital 9. This ordinance, to be known as the 2026 Stormwater Code Update, contains amendments to comply with the MS4 Permit and other amendments not required to comply with the MS4 Permit, to further the purposes of the Stormwater Code.

Recital 10. Ecology has reviewed the proposed revisions to the Stormwater Code contained in this ordinance and found them, together with concurrently proposed Seattle Stormwater Manual

revisions, to comply with the requirements of the MS4 Permit.

Recital 11. In developing this ordinance and other stormwater regulations that protect the functions and values of critical areas, including those in the Shoreline District, the City has included the best available science. Therefore,

Be it ordained by The City Of Seattle as follows:

Section 1. Chapter 22.800 of the Seattle Municipal Code, last amended by Ordinance 126336, is amended as follows:

Chapter 22.800 Title, Purpose, Scope, And Authority

* * *

22.800.040 Exemptions, adjustments, and exceptions

A. Exemptions

1. The following land uses are exempt from the provisions of this subtitle:

- a. Commercial agriculture, including only those activities conducted on lands defined in RCW 84.34.020(2), and production of crops or livestock for wholesale trade; and
- b. Forest practices regulated under Title 222 Washington Administrative Code, except for Class IV general forest practices, as defined in WAC 222-16-050, that are conversions from timber land to other uses.

2. The following land disturbing activities are ~~((not required to comply with))~~ exempt from the following specific minimum requirements ~~((listed below.))~~ :

- a. Maintenance, repair, upgrade, or installation of underground or overhead utility facilities, such as, but not limited to, pipes, conduits and vaults, ~~((and))~~ that ~~((includes replacing))~~ replaces the ground surface with in-kind material or materials with similar runoff characteristics ~~((are not required to comply with))~~ is exempt from Section 22.805.070 (Minimum requirements for on-site stormwater management), Section 22.805.080 (Minimum requirements for flow control), ~~((or))~~ and Section 22.805.090 (Minimum requirements for treatment), except ~~((as modified as follows: 1) Installation))~~ installation of underground or overhead utility facilities that are integral with and contiguous to a trail or sidewalk project, parcel-based project, or a road-related project ~~((shall))~~ must comply with Section 22.805.040 (Minimum requirements for trail and sidewalk projects), Section 22.805.050 (Minimum requirements for parcel-based projects), or Section 22.805.060 (Minimum requirements for roadway projects), respectively.

b. Pavement maintenance practices, as defined in Section 22.801.170, ((limited to the following activities)) are ((not required to comply with Section 22.805.060 (Minimum requirements for roadway projects),)) exempt from Section 22.805.070 (Minimum requirements for on-site stormwater management), Section 22.805.080 (Minimum requirements for flow control), ((or)) and Section 22.805.090 (Minimum requirements for treatment), except ((:)) pavement maintenance practices that are integral with and contiguous to a parcel-based project or a road-related project must comply with Section 22.805.050 (Minimum requirements for parcel-based projects) or Section 22.805.060 (Minimum requirements for roadway projects), respectively.

~~((1) Pothole and square cut patching;~~

~~2) Overlaying existing asphalt or concrete or brick pavement with asphalt or concrete without expanding the area of coverage;~~

~~3) Shoulder grading;~~

~~4) Reshaping or regrading drainage ditches;~~

~~5) Crack sealing; and~~

~~6) Vegetation maintenance.))~~

c. Land disturbing activity that includes replacing the ground surface with in-kind material or with materials having equivalent runoff characteristics and is associated solely with soil remediation or tank removal for the purpose of removing contaminants and pollutants and not associated with other development is not required to comply with subsections 22.805.050.A and 22.805.060.A (Soil amendment), Section 22.805.070 (Minimum requirements for on-site stormwater management), or Section 22.805.080 (Minimum requirements for flow control). Projects that include any development in addition to soil remediation or tank removal ((replaced with in-kind material or with materials having equivalent runoff characteristics)) are not exempt.

d. Drainage control facilities that are part of a public retrofit project installed to meet Appendix 12 to the City's municipal stormwater NPDES permit or for combined sewer control, or other voluntary retrofit project, are not required to comply with Section 22.805.070 (Minimum requirements for on-site stormwater management), Section 22.805.080 (Minimum requirements for flow control), or Section 22.805.090 (Minimum requirements for treatment). This exemption does not include land disturbing activities or hard surfaces that are not integral ((to)) with or are in addition to the drainage control facilities described above, or installation of drainage control facilities that are otherwise required to meet this subtitle.

e. Additional work associated with an activity exempted by this subsection 22.800.040.A.2 that is necessary to comply with the federal Americans with Disabilities Act is included in the exemption granted.

3. Sites that produce no runoff as determined by a licensed civil engineer using a continuous runoff model approved by the Director are not required to comply with Section 22.805.080 (Minimum requirements for flow control).

4. When a portion of the site being developed discharges only to the public combined sewer, and that portion is not required to implement source controls pursuant to Section 22.803.040 for specified activities, the Director has the authority, to the extent allowed by law, to issue an order under Chapter 22.808 requiring the responsible party to undertake source controls, if the Director determines that these activities pose a hazard to public health, safety or welfare; endanger any property; adversely affect the safety and operation of City right-of-way, utilities, or other property owned or maintained by the City; or adversely affect the functions and values of an environmentally critical area or buffer.

5. Residential activities are not required to comply with the provision of subsection 22.805.020.I (Install source control BMPs) unless the Director determines that these activities pose a hazard to public health, safety or welfare; endanger any property; adversely affect the safety and operation of City right-of-way, utilities, or other property owned or maintained by the City; or adversely affect the functions and values of an environmentally critical area or buffer.

6. With respect to all state highway right-of-way under Washington State Department of Transportation (WSDOT) control within the jurisdiction of The City of Seattle, WSDOT shall use the current, approved Highway Runoff Manual (HRM) for its existing and new facilities and rights-of-way, as addressed in WAC 173-270-030(1) and (2). Exceptions to this exemption, where more stringent stormwater management requirements apply, are addressed in WAC 173-270-030(3)(b) and (c).

a. When a state highway is located in the jurisdiction of a local government that is required by Ecology to use more stringent standards to protect the quality of receiving waters, WSDOT shall comply with the same standards to promote uniform stormwater management.

b. WSDOT shall comply with standards identified in watershed action plans for WSDOT rights-of-way, to the extent required by state law.

c. Other instances where more stringent local stormwater standards apply are projects subject to tribal government standards or to the stormwater management-related permit conditions imposed under Chapter 25.09 to protect environmentally critical areas and their buffers (under the Growth Management Act), an NPDES permit, or

shoreline master programs (under the Shoreline Management Act). In addition, WSDOT shall comply with local jurisdiction stormwater standards when WSDOT elects, and is granted permission, to discharge stormwater runoff into a municipality's drainage system or combined sewer system.

* * *

22.800.070 Minimum requirements for City agency projects

A. Compliance. A City (~~(agencies)~~) agency shall comply with all the requirements of this subtitle except as specified below:

1. City agencies are not required to obtain permits and approvals under this subtitle for work performed within a public right-of-way or for the operation and maintenance of city park lands, ((other than)) except for inspections as set out in subsection 22.800.070.B and review and approval when applying roadway project infeasibility as provided in subsection 22.805.060.E((, for work performed within a public right-of-way or for work performed for the operation and maintenance of park lands under the control or jurisdiction of the Department of Parks and Recreation. Where the work occurs in a public right-of-way, it shall also comply with Title 15, Street and Sidewalk Use, including the applicable requirements to obtain permits or approvals)).

2. A City agency project(~~(, as defined in Section 22.801.170,))~~) that is not required to obtain permit(s) and approval(s) pursuant to subsection 22.800.070.A.1 and meets all of the conditions set forth below, is not required to comply with amendments to ~~((Sections 22.800.020 through 22.808.110))~~ this subtitle that take effect on ~~((July 1, 2021))~~ July 1, 2026, except the amendments to this subsection 22.800.070.A.2 ~~((,))~~ , provided that:

a. The project begins land disturbing activities ~~((within five years of the effective date of this subtitle))~~ before July 1, 2031; and

b. The project complies with the Stormwater Code that was made effective ~~((January 1, 2016))~~ July 1, 2021, by Ordinance ~~((124872))~~ 126336, ~~((which requires compliance))~~ and with Directors' Rules SDCl ~~((17-2017))~~ 10-2021/SPU DWW 200 effective ~~((January 1, 2016))~~ July 1, 2021; and

c. The project ~~((meets one or more of the following criteria))~~ is financed in whole or in part by funds:

1) ~~((Project funding was appropriated as identified in Ordinance 126237 titled, "An ordinance adopting a budget, including a capital improvement program and position modifications, for The City of Seattle for 2021"))~~ Appropriated by ordinance as part of the City's 2026 budget; or

2) ~~((Project received or will receive voter approval of financing))~~ Approved by voters
before ~~((January 1, 2021))~~ July 1, 2026; or

3) ~~((Project received or will receive funds based on))~~ Received as a result of a state or
federal grant ~~((application(s)))~~ application submitted before ~~((January 1, 2021))~~ July 1, 2026.

* * *

22.800.100 ~~((Transition to revised))~~ Stormwater Code vesting

A. ~~((Any building or grading permit issued prior to June 30, 2020, (1) which was not considered, either in the initial application process or in a renewal process, under the version of the Stormwater Code in effect on or after January 1, 2016, and (2) pursuant to which construction has not started by June 30, 2020, shall expire on June 30, 2020.~~

B. ~~Any building or grading permit (1) which was considered under a version of the Stormwater Code in effect on or after January 1, 2016, but before July 1, 2021, and (2) pursuant to which construction has not started by July 1, 2026, shall expire on July 1, 2026.~~

C. ~~Any master use permit issued prior to June 30, 2020, for a project not requiring a building permit (1) which was not considered, either in the initial application process or in a renewal process, under the version of the Stormwater Code in effect on or after January 1, 2016, and (2) pursuant to which construction has not started by June 30, 2020, shall expire on June 30, 2020.~~

D. ~~Any master use permit for a project not requiring a building permit (1) which was considered under a version of the Stormwater Code in effect on or after January 1, 2016, but before July 1, 2021, and (2) pursuant to which construction has not started by July 1, 2026, shall expire on July 1, 2026.~~

E. ~~Neither Section 23.22.028, Section 23.22.064, Section 23.24.050, RCW 58.17.033, nor RCW 58.17.170 shall require any permit application submitted on or after January 1, 2016, to be considered under a version of the Stormwater Code in effect prior to January 1, 2016, or require any permit application submitted on or after July 1, 2021 to be considered under a version of the Stormwater Code in effect prior to July 1, 2021. For purposes of this subsection 22.800.100.E, "permit application" means an application for any permit required for construction within a plat or short plat or for construction of facilities and improvements for a plat or short plat, including, but not limited to, master use, building and grading permits.~~

F. ~~Neither Section 23.22.028 nor Section 23.22.064 shall authorize starting construction, after June 30, 2020, of facilities or improvements for any plat without compliance with the version of the Stormwater Code in effect on or after~~

~~January 1, 2016, or authorize starting construction, after July 1, 2026, of facilities or improvements for any plat without compliance with the version of the Stormwater Code in effect on or after July 1, 2021.~~

~~G. For purposes of this section, "starting construction" or "started construction" means the site work associated with and directly related to the approved project has begun. For example: grading the project site to final grade or utility installation such as water, sewer, drainage, gas, or electrical infrastructure installed to serve the project and associated with the application. Simply clearing the project site or installing conduit does not constitute the start of construction.)~~

Applicability. Except as provided in Section 22.800.070, all project applications must comply with the Stormwater Code in effect as follows:

1. Applications submitted on or after July 1, 2026, must comply with the Stormwater Code in effect on or after July 1, 2026.
2. Applications submitted before July 1, 2016, must be revised to comply with the Stormwater Code in effect on or after July 1, 2026, if construction has not started by July 1, 2021.
3. Applications submitted on or after July 1, 2016, but before July 1, 2021, must be revised to comply with the Stormwater Code in effect on or after July 1, 2026, if construction has not started by July 1, 2026.
4. Applications submitted on or after July 1, 2021, but before July 1, 2026, must be revised to comply with the Stormwater Code in effect on or after July 1, 2026, if construction has not started by July 1, 2031.

B. Expiration of permits or approvals when construction has not started. For any project that has not met the applicable deadline to start construction set forth in subsection 22.800.100.A, the associated permit or approval shall expire on that applicable deadline unless the project application is revised to comply with the Stormwater Code in effect on or after July 1, 2026, and approved by the Director.

C. Definition of "project application," "start," and "started." For purposes of this Section 22.800.100:

1. "Project application" means a complete application, as determined by the Director, for a permit or approval required for development, including construction within a plat or short plat or for construction of facilities and improvements for a plat or short plat, including, but not limited to, master use, building, street use, and grading permits.
2. "Start" or "started" with respect to construction means, at a minimum, that site work associated with and directly related to the approved project has begun. For example: grading the project site to final grade or utility installation such as water, sewer, drainage, or electrical infrastructure installed to serve the entire project and associated with the application. Simply clearing the project site or installing conduit does not constitute the start of construction.

Additional requirements for determining the start of construction may be established by rules promulgated by the Director.

D. Permit vesting and construction authorization relative to Stormwater Code. Section 23.22.028, Section 23.22.074, Section 23.24.050, Section 23.76.029, RCW 58.17.033, and RCW 58.17.170 shall not be construed to:

1. Determine the Stormwater Code applicable to a project; or
2. Authorize starting construction after the deadlines identified in subsection 22.800.100.A without

compliance with the version of the Stormwater Code in effect under subsection 22.800.100.A.

Section 2. Chapter 22.801 of the Seattle Municipal Code, last amended by Ordinance 127376, is amended as follows:

Chapter 22.801 Definitions

* * *

22.801.020 "A"

* * *

"Aquatic life use, fresh water" means "aquatic life uses" as defined in WAC 173-201A-200 (Fresh Water Designated Uses and Criteria). For the purposes of this subtitle, at minimum the following water bodies are designated for fresh water aquatic life use: small lakes, ((reeks,)) streams, wetlands, and fresh water designated receiving waters.

"Aquatic life use, marine water" means "aquatic life uses" as defined in WAC 173-201A-210 (Marine Water Designated Uses and Criteria) and includes marine surface waters of the state of Washington.

* * *

22.801.040 "C"

* * *

"City agency" means "City agency" as defined in Section 25.09.520.

"Closely related projects" means two or more projects that are concurrently under review, under issued permits not yet approved for final construction, or both, and share any of the following physical or functional interdependencies:

1. A feature physically spans the property lines between lots or the project sites, such as shared structures, shared driveways, shared pedestrian access (including easements to rights-of-way), shared drainage and utility designs, foundation footings, or retaining walls. For purposes of this subsection, abutting driveways or pedestrian accesses are not considered to span the property lines if the required driveway or pedestrian access width for each project independently meets development standards;

2. A shared driveway is proposed to access a parking area for more than one project, regardless of whether the parking is required;

3. Parking, including maneuvering, aisle requirements, or other parking related easements, regardless of whether the parking is required, is proposed to be provided (or partially provided) on the site of another project, even if the project sites do not abut each other;

4. Proposed structures are joined or share a common wall;

5. Proposed projects share required open space, amenity area, or both;

6. The design of two or more project sites are dependent on grading, construction of retaining walls or foundations, or both across the lot lines or project sites;

7. One site is required to permanently access, construct, and maintain the structures or development features on an abutting or adjacent site; or

8. Other features that create physical or functional interdependence between the projects.

"Combined sewer." See "public combined sewer."

"Combined sewer basin" or "public combined sewer basin" means the area tributary to a public combined sewer feature, including, but not limited to, a combined sewer overflow outfall, trunk line connection, pump station, or regulator.

"Common plan of development or sale" means a site where multiple separate and distinct construction activities may be taking place at different times on different schedules and/or by different contractors, but still under a single plan.

Examples of "common plan of development or sale" include:

1. Phased projects and projects with multiple filings/lots, even if the separate phases or filings/lots will be constructed under separate contract or by separate owners (e.g., a development where lots are sold to separate builders);

2. A development plan that may be phased over multiple years, but is still under a consistent plan for long-term development;

3. Projects in a contiguous area that may be unrelated but still under the same contract, such as construction of a building extension and a new parking lot at the same facility; and

4. Linear projects such as roads, pipelines, or utilities.

* * *

"Construction (~~(Stormwater Control Plan))~~ stormwater control plan" means a document that explains and

illustrates the measures to be taken on the construction site to prevent erosion and discharge of sediment and other pollutants on a construction project.

* * *

"Creek" means ~~((a Type S, F, Np or Ns water as defined in WAC 222-16-031, or as defined in WAC 222-16-030 after state water type maps are adopted, and is used synonymously with "stream."))~~ "stream" as defined by Section 22.801.200 and is used synonymously.

22.801.050 "D"

* * *

"Development" means the following activities:

1. Class IV-general forest practices that are conversions from timberland to other uses;
2. Land disturbing activity;
3. The addition or replacement of hard surfaces;
4. Expansion of a building footprint or addition or replacement of a structure;
5. Structural development, including construction, installation, or expansion of a building or other structure;
6. Seeking approval of a building permit, other construction permit, grading permit, street improvement permit, or master use permit that involves any of the foregoing activities; and
7. Seeking approval of subdivision, short plat, unit lot subdivision, or binding site plans, as defined and applied in chapter 58.17 RCW, or other master use permit.

Development is a type of project.

* * *

"Drainage water" means stormwater and all other discharges that are permissible pursuant to ~~((subsection))~~ subsections 22.802.030.A and 22.802.030.B.

22.801.060 "E"

* * *

~~(("Enhanced treatment facility" means a drainage control facility designed to reduce concentrations of dissolved metals in drainage water.))~~

* * *

22.801.080 "G"

* * *

"Groundwater" means "groundwater" as defined in chapter 173-200 WAC (Water Quality Standards for Groundwaters of the State of Washington) and includes water, perched or otherwise, in a saturated zone or stratum beneath the surface of land or below a surface water body. (~~(Refer to Ground Water Quality Standards, Chapter 173-200 WAC.)~~)

22.801.090 "H"

"Hard surface" means an impervious surface, a permeable pavement, or a vegetated roof.

"High-use sites" means sites that typically generate high concentrations of oil due to high traffic turnover or the frequent transfer of oil or other petroleum products. High-use sites include:

1. An area of a commercial or industrial site subject to: an expected average daily traffic (ADT) count equal to or greater than 100 vehicles per 1,000 square feet of gross building area; 300 or more total trip ends per day; or both;
2. An area of a commercial or industrial site subject to petroleum storage and transfer in excess of 1,500 gallons per year, not including routinely delivered heating oil;
3. An area of a commercial or industrial site subject to parking, storage or maintenance of 25 or more vehicles that are over 10 tons gross weight (trucks, buses, trains, heavy equipment, etc.);
4. A road intersection with a measured ADT count of 25,000 vehicles or more on the main roadway and 15,000 vehicles or more on any intersecting roadway, excluding projects proposing primarily pedestrian or bicycle use improvements.

22.801.100 "I"

* * *

"Impervious surface" means any surface exposed to rainwater from which most water runs off. Impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, formal planters, parking lots or storage areas, concrete or asphalt paving, areas with underdrains designed to remove stormwater from subgrade (e.g. playfields, athletic fields, rail yards), gravel surfaces (~~(subjected)~~) subject to vehicular (~~(traffic)~~) use, compact gravel, packed earthen materials, and oiled macadam or other surfaces which similarly impede the natural infiltration of stormwater. Open, uncovered retention/detention facilities shall not be considered as impervious surfaces for the purposes of determining

whether the thresholds for application of minimum requirements are exceeded. Open, uncovered retention/detention facilities shall be considered impervious surfaces for purposes of stormwater modeling.

* * *

"Infiltration facility" or "infiltration BMP" means a drainage control facility that temporarily stores, and then percolates, drainage water into the underlying soil.

* * *

22.801.130 "L"

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"Large project" means a project including:

1. (~~Five thousand~~) 5,000 square feet or more of new plus replaced hard surface; or
2. (~~One acre~~) 10,000 square feet or more of land disturbing activity; (~~;~~
3. ~~Conversion of 3/4 acres or more of vegetation to lawn or landscaped area; or~~
4. ~~Conversion of 2.5 acres or more of native vegetation to pasture.~~)

* * *

22.801.140 "M"

"Master use permit" means a "master use permit" as defined in (~~subsection~~) Section 23.84A.025.

"Maximum extent feasible" means the requirement is to be fully implemented, constrained only by the physical limitations of the site, practical considerations of engineering design, and reasonable considerations of financial costs.

"Metals treatment facility" means a drainage control facility designed to reduce concentrations of dissolved metals in drainage water.

"Municipal separate storm sewer system" (MS4) means "municipal separate storm sewer system" as defined in the municipal stormwater NPDES permit.

"Municipal stormwater NPDES permit" means the permit issued to the City under the federal Clean Water Act for public drainage systems (~~within the City limits~~).

22.801.150 "N"

"Native vegetation" means "native vegetation" as defined in Section 25.09.520.

"New hard surface" means (~~(a)~~) the creation of a hard surface (~~(that is: changed from a pervious surface to a hard surface)~~) or the conversion, modification, or upgrade of an existing hard surface to another hard surface. Examples

of a new hard surface include, but are not limited to, ~~((e.g.,))~~ converting, modifying, or upgrading:

1. ~~Vegetation, lawn, dirt, or other earthen material~~ to a ~~hard surface (e.g., compact gravel, packed earthen material, permeable pavement, ((resurfacing by upgrading from dirt to gravel,))~~ a bituminous surface treatment ("chip seal"), asphalt, concrete, or a ~~((hard surface))~~ structure); ~~((or upgraded from gravel))~~
2. ~~Gravel~~ to permeable pavement, chip seal, asphalt, concrete, or a ~~((hard surface))~~ structure; ~~((or from a))~~
3. A ~~hard surface~~ to a modified hard surface (e.g., grading an existing parking area and repaving);
4. A ~~hard surface~~ to a ~~((hard surface))~~ structure; or
5. A structure to another hard surface or another structure not otherwise meeting the definition of replaced hard surface.

~~((Note that if))~~ If asphalt or concrete has been overlaid by a chip seal, the existing condition ~~((should be))~~ is considered ~~((as))~~ asphalt or concrete.

If, for a structure, the existing foundation is removed or, for any other hard surface, the subgrade or base course grade elevation is modified beyond what is required to repair the existing hard surface or base course, then the structure or other hard surface is a new hard surface.

~~(("New impervious surface" means a surface that is: changed from a pervious surface to an impervious surface (e.g., resurfacing by upgrading from dirt to gravel, a bituminous surface treatment ("chip seal"), asphalt, concrete or an impervious structure); or upgraded from gravel to chip seal, asphalt, concrete, or an impervious structure; or from a impervious surface to an impervious structure. Note that if asphalt or concrete has been overlaid by a chip seal, the existing condition should be considered as asphalt or concrete.))~~

* * *

22.801.170 "P"

"Parcel-based project" means any project that is not a roadway project, ~~((single-family residential project,))~~ sidewalk project, or trail project. The boundary of the public right-of-way shall form the boundary between the parcel and roadway portions of a project.

"Pavement maintenance practices" means repair and maintenance of an existing surface including sidewalks, limited to:

1. Targeted pothole and square cut patching;

2. Overlaying existing asphalt, concrete, or brick pavement with asphalt or concrete, so long as the base course is not exposed;

3. Shoulder grading;

4. Reshaping or regrading drainage systems, including adding curb, gutter, or wedge curbs;

5. Crack sealing; and

6. Vegetation maintenance.

“Pavement maintenance practices” does not include work that: increases the vehicle capacity of a roadway or parking area; adds new hard surface or results in replaced hard surface (except for pothole or square cut patching); or materially alters a roadway’s characteristics.

* * *

~~“Pollution-generating hard surface” means those hard surfaces considered to be a significant source of pollutants in drainage water. ((See definition of pollution-generating impervious surface in this Section 22.801.170 for surfaces that are considered significant sources of pollutants in drainage water. In addition, permeable pavement subject to vehicular use or other pollutants as described in the definition for pollution-generating impervious surfaces is a pollution-generating hard surface.)) Such surfaces include those that are subject to any of the following: vehicular use; industrial activities; and storage of erodible or leachable materials, wastes, or chemicals, that receive direct rainfall or the run-on or blow-in of rainfall. Such surfaces also include roofs subject to venting of significant sources of pollutants and metal roofs unless coated with an inert, non-leachable material (e.g., baked-on enamel coating).~~

~~((“Pollution-generating impervious surface” means those impervious surfaces considered to be a significant source of pollutants in drainage water. Such surfaces include those that are subject to any of the following: vehicular use; industrial activities; storage of erodible or leachable materials, wastes, or chemicals, and that receive direct rainfall or the run-on or blow-in of rainfall. Such surfaces also include roofs subject to venting of significant sources of pollutants and metal roofs unless coated with an inert, non-leachable material (e.g., baked-on enamel coating).~~

~~A surface, whether paved or not, shall be considered subject to vehicular use if it is regularly used by motor vehicles. The following are considered regularly used surfaces: roads; unvegetated road shoulders; bike lanes within the traveled lane of a roadway; driveways; parking lots; unfenced fire lanes; vehicular equipment storage yards; rail lines and railways; and airport runways.~~

~~The following are not considered regularly used by motor vehicles: sidewalks and trails not subject to drainage~~

~~from roads for motor vehicles; paved bicycle pathways separated from and not subject to drainage from roads for motor vehicles; fenced fire lanes; and infrequently used maintenance access roads with recurring routine vehicle use of no more than once per day.))~~

"Pollution-generating pervious surface" means any pervious surface subject to any of the following: vehicular use; industrial activities; storage of erodible or leachable materials, wastes, or chemicals, and that receive direct rainfall or run-on or blow-in of rainfall; use of pesticides and fertilizers; or loss of soil. Typical pollution-generating pervious surfaces include lawns~~((,))~~ and landscaped areas, such as golf courses, parks, cemeteries, and sports fields (natural and artificial turf).

"Pre-developed condition" means the vegetation and soil conditions that are used to determine the allowable post-development discharge peak flow rates and flow durations, such as pasture or forest.

"Private drainage system" means a drainage system that is not a public drainage system.

"Project" means any proposed action to alter or develop a site, including development. ~~((Development is a type of project.))~~

* * *

22.801.190 "R"

* * *

"Replaced hard surface" or "replacement of hard surface" means~~((, for))~~ :

1. For structures, the removal of the structure down to (i.e., exposing the top of) the foundation without removing the foundation and replacement of the structure; and~~((, for))~~

2. For other hard surfaces, the removal of the surface down to the existing base course or exposing the top of the subgrade ~~((or base course))~~ and replacement, including repair of the base course layer.

If, for a structure, the existing foundation is removed or, for any other hard surface, the subgrade or base course grade elevation is modified beyond what is required to repair the existing hard surface or base course, then the structure or other hard surface is a new hard surface.

~~(("Replaced impervious surface" or "replacement of impervious surface" means, for structures, the removal down to the foundation and replacement and, for other impervious surfaces, the removal down to existing subgrade or base course and replacement.))~~

* * *

22.801.200 "S"

* * *

~~("Single-family residential project" means a project that constructs one Single-family Dwelling Unit as defined in subsection 23.84A.032 and any associated accessory dwelling unit located in land classified as being Neighborhood Residential 1 (NR1), Neighborhood Residential 2 (NR2), or Neighborhood Residential 3 (NR3) pursuant to Section 23.30.010, and the total new plus replaced hard surface is less than 5,000 square feet.)~~

"Site" means the area defined by the legal boundaries of a parcel or parcels of land subject to development. For roadway projects, the length of the project site and the right-of-way boundaries define the site. A site may include multiple parcels and/or sections of right of-way, if multiple parcels and/or sections of right-of-way are subject to development.

"Slope" means an inclined ground surface.

"Small lakes" means Bitter Lake, Green Lake and Haller Lake.

"Small project" means a project with:

1. Less than 5,000 square feet of new and replaced hard surface; and
2. Less than ~~((one acre))~~ 10,000 square feet of land disturbing activities.

* * *

~~"Stream" means a ((Type S, F, Np or Ns water as defined in WAC 222-16-031, or as defined in WAC 222-16-030 after state water type maps are adopted, and is used synonymously with "creek."))~~ watercourse through which naturally occurring surface waters flow sufficiently, whether on a perennial or intermittent basis, to carve a defined channel or bed evidencing the passage of water, including but not limited to bedrock channels, gravel beds, alluvial mineral beds, defined -channel swales, and beds containing hydraulically sorted sediments. "Stream" does not include watercourses created entirely by artificial means, such as irrigation or roadside ditches, stormwater runoff devices, or canals, unless the watercourse conveys a stream that flowed naturally prior to the creation of the watercourse. "Stream" is used synonymously with "creek".

"Surface waters" means "surface waters of the state" as defined in chapter 173-201A WAC (Water Quality Standards for Surface Waters of the State of Washington) and includes lakes, rivers, ponds, streams, inland waters, saltwaters, wetlands and all other surface waters and watercourses within the jurisdiction of the state of Washington.

* * *

22.801.220 "U"

"Uncontaminated" means ~~((surface water or groundwater))~~ not containing sediment or other pollutants or contaminants above natural background levels and not containing pollutants or contaminants in levels greater than City-supplied drinking water when referring to potable water.

22.801.230 "V"

"Vegetation" means "vegetation" as defined in Section 25.09.520.

"Vehicular use" means regular use of a hard or pervious surface by motor vehicles. The following surfaces, whether paved or not, are considered subject to regular vehicular use: roads; unvegetated road shoulders; bike lanes within the traveled lane of a roadway; driveways; parking lots; unfenced fire lanes; vehicular equipment storage yards; rail lines and railways, including light rail elevated and non-elevated guideways and tracks; and airport runways and other surfaces intended for movement or storage of aircraft.

The following are not considered regularly used by motor vehicles: sidewalks and trails not subject to drainage from roads for motor vehicles; paved bicycle pathways separated from and not subject to drainage from roads for motor vehicles; fenced fire lanes; and infrequently used maintenance access roads with recurring routine vehicle use of no more than once per day.

22.801.240 "W"

"Wastewater" means "wastewater" as defined in Section 21.16.030.

"Water Quality Standards" means Surface Water Quality Standards, ~~((Chapter))~~ chapter 173-201A WAC, ~~((Ground Water))~~ Groundwater Quality Standards, ~~((Chapter))~~ chapter 173-200 WAC, and Sediment Management Standards, ~~((Chapter))~~ chapter 173-204 WAC.

* * *

Section 3. Chapter 22.802 of the Seattle Municipal Code, last amended by Ordinance 124872, is amended as follows:

Chapter 22.802 Prohibited And Permissible Discharges

* * *

22.802.020 Prohibited discharges

A. Prohibited ~~((Discharges))~~ discharges. The following common substances are prohibited to enter, either directly or indirectly, a public drainage system, a private drainage system, or a receiving water within or contiguous to Seattle city limits, including but not limited to when entering via a service drain, overland flow, or as a result of a spill or deliberate

dumping:

1. ((acids;)) Acids;
2. ((alkalis)) Alkalis including cement wash water;
3. ((ammonia;)) Ammonia;
4. ((animal)) Animal carcasses;
5. ((antifreeze)) Antifreeze, oil, gasoline, grease, and all other automotive and petroleum products;
6. ((chemicals)) Chemicals not normally found in uncontaminated water;
7. ((chlorinated)) Chlorinated/brominated swimming pool or hot tub water;
8. ((chlorine)) Chlorine/bromine;
9. ((commercial)) Commercial and household cleaning materials;
10. ((detergent;)) Detergent;
11. ((dirt;)) Dirt;
12. ((domestic)) Domestic or sanitary sewage;
13. ((drain)) Drain cleaners;
14. ((fertilizers;)) Fertilizers;
15. ((filter)) Filter backwash wastewater;
16. ((flammable)) Flammable or explosive materials;
17. ((food)) Food and food waste;
18. ((gravel;)) Gravel;
19. ((herbicides;)) Herbicides;
20. ((human)) Human and animal waste;
21. ((ink;)) Ink;
22. ((laundry)) Laundry waste;
23. ((metals)) Metals in excess of naturally occurring amounts, whether in liquid or solid form;
24. ((painting)) Painting products;
25. ((pesticides;)) Pesticides;
26. ((process)) Process wastewater;
27. ((sand;)) Sand;

28. ~~((soap;))~~ Soap;
29. ~~((solid))~~ Solid waste;
30. ~~((solvents))~~ Solvents and degreasers;
31. ~~((steam-cleaning))~~ Steam-cleaning waste; and
32. ~~((yard))~~ Yard waste.

* * *

22.802.030 Permissible discharges

A. Conditionally ~~((Permissible Discharges to Drainage Systems and Receiving Waters))~~ permissible discharges to drainage systems and receiving waters. Discharges from the sources listed below are permissible discharges only if the stated conditions are met and unless the Director of SPU determines that the type of discharge, directly or indirectly to a public drainage system, private drainage system, or a receiving water within or contiguous to Seattle city limits, whether singly or in combination with others, is causing or contributing to a violation of the City's NPDES stormwater permit or is causing or contributing to a water quality problem:

1. Discharges from potable water sources, including, but not limited to, flushing of potable water lines, hyperchlorinated water line flushing, fire hydrant system flushing, pipeline hydrostatic test water, and washing of potable water storage reservoirs. Planned discharges shall be de-chlorinated to a total residual chlorine concentration of 0.1 ppm or less, pH-adjusted if necessary, and volumetrically and velocity controlled to prevent resuspension of sediments in the drainage system. No chemicals may be added, and settleable solids must be removed prior to discharge;
2. Discharges from swimming pools, spas, hot tubs, fountains, or similar aquatic recreation facilities and constructed water features, provided the discharges have been de-chlorinated/de-brominated to a total residual ~~((chlorine))~~ concentration of 0.1 ppm or less, free from sodium chloride, pH-adjusted and reoxygenated if necessary, volumetrically and velocity controlled to prevent resuspension of sediments in the drainage system, and thermally controlled to prevent an increase of temperature in the receiving water. Swimming pool cleaning wastewater and filter backwash shall not be discharged;
3. Discharges of street and sidewalk washwater when the surfaces are swept prior to washing, detergents are not used, and water use is minimized;
4. Discharges ~~((of water))~~ from routine external building washdown when detergents are not used and water use is minimized at (i) buildings built or renovated before 1950 and after 1980, (ii) single detached dwelling units

and associated accessory structures (e.g., garage), and (iii) structures built or renovated between 1950 and 1980 (inclusive) and determined to be without PCB containing materials on their exterior;

5. Discharges of water used to control dust when water use is minimized; ~~((and))~~

6. Discharges from lawn watering and other irrigation runoff, including from reclaimed water sources, when water use is minimized; and

7. Other non-stormwater discharges, provided that these discharges are in compliance with the requirements of a pollution prevention plan that addresses control of such discharges and is approved by the Director.

B. Permissible ~~((Discharges))~~ discharges. Discharges from the sources listed below are permissible discharges unless the Director of SPU determines that the type of discharge, directly or indirectly to a public drainage system, private drainage system, or a receiving water within or contiguous to Seattle city limits, whether singly or in combination with others, is causing or contributing to a violation of the City's NPDES stormwater permit or is causing or contributing to a water quality problem:

1. Discharges from surface waters, including diverted stream flows;

2. Discharges of uncontaminated groundwater, including uncontaminated groundwater infiltration (as defined at 40 CFR 35.2005(b)(20)), uncontaminated pumped groundwater, and rising groundwaters;

3. Discharges of air conditioning condensation;

4. Discharges from springs;

5. Discharges of uncontaminated water from crawl space pumps;

6. ~~((Discharges from lawn watering; 7.))~~ Discharges from ~~((irrigation runoff, including))~~ irrigation water from agricultural sources that is commingled with stormwater and that does not contain prohibited substances;

~~((8.))~~ 7. Discharges from riparian habitats and wetlands;

~~((9.))~~ 8. Discharges from approved footing drains and other subsurface drains or, where approval is not required, installed in compliance with this subtitle and rules promulgated pursuant to this subtitle;

~~((10.))~~ 9. Discharges from foundation drains;

~~((11.))~~ 10. Non-stormwater discharges authorized by another NPDES permit or State Waste Discharge permit;

~~((12.))~~ 11. Discharges that are from emergency fire fighting activities; and

~~((13.))~~ 12. Discharges of non-toxic tracing dye used to establish or verify a drainage or sewer connection.

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Section 4. Chapter 22.803 of the Seattle Municipal Code, last amended by Ordinance 126336, is amended as follows:

Chapter 22.803 Minimum Requirements For All Discharges And All Real Property

* * *

22.803.020 Minimum requirements for all discharges and real property

* * *

C. Requirements to maintain facilities. All treatment facilities, flow control facilities, drainage control facilities, and drainage systems shall be maintained as specified in rules promulgated by the Director in order for these facilities and systems to be kept in continuous working order. Facility components must be kept accessible for inspection and maintenance purposes, including for inspections conducted by the City.

* * *

22.803.030 Minimum requirements for source controls for all real property

For all discharges, responsible parties shall implement and maintain source controls to prevent or minimize pollutants from leaving a site or property, as specified in the joint SPU/SDCI Directors' Rule titled "Seattle Stormwater Manual" at "Volume 4-Source Control." Source controls that are required for all real property include, but are not limited to, the following, as further described in rules promulgated by the Director:

* * *

H. ~~((Rooftop))~~ Constructed dog runs. Dog runs located on private property, whether located at or above grade (e.g., on rooftops, podiums, or ((above-grade)) plazas), must prevent stormwater from the dog run from discharging directly or indirectly to a public drainage system, private drainage system, or receiving water body.

22.803.040 Minimum ~~((requirements for))~~ source controls for ~~((businesses and public entities for))~~ specific activities

A. In addition to the source controls required by Section 22.803.030 for all real properties, businesses and public entities must implement source controls, to the extent allowed by law, for specific pollution-generating activities as specified in the joint SPU/SDCI Directors' Rule titled "Seattle Stormwater Manual" at "Volume 4-Source Control," as necessary to prevent discharges prohibited by Section 22.802.020 or Chapter 21.16, as applicable. Source controls include, but are not limited to: segregating or isolating wastes to prevent contact with drainage water; enclosing, covering,

or containing the activity to prevent contact with drainage water; developing and implementing inspection and maintenance programs; sweeping; and taking management actions such as training employees on pollution prevention.

B. For all discharges, source controls shall be implemented, to the extent allowed by law, by businesses and public entities for the following specific pollution-generating activities as specified in the joint SPU/SDCI Directors' Rule titled "Seattle Stormwater Manual" at "Volume 4-Source Control," ~~((to the extent))~~ as necessary to prevent prohibited discharges as described in ~~((subsection 22.802.020.A through subsection 22.802.020.D))~~ Section 22.802.020, and to prevent contaminants from coming in contact with drainage water or being discharged to the drainage system, public combined sewer, or directly into receiving waters:

1. Fueling at dedicated stations, for new or substantially altered fueling stations.
2. Mobile fueling of vehicles and heavy equipment.
3. In-water and over-water fueling.
4. Maintenance and repair of vehicles and equipment.
5. Concrete and asphalt mixing and production.
6. Concrete pouring, concrete/asphalt cutting, and asphalt application.
7. Recycling, wrecking yard, and scrap yard operations.
8. Storage of liquids in aboveground tanks.

Source controls include, but are not limited to, segregating or isolating wastes to prevent contact with drainage water; enclosing, covering, or containing the activity to prevent contact with drainage water; developing and implementing inspection and maintenance programs; sweeping; and taking management actions such as training employees on pollution prevention.

~~((B. For all discharges except those that drain only to the public combined sewer, source controls shall be implemented, to the extent allowed by law, by businesses and public entities for specific pollution-generating activities as specified in the joint SPU/SDCI Directors' Rule titled "Seattle Stormwater Manual" at "Volume 4-Source Control," to the extent necessary to prevent prohibited discharges as described in subsection 22.802.020.A through subsection 22.802.020.C, and to prevent contaminants from coming in contact with drainage water or being discharged to the drainage system or directly into receiving waters. Source controls include, but are not limited to, segregating or isolating wastes to prevent contact with drainage water; enclosing, covering, or containing the activity to prevent contact with drainage water; developing and implementing inspection and maintenance programs; sweeping; and taking management~~

~~actions such as training employees on pollution prevention.))~~

Section 5. Chapter 22.805 of the Seattle Municipal Code, last amended by Ordinance 127375, is amended as follows:

Chapter 22.805 Minimum Requirements For All Projects

22.805.010 General

* * *

B. ~~Closely related projects, projects under a common plan of development or sale, subdivisions, and short plats ((shall be))~~ are considered as one project for purposes of applying the Stormwater Code, including but not limited to determining whether the thresholds for applicability of particular Stormwater Code minimum requirements are met. ~~((The Director shall determine whether two or more projects are closely related as specified in the joint SPU/SDCI Directors' Rule titled "Seattle Stormwater Manual" at "Volume 1-Project Minimum Requirements."))~~

* * *

D. In the case of a subdivision under Chapter 23.22 and short plat under Chapter 23.24, unless an adjustment pursuant to subsection 22.800.040.B is approved by the Director, for the purposes of applying the thresholds in this Chapter 22.805~~((;))~~ :

1. A subdivision of property does not affect or reduce the requirements of this subtitle, Chapter 21.16, and associated rules promulgated by the Director. The proposed parcels within a subdivision or short plat shall meet the standards required by the higher area threshold of the entire property being subdivided, rather than the standards required for each of the proposed parcels individually.

2. In neighborhood residential (NR) zones, the hard surface coverage is the maximum lot coverage allowed per Subtitle III of Title 23, ((Land Use Code,)) plus required and proposed pedestrian and vehicular access and amenities, including roadways, driveways, walkways, plazas, and patios identified on the preliminary drainage control plan and associated preliminary site plan, unless otherwise approved by the Director. In all other zones, the hard surface coverage shall be based on an approved site plan showing the maximum allowed build-out including all phases of the subdivision or short plat.

E. Construction of drainage control facilities and drainage systems for plats

1. In the case of a subdivision under Chapter 23.22, drainage control facilities or drainage systems that are identified on the associated preliminary drainage control plan or the approved preliminary plat and will serve multiple

proposed lots, parcels, tracts, or rights-of-way shall be constructed prior to approval of the final plat unless a bond is provided according to subsection 23.22.070.C. If a bond is provided in lieu of construction prior to approval of the final plat, the construction permit for the facilities or systems must be issued prior to issuance of any building permit for any other construction within the subdivision and construction of the facilities or systems shall be completed and final inspection approved prior to final inspection approval of any building permit for any other construction within the subdivision and prior to occupancy of any buildings, but in no event later than two years after final plat approval.

2. In the case of a short plat under Chapter 23.24 with shared drainage control facilities or drainage systems that are identified on the preliminary drainage control plan and will serve multiple proposed lots, parcels, tracts, or rights-of-way(~~(, the following shall occur)~~) :

a. The construction permit (~~(for)~~) that includes the shared facilities or systems shall be issued prior to issuance of any other building permit for any other construction within the lots, parcels, tracts, or rights-of-way served by the shared facilities or systems; and

b. Construction of the shared facilities or systems shall be completed and final inspection approved prior to final inspection approval of any building permit for any other construction within the lots, parcels, tracts, or rights-of-way served by the shared facilities, and prior to occupancy of any buildings on these lots, parcels, or tracts.

* * *

22.805.020 Minimum requirements for all projects

* * *

C. Minimum requirements for flood-prone areas. On sites within flood-prone areas, responsible parties are required to employ procedures to minimize the potential for flooding on the site and to minimize the potential for the project to increase the risk of floods on adjacent or nearby properties. Flood control measures shall include those set forth in other titles of the Seattle Municipal Code and rules promulgated thereunder, including, but not limited to, Chapter ~~((23.60 (Shoreline District)))~~ 23.60A (Seattle Shoreline Master Program Regulations), Chapter 25.06 (Floodplain Development), and Chapter 25.09 (Regulations for Environmentally Critical Areas).

D. Minimum requirements for construction stormwater pollution prevention plan. Temporary and permanent construction controls shall be used to accomplish the following minimum requirements. All projects are required to meet each of the elements below or document why an element is not applicable. Additional controls may be required by the Director when minimum controls are not sufficient to prevent erosion or transport of sediment or other pollutants from the

site.

1. Mark clearing limits and environmentally critical areas. Within the boundaries of the project site and prior to beginning land disturbing activities, including clearing and grading, clearly mark all clearing limits, easements, setbacks, all environmentally critical areas and their buffers, and all trees and drainage courses that are to be preserved within the construction area.

2. Retain top layer. Within the boundaries of the project site, the duff layer, topsoil, and native vegetation, if there is any, shall be retained in an undisturbed state to the maximum extent feasible. If it is not feasible to retain the top layer in place, it should be stockpiled on-site, covered to prevent erosion, and replaced immediately upon completion of the land disturbing activities to the maximum extent feasible.

3. Establish construction access. Limit construction vehicle access, whenever possible, to one route. Stabilize access points and minimize tracking sediment onto public roads. Promptly remove any sediment tracked off site.

4. Protect downstream properties and receiving waters. Protect properties and receiving waters downstream from the development sites from erosion or flooding due to increases in the volume, velocity, duration, and peak flow rate of drainage water from the project site. If it is necessary to construct flow control facilities to meet this requirement, these facilities shall be functioning prior to implementation of other land disturbing activity. If permanent infiltration facilities are used to control flows during construction, these facilities shall be protected from siltation during the construction phase of the project.

5. Prevent erosion and sediment transport from the site. Pass all drainage water from disturbed areas through a sediment trap, sediment pond, or other appropriate sediment removal BMP before the water leaves the site or prior to discharge to an infiltration facility. Sediment controls intended to trap sediment on site shall be constructed as one of the first steps in grading and shall be functional before other land disturbing activities take place. BMPs intended to trap sedimentation shall be located in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration where feasible.

6. Prevent erosion and sediment transport from the site by vehicles. Whenever construction vehicle access routes intersect paved roads, the transport of sediment onto the paved road shall be minimized. If sediment is transported onto a paved road surface, the roads shall be cleaned thoroughly at the end of each day. Sediment shall be removed from paved roads by shoveling or sweeping and shall be transported to a controlled sediment disposal area. If

sediment is tracked off site, roads shall be cleaned thoroughly at the end of each day, or at least twice daily during wet weather. Street washing is allowed only after sediment is removed, and street wash wastewater shall be prevented from entering the drainage system and receiving waters.

7. Stabilize soils. Prevent on-site erosion by stabilizing all exposed and unworked soils, including stock piles and earthen structures such as dams, dikes, and diversions. From October 1 to April 30, no soils shall remain exposed and unworked for more than two days. From May 1 to September 30, no soils shall remain exposed for more than seven days. Soils shall be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast. Soil stockpiles shall be stabilized from erosion, protected with sediment trapping measures, and be located away from storm drain inlets, waterways, and drainage channels. Before the completion of the project, permanently stabilize all exposed soils that have been disturbed during construction.

8. Protect slopes. Erosion from slopes shall be minimized. Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Off-site stormwater run-on or groundwater shall be diverted away from slopes and undisturbed areas with interceptor dikes, pipes, and/or swales. Pipe slope drains or protected channels shall be constructed at the top of slopes to collect drainage and prevent erosion. Excavated material shall be placed on the uphill side of trenches, consistent with safety and space considerations. Check dams shall be placed at regular intervals within constructed channels that are cut down a slope.

9. Protect storm drains. Prevent sediment from entering all storm drains, including ditches that receive drainage water from the project. Storm drain inlets protection devices shall be cleaned or removed and replaced as recommended by the product manufacturer, or more frequently if required to prevent failure of the device or flooding. Storm drain inlets made operable during construction shall be protected so that drainage water does not enter the drainage system without first being filtered or treated to remove sediments. Storm drain inlet protection devices shall be removed at the conclusion of the project. When manufactured storm drain inlet protection devices are not feasible, inlets and catch basins must be cleaned as necessary to prevent sediment from entering the drainage control system.

10. Stabilize channels and outlets. All temporary on-site drainage systems shall be designed, constructed, and stabilized to prevent erosion. Stabilization shall be provided at the outlets of all drainage systems that is adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches.

11. Control pollutants. Measures shall be taken to control potential pollutants and shall include, but not be limited to, the following measures:

a. All pollutants, including sediment, waste materials, and demolition debris, that occur on site shall be handled and disposed of in a manner that does not cause contamination of drainage water and pursuant to all applicable disposal laws.

b. Containment, cover, and protection from vandalism shall be provided for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment.

c. On-site fueling tanks shall include secondary containment.

d. Maintenance, fueling, and repair of heavy equipment and vehicles involving oil changes, hydraulic system drain down, solvent and de-greasing cleaning operations, fuel tank drain down and removal, and other activities which may result in discharge or spillage of pollutants to the ground or into drainage water runoff shall be conducted using spill prevention and control measures.

e. Contaminated soils shall be removed and surfaces shall be cleaned immediately following any discharge or spill incident.

f. Wheel wash or tire bath wastewater shall be discharged to a separate on-site treatment system that prevents discharge to surface water, or to the sanitary sewer or combined sewer system with approval of the Director of SPU. Temporary discharges or connections to the public sanitary and combined sewers shall be made in accordance with Chapter 21.16 (Side Sewer Code).

g. Application of fertilizers and pesticides shall be conducted in a manner and at application rates that will not result in loss of chemical to drainage water. Manufacturers' label requirements for application rates and procedures shall be followed.

h. BMPs shall be used to prevent or treat contamination of drainage water by pH-modifying sources. These sources include, but are not limited to, recycled concrete stockpiles, bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, and concrete pumping and mixer washout waters. Construction site operators may be required to adjust the pH of drainage water if necessary to prevent a violation of water quality standards.

i. Construction site operators must obtain written approval from Ecology prior to using chemical treatment other than carbon dioxide (CO₂) dry ice, or food grade vinegar, to adjust pH.

j. Uncontaminated water from water-only based shaft drilling for construction of building, road,

and bridge foundations may be infiltrated provided the wastewater is managed in a way that prevents discharge to surface waters. Prior to infiltration, water from water-only based shaft drilling that comes into contact with curing concrete must be neutralized until pH is in the range of 6.5 to 8.5 (su).

k. Train all employees on proper BMPs for preventing illicit discharges, including spills.

12. Control dewatering. When dewatering devices discharge on site, to a public drainage system, or to the public combined sewer, dewatering devices shall discharge into a sediment trap, sediment pond, gently sloping vegetated area of sufficient length to remove sediment contamination, or other sediment removal BMP. Foundation, vault, and trench dewatering waters must be discharged into a controlled drainage system prior to discharge to a sediment trap or sediment pond. Clean, non-turbid dewatering water, such as unpolluted well-point groundwater, that is discharged to systems tributary to ~~((state))~~ surface waters must not cause erosion or flooding. Highly turbid or contaminated dewatering water shall be handled separately from drainage water. For ~~((any project))~~ all projects with an excavation depth of 12 feet or more below the existing grade, all projects with an excavation depth of less than 12 feet located in an area expected to have shallow groundwater depths, and ~~((for))~~ all ~~((large))~~ projects with 5,000 square feet or more of new plus replaced hard surface or one acre or more of land disturbing activity, a dewatering ~~((flows))~~ analysis must be ~~((determined))~~ performed to determine dewatering flows and ~~((it must be verified))~~ to verify that there is sufficient capacity in the downstream system (e.g., public drainage system ((and)) or public combined sewer] ((prior to discharging)) for review and approval or disapproval by the Director.

13. Maintain BMPs. All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. All temporary erosion and sediment controls shall be removed within five days after final site stabilization is achieved or after the temporary controls are no longer needed, whichever is later. Trapped sediment shall be removed or stabilized on site. Disturbed soil areas resulting from removal shall be permanently stabilized.

14. Inspect BMPs. BMPs shall be periodically inspected. For projects with 5,000 square feet or more of new plus replaced hard surface or 7,000 square feet or more of land disturbing activity, site inspections shall be conducted by a Certified Erosion and Sediment Control Lead who shall be identified prior to construction and shall be present on-site or on-call at all times.

15. Execute ~~((Construction Stormwater Control Plan))~~ construction stormwater control plan. Construction site operators shall maintain, update, and implement their ~~((Construction Stormwater Control Plan))~~ construction

stormwater control plan. Construction site operators shall modify their ~~((Construction Stormwater Control Plan))~~ construction stormwater control plan to maintain compliance whenever there is a change in design, construction, operation, or maintenance at the site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.

16. Minimize open trenches. In the construction of underground utility lines, where feasible, no more than 150 feet of trench shall be opened at one time, unless soil is replaced within the same working day, and where consistent with safety and space considerations, excavated material shall be placed on the uphill side of trenches. Trench dewatering devices shall discharge into a sediment trap or sediment pond.

17. Phase the project. Development projects shall be phased to the maximum extent feasible in order to minimize the amount of land disturbing activity occurring at the same time and shall take into account seasonal work limitations.

18. Install flow control and water quality facilities. Development projects required to comply with Section 22.805.080 (Minimum requirements for flow control) or Section 22.805.090 (Minimum requirements for treatment) shall install permanent flow control and water quality facilities to prevent erosion or transport of sediment or other pollutants from the site during construction.

19. Protect stormwater BMPs

a. Protect all stormwater BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the stormwater BMP must include removal of sediment and any sediment-laden stormwater BMP soils, and replacing the removed soils with soils meeting the design specification.

b. Prevent compacting ~~((on-site))~~ infiltration BMPs by excluding construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.

c. Control erosion and avoid introducing sediment from surrounding land uses onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment-laden runoff onto permeable pavements or base materials.

d. Permeable pavements fouled with sediments or no longer passing an initial infiltration test must be cleaned until infiltrating per design or replaced.

e. Keep all heavy equipment off existing soils under ~~((on-site))~~ infiltration BMPs, especially those

that have been excavated to final grade, to retain the infiltration rate of the soils.

* * *

G. Protect shorelines. All projects discharging directly or indirectly through a drainage system into the shoreline district as defined in Chapter ~~((23.60))~~ 23.60A (Seattle Shoreline Master Program Regulations) shall prevent impacts to water quality and stormwater quantity that would result in a net loss of shoreline ecological functions as defined in WAC 173-26-020(13).

H. Ensure sufficient capacity. All ~~((large))~~ projects with 5,000 square feet or more of new plus replaced hard surface or one acre of land disturbing activity, all projects with an excavation depth of 12 feet or more below the existing grade, ~~((and))~~ all projects with an excavation depth of less than 12 feet located in an area expected to have shallow groundwater depths, and all projects that alter the drainage pattern from 5,000 square feet or more of an existing, new, or replaced hard surface or 3/4 of an acre or more of a pervious surface from a site to a downstream system not previously connected via discrete conveyance shall ensure that sufficient capacity exists in the ~~((public))~~ drainage system and public combined sewer to carry existing and anticipated loads, including any flows from dewatering activities. Capacity analysis shall extend to at least 1/4-mile from the discharge point of the site. Sites at which there is insufficient capacity may be required to install a flow control facility or improve the drainage system or public combined sewer to accommodate flow from the site. Unless approved otherwise by the Director as necessary to meet the purposes of this subtitle:

1. Capacity analysis for discharges to the ~~((public))~~ drainage system shall be based on peak flows with a 4 percent annual probability (25-year recurrence interval); and
2. Capacity analysis for discharges to the public combined sewer shall be based on peak flows with a 20 percent annual probability (5-year recurrence interval).

* * *

K. Comply with Side Sewer Code

1. All privately owned and operated drainage control facilities or systems, whether or not they discharge to a public drainage system or public combined sewer, shall be considered side sewers and subject to Chapter 21.16 (Side Sewer Code), SPU Director's Rules promulgated under Title 21, and the design and installation specifications and permit requirements of SPU ~~((and SDCI))~~ for side sewer and drainage systems.

2. Side sewer permits and inspections shall be required for constructing, capping, altering, or repairing privately owned and operated drainage systems as provided for in Chapter 21.16. When the work is ready for inspection,

the permittee shall notify the Director of ~~((SDCI))~~ SPU. If the work is not constructed according to the plans approved under this Subtitle VIII, Chapter 21.16, the SPU Director's Rules promulgated under Title 21, and SPU ~~((and SDCI))~~ design and installation specifications, then the Director may issue a stop work order under Chapter 22.808 and require modifications as provided for in this Subtitle VIII and Chapter 21.16.

* * *

O. Minimum requirements for treatment. All projects that connect flows from 5,000 square feet or more of an existing, new, or replaced pollution-generating hard surface from the site not previously connected via discrete conveyance to a drainage system that discharges to a receiving water or a receiving water, and all projects that convert an existing hard surface of 5,000 square feet or more to a pollution-generating hard surface (e.g., an existing slab not previously subject to vehicular use) and direct flows from the site not previously connected via discrete conveyance to a drainage system that discharges to a receiving water or a receiving water, shall comply with the minimum requirements for treatment contained in Section 22.805.090 to treat flows from those pollution-generating hard surfaces. When stormwater flows from other areas, including non-pollution generating surfaces (e.g., roofs), dewatering activities, and off-site areas, cannot be separated or bypassed, treatment BMPs shall be designed for the entire area draining to the treatment facility.

~~((22.805.030 Minimum requirements for single-family residential projects~~

~~A. Soil amendment. Retain and protect undisturbed soil in areas not being developed, and prior to completion of the project, amend all new, replaced, and disturbed topsoil (including construction lay-down areas) with organic matter to the extent required by and in compliance with the rules promulgated by the Director.~~

~~B. On-site stormwater management. Single-family residential projects shall meet the minimum requirements for on-site stormwater management contained in Section 22.805.070, to the extent allowed by law, if:~~

~~1. For a project on a lot most recently created, adjusted, altered, or otherwise amended by a plat or other lawful document recorded with the King County Recorder on or after January 1, 2016, and where that document either created the lot or altered the size of the lot, either the total new plus replaced hard surface is 750 square feet or more or land disturbing activity is 7,000 square feet or more; or~~

~~2. For any other project, either the total new plus replaced hard surface is 1,500 square feet or the land disturbing activity is 7,000 square feet or more.))~~

22.805.040 Minimum requirements for trail and sidewalk projects

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B. On-site stormwater management. All trail and sidewalk projects with 2,000 square feet or more of new plus replaced hard surface or 7,000 square feet or more of land disturbing activity shall meet the minimum requirements for on-site stormwater management contained in Section 22.805.070, to the extent allowed by law.

22.805.050 Minimum requirements for parcel-based projects

* * *

C. Flow control. Parcel-based projects shall meet the minimum requirements for flow control contained in Section 22.805.080, to the extent allowed by law, as prescribed below.

1. Discharges to wetlands. Parcel-based projects discharging into a wetland, or to the drainage basin of a wetland, shall:

a. Comply with Section 22.805.020 (Minimum requirements for all projects), including, but not limited to subsection 22.805.020.E (Protect wetlands).

b. Comply with the minimum requirements for wetland protection contained in subsection ((22.805.080.B.1)) 22.805.080.C (Wetland protection standards) if:

1) The total new plus replaced hard surface is 5,000 square feet or more; or

2) The project converts 3/4 acres or more of vegetation to lawn or landscaped areas, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

3) The project converts 2.5 acres or more of native vegetation to pasture and from the project there is a surface discharge into a natural or constructed conveyance system from the site.

2. Discharges to listed creek basins. Parcel-based projects discharging into Blue Ridge Creek, Broadview Creek, Discovery Park Creek, Durham Creek, Frink Creek, Golden Gardens Creek, Kiwanis Ravine/Wolfe Creek, Licton Springs Creek, Madrona Park Creek, Mee-Kwa-Mooks Creek, Mount Baker Park Creek, Puget Creek, Riverview Creek, Schmitz Creek, Taylor Creek, or Washington Park Creek, or to the drainage basin of such creek, shall:

a. Comply with subsection ((~~22.805.080.B.2~~)) 22.805.080.D (Pre-developed forested standard) if the existing hard surface coverage is less than 35 percent and one or more of the following apply:

1) The project adds 5,000 square feet or more of new hard surface and the total new plus replaced hard surface is 10,000 square feet or more; or

2) The project converts 3/4 acres or more of vegetation to lawn or landscaped areas, and

from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

3) The project converts 2.5 acres or more of native vegetation to pasture, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

4) The project adds 5,000 square feet or more of new hard surface and, through a combination of effective hard surfaces and converted pervious surfaces, causes a 0.15 cubic feet per second increase in the 100-year recurrence interval flow frequency as estimated using a continuous model approved by the Director.

b. Comply with subsection ((22.805.080.B.3)) 22.805.080.E (Pre-developed pasture standard) if the criteria in subsection 22.805.050.C.2.a do not apply and one or more apply:

1) The total new plus replaced hard surface is 5,000 square feet or more; or

2) The project converts 3/4 acres or more of vegetation to lawn or landscaped areas, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

3) The project converts 2.5 acres or more of native vegetation to pasture, and from the project there is a surface discharge into a natural or constructed conveyance system from the site.

3. Discharges to non-listed creek basins. Parcel-based projects discharging into a creek not listed in subsection 22.805.050.C.2, or to the drainage basin of such creek, shall:

a. Comply with subsection ((22.805.080.B.2)) 22.805.080.D (Pre-developed forested standard) if the existing land cover is forested and one or more of the following apply:

1) The project adds 5,000 square feet or more of new hard surface and the total new plus replaced hard surface is 10,000 square feet or more; or

2) The project converts 3/4 acres or more of vegetation to lawn or landscaped areas, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

3) The project converts 2.5 acres or more of native vegetation to pasture, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

4) The project adds 5,000 square feet or more of new hard surface and, through a combination of effective hard surfaces and converted pervious surfaces, causes a 0.15 cubic feet per second increase in the 100-year recurrence interval flow frequency as estimated using a continuous model approved by the Director.

b. Comply with subsection ((22.805.080.B.3)) 22.805.080.E (Pre-developed pasture standard) if the criteria in subsection 22.805.050.C.3.a do not apply and one or more of the following apply:

- 1) The total new plus replaced hard surface is 5,000 square feet or more; or
- 2) The project converts 3/4 acres or more of vegetation to lawn or landscaped areas, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or
- 3) The project converts 2.5 acres or more of native vegetation to pasture, and from the project there is a surface discharge into a natural or constructed conveyance system from the site.

4. Discharges to small lake basins. Parcel-based projects discharging into Bitter Lake, Green Lake, or Haller Lake, or to the drainage basin of such lake, shall comply with subsection (~~(22.805.080.B.5)~~) 22.805.080.G (Peak control standard) if the total new plus replaced hard surface is (~~(2,000)~~) 5,000 square feet or more.

5. Discharges to public combined sewer. Unless the Director of SPU has determined that the public combined sewer has sufficient capacity to carry existing and anticipated loads, parcel-based projects discharging into the public combined sewer or its basin shall comply with subsection (~~(22.805.080.B.5)~~) 22.805.080.G (Peak control standard) if the total new plus replaced hard surface is 5,000 square feet or more.

6. Discharges to a capacity-constrained system. In addition to applicable minimum requirements for flow control in subsection 22.805.050.C.1 through subsection 22.805.050.C.5, parcel-based projects discharging into a capacity-constrained system or its basin shall also comply with subsection (~~(22.805.080.B.5)~~) 22.805.080.G (Peak control standard) if the total new plus replaced hard surface is (~~(2,000)~~) 5,000 square feet or more unless the downstream system only includes ditches or culverts and the system has been determined to have sufficient capacity as specified in subsection 22.805.020.H (Ensure sufficient capacity).

7. Discharges from groundwater. In addition to applicable minimum requirements for flow control in subsection 22.805.050.C.1 through subsection 22.805.050.C.6, parcel-based projects that will permanently discharge groundwater to a public drainage system or to a public combined sewer shall also comply with subsection (~~(22.805.080.B.5)~~) 22.805.080.G (Peak control standard) if the total new plus replaced hard surface is 2,000 square feet or more.

D. Treatment. Parcel-based projects not discharging to the public combined sewer shall comply with the minimum requirements for treatment contained in Section 22.805.090 for flows from the total new plus replaced pollution-generating hard surface and the new plus replaced pollution-generating pervious surface, to the extent allowed by law, if:

1. The total new plus replaced pollution-generating hard surface is 5,000 square feet or more; or
2. The total new plus replaced pollution-generating pervious surfaces is 3/4 acres or more, and from ~~(the~~

project)) which there is a surface discharge in a natural or constructed conveyance system from the site.

22.805.060 Minimum requirements for roadway projects

* * *

B. ((On-Site)) On-site stormwater management. All roadway projects with 2,000 square feet or more of new plus replaced hard surface or 7,000 square feet or more of land disturbing activity shall meet the requirements for on-site stormwater management contained in Section 22.805.070, to the extent allowed by law, except as provided in subsection 22.805.060.E.

C. Flow control. Roadway projects shall meet the minimum requirements for flow control contained in Section 22.805.080, to the extent allowed by law, as prescribed below, except as provided in subsection 22.805.060.E.

1. Discharges to wetlands. Roadway projects discharging into a wetland or to the drainage basin of a wetland, shall:

a. Comply with Section 22.805.020 (Minimum requirements for all projects), including, but not limited to subsection 22.805.020.E (Protect wetlands).

b. Comply with the minimum requirements for wetland protection contained in subsection ((~~22.805.080.B.4~~)) 22.805.080.C (Wetland protection standards) if the existing hard surface coverage is less than 35 percent and one or more of the following apply:

1) The total new plus replaced hard surface is 5,000 square feet or more; or

2) The project converts 3/4 acres or more of vegetation to lawn or landscaped areas, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

3) The project converts 2.5 acres or more of native vegetation to pasture and from the project there is a surface discharge into a natural or constructed conveyance system from the site.

c. Comply with the minimum requirements for wetland protection contained in subsection ((~~22.805.080.B.4~~)) 22.805.080.C (Wetland protection standards) if the existing hard surface coverage is greater than or equal to 35 percent and one or more of the following apply:

1) The total new plus replaced hard surface is 10,000 square feet or more. If the new plus replaced hard surfaces total 50 percent or more of the existing hard surfaces within the project limits, comply with subsection 22.805.080.C for the flows from the total new plus replaced hard surfaces; if the new plus replaced hard surfaces total less than 50 percent, comply with subsection 22.805.080.C for the flows from the total new hard surfaces.

The project limits are defined by the length of the project and the width of the right-of-way; or

2) The project converts 3/4 acres or more of vegetation to lawn or landscaped areas, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

3) The project converts 2.5 acres or more of native vegetation to pasture and from the project there is a surface discharge into a natural or constructed conveyance system from the site.

2. Discharges to listed creek basins. Roadway projects discharging into Blue Ridge Creek, Broadview Creek, Discovery Park Creek, Durham Creek, Frink Creek, Golden Gardens Creek, Kiwanis Ravine/Wolfe Creek, Licton Springs Creek, Madrona Park Creek, Mee-Kwa-Mooks Creek, Mount Baker Park Creek, Puget Creek, Riverview Creek, Schmitz Creek, Taylor Creek, or Washington Park Creek, or to the drainage basin of such creek, shall:

a. Comply with subsection ~~((22.805.080.B.2))~~ 22.805.080.D (Pre-developed forested standard) if the existing hard surface coverage is less than 35 percent and one or more of the following apply:

1) The project adds ~~((5,000))~~ 10,000 square feet or more of new plus replaced hard surface ~~((and the total new plus replaced hard surface is 10,000 square feet or more));~~ or

2) The project converts 3/4 acres or more of vegetation to lawn or landscaped areas, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

3) The project converts 2.5 acres or more of native vegetation to pasture, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

4) The project adds 5,000 square feet or more of new hard surface and, through a combination of effective hard surfaces and converted pervious surfaces, causes a 0.15 cubic feet per second increase in the 100-year recurrence interval flow frequency as estimated using a continuous model approved by the Director.

b. Comply with subsection ~~((22.805.080.B.4))~~ 22.805.080.F (Existing condition standard) if the criteria in subsection 22.805.060.C.2.a do not apply and the total new plus replaced hard surface is 10,000 square feet or more, and:

1) If the new plus replaced hard ~~((surface adds))~~ surfaces total 50 percent or more ~~((to))~~ of the existing hard surfaces within the project limits, comply with subsection ~~((22.805.080.B.4))~~ 22.805.080.F (Existing condition standard) for the flows from the total new plus replaced hard surfaces. The project limits are defined by the length of the project and the width of the right-of-way; or

2) If the new plus replaced hard ~~((surface adds))~~ surfaces total less than 50 percent ~~((to))~~

of the existing hard surfaces within the project limits, comply with subsection ((22.805.080.B.4)) 22.805.080.F (Existing condition standard) for the flows from the total new hard surfaces. The project limits are defined by the length of the project and the width of the right-of-way.

3. Discharges to non-listed creek basins. Roadway projects discharging into a creek not listed in subsection 22.805.060.C.2, or to the drainage basin of such creek, shall:

a. Comply with subsection ((22.805.080.B.2)) 22.805.080.D (Pre-developed forested standard) if the existing land cover is forested and one or more of the following apply:

1) The project adds ((5,000)) 10,000 square feet or more of new plus replaced hard surface ((and the total new plus replaced hard surface is 10,000 square feet or more)); or

2) The project converts 3/4 acres or more of vegetation to lawn or landscaped areas, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

3) The project converts 2.5 acres or more of native vegetation to pasture, and from the project there is a surface discharge into a natural or constructed conveyance system from the site; or

4) The project adds 5,000 square feet or more of new hard surface and, through a combination of effective hard surfaces and converted pervious surfaces, causes a 0.15 cubic feet per second increase in the 100-year recurrence interval flow frequency as estimated using a continuous model approved by the Director.

b. Comply with subsection ((22.805.080.B.4)) 22.805.080.F (Existing condition standard) if the criteria in subsection 22.805.060.C.3.a do not apply and the total new plus replaced hard surface is 10,000 square feet or more, and:

1) If the new plus replaced hard ((surface adds)) surfaces total 50 percent or more ((to)) of the existing hard surfaces within the project limits, comply with subsection ((22.805.080.B.4)) 22.805.080.F (Existing condition standard) for the flows from the total new plus replaced hard surfaces. The project limits are defined by the length of the project and the width of the right-of-way; or

2) If the new plus replaced hard ((surface adds)) surfaces total less than 50 percent ((to)) of the existing hard surfaces within the project limits, comply with subsection ((22.805.080.B.4)) 22.805.080.F (Existing condition standard) for the flows from the total new hard surfaces. The project limits are defined by the length of the project and the width of the right-of-way.

4. Discharges to small lake basins. Roadway projects discharging into Bitter Lake, Green Lake, or Haller

Lake, or to the drainage basin of such lake, shall comply with subsection (~~(22.805.080.B.4)~~) 22.805.080.F (Existing condition standard) if the total new plus replaced hard surface is 10,000 square feet or more, and:

a. If the new plus replaced hard (~~(surface adds)~~) surfaces total 50 percent or more (~~((tø))~~) of the existing hard surfaces within the project limits, comply with subsection (~~(22.805.080.B.4)~~) 22.805.080.F (Existing condition standard) for the flows from the total new plus replaced hard surfaces. The project limits are defined by the length of the project and the width of the right-of-way; or

b. If the new plus replaced hard (~~(surface adds)~~) surfaces total less than 50 percent (~~((tø))~~) of the existing hard surfaces within the project limits, comply with subsection (~~(22.805.080.B.4)~~) 22.805.080.F (Existing condition standard) for the flows from the total new hard surfaces. The project limits are defined by the length of the project and the width of the right-of-way.

5. Discharges to a capacity-constrained system. In addition to applicable minimum requirements for flow control in subsection 22.805.060.C.1 through subsection 22.805.060.C.4, roadway projects discharging into a capacity-constrained system or its basin shall also comply with subsection (~~(22.805.080.B.4)~~) 22.805.080.F (Existing condition standard) if the total new hard surface is 10,000 square feet or more unless the downstream system only includes ditches or culverts and has been determined to have sufficient capacity as specified in 22.805.020.H (Ensure sufficient capacity).

D. Treatment. Roadway projects not discharging to the public combined sewer shall, to the extent allowed by law, except as provided in subsection 22.805.060.E:

1. If the site has less than 35 percent existing hard surface coverage, and the project's total new plus replaced pollution-generating hard surface is 5,000 square feet or more, comply with the minimum requirements for treatment contained in Section 22.805.090 for flows from the total new plus replaced pollution-generating hard surface and new plus replaced pollution-generating pervious surface; and

2. If the site has greater than or equal to 35 percent existing hard surface coverage and the project's total new plus replaced pollution-generating hard surface is 5,000 square feet or more, and

a. If the new plus replaced pollution-generating hard (~~(surface adds)~~) surfaces total 50 percent or more (~~((tø))~~) of the existing hard surfaces within the project limits, comply with the minimum requirements for treatment contained in Section 22.805.090 for flows from the total new plus replaced pollution-generating hard surface and new plus replaced pollution-generating pervious surface. The project limits are defined by the length of the project and the width of the right-of-way; or

b. If the new plus replaced pollution-generating hard ~~((surface adds))~~ surfaces total less than 50 percent ~~((to))~~ of the existing hard surfaces within the project limits, comply with the minimum requirements for treatment contained in Section 22.805.090 for flows from the total new pollution-generating hard surface and new pollution-generating pervious surface. The project limits are defined by the length of the project and the width of the right-of-way; and

3. If the total new plus replaced pollution-generating pervious surfaces is 3/4 acres or more, and from ~~((the project))~~ which there is a surface discharge in a natural or constructed conveyance system from the site, comply with the minimum requirements for treatment contained in Section 22.805.090 for flows from the total new plus replaced pollution-generating pervious surface and the new plus replaced pollution-generating hard surface.

E. For a roadway project that adds less than 50 percent to the existing hard surface within the project limits on a site having greater than 35 percent existing hard surface coverage, the requirements of subsections 22.805.060.B, 22.805.060.C, and 22.805.060.D to install drainage control facilities are modified based on infeasibility to the degree that (1) complete installation would require that an existing major publicly or privately owned infrastructure or utility element be relocated, or (2) the drainage control facility cannot be built and operated to discharge stormwater from the site under gravity flow conditions while meeting the applicable engineering standards. Compliance with subsections 22.805.060.B, 22.805.060.C, and 22.805.060.D is required to the degree that the project can avoid the infeasibility described in this subsection 22.805.060.E. Standard drainage review and approval shall be required whenever this subsection is used, whether or not Section 22.800.070 applies. ~~((+))~~ The following are considered existing major infrastructure or utility elements:

~~((a-))~~ 1. Gravity flow pipe greater than or equal to 24 inches in diameter or gravity flow pipe which cannot be relocated to discharge under gravity flow conditions;

~~((b-))~~ 2. High-pressure gas pipe;

~~((c-))~~ 3. Pressure gas pipe greater than 8 inches in diameter;

~~((d-))~~ 4. Any other pressure pipe greater than 12 inches in diameter (e.g., water or steam);

~~((e-))~~ 5. Duct banks, vaults, or handholes, for underground electrical, fiber optic, or telecommunication services;

~~((f-))~~ 6. Bridge, building, or tunnel structural foundations; and

~~((g-))~~ 7. Foundations for walls greater than 6 feet in height or 15 feet in length.

22.805.070 Minimum requirements for on-site stormwater management

A. Applicability. The requirements of this Section 22.805.070 apply as required in Section ~~((22.805.030))~~ 22.805.040 to Section 22.805.060.

B. Requirements. On-site stormwater management shall be installed to the extent allowed by law and maintained in compliance with the rules promulgated by the Director to receive flows from that portion of the site being developed and shall:

1. Comply with either:

- a. Subsection 22.805.070.C (On-site performance standard); or
- b. Subsection 22.805.070.D (On-site lists).

C. On-site performance standard:

1. If the existing hard surface coverage is less than 35 percent and the project discharges to a listed creek, or to the drainage basin of such creek:

a. The post-development discharge durations shall match the discharge durations of a pre-developed forested condition for the range of pre-developed discharge rates from 8 percent of the 2-year peak flow to 50 percent of the 2-year peak flow.

2. For all other projects:

a. The post-development discharge durations shall match the discharge durations of a pre-developed pasture condition for the range of pre-developed discharge rates between the 1 percent and 10 percent exceedance values.

D. On-site lists

1. For each project surface, follow the appropriate project table in this subsection 22.805.070.D~~((2 to subsection 22.805.070.D.5))~~ to evaluate on-site BMPs shown for that type of surface, by category. The project tables apply to roofs and other hard (non-roof) surfaces. All on-site BMPs used must comply with the rules promulgated by the Director. For each surface, consider all ~~((of))~~ the applicable on-site BMPs in the first category. Use any that is considered feasible. If none is feasible for that surface, move on to each successive category and repeat the selection process as necessary. Once one on-site BMP is used for a surface, no other on-site BMP is necessary for that surface. If no BMP in the appropriate categories is feasible, then no further evaluation is required for that surface under this subsection 22.805.070.D.1. Feasibility shall be determined by evaluation against:

a. Design criteria, minimum size, limitations, and infeasibility criteria identified for each BMP in this subsection 22.805.070.D and the rules promulgated by the Director; and

b. Competing needs. ~~((Subsection))~~ This subsection 22.805.070.D ~~((On-site lists) can))~~ may be superseded or reduced by the Director if the installation of the BMPs is in conflict with:

1) Any of the following federal or state laws, rules, and standards, as may be amended or superseded: Historic Preservation and Archaeology Laws identified in subsection 22.805.070.E (Historic preservation and archaeology laws), Federal Superfund or Washington State Model Toxics Control Act, Federal Aviation Administration requirements for airports, the Americans with Disabilities Act, and related rules and standards; or

2) Special zoning district design criteria adopted and being implemented pursuant to a community planning process. Special zoning districts include, for example, historic and preservation districts, pedestrian zone overlays, station area overlays, special review districts, multifamily residential zones, urban centers and urban villages, and master planned communities. Specific criteria in these areas include, but are not limited to, minimum Floor Area Ratio standards; zero lot line development; usable open space requirements; minimum sidewalk width and required bicycle facilities; alley, loading, and access requirements; pitched roof standards; and street-level development standards for modulation and projections; or

3) Public health and safety standards; or

4) Transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way; or

5) Chapter 15.43 (Tree and Vegetation Management in Public Places); Chapter 25.09 (Regulations for Environmentally Critical Areas); Chapter 25.11 (Tree Protection); and Chapter 23.60A (Standards for Vegetation in the Shoreline Master Plan).

~~((2. For single-family residential projects, Table A for 22.805.070 applies.~~

Table A for 22.805.070 On-site List for Single-family Residential Projects

Category	BMPs	All-Discharge Locations
4	Full-Dispersion	R, S
4	Infiltration Trenches	R, S ^d
4	Drywells	R, S ^d
2	Rain Gardens ^a	R, S
2	Infiltrating Bioretention	R, S

2	Rainwater Harvesting-Category 2 Sizing	X ^b
2	Permeable Pavement Facilities	R, S
2	Permeable Pavement Surfaces	S
2	Sidewalk/Trail Compost-Amended Strip ^a	S
3	Sheet Flow Dispersion	R, S
3	Concentrated Flow Dispersion	S
3	Splashblock Downspout Dispersion	R
3	Trench Downspout Dispersion	R
4	Non-infiltrating Bioretention	R, S
4	Rainwater Harvesting-Category 4 Sizing	X ^c
4	Vegetated Roofs	X
5	Single-family Residential Cisterns	R
5	Perforated Stub-out Connections	R
5	Trees	S

Note that subsection 22.805.070.D.1 requires consideration of all on-site BMPs in a category for feasibility before moving on to each successive category as necessary. Within a category, BMPs may be considered in any order.

Key to Table A for 22.805.070

R = Evaluation is required for all roof runoff from Single-family residential projects.

S = Evaluation is required for all other hard (non-roof) surfaces of Single-family residential projects, unless otherwise noted below.

X = Evaluation is not required but is allowed.

^a Installation is only allowed for projects with less than 5,000 square feet of hard surface infiltrating on the project site.

^b Category 2 rainwater harvesting shall be sized to meet the on-site performance standard, subsection 22.805.070.C.

^c Category 4 rainwater harvesting shall be sized to reduce the runoff volume by 25 percent or more on an annual average basis.

^d Evaluation of other hard (non-roof) surfaces is not required but is allowed.))

3. For trail and sidewalk projects, Table B for 22.805.070 applies.

Table B for 22.805.070 On-site List for Trail and Sidewalk Projects

((Table B for 22.805.070 On-site List for Trail and Sidewalk Projects))

Category	BMPs	Projects Discharging to a Receiving Water Not Designated by Section 22.801.050, or its Basin	Projects Discharging to a Public Combined Sewer or Capacity-constrained System, ^c or its Basin	Projects Discharging to a Designated Receiving Water, or its Basin
1	Full Dispersion	S	S	S
2	Rain Gardens <u>With or Without Tree</u>	S	S	X
2	<u>Infiltrating Soil Cell Bioretention With Tree</u> ^d	X	X	X
2	Permeable Pavement Facilities	X	X ^a	X ^{a, b}
2	Permeable Pavement Surfaces ^e	S	S ^a	X ^{a, b}
2	Sidewalk/Trail Compost-Amended Strip ^e	S	S	X
3	Sheet Flow Dispersion	S	S	S
3	Concentrated Flow Dispersion	S	S	S
4	Trees	S	S	S

Note that subsection 22.805.070.D.1 requires consideration of all on-site BMPs in a category for feasibility before moving on to each successive category as necessary. Within a category, BMPs may be considered in any order.

Key to Table B for 22.805.070

S = Evaluation is required for all surfaces of trail or sidewalk projects.

X = Evaluation is not required for trail or sidewalk projects.

^a Minimum permeable pavement area allowed in right-of-way is 2,000 square feet of pavement within the project site.

^b Installation is not allowed in the right-of-way if new plus replaced pollution-generating hard surface area is less than 2,000 square feet of pavement within the project site.

^c Does not include any project discharging to a receiving water not designated by Section 22.801.050, or its basin, even if the project discharges to a capacity-constrained system or its basin.

^d Tree is required unless considered infeasible per rules promulgated by the Director.

^e Infiltration testing is not required to use for the on-site list approach, it is only necessary to prove infeasibility.

((4.)) 2. For parcel-based projects, Table ((G)) A for 22.805.070 applies.

Table A for 22.805.070 On-site List for Parcel-based Projects

((Table C for 22.805.070 On-site List for Parcel-based Projects))

Category	BMPs	Projects Discharging to a Receiving Water Not Designated by Section 22.801.050, Public Combined Sewer, or Capacity-constrained System, or its Basin	Projects Discharging to a Designated Receiving Water or its Basin
1	Full Dispersion	R, S	R, S
1	Infiltration Trenches	R, S ^g	R, S ^g
1	Drywells	R, S ^g	R, S ^g
1	Rainwater Harvesting-Category 1 Sizing	X ^e	X ^e
2	Rain Gardens <u>With or Without Tree</u>	R ^a , S ^a	R ^a , S ^a
2	Infiltrating Bioretention <u>With or Without Tree</u>	R, S	R, S
2	Infiltrating Soil Cell Bioretention With Tree	X	X
((2))	((Rainwater Harvesting-Category 2 Sizing))	((X ^e))	((X ^e))
2	Permeable Pavement Facilities <u>or approved equivalent</u>	R, S	R, S
2	Permeable Pavement Surfaces <u>or approved equivalent</u> ^h	S	S
2	Sidewalk/Trail Compost-Amended Strip ^h	S	S
3	Infiltrating Soil Cell Bioretention Without Tree	X	X
3	Sheet Flow Dispersion	R, S	R, S
3	Concentrated Flow Dispersion	S	S
3	Splashblock Downspout Dispersion	R	R
3	Trench Downspout Dispersion	R	R
4	Non-infiltrating Bioretention	R ^d , S ^d	R ^d , S ^d
4	Non-Infiltrating Soil Cell Bioretention With Tree	X	X
4	Rainwater Harvesting-Category 4 Sizing	R ^{b, f}	X ^f
4	Vegetated Roofs	R ^c	((X)) R ^c
4	Residential Cistern	X	X
5	Perforated Stub-out Connections	R	R
5	Trees ⁱ	S	S

Note that subsection 22.805.070.D.1 requires consideration of all on-site BMPs in a category for feasibility before moving on to each successive category as necessary. Within a category, BMPs may be considered in any order.

Key to Table ((C)) A for 22.805.070

R = Evaluation is required for all roof runoff from parcel-based projects.

S = Evaluation is required for all other hard (non-roof) surfaces of parcel-based projects, unless otherwise noted below.

X = Evaluation is not required but is allowed.

^a Rain gardens cannot be used to meet Section 22.805.080 (Minimum Requirements for Flow Control) or Section 22.805.090 (Minimum Requirements for Treatment) or for projects with areas of 5,000 square feet or more hard surface infiltrating on the project site.

^b Evaluation is not required for projects with less than 20,000 square feet of new plus replaced rooftop surface.

^c Evaluation is not required for projects with less than 5,000 square feet of new plus replaced rooftop surface.

^d Water quality treatment BMPs sized to meet Section 22.805.090 (Minimum Requirements for Treatment) may be installed in lieu of non-infiltrating bioretention unless the project discharges to a public combined sewer basin.

^e Category ((2)) 1 rainwater harvesting shall be sized to meet the on-site performance standard, subsection 22.805.070.C.

^f Category 4 rainwater harvesting shall be sized to reduce the runoff volume by 25 percent or more on an annual average basis.

^g Evaluation of other hard (non-roof) surfaces is not required but is allowed.

^h Infiltration testing is not required to use for the on-site list approach; it is only necessary to prove infeasibility.

((5-)) 4. For roadway projects, Table ((D)) C for 22.805.070 applies.

Table C for 22.805.070 On-site List for Roadway Projects

((Table D for 22.805.070 On-site List for Roadway Projects))

Category	BMPs	Projects Discharging to a Receiving Water Not Designated by Section 22.801.050, or its Basin	Projects Discharging to a Public Combined Sewer or Capacity-constrained System, ^g or its Basin	Projects Discharging to a Designated Receiving Water or its Basin
1	Full Dispersion	S	S	S
2	Rain Gardens <u>With Tree</u> ^h	S ^a	S ^a	S ^a
2	Infiltrating Bioretention <u>With Tree</u> ^h	S	S ^b	S ^{b, c}
<u>2</u>	Infiltrating Soil Cell Bioretention <u>With Tree</u> ^h	X	X	X
2	Permeable Pavement Facilities	X ^d	X ^{e, f}	X ^{c, e, f}

2	Permeable Pavement Surfaces ⁱ	S ^d	S ^{e, f}	X ^{c, e, f}
2	Sidewalk/Trail Compost-Amended Strip ⁱ	S ^e	S ^e	S ^e
3	Sheet Flow Dispersion	S	S	S
3	Concentrated Flow Dispersion	S	S	S
4	Trees	S	S	S
4	Non-Infiltrating Soil Cell Bioretention With Tree ^h	X	X	X

Note that subsection 22.805.070.D.1 requires consideration of all on-site BMPs in a category for feasibility before moving on to each successive category as necessary. Within a category, BMPs may be considered in any order.

Key to Table ((D)) C for 22.805.070

S = Evaluation is required for all surfaces of Roadway Projects.

X = Evaluation is not required for Roadway Projects, but is allowed.

^a Rain gardens cannot be used to meet Section 22.805.080 (Minimum Requirements for Flow Control) or Section 22.805.090 (Minimum Requirements for Treatment) or for projects with areas of 5,000 square feet or more hard surface infiltrating on the project site.

^b Minimum bioretention cell size top area in right-of-way is 500 square feet (including pre-settling area). Evaluation is only required and installation only allowed when contributing area is sufficient to warrant minimum bioretention cell size in right-of-way.

^c Evaluation is not required, and installation is not allowed, if new plus replaced pollution-generating hard surface is less than 2,000 square feet.

^d Evaluation of roadway surfaces is not required, and installation is not allowed, if roadway is an arterial street/collector.

^e Evaluation of roadway surfaces, including alleys, is not required and installation is not allowed.

^f Minimum permeable pavement area allowed in right-of-way is 2,000 square feet of pavement within the project site.

^g Does not include any project discharging to a receiving water not designated by Section 22.801.050, or its basin, even if the project discharges to a capacity-constrained system or its basin.

^h Tree is required unless considered infeasible per rules promulgated by the Director.

ⁱ Infiltration testing is not required to use for the on-site list approach; it is only necessary to prove infeasibility.

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22.805.080 Minimum requirements for flow control

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B. Requirements. Flow control facilities shall be installed to the extent allowed by law and maintained pursuant to rules promulgated by the Director to receive flows from that portion of the site being developed. Post-development discharge determination must include flows from dewatering activities. All projects shall use on-site BMPs identified in subsection 22.805.070.D or other infiltration BMPs authorized by rule to the maximum extent feasible to meet the minimum requirements. Flow control facilities that receive flows from less than that portion of the site being developed may be installed if the total new plus replaced impervious surface is less than 10,000 square feet, the project site uses only on-site BMPs to meet the requirement, and the on-site BMPs provide substantially equivalent environmental protection as facilities not using on-site BMPs that receive flows from all of the portion of the site being developed.

~~((1.))~~ C. Wetland protection standards~~((:-))~~

1. Protect the functions and values of wetlands and their buffers from all projects discharging stormwater directly or indirectly to them. The hydrologic conditions, vegetative community, and substrate characteristics of the wetlands shall be protected, and impacts caused by changes in water flows and pollutants shall be prevented. The introduction of sediment, heat, and other pollutants and contaminants into wetlands shall be minimized through the selection, design, installation, and maintenance of temporary and permanent controls.

2. Before authorizing new discharges to a wetland, alternative discharge locations shall be evaluated and infiltration options outside the wetland shall be maximized unless doing so will adversely impact the functions and values of the affected wetlands.

3. If the wetland protection standard cannot be met due to Sections 22.805.070 or 22.805.090, the wetland protection standard shall be met to the maximum extent feasible while fully meeting the on-site stormwater management and water quality treatment requirements, unless an analysis by a wetland professional per rules promulgated under subsection 25.09.330.C (Technical Reports) is conducted that demonstrates that the functions and values of the affected wetland are not protected.

4. If one or more of the flow control requirements contained in subsections ~~((22.805.080.B.2 through 22.805.080.B.4))~~ 22.805.080.D through 22.805.080.F also applies to the project, the wetland standard must be met ~~((an analysis shall be conducted))~~ to ensure that the functions and values of the affected wetland are protected before implementing these flow control requirements to the full extent.

5. Notwithstanding any provision in this subtitle, no net loss of wetland functions or values shall result from actions regulated by this subtitle.

6. Refer to the Washington State Wetland Rating System for Western Washington: 2014 Update, Version 2.0 (Hruby, ((2014)) 2023) to determine the category, characteristics, and habitat score of the wetland. Wetland classification shall be determined by a wetland professional per rules promulgated under subsection 25.09.330.C (Technical reports).

7. Projects triggering Method 1 or Method 2 in this subsection 22.805.080.C shall refer to I-C.4, Wetland Hydroperiod Protection and I-C-5, Wetland Hydroperiod Data Collection, Evaluation Procedures, and Strategies presented in Appendix I-C of Ecology's Stormwater Management Manual for Western Washington (Ecology 2024) for additional guidance.

((a-)) 8. Comply with subsection ((22.805.080.B.1.e)) 22.805.080.C.10 (Wetland Protection Standard-Method 1: Monitoring and Wetland Stage Modeling) if the following applies:

((1)) a. The project discharges to a Category I or II depressional or riverine impounding wetland;
and

((2)) b. The project owner has legal access to the entire wetland for purposes of conducting monitoring in the wetland.

((b-)) 9. Comply with subsection ((22.805.080.B.1.d)) 22.805.080.C.11 (Wetland Protection Standard-Method 2: Site Discharge Modeling) if the criteria in subsection ((22.805.080.B.1.a)) 22.805.080.C.8 do not apply and one or more of the following applies (or applicability is unknown):

((1)) a. The wetland is Class I or II and does not meet the requirements of subsection ((~~22.805.080.B.1.a~~) 22.805.080.C.8.

((2)) b. The wetland is Class III or IV and:

((a)) 1) Has a habitat score greater than 5;

((b)) 2) Is interdunal and has special characteristics;

((c)) 3) Provides habitat for rare, threatened, endangered, or sensitive species; or

((d)) 4) Contains breeding population of any native amphibian. Per Ecology's guidance, wetlands with permanent or seasonal ponding or inundation are assumed to have breeding population of native amphibian.

((e-)) 10. Wetland Protection Standard-Method 1: Monitoring and Wetland Stage Modeling. Comply with I-C.4, Wetland Hydroperiod Protection, presented in Appendix I-C of Ecology's Stormwater Management Manual for

Western Washington (Ecology ((2019)) 2024).

~~((Projects triggering Method 1 shall refer to I-C-5, Wetland Hydroperiod Data Collection and Evaluation Procedures, presented in Appendix I-C of Ecology's Stormwater Management Manual for Western Washington (Ecology 2019) for additional guidance.))~~

~~((e.))~~ 11. Wetland Protection Standard-Method 2: Site Discharge Modeling. The total volume of stormwater discharging from the project site into a wetland shall not be more than:

~~((1.))~~ a. On a daily basis, 20 percent higher or lower than the pre-project volume, and

~~((2.))~~ b. On a monthly basis,

1) 20 percent higher or lower than the pre-project volumes for the months of October, November, and December, and

2) 15 percent higher or lower than the pre-project ((volume)) volumes for all other months (January through September).

~~((Projects triggering Method 2 shall refer to I-C-5, Wetland Hydroperiod Data Collection and Evaluation Procedures, presented in Appendix I-C of Ecology's Stormwater Management Manual for Western Washington (Ecology 2019) for additional guidance.))~~

~~((2.))~~ D. Pre-developed forested standard. The post-development discharge durations from the project site shall match the discharge durations of a pre-developed forested condition for the range of pre-developed discharge rates from 50 percent of the 2-year peak flow to the 50-year peak flow.

~~((3.))~~ E. Pre-developed pasture standard. The post-development discharge durations from the project site shall match the discharge durations of a pre-developed pasture condition for the range of pre-developed discharge rates from 50 percent of the 2-year peak flow to the 2-year peak flow.

~~((4.))~~ F. Existing condition standard. ~~((a.))~~ The post-development discharge durations from the project site shall be limited as follows:

~~((1.))~~ 1. Match the discharge durations of the existing land cover condition for the range of discharge rates from 50 percent of the 2-year peak flow to the 25-year peak flow; and

~~((2.))~~ 2. For discharges to a creek or a creek drainage basin or to a small lake or a small lake basin, also match the discharge durations of the existing land cover condition for the range of discharge rates from 50 percent of the 2-year peak flow to the 50-year peak flow.

~~((5-))~~ G. Peak control standard. ~~((a-))~~ The post-development release rates from the project site shall be limited as follows:

~~((1))~~ 1. The peak flow with a 50 percent annual probability (2-year recurrence flow) shall not exceed 0.07 cubic feet per second per acre;

~~((2))~~ 2. The peak flow with a 20 percent annual probability (5-year recurrence flow) shall not exceed 0.10 cubic feet per second per acre; and

~~((3))~~ 3. The peak flow with a 4 percent annual probability (25-year recurrence flow) shall not exceed 0.40 cubic feet per second per acre.

~~((G-))~~ H. Inspection and maintenance schedule. Temporary and permanent flow control facilities shall be inspected and maintained according to rules promulgated by the Director to keep these facilities in continuous working order.

22.805.090 Minimum requirements for treatment

* * *

B. Requirements. Water quality treatment facilities shall be installed to the extent allowed by law and maintained pursuant to rules promulgated by the Director to treat flows from the pollution-generating pervious and hard surfaces on the site being developed. When stormwater flows from other areas, including non-pollution generating surfaces (e.g., roofs), dewatering activities, and off-site areas, cannot be separated or bypassed, treatment BMPs shall be designed for the entire area draining to the treatment facility. All projects shall use on-site BMPs identified in subsection 22.805.070.D₁ or other infiltration BMPs authorized by rule, to the maximum extent feasible to meet the minimum requirements. For pollution-generating pervious surfaces other than artificial turf, a landscape management plan developed according to rules promulgated by the Director may be utilized in lieu of installing water quality treatment facilities.

1. Runoff volume. Stormwater treatment facilities shall be designed based on the stormwater runoff volume from the contributing area or a peak flow rate as follows:

a. The daily runoff volume at or below which 91 percent of the total runoff volume for the simulation period occurs, as determined using an approved continuous model. It is calculated as follows:

- 1) Rank the daily runoff volumes from highest to lowest.
- 2) Sum all the daily volumes and multiply by 0.09.
- 3) Sequentially sum daily runoff volumes, starting with the highest value, until the total

equals 9 percent of the total runoff volume. The last daily value added to the sum is defined as the water quality design volume.

b. Different design flow rates are required depending on whether a treatment facility will be located upstream or downstream of a detention facility:

1) For facilities located upstream of detention or when detention is not required, the design flow rate is the flow rate at or below which 91 percent of the total runoff volume for the simulation period is treated, as determined using an approved continuous runoff model.

2) For facilities located downstream of detention, the design flow rate shall be the full 2-year release rate, as determined using an approved continuous runoff model.

c. Infiltration facilities designed for water quality treatment must infiltrate 91 percent of the total runoff volume as determined using an approved continuous runoff model. To prevent the onset of anaerobic conditions, an infiltration facility designed for water quality treatment purposes must be designed to drain the water quality design treatment volume (the 91st percentile, 24-hour volume) within 48 hours.

2. Basic treatment. A basic treatment facility (~~(shall be)~~) is required for all projects. The requirements of subsection 22.805.090.B.3 (Oil control treatment), subsection 22.805.090.B.4 (Phosphorus treatment), and subsection 22.805.090.B.5 (~~((Enhanced))~~) Metals treatment) are in addition to this basic treatment requirement.

3. Oil control treatment. An oil control treatment facility (~~(shall be)~~) is required for high-use sites, as defined in this subtitle.

4. Phosphorus treatment. A phosphorus treatment facility (~~(shall be)~~) is required for projects discharging into nutrient-critical receiving waters.

5. (~~((Enhanced))~~) Metals treatment. (~~((Unless a project discharges))~~) Except for landscaped areas (unless containing crumb rubber) and projects that discharge to a basic treatment receiving water ((Section 22.804.030 "B")), (~~(an enhanced))~~) a metals treatment facility for reducing concentrations of dissolved metals (~~(shall be)~~) is required for projects that discharge, directly or through conveyance systems, to fresh waters designated for aquatic life use or having an existing aquatic life use, or that use infiltration strictly for flow control (not treatment) and discharge within (~~(one-quarter))~~) 1/4 mile of fresh waters designated for aquatic life use or having an existing aquatic life use, if the project meets one of the following criteria:

a. For a parcel-based project, the project is industrial, is commercial, or proposes four or more

dwelling units, or the site is subject to industrial activities.

b. For a roadway project, the site ~~((is either))~~ includes a road:

1) ~~((A fully controlled or a partially controlled limited access highway with Annual Average Daily Traffic counts of 15,000 or more; or 2) Any other road with))~~ With an expected Annual Average Daily Traffic count of 7,500 or greater; or

2) That provides on-street parking for commercial or industrial areas.

6. Discharges to groundwater. Direct discharge of untreated drainage water from pollution-generating hard surfaces to groundwater is prohibited.

* * *

Section 6. Chapter 22.807 of the Seattle Municipal Code, last amended by Ordinance 126336, is amended as follows:

Chapter 22.807 Drainage Control Review And Application Requirements

* * *

22.807.020 Drainage control review and application requirements

A. Thresholds for drainage control review. Drainage control review and approval as described in subsection 22.807.020.B is required for any of the following:

1. Preliminary drainage review and approval is required for applications for the following approvals:

a. Subdivisions (Chapter 23.22);

b. Short plats (Chapter 23.24);

c. Unit lot subdivisions (Sections 23.22.062 and 23.24.045);

d. Lot boundary adjustments (Chapter 23.28); or

e. Master use permits that would allow development that includes 750 square feet or more of new plus replaced hard surface or 5,000 square feet of land disturbing activity where the Director has determined that a preliminary drainage review is required considering, but not limited, to the following attributes of the site:

1) Location within an environmentally critical area or buffer;

2) Proximity and tributary to an environmentally critical area or buffer; and

3) Proximity and tributary to an area with adequacy, erosion, water quality, or flooding

problems.

2. Standard drainage review and approval is required for the following:

- a. Applications other than those listed in subsection 22.807.020.A.1 that include any land disturbing activity encompassing an area of 5,000 square feet or more, including demolition permits;
- b. Applications for a building permit or other construction permit that authorizes the construction or installation of 750 square feet or more of new plus replaced hard surface;
- c. Applications for which a grading permit or approval is required pursuant to Chapter 22.170;
- d. Applications for street use permits for the cumulative addition of 750 square feet or more of new plus replaced hard surface and land disturbing activity;
- e. City public works projects or construction contracts, including contracts for day labor and other public works purchasing agreements, for the cumulative addition of 750 square feet or more of new plus replaced hard surface and/or land disturbing activity to the site, ~~((except for projects in a City-owned right-of-way and))~~ except for work performed for the operation and maintenance of park lands under the control or jurisdiction of the Department of Parks and Recreation;
- f. Applications for approvals and contracts that include any new or replaced hard surface or any land disturbing activity on a site deemed a potentially hazardous location, as specified in Section 22.800.050 (Potentially Hazardous Locations);
- g. Applications for approvals that include any new hard surface in a Category I peat settlement-prone area delineated pursuant to Section 25.09.012;
- h. Whenever an exception to a requirement set forth in this Subtitle VIII or in a rule promulgated under this Subtitle VIII is desired, whether or not review and approval would otherwise be required, including, but not limited to, alteration of natural drainage patterns or the obstruction of watercourses;
- i. Whenever roadway project infeasibility pursuant to subsection 22.805.060.E is applied, whether or not review and approval would otherwise be required; or
- j. Applications for approvals for activities or projects for:
 - ~~((1.))~~ 1) Fueling at dedicated stations, for new or substantially altered fueling stations.
 - ~~((2.))~~ 2) In-water and over-water fueling.
 - ~~((3.))~~ 3) Maintenance and repair of vehicles and equipment.
 - ~~((4.))~~ 4) Concrete and asphalt mixing and production.

~~((5-))~~ 5) Recycling, wrecking yard, and scrap yard operations.

~~((6-))~~ 6) Storage of liquids in aboveground tanks.

~~((7-))~~ 7) Other projects that the Director determines pose a hazard to public health, safety, or welfare; endanger any property; adversely affect the safety and operation of City right-of-way, utilities, or other property owned or maintained by the City; or adversely affect the functions and values of an environmentally critical area or buffer.

3. Comprehensive drainage review and approval is required for applications other than those listed in subsection 22.807.020.A.1 that include:

a. ~~((Five thousand))~~ 5,000 square feet or more of new plus replaced hard surface;

b. ~~((One acre))~~ 10,000 square feet or more of land disturbing activity;

c. ~~((Conversion of 3/4 acres or more of vegetation to lawn or landscaped area))~~ A project that has no available off-site point of discharge for stormwater as determined by the Director; ~~((or))~~

d. ~~((Conversion of 2.5 acres or more of native vegetation to pasture;))~~ An infiltration facility that is designed to fully infiltrate all stormwater runoff directed to it;

e. An installation of a new outfall to a receiving water; or

f. Demolition of a building with a roof area of 5,000 square feet or greater, even if the existing building slab remains.

B. For purposes of applying the thresholds in subsection 22.807.020.A, all closely related projects, projects under a common plan of development or sale, subdivisions, and short plats as determined according to subsection 22.805.010.B shall be counted towards the threshold.

* * *

D. Submittal requirements for drainage control review and approval

1. Information required for preliminary drainage review. The following information shall be submitted to the Director for all projects for which preliminary drainage review is required:

a. Preliminary site plan. A site plan as set forth in rules promulgated by the Director.

b. Preliminary drainage control plan. A drainage control plan that identifies all new and replaced hard surfaces, new and replaced pollution-generating hard surfaces, drainage control facilities, and best management practices for each lot, parcel, and tract of land within the project.

1) The preliminary drainage control plan shall include all drainage control facilities required to meet the minimum requirements for flow control (Section 22.805.080), water quality treatment (Section 22.805.090), and on-site stormwater management (Section 22.805.070), as well as all other best management practices to ensure drainage adequacy.

2) The preliminary drainage control plan shall be prepared by a licensed civil engineer in accordance with standards adopted by the Director, for projects that meet the thresholds for comprehensive drainage control review per subsection 22.807.020.A.3. ~~((include any one or more of the following:~~

- ~~a. Five thousand square feet or more of new plus replaced hard surface;~~
- ~~b. One acre or more of land disturbing activity;~~
- ~~c. Conversion of 3/4 acres or more of vegetation to lawn or landscaped area;~~
- ~~d. Conversion of 2.5 acres or more of native vegetation to pasture; or~~
- ~~e. No accessible off-site discharge point.~~

~~c. Submittals identified by rule. Additional information shall be submitted to the Director to comply with the requirements of this subtitle and rules promulgated hereunder and to accomplish the purposes of this subtitle.))~~

2. Information required for standard drainage review. The following information shall be submitted to the Director for all projects for which standard drainage review is required.

a. Site plan. A site plan shall be submitted to the Director.

b. Standard drainage control plan. A drainage control plan shall be submitted to the Director. Standard designs for drainage control facilities as set forth in rules promulgated by the Director may be used. ~~((For a project with no accessible off-site discharge point or that includes development conducted in or near a receiving water requiring a Hydraulic Project Approval (chapter 220-660 WAC), the drainage control plan shall be prepared by a licensed civil engineer in accordance with standards adopted by the Director.))~~

c. Construction stormwater control plan. A construction stormwater control plan demonstrating controls sufficient to determine compliance with subsection 22.805.020.D shall be submitted. The Director may approve a checklist in place of a plan, pursuant to rules promulgated by the Director.

d. Memorandum of drainage control. The owner(s) of the site shall sign a "memorandum of drainage control" that has been prepared by the Director of SPU. Completion of the memorandum shall be a condition precedent to issuance of any permit or approval for which a drainage control plan is required. The applicant shall file the

memorandum of drainage control with the King County Recorder's Office so as to become part of the King County real property records. The applicant shall give the Director of SPU proof of filing of the memorandum. The memorandum shall not be required when the drainage control facility will be owned and operated by the City. A memorandum of drainage control shall include:

- 1) The legal description of the site;
- 2) A summary of the terms of the drainage control plan, including any known limitations of the drainage control facilities, and an agreement by the owners to implement those terms;
- 3) An agreement that the owner(s) shall inform future purchasers and other successors and assignees of the existence of the drainage control facilities and other elements of the drainage control plan, the limitations of the drainage control facilities, and of the requirements for continued inspection and maintenance of the drainage control facilities;
- 4) The side sewer permit number and the date and name of the permit or approval for which the drainage control plan is required;
- 5) Permission for the City to enter the property for inspection, monitoring, correction, and abatement purposes;
- 6) An acknowledgment by the owner(s) that the City is not responsible for the adequacy or performance of the drainage control plan, and a waiver of any and all claims against the City for any harm, loss, or damage related to the plan, or to drainage or erosion on the property, except for claims arising from the City's sole negligence; and
- 7) The owner(s)' signatures acknowledged by a notary public.

e. Submittals identified by rule. Additional information shall be submitted to the Director to comply with the requirements of this subtitle and rules promulgated hereunder and to accomplish the purposes of this subtitle.

3. Information required for comprehensive drainage review. In addition to the submittal requirements for standard drainage review, the following information is required to be submitted to the Director for projects for which comprehensive drainage review is required:

- a. Comprehensive drainage control plan. A comprehensive drainage control plan, in lieu of a standard drainage control plan, to comply with the requirements of this subtitle and rules promulgated hereunder and to accomplish the purposes of this subtitle shall be submitted with the permit application. It shall be prepared by a licensed

civil engineer in accordance with standards adopted by the Director unless otherwise not required per rules promulgated by the Director.

b. Inspection and ~~((Maintenance))~~ maintenance schedule. A schedule shall be submitted that provides for inspection of temporary and permanent flow control facilities, treatment facilities, and source ~~((controls))~~ control facilities to comply with Section 22.803.040 (Minimum source controls for specific activities), Section 22.805.070 (Minimum requirements for on-site stormwater management), Section 22.805.080 (Minimum requirements for flow control), and Section 22.805.090 (Minimum requirements for treatment).

c. Construction stormwater control plan. A construction stormwater control plan prepared in accordance with subsection 22.805.020.D shall be submitted.

4. Applications for drainage control review and approval shall be prepared and submitted in accordance with provisions of this subsection, with Chapter 21.16 (Side Sewer Code), and with associated rules and regulations adopted ~~((jointly))~~ by the Directors of SDCI and SPU.

5. The Director may require additional information necessary to adequately evaluate applications for compliance with the requirements and purposes of this subtitle and other laws and regulations, including, but not limited to, Chapter 25.09 (Regulations for Environmentally Critical Areas) and Chapter 23.60A (Seattle Shoreline Master Program Regulations). The Director may also require appropriate information about adjoining properties that may be related to, or affected by, the drainage control proposal in order to evaluate effects on the adjacent property. This additional information may be required as a precondition for permit application review and approval.

* * *

Section 7. The Code Reviser is requested to reorder material in subsections and tables of Seattle Municipal Code subsection 22.805.070.D as appropriate, after the amendments made by this ordinance.

Section 8. This ordinance shall take effect on July 1, 2026.

Passed by the City Council and signed in open session in authentication of its passage on .

President of the City Council
on .

Katie B. Wilson, Mayor

Attested on .

Scheereen Dedman, City Clerk

Seal

Summary and Fiscal Note

1. Legislation Summary

Department:

Seattle Public Utilities

Title:

AN ORDINANCE relating to the 2026 Stormwater Code Update; updating stormwater control requirements for development, roadways, utilities, and maintenance activities; strengthening stormwater treatment and infiltration standards; clarifying vesting and review thresholds; ensuring the City's compliance with requirements of the State Department of Ecology; and amending Chapters 22.800, 22.801, 22.802, 22.803, 22.805, and 22.807 of the Seattle Municipal Code.

Background:

This legislation would update the City's Stormwater Code. The purpose of the Stormwater Code is to protect life, property, public health, and the environment from the adverse impacts of urban stormwater runoff. Adverse impacts can include flooding, water pollution, landslides, and erosion. This Stormwater Code revision includes various additions and revisions to the Stormwater Code and associated Director's Rule (Stormwater Manual¹). In addition, a new Director's Rule is proposed in association with

¹ See Stormwater Code and Manual Update 2026 [Project Documents page](#) to access January 2026 second public review draft of Stormwater Manual (Volumes 1-5, Appendices A-J) and summary of changes document.

this legislation related to public mainline extensions and drainage requirements in the public right-of-way.

The Stormwater Code and associated joint Seattle Public Utilities/Seattle Department of Construction and Inspections (SPU/SDCI) Directors' Rules (Stormwater Manual) are being revised to comply with the City's 2024-Phase I Municipal Stormwater Permit (MS4 Permit) which was effective on August 1, 2024. The MS4 Permit requires that the Stormwater Code and associated Stormwater Manual include minimum requirements, thresholds, definitions, and other specified requirements, limitations and criteria be equivalent to the MS4 Permit for new development, redevelopment and construction. In addition, maintenance provisions must be at least as protective of facility function as, and source control provisions must be functionally equivalent to, Ecology's Stormwater Management Manual for Western Washington.

SPU, SDCI, and other City departments with input from external stakeholders are updating the Stormwater Code to: 1) incorporate new Ecology requirements; 2) incorporate policy changes; and 3) improve usability. All updates to the Stormwater Code must occur at one time with an effective date of July 1, 2026.

Summary Attachments:

Summary Exhibit A – Legislative Summary

Summary Exhibit B – Ecology Conditional Approval Letter

Summary Exhibit C – Environmentally Critical Areas: Best Available Science Review

2. Capital Improvement Program (CIP)

Does this legislation create, fund, or amend a CIP Project?

Yes

No

3. Summary of Financial Implications

Does this legislation have financial impacts to the City?

Yes

No

Capital and operations and maintenance costs to City departments are discussed in section 3.d.

3d. Other Financial Impacts

a. Does this legislation create any other financial impacts for The City of Seattle, such as direct or indirect costs, one-time or ongoing, that aren't mentioned above? If yes, please explain these impacts.

Yes, details on specific cost impacts by department are outlined below.

b. If the legislation has costs that can be covered within the current budget, explain how. Does the department have extra resources in its budget to handle these costs? Or does the department need to shift resources away from other work to handle these costs?

This legislation does not make appropriations. However, the 2026 Stormwater Code Update will impact costs and work requirements in several departments. Additional training for SPU, SDCI, SDOT, SPR, SCL, and FAS staff will be required in 2026 to prepare for the implementation of the 2026 Stormwater Code Update. It is unlikely these departments will need additional appropriations in 2026. However, if additional appropriations are needed to prepare for the change in code, the affected department will bring forward a supplemental budget request prior to the end of 2026.

The following department-specific notes are provided for illustrative purposes. Any budget or staffing adjustments will be addressed through the budget process by each department as needed.

SPU

1. SPU Future Capital.

There may be a relatively small increase in SPU capital costs for some projects due to the water quality threshold changes for Roadway Projects. At this time, sufficient information to accurately project long-term cost increases does not exist. However, those increases are anticipated to be relatively small compared to overall project costs or may not increase depending on a project's scope.

2. SPU Future Operation & Maintenance

SPU typically takes ownership and assumes all operation and maintenance responsibilities for subsurface drainage structures installed in the public right-of-way, including flow control and water quality facilities. As a result of the 2026 Stormwater Code Update, more water quality facilities are expected to be installed in the right-of-way due to Ecology's required threshold changes to account for "replaced" pollution-generating hard surface in addition to such "new" surface to address contaminants of emerging concern such as 6PPD found in a tire preservative that is harmful to juvenile salmon. Sufficient information to accurately project long-term impacts does not currently exist but a minimal net increase in future O&M costs is anticipated overtime.

SDCI

1. SDCI Future Operation & Maintenance

Other than potential training costs noted above, SDCI does not anticipate fiscal impacts due to this legislation.

SDOT

Based on the current draft of the 2026 City of Seattle Stormwater Code (SWC) and associated Directors' Rule (DR), Seattle Department of Transportation (SDOT) has analyzed the impact on the planned Capital Improvement Program (CIP) as well as maintenance and operations functions for the next five years (July 2026 – July 2031).

An analysis of five years was chosen as it corresponds to the timeframe for the current draft of the SWC.

The analysis below indicates that SDOT costs may increase between 2026 to 2031 due to the proposed changes.

1. SDOT Capital Project Construction Cost Analysis

2026 SWC – Flow Control Treatment (FC) Water Quality Treatment (WQ) and On-Site Stormwater Management (OSM) Changes

The currently proposed SWC will make the following changes:

- 1) Update definitions for new and replaced hard surfaces to be consistent with 2024 Municipal Storm Sewer System (MS4) Permit:
 - Revise “new hard surface” to clarify it is the creation of a hard surface or upgrade from existing hard surface.
 - Revise “replaced hard surface” to clarify existing foundation or subgrade/base course must remain.
- 2) Add “new plus replaced” hard surface to flow control and water quality treatment thresholds for Roadway Projects to be consistent with 2024 MS4 Permit.
- 3) Update on-site lists to facilitate increase in tree canopy and stormwater management, improve feasibility of bioretention in space-limited urban areas, provide additional BMP options, address temperature increases and atmospheric deposition, and reduce feasibility barriers for certain BMPs.
 - Add that “Infiltrating Soil Cell Bioretention with Tree” can be used as an OSM BMP in Category 2
- 4) Revise terminology from “enhanced” to “metals” treatment and update Metals Treatment thresholds to be consistent with 2024 MS4 Permit.
 - For Metals Treatment, lowered the annual average daily traffic (AADT) threshold for roadways, and will include roadways that provide on-street parking for commercial and industrial areas and sites that are subject to “industrial activities.”
- 5) Remove 5,000 square feet “new” hard surface threshold for flow control and treatment thresholds for Roadway Projects based on Ecology’s equivalency comments.
- 6) Add a treatment requirement that all projects that newly convey runoff from 5,000 square feet or more of pollution-generating hard surface to a receiving water must provide stormwater treatment for that area where that area previously dispersed or infiltrated.

SDOT anticipates increases in construction costs for Arterial Asphalt and Concrete (AAC) Program projects resulting from the City’s adoption of the 2026 SWC to meet equivalency with the 2024 MS4 permit; SDOT does not anticipate increased construction costs for projects in Multi-Modal Corridor

(MMC), Pedestrian Master Plan (PMP), and Sidewalks Programs projects (see Table 1).

Updates primarily affect Large Projects that trigger OSM, FC, and WQ treatment requirements including metals treatment. Table 1 below presents estimated net cost increases for SDOT Program projects during each year. Original budgets assumed 2021 SWC; amounts reflect difference between 2021 SWC and 2026 SWC.

Per 2026 SWC transition provisions (see Code section 22.800.070, Minimum Requirements for City Agency Projects):

- City projects may vest under the 2021 SWC if funded by 7/1/2021 and before 7/1/2026 if construction starts by 7/1/2031 (avoids new requirements if deadline is met).
- Projects not starting construction before 7/1/2031 must revise plans to comply with 2026 SWC.

Therefore, FC, WQ treatment, and related cost increases primarily apply to:

- Projects that will not vest under 2021 SWC, or
- Projects that trigger stricter 2026 SWC requirements regardless.

Table-1 Overall Flow Control Treatment & OSM Cost Changes Resulting from 2026 SWC by Year

Year	Programs	Funding Source	FC Treatment Cost	WQ Treatment Cost	OSM Cost	Overall Cost Change
2026	AAC, MMC, PMP, Sidewalks	STL ¹	\$0	\$0	\$0	\$0
2027	AAC, MMC, PMP, Sidewalks	STL	\$0	\$0	\$0	\$0
2028	AAC, MMC, PMP, Sidewalks	STL	\$0	\$0	\$0	\$0
2029	AAC, MMC, PMP	STL	\$0	\$0	\$0	\$0
2030	AAC, MMC, PMP	STL	\$0	\$0	\$0	\$0
2031	AAC	STL	\$0	\$1,800,000	\$0	\$1,800,000
Total						\$1,800,000

• ¹STL – Seattle Transportation Levy

The adoption of the 2026 SWC is anticipated to increase total costs for SDOT CIP projects by \$1.8 million. The net cost increase is minimized because many projects funded through the Seattle Transportation Levy are scheduled

for construction between 2026 and 2030 and can vest under the 2021 SWC, thereby not requiring the more stringent 2026 SWC requirements.

2. SDOT Operations & Maintenance Cost Analysis

Training for SDOT staff will be required in 2026 to prepare for the implementation of the 2026 SWC Update. These trainings would be required for up to 198 staff across five SDOT Divisions, including Capital Projects, Street Use, Project Development, Urban Design, Pavement Engineering/ROW Crew Construction, and ROW Maintenance/Urban Forestry. Funding may be needed to ensure that SDOT staff have an adequate understanding of the stormwater code requirements.

3. Legal and Consent Decree Obligations

The City of Seattle has an obligation under a consent decree implemented in the terms of *Reynoldson v. City of Seattle* to deliver Citizen Requested Curb Ramps (CSR). There is an established number of ramps that SDOT is committed to building each year, and there is currently a finite budget to accomplish this work.

Due to uncertainty regarding locations, extent of work, and existing drainage infrastructure, the impact of this legislation to the CSR program is not possible to determine. However, should project sites require additional substantial costs to meet the SWC requirements, additional funding will be needed.

SPR

1. SPR Future Capital

As a result of the 2026 Stormwater Code Update, SPR may see cost increases on a wide variety of project types including: accessibility projects, play area renovations, construction of new facilities, pathways and sidewalks, athletic fields, park irrigation and drainage, dog off-leash areas, and beaches and shoreline structures (piers, floats, etc.).

These projects may be affected by a revision of the types of projects that qualify as exempt in the 2026 Stormwater Code, specifically the removal of exemptions for utility work and pavement maintenance for parcel-based projects. Project costs for SPR may also increase due to the change in definition of a “Large project” from one acre to 10,000 sf of land disturbing activities, requiring more projects to include a “Large Project” Construction Stormwater Control plan sheet.

SPR will evaluate associated cost impacts on a project-by-project basis and endeavor to manage higher costs within existing capital appropriation to the

extent possible. However, the amount per project is dependent on the type of capital improvement and actual costs will not be known until projects go into design. Depending on how the code updates ultimately impact capital projects, SPR may submit a funding request as part of a future budget process.

2. SPR Future Operation & Maintenance

As a result of the 2026 Stormwater Code Update, additional staff time may be needed to address new requirements in the code referencing Volume 4 on source control. At this time, there is not sufficient information to accurately project long-term costs. SPR is currently evaluating how to best meet any future staffing need and will, if deemed necessary, submit a funding request as part of the future budget process. Examples of source control changes that may have ongoing budget impact include the following:

Due to the need to collect washwater at buildings suspected of containing PCBs, SPR will likely need to use contractor services and equipment rental in order to maintain a number of buildings, or purchase new equipment to maintain these buildings and properly dispose of washwater. Ongoing costs are unknown and depend on the level and frequency of maintenance and the wastewater treatment necessary.

The requirement to collect and dispose of any washwater generated from hosing down, pressure washing, scrubbing or otherwise cleaning graffiti-impacted areas into the sanitary sewer may also require the rental or purchase and deployment of new equipment to conduct this work in locations where there is not ready access to the sanitary sewer system. Ongoing costs are unknown and depend on the level and frequency of maintenance and the wastewater treatment necessary.

SCL

1. SCL Future Operation & Maintenance

Building cleaning/maintenance: Due to the need to collect washwater at buildings suspected of containing PCBs, SCL will likely need to use contractor services and equipment rental in order to maintain a handful of buildings. Ongoing costs are unknown and depend on the level and frequency of maintenance and the wastewater treatment necessary.

FAS

1. FAS Future Operation & Maintenance

Building cleaning/maintenance: Due to the need to collect washwater at buildings suspected of containing PCBs, FAS will likely need to use contractor services and equipment rental in order to maintain a handful of buildings. Ongoing costs are unknown and depend on the level and frequency of maintenance and the wastewater treatment necessary.

c. What financial costs or other impacts might happen if this legislation is not implemented?

The possible cost implication of not implementing are primarily the risk of non-compliance with the City's MS4 Permit, based on the Federal Clean Water Act and state law (Washington State Water Pollution Control Act, RCW 90.48). Any person who violates the federal Clean Water Act is subject to maximum criminal penalties of \$25,000 per day, one year imprisonment, or both, for negligent violations and maximum criminal penalties of \$50,000 per day, or three years imprisonment, or both for knowing violations – with fines increased for repeat violations. Willful violations of the State Water Pollution Control Act are also subject to maximum criminal penalties of \$10,000 per day, one year imprisonment, or both. Additionally, violating the City's MS4 Permit presents a risk of up to \$68,445, the current inflation-adjusted civil penalty per day, recoverable through a third-party (citizen) lawsuit.

d. How might this legislation affect other City departments besides the one that proposed it?

The primary departments other than SPU that will be impacted by this legislation include SDCI, SDOT, SPR, SCL, and FAS. This legislation applies city-wide and includes revisions to minimum requirements related to on-site stormwater management, flow control, water quality treatment, and development projects. The effect of this legislation on other departments will vary to the degree departments engage in ongoing activities

to which source control measures apply, or to the degree that each department is involved in capital projects.

4. Other Impacts

a. Does this legislation require a public hearing?

Yes

No

Environmental review under the State Environmental Policy Act (SEPA) is required for this legislation, and publication of notice of the environmental determination was made in *The Daily Journal of Commerce* and in the City’s Land Use Information Bulletin on January 12, 2026. No appeals were received. The SEPA Determination of Non-Significance was closed out on February 9th, 2026.

In addition, below is a summary of the previous public engagement activities conducted in developing this Stormwater Code Update.

Public Engagement on Stormwater Code Update Process

Date	Meetings, Announcements, Newsletters, Updates
12/11/2024	Listening Session with Developers, Builders, Design/Engineering Community
12/15/2024	Listening Session with Port of Seattle
5/8/2025	SDCI Building Connections Newsletter Announcement – General information and What’s Coming Up
5/8/2025	SDCI Listserv Announcement - General Information and What’s Coming Up
5/29/2025	DSO Listserv Newsletter Announcement – Save the Date for First Public Review Draft and Meeting
5/29/2025	SDCI Listserv Announcement - Save the Date for First Public Review Draft and Meeting
7/1/2025	SDCI Listserv Announcement – Public Meeting Details and Registration Info
7/7/2025	SDCI Listserv Announcement – Documents Available and Repeat of Public Meeting Details and Registration Info
7/14/2025	SDCI Listserv Announcement – Public Meeting Reminder
7/15/2025	1 st Public Meeting

Date	Meetings, Announcements, Newsletters, Updates
7/22/2025	SDCI Listserv Announcement – Public Meeting Recording Available Online
8/11/2025	SDCI Listserv Announcement – Reminder to Provide Comments
8/22/2025	Mayor's Office Briefing - SW Code Update
9/3/2025	SDCI Listserv Announcement – Fall Listening Session Registration
9/3/2025	DSO Listserv Newsletter Announcement – Fall Listening Session Registration
9/15/2025	DWW LOB E-Team WQ BMP ROW Briefing
9/22/2025	SDCI Listserv Announcement – Fall Listening Session Reminder and Response to Comments Available Online
9/23/2025	DSO Listserv Newsletter Announcement- Fall Listening Session Reminder and Response to Comments Available Online
9/25/2025	Fall Listening Session – General Public
9/18/2025	Mayor's Office Weekly
10/15/2025	Listening Session with Port of Seattle
10/20/2025	Listening Session with WDFW
11/25/2025	SDCI Listserv Announcement – Second Public Meeting Details and Registration
11/26/2025	DSO Listserv Newsletter Announcement - Second Public Meeting Details and Registration
12/1/2025	SDCI Building Connections Newsletter Announcement - Second Public Meeting Details and Registration
12/16/2025	Reminder SDCI Listserv Announcement - Second Public Meeting Details and Registration
1/7/2026	SDCI Listserv Announcement – Public Meeting Reminder and Documents Available Online
1/7/2026	DSO Listserv Newsletter Announcement - Public Meeting Reminder and Documents Available Online
1/14/2026	Second Public Meeting
1/22/2026	SDCI Listserv Announcement – Public Meeting Materials Available Online, Public Comment Reminder, and Clarifications
1/22/2026	DSO Listserv Newsletter Announcement - Public Meeting Materials Available Online, Public Comment Reminder, and Clarifications

b. Does this legislation require a notice to be published in The Daily Journal of Commerce and/or The Seattle Times?

Yes

No

Environmental review under the State Environmental Policy Act (SEPA) is required for this legislation, and publication of notice of the environmental determination was made in *The Daily Journal of Commerce* and in the City's Land Use Information Bulletin on January 12, 2026.

c. Does this legislation affect a piece of property?

No. The proposal is a non-project legislative action with no specific site. As Stormwater Code requirements are city-wide, specific projects affected by the proposal may occur anywhere within Seattle's city limits.

d. Race and Social Justice Initiative impacts:

1. How does this legislation affect vulnerable or historically disadvantaged communities? How did you come to this conclusion? Please consider both impacts within City government (like employees and internal programs) and in the broader community.

There is no perceived implication for the principles of the Race and Social Justice Initiative. This legislation does not impact vulnerable or historically disadvantaged communities as the requirements are applied throughout the city.

2. Please attach any Racial Equity Toolkits or other racial equity analyses used to develop or assess this legislation.

None.

3. What is the Language Access Plan for communicating with the public about this legislation?

A plain language summary of the ordinance was distributed to potential permit applicants, developers, architects and the general public via SDCI Stormwater Code Listserv, SPU Development Services Office (DSO) Subscribers Listserv, and SDCI's Building Connection Newsletter.

e. Climate change impacts:

1. Emissions: Will this legislation significantly increase or decrease carbon emissions? Attach any studies or materials that inform your answer.

With more options to include trees along with other stormwater requirements such as soil cell bioretention, it's more likely that trees will be utilized in addition to, and as part of, stormwater management. This will have the potential to increase carbon sequestration and reduce ground level and building temperatures, due to the shading effect of trees, which may lower energy consumption.

2. Resiliency: Will this legislation make Seattle more or less able to adapt to climate change? If it reduces resiliency, explain what can be done to lessen the impact.

The proposed legislation and Stormwater Manual updates are expected to increase Seattle's climate resiliency by expanding the use of integrated green infrastructure. Clarified alignment between bioretention and tree requirements, along with a new soil cell bioretention option, increases opportunities for urban tree canopy and distributed stormwater management. Revisions to flow control thresholds and facility sizing reduce reliance on pumped systems in shallow drainage areas, lowering vulnerability during power outages while maintaining capacity to manage larger storm events. Together, these changes support more reliable, passive, and climate-adaptive stormwater infrastructure.

f. If this legislation creates a new program or expands an existing one, what are the long-term, measurable goals? How will this legislation help achieve those goals? What methods will be used to track progress?

This legislation does not include a new initiative or a major programmatic expansion.

g. Does this legislation create a non-utility CIP that involves shared funding with a non-City partner or organization?

This legislation does not create a non-utility CIP project that involves a shared financial commitment with a non-City partner agency or organization.

Legislative Summary 2026 Stormwater Code Update March 6, 2026

Overview

The primary purpose of this legislation and update of associated SPU/SDCI Directors' Rule (Stormwater Manual) is to comply with the 2024–2029 Phase I Municipal Separate Storm Sewer System (MS4) Permit (Permit) issued by the Washington State Department of Ecology (Ecology) under federal and state water quality laws.

In addition to maintaining Seattle's compliance with state and federal water quality permits, there are independent City policy and usability improvements developed using best available science including:

- Aligning requirements with recent land use code updates
- Modernizing technical standards to reflect current science and Ecology guidance
- Supporting City priorities related to urban greening, resilience, and water quality
- Improving clarity and predictability for applicants and reviewers

To meet the Permit requirements, all code and rule updates must be adopted and take effect no later than **July 1, 2026**.

Background

The Permit was issued by the Ecology under both the National Pollutant Discharge Elimination System (NPDES) program established by the federal Clean Water Act and the State of Washington Water Pollution Control Law. The Permit was issued on July 1, 2024, and became effective on August 1, 2024.

The Permit requires that the City's Stormwater Code and associated Stormwater Manual include minimum requirements, thresholds, definitions, and other specified requirements, limitations and criteria, determined by Ecology to be equivalent to Appendix 1 of the Permit for new development, redevelopment, and construction. In addition, stormwater facilities and maintenance provisions must be at least as protective of facility function as, and source control provisions must be functionally equivalent to, Ecology's Stormwater Management Manual for Western Washington (SWMMWW, Ecology 2024).

The purpose of the City of Seattle's Stormwater Code (Chapters 22.800 – 22.808 SMC) is to protect life, property, public health, and the environment from the adverse impacts of urban stormwater runoff. Adverse impacts can include flooding, water pollution, landslides, and erosion. The Stormwater Code was substantially updated in 2009 and revised in 2015, 2016, and 2021.

The Code applies broadly to:

- Land disturbing activity
- Drainage and erosion control
- Discharges to public drainage, combined sewer systems, or receiving waters
- New and existing development and land uses

The Code is implemented through the Seattle Stormwater Manual, issued jointly by SPU and SDCI, and consists of the following sections:

- Volume 1 – Project Minimum Requirements (pursuant to the Stormwater Code Minimum Requirements)
- Volume 2 – Construction Stormwater Control
- Volume 3 – Project Stormwater Control
- Volume 4 – Source Control
- Volume 5 – Enforcement
- Appendices

Summary of Legislation

The proposed updates and modifications to the Stormwater Code and Manual will affect administration, source control, development, and construction site stormwater pollution prevention control. A Table of Key Changes on SDCI's Stormwater Code and Manual Update 2026 website provides detailed lists of key changes to the code and manual¹.

Summary of Key Changes

These changes are necessary to maintain the City's permit coverage:

- Updated definitions, thresholds, and requirements to match the Permit and SWMMWW including adding "Common Plan of Development or Sale".
- Revised utility work and pavement maintenance exemptions.
- Clarified vesting dates, thresholds, and "closely related projects" provisions.
- Updated drainage control review and application thresholds to ensure adequate erosion and construction stormwater review in dense urban settings.
- Modified roadway project thresholds, including removal of the 5,000 sq. ft. "new hard surface" trigger and use of combined "new plus replaced" surfaces.
- Updated metals treatment standards (terminology and thresholds).
- Revised wetland protection method for winter volume matching flexibility.

The following key updates were not equivalency related but made for consistency with current City policy including supporting housing development, increasing tree canopy, and improving water quality outcomes:

- Alignment with current Land Use Code updates, including removal of outdated single-family terminology.
- Expanded and refined on-site stormwater management BMP options to:
- Strengthened requirements for use of infiltration best management practices (BMPs) to the maximum extent feasible to support stream interflow.
- Revised ensure sufficient capacity threshold to address changing drainage patterns during construction.
- Added provisions to address water quality from pollution-generating surfaces not previously discharging to receiving waters.

¹ See Stormwater Code and Manual Update 2026 [Project Documents page](#) to access January 2026 second public review draft of Stormwater Manual (Volumes 1-5, Appendices A-J) and summary of changes document.

- Softening flow control thresholds for some parcel-based projects draining to small lakes or capacity-constrained systems (2,000 → 5,000 square feet.).
- Added direction for projects where wetland protection standards conflict with other requirements.
- Added exception regarding landscape areas (including artificial turf sports fields) requiring metals treatment.
- Clarified and streamlined drainage review processes.

Public Participation

Public outreach began in October 2024 and included a series of virtual public meetings to inform stakeholders about proposed Stormwater Code updates and to gather feedback. Participants included representatives from:

- Development and building industries
- Environmental advocacy organizations
- Regional and state agencies
- Engineering and consulting firms

Outreach included:

- 2024 industry listening session
- Public meetings in 2025 and January 2026
- Two public comment periods, the last ending February 9, 2026

Additional outreach methods included:

- Stormwater code update website
- Announcements distributed through the SDCI Stormwater Code Listserv and SPU Development Services Office (DSO) Subscribers Listserv
- Articles published in SDCI’s Building Connection Newsletter
- Information shared at Master Builders Association meetings

These efforts supported early awareness, technical input, and broader stakeholder engagement in advance of the legislative process. The dates and content of the virtual public meetings (**bold**), list serv announcements, the Building Connection newsletter, and meetings are shown below.

Date	Meetings, Announcements, Newsletters, Updates
12/11/2024	Listening Session with Developers, Builders, Design/Engineering Community
12/15/2024	Listening Session with Port of Seattle
5/8/2025	SDCI Building Connections Newsletter Announcement – General information and What’s Coming Up
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10/15/2025	Listening Session with Port of Seattle
10/20/2025	Listening Session with Washington Department of Fish & Wildlife
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11/26/2025	DSO Listserv Newsletter Announcement - 2nd Public Meeting Details and Registration
12/1/2025	SDCI Building Connections Newsletter Announcement - 2nd Public Meeting Details and Registration
12/16/2025	SDCI Listserv Announcement – Reminder: Second Public Meeting Details and Registration
12/17/2025	DSO Listserv Newsletter Announcement – Reminder: 2nd Public Meeting Details and Registration
1/5/2026	SDCI Building Connections Newsletter Announcement - 2nd Public Meeting Details and Registration
1/7/2026	SDCI Listserv Announcement – Public Meeting Reminder and Documents Available Online
1/7/2026	DSO Listserv Newsletter Announcement - Public Meeting Reminder and Documents Available Online
1/12/2026	SDCI Listserv Announcement – Public Meeting Reminder
1/13/2026	DSO Listserv Announcement – Public Meeting Reminder
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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Northwest Region Office
PO Box 330316, Shoreline, WA 98133-9716 • 206-594-0000

December 22, 2025

Andrew Lee
General Manager & CEO
Seattle Public Utilities
Sent by email only: andrew.lee@seattle.gov
WAR044503

RE: Preliminary Approval of City of Seattle Stormwater Manual and Municipal Code

Dear Andrew Lee:

The Department of Ecology (Ecology) has completed our review of the changes to the *Seattle Municipal Code* and the *Seattle Stormwater Manual*, as effective July 1, 2021, for the purpose of determining equivalency to the required portions of Ecology's *2024 Stormwater Management Manual for Western Washington (SWMMWW)*, as outlined in Special Condition S5.C.5.b of the 2019-2024 Phase I Municipal Stormwater Permit (Permit). Ecology limited its review, based on the previous approval of your local program as functionally equivalent to the SWMMWW as amended in 2021, to changes submitted in the format outlined in Appendix 10 of the Permit, and communication that followed. This letter serves as our response as required by S5.C.5.b.iii. Our preliminary determination is that the items reviewed are equivalent, except for the items specified below that will require further communication before they can be deemed equivalent to the *2024 SWMMWW*:

- Table 10.1 - SMC 22.801.040 "C"; SMC 22.805.010 General; SMC 22.807.020 Drainage control review and application requirements – Addition of unabridged definition for Common Plan of Development or Sale.
- Table 10.2 – Volume 1 – 2.1.2 – Common Plan of Development – Addition of unabridged definition for Common Plan of Development or Sale.
- Table 10.2 – Volume 1 – 2.1.3 – Closely Related Projects – List of project aspects which may not be considered when evaluating if multiple projects are closely related.
- Table 10.2 – Volume 3 – 5.4.10 – Infiltrating Structural Soil Cell BMP – Tables 5.30, 5.31, and 5.32 still require completion of missing calculations.
- Table 10.2 – Volume 3 – 5.8.12 – Non-Infiltrating Structural Soil Cell BMP – Incomplete Table 5.52.

Your revised program is required to be adopted and made effective by July 1, 2026. If changes are made to the items listed above during your legislative or administrative adoption processes, those changes will need further Ecology review. Ecology's determination will not become final

Andrew Lee
City of Seattle
Page 2 of 2

until after Ecology conducts a public review process associated with a future modification of Appendix 10 of the Phase I Permit.

I appreciate the hard work and dedication of your team to develop revised stormwater management regulations and rules.

Please contact me at ccro461@ecy.wa.gov or 425-429-4571 if you have any questions.
Sincerely,



Colleen Griffith
Municipal Stormwater Permit Planner, NWRO
Water Quality Program

ecc: Jessica Huybregts, Seattle Public Utilities
Sherell Ehlers, Seattle Public Utilities
Abbey Stockwell, Washington Department of Ecology
Douglas Howie, Washington Department of Ecology



Environmentally Critical Areas:
Best Available Science Review
February 2026

INTRODUCTION

Purpose of Report

The purpose of this report is to provide a compilation and review of selected literature that is representative of the best available science regarding urban stormwater management. It has been prepared for the proposed revisions to the City of Seattle (City) Stormwater Code (Seattle Municipal Code [SMC] 22.800 – 22.808). It is intended to support the provisions of Revised Code of Washington (RCW) 36.70A.172, which requires that cities and counties “include the best available science in developing policies and development regulations to protect the functions and values of critical areas” and the Washington Administrative Code (WAC) 365-195-900 through WAC 365-195-925, which contain rules designed to assist cities and counties in identifying and including the best available science in adopted policies and regulations.

Scope of Report

The Stormwater Code and associated joint Seattle Public Utilities/Department of Planning and Development (SPU/DPD) Directors’ Rules are being revised in order to comply with the requirements of the City’s coverage under the 2024-2029 Phase I Municipal Stormwater Permit (MS4 Permit, Ecology 2024a), and to incorporate related City policy changes and to improve usability. The MS4 Permit was issued by the Washington State Department of Ecology (Ecology) under both the National Pollutant Discharge Elimination System (NPDES) program established by the federal Clean Water Act and the State of Washington Water Pollution Control Law. The MS4 Permit was issued on July 1, 2024 and became effective on August 1, 2024. The MS4 Permit requires that the City’s Stormwater Code and associated Stormwater Manual (to be contained in the Directors’ Rule) include minimum requirements, thresholds, definitions, and other specified requirements, limitations, and criteria, determined by Ecology to be equivalent to Appendix 1 of the MS4 Permit for new development, redevelopment, and construction. In addition, maintenance provisions must be at least as protective of facility function as, and source control provisions must be functionally equivalent to, Ecology’s Stormwater Management Manual for Western Washington (SWMMWW, Ecology 2024b).

The MS4 Permit requirements (and the proposed 2026 Stormwater Code Updates) follow a set of previous MS4 Permit requirements that became effective in January 2015 (Ecology 2014a). The technical basis for the 2016 Stormwater Code update was well established, and the associated best available science documentation was thorough. Most is still applicable. As such, a substantial portion of this document repeats and incorporates information presented in the 2015 Best Available Science Review (Supplemental Report) (Seattle 2015) and the 2021 Best Available Science Review (Supplemental Report) (Seattle 2021a). This February 2026 update to the 2021 Best Available Science Review (Supplemental Report) refers to additional literature on the

general impacts of stormwater management, as well as selected information related to particularly notable 2026 Stormwater Code Update elements.

This document also supplements the City’s Environmentally Critical Areas: Best Available Science Reviews (Seattle 2005, Seattle 2007, Seattle 2013a), which present detailed reviews of the best available science regarding wetlands, fish and wildlife conservation areas, geologic hazard areas, flood-prone areas, abandoned landfills, and critical aquifer recharge areas.

Overview of Report

This report provides a summary of the impacts of urban stormwater runoff on receiving waters relating to changes in flow rates and volumes, and water quality. It then presents a review of selected scientific literature related to urban stormwater management, focusing on BMPs related to stormwater runoff flow control and water quality treatment. It includes literature regarding wetland protection, flow control in creek basins, low impact development, stormwater quality treatment facilities, and construction site stormwater pollution prevention.

This report is not intended to present an exhaustive review of the scientific literature on the subject of urban stormwater runoff management. Creating such an all-inclusive compilation would result in a multi-volume document that would duplicate existing resources. Readers interested in more comprehensive compilations regarding the science of managing urban stormwater runoff should consider: Ecology (2024), Minton (2002), Sheldon (2005), Washington State University/Puget Sound Partnership (WSU and PSP 2012), Shaver et al. (2007), National Research Council (2009), and Puget Sound Partnership (2010), among many others.

EFFECTS OF URBAN STORMWATER

Impacts of Urban Stormwater Runoff on Flow

Prior to Euro-American settlement, the landscape tree canopy, other vegetative cover, and forest duff layer limited damaging high stormwater runoff flows through interception, evapotranspiration, and absorption of rainfall. As the human population increased and commerce grew in Seattle, the overall nature of the landscape was changed. Trees were logged, land was cleared, buildings and roadways were built, and the soil was compacted. The overall impact of these changes resulted in:

- Increased flow rates of stormwater runoff
- Increased volumes of stormwater runoff
- Decreased time for stormwater runoff to reach a downstream receiving water
- Greater in-stream flow velocities.
- Reduced groundwater recharge
- Increased frequency and duration of high stream flows and wetland inundation during and after wet weather
- Reduced stream flows and wetland water levels during the dry season.

Schueler (1987) provides an illustrative graph showing the relationship between pre-developed stream flow rates and post-development stream flow rates, which is provided below in Figure 1.

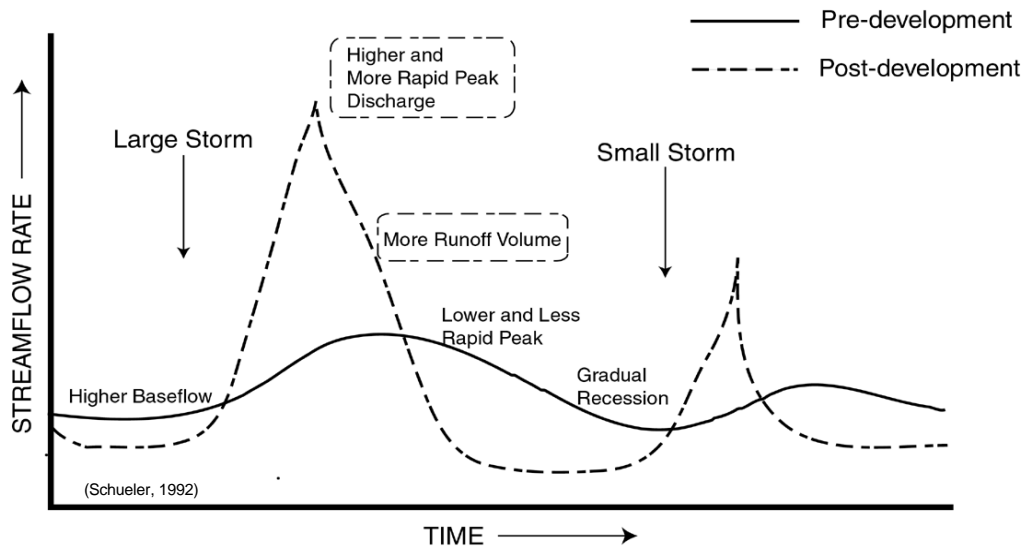


Figure 1. Changes in Hydrology after Development (Schueler 1987)

The relationship between changes in effective imperviousness and the quality of streams is well documented (see, for example, Dunn and Leopold 1978, Booth and Jackson 1997, Arnold and Gibbons 1996, McMahon and Cuffney 2000, USGS 2009). High stream flows, caused by increases in imperviousness in a catchment, can result in channel erosion and stream bank instability. Booth and Jackson (1997) showed that increased flows can occur even when the catchment has undergone relatively small changes in the percent of effective imperviousness. For example, Figure 2 illustrates how runoff from a 2-year storm in an urban catchment with approximately 10 percent impervious surface is equal to the runoff from a 10-year storm in a forested catchment (ibid).

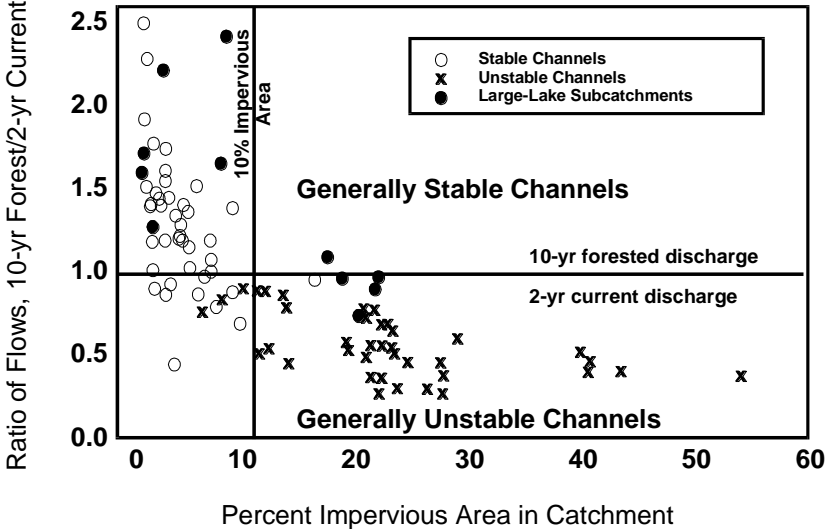


Figure 2. Channel Stability and Land Use: Hylebos, East Lake Sammamish, and Issaquah Basins (Booth and Jackson 1997)

The changes in hydrologic regime associated with urban stormwater runoff can also significantly impact aquatic life. When a stream changes its physical configuration and substrate due to increased flows, habitats are altered. Significant and detectable changes in the biological community of Puget Sound lowland streams have been observed early in the urbanization process. This is due to a combination of changes in flow conditions, as well as water quality conditions (discussed further in the next section). May (1996) and May et al. (1997) reported observable biological changes in the 5-10 percent total impervious area range of a watershed (Figure 3). Using the Benthic Index of Biotic Integrity (B-IBI) developed by Karr (1991) and Kleindl (1995), May et al. (1997) evaluated the relationship between B-IBI and the extent of watershed urbanization as estimated by the percentage of total impervious area (Figure 3). Also shown in Figure 3 is the correlation between the abundance ratio of juvenile Coho salmon to cutthroat trout (Lucchetti and Fuerstenberg 1993) and the extent of urbanization.

The biological communities in wetlands are also severely impacted and altered by the hydrological changes. Relatively small changes in the natural water elevation fluctuations can cause significant shifts in vegetative and animal species composition (Reinelt and Taylor 2000, Azous and Horner 2001).

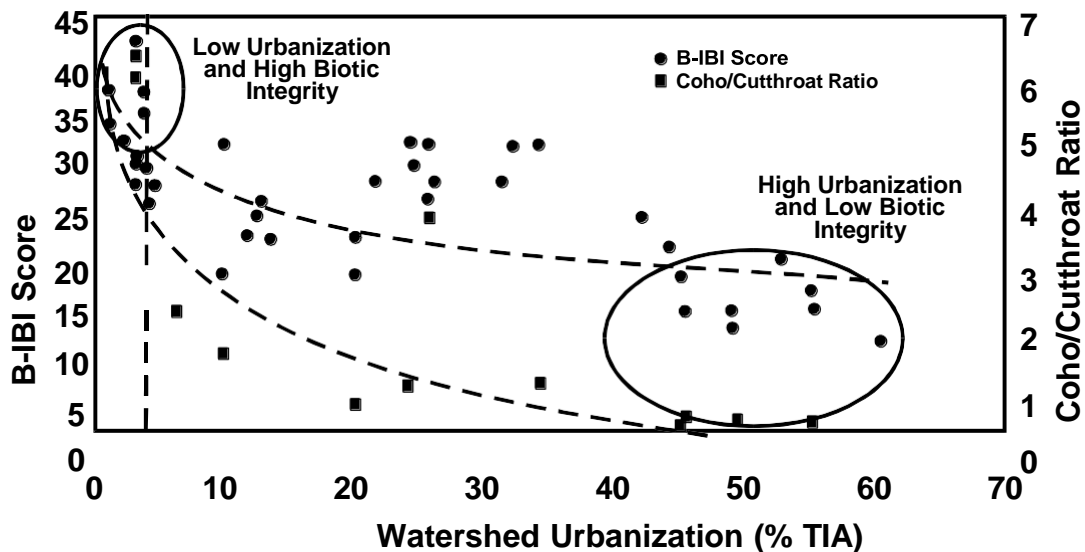


Figure 3. Relationship between Basin Development and Biologic Integrity in Puget Sound Lowland Streams (May et al., 1997)

Impacts of Urban Stormwater Runoff on Water Quality

Stormwater may become contaminated by activities as a result of contact with materials stored outside, spills and leaks from equipment or materials used onsite, contact with materials during loading, unloading or transfer from one location to another, and from airborne contaminants. Stormwater runoff and associated contaminants from developed areas have been identified as one of the leading threats to aquatic life supported by the Puget Sound ecosystem. Reducing surface water

runoff pollutant loading and runoff from the built environment is a key priority action for the restoration of Puget Sound (Puget Sound Partnership 2010). Stormwater runoff from developed areas can contain pollutants that can contaminate surface, marine, and groundwaters (Ecology 2011a).

In 2015, Ecology synthesized the stormwater monitoring data collected by Western Washington Phase I stormwater permittees under the 2007 NPDES permit. Ecology evaluated pollutant detection rates, concentrations, and discharge patterns with land use and season. This local dataset plus early national efforts represent forty years of progressive understanding about pollutants that can be transported by runoff (Ecology 2015). Land use is an important determinant of runoff quality (EPA 1983, Strecker et al. 1997, Maestre et al. 2005, Pitt 2011). The type of pollutant depends on the nature of activities in those areas as follows:

- **Roads:** Runoff from roads is typically contaminated with pollutants from vehicles. Oil, grease, polynuclear aromatic hydrocarbons (PAHs), lead, zinc, copper, cadmium, sediments (soil particles), associated nutrients, and road salts are all typical pollutants present in road runoff (Zawlocki et al. 1981, Mar et al. 1982, Davis et al. 2001). Vehicles are the primary source of most of these pollutants. Most oil and grease come from vehicle leakage, while PAH's are primarily from vehicle exhaust. Lead is most commonly associated with wear of metallic parts, wheel balance weights (wearing and falling from wheels), and battery leakage due to car accidents. The primary source of zinc is wear from tires, and copper primarily comes from brake pad wear. A highly toxic chemical (6PPD) associated with rubber tire residue is also associated with roadway runoff and may be linked to the acute mortality of adult migrating salmon (Tian et al 2020).
- **Commercial/Industrial areas:** Runoff from commercial and industrial areas typically can contain heavy metals, sediments, and a broad range of man-made organic pollutants including phthalates, PAHs, and other petroleum-based hydrocarbons (National Research Council 2009). Vehicles and pavement sealants are two common sources of pollutants from these areas. Other sources depend on the types of operations that are present on the property.

Commercial and industrialized land uses generally have higher concentrations of fecal indicator bacteria, metals (arsenic, copper, lead, magnesium, and zinc), polycyclic aromatic hydrocarbons (PAH's), and solids compared to the residential areas (Ecology 2015). Commercial and industrial areas where traffic congestion and vehicle use is routine are priority areas for intercepting key stormwater pollutants such as sediment, PAHs, and toxic metals (cadmium, chromium, copper, lead, manganese, zinc). Heavy metals and PAHs from industrial, commercial and mixed residential land uses pose the highest risks for environmental impact (Lundy et al. 2012, Ma et al. 2017, Müller et al. 2020).

- **Residential areas:** Runoff from residential areas can include the same road-based pollutants outlined above, as well as herbicides, pesticides,

surfactants, nutrients (from fertilizers), bacteria and viruses (from animal waste, Engstrom 2004), as well as sediment from dirt and gravel driveways. These contaminants can be entrained in stormwater runoff directly, or can reach downstream surface water bodies and marine environments via shallow groundwater flows. In addition, curtain and foundation drains often discharge to municipal systems and can contribute pollutants to surface water bodies. Zinc strips and other zinc based products are commonly used in residential areas to prevent and treat moss, and can add additional zinc to runoff from residential areas. Bleach and detergents are also commonly used for moss treatment. Most detergents contain phosphorus, which can contribute to eutrophication of surface water bodies (because productivity in fresh water bodies is typically phosphorus limited). Other pollutants from residential areas include insecticides, copper from copper roofs, zinc from composite roofs, and deicers.

- **Construction sites:** Runoff from construction sites can include sediments and other suspended material, which can increase turbidity or cloudiness in downstream receiving waters and can be deposited over the natural sediments of the receiving water and affect streams and wetlands (Barrett et al. 1995, Ecology 2014b, Horner et al. 2002a). The City has also given attention to concerns associated with construction demolition activities and the potential for heavy metals contamination and dust fall. Jacobs et al. (2013) found that “lead dust suppression is feasible and important in single-family housing demolition where distances between houses are smaller and community exposures are higher.” Though they also indicate that additional research is needed to determine the likelihood of potential for stormwater contamination. Several agencies and groups provide guidance on control of pollution from demolition activities, including East Baltimore Development’s 2006 *Operations Protocol for Salvage, Deconstruction, Demolition and Site Preparation Activities* (EBDI 2006).

Stormwater pollutants resulting from development can be dissolved in the water column or can be attached to particulates that settle in streambeds, lakes, wetlands, or marine estuaries. The toxic pollutants in the water column can have both immediate and long-term lethal impacts (Baldwin et al. 2003; Hansen et al. 2002). In addition, development can increase water temperatures by heating stormwater runoff as it passes over exposed surfaces, before being discharged to receiving waters (Foulquier et al. 2009). A rise in water temperature can have direct lethal effects on aquatic organisms by reducing the available dissolved oxygen and potentially causing algae blooms that further reduce water clarity and the amount of dissolved oxygen in the water (McCullough et al. 2001).

STORMWATER FLOW CONTROL AND WATER QUALITY TREATMENT

Overview

Stormwater runoff is widely recognized in scientific literature as an agent for physical, chemical, and biological degradation (Booth et al. 2006), and stormwater research is an ongoing, evolving field of study. Consider, for example, how the best available science regarding flow control performance standards for stormwater discharges into creeks in western Washington has changed over the past three decades. Early flow control requirements were based solely on limiting the post-development *peak flow rates* to below a set value – a value independent of the pre-developed condition (King County 1979). Booth (1990) advocated a different post-development peak flow rate standard that was linked to a percentage of the pre-development peak flow rate. Soon thereafter, and as a result of research indicating that peak flow control alone was insufficient to mitigate stormwater impacts to creeks, a post-development flow control standard based on a pre-development *flow-duration standard* was proposed (Booth 1991). Less than 10 years later, additional research indicated that this proposed flow-duration standard was not achieving all the objectives for protecting creeks from channel incision and sediment transport, owing to overall disruption of the natural hydrologic regime (Booth and Jackson 1997). More recently, low impact development (LID) techniques have been promoted as the preferred means for managing urban stormwater runoff and mimicking pre-development flow regimes (Booth 2007, Horner 2007, Holz 2007, NRDC 2006, Ecology 2014b), with an emphasis on mitigating the impacts of small and less-frequent storm events. Thus, in the space of roughly 30 years of research and assessment, four different types of flow control requirements have been presented in the scientific and professional literature as representative of the best available science for urban runoff management for flow control for creek basins in western Washington alone.

The sections that follow provide a review of selected citations that address two critical aspects of urban stormwater runoff management: flow control and water quality treatment. Flow control is important to mitigate the impacts of urban development on changes in hydrologic regime in wetlands and creek basins. Water quality treatment focuses on 1) permanent/constructed stormwater treatment facilities designed to remove chemical contaminants from runoff, and 2) operational BMPs to reduce stormwater contamination and minimize the transport of sediment to receiving waters from construction sites and grading activities. Note that although specific constructed facilities described below are included under one of the two categories of flow control or water quality treatment, many facilities (such as those involving infiltration) often serve a dual role, providing both flow control and water quality treatment, depending on how these facilities are designed (Ecology 2014b, Ecology 2019b).

Flow Control

The following sections build on the information presented previously to elaborate on the aspects of stormwater runoff impacts and mitigation measures related to flow control. Information is discussed relating to wetland and creek protection, followed by an expanded discussion on low impact development (LID) and LID BMPs related to flow control.

Wetland Protection

The following information is derived from a report prepared by Sheldon et al. (2005), which provides a comprehensive summary and synthesis of the literature relevant to the science and management of wetlands in the state of Washington.

Urbanization is recognized as both increasing and decreasing the flows that reach down-gradient aquatic systems such as wetlands. Greater volumes of water are generated more quickly while smaller, long-duration flows that would occur under less developed conditions are reduced or perhaps eliminated. Research has shown that collecting stormwater through modern storm drains, culverts, and catchments results in the rapid transport of large volumes of stormwater runoff into rivers, lakes, and wetlands at much faster rates and higher volumes than under predevelopment conditions (Dunn and Leopold 1978, Booth 1991, May 1996). Although some of the research has focused on the effects of urbanization on streams, the findings on changes in flow volumes, rates, and frequency apply equally to wetlands that receive storm drainage. Streams and wetlands are “intimately interconnected in the watersheds of western Washington” (Booth 1991).

Changes to hydrologic conditions can negatively impact the ecology of a wetland. Reinelt and Taylor (2000) used water level fluctuations as a primary factor in evaluating wetland hydroperiod. “Water level fluctuation is perhaps the best single indicator of wetland hydrology, because it integrates nearly all hydrologic factors.” Increases in impervious surface coverage reduce infiltration, thereby reducing interflow (shallow, subsurface flow) and base flow, which may influence the hydroperiod of down-gradient wetlands if they are fed by that shallow subsurface flow. Similarly, reductions in watershed infiltration correspond to increases in surface water runoff, which also impact the hydroperiod of downstream wetlands. These increased water level fluctuations have been associated with declines in the biotic diversity of wetlands (Ecology 1997, Reinelt et al. 1998, Azous and Horner 2001). Likewise, although many hydric soils (i.e., wetland soils) may be anaerobic, changing the length of time the soils are inundated results in changes in wetland soil chemistry, which in turn can influence the survival of vegetation and microbes in the soil that were adapted to shorter periods of inundation (Thom et al. 2001). The wetland protection standards outlined in the MS4 Permit and SWMMWW aim to minimize these fluctuations in hydroperiod through control of the changes in the volume of stormwater runoff delivered to a wetland pre- and post-project development.

The *Washington State Wetland Rating System for Western Washington* (Hruby 2014) provided an updated wetland rating system to provide a more accurate rating of functions and values.

Flow Control in Creek Basins

As noted previously, a growing body of research confirms that urbanization alters the hydrologic regime (Dunne and Leopold 1978, Schueler 1987, Booth and Jackson 1997, Ecology 2014b). These alterations result in higher volumes of stormwater

runoff, delivered at higher flow rates for longer durations than under pre-development conditions (Booth 1991, May 1996). Research by Konrad and Booth (2002) in the Puget Sound lowlands showed statistically significant correlations between urbanization in a watershed and altered creek hydrologic regimes. Even small changes in watershed imperviousness can have measurable influences on flows in a creek system (Azous and Horner 2001). Booth (1991) concluded that urbanization could cause peak flow rates to increase by up to five-fold for a given storm event. These altered hydrologic regimes adversely impact creek systems through channel erosion and incision (May 1996, May et al. 1997). These effects are spread across a wide range of storm event sizes, with smaller and more frequent events often having the greatest cumulative effect on creek morphology.

Stormwater flow control BMPs are designed to reduce the volume, flow rate, and timing of stormwater flows released from developed sites. Some facilities function by storing stormwater and controlling the release rates so that post-development hydrology more closely resembles pre-development hydrology. Other facilities use infiltration, evapotranspiration, and stormwater reuse in an attempt to better mimic natural hydrologic regimes.

Flow Control Performance Standards to Protect Creeks

The term *flow control performance standard* is used to represent the combination of flow rates, volumes, and durations that are allowed to be discharged from a site. Per the MS4 Permit, these standards must be met for projects that exceed certain regulatory thresholds, most generally based on the amount of new and replaced impervious surfaces, but which can also be dependent on the type of project, size of project, area disturbed, and the drainage basin in which the project is located. Flow control performance standards are intended to reduce the impacts of changes in hydrologic regime on creek systems caused by changes in land cover, impacts that can include: erosion, sedimentation, instability, flooding, and other damage to the streambank and riparian corridor.

The Stormwater Management Manual for the Puget Sound Basin (Ecology 1992) required the use of a single-rainfall-event hydrologic model to calculate pre-development and post-development runoff, and associated flow control performance standards. The following post-development peak flow rate conditions, based on selected storm statistics, were required if stormwater infiltration was not feasible on site:

- 100-year/24-hour storm – post-development peak flow rate could not exceed the pre-development peak flow rate
- 10-year/24-hour storm – post-development peak flow rate could not exceed the pre-development peak flow rate
- 2-year/24-hour storm – post-development peak flow rate could not exceed the 50 percent of pre-development peak flow rate.

The intent of the “50 percent of the pre-development peak flow rate” component of the standard was to prevent stream channel destabilization by controlling sediment

transport, based on research by Sidle (1988) and Booth (1990). (The other two standards were focused more on flooding and property protection.) While this flow control approach provided more environmental protection than having no standards, it is now widely acknowledged to have some fundamental flaws in achieving its intent, among them:

- It assumed that flow statistics correlated to rainfall statistics. That is, the X-year peak flow was assumed to correlate to the X-year, 24-hour peak rainfall depth. The results of continuous simulation models, which use many years of rainfall data rather than individual 24-hour events, show that this assumption is not always valid.
- It assumed that controlling the peak flow from a storm (i.e., preventing the peak flow from exceeding some standard), would prevent channel instability. This is not true, since the peak flow standards do not address the increase in total runoff volume that occurs with urbanization, which translates into an increase in total time that elevated storm flow rates will work on the channel to transport sediment.
- It did not address alteration of the pre-development hydrologic regime related to total rainfall infiltration, evapotranspiration, and inter-storm runoff.

Booth (1991) discussed the shortcomings of single-event model and a peak flow detention standards, and proposed using a “flow duration control” standard. Rather than limiting only the peak flow rate, a flow duration control standard limits the total amount of time over a relatively long period (e.g., months) during which the flow rate could exceed selected flow rates of concern. Designing a project site to meet a flow duration control standard requires a continuous simulation hydrologic model.

Six years later, Booth and Jackson (1997) discussed the shortcomings of flow duration control standards. Among these is the premise that for all streams there is a flow rate below which no sediment transport occurs, and that a flow rate below this index rate would not cause channel incision regardless of the flow duration. Booth and Jackson (1997) state that “For gravel-bed stream channels, this threshold discharge is real and can be determined on a site-specific or generic basis. In sand-bedded channel, however, the threshold of sediment motion occurs at impracticably low discharges, and so increases in the net transport of bed material virtually unavoidable in such systems.”

In 1998, King County promulgated a stormwater technical manual and associated regulations that used flow duration control standards to mitigate impacts from stormwater flow, specifically intended to reduce impacts related to transport of sediment and stream channel erosion (Booth 1991, King County 1998). To implement this performance standard, King County developed a continuous modeling tool, the King County Runoff Time Series (KCRTS) program, which was based on the Hydrological Simulation Program-Fortran (HSPF) model developed by the US Geological Survey (USGS). Ecology followed suit in 2001, incorporating a flow duration control standard into the minimum requirements flow control contained in the Stormwater Management Manual (Ecology 2001) and the subsequent iterations of the SWMMWW (Ecology 2005, Ecology 2014b). Based in part on

results of in-depth investigations performed by King County on the Juanita Creek watershed (O'Brien 2014), the 2014 version of the SWMMWW has reinforced the emphasis on both flow duration and small/frequent storm events by including an added *Low Impact Development Performance Standard* requiring that stormwater discharges match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 8 percent of the 2-year peak flow to 50 percent of the 2-year peak flow. This captures an expanded range of storm events, including storms below (i.e., smaller and more frequent than) those targeted by the flow control duration standard in the previous (2005) SWMMWW.

The recommended parameters were updated due to the smaller project sites typical within the City of Seattle. The parameters are within the range of possible values cited in *EPA Basins Technical Note 6 Estimating Hydrology and Hydraulic Parameter for HSPF* (EPA 2000).

Reports also consulted includes *Characterization and Simulation of Rainfall-Runoff Relations for Headwater Basins in Western King and Snohomish Counties, Washington* (Dinicola 1990) and *Validation of a Numerical Modeling method for Simulating Rainfall-Runoff Relations for Headwater Basins in Western King and Snohomish Counties, Washington* (Dinicola 2001).

Low Impact Development, Green Stormwater Infrastructure, and Flow Control

The term *low impact development* (LID) refers to a range stormwater management measures that are intended to limit impacts of development on hydrologic regime. Ecology (2014a) defines LID as follows:

A stormwater and land use management strategy that strives to mimic pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation, and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design.

Green stormwater infrastructure (GSI) is the term Seattle generally uses to describe LID approaches in the city. Complicating things somewhat, Ecology uses the term *On-site Stormwater Management* as a “synonym” for LID in the MS4 Permit (Ecology 2014a) when referring to required LID management practices on development sites. As such, Seattle has decided to use the term on-site stormwater management in the 2016 Stormwater Code Update and 2021 Stormwater Code Update in reference to the suite of BMPs required to meet the applicable elements of the MS4 Permit. For clarity, general discussions in this document about LID/GSI approaches and benefits use the term LID or GSI. The term on-site stormwater management will only be used to refer to discussions specific to the MS4 Permit requirements and associated 2016 Stormwater Code Update.

As with LID, one of the key components of GSI in the City of Seattle is trying to replicate as much as feasible the natural hydrologic function by slowing and/or reducing the volume and rate of stormwater runoff through small, distributed runoff management controls and other best practices close to where precipitation lands. By meeting this objective, GSI reduces the capacity, flow, and volumetric demand on

the City's stormwater and sanitary systems. GSI also helps provide resiliency and climate adaptation, as a long-term solution to managing the impacts of precipitation and stormwater runoff. According to the US EPA, as communities develop and climate patterns shift, existing stormwater conveyance and treatment infrastructure needs are expected to grow (US EPA 2014). While grey stormwater infrastructure is largely designed to move urban stormwater away from the built environment, GSI reduces (and often treats) stormwater runoff at or near its source (often while providing other environmental, social, and economic benefits).

Over roughly the past decade, an increasing body of literature has promoted LID as a preferred means for addressing urban stormwater runoff in the Puget Sound region (Booth 2007, Horner 2006, Horner 2007, and Holz 2007). Moreover, as part of the municipal appeals of the 2007 MS4 Permits, the Washington State Pollution Control Board (PCHB) concluded in the Phase I MS4 Permit decision that "...based on the great weight of testimony, reference documents, and technical manuals, that low impact development represents AKART [all known, available and reasonable methods of prevention, control and treatment] and is necessary to reduce pollutants in our state's waters to the maximum extent practicable, the federal standard..." (PCHB 2008). The Low Impact Development Technical Guidance Manual for Puget Sound (WSU and PSP 2012) – first published in 2005 and substantially updated in 2012 – contains extensive LID-specific information on site assessment; site planning and layout; vegetation and soil protection; reforestation; site preparation, construction, and inspection; and integrated management practices tailored to the Puget Sound region. It also contains information on hydrologic modeling for LID flow control measures. Much of this information is also contained in the updated version of Ecology's SWMMWW (Ecology 2019b). Ecology has also developed a guidance document focused on the unique operation and maintenance requirements of LID facilities (Ecology 2013a). Likewise, Seattle has been and remains at the forefront of GSI studies and implementation, and plays an integral role in defining and evaluating the best available science as it relates to LID and GSI in the region. In particular, the City has funded several recent studies focused on evaluating and monitoring bioretention facilities, as well as green roofs (Seattle 2014, WSU 2014, Seattle 2012a). Pertinent outcomes from these studies are discussed further in subsequent sections.

Nationwide, the emphasis on LID has been equally persistent and growing. Similar to the term LID and GSI, *green infrastructure* is the term used by US EPA to refer to the use of "vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water" (US EPA 2015). (The definitions of LID, GSI, and green infrastructure are essentially the same, and used by various agencies and groups nationwide interchangeably.) The amount of literature, technical documentation, guidance manuals, design tools, monitoring information, and educational material focused on LID and green infrastructure is substantial. As such, it is beyond the scope of this document to catalog the full extent of LID resources that are available and the current state of the science for this rapidly evolving technology. Rather, the following sections summarize elements most pertinent to the

2016 Stormwater Code Update and 2021 Stormwater Code Update. Extensive additional information and resources on LID can be found at the US EPA's green infrastructure website: water.epa.gov/infrastructure/greeninfrastructure and Seattle's GSI website: www.seattle.gov/util/EnvironmentConservation/Projects/GreenStormwaterInfrastructure/index.htm. The Low Impact Development Technical Guidance Manual for Puget Sound (WSU and PSP 2012) is also one of the most current and comprehensive sources of additional detailed information and references related to LID in the Puget Sound region.

Applications of Green Stormwater Infrastructure

Green stormwater infrastructure can be an important component of stormwater management strategies, as they may be effective at reducing stormwater discharge volumes and rates of flow through infiltration, evapotranspiration, and capture and reuse. The following sections describe the common applications of GSI.

Creek systems. Proper implementation of GSI measures in creek systems has provided stream erosion protection and preservation, water quality treatment, and watershed habitat improvements (NRDC 2006, ASCE *In Press*). National data is supported locally. University of Washington monitoring of creek watershed projects showed significant reductions of stormwater volumes, rates, and pollutant loads due in part to the use of GSI (Horner and Chapman 2007). In case studies in the City of Seattle, the 110th Street Cascade and SEA Street projects recorded a runoff volume reduction of 50-98 percent and a peak flow reduction of at least 60 percent. The 110th Street Cascade was monitored for 235 precipitation events, and 79 percent of these events produced no discharge from the bioretention facility (Horner and Chapman, 2007). Monitoring of a typical block of bioretention with underdrain at the High Point redevelopment (till soils) within the Longfellow Creek watershed (December 29, 2006 through September 30, 2007) concluded that the test bioretention cell "treated all runoff from storm events with precipitation totals below the 6-month, 24-hour and 2 year, 24-hour design storms for water quality treatment and flow control, respectively" (Herrera 2009a). The City continues to collect and monitor GSI performance.

CSO reduction. The flow control benefits that are observed in creek systems are also critical in combined sewer systems – with an emphasis on providing volume reduction in wet weather flow conditions to reduce combined sewer overflows (CSOs). In some situations, GSI can be used instead of, or in conjunction with, grey infrastructure depending on the costs and level of control required within a CSO basin. By preventing the rainfall runoff that is generated from impervious sites from quickly entering the piped conveyance system, GSI has been shown to reduce the volume of flow that is conveyed to the treatment plants, thereby reducing both CSOs and general treatment loads during storm events (Dearmont et al. 1998, NRDC 2006, US EPA 2012, ASCE *In Press*).

Local monitoring (September 2012 through April 2013) of a CSO reduction project in the Ballard neighborhood showed significant stormwater runoff volume reduction and delay. Bioretention cells without an underdrain functioned as well as or better

than they were designed for by capturing and infiltrating events in excess of a 1-year recurrence interval (over 95 percent of the volume that would otherwise enter the combined system). Even a bioretention cell retrofitted with an underdrain also exceeded design expectations and was found to provide significant volume reduction (approximately 50 percent in 2012-2013, and up to 89 percent average annual volume loss in 2013-2014) during most storms with variability occurring depending on the season, storm patterns, and antecedent moisture conditions (Hutchinson and Atchison 2014).

National studies conducted in North Carolina and Maryland found that six different bioretention cells with underdrains each reduced runoff volume by 20-50 percent, in addition to delaying and reducing peak flows (Li et al. 2009). A modeling effort by the San Francisco Public Utilities Commission found that their 30-year plan for GSI implementation – including green roofs, street trees, bioretention, and permeable pavement – could reduce annual CSO amounts by 200-400 million gallons, equating to a 14-27 percent volume reduction in CSO events (US EPA 2014).

Pipe capacity/flooding. Benefits to other piped conveyance systems can also be realized through GSI implementation. Depending on the causes of piped capacity limitations for a particular system, GSI approaches may be used in conjunction with traditional grey infrastructure improvements and capacity management strategies to help reduce the rate of runoff delivered to piped conveyance systems. Locally, modeling of GSI within the Pipers Creek conveyance network found GSI facilities sized to achieve the City's peak flow control goal (reducing the 2- year event to pre-developed pasture conditions) reduced the 10-year peak stormwater runoff rate by 36 percent and the 50-year peak rate by 15 percent (Scheller 2014). Nationally, the Milwaukee Metropolitan Sewerage District reported in their 2020 Facilities Plan that GSI could reduce the 100-year storm peak runoff rates by 22 percent, and the peak for smaller storms could be reduced even further (Sands and Chapman 2011).

Some municipalities have also observed a reduction in flood risk with the implementation of GSI (CNT 2013, US EPA 2014). A study in the southeastern United States found that although GSI does not have a large impact on flooding during very large events (e.g., a 100-year event), smaller events such as the 5-year event can be noticeably mitigated through the use of GSI (Medina et al. 2011). The study also found that targeting a GSI capture volume of 1.2 inches of rainfall, the cost of damage from a 5-year event was reduced from \$13 million to \$8 million average annualized losses.

Types of On-Site Stormwater Management Practices

The following on-site stormwater management BMPs are included in various requirements of the 2016 Stormwater Code Update and 2021 Stormwater Code Update. Note that all of the below facilities are already included in the existing Stormwater Code and are required as part of the City's MS4 Permit obligations (Ecology 2019a).

As mentioned previously (and referenced in this report), there is ongoing research and resultant technical information dedicated to the design, performance, and monitoring of LID facilities in order to ensure that the best available science is

incorporated into local guidance and requirements. There have been dozens of ongoing LID monitoring and assessment projects in the Puget Sound region alone (notable results, where available, are discussed herein). Moreover, the PCHB decision referenced previously (PCHB 2008) clearly established LID as constituting AKART. Notably, soon after that decision, Ecology acted on the LID-based portions of the PCHB's decision by forming committees of LID experts from across the region to assist in developing LID portions of the next round of MS4 Permit requirements. Among other items, Ecology (with the assistance of these LID Committees) evaluated various site conditions and LID BMPs with the goal of establishing a system that derived the most benefit from a LID BMP. Focusing on the site and subdivision level, Ecology prepared a list of LID BMPs and sought input from the LID Committees on the question of which of the listed BMPs were AKART (O'Brien 2014). These discussions ultimately led to the on-site stormwater management requirements of the 2016 Stormwater Code and 2021 Stormwater Code Update.

As such, the intent of this section is not to document the absolute state of the science of on-site stormwater management BMP design and performance but to briefly highlight some of the region's history and science associated with those BMPs included in the 2016 Stormwater Code Update and 2021 Stormwater Code Update. For additional detailed information on any of the following BMPs, the Low Impact Development Technical Guidance Manual for Puget Sound (WSU and PSP 2012) is an excellent resource.

Last, in addition to flow control benefits, several of these BMPs also provide significant water quality treatment benefits. Therefore, information pertaining to both flow control and water quality treatment may be presented below, rather than repeating information about a given BMP in both the flow control and water quality treatment sections of this report.

Bioretention

The term *bioretention* is used to describe various designs using soil and plant complexes to manage stormwater runoff. The healthy soil structure and vegetation associated with bioretention facilities promote infiltration, storage, slow release, and treatment of stormwater runoff to more closely mimic natural conditions. In practice, bioretention facilities are also commonly referred to as "rain gardens." (In the 2016 Stormwater Code Update and 2021 Stormwater Code, the terms bioretention and rain gardens have distinct differences that carry associated design and regulatory requirements for new and redevelopment projects specifically.) Bioretention can provide flow control via detention, attenuation, and losses due to infiltration, interception, and evapotranspiration. Treatment can be provided through sedimentation, filtration, adsorption, and phytoremediation. Early hydrologic performance of a bioinfiltration system in Maryland is discussed by Davis et al. (1998). Early design information was provided by Prince George's County (1999 and 2002), with a multitude of agencies and groups (including Seattle) developing their own variations on bioretention design since that time.

In the late 1990s, the City constructed its first bioretention facility in a street right-of-way. The system consisted of a roadside swale filled with organically amended soil, in which a perforated drain was installed above the trench bottom so that some

water would be retained before the drain was engaged. Water could also be held in the amended soil. The underlying soil was mostly glacial till but there was some sand as well. Approximately 2.3 acres of road and residential development drained to the swale. During the period between January 2000 and January 2001, the system retained all of the dry-season runoff and 98 percent of the wet-season runoff, and was capable of fully attenuating approximately 0.75 inches of rainfall on the catchment area (Horner et al. 2002b). Since that time, dozens of rain gardens and bioretention facilities have been installed on City and private property. Of the on-site stormwater management BMPs presented in the 2016 Stormwater Code Update, bioretention facilities probably receive the most attention in the Puget Sound region with regards to design variations and performance monitoring. The City has performed monitoring on several of these installations, most notably on two facilities from the Ballard Roadside Raingardens project (Seattle 2014). Monitoring of both facilities included continuous flow monitoring for one year, and controlled flow tests in the fall and spring. Monitoring of the bioretention facility on 30th Avenue NW showed that it more than met the design goal of removing the contributing area runoff for up to approximately a 1-year storm event, and that it captured all of the runoff for up to the 15-year storm event. It was also determined that the infiltration rates of the native soil at the 30th Avenue NW facility were higher than assumed during the facility design. The second bioretention facility monitored as part of the study was installed as part of one of the retrofitted blocks along 28th Avenue NW. After the original installation, the facility did not drain as designed and had to be retrofitted with an underdrain to meet the drawdown requirements. Monitoring was performed to determine what change in performance occurred due to the installation of the underdrain. The monitoring results demonstrated that significant flow control and volume reduction benefits were still provided by this system, even though it had an underdrain. The facility reduced peak flow rates by an average of 80 to 90 percent of approximately a 1-year storm event, and delayed discharge to the combined sewer system for 54 percent of the inflow volume. The facility also infiltrated the remaining 46 percent of the inflow volume, more than was originally expected for the retrofitted facility. The City is also tracking or involved in several regional bioretention studies. For example, Kitsap County et al. (2014) has been leading efforts to evaluate the performance of various compositions of bioretention soil media. Among other results, the studies have found that some (but not all) soil mixes may be leaching dissolved copper (Kitsap County et al. 2014). The studies are ongoing and are investigating which soil mixes are best for use in Washington State. As part of a closely related effort, the City is working with the Washington State University (WSU) LID research facility to evaluate the water quality treatment performance of the City of Seattle bioretention soil media (BSM). The study (WSU 2014) consists of monitoring of four individual bioretention “mesocosms” (to provide replicate samples) built with the City of Seattle BSM. The study routed natural stormwater and synthetic stormwater (i.e., dosed influent) through the mesocosms and collecting samples of the effluent to evaluate water quality. The results were consistent with other studies around the region, showing higher percentages of pollutant removal with higher influent pollutant concentrations (typical of commercial, industrial areas), but evidence of export of some pollutants (e.g., TSS, dissolved

copper, and phosphorus) with lower influent pollutant concentrations (more typical of residential areas). The export of TSS and dissolved copper appeared to decrease over time, but phosphorus release remained mostly steady during the course of the study. McIntyre et al. (In Press) also found bioretention facilities to be very effective at treating polluted runoff from roadway areas, with significant reductions in roadway runoff toxicity when the runoff is filtered through a bioretention facility.

The City of Seattle initiated an investigation (Herrera, 2016) into the use of polishing layers with compost-based bioretention media to examine its use under Seattle's compost-based media as a means to filter and capture N, P and Cu. The City of Seattle has adopted a bioretention mix (70 percent sand and 30 percent compost) in their stormwater guidelines so this was the bioretention mix used in this study. Several combinations of volcanic sand, coarse and fine activated alumina, iron aggregate and high-carbon wood ash were tested. Ninety% volcanic sand, 5% iron aggregate and 5% fine activated aluminum performed the best with respect to TP, ortho-P, dissolved copper removal as well as performing very well for dissolved Zn capture and TSS capture. It showed a hydraulic conductivity of 12.94 inches per hour. This combination was recommended for use as a polishing layer.

The City of Seattle also initiated an evaluation of presettling facilities prior to bioretention (Herrera, 2023) in response to questions that emerged about best practices. Sediment in bioretention reduces the BMPs capacity to mitigate stormwater and can be difficult to remove. Better guidance as to when, where and how presettling should be used prior to bioretention was explored. The evaluation consisted of review of existing guidance, review of built GSI project, development of stormwater TSS loading and sediment capture design bases, and review of available presettling BMPs. A target particle size of 80 microns was selected for sizing and evaluating presettling practices including normalizing the sizing of proprietary manufactured treatment devices that are on the TAPE Pretreatment GULD list. The recommendations for where presettling is required and the recommended BMP are shown in the following table.

Table 7. Proposed Presettling Requirements for Bioretention Facilities on Capital Improvement Projects.

Contributing Basin Size and Slope	Presettling Requirement for Bioretention Facilities
Total Basin Size ^a <1.5 acre OR Total Basin Size ^a 1.5–3 acres and <50% EIA OR Total Basin Size ^a 3–6 acres and <50% EIA and average basin slope ^b <5 percent	No presettling required.
Total Basin Size ^a 1.5–3 acres and >50% EIA OR Total Basin Size ^a 3–6 acres and average basin slope ^b >5 percent (and either <=50% EIA or >50% EIA)	Extended Sump required.
Total Basin Size ^a >6 acres	MTD, Extended Sump, or “fat pipe” required.

^a Total basin size: the total area (pervious and impervious) contributing runoff to a single cell or series of connected cells from both piped inflow and sheet flow from adjacent surfaces. The size of the basin producing the runoff is considered irrespective of any flow splitters that may be in use.

^b Basin slope: overall slope estimated across an entire city block.

Permeable pavement

Permeable pavement is a paving system which allows rainfall to percolate into an underlying aggregate storage reservoir, where stormwater is stored and infiltrated to the underlying subgrade or removed by a supplemental outlet/overflow system. The primary factors controlling the use of permeable pavement as an infiltration system are the long-term hydraulic capacity of the paving material, and the infiltration capacity of the underlying soil. Permeable pavement has been used for stormwater management worldwide for decades, though the technology has only gradually taken hold regionally. Booth and Leavitt (1999) documented the pollution removal capability and hydraulic performance of four types of permeable pavement in comparison to standard asphalt pavement at a municipal building parking lot in Renton, Washington. The test site was constructed in 1996 and data were gathered in the year following. The native soil at the site was deep and very permeable sand, such that overall infiltration capacity of the pavement/soil system was limited by the pavement. Booth and Leavitt observed no surface runoff from the permeable pavement. Brattebo and Booth (2003) reevaluated the hydraulic performance at the same pavement system during fifteen storms in the winter of 2001-2002. Virtually all water infiltrated for every observed storm; the most significant surface runoff event occurred during a 4.75- inch/72-hour storm, in which only 0.16 inches of surface runoff was generated from one type of pavement.

In the years since these early installations, permeable pavement (like bioretention) has become the focus of many additional design and performance studies. While the state of the science continues to evolve, some of the most significant findings can be found in the Low Impact Development Technical Guidance Manual for Puget Sound (WSU and PSP 2012).

Acceptable run-on ratios from several other jurisdictions' stormwater guidance manuals were reviewed, including from the City of San Francisco, CA; City of San Antonio, TX; City of Vancouver, BC; City of Portland, OR; City of Gresham, OR; City of Omaha, NE, City of Denver, CO and City of Tacoma, WA as well as *Permeable Pavement* (ASCE 2015).

Rainwater Harvesting

Rainwater harvesting is the capture and storage of rainwater for subsequent use. Runoff from non-pollution generating surfaces may be routed to cisterns for storage and beneficial non-potable uses, such as irrigation, toilet flushing, and cold water laundry. Like other flow control BMPs, rainwater harvesting can be used to achieve reductions in peak flows, flow durations, and runoff volumes, and can be a particularly effective practice for projects where infiltration is not permitted or desired. The flow control performance of rainwater harvesting is a function of contributing area, storage volume, and rainwater use rate. While the City accepts rainwater harvesting systems with indoor water use for compliance with the flow control standards of the 2021 Stormwater Code, the indoor use of harvested water is regulated by WAC 51-56-1628.4.

Rainwater harvesting has been around for centuries, and (unlike bioretention and permeable pavement for example) is not subject to as frequent or numerous research studies. Depending on whether the design is for potable or non-potable uses, additional information can be obtained from various engineering or Department of Health documentation. For information most pertinent to the Puget Sound region, consult the Low Impact Development Technical Guidance Manual for Puget Sound (WSU and PSP 2012).

A technical memorandum (Herrera 2020) was prepared to evaluate allowing Rainwater Harvesting for Single-Family Residential and Parcel-based projects under Category 2 and 4 of the On-site list. Rainwater Harvesting is allowed under Category 2 if it is sized to meet the On-site performance criteria, similar to other Category 2 BMPs. The memorandum discusses the performance criteria that were evaluated for it to be used as a Category 4 BMP before settling on the criteria that Rainwater Harvesting must reduce the rooftop runoff volume by 25 percent on an average annual basis and that the volume reduction must exceed that for a Vegetated Roof.

Vegetated Roofs

Vegetated roofs are areas of living vegetation installed on top of buildings, or other above grade impervious surfaces. Vegetated roofs are also known as ecoroofs, green roofs, and roof gardens. Used in Europe for decades, vegetated roofs have received significant attention in the US in the past decade or so as the focus on LID approaches (and green building in general) has increased.

As such, similar to bioretention and permeable pavement, extensive research has been dedicated to the design and performance of vegetated roof systems regionally, and nationwide, particularly over the past decade. For example, in one of the preliminary studies in Philadelphia, runoff monitoring was conducted for a nine-month period at a pilot-scale vegetated roof with a thickness of less than three

inches (US EPA 2000). In this period there were 44 inches of rain and less than 16 inches of runoff. Similarly, in Portland, Oregon, monitoring of four storms (two in March 2001, and two in August 2001) at a full-scale commercial building vegetated roof showed between a three-fold and nine-fold reduction in per-storm runoff volume (Portland 2001). More recently, the City of Seattle has performed in-depth vegetated roof monitoring through a dedicated Green Roof Performance Study (Seattle 2012a). The study evaluated a range of vegetated roofing designs over five different site locations. Results indicated a reduction peak flow rates (relative to conventional roofs) ranging from 53 percent to 15 percent. The percentage reductions in rainfall volume ranged from near zero during the wetter seasons, but as high as 70 percent or greater during the dryer seasons.

Trees

Trees provide stormwater flow control via interception, transpiration, and increased infiltration. Additional environmental benefits include improved air quality, reduced heat island effect, pollutant removal, and habitat preservation or formation, although benefits can vary with seasonality (Xiao et al. 1998). Trees are a landscape amenity with flow control benefits that can be applied in most settings. The 2016 Stormwater Code Update and 2021 Stormwater Code Update includes flow control credits for retaining or planting trees on a development site, with higher credit applied when trees are proximate to impervious surfaces. The degree of flow control provided by a tree depends on the tree type (i.e., evergreen or deciduous), canopy area, and proximity to impervious surfaces. A report summarizing the results of a literature review on the effects of trees on stormwater runoff and recommendations regarding flow control credits is provided in Herrera (2008).

Ecology studied the stormwater mitigation potential of individual local trees in Western Washington. Phase II of this study focused on the stormwater mitigation value of young and isolated conifer and deciduous trees in streetside and parking lot locations when compared to mature native trees, which were evaluated in Phase I. The study found that street trees reduced runoff by 42 – 66% during the study period (2023 – 2024), and that conifers had greater rates of transpiration during winter months than deciduous trees. When comparing data collected during Phase I and Phase II, larger trees were found to have greater transpiration and interception rates. Therefore, larger trees and retained trees are more valuable to stormwater uptake than planting a new tree. (Ecology 2025).

Dispersion

Downspout dispersion BMPs are splash blocks or gravel-filled trenches that serve to spread roof runoff over vegetated pervious areas. Dispersion attenuates peak flows by slowing entry of the runoff into the conveyance system, allows for some infiltration, and provides some water quality benefits. Although downspout dispersion in general has been used in Seattle for decades, to meet the specific design requirements of the MS4 Permit, downspout dispersion BMPs generally require large areas of vegetated ground cover and may not be feasible in most urban settings. Likewise, little performance monitoring data have been generated specific to downspout dispersion BMP performance, particularly in urban settings.

Nonetheless, downspout dispersion is included as one of Ecology's required on-site stormwater management BMPs, so it is included in this discussion.

Infiltration

Infiltration, where appropriate, is the City's preferred method for stormwater management because it most directly attempts to restore the pre-development flow regime. Many on-site stormwater management BMPs discussed previously use infiltration as a primary or secondary mode of stormwater control. In addition, several types of non-vegetated systems are designed primarily for stormwater infiltration including infiltration trenches, vaults, basins, or drain fields. Given the significant role of infiltration processes in LID, on-site stormwater management, and stormwater flow control in general, this subsection presents a brief overview of infiltration considerations.

Massman (2003) performed full-scale "flood tests" conducted at four infiltration facilities in western Washington. Lateral flow along the sides of the ponds could be significant. Saturated hydraulic conductivity values estimated from measuring air conductivity and from regression equations derived from grain size parameters were compared to full-scale infiltration rates for 15 sites in western Washington. The estimated values for saturated hydraulic conductivity were up to two orders-of-magnitude larger than the full-scale infiltration rates for some sites and were two orders-of-magnitude smaller at others. These results show that long-term infiltration rates cannot be reliably estimated on the basis of soil properties alone; information related to the hydraulic gradient is also important.

Aside from the reduced area available for infiltration due to the construction of impervious surfaces, development typically results in the compaction or removal of the upper soil layers, which reduces the overall infiltration capacity of the remaining soil (Booth et al. 2002, Chollak and Rosenfeld 1997, Kosti et al. 1995). This effect also significantly reduces the ability of the soil to remove dissolved metals (Minton 2005). Other factors that may limit the long-term performance of these systems are clogging due to sediment input, or biological fouling, as described by Warner et al. (1994).

Given the significant role of infiltration in stormwater management, and the relative complexity of soil and general geologic conditions in Washington, Ecology has dedicated extensive time and energy to understanding and safeguarding infiltration facility designs. The 2014 SWMMWW (Ecology 2014b) includes extensive detail on the requirements for evaluating project area soil conditions and infiltration potential prior to designing and installing infiltration facilities. Seattle has generally followed these requirements, with modification as needed to accommodate local conditions and challenges. Due to the geologic and topographic conditions in Seattle, not all sites are suitable for stormwater infiltration. The City may limit the use of infiltration practices in some areas due to topography and potential landslide hazards. In addition, many locations in Seattle have soils that are underlain by hydraulically-restrictive materials. These relatively impervious layers may limit or preclude infiltration causing perched groundwater conditions during the wet season. A memorandum *Recommendations for Infiltration Acceptance Testing During*

Construction for Select Infiltration BMPs (Gibson and Martin 2018) provided information that informed the development of the infiltration acceptance testing guidelines. Studies related to modeling for hydraulic conductivity near saturation were reviewed (van Genuchten 1980, Schaap and van Genuchten 2005).

Soil Amendment

Naturally occurring (i.e., undisturbed) soil and vegetation provide important stormwater management functions, including: water infiltration; nutrient, sediment, and pollutant adsorption; sediment and pollutant biofiltration; water interflow storage and transmission; and pollutant decomposition. These soils can also provide indirect benefit by providing a suitable growing medium for healthy plants and microbes, which themselves also provide important stormwater benefits. All of these functions are largely lost when development removes native soil and vegetation and replaces it with imported soil and sod with minimal depth. Not only are important stormwater management functions lost, but such altered landscapes themselves can easily become pollution-generating pervious surfaces. Pollutants can include pesticides, fertilizers, and other landscaping and household/industrial chemicals; pet wastes; and roadside litter.

Studies by Chollak and Rosenfeld (1997) developed guidelines for amending soils with compost in landscaping practices. Kosti et al. (1995) measured surface runoff and subsurface runoff from seven test plots of glacial till soil containing differing amounts of compost. During storm events from December 1994 to June 1995, two plots containing compost generated only 53 percent and 70 percent of the total runoff volume generated by a control plot with no compost. In addition to flow control benefits, amended soils in urban lawns can also have the benefits of reduced fertilizer requirements and reduced dry-season irrigation requirements (US EPA 1997). The MS4 Permit includes requirements for using soil amendment for disturbed areas, and the 2014 SWMMWW and a supplemental document produced by Soils for Salmon (Guidelines and Resources for Implementing Soil Quality and Depth BMP T5.13 in WDOE Stormwater Management Manual for Western Washington, Soils for Salmon 2012) include the latest guidelines for soil amendment in western Washington.

Sidewalk/Trail Compost-Amended Strips

Sidewalk/Trail Compost-Amended Strip is a new BMP focused on managing sheet flow from sidewalk and trail surfaces (Seattle Public Utilities 2020).

Water Quality Treatment

Urban stormwater runoff collects and conveys pollutants to receiving waters. Between 1978 and 1983, the Nationwide Urban Runoff Program gathered runoff pollution data from 2,300 storms from 28 project sites across the nation (US EPA 1983). The results from this large-scale study helped to initially quantify the nature and extent of stormwater pollution and influenced subsequent regulations requiring treatment of stormwater runoff from sites with pollution generating surfaces. Ongoing monitoring, analysis, and assessments have provided additional information

regarding the nature of pollutants in stormwater. Chandler (1995, 1999) conducted an analysis of urban stormwater runoff event mean concentrations from 70 sites collected by eleven municipalities located in inland urban areas of western Washington and Oregon. Maestre and Pitt (2005) developed a database containing approximately 3,765 events from 360 sites in 65 communities throughout the US. Clark et al. (2007) provide a comprehensive literature review of urban wet weather flow literature for the eleven years from 1996 through 2006 that includes stormwater discharge water quality characterization.

Recent assessments of toxic contaminants in Washington State determined that the bulk of toxic chemicals that enter Puget Sound marine waters have done so through runoff from land surfaces (Ecology 2007b, Ecology 2011a, Ecology 2014c, Ecology 2015). Of particular note, during 2010, Ecology conducted a study to identify the primary sources of toxic chemicals in the Puget Sound basin and estimate annual releases of those chemicals (Ecology 2011a). Fourteen chemicals and chemical groups of concern were addressed, and the quantities of chemicals released annually from numerous sources were estimated. The study identified petroleum and zinc as two of the most significant chemicals of concern, with both chemicals released at a rate greater than 1,000 metric tons (t) per year. Lead, polycyclic aromatic hydrocarbons (PAHs), copper, and triclopyr were identified as additional chemicals of concern, released at rates greater than 100 t/year (ibid). Similarly, as part of the previous MS4 Permit requirements, stormwater and storm sediment discharge data were collected by Phase I MS4 permittees between 2007 and 2013 (Ecology 2015). The permittees collected storm-event data under a prescribed monitoring program that represented multiple land uses, storm characteristics, and seasons. Working from the combined analysis of 44,800 data records representing 597 storm events, up to 85 parameters were analyzed in the stormwater samples. Results indicated that metals, hydrocarbons, phthalates, total nitrogen and phosphorus, pentachlorophenol, and PCBs were detected more frequently and at higher concentrations from commercial and industrial areas than from residential areas. Residential areas exported stormwater with the highest dissolved nutrient concentrations (Ecology 2015).

Ecology also recently determined that artificial turf fields are to be considered a pollution generating pervious surface in western Washington (Ecology 2014a). Ecology indicated that their decision to list artificial turf fields as pollution generating was based primarily on two studies identified by King County (personal communication Rachel McCrea, July 2013). Those studies (Connecticut DEP 2010, Moretto 2007) suggest that dissolved metals and organics could

leach from the underflow from these types of artificial turf fields. However, further review of those studies and supplemental analyses of turf fields (Herrera 2010) raises questions about the pollutant generating potential of those surfaces. An additional study (Herrera 2019) found that drainage from crumb rubber infill playfields yields high water quality that does not need treatment prior to discharging into a surface water body, regardless of whether it is a new crumb rubber field or an old crumb rubber field. However, the study did not evaluate the recently discovered toxicant found in tires, 6PPD-quinone (Tian et al 2020). Additionally, as part of the study (Herrera 2019), it was determined that poor water quality of drainage from the tested cork infill playfield was likely due to contamination. Additional testing of drainage exclusively from a cork playfield with new base materials would be needed to accurately characterize pollutant concentrations and determine treatment requirements.

King County also conducted laboratory testing on TPE Pro-Max 37 (TPE) and crumb rubber (two types of synthetic turf infill) in 2017-2019. The study concluded that metals treatment was not necessary for synthetic turf fields using new or used TPE infill, but zinc and copper levels from new and used crumb rubber could harm aquatic life. This study also did not evaluate 6PPD-quinone.

The Toxic Use Reduction Institute (TURI) published a fact sheet in 2020 documenting the pollutants of concern from artificial turf and suggested organically managed natural grass as a safer alternative. TURI reports that using organically managed natural grass may reduce environmental concerns but also may reduce life-cycle costs.

Additional information on BMPs designed to reduce water quality pollution from permanent and temporary (construction) sites is discussed below.

Types of Stormwater Quality Treatment Best Management Practices

Pollutants in stormwater can be reduced through source control activities, regulations prohibiting certain types of discharges, programmatic actions aimed at eliminating illegal dumping and illicit connections, and permanent water quality treatment BMPs designed to remove pollutants contained in stormwater runoff (Ecology 2014b, Ecology 2006, Ecology 2014a). This section focuses on permanent (constructed) water quality treatment BMPs, with a brief discussion at the end of this section on developments in pollutant source control related to street sweeping activities.

Common pollutants of concern targeted by water quality treatment BMPs include sand, silt, and other suspended solids; metals such as copper, lead, and zinc; nutrients (e.g., nitrogen and phosphorous); certain bacteria and viruses; and organics such as petroleum hydrocarbons and pesticides. Methods of pollutant removal include sedimentation/settling, filtration, plant uptake, ion exchange, adsorption, and bacterial decomposition. Floatable pollutants such as oil, debris, and scum can be removed with separator structures. Minton (2002, 2005) provides a thorough discussion of treatment mechanisms and their application in stormwater treatment. The American Society of Civil Engineers (ASCE) and the United States

Environmental Protection Agency jointly prepared (and continue to manage) an extensive “International Stormwater BMP Database” of stormwater treatment system performance data (ASCE/US EPA 1996). The International Stormwater BMP Database is a primary resource for further information on the water quality treatment BMPs discussed below (<www.bmpdatabase.org>).

Infiltration and Bioinfiltration

Infiltration not only provides the flow control benefits discussed previously, but also can be a very effective pollutant removal mechanism. Infiltration and bio-infiltration systems remove pollutants primarily via physical filtration as stormwater passes through the underlying soil, but also via chemical adsorption and precipitation reactions. Biological uptake by plants may also occur in bioinfiltration. In addition, some pollutants such as nutrients may also be utilized by microbes present in the soil. A wide range of vegetated and non-vegetated BMPs utilize infiltration as a portion of their treatment designs. Following is a brief summary of a subset of the extensive infiltration performance studies available. The International Stormwater BMP Database contains extensive additional information for individual BMP types (ASCE/US EPA 1996).

A study of several stormwater infiltration system designs in Pierce County, Washington, showed that infiltration of stormwater through a biofiltration swale underlain by six inches of imported topsoil reduced total copper concentrations by 47 percent, total lead concentrations by 79 percent, and total zinc concentration by 50 percent (Tacoma-Pierce County Health Department/Pierce County Public Works Department 1995). Nineteen storm events were monitored over four years in the study. In contrast to these results, the study also found elevated concentrations of these metals in groundwater under infiltration systems that discharged directly to the gravelly native soils without any other treatment. These results together demonstrate the importance of properly absorptive soil or treatment medium, but also the efficacy of a relatively shallow layer of such soil in removing metals. Hathhorn and Yonge (1996) investigated the potential for groundwater pollution from stormwater infiltration systems using bench-scale systems containing soils found in Washington State and organic soil amendments. They found that copper and zinc tended to be removed by association with organic material, while adsorption onto soil minerals due to cation exchange was the dominant removal mechanism for cadmium and lead. Extensive reviews of the potential for and confirmation of groundwater contamination are provided in Minton (2002) and Pitt (1996).

As referenced previously regarding permeable pavement flow control performance, Booth and Leavitt (1999) also documented the pollution removal capability of infiltration below four types of commercially available permeable pavement systems in comparison to standard asphalt pavement at a municipal building parking lot in Renton, Washington. Total copper and total zinc concentrations in the sampled infiltrate were significantly lower than corresponding concentrations in runoff from the asphalt. Motor oil was detected in 89 percent of the samples from the asphalt runoff, but not in any water sample infiltrated through the permeable pavement. Brattebo and Booth (2003) reevaluated pollution removal at the same pavement

system during nine storms in the winter of 2001-2002. Again, infiltration had a dramatic effect on water quality. Toxic concentrations of copper and zinc were present in 97 percent of the asphalt runoff samples, and in 14 percent of the infiltrate samples. A comparison of the data from the two studies showed that zinc concentrations increased with statistical significance in the later study for both permeable pavement and asphalt, whereas copper concentrations in infiltrate from two kinds of permeable pavement were significantly decreased in the later study (Brattebo and Booth 2003). While Ecology does not currently give water quality treatment credit for stormwater passing through a standard permeable pavement design (i.e., additional treatment design elements must be incorporated into the subgrade material), this and other research has shown that permeable pavement has considerable pollutant removal capabilities for common roadway pollutants such as metals and petroleum (Dierkes et al. 2001, Pratt et al. 1999, Clauson and Gilbert 2003).

Though infiltration can be a very reliable water quality treatment approach, the design and construction must also be carefully scrutinized to ensure appropriate water quality treatment is achieved and maintained. Studies of conventional infiltration trenches in Maryland indicate that up to half of newly constructed (5-years old or less) facilities failed to operate as designed do to clogging or inflow problems (Galli 1992). The study found that lifespan can be increased by proper design of pretreatment systems, use of a sand layer rather than filter fabric at the bottom of the trench, and rototilling the trench bottom to preserve infiltration rates. Other studies in the mid-Atlantic region indicate that infiltration basins also have high failure rates within five years of construction due to clogging (Maryland Department of Environment 1991, Maryland Department of Environment 1986). Facility performance can be increased by constructing facilities with adequate pretreatment, shallow water depths, bypass systems for large storms, careful geotechnical investigations, sand surfacing for the trench bottom, and installation of underdrains (Schueler 1994).

As was noted previously, of the on-site stormwater management BMPs presented in the 2016 Stormwater Code Update, bioretention facilities probably receive the most attention with regards to design variations and performance monitoring. Bioretention BMPs have been demonstrated to provide considerable reduction in stormwater pollutants through infiltration and bioinfiltration, though there have been concerns with the impacts of various imported bioretention soil mixes and the effect they have on pollutant removal and or release from these BMPs, particularly dissolved metals (Ecology 2013b, Kitsap County et al. 2014, WSU 2014). Several recent and ongoing studies have been designed to evaluate and optimize the pollutant removal effectiveness of bioretention facilities, and the City is actively involved in those studies and/or tracking the outcomes as they become available.

Sand Filtration

Sand filtration is a water treatment technology that has been applied to stormwater for decades. A typical sand filtration facility consists of a pretreatment system, flow spreaders, a sand bed, and underdrain piping (Ecology 2014b). A sand filter vault is

similar to an open sand filter except that the sand layer and underdrains are installed below-grade in a vault that consists of presettling and sand filtration cells. A linear sand filter is a long, shallow, two-celled and rectangular vault, with the first cell designed for settling coarse particles and the second cell containing the sand bed (Ecology 2014b). Useful references regarding sand filtration include: Austin (1990), Horner and Horner (1995), Bell et al. (1995), California Department of Transportation (2004), and Minton (2005). These studies show that sand filters can be designed to remove total suspended solids (TSS), metals, biochemical oxygen demand (BOD), petroleum, total nitrogen, and phosphorous.

Minton (2002) cites various studies showing the pollution removal effectiveness of sand coated with iron oxide and sand mixed with iron wool or calcitic lime. Wanielista and Cassagnol (1981) demonstrated that various amended sand media reduced BOD and TSS concentrations in detention pond effluent, and that some nitrogen removal took place in the filters as well. Stormwater filtration using peat mixed with sand is effective at removing metals (Clark et al. 1998). Severe clogging in a sapric peat/sand filter in Minnesota demonstrated the importance of using hemic or fibric peat (Tomasek et al. 1987). These hydraulic problems can be avoided by using commercially available peat pellets.

Basic sand filters are expected to achieve average pollutant removals of 80 percent TSS at influent Event Mean Concentrations of 300 mg/L (King County 1998, Chang 2000). Basic sand filters are also expected to reduce oil and grease to below 10 mg/L daily average and 15 mg/L at any time, with no ongoing or recurring visible sheen in the discharge (Ecology 2014b). Large sand filters are expected to remove at least 50 percent of the total phosphorous compounds (as total phosphorus) by collecting and treating 95 percent of the runoff volume (ASCE and WEF 1998). Pretreatment is necessary to reduce velocities to the sand filter and remove debris, floatables, large particulate matter, and oils. An underground filter should be considered in areas subject to freezing conditions (Urbonas 1999).

Wetpool Facilities – Wet ponds, Wet vaults, Combined Detention and Wetpool Facilities

Water quality facilities built as wetpool facilities – facilities that contain a permanent pool of water – include wet ponds, wet vaults, and combined detention and wetpool facilities. The primary design factor that determines a wetpool's treatment efficiency is the volume of the wetpool. The larger the wetpool volume, the greater the potential for pollutant removal (Ecology 2014b). These facilities provide runoff treatment by allowing settling of particulates during quiescent conditions (sedimentation) and, for above-ground facilities, by biological uptake and vegetative filtration. A wet pond is a constructed stormwater pond that retains a permanent pool of water at least during the wet season. A wet vault is an underground structure similar in appearance to a detention vault, except that a wet vault has a permanent pool of water that dissipates energy and improves the settling of particulate pollutants. A combined detention and wetpool facility has the appearance and design features of a detention facility, but contains a permanent pool of water to also perform water quality treatment functions. Because the wet vault is underground, it

lacks any biological pollutant removal mechanisms, such as algae uptake, that would be present in surface wet ponds.

Studies of pollution removal in wetpool facilities in the Puget Sound region include King County (1995), Comings (1998), and Kulzer (1989). Other useful studies include Driscoll (1986), Gain (1996), Kantrowitz and Woodham (1995), Lawrence et al. (1996), Stanley (1996), Walker (1987), Whipple (1979), and Wu et al. (1996). These studies show that wetpool facilities can remove total suspended solids, total nitrogen, metals, and phosphorous. However, some of the studies showed a net release of some of these pollutants. Wetpools can also remove dissolved pollutants, although their long-term performance in this respect is problematic particularly with respect to dissolved phosphorus (Minton 2004, 2005). Minton (2002) discusses the difficulties in designing appropriate sampling strategies to comparing data from different treatment system evaluation studies. Wetpool facilities can pose a particular problem since they often have a storage volume greater than the influent volume from many storms, so samples of influent and effluent from a single storm do not represent batch treatment of a single test volume of water. A detailed discussion of performance and design elements on wetpool facilities is provided by Minton (2005).

A Florida study of the migration of soluble metals through sediments accumulated in the bottom of highway-runoff wet ponds showed that most of the metals are retained in the top 15-25 centimeters, and that removal of accumulated bottom sediments approximately every 25 years would be sufficient to minimize the potential of groundwater contamination (Yousef and Yu 1992). However, this study did not indicate the native soil type or sediment size distribution, which would affect the results. Most modern wet ponds are designed with an impermeable base layer to prevent any infiltration of stormwater through the bottom sediments.

Stormwater Treatment Wetlands

Water quality treatment in wetlands is achieved through sedimentation, filtration, soil adsorption, chemical precipitation, biological uptake by plants, and microbial transformation of nutrients. Wetland hydroperiod is the primary driver of these processes because hydrology is the most important factor for sustaining wetland processes and plant communities (Mitsch and Gosselink 1986). Hydroperiod of a wetland includes the water depth, flow, and duration and frequency of flooding. The hydroperiod affects species composition and richness, primary productivity, organic accumulation, and nutrient cycling. Wetlands constructed for water quality treatment generally provide high quality treatment similar to the effectiveness of bioretention and infiltration, however with a lower risks of impact to groundwater quality. Although stormwater treatment wetlands typically require large amounts of surface area and are not common in urban areas. Constructed stormwater treatment wetland designs that incorporate long residence times and low velocities are typically the most effective at treating stormwater. Kadlec and Knight (1996) give the following expected pollutant removal performance (listed with constituent concentration) for parking lot runoff treated by constructed stormwater treatment wetlands:

- TSS: 88 – 98 percent (2-10 mg/L)
- Fecal coliform: 60-90 percent (20-500 colonies/100 mL)

- Total zinc: 25 to 95 percent
- Total phosphorus: 89-95 percent (0.02-0.05 mg/L).

The processes that occur in wetlands make them particularly capable of significant metals removal (Kadlec and Knight 1996). These metals removal processes include:

- Binding to soils, sediment, particulates, and soluble organics
- Precipitation as insoluble salts, principally sulfides and oxyhydroxides
- Uptake by plants, including algae and bacteria.

Wetland studies indicate that stormwater treatment wetlands are effective at removing between 21 percent and 95 percent of copper (by mass), with a median of 73 percent for all studies (Feijtel et al. 1989, Hendry et al. 1979, Schiffer 1989, Harper et al. 1986, Sinicrope et al. 1992, Noller et al. 1994, Gladden et al. 2002, Walker and Hurl 2002). Similarly, these studies also show wetlands can be very effective at removal of zinc, with documented removal rates of 33 percent to 96 percent (by mass), with a median of 79 percent for all studies.

Hydrocarbons in wetlands are removed through volatilization, photochemical oxidation, sedimentation, sorption, and biological (microbial) degradation (Kadlec and Knight 1996). Most studies on hydrocarbon removal focused on biological and chemical oxygen demand for municipal waste, but studies do indicate that wetlands are also effective for hydrocarbon removal (Litchfield and Schatz 1989, Litchfield 1993, Tang and Lu 1993, Knight et al. 1994, Fountalakis et al. 2009, Terzakis et al. 2008). Nonetheless, specific values are not presented in this report because of limited applicability to stormwater runoff.

Media Filtration

Media filtration systems typically consist of a vault or catch basin housing a material through which stormwater passed. The performance of a media filtration facility depends on many factors, including the type of media (e.g., diatomaceous earth, leaf compost, perlite, sand, Zeolite, etc.) and the physical properties of the granular media, including size, size distribution, sphericity, porosity, density, and hardness (Minton 2005). Leif (1999) and CSF Treatment Systems (1994) demonstrated that filtration using mature processed leaf compost effectively removed TSS and total metals. Phosphorous concentrations were higher in the effluent than in the influent in the tests by Leif (1999), probably due to degradation of vegetative material washed onto the filter and bird manure deposited on the filter bed. Since compost serves as a cation exchange medium, one would expect metals removal by adsorption, but not removal of phosphorous or nitrate, which are anions. Minton (2002) cited various studies showing the effectiveness of zeolite minerals as a filtration medium to remove metals by cation exchange and phosphorous by anion exchange in cases where the zeolites were amended to improve anion exchange capability. Minton (*ibid.*) also cited the studies on the use of activated alumina, cationic and anionic polymers, synthetic resins, and other media.

There are several proprietary cartridge-based media filters that have been approved for various levels of treatment in Washington by Ecology (see also the Proprietary

and Emerging Technologies section below). These systems typically utilize a proprietary media to achieve targeted water quality treatment results. The list of available and approved technologies changes regularly, so designers are encouraged to visit Ecology's emerging technologies website for current information: <www.ecy.wa.gov/programs/wq/stormwater/newtech/technologies.html>.

Ecology's SWMMWW (2014b) also provides guidance for design and construction of media filter drains (previously known as ecology embankments). The media filter drain consists of a roadside embankment constructed with a wedge of media (aggregate, perlite, dolomite, and gypsum) that dispersed runoff must pass through before entering an underdrain system. Studies conducted by the Washington State Department of Transportation (WSDOT) indicated that media filter drains can remove greater than 80 percent of influent TSS, greater than 50 percent of total phosphorus, and approximately 50 percent of dissolved copper and zinc (Herrera 2006, Herrera 2009b).

Biofiltration Swales

Basic biofiltration swales typically have a trapezoidal or parabolic shaped cross-section and are commonly designed to be an in-line treatment facility. These facilities are designed to remove low concentrations of pollutants such as TSS, heavy metals, nutrients, and petroleum hydrocarbons (Ecology 2014b). A wet biofiltration swale is a variation of a basic biofiltration swale and used where the longitudinal slope is slight, water tables are high, or continuous low base flow is likely to result in saturated soil conditions. Vegetation specifically adapted to saturated soil conditions is needed, which in turn requires modification of several of the design parameters for the basic biofiltration swale (Ecology 2014b). A continuous inflow biofiltration swale is used in situations where water enters a biofiltration swale continuously along the side slope rather than discretely at the head. This type of facility requires an increased swale length to achieve an equivalent average residence time (*ibid.*).

The performance of biofiltration swales is highly variable (Ecology 2014b, Minton 2005). Local biofiltration studies include Goldberg et al. (1993), King County (1995), and Horner (1988).

These studies generally showed that TSS and total metals are removed in biofiltration swales, with phosphorous removal possible to a more variable degree. Field inspection of thirty-nine biofiltration swales in King County found only nine to be in "good" condition; that is, having relatively complete and uniform vegetation cover (King County 1995). While unvegetated systems that contain standing water may remove pollutants through settling under low flow conditions, sediment would likely be resuspended in these systems during higher flows (*ibid.*). Flow-through grass swales function as treatment devices if vegetation remains sufficiently erect to reduce the shear stresses in the channel, thereby reducing its capacity to carry sediment (Carollo et al. 2002).

Non-Infiltrating Bioretention

Typical minimum non-infiltration bioretention planter box widths were reviewed from

other jurisdictions in the Pacific Northwest (Clean Water Services 2016, Gresham 2007).

Filter Strips

Filter strips are vegetated treatment systems (typically grass) which are designed to remove low concentrations and quantities of total suspended solids (TSS), heavy metals, petroleum hydrocarbons, and/or nutrients from stormwater by means of sedimentation, filtration, soil sorption, and/or plant uptake. They are typically configured as linear strips that receive dispersed sheet flow from roads or other surfaces. Contaminated stormwater is distributed as sheet flow across the inlet width (Ecology 2014b).

Newberry and Yonge (1996) found that a vegetated strip removed significant amounts of TSS and metals from simulated stormwater. WSDOT developed a compost amended vegetated filter strip (CAVFS) and found that the system infiltrated more water than a standard roadside embankment. However, the effluent concentrations were not lower in the CAVFS system compared with the unimproved control (Herrera 2009c). In a separate study, WSDOT monitored the performance of unimproved filter strips along Interstate 5 (Herrera 2009d). They found that even 42-year old embankments that were not designed for stormwater treatment removed 94, 83, and 71 percent of influent TSS, total zinc, and total copper, respectively.

Oil Control Facilities

Oil control facilities are designed to remove oil and other water-insoluble hydrocarbons and settleable solids from stormwater runoff. These facilities typically consist of three bays: forebay; separator section; and the after bay. The American Petroleum Institute (API) separator, also called a baffle type separator, contains two baffles. The sludge retaining baffle rises from the floor of the oil/water separator chamber and settled solids are trapped behind this baffle. The oil retaining baffle descends from the top of the chamber and extends at least 50 percent below the depth of the oil/water volume. The floating oil and other hydrocarbons are trapped behind this baffle as the relatively cleaner water flows under and exits the facility (American Petroleum Institute 1990, Ecology 2014b). The coalescing plate separator consists of a series of parallel and inclined plates that provide quiescent conditions for settling and a depth separation to trap oils at the surface (Ecology 2014b).

Proprietary and Emerging Technologies

Proprietary stormwater treatment technologies increasingly are being used to treat stormwater, especially in highly urbanized areas where there is limited space for traditional facilities. The performance of these facilities depends on many factors including but not limited to: sizing, maintenance frequency, installation location, treatment mechanism, treatment media, inlet pollutant concentrations, rainfall intensity, and seasonality. Ecology, in concert with stormwater professionals from the Puget Sound region, developed a protocol for evaluating emerging treatment systems – Technology Assessment Protocol Ecology (TAPE, Ecology 2011b) – and publishes an extensive list of approved technologies (and their technical evaluation study results) on the Ecology website at:

<www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html>. Through this process, Ecology approves BMPs and technologies that can be used for several types of water quality treatment, including pretreatment, oil treatment, basic treatment, enhanced treatment, phosphorus treatment, and treatment at construction sites.

The evaluation process requires rigorous field testing of the new stormwater treatment technologies, after which the vendor submits a technology evaluation report (TER) to Ecology for review and approval. Under the technology assessment process, Ecology assigns “Use Level Designations” to emerging technologies based on the results of the evaluation. These designations are described below (Ecology 2014b).

- **GULD – General Use Level Designation.** A General Use Level Designation (GULD) assigned to technologies for which the performance monitoring demonstrates with a sufficient degree of confidence, that the technology is expected to achieve Ecology’s performance goals. Use is subject to conditions documented in a use level designation letter prepared by Ecology.
- **CULD – Conditional Use Level Designation.** A Conditional Use Level Designation (CULD) is assigned to technologies that have considerable performance data not collected per the TAPE protocol. Ecology will allow the use of technologies that receive a CULD for a specified time, during which performance monitoring must be conducted and a TER submitted to Ecology. Units that are in place do not have to be removed after the specified time period. Use is subject to conditions documented in a use level designation letter prepared by Ecology.
- **PULD – Pilot Use Level Designation.** A Pilot Use Level Designation (PULD) is assigned to new technologies that have limited performance monitoring data or that only have laboratory performance data. The PULD allows limited use of the technology to allow performance monitoring to be conducted. PULD technologies may be installed provided that the vendor and/or developer agree to conduct performance monitoring per the TAPE protocol at all installations. Use is subject to conditions documented in a use level designation letter prepared by Ecology.

In addition, Seattle recently evaluated several catch basin storm filters and found good performance when not clogged; however clogging was a concern at many of the installations in the city (Seattle 2012b, 2013b). National studies and evaluations of the performance of stormwater treatment technologies are also found on the International Stormwater BMP Database (<www.bmpdatabase.org>).

Street Sweeping and Water Quality

Street sweeping with high-efficiency or regenerative air sweepers can be an effective means of removing pollutants from roadways before they become entrained in stormwater runoff. The effectiveness of street sweeping depends on many factors including but not limited to: type of sweeper, sweeping frequency, pavement condition, pollutant build-up, parking restrictions, and season. Studies of street

sweeping effectiveness in the Puget Sound region include Seattle Public Utilities (SPU) and Herrera (2009), Seattle (2012c), and Kurahashi & Associates (1997). Other useful studies include Bannerman (2008), Depree (2008), Eisenberg et al (2007), Florida Department of Environmental Protection (2004), Kalinosky et al. (2012), Law et al. (2008), Nevada Tahoe Conservation District (2011), Pitt (1979, 1985, 2013), Sansalone (2011), Selbig et al. (2007), URS (2010, 2011), Weston Solutions (2010), and Zarriello et al. (2002).

Types of Construction and Grading Site Best Management Practices

Soil erosion from construction sites and grading activities has long been identified as a significant source of sediment and other suspended solids in runoff in many parts of the United States (Ellis 1936, Hagman et al. 1980, Yorke and Herb 1976, Becker et al. 1974) and the primary stormwater pollutant at a construction site remains sediment (US EPA 2007). Sediment from construction and grading sites with poor stormwater control can harm aquatic environments, adjacent properties, public and private roadways, and drainage systems. Numerous studies at large sites (greater than five acres) have shown that the amount of sediment transported by stormwater runoff is significantly greater from sites with no erosion control practices than from sites with erosion controls (US EPA 1999; Owens et al. 2000). Similarly, results of a USGS/Dane County Land Conservation study (Owens et al. 2000) indicate that small sites can also be significant sources of sediment. Sediment loads in stormwater runoff from two monitored construction sites were 10 times greater than that which is typical from rural and urban land uses in Wisconsin. Total and suspended solids concentration data indicate the active construction phase produced concentrations that were orders of magnitude higher than pre- and post-construction periods.

The best way to minimize erosion during land-disturbing and other construction activities is to employ BMPs that keep the soil in place through existing vegetation, erosion control blankets, or other methods. These BMPs help prevent the soil from becoming dislodged during rain events (Ecology 2014b). Erosion and sediment control BMPs can be grouped according to three broad categories:

1. **Cover practices** – temporary or permanent cover that are designed to stabilize disturbed areas
2. **Erosion control practices** – physical measures that are designed and constructed to prevent erosion at the project site
3. **Sediment control practices** – temporary measures designed to prevent eroded soils from leaving the project site by trapping them in a depression, filter, or other barrier.

Ecology has developed a training program to design and inspect erosion and sediment control BMPs to assure they are reducing erosion and sedimentation from construction sites, including all sites subject to NPDES requirements (sites generally over one acre in size). BMPs must be inspected by a Certified Erosion and Sediment Control Lead (CESCL).

In addition to sediment, construction sites can also be sources of other pollutants, such as phosphorus, petroleum products, and products that can affect pH. Source

control practices designed for construction sites can reduce the use of these potential pollutants and/or prevent them from contaminating stormwater (Ecology 2010). Pollutants other than sediment are primarily controlled using good housekeeping practices (such as maintaining vehicles and checking them regularly for leaks, keeping a spill kit on site, controlling concrete washout onsite) and other operational methods to reduce both the risks of pollutants contacting stormwater and the risks and impacts of accidental spills. For example, work can be phased to minimize the amount of soil that is exposed and subject to erosion at any given time. In Washington State it is practical to follow different procedures in the wet season when rain is frequent than in the dry season. West of the Cascade Mountains, Ecology defines the wet season as October 1 to April 30 and the dry season as May 1 to September 30. Extensive information on stormwater BMPs for construction sites can be found in the SWMMWW (Ecology 2014b).

Several documents were reviewed to update mass loading ratios for proprietary water quality treatment technologies. These include *Stormwater Management StormFilter (StormFilter) with Perlite Media* (Contech Engineered Solutions LLC, 2016), *Oldcastle PerkFilter System with SPC Media* (Oldcastle Infrastructure, 2017), *Filterra Bioretention System* (Contech Engineered Solutions, 2020), *BayFilter Enhanced Media Cartridge* (BaySaver Technologies, LLC), *BioPod Biofilter with StormMix Media* (Oldcastle Infrastructure, 2018), *Kraken Membrane Filtration System* (Bio Clean Environmental Services, Inc., 2016).

Types of Industrial Discharge Best Management Practices

Industrial wastewater includes wastewater produced from industrial processes, contaminated groundwater, and stormwater removed from construction sites. An industrial facility in King County discharging wastewater to the county sewer system may be subject to federal and local restrictions, or discharge limits. The King County Industrial Waste Program (KCIW) regulates discharges of industrial wastewater for four types of customers: categorical, high-strength wastewater or “surcharge”, construction, or other non-categorical customers, such as landfills, transfer stations, and groundwater remediation sites. Categorical dischargers include industries such as metal finishing, electronic component manufacturing, and centralized waste treatment. High-strength wastewater, which contains wastes above domestic-strength levels, comes from facilities such as dairies, meat and fish processing operations, and breweries. Construction customers must apply to send contaminated dewatering water from groundwater or stormwater sources to the sanitary sewer system.

The KCIW regulates PCB discharges by two methods: a screening limit and a site-specific limit. Method selection depends on the concentration total PCBs detected in biosolids collected at the site. For sites with total PCB concentrations less than 1 mg/kg, a screening limit of 0.10 µg/L per PCB Aroclor applies. BMPs such as sweeping, catch basin inserts, etc. can be implemented to achieve PCB concentrations less than the screening limit. For sites with total PCB concentrations greater than 1 mg/kg, the site-specific limit applies. Site operators need to incorporate wastewater treatment with granular activated carbon (GAC) as the final polishing step to meet site-specific limits calculated using a spreadsheet (King

County 2023).

Sea Level Rise and Climate Change

Projected sea level rise was assessed using Projected Sea Level Rise for Washington State- a 2018 Assessment (Miller et al 2018 and Mayhew 2020). The *Colorado-New Mexico Regional Extreme Precipitation Study Summary Report Volume VI Considering Climate Change in the Estimation of Extreme Precipitation for Dam Safety* (Colorado Division of Water Resources, 2018) and *Assessment of 2-Hour, 6-Hour and 48-Hour precipitation Time Series for Non- Stationarity and Implications of Assessing Spillway Adequacy for Dams in Washington State* (Schaefer, 2019) were reviewed to assess the potential for changes in precipitation-frequency due to climate change.

SPU has investigated the potential impacts of climate change on precipitation. In 2017, Jacobs (*Combined Sewer Overflow Sizing Approach Implementation: Perturbing Precipitation Time Series to Future Climate Conditions*, Jacobs (formerly CH2M Hill), 2017) prepared a technical memorandum documenting the perturbation of Seattle’s precipitation time series to reflect the possible impacts of climate change. The times series were adjusted to represent possible future climate conditions in 2035 and 2100. The climate-perturbed method used results from multiple peer-reviewed and -approved general circulation models (GCMs) available from the World Climate Research Program’s Couple Model Intercomparisons Project Phase 5 (CMIP5). The precipitation was perturbed using two approaches – a monthly scaling factor for lower-intensity precipitation, and a scaling factor derived from intensity-duration-frequency (IDF) curves for high intensity events.

In 2022, MGS Engineering Consultants, Inc. used the climate-perturbed method developed by Jacobs to perturb the extended time series used for code compliance. The extended precipitation time series was developed by combining and scaling records from distant precipitation stations (Salem, OR; Seattle, WA and Vancouver, BC) to yield a time series with a record length of 158 years. The extended time series allows evaluation of responses to various combinations of storm magnitudes, temporal patterns and sequence of storms. In addition, it allows the estimation of extreme events via interpolation rather than extrapolation as is required with a short time series. The perturbation of the extended time series is documented in *Development of Climate Adjusted Extended Precipitation Time Series for Hydrologic Design Technical Memorandum* (MGS Engineering, February 8, 2022). The extended time series were extended to 2035, 2075 and 2100. The 2075 scaling factors were derived from a linear interpolation of the factors for 2035 and 2100.

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ABBREVIATIONS

AKART	All known, available and reasonable methods of prevention, control and treatment
API.....	American Petroleum Institute
ASCE.....	American Society of Civil Engineers
B-IBI	Benthic-Index of Biotic Integrity
BMPs.....	Best Management Practices
BOD.....	Biochemical Oxygen Demand
City	City of Seattle
ECA.....	Environmentally Critical Areas
Ecology.....	Washington State Department of Ecology
GAC.....	Granular activated carbon
GSI	Green Stormwater Infrastructure
HCI	Habitat Comparison Index
HSPF.....	Hydrological Simulation Program-Fortran
KCIW.....	King County Industrial Waste Program
KCRTS.....	King County Runoff Time Series
LID.....	Low Impact Development
mg/L	Milligrams per liter
MS4.....	Municipal Separate Storm Sewer System
NPDES.....	National Pollutant Discharge Elimination Program
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
RCW.....	Revised Code of Washington
RSMP	Regional Stormwater Monitoring Program
SMC	Seattle Municipal Code
TSS	Total Suspended Solids/Sediment
USGS	United States Geological Survey
WAC.....	Washington Administrative Code
WSDOT.....	Washington State Department of Transportation
WWHM.....	Western Washington Hydrologic Model

2026 Stormwater Code Update

Governance & Utilities Committee

April 9, 2026

Agenda

- **Background**
 - Purpose of Stormwater Code
 - Who does it apply to?
 - Why are we updating now?
- **Schedule**
- **Code Updates Summary**
- **Outreach & Feedback**
- **Next Steps**





Background - Why and What?

Why do we have a Stormwater Code?

- Protects people, property, and the environment from damage caused by stormwater runoff
- Meets the City's obligation to comply with Department of Ecology's Stormwater Permit

What is in the Stormwater Code?

- Source control for ongoing practices
- Construction site pollution prevention
- Onsite stormwater management, flow control and water quality treatment requirements for development

Background - Who?

Who does the Code apply to?

- Private development and City projects
- Businesses
- Residents

Who administers?

- SDCI (private property development)
- SPU (right-of-way development & other provisions)
- SDOT (construction erosion control enforcement for right-of-way)



Background - Why Now?

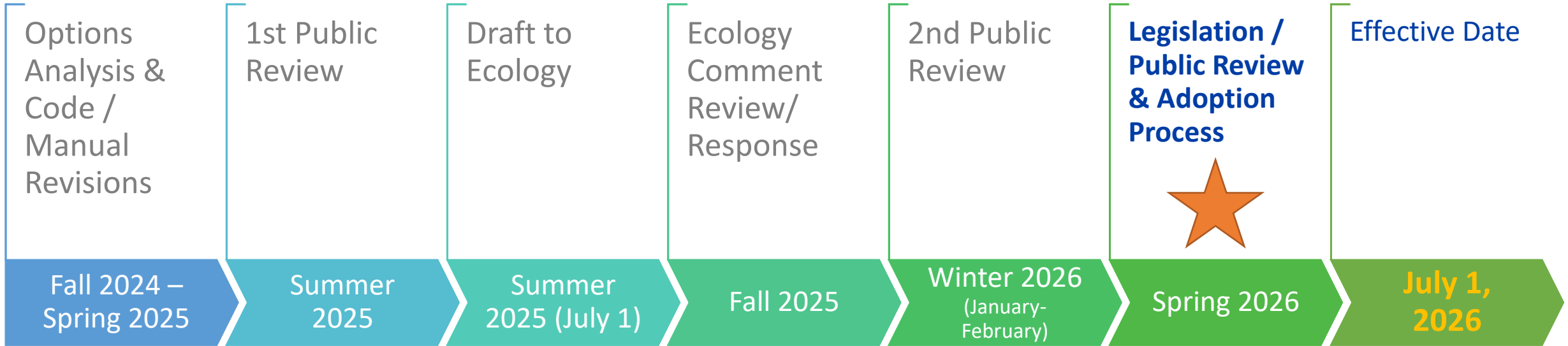
Regulatory Requirement Effective Date -
July 1, 2026

Key Objectives:

- Regulatory compliance with Ecology's Municipal Stormwater Permit
- Policy alignment with current City priorities
- Improved clarity and usability

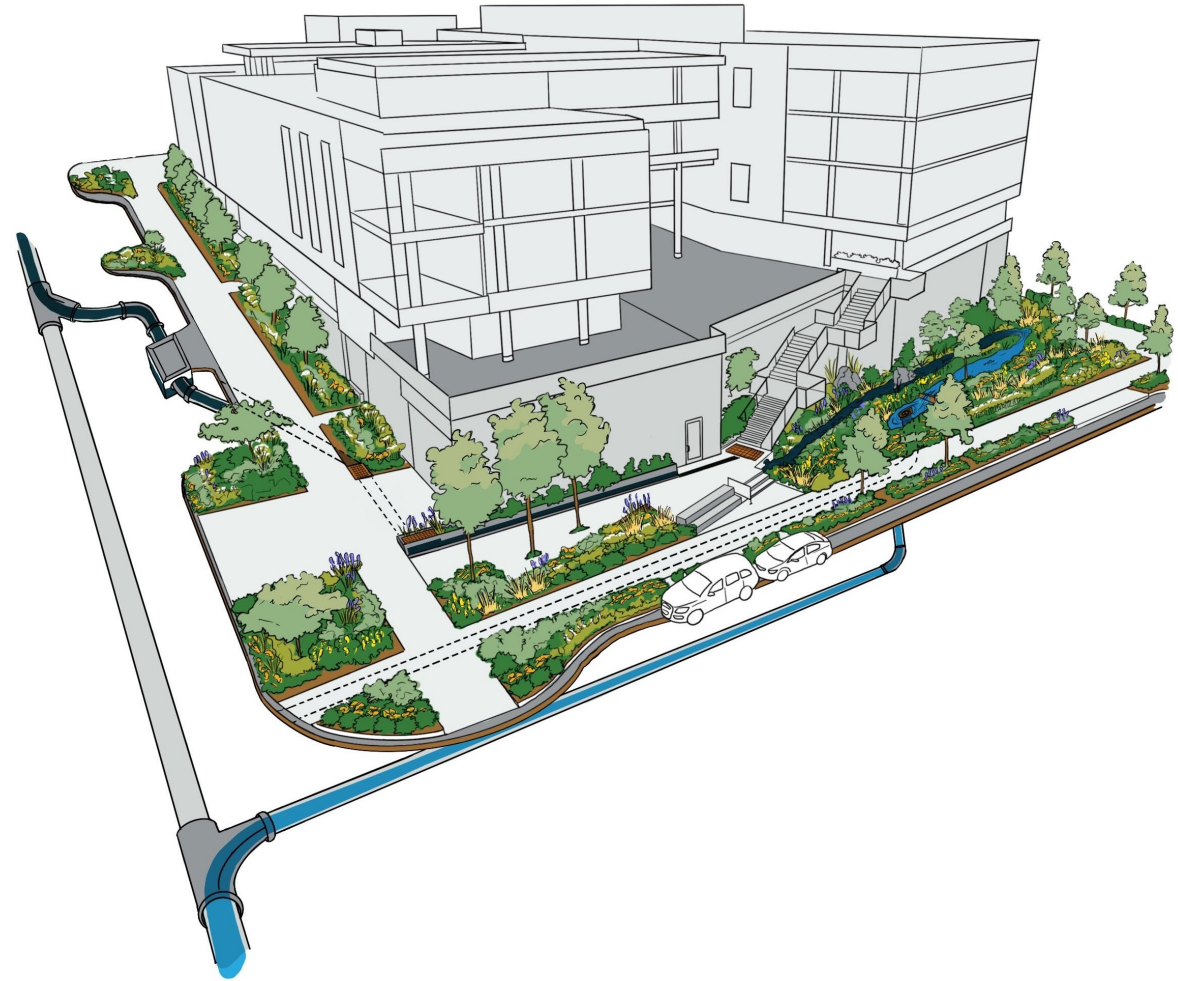


Schedule



Stormwater Code Update - Summary

- Very few new requirements, mostly required by Ecology
- Many technical updates for users of the manual
- Minimal fiscal impacts to the City and capital projects, mostly required by Ecology



Outreach & Feedback

Extensive Public Notification (since October 2024)

- SDCI and SPU listservs announcements
- SDCI Building Connections Newsletters
- 2 public meetings and comment periods
- 4 listening sessions attended by key partners, and development, environmental, and consulting communities
- 1 additional listening session for general public

Over 550 Public Comments Received

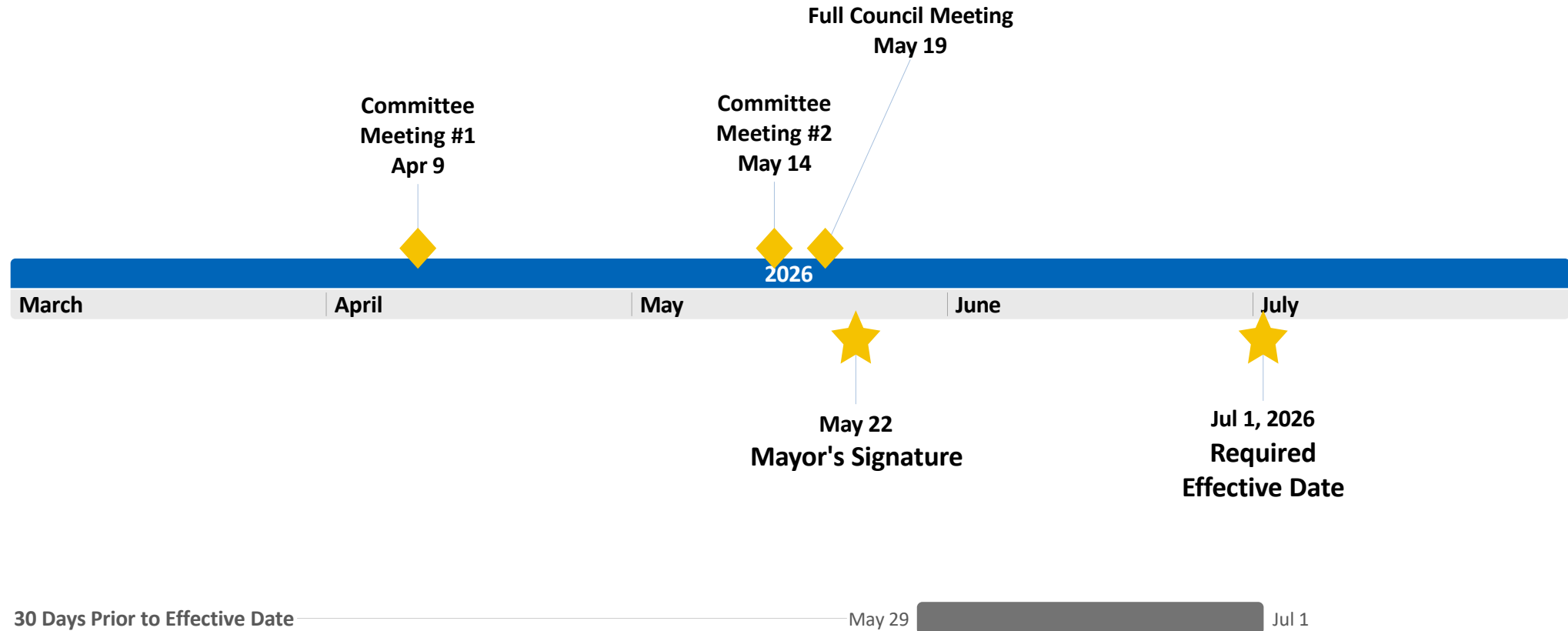
- Many incorporated, the remaining resulted in no changes due to Ecology requirements or policy decisions.
- No significant outstanding concerns.

Comment Takeaways

- Majority are technical in nature
- Strong support for tree preservation, environmental protection, and water quality
- Developer concerns for Ecology's requirements for "like" projects
 - Hosted two meetings with development community to discuss concerns



Legislation Schedule - May Adoption



Questions & Discussion

