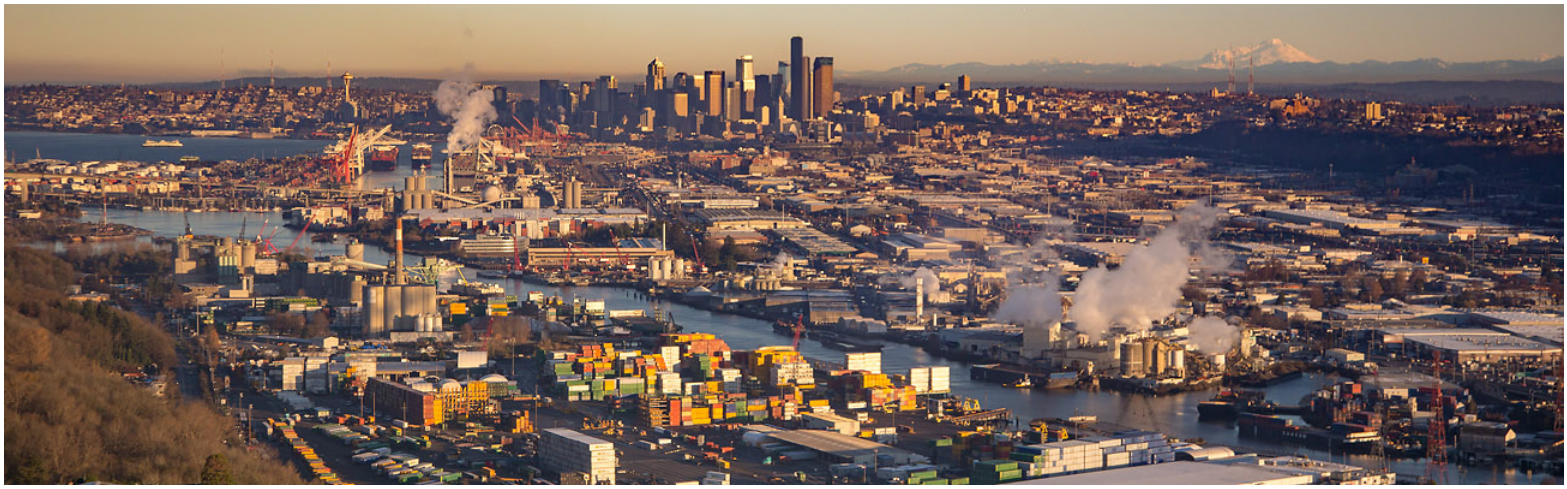
Seattle's Source Control Plan for the Lower Duwamish Waterway (2026 – 2031)



Seattle

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Acronyms and Abbreviations

AKART	All known, available and reasonable methods of prevention, control and treatment
AOC	Administrative Order on Consent
As	Arsenic
BA	Benzoic acid
BAl	Benzyl alcohol
BBP	Butyl benzyl phthalate
BEHP	Bis(2-ethylhexyl)phthalate
CB	Catch basin
Cu	Copper
COC	Chemical of concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbons = sum of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene
CSCSL	Confirmed and suspected contaminated site list
CSL	Cleanup screening level per Washington State Department of Ecology Sediment Management Standards (WAC 173-204)
CSO	Combined sewer overflow
DMP	Dimethyl phthalate
Ecology	Washington State Department of Ecology
EOF	Emergency overflow
EPA	U.S. Environmental Protection Agency
ERTS	Environmental report tracking system
HPAH	High molecular weight polycyclic aromatic hydrocarbons = sum of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k) fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, pyrene
KC	King County
KCIW	King County Industrial Waste
KCWTD	King County Wastewater Treatment Division
LAET	Lowest apparent effects threshold (dry weight equivalent of the sediment cleanup objective)
2LAET	Second lowest apparent effects threshold (dry weight equivalent of cleanup screening level)
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group (City of Seattle, King County, and The Boeing Company)
LPAH	Low molecular weight polycyclic aromatic hydrocarbons = sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, phenanthrene
Hg	Mercury
MEP	Maximum extent practicable

mg/kg	milligrams per kilogram
MH	Maintenance hole
MS4	Municipal separated storm sewer system per the National Pollutant Discharge Elimination System program
MTCA	Washington State Model Toxics Control Act (WAC 173-340)
NEP	Near end-of-pipe
ng/kg	nanogram per kilogram
NOV	Notice of violation
NPDES	National Pollutant Discharge Elimination System
ODS	Outside drainage system. For source tracing purposes, ODS samples include soil, surface dirt, or other material such as paint or caulk.
Parks	Seattle Department of Parks and Recreation
Pb	Lead
PCBs	Polychlorinated biphenyls
PS	Pump station
RAL	Remedial action level
RCB	Catch basin located in the public right-of-way
RM	River Mile
ROW	Right of way
RI/FS	Remedial Investigation/Feasibility Study
SCIP	Source Control Implementation Plan
SCIP 1	City of Seattle Source Control Implementation Plan for 2015-2020
SCIP 2	City of Seattle Source Control Implementation Plan for 2021-2026
SCIP 3	City of Seattle Source Control Implementation Plan for 2026-2031
SCO	Sediment cleanup objective per Washington State Department of Ecology Sediment Management Standards (WAC 173-204)
SD	Storm drain
SDCI	Seattle Department of Construction and Inspections
SDOT	Seattle Department of Transportation
SKCPH	Seattle and King County Public Health
SMS	Sediment Management Standards (WAC 173-204)
SPU	Seattle Public Utilities
TEQ	Toxic Equivalent. Calculated using the following toxic equivalency factors for cPAH per Lower Duwamish Water Group:

benzo(a)anthracene:	0.1
benzo(a)pyrene	1
benzo(b)fluoranthene	0.1
benzo(k)fluoranthene	0.1
chrysene	0.01
dibenz(a,h)anthracene	0.4
indeno(1,2,3-cd)pyrene	0.1

TPH	Total petroleum hydrocarbons per method NWTPH-Dx (diesel extended)
ug/kg dw	micrograms per kilogram, dry weight
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
Zn	Zinc

1. INTRODUCTION

This report presents the City of Seattle's (City's) Source Control Implementation Plan (SCIP) for the Lower Duwamish Waterway (LDW) for the period 2026 to 2031. It is the City's third 5-year plan, presenting information on the City's source control efforts over the past five years and plans for the next five years. The SCIP is developed by Seattle to describe the results and actions focused on source control for the Lower Duwamish Waterway, present information for use in the LDW Superfund Source Control Sufficiency evaluation, and to meet the requirements of Appendix 13 of the 2024-2029 National Pollutant Discharge Elimination System (NPDES) Phase I Municipal Stormwater Permit. The SCIP is focused on the City's stormwater source control efforts which support the cleanup and protection of the LDW. Additional activities and actions, such as those occurring within areas served by the combined sewer system may have impacts on the source control and cleanup efforts within the LDW, so they are addressed within this document as well.

The remedial design phase of the LDW sediment cleanup began in 2016 with the release of the 3rd Administrative Order on Consent (AOC) for the Lower Duwamish Waterway Superfund site, which directed the Lower Duwamish Waterway Group (LDWG) to conduct predesign studies needed to advance the implementation of the Selected Remedy for the LDW (EPA 2016). Seattle has incorporated pertinent data generated as part of these pre-design studies, to assess source control actions and develop priorities for future source control activities. Since then, in 2018, the U.S. Environmental Protection Agency (EPA) issued the 4th AOC (EPA 2018) which initiated the design of the remedy for River Mile 3.0 to 5.0 (Upper Reach). Development of the design occurred over the following 4 years, and cleanup began in the fall of 2024 with an expected completion in February 2026. An additional AOC (AOC 5) was issued in July of 2020 to initiate the design of the remedy for River Mile 1.6 to 3.0 (Middle Reach). Cleanup of the Middle Reach is expected to begin in the fall of 2027.

The City's source control program will have increased focus on the Middle Reach (River Mile 1.6 to 3.0) over the next three years (2025 – 2028) while LDWG plans and designs the Middle Reach cleanup. This increased focus will also apply to the Lower Reach (River Mile 0.0 to 1.6) beginning in 2027 to coincide with the start of active cleanup work in the Middle Reach and shift planning and design work to the Lower Reach. As in the previous SCIP, Seattle's goal over the next five years is to minimize the potential for waterway sediments to exceed the Remedial Action Levels (RALs) set by EPA (Table 1). While meeting the RALs in the offshore sediment is Seattle's goal, it is important to understand that due to the urban and industrial nature of the Duwamish watershed, low levels of contaminants are ubiquitous and will continue being discharged to the waterway during and after cleanup. No amount of source control efforts would eliminate these low-level discharges.

Table 1: LDW remedial action levels.

Chemical	Units	Remedial Action Level	
		LDW-wide	Intertidal
Arsenic	mg/kg	57	28
PCBs	mg/kg	12	65
	µg/kg dw	130[a]	1,000[a]
cPAH	µg TEQ/kg dw	1,000	900
Dioxins/furans	ng TEQ/kg dw	25	28
Benthic SMS	--	2 x SCO[b]	--

Source: EPA (2014).

a. Approximate dry-weight equivalent of the organic carbon normalized value.

b. 10-year post-construction target to meet SCO.

Preventing sediment recontamination and planning longer term objectives will require collaboration among the agencies with jurisdiction, including the Washington State Department of Ecology (Ecology), EPA, Washington State Department of Transportation (WSDOT) and King County. The City assumes that long-term objectives will be established as part of the Ecology led Source Control Program for implementation of the Record of Decision for the LDW. The City regularly coordinates with Ecology and the other agencies to establish the long-term objectives and incorporate them into source control plans.

This plan describes the work conducted to identify and control sources in the LDW since Seattle's 2020-2026 Source Control Implementation Plan (Seattle 2020) was published (covering the period July 1, 2020 through June 30, 2025) and explains the City's source control program in the LDW for the next five years (2026 – 2031). It also describes what has been done and learned up to now and new strategies and improvements that will be tried and evaluated in the future. As this document is being written in late 2024, the data and activities conducted from July 1, 2020 to June 30, 2024 are outlined. Future expansion or changes to the City source control program over the next five years will be predicated on available funding and resources and guided by lessons learned as the program is refined to address future conditions and the ongoing waterway cleanup in the Upper Reach of the LDW (RM 3.0 to 5.0) as well as the planned cleanup of the Middle Reach (RM 1.6 to 3.0) and Lower Reach (RM 0.0 to 1.6).

Background information about the City's stormwater and wastewater infrastructure are provided in Section 2. Summary of findings from Seattle's LDW-specific business inspection, source tracing, and line cleaning programs, are provided in Sections 3, 4, and 6, respectively. Section 9 describes the City's planned source control activities for the next five years and Section 11 describes mechanisms for reporting progress to Ecology.

1.1. APPROACH

In developing this plan, the City used a three-pronged approach: (1) document current source control activities in the LDW, (2) prioritize drainage basins/systems in the LDW, and (3) develop the plan for the next five years and prioritize future program enhancements. The City used multiple lines of evidence to prioritize drainage basins/systems so that future activities could be focused on the most critical areas. Priority basins were selected as follows:

- Locations where elevated levels of contaminants were found in both offshore sediment samples collected in the vicinity of the outfall and storm drain solids samples collected from the downstream end of the drainage system (i.e., near end-of-pipe samples).
- Locations where storm drain solids contaminant concentrations are significantly higher than in other drains in the LDW, which suggests the presence of a unique source(s) in that basin.
- Locations where offshore sediments were predicted to exceed the sediment RAL based on the sediment transport/bed composition model that was developed during the LDW Feasibility Study.

Priority basins were then ranked using the following criteria:

- Evidence of ongoing sources and pollution-generating activities in the basin based on business inspection findings.
- Drainage basin size, which provides an indication of pollutant loading potential.
- Multiple and recurring exceedances of source tracing triggers for chemicals of concern identified in waterway sediment, which indicates a need for additional source tracing.
- Land use characteristics such as percentage of industrial use in the basin.

A detailed description of how basins were prioritized is provided in Appendix E.

Future program improvements are included in this plan and are listed in each section as enhancements.

2. BACKGROUND

Seattle Public Utilities (SPU) has implemented an aggressive source control program in the LDW drainage area since early 2003. At that time, LDWG's municipal partners (e.g., City of Seattle, King County, and Port of Seattle), began to coordinate their efforts to identify and reduce sources of contamination to the LDW. EPA and Ecology were also beginning to develop a comprehensive strategy for controlling sources to the LDW; which was published by Ecology in 2004. Ecology's Source Control Strategy was last updated in 2016.

Since its start in 2003, Seattle's source control program has been successful in identifying and controlling sources of contaminants to the LDW. SPU's source control program includes activities specifically designed to support the cleanup of the waterway, as well as activities that are employed citywide as part of the City's Stormwater Management Program. The LDW-specific activities that Seattle must implement are contained in Appendix 13 of the Ecology-issued NPDES Phase I Municipal Stormwater Permit. While the SCIP describes both stormwater and wastewater systems, Appendix 13 requirements are only applicable to the municipal separated storm sewer system (MS4). The City's LDW source control program includes more comprehensive and frequent business inspections than in other parts of the City. The Appendix 13 LDW-specific activities include focused source sampling, an effectiveness monitoring program, targeted line-cleaning and street sweeping, and an annual prioritization process. These requirements were adjusted by Ecology in the 2024 NPDES Municipal Stormwater Permit and the changes have been incorporated into this document. Citywide activities that also support source control efforts in the LDW drainage areas include the illicit discharge detection elimination programs (including the spill response, water quality complaint response, and dry weather screening programs), , operations and maintenance of the City-owned drainage and wastewater systems and properties, stormwater code development and implementation, drainage system retrofits and other capital improvements, public education and outreach, recreational vehicle wastewater collection, and interdepartmental coordination. These programs are described in Appendix A.

2.2 DRAINAGE AND WASTEWATER SYSTEMS IN THE LDW

The City owns and operates most of the municipal systems that collect stormwater and wastewater from homes and businesses throughout Seattle. Certain areas of the City, including portions of the LDW, convey wastewater and stormwater in a single pipe, in what is called a combined sewer system, while other areas convey stormwater runoff through stormwater specific drainage mainlines to adjacent waterways. King County owns the conveyance system that transports the combined sewer system stormwater/wastewater from the City trunk lines to the treatment plants. Parts of both the City and County wastewater collection systems overflow to the Duwamish when there are combined sewer overflows (CSOs). When the system was originally built early in the 1900's, stormwater and wastewater were collected in the same pipes and the combined sewage was discharged to receiving water bodies, such as the Duwamish Waterway. Later some of the combined sewage was routed to a treatment plant, such as the one that Seattle built near Diagonal Ave S and E Marginal Wy S in 1940.

In 1961, following the formation of METRO, the City and METRO agreed that METRO would take over ownership and operation of the combined sewer trunk lines, collection pipes and associated overflow points for large (1,000 acres or more) basins.[1] The City continued operating the local collection system and overflow points for smaller basins, which conveyed combined stormwater and wastewater to METRO's trunk lines. METRO agreed to "accept" the City's sewage and took responsibility for treating it.

[1] The Metropolitan Sewerage System shall thus include trunk or interceptor sewer facilities extending to a point within each tributary, and natural drainage area, where not more than one thousand acres remain to be served beyond the upper terminus of such trunk or interceptor sewer. Basic Agreement, p. 2.

In 1985 the Washington Legislature enacted a requirement that combined sewer overflows be reduced at the earliest possible date. Ecology directed METRO to reduce the volume of overflows from its CSOs by 75 percent by the year 2005. METRO determined that separating stormwater from sanitary sewage would be the fastest and most cost-effective means to reach that goal. METRO and the City worked together to separate stormwater from wastewater in several drainage basins. A consequence of that effort was that more untreated stormwater was discharged to local water bodies. As our understanding of stormwater impacts has evolved and stormwater regulations were promulgated, CSO control projects have more recently focused on using green stormwater infrastructure to mitigate stormwater impacts to the combined sewer system.

Due to this history, the City currently is served by three kinds of drainage systems[2]:

- Separate storm sewer systems where stormwater is collected in storm drains, which discharge directly to receiving water bodies, and wastewater is collected in a sanitary sewer system which conveys flow to the King County conveyance system and treatment plants at West Point or Renton.
- Combined sewer systems where stormwater and wastewater are collected in a single pipe and flow is routed to the treatment plants via the King County conveyance system. During large storm events, combined flows can exceed the capacity of the conveyance system. When this occurs, excess flows are discharged to the nearest waterway via an overflow structure to keep wastewater/stormwater from backing up into homes, businesses, and on City streets. Seattle and King County both operate combined sewer overflows (CSOs) in Seattle. Seattle currently has only one CSO that discharges to the Lower Duwamish Waterway. It is located at the Diagonal Ave S CSO/SD.
- Partially separated systems where runoff from streets is generally collected in a separate storm drain system, but runoff from private properties (e.g., rooftops, yards, parking lots, and other areas) continues to discharge to the combined sewer system. These areas were once served by the combined sewer system, but the City and METRO later constructed storm drain separation projects that diverted street runoff from the combined system. Most of these separation projects were constructed in the 1960-1990s, typically to reduce the occurrences of combined sewer overflows.

The LDW source control area includes approximately 8,940 acres of land in south Seattle, Georgetown, South Park, the City of Tukwila, and unincorporated King County that are served by separated storm drains (private and public), and approximately 20,000 acres that are served by combined sewers[3] owned by the City of Tukwila, King County and Seattle.

Average annual runoff is estimated at about 4,100 million gallons per year based on average rainfall conditions (1986) with an expected range of approximately 3,100 to 5,300 million gallons per year for typical dry (1993) and wet years (2002), respectively (SPU 2008)[4].

Most of the Duwamish waterfront areas discharge stormwater directly to the LDW via privately-owned storm drains or sheet flow. Upland areas are typically served by a variety of private and public (i.e., City of Seattle, Port of Seattle, City of Tukwila, King County, and Washington State Department of Transportation [WSDOT]) drainage systems. Seattle owns 17 active stormwater outfalls within the five-mile stretch of the LDW. Seattle City Light (SCL) owns three of the City storm drain outfalls, which only serve the Duwamish Substation, located in the Upper Reach. The remaining 14 active stormwater outfalls are owned by Seattle Public Utilities. Seattle

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2 The drainage system is termed the Municipal Separate Storm Sewer System (MS4) by Ecology and EPA.

3 Because much of the area in the LDW is partially separated, the separated storm and combined sewer basins overlap.

4 Annual stormwater runoff was estimated from land use, soil type, slope, and rainfall using a simplified Hydrologic Simulation Program-Fortran (HSPF) model.

also discharges to 15 other outfalls in the LDW that are owned by King County, WSDOT, City of Tukwila, or private entities.

In addition, Seattle operates three emergency overflows (EOFs) that discharge sewage to outfalls owned by King County and the City of Tukwila. Emergency overflows are located on sanitary sewer force mains to relieve backups due to pump station failure or mechanical clogging. All of the sanitary sewer pump stations in the LDW are equipped with backup generators, so these systems are not affected by power outages.

Outfalls owned or used by the City of Seattle in the LDW are listed in and shown on Map 1. The source control activities described in this plan are applicable to the portions of these systems located within the City-owned MS4.

Table 2: Outfalls in the LDW that are owned or used by City of Seattle.

Outfall	Currently Owned or Built By[m]	River Side	Outfall Number [a]	Map Number [b]	Seattle Use	Area (acres) [c]	Diameter (inches)
Upper Reach							
16th Ave S SD (east)	Tukwila	East	3031 3032	4	SD	3.2	12
KCIA SD#2/ PS 78 EOF	King County	East	2062	--	EOF	0	48
KCIA SD#1	King County	East	2080	5	SD	114	30
S Norfolk CSO/PS 17 EOF/SD	Tukwila	East	2095	6	EOF, SD	431 [d] 1,060 [e]	84
I5 SD at S Ryan St	WSDOT	East	NA	7	SD	407	60
16th Ave S SD (west)	King County	West	2215	8	SD	1.3	12
17th Ave S SD	Seattle	West	NA	9	SD	2.9	18
S 96th St SD	Private	West	2100	10	SD	99	72
Duwamish substation SD#3	Seattle	West	NA	11	SD	1.9	8
Duwamish substation SD#2	Seattle	West	2098	11	SD	1	8
Duwamish substation SD#1	Seattle	West	2099	11	SD	0.6	8
W Marginal Pl S SD	Tukwila	West	2200	11	SD	4.9	30
Middle Reach							
Head of Slip 2 SD	Private	East	2019	12	SD	12[o]	24
1st Ave S SD (east)	WSDOT	East	2503	13	SD	15	36
S River St SD	Seattle	East	NA	14	SD	7.6	8
S Brighton St SD	Seattle	East	NA	15	SD	19	30
S Myrtle St SD	Seattle	East	2026	16	SD	8.6	30
S Garden St SD	Private	East	2035	17	SD	1.5	30
I5 SD at Slip4	WSDOT	East	2046	18	SD	65 [f]	72
Georgetown SD	Seattle	East	2047	19	SD	4.5	24
North Boeing Field SD [g]	Seattle	East	None	--	None	0	24
KCIA SD #3/PS44 EOF	King County	East	2049	--	EOF	0	60
SW Kenny St SD/T115 CSO	Seattle	West	2127	20	SD	154 100 [e]	48

Outfall	Currently Owned or Built By[m]	River Side	Outfall Number [a]	Map Number [b]	Seattle Use	Area (acres) [c]	Diameter (inches)
Highland Park Wy SW SD	Seattle	West	2125	21	SD	296 [h]	72
1st Ave S SD (west)	WSDOT	West	NA	22	SD	606	Channel
2nd Ave S SD	Private	West		23	SD	18.4	36 [n]
West Seattle reservoir overflow	Seattle	West	2120	--	Water [i]	None	36
S Webster St SD	Seattle	West	2113		SD	j	6
7th Ave S SD	Seattle	West	2112	24	SD	238	72
Lower Reach							
S Nevada St SD	Seattle	East	NA	25	SD	26	18
Diagonal Ave S CSO/SD	Seattle	East	2155	26, 27	CSO, SD	415 [k] 1,500 2,666	144
SW Dakota St SD	Seattle	West	2253	28	SD	47 [l]	30
SW Idaho St SD	Seattle	West	2147	29	SD	423	72
South Ops Center SD [p]	Seattle	West	--	30	SD	6	30

SD = storm drain, CSO = combined sewer overflow, EOF = emergency overflow, (D) = drainage area, (C) = combined sewer area, PS = pump station, Ops = Operations

Note: outfalls are listed in order from downstream end of waterway to upstream end of waterway starting with outfalls located on the east side followed by those on the west side of the waterway

624 / 5,000 / 2,613 = City CSO basin area / King County CSO basin area / separated drainage basin

a. Number from the Herrera (2004) outfall survey used by Ecology to identify outfalls.
b. Refer to Map Atlas for maps. Maps are grouped by drainage basin area
c. Drainage area in City MS4.
d. Includes portion of S Norfolk CSO/PS 17 EOF/SD drainage basin that can discharge to the I-5 SD at S Ryan St during large storm events.
e. King County combined sewer basin
f. An additional 85 acres from I-5 and railroad right-of-way drain to this outfall
g. This storm drain is no longer active.
h. Does not include the approximately 7.3 acre overlap within the 1st Ave S drainage basin.
i. Overflow from drinking water reservoir. No drainage connections.
j. A single catch basin in S Riverside Dr is connected to this outfall.
k. Seattle combined sewer service area, King County combined sewer service area, and drainage basin, respectively.
l. An additional 9 acres drains to the constructed channel that discharges to the LDW downstream (i.e., east) of the City's outfall. See Section 5.3.3.
m. Entity that is currently responsible for the outfall.
n. Upstream end of private pipe.
o. Includes areas served by private storm drains. City MS4 includes 7 catch basins on E Marginal Wy S and one on 1st Ave S.
p. Formerly known as Herrings House outfall.

2.2.1 City Storm Drains

The City-owned MS4 serves an area of about 5,500[5] acres in the LDW source control area. Stormwater runoff from the City-owned MS4 is discharged to the LDW via 32 outfalls, 17 of which are owned by the City. Maps 4-

5 Includes portions of the I-5 corridor and railroad right-of-way that have not been separately delineated.

30 show the basin areas for outfalls owned by the City of Seattle and outfalls that the City uses to discharge stormwater and/or wastewater from City-owned systems.

2.3 Combined Sewer Overflows

The City and King County both operate and maintain combined sewer overflows (CSOs) in the LDW. This plan does not address actions in CSO basins as SPU and King County are currently updating and implementing Long Term Control Plans to address these discharges and associated potential sources of pollutants. The information is provided to summarize CSOs that discharge via City-owned outfalls in the LDW. CSO basins are shown on Map 3.

Only one City outfall in the LDW is affected by CSOs, the Diagonal Ave S CSO/SD. Both the City (CSO 111) and King County (Hanford #1) combined sewer systems overflow to the Diagonal Ave S CSO/SD outfall. CSO 111 serves an area of approximately 416 acres of mostly industrial and commercial property. The area is partially separated. CSO 111 had 8 separate overflow locations into the Diagonal Ave S system (111A through 111H), but two were sealed in 2011 (111E and 111F) after records showed that these structures had not overflowed since at least 1998 and modeling indicated that these locations had a low probability of ever overflowing in the future (CH2M Hill et al. 2012). Overflow records are summarized in Table 3.

In 2005, SPU modified the overflow structure on the largest overflow point (111D) to allow more flow to enter the King County system for treatment at its West Point facility. In 2014, SPU raised the overflow weirs at outfalls B and C. SPU has been monitoring the system and updated the basin model in 2018. Modeling indicates that raising the weirs has decreased the frequency of overflows at CSO 111 from 1.9 to 1.2 times per year on average (SPU 2019).

CSO 111 was included in the Long-Term Control Plan (LTCP) that SPU prepared to control CSOs throughout the City (CH2M Hill et al. 2015).[6] The LTCP is in the process of being updated as of 2024. Planned control measures for CSO 111 include:

- Partnering with King County to include CSO 111 A-G overflow point control through the planned MDCSO Wet Weather Treatment Facility.
- Offline storage for overflow 111H.

Table 3: CSO 111 overflow records (2012-2023).

Year	No. of Overflows	Duration (hrs)	Total Volume (gallons)	Event Rainfall Totals (inches)
2012	1	26.2	314,968	3.7
2013	3	6.3	11,507	6.1
2014	3	16.6	146,654	5.72
2015	3	6.6	1,056,402	12.3
2016	0	0	0	-
2017	2	5.9	549,547	4.6
2018	1	2.8	56,370	2.9
2019	1	8	1,401,251	4.1
2020	1	4.5	292,182	2.41
2021	2	4.9	309,788	6.13
2022	4	11.4	444,498	8.9

[6] http://www.seattle.gov/util/EnvironmentConservation/Projects/SewageOverflowPrevention/IntegratedPlan/index.htm

Year	No. of Overflows	Duration (hrs)	Total Volume (gallons)	Event Rainfall Totals (inches)
2023	1	15.2	138,803	3.1

The Diagonal outfall also receives overflows from King County's Hanford #1 (Hanford at Rainier) CSO. The Hanford #1 CSO serves an area of about 4,800 acres[7] of industrial and commercial land. Overflows from this system discharge to the Diagonal Ave S CSO/SD via King County's regulator station located at 8th Ave S and S Hanford St. Annual overflows from the King County Hanford #1 CSO to the City's Diagonal Ave S CSO/SD for 2020-2023[8] ranged from a minimum of 18,370,363 gallons in 2021 to a maximum 53,690,401 gallons in 2020 and averaged 30,872,733 gallons per year (King County 2020 through King County 2023). Control of the Hanford #1 CSO is addressed in King County's CSO control plan. For further information, see King County's website at http://www.kingcounty.gov/environment/wastewater/CSO/Library/PlanUpdates.aspx.

SPU is in the process of planning a major capital project to address overflows from CSO 111. The proposed project involves partnering with King County on a wet weather treatment facility which would provide treatment of CSO flows prior to discharge. This project is in the planning phase and should be online by 2032. If SPU is unable to partner with King County through this project, SPU will pursue control methods independently.

2.4 Emergency Overflows

Seattle operates three emergency overflows on sanitary pump stations in the LDW. As explained above, EOFs are relief points on sanitary force mains to prevent sewer backups should the pump fail, or a blockage occur in the line. These discharges are regulated as sanitary sewer overflows (SSO). SPU is required to submit an Environmental Incident Report Form to Ecology's Environmental Report Tracking System (ERTS) for any sanitary sewer overflow immediately once the City becomes aware of the discharge. The City must assess the situation, take appropriate steps to control the discharge, and submit a written report to Ecology within five business days. The report describes 1) the reason for the discharge, 2) date and duration of the discharge, 3) estimated time the discharge is expected to continue if it has not been corrected, 4) estimated discharge volume, and 5) steps taken or planned to reduce, eliminate, or prevent future occurrences. Records from 2009-2019 indicate that EOFs in the LDW source control area occur infrequently (Table 4).

Table 4: Emergency overflow records.

Pump Station	Outfall	Reported EOFs		
		Date	Duration (hrs)	Volume (gallons)
17	Norfolk CSO/PS17 EOF/SD	12/12/10[a]	6.8	1,300,000[b]
17	Norfolk CSO/PS17 EOF/SD	02/19/17[c]	5.2	47,075
44	KCIA SD#2/PS44 EOF	12/12/10[a]	4.4	72,000
45/78[d]	KCIA SD#2/PS44 EOF	--	--	--
45	KCIA SD#2/PS44 EOF	02/19/17	0.2	100
NA[e]	7966 Perimeter Rd S	09/19/19	68	320,000
45[f]	KCIA SD#2/PS44 EOF	1/03/21	3.5	21,000
45[f]	KCIA SD#2/PS44 EOF	1/02/22	17	100,000
45[f]	KCIA SD#2/PS44 EOF	1/06/22	28.8	161,441
45[f]	KCIA SD#2/PS44 EOF	2/28/22	24	125,200

[7] Total area served by the combined sewer. Includes about 1,500 acres that drain to the combined sewer in this area (Phillips 2013).

[8] Data not available for 2024 as of the drafting of this SCIP 3 document.

Pump Station	Outfall	Reported EOFs		
		Date	Duration (hrs)	Volume (gallons)
45[f]	KCIA SD#2/PS44 EOF	12/24/22	81.7	5,676
17	Norfolk CSO/PS17 EOF/SD	12/5/23	12	400,000
45[f]	KCIA SD#2/PS44 EOF	12/6/23	28.9	135,000

a. Seattle rain gauges recorded a 50- to 100-year event on December 11-12, 2010. Under these conditions, inflow and infiltration can overwhelm the capacity of the sewer system, because City systems are not designed to handle this size storm event.
b. Worst case estimate. No evidence that duckbill valve opened to allow flow from the sanitary sewer to discharge to the storm drain. SPU crews did not observe any evidence of sewage in the ditch downstream.
c. Pump station capacity exceeded
d. PS78 overflows to PS45.
e. Overflow occurred at MH 072-037 due to blockage in sanitary sewer line caused by vandals (plywood dumped in maintenance hole). Sewage flowed down ditch and entered KCIA SD #1 drainage system. SPU removed approximately 3,000 gallons of sewage from ditch and surface soil from about 800 feet of ditch.
f. PS45 found to be overflowing due to cross connection from KC Airport, resulting in substantially increased rainwater inflow to sanitary system. Cross connection was resolved in early 2024.

3. BUSINESS INSPECTION PROGRAM

SPU inspects businesses in the LDW to ensure that they are complying with City Stormwater Code requirements for pollution prevention. Inspections are conducted as a part of the NPDES Municipal Stormwater Permit requirements as well as for targeted source tracing activities when a pollutant is discovered through sediment sampling activities. Businesses are assigned a risk ranking, which is based on the potential for the business to impact the MS4, and this ranking determines the frequency of inspection that the business will be held to. This frequency may be adjusted due to reported spills or water quality incidents and source tracing sampling results in the proximity of these properties. Between the start of the SCIP 2 period and the drafting of SCIP 3 (2024) SPU conducted 554 inspections at 360 businesses in the separated drainage areas of the LDW.[8]

A detailed description of SPU's inspection program is provided in Appendix A. Improvements made over the past 5 years are summarized below:

- **Ongoing database improvements**. In 2018, SPU converted to a new database based on the Microsoft Dynamics platform. Since 2019, SPU has worked to refine a mobile accessible inspection program called the Resco Cloud platform to improve access to information for inspectors. Continuous development phases in 2020, 2021, and 2023 have focused on workflow improvements, data quality safeguards, further automation of the business correspondence process, and simplification of the reporting process.

Technical assistance. Inspectors have improved business compliance through increased dissemination of best management practice literature as enclosures or attachments in corrective action letters.

- **Interagency coordination**. SPU has taken the lead on the Duwamish Inspector Group coordination and has worked to broaden the inspector group to include agencies and municipalities that have not traditionally participated. This has improved coordination and information sharing amongst those with source control responsibilities in the LDW and has improved response time for emerging issues.

[8] The number of inspections exceeds the number of businesses due to many businesses being inspected more than once during SCIP phase.

- **Inspection checklist**. Included with the ongoing database improvements, the inspection checklist has been restructured to trigger code and inspection reminders and to highlight potential violations for the inspectors, reducing the potential for missed regulatory citations.
- **Business inventory proofing.** During the COVID-19 pandemic, while inspectors were unable to conduct in person inspections, a thorough business inventory assessment was conducted. The businesses listed in the inspection inventory were cross referenced with businesses licensing data, street view and other internet data listings, as well as block scale data checks to remove closed businesses. This process greatly reduced the total number of businesses within the business inspection inventory, and updated sites to incorporate newly opened businesses. A regular data check is conducted by inspection staff to keep the inventory up to date.

3.1 Corrective Actions

When inspectors find violations of the stormwater code and/or potential sources of pollutants impacting the stormwater drainage system, they require businesses to implement corrective actions to address these violations or control these sources. All violations found are noted in the corrective action letters issued to businesses, and all issues are required to be addressed in order to close out the inspection cycle. With the 2019 changes to the database, corrective actions are now tied directly to the BMP requirements in the City Stormwater Manual.

To enable comparison between the pre-SCIP2 phase and the SCIP 2 phase, corrective actions have been organized by BMP in Table 5. Historically, SPU utilized a three-stage process for compliance, where businesses would be issued a corrective action, then a follow-up second and final letter if the business had not yet reached compliance, followed by a Notice of Violation. In 2017, the second and final process was removed from the compliance schedule and more strict compliance language was added to the corrective action letter. The removal of the second and final process has resulted in a substantial decrease in total corrective actions issued due to the reduction in compliance letters issued, but no reduction in compliance successes with businesses inspected. Additionally, over time, inspections conducted within the Lower Duwamish Waterway have noted fewer compliance issues with the businesses that are being inspected, resulting in a decreasing number of corrective actions issued. This is viewed as the natural progression of the business inspection process, where businesses better understand the code and BMPs and stay in compliance with these items between inspection cycles. There has also been a reduction in the total businesses operating within the LDW, as well as a shift from manufacturing and heavy industrial businesses to warehousing and commercial operations, requiring less frequent inspections. All of these factors have reduced to total number of inspections required and available to conduct annually within the LDW. From 2020 – June 30th, 2024, a total of 554 inspections were conducted. Approximately 33% of business inspections (181) resulted in a corrective action letter issued, with 442 total corrective actions required of the businesses.

Table 5: Summary of corrective actions.

Corrective Action Category	Number of Violations Pre-SCIP 2	% of Pre-SCIP 2 Violations	Number of Violations 2020 - 2024	% of SCIP 2 Violations
Spill plan	281	13.9%	58	13.1%
Clean onsite catch basins	280	13.9%	70	15.8%
Spill kit	202	10.0%	51	11.5%
Stormwater and spill response training	219	10.8%	2	0.5%
Referral to partner agency	199	9.9%	2*	0.5%
Illicit connection, prohibited discharge	121	6.0%	20	4.5%
Spill cleanup	58	2.9%	12	2.7%
Container storage	143	7.1%	64	14.5%
Perform routine site maintenance	148	7.3%	19	4.3%
Solid waste storage	12	0.6%	47	10.6%
Repair, map, or install drainage infrastructure	145	7.2%	31	7.0%
Cleaning and washing	58	2.9%	18	4.0%
Storage of leachable or erodible materials	100	5.0%	18	4.0%
Equipment and vehicle repair	24	1.2%	6	1.4%
Material transfer	11	0.5%	14	3.2%
Vehicle and equipment fueling	20	1.0%	10	2.3%
Total	2021		442	
* Referrals to other agencies were removed from the Corrective Action list in 2020. Referrals still occur to other agencies where deficiencies are found but are no longer included as a corrective action.				

3.2 NOTICES OF VIOLATION

From 2020 to 2024, SPU issued 13 Notices of Violation (NOV) letters to businesses in the LDW. The cause for the NOVs were:

- Spills, either due to negligent discharges or failing to report the incident (7).
- Failure to implement appropriate BMPs (5),
- Broken or clogged side sewer (1).

On some occasions, businesses were issued NOV letters citing more than one code violation. One of the "failure to implement BMPs" NOVs was issued to a business located in a combined area.

SPU started issuing monetary penalties in 2009, with penalties suspended in some cases to compel compliance. Suspended penalties are often waived if the business corrects the problem within the specified period. During this reporting period, penalties were waived for 2 of the NOVs. Penalties ranged from $250 to $9,000, with the most common penalty being $500 (4), a median penalty of $1000, and an average across the values of $1,538.

3.3 REFERRALS

SPU Source Control staff regularly inspect sites and respond to spills and water quality complaints. During these activities, they often identify businesses that may need assistance with regulations outside of SPU's jurisdiction. To efficiently address these issues, referrals are made to the appropriate agencies.

For hazardous waste handling, labeling, and disposal, businesses are directed to King County's Hazardous Waste program, who can provide technical and financial assistance for small quantity generators. For large quantity generators, the businesses are referred to Ecology for regulatory oversight. Industrial waste issues, such as process waste being discharged to the sanitary or combined sewer, are referred to King County's Industrial Waste program.

Businesses that contribute pollutants to the MS4 and cannot be adequately addressed through SPU's Corrective Action or Notice of Violation processes, or other components of the City's Stormwater Management Program, may be referred to Ecology's Water Quality program as potential significant contributors. Additionally, businesses that require industrial stormwater permits through Ecology but have not yet obtained them are referred to Ecology Water Quality for NPDES permit coverage.

3.4 Inspection Program Source Identification Examples

Hydro-excavation Waste Facility

On March 20, 2023, SPU received a report that a hydro-excavation company was improperly dumping wastewater into a drain. Upon investigation, SPU found discolored water with a petroleum sheen and odor downstream of the reported location, a hydro-excavation business that had closed for the day. The site was referred to SPU's business inspection program for follow up.

On March 21, SPU Business Inspectors and King County Industrial Waste (KCIW) conducted an unnannouncedjoint inspection of the site. They observed two third-party owned tanker trucks discharging at the site, with one discharging wastewater onto the parking lot pavement and the second discharging into a storage tank. The storage tank was part of a water treatment system that discharged to the sanitary sewer. The flow meter for this tank had been removed from the discharge pipe, allowing the wastewater to flow directly into the sewer.

During the investigation, the hydro-excavation company stated that technical issues with its treatment system led to them to instruct the third-party waste hauler to discharge improperly. The third-party waste haulers stated that the water was from a state-managed construction project in Seattle. Dye testing conducted on the pavement drains confirmed that they connected to the stormwater system where pollutants had been observed on March 20 and that the system ultimately discharged into the Lower Duwamish Waterway.[9]

On March 22, SPU spoke with the project engineer from the state-managed construction site where the discharged water originated. The engineer explained that the water was high in metals such as copper, lead, and zinc, and could not be treated by the construction site's water treatment system. Analytical results confirmed this.

The hydro-excavation company was issued an NOV for prohibited discharge to the stormwater system and violations of permissible discharge regulations to sanitary sewer. A penalty of $9,000 was imposed. The third-party waste hauling company was also issued an NOV and a penalty. Stormwater code and best management practices were conveyed to both businesses and both were warned to comply with these regulations or face increased penalties and associated cleanup costs.

Georgetown Recycling Facility

In late 2022, SPU was contacted by staff from the KC Wastewater Treatment Division and KCIW to assist in source tracing elevated PCBs and Mercury that they had found in samples collected from sediment traps located

[9] The City completed all appropriate notifications in accordance with the MS4 Permit (G3 [ERTS #721565] and S4.F [notification letter submitted to Ecology on 4/19/2023])

within their South Michigan CSO basin. To assist the County in addressing these pollutants, SPU Business Inspection staff screened the CSO basin and noted several business operations that were potential sources of the pollutants of concern. Two weeks later, the Business Inspection staff collected samples of street dirt and catch basin settled solids in areas that could be impacted by these potential sources.

Sample results indicated PCBs and mercury present in solids adjacent to a metal recycling facility within the screened basin area. The recycling business had relocated to the site a few years prior and lacked adequate drainage and treatment infrastructure on the property for their operation.

A joint meeting was held with agencies that are involved in regulating recycling facilities including Seattle King County Public Health (SKCPH), KCIW, KCWTD, and SPU Business Inspectors. During the meeting, it was determined that the site would need to make structural modifications and install treatment to comply with the various code requirements for recycling facilities, including a Stormwater Code update that went into effect in 2021, which added scrap metal operations to the Citywide BMPs. These regulations previously only applied in the areas of the city which were served by the MS4.

To compel the structural changes necessary for the business to operate in compliance with Code overseen by the various agencies involved at the site, SPU Business inspectors issued an NOV with a deferred penalty dependent on a compliance deadline imposed on the property. The business requested that a Voluntary Compliance Agreement be negotiated so that adequate time would be allowed for the design, permitting, and installation of the required treatment system. In the interim, the business would implement the Code requirements and implement a temporary treatment system, with the understanding that the NOV penalty would be forgiven if they complied with the terms of the Voluntary Compliance Agreement.

A temporary treatment system was installed in the fall of 2023, with the permanent treatment system scheduled for installation in late 2024, pending permits and approvals. The business was able to continue to operate in the location while minimizing their risks of discharge through implementation of BMPs and operation of temporary control measures. Drainage structures impacted by the operation were cleaned to remove accumulated settled solids. Follow up sampling will occur after the permanent treatment system is operational to assess its function.

4. SOURCE TRACING/SAMPLING PROGRAM

This section describes the City's sampling efforts to identify and characterize sources of contaminants discharged to and from the City-owned MS4 drainage system. SPU conducts source tracing to determine the extent and location of contaminants within the drainage system. Sampling is designed to identify sources by sampling at key locations within these systems. Sampling generally starts at the downstream end of the system or at key junctions within the system and systematically moves upstream to identify sources. In addition, inspectors also collect samples from catch basins on private property during business inspections if problems or unusual conditions are encountered during the inspection and permission is granted by the property owner. SPU refers to these as "private onsite catch basin" samples.

Data generated by the sampling program are used to:

- Identify sources of contaminants to the City-owned MS4
- Characterize storm drain solids that may be discharged to the LDW to inform LDW recontamination analyses
- Identify and prioritize City-owned MS4 sections for cleaning.

Source tracing is an iterative process relying on snapshot data obtained from samples collected in conveyance pipes and ground surfaces. While the concept is simple, in practice it can be difficult to locate individual sources

due to a variety of factors, such as the size of the basins being investigated, potential for multiple sources to exist, the availability of solids to sample, and numerous other variables. Source tracing works best when contaminants associated with a site are significantly elevated and the site discharges into a relatively flat section of pipe where material can accumulate. Over time, as many of the sources of pollutants have been identified and controlled, source tracing has become more challenging.

A detailed description of SPU's source tracing program is provided in Appendix A.

4.1 2020-2026 PROGRESS

4.1.1 Source Tracing

Between July 1, 2020 and June 30, 2024, SPU collected source tracing samples from 24 storm drains in the LDW drainage basin. Samples were collected in 13 of the 17 city-owned outfalls and 11 of the other 15 outfalls used by Seattle in the LDW (Table 6). Sample locations are shown on Maps 31-53. A detailed description of the source tracing results for each major drainage basin discharging to outfalls either owned by or used to discharge stormwater and/or wastewater from City-owned systems is provided in Section 6 of this SCIP. Box plots of the sample results for select chemicals are provided in Section 6 as well.

Table 6: Summary of source tracing samples in the LDW (July 2020 through June 2024).

City-owned outfalls	Sample Type	Other outfalls[a]	Sample Type
Upper Reach			
17th Ave S SD	Trap, inline, ODS, CB	**16th Ave S SD (east)**	Inline, Trap
Duwamish Substation SD#3	None[b]	**KCIA SD #1**	Inline
Duwamish Substation SD#2	None[b]	**S Norfolk St CSO/PS17 EOF/SD**	Trap, Inline, CB
Duwamish Substation SD#1	None[b]	I5 SD at S Ryan St	None[c]
		16th Ave S SD (west)	Inline
		S 96th St SD	Trap
		W Marginal Pl S SD	None
		KCIA SD#2/ PS 78 EOF	None[d]
City-owned outfalls	**Sample Type**	**Other outfalls[a]**	**Sample Type**
Middle Reach			
S River St SD	Inline, Trap	**Head of Slip 2 SD**	Inline
S Brighton St SD	Inline, ODS	**S Garden St SD**	Trap, CB
S Myrtle St SD	Trap, CB	**I5 SD at Slip 4**	Trap, Inline
Georgetown SD	Inline, ODS	**1st Ave S SD (west)**	Trap, Inline, CB
SW Kenny St SD/T115 CSO	Trap, CB	**1st Ave S SD (east)**	Inline, CB
Highland Park Wy SW SD	Trap, Inline	**2nd Ave S SD**	Inline, CB
S Webster St SD	CB	KCIA SD #3/PS44 EOF	None[d]
7th Ave S SD	Trap, Inline, CB		
North Boeing Field SD	None[e]		

City-owned outfalls	Sample Type	Other outfalls[a]	Sample Type
Lower Reach			
S Nevada St SD	CB, ODS		
Diagonal Ave S CSO/SD	Trap, Inline, CB, ODS		
South Ops Center SD	Inline		
SW Idaho St SD	Trap		
SW Dakota St SD	Inline		

Note: Outfalls are listed in order from upstream end of the waterway to downstream end of the waterway starting with outfalls located on the east side followed by those on the west side of the waterway
Trap = inline sediment trap, CB = catch basin grab sample, inline = inline grab sample
ODS = outside drainage system (e.g., soil or street dirt, and other materials such as paint or caulk)

a. Receives discharges from City-owned stormwater and/or wastewater collection systems.
b. Sampling attempted, but not enough sediment present for chemical analysis.
c. Sampling attempted, but structures submerged. Samples collected from upstream portion that splits to S Norfolk St CSO/PS17 EOF/SD
d. Outfall serves the KC Airport only but provides an Emergency Overflow Point for Sanitary Pump Stations.
e. This storm drain is not active.

Sample counts by sample type are summarized in Table 7.

Table 7: Source tracing sample counts by sample type (July 2020 through June 2024).

Sample Type	Count
Sediment trap	84
Inline grab	54
Private onsite catch basin grab	4
Right-of-way catch basin grab	68
Soil/street dirt	16
Total	226

In 2020-2024, SPU installed new traps at 4 locations (Table 8). Traps were installed to provide near-end-of-pipe data for future Source Control Sufficiency analyses or to support source tracing efforts.

Table 8: New traps installed 2020-2024.

Reach	Year	Number	Storm Drain	Purpose	
				Long term monitoring[a]	Source tracing
Upper	2022	2	S 96th St SD	X	
Middle	2022	2	S Garden St SD	X	
Middle	2022	2	16th Ave S SD (East)	X	X
Middle	2023	2	S River St SD[b]	X	X

a. Traps installed near the downstream end of the system to support long term monitoring/source control sufficiency evaluation.

b. S River St SD traps installed in 2023 were removed after it was discovered that they were impacting the flow within the tidally-influenced pipe segment in which they were installed. Grab samples will be collected annually from this location to provide long term monitoring data.

SPU currently maintains sediment traps at 24 locations in 13 of the major storm drains discharging to the LDW. Traps are installed to monitor the quality of solids discharged to the LDW and, in larger basins where multiple traps are installed, to isolate contributions from major sub-basins contributing to the outfall. Trap installations are summarized in Table 9 and shown on Map 58. Several proposed trap locations from SCIP2 were investigated and determined to be infeasible for trap installation due to pipe diameter, pipe material, or safety risks associated with trap installation in submerged structures.

Table 9: Sediment traps maintained by SPU in the LDW.

Storm drain	Trap Type	No. of trap Locations	Year Installed	Last sampled by SPU
Upper Reach				
17th Ave S SD	Modified-Norton	1	2017	April 2024
S Norfolk St CSO/PS17 EOF/SD	Modified-Norton	4	2007	March 2024
S 96th St SD	Trent Bowl	1	2022	August 2023[b]
Middle Reach				
S Myrtle St SD	Trent Bowl	1	2016	June 2024
S Garden St SD	Trent Bowl	1	2022	April 2024
I5 SD at Slip 4	Modified-Norton	1	2005	May 2024
SW Kenny St SD/T115 CSO	Modified-Norton	1	2008	May 2023[b]
Highland Park Wy SW SD	Modified-Norton	2	2008	May 2023[b]
1st Ave S SD (west)	Modified-Norton	3	2008	April 2024[b]
7th Ave S SD	Modified-Norton	2	2008	April 2024[b]
16th Ave S SD (East)	Trent Bowl	1	2022	May 2023[b]
Lower Reach				
Diagonal Ave S CSO/SD	Modified-Norton	3	2003-2016	June 2024[b]
SW Idaho St SD	Modified-Norton	3	2008[b]	April 2024[b]
Total		24		

a. Traps located in SW Idaho St SD were damaged in 2022 and were replaced in 2023 with new modified-Norton traps.
b. Sampled in 2024 outside of SCIP drafting cutoff. Data included in sample analysis runs through June 30, 2024.

4.1.2 Overview by Chemicals Found in Storm Drain Solids Samples (2003 – 2024)

This section summarizes results of SPU source tracing efforts in the City MS4 for the entire period of record (2003-2024). Data analysis focuses on results for the following chemicals of concern in waterway sediment and chemicals commonly found in storm drain solids samples collected from the City MS4 and from catch basins on private property that drain to the MS4.

- Arsenic
- Bis(2-ethylhexyl) phthalate (BEHP)

- Copper
- Lead
- Mercury
- Zinc
- Low molecular weight polycyclic aromatic hydrocarbons (LPAH)
- High molecular weight polycyclic aromatic hydrocarbons (HPAH)
- Polychlorinated biphenyls (PCBs)
- Carcinogenic polycyclic aromatic hydrocarbons (cPAH).

LPAH = Sum of acenaphthene, acenaphthylene, anthracene, anthracene, fluorene, naphthalene, and phenanthrene.

HPAH = Sum of benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, total benzofluoranthenes, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene.

cPAH = Total toxic equivalent concentration calculated as the sum of benzo(a)pyrene, benzo(a)anthracene, total benzofluoranthenes, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene adjusted using the toxic equivalency factors specified in WAC 173-340-900.

Overall results, which combine data from nearly 670 samples (inline grabs, inline sediment traps, and grab samples collected from catch basins in the right-of-way), are summarized in Table 10 and discussed in the following chemical specific sections. Private catch basin samples and samples collected prior to line cleaning within the structure sampled have been removed from the data set and the chemical specific discussions that follow. Samples collected between 2020 and 2024, including in locations where cleaning occurred after sample collection, are included in the data sets to allow for sufficient sample numbers for analysis. Chemicals of concern in the LDW sediment are frequently detected in City storm drains, but for most contaminants (i.e., arsenic, copper, lead, mercury, LPAH, HPAH, and cPAH), concentrations are relatively low with only occasional exceedances of the SMS screening levels. The major exceptions are zinc, PCBs, and bis(2-ethylhexyl)phthalate (BEHP), butyl benzyl phthalate, and dimethyl phthalate where SCO exceedances occur in 51, 43.5, 68, 70.8, and 49 percent of the samples, respectively. However, CSL/2LAET exceedances of zinc (14.1 percent) and PCBs (3.9 percent) are uncommon. Only BEHP frequently exceeds both the LAET and 2LAET screening levels (68 and 63 percent of the samples, respectively).

Detailed discussions of sampling results for the period of record are presented in the following locations in this report:

- Results for the entire period of record for inline samples collected near the downstream end of each MS4 drainage system are summarized in Section 4.3. SPU considers these near end-of-pipe inline samples to be most representative of storm drain solids discharged to the waterway.
- Box plots for each chemical by outfall are provided by chemical within each chemical sub-section below (Figures 1 through 9, and 10 through 13).
- Discussion of results by outfall are provided in Section 4.3.
- Discussion of major sources identified to date and status of source control activities are provided in Appendix D.
- Discussion of the process used to prioritize the City's source sampling activities over the next five years is provided in Appendix E.

Table 10: Summary statistics for select contaminants in drain solids collected from the City MS4.

	Count	% Detect	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	576	61	57	93	<0.52	452	14.8	10	1.2	1
Copper	576	100	390	--	<8.7	1,170	123	97.2	3.3	--
Lead	576	99.6	450	530	1.42	40,500 [d]	178	70.3	2.4	1.9
Mercury	576	81	0.41	0.59	0.005	27.2	0.19	0.08	4.9	3.3
Zinc	576	100	410	960	35.5	6,110	561	429	51	14.1
LPAH	569	95	5,200	--	6.5	97,400	1,445	435	4	--
HPAH	569	99	12,000	17,000	<7	444,730	7,507	2,788	8.8	6.3
cPAH	567	98	1,000[a]	--	<9	68,382	957	338	79	--
PCBs	649	77	130	1,000	8.8	13,300[c]	281	105	43.5	3.9
BEHP	568	98	1,300	1,900	<5.5	98,700	6,001	3,650	68	63
BBP	569	67.3	63	900	<6.7	71,000	624	190	70.8	8.8
DMP	569	34.4	71	160	<4.3	36,000	254	68	49	24.4
TPH-Oil	283	98.6	2,000[b]		16	16,000	2,514	1,600	43	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH = total petroleum hydrocarbons, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH
All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between 2003 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way), except for samples collected prior to line cleaning. Samples collected in private drainage structures and from the ground surface were excluded. If MS4 lines were cleaned prior to 2020, only post-cleaning samples from these lines are included, as line cleaning activities would have removed pre-cleaning contamination. Samples collected from lines cleaned between 2020 and 2024 were included in the data set to ensure sufficient sample numbers to provide analysis. See the description of line cleaning activities in section 6 for additional information.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.
c. Does not include samples collected in the storm drain on Denver Ave S where a PCB spill was discovered in 2019. See Section 7.1.1.
d. Inline grab sample collected in 2019 in Diagonal Ave S CSO/SD from discrete deposit beneath a lateral entering at ST2 from the adjacent property. Lead in the three sediment trap samples collected at this location were below the SCO.

When a sample is found to have exceeded the CSL/2LAET for any chemical of concern is received, source tracing activities are conducted to attempt to find and eliminate the source of these materials. The SPU Source Control business inspectors are notified of the exceedance and tasked with trying to find the source and remove the contamination. This process often involves additional sampling, localized focused business inspections, and follow-up line cleaning activities by either SPU or a private business to remove residual contamination.

Chemical concentrations are typically higher in samples collected from private onsite catch basins compared to right-of-way catch basins. This is expected given that onsite samples are usually collected either 1) during a business inspection when inspectors observe high-risk pollution generating activities and/or problems with the business' pollution prevention practices or 2) as the last step in source tracing to confirm that a particular site is a source of contaminants to the City storm drain system. When these sources are discovered, corrective actions

are issued to eliminate the discharge through modifications to storage or operations. Catch basins or drainage lines are cleaned to remove the accumulated materials.

4.1.2.1 Arsenic

Arsenic continues to be found sporadically and at primarily low concentrations in the City MS4. As a result, SPU does not consider arsenic a chemical of concern for municipal storm drain discharges. It has been detected in 60.6 percent of the 576 samples collected in the MS4 since 2003.. Arsenic samples exceeded the SCO and CSL screening levels in 1.2 percent (7 samples) and 1 percent (6 samples) of the samples collected, respectively.

The highest concentration (452 mg/kg) was found in an inline grab sample collected in 2019 at the sediment trap pilot test station in the Diagonal Ave S CSO/SD. None of the three sediment trap samples collected at this location in 2019 (7.42-15.4 mg/kg) exceeded the SCO. Other samples that exceeded the SCO screening level (57 mg/kg) include:

- The 2019 NST4 sediment trap location within the S Norfolk St CSO/PS EOF/SD. The sample contained 95.4 mg/kg, and was collected during redevelopment activities at an adjacent warehouse property. Samples collected prior to and after 2019 did not exceed the SCO screening level. Redevelopment activities replaced a large portion of the drainage system flowing into the sample location. Subsequent samples from this location have had substantially lower arsenic levels.
- A sediment trap sample from Puget Creek within the SW Idaho St SD collected in April of 2024 contained 249 mg/kg arsenic. This sample was collected from the natural watercourse in a residential neighborhood. This sample analytical result was characteristically very different from prior samples collected from the location and upstream investigations have not identified any sources of pollutants. Prior samples collected from this location contained low levels of arsenic, when it was detected.
- A newly installed sediment trap in the S 96th St SD contained 92.6 mg/kg. This trap location has a small industrial basin upstream and is heavily impacted by concrete fill dust.
- Diagonal Ave S CSO/SD (3 inline grab samples collected at various locations in the drainage system). Two of these samples were near the 2019 sediment trap pilot test station and may have had the same source. The other sample was collected from a maintenance hole adjacent to a play field in a residential neighborhood. None of the 35 inline samples collected near the downstream end of the Diagonal Ave S CSO/SD system have exceeded the SCO, which indicates that this outfall is not a significant contributor of arsenic to the waterway.

Arsenic exceeded the SCO in less than two percent of the surface sediment samples collected from the waterway and none of these sampling locations is near an outfall that is owned by the City or that receives stormwater and/or wastewater from a City-owned system (AECOM 2012a). See Appendix E for detailed description of SMS exceedances in waterway samples collected near outfalls and their impacts on basin prioritization.

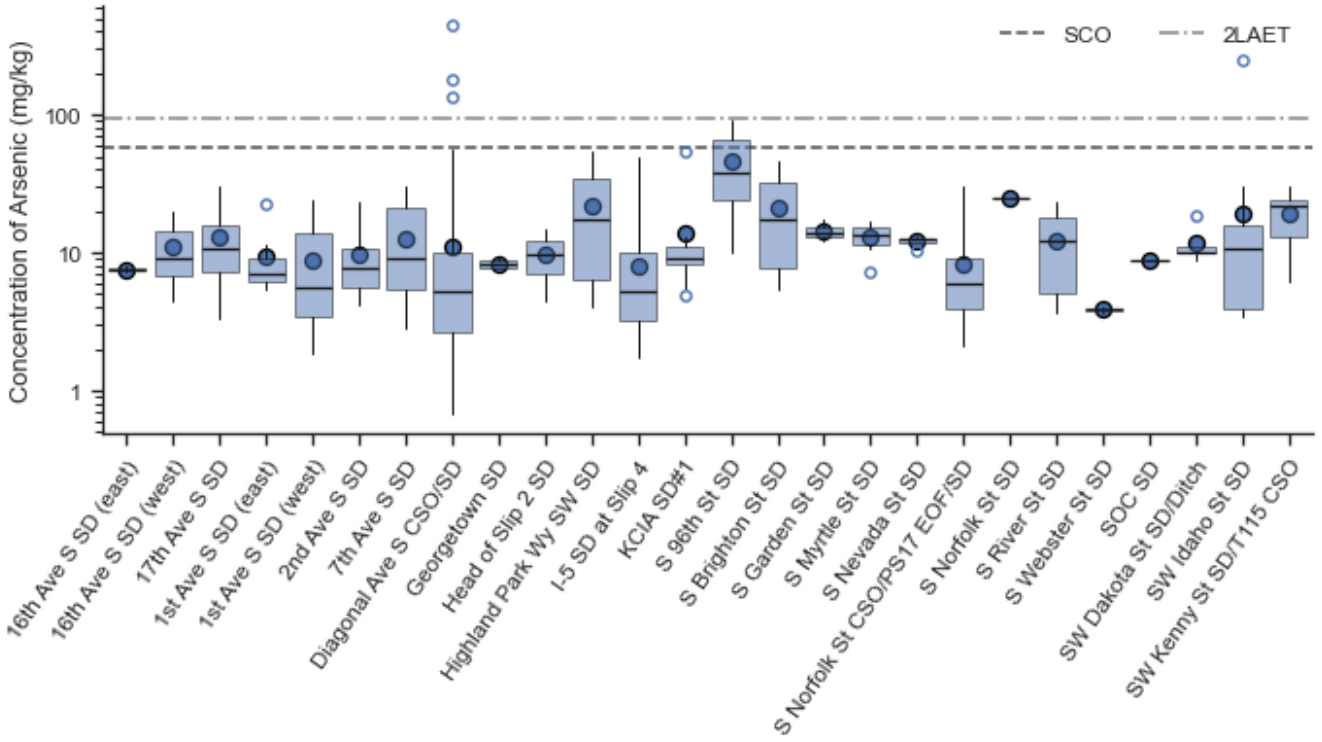


Figure 1: Arsenic box plots by drainage basin

4.1.2.2 Copper

Copper is commonly associated with electrical equipment and metal working industries as well as with brake pads on vehicles. It has been found frequently in samples collected in proximity to recycling facilities and other locations where metal materials are stockpiled, as well as within roadside catch basins. Copper was detected in all 576 samples collected in the MS4 but exceeded the SCO/CSL screening level in only 3.3 percent of the samples.

Copper has exceeded the SCO/CSL in near end-of-pipe samples collected from five outfalls, including S Myrtle St SD, S Garden St SD, 17th Ave S SD, a grab from the 7th Ave S SD, and the KCIA SD#1. Five of the 19 exceedances occurred in the S Myrtle St SD and one occurred in the S Garden St SD, adjacent to a metals recycling facility. A lawsuit completed in 2019 required the metal recycling facility to make modifications to their operation to help to control contaminants leaving the site. The drainage samples from the basin have seen a reduction in copper levels since the implementation of these changes, which coincided with increased drainage system maintenance and sweeping conducted by SPU. Several locations that had previously been found to have elevated copper within source trace samples have not exceeded the copper SCO/CSL since their most recent cleaning, including the Highland Park Wy SW SD near-end-of-pipe samples.

Copper exceeded the SCO in only about one percent of the 1,994 surface sediment samples collected from the waterway (Windward 2019) and, with the exception of one sample collected 100 feet upstream of the 2nd Ave S SD, none of these sampling locations is located within 200 feet of an outfall that is owned by the City or that receives stormwater and/or wastewater from a City-owned system (Windward 2010). See Appendix J for a detailed description of SMS exceedances in waterway samples collected near outfalls.

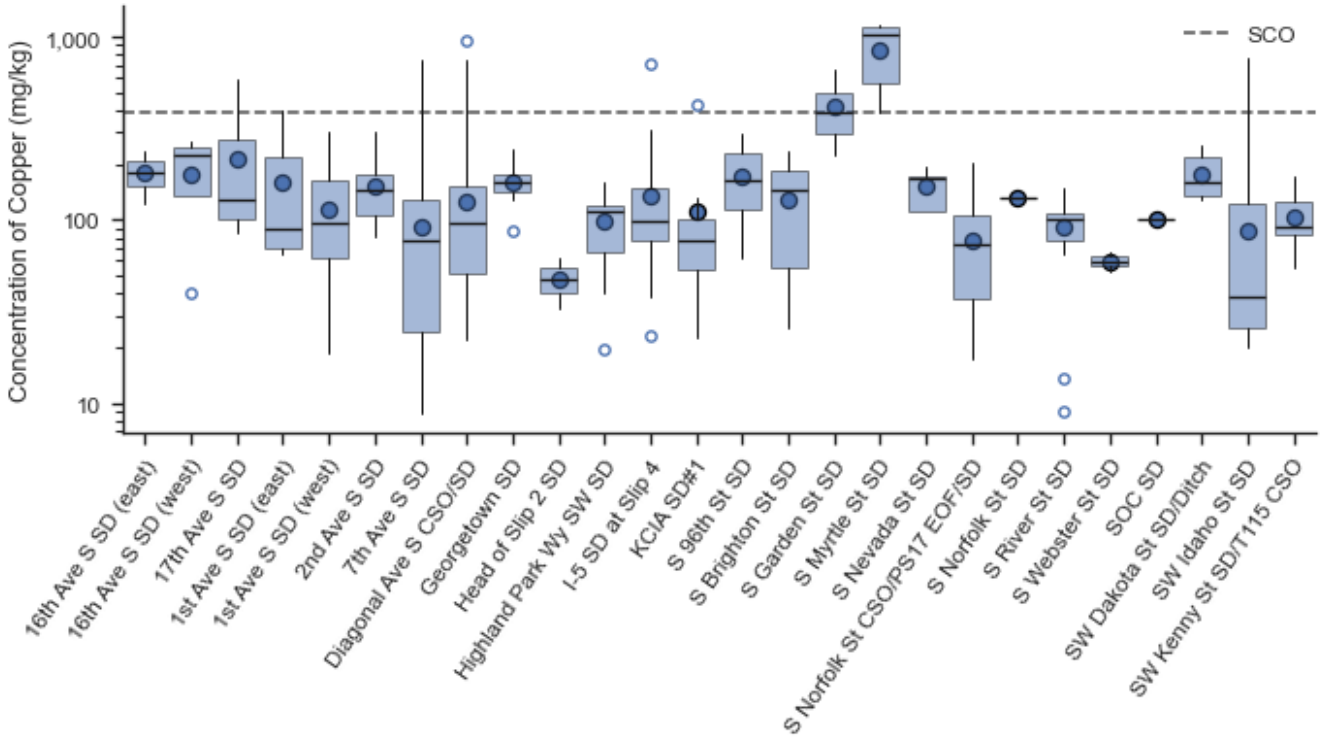


Figure 2: Copper box plots by drainage basin

4.1.2.3 Lead

Lead is typically associated with metal working facilities and recyclers, weathered legacy paints, leaded fuels which are still used in light aircraft and older electrical equipment. Lead was detected in all but two of the 576 samples collected in the MS4. Roughly 2.4 percent of these samples exceeded the SCO screening level and just under two percent exceeded the CSL screening level. Like copper, lead exceeded the CSL in near end-of-pipe samples collected from the S Myrtle St SD and S Garden St storm drains, as well as in sediment trap samples collected within the SW Idaho St SD, Highland Park Way SW SD, and the WSDOT owned I5 at Slip 4 SD. Additional exceedances were found in roadside catch basins adjacent to heavily trafficked arterials, as well as along SW Front St. The SW Front St location discharges into the SW Kenny St SD/T115 CSO basin, which accepts sheet flow runoff from the Port operated T115 site and the Lafarge Cement Plant. SPU suspects that when elevated lead is identified in roadway samples, it is often due to lead tire balance weights that have fallen onto the roadway and have made their way into the site drains. While new lead wheel weights were banned in Washington State in 2011, they are still regularly encountered on the roadway surface during sampling events from older vehicles or vehicles imported from out of state. SPU expects that the prevalence of these weights will drop over time as new vehicles replace older ones and more states ban the use of lead for this purpose.

Lead exceeded the SCO in only about two percent of the 2,124 surface sediment samples collected from the waterway (Windward 2019). The 2nd Ave S SD (Trotsky Inlet), which is a private outfall, is the only outfall that receives stormwater and/or wastewater from a City-owned system where lead exceeded the SCO within 200 feet of the outfall (AECOM 2012a). Samples from within the 2nd Ave S SD in proximity to SPU's inputs have not indicated lead is present above the SCO within the SPU operated portion of this system. Based on these data, it does not appear that the City MS4 is a significant contributor of lead to waterway sediment.

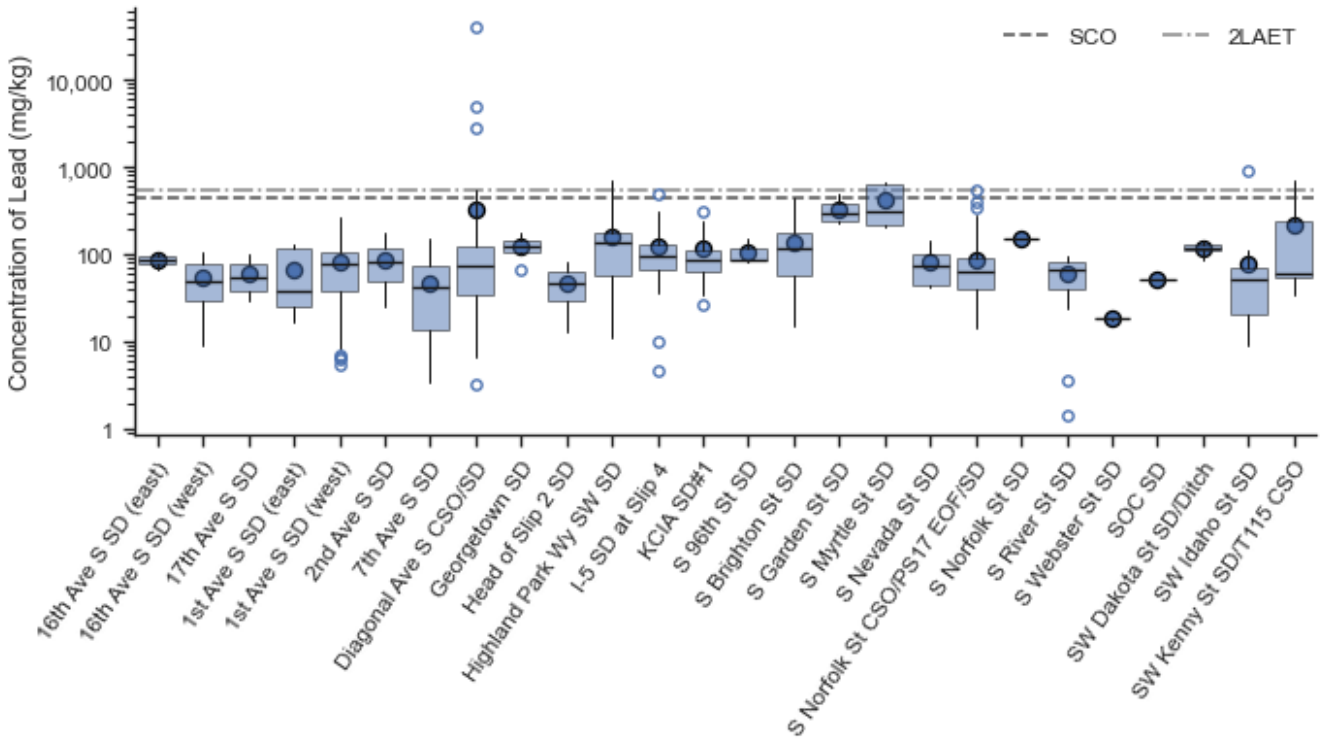


Figure 3: Lead box plots by drainage basin

4.1.2.4 Mercury

Mercury is typically associated with electrical equipment, appliances, and recycling facilities. It is a key component within fluorescent light tubes and bulbs, switches within appliances and vehicles, as well as within some batteries. It may also be found in some metal fabrication facilities. Mercury was detected in 81 percent of the 577 samples collected in the MS4 but exceeded the SCO and CSL screening levels in only 4.9 and 3.3 percent of the samples, respectively. Samples from private drainage assets were excluded from the analysis, but elevated mercury levels have historically been found near recycling (0.8 – 27.2 mg/kg), battery (2.05 mg/kg), machine shop (2.2 – 4.3 mg/kg), and equipment design/testing (0.66-0.86 mg/kg) businesses. Only one of these businesses (Seattle Iron and Metals Company) operates under an NPDES Industrial Stormwater Permit issued by Ecology.

Mercury concentrations were also elevated during the SCIP 1 phase (1.5-7.6 mg/kg) in inline samples collected from a small sub-basin, called the S Snoqualmie Sub-basin of the Diagonal Ave CSO/SD drainage basin, located near Airport Wy S and 7th Ave S. SPU has cleaned the storm drain lines and conducted extensive source tracing efforts in this area but has not yet identified a source. Near-end-of-pipe samples have fluctuated from well below the SCO to exceeding the CSL in four samples out of 39 (0.6-2.72 mg/kg). SPU continues to monitor this sub-basin working to identify any ongoing sources and plans to collect annual samples from within the sub-basin.

Only 4 percent of the 1,958 surface sediment samples collected in the LDW were greater than the SCO and less than the CSL, while 3 percent of the samples were greater than the CSL (Windward 2019). Slip 4, Trotsky inlet, S Myrtle St SD, and 7th Ave SD are the only sampling locations where SMS exceedances occurred near an outfall that either is owned by the City or that receives stormwater and/or wastewater from a City-owned system. One sample collected 165 feet offshore of the Diagonal Ave S CSO/SD outfall exceeded the SCO for mercury, but

none of the samples collected within 100 feet of the outfall exceeded the SCO. In addition, none of the samples collected since the 2004-2005 Diagonal Duwamish Early Action Area cleanup have exceeded the SCO for mercury. See Appendix J for a detailed description of SMS exceedances in waterway samples collected near outfalls.

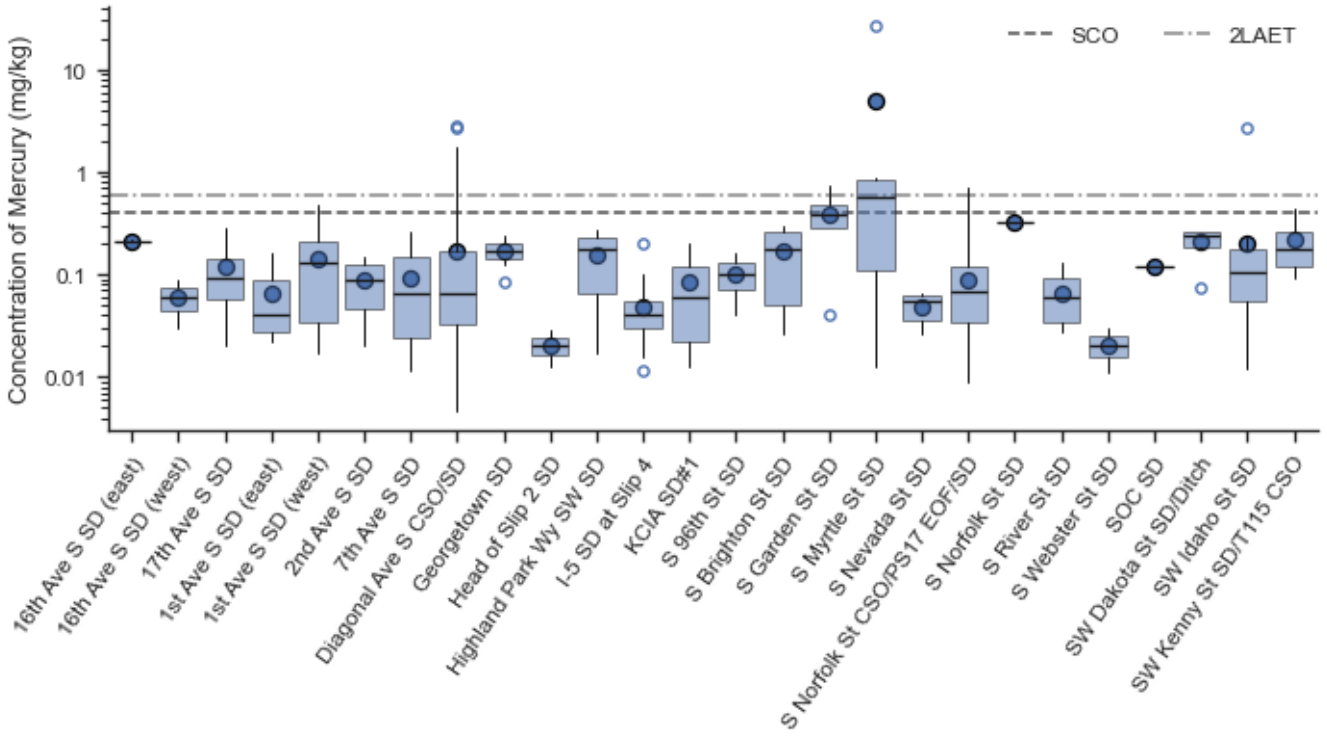


Figure 4: Mercury box plots by drainage basin

4.1.2.5 Zinc

Zinc is a common component of galvanized materials (e.g., fences, roofs, flashing, pipe, and heating and ventilation equipment), automobile and equipment tires, motor and hydraulic oils, and chemical treatments for moss control. The widespread use of the metal has resulted in elevated levels of zinc being found in roadside catch basins and inline grabs. Zinc is frequently found in private catch basins in parking lots as well as in areas used to store metals, tires, and other zinc containing materials. Zinc was detected in all 576 samples collected in the MS4. Fifty-one (51) percent of the samples exceeded the SCO screening level and 14 percent exceeded the CSL screening level. However, zinc was not often found above SCO in waterway sediment. Only 3.1 percent of the surface sediment samples collected in the LDW were greater than the SCO and less than the CSL, while 1.9 percent of the samples were greater than the CSL (AECOM 2012a). One of these samples is located within 200 feet of an outfall owned by the City (Diagonal Ave S CSO/SD)[10]. Two are located near an outfall that receives stormwater and/or wastewater from a City-owned system (16th Ave S SD and 2nd Ave S SD). See Appendix J for a detailed description of SMS exceedances in waterway samples collected near outfalls. Because of the widespread use of zinc and the low frequency of zinc in waterway sediment, SPU has not focused source tracing efforts on zinc.

10 Sample DUD005 collected in 1994 prior to King County's 2004-2005 Duwamish/Diagonal Early Action Area cleanup. Zinc did not exceed SCO in surface sediment samples collected post-cleanup.

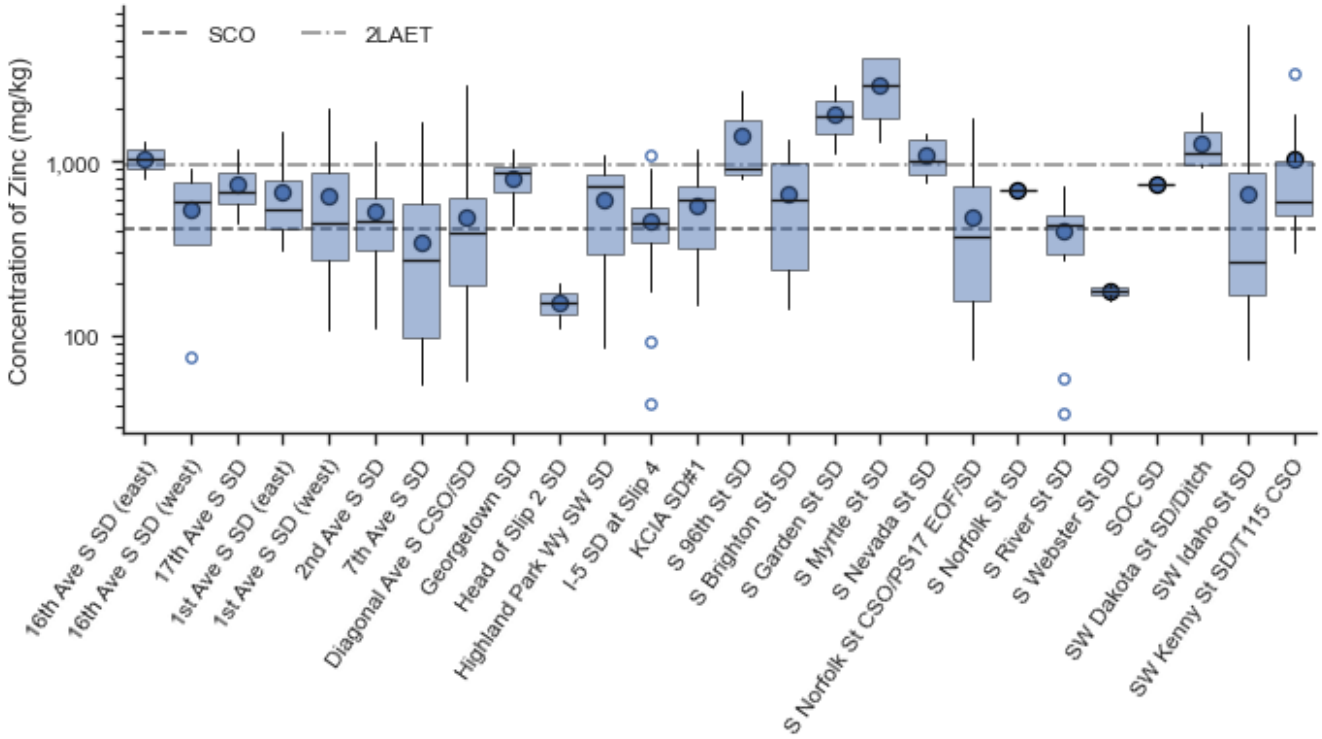


Figure 5: Zinc box plots by drainage basin

4.1.2.6 LPAH

LPAH was detected in approximately 95 percent of the 569 samples collected in the MS4 but exceeded the LAET/2LAET screening level (5,200 ug/kg dw) in only 4.0 percent of the samples. Median concentrations of LPAHs in right-right of way catch basin and inline samples was 434.9 ug/kg dw.

Historically, the highest LPAH concentrations were found in two catch basins in the parking lot at the King County Sheriff's storage facility located within the S Snoqualmie St Sub-basin of the Diagonal Ave S CSO/S, where coal tar sealant had been used on the pavement (140,100 ug/kg dw at CB222 and 173,200 ug/kg dw at CB221) at some time in the past. King County removed the sealant material and resurfaced most of the parking area in 2016. LPAH concentrations in samples after the sealant was removed were below the LAET (483-514 ug/kg dw in CB221 and 4,519 ug/kg dw in CB222). These structures were cleaned, as was the downstream drainage mainline, so these samples were not included in the analysis of concentrations.

Line cleaning is often used to remove accumulated PAHs, such as LPAH. The cleaning process removes all solids from the drainage system and heavy particles, like dirt and rock, are slow to return. LPAHs are often associated with light weight, easily transported particles, like soot. These particles are typically the first that re-enter the drainage system, as they can be transported by runoff generated by light rains. After cleaning drainage lines, SPU has sometimes observed an initial *increase* in levels of LPAHs during the following sampling season. Over time, as other solids accumulate in the drainage system, the LPAH concentrations in samples gradually decrease, eventually falling below the levels observed when the active source was still present. Further cleaning in the area typically reduces LPAH levels even more, as it removes more of the residual contamination.

Samples collected in the past five years that contained elevated levels of LPAH are listed in Table 11.

Table 11: Samples containing elevated levels of LPAH (2020-2024).

Sample	Date	Sample Type	Outfall	LPAH (ug/kg dw)
MH23	05/01/24	Inline Grab	Georgetown SD	97,400
RCB86	01/24/24	Right-of-way catch basin	S Nevada St SD	47,404
MH52	02/02/22	Inline Grab	Diagonal Ave S CSO/SD	34,846
MH23	06/06/23	Inline Grab	Georgetown SD	23,852
MH74	10/07/21	Inline Grab	S Norfolk St CSO/PS17 EOF/SD	12,215
RCB398	01/09/24	Right-of-way catch basin	Diagonal Ave S CSO/SD	8,944
MH23	05/11/22	Inline Grab	Georgetown SD	8,323
RCB298	07/05/23	Right-of-way catch basin	S Webster St SD	5,516

LPAH exceeded the SCO in less than 1 percent of the surface sediment samples collected from the waterway and only one of these sampling locations is near an outfall (7th Ave S SD) that is owned by the City or that receives stormwater and/or wastewater from a City-owned system (AECOM 2012a).[11] See Appendix J for a detailed description of SMS exceedances in waterway samples collected near outfalls.

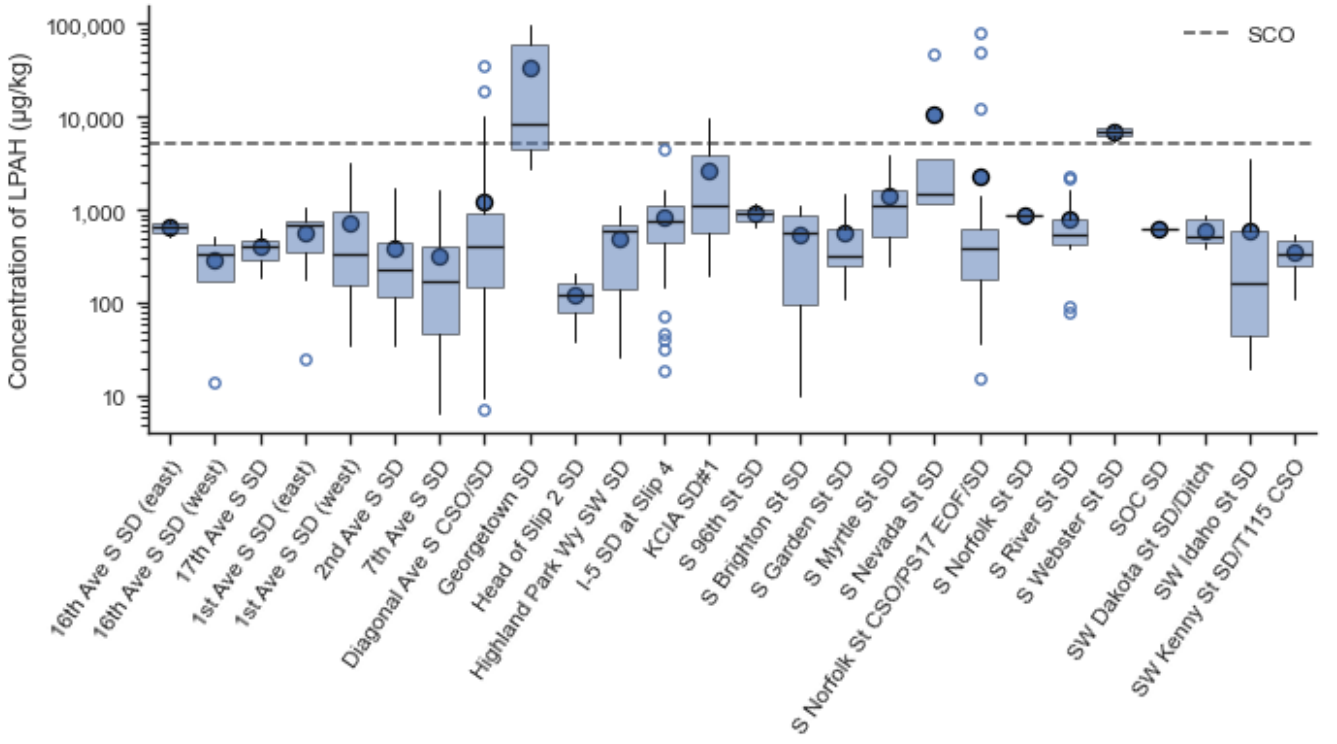


Figure 6: LPAH box plots by drainage basin

11 LPAH exceeded the SCO offshore of the outfalls in Slip 4 prior to the 2012 cleanup but did not exceed the SCO in the 2013 post-cleanup samples.

4.1.2.7 HPAH

HPAH was detected in 99 percent of the 569 samples collected in the MS4. Almost nine (9) percent (50 samples) and 6.3 percent (36 samples) of the samples exceeded the LAET and 2LAET screening levels, respectively. HPAHs were generally found in samples collected in close proximity to creosote coated timbers, such as railroad rights-of-way or telephone poles, as well as adjacent to fuel burning activities. They were also identified in areas where coal tar had been applied to parking lot surfaces or roofs.

Several locations, such as the Bush Pl sub-basin in the Diagonal Ave S CSO/SD consistently contained elevated HPAH levels during the pre-SCIP and SCIP 1 phase, due to proximity to coal tar containing materials such as coated parking lots, telephone poles, railroad ties, and roofs. Over time, many of these sources have been eliminated through source control actions, such as removal of roof and parking lot coatings, or better runoff control from rail beds. Consistently elevated HPAH levels are less frequent in samples collected during more recent years. Samples collected in the past five years that contained elevated levels of HPAH are listed in Table 12.

Table 12: Samples containing elevated levels of HPAH (2020 - 2024).

Sample	Date	Sample Type	Outfall	HPAH (ug/kg dw)
MH23	05/01/24	Inline grab	Georgetown SD	444,730
RCB86	01/24/24	Right-of-way catch basin	S Nevada St SD	179,970
MH23	06/06/23	Inline grab	Georgetown SD	135,500
MH74	10/07/21	Inline grab	S Norfolk St CSO/PS17 EOF/SD	108,000
MH52	02/02/22	Inline grab	Diagonal Ave S CSO/SD	75,571
MH23	05/11/22	Inline grab	Georgetown SD	45,297
RCB398	01/09/24	Right-of-way catch basin	Diagonal Ave S CSO/SD	42,869
ID-ST1	04/15/24	Inline Sediment Trap	SW Idaho St SD	26,400
MYR-ST1	10/12/22	Inline Sediment Trap	S Myrtle St SD	26,090
RCB298	07/05/23	Right-of-way catch basin	S Webster St SD	24,733
MH47	01/09/24	Inline grab	KCIA SD#1	24,680
MH211	05/01/23	Inline grab	S River St SD	23,539
ID-ST1	03/08/23	Inline Sediment Trap	SW Idaho St SD	19,522

HPAH exceeded the SCO in 2.9 percent and the CSL in 0.48 percent of the surface sediment samples collected from the waterway (AECOM 2012a). SCO exceedances occurred in samples located within 200 feet of outfalls in Slip 4 (prior to the 2012 Early Action Area cleanup), offshore of the Diagonal Ave S CSO/SD (prior to the 2004-2005 Early Action Area cleanup), 16th Ave S SD (east), KCIA SD #2/PS78 EOF, SW Dakota St SD, 2nd Ave S SD, and 7th Ave S SD outfalls. See Appendix J in SCIP 2 for a detailed description of SMS exceedances in waterway samples collected near outfalls.

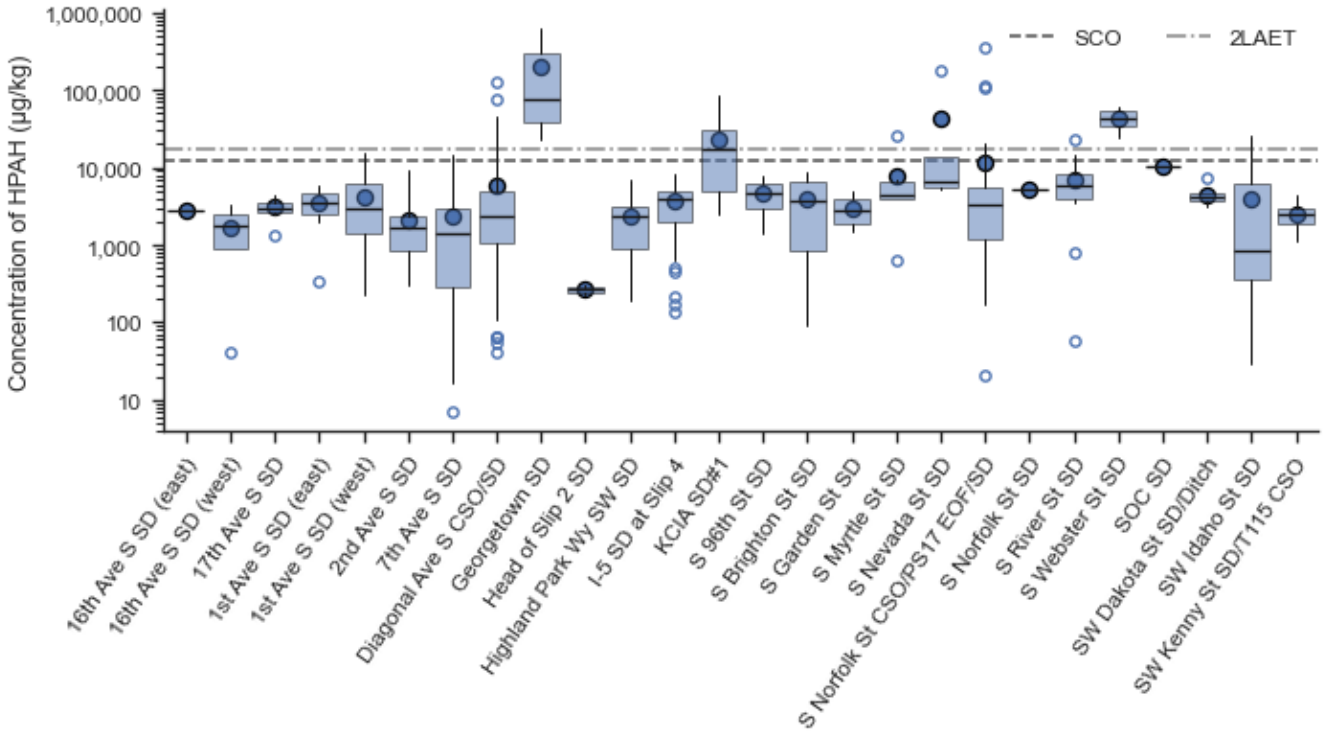


Figure 7: HPAH box plots by drainage basin.

4.1.2.8 cPAH

cPAH were detected in 98.5 percent of the 566 samples included in the analyzed data set dating back to 2003. There are no SMS for cPAH. For this analysis, the remedial action level (RAL = 1,000 mg/kg TEQ) was used to assess storm drain solids results[12]. Fourteen percent of the samples exceeded the RAL. Because cPAHs are a subset of the HPAH, elevated levels of cPAH were found at the same locations as described above for HPAH. SPU has conducted targeted source trace sampling for cPAHs in basins where concentrations have generally been elevated, such as the S Norfolk St CSO/PF EOF/SD, where sources may exist.

When elevated concentrations have been found throughout a drainage basin, that basin has been targeted for line cleaning to address these concentrations. Line cleaning within these basins has resulted in a slight reduction in cPAH presence and concentrations within the analyzed data set compared to the SCIP2 period. SPU believes that this trend will continue as older sample data sets are replaced due to line cleaning with newer samples. Occasional spikes of cPAH concentrations have been identified in several drainage basins including the Georgetown SD and S River St SD. These spikes have coincided with work being conducted upstream on PAH containing materials, such as the railroad bed (S River St) and a coal tar roof replacement (Georgetown SD). SPU identified this potential impact and coordinated line cleaning activities with these maintenance activities to remove cPAHs from the adjacent drainage systems to reduce their impact on the LDW.

Elevated cPAHs have been identified adjacent to railroad infrastructure in many locations throughout the LDW, as well as in proximity to creosote treated wood, asphalt coated materials, and within sporadic roadside samples. When SPU identifies elevated contaminants, the nearby drainage system is often cleaned to remove material from the pipe, so follow up source tracing actions can be implemented afterwards. Similar to LPAHs

[12] The RAL = MTCA Method A cleanup level for unrestricted land use for cPAHs.

and HPAHs, these concentrations may increase shortly after the line cleaning occurs but are then expected to decrease as the cPAHs are diluted and active sources are eliminated.

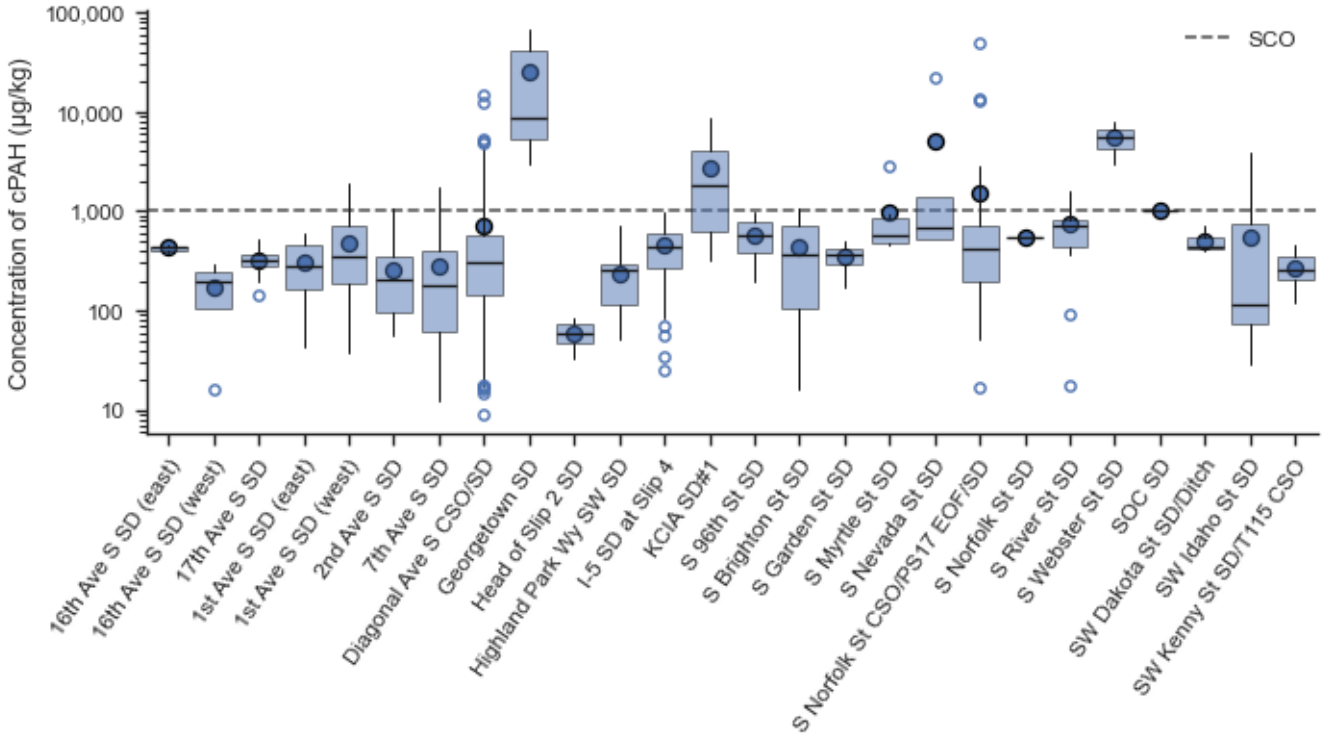


Figure 8: cPAH box plots by drainage basin

4.1.2.9 PCBs

PCBs were detected in 77 percent of the 649 samples collected in the MS4. Approximately 43.5 percent of the samples exceeded the LAET screening level and 3.9 percent exceeded the 2LAET screening level. Relatively low levels of PCBs (100 – 300 ug/kg dw) are commonly found in the City MS4, but hot spots are limited to a few locations where significant sources of PCBs have been found. Ecology's 2016 Source Control Strategy established a near-term goal "to control ongoing sources of contaminants to LDW sediments with the potential to exceed the remedial action level established in Record of Decision", which for PCBs is 130 ug/kg dw. Source tracing data collected to date indicates that it will be difficult to achieve this level of PCBs throughout the drainage system. A detailed discussion of the City's process for prioritizing storm drains for source control work and outfall by outfall discussion of sampling results is provided in Appendix D of SCIP 2 and Appendix E of this SCIP 3 document.

To date, eight significant sources of PCBs have been identified (see Appendix D of SCIP2 for summaries of the below location histories):

- Terminal 117. Terminal 117 (T117) is one of seven early action sites in the LDW. Upland areas on T117, as well as adjacent streets and residential yards, were contaminated with PCBs from historic operations at a manufacturer of asphalt roofing materials. PCBs were found in the drainage system (1,200 – 16,000 ug/kg dw), as well as soil in the adjacent right-of-way (1,300 – 9,200 ug/kg dw) and yards (170 – 46,000 ug/kg) [Windward 2010, KCHD 2004]. Seattle completed cleanup of adjacent yards

in 2013 and the right-of-way in 2016. A new drainage system and outfall were installed in 2017 for the upland areas of the drainage basin, now called the 17th Ave S SD. SPU continues to monitor the drainage assets in this area for PCBs and has completed targeted source tracing for PCBs when elevated levels have been found in Near-End-of-Pipe (NEP) samples. While very low volumes of sediment reach the drainage system and are able to be transported to the river, those sediments that do enter the drainage system have periodically contained elevated PCBs, as high as 1,200 ug/kg dw. SPU conducted extensive maintenance on a Filterra system in this location in 2024, as filter media within the structure was indicating it was saturated and was having reduced effectiveness in filtering PCBs from the inflowing stormwater. The PCB detection dog was used to screen this drainage area in 2023, to identify potential ongoing sources. The dog indicated interest in two vegetated areas in the basin, but did not signal a "hit" for PCBs. Follow up monitoring is ongoing and will continue until sources are identified and addressed or PCB concentrations begin to decrease. See Appendix G for the 2023 T117 Annual Report.

- Rainier Commons property at 3100 Airport Wy S where PCB concentrations as high as 213,000,000 ug/kg were found in exterior building paint (NVL 2012). The paint was in poor condition. The EPA Toxics Substances Control Act (TSCA) Program took over enforcement for this site following a 2009 inspection with high levels of PCBs found in exterior paint samples. The first phase of the cleanup, involving paint removal from two of the 24 buildings to be cleaned, was completed in 2014. The second phase (IIa), which involved cleaning the south wall of Building 15, was completed in 2016. The third phase of the cleanup began in 2023. Additional monitoring and cleanup phases will be implemented by the property owner based on EPA TSCA guidance. Rainier Commons is located within the Diagonal Ave S CSO/SD basin.
- Seattle Iron and Metals Company at 601 S Myrtle St, a metal recycling facility, where PCB concentrations as high as 25,000 ug/kg dw were detected in storm drain solids collected from the onsite drainage system. Site runoff passes through an onsite treatment system before discharging to the S Garden St storm drain. Fugitive dust emissions and track-out of contaminated material are affecting the adjacent roadways, properties, and the City storm drain systems at S Myrtle St, S Garden St, and S Brighton St. SPU has increased sweeping and maintenance of drainage assets on S Myrtle St and S Garden St to lessen impacts to the drainage systems in these areas and is currently scoping treatment options for S Myrtle St to further reduce the impacts to the LDW from the drains in this area.
- Independent Metals Plant 1/Green Day Trading and Recycling at 747 S Monroe St, was a metal recycling facility where PCBs in soil adjacent to the south gate were 46,910 and 63,810 ug/kg dw at the fence line and in a nearby planter area, respectively. The business vacated the property in 2014, but elevated PCBs were identified in the soil on the south side of the facility. Minor remodeling was conducted by the property owner in this location, which have reduced the potential for transport to the adjacent right-of-way. This area drains to the County's 8th Ave S Combined sewer system.
- Independent Metals Plant 2, was a metal recycling and processing facility located at 816 S Kenyon St. The facility closed in 2014, but while operational, PCBs were identified in roadside drainage immediately adjacent to the shredding house. The impacted drains in the adjacent streets discharge to the combined sewer system (5,300 ug/kg dw). The site was leased by a Gypsum recycling facility after Independent Metals vacated. SPU acquired the property in 2024 and will conduct a site remediation prior to constructing the South Park Water Quality Facility on the parcels.
- Former Western Waterproofing Company facility at 4429 Airport Wy S where elevated levels of PCBs (16,100 - 145,000 ug/kg dw) were found in an onsite catch basin, as well as surface dirt on the pavement (28,900 – 39,000 ug/kg dw). SPU had the company clean its onsite drainage system as well as the affected public drainage system. The company also paved over a portion of the yard area where PCBs were thought to exist. This property is currently leased to a welding and engine repair facility. Follow up

sampling in the public drainage system has indicated that elevated PCBs are no longer leaving this facility.

- Sun Food Trading Company property at 4715 6th Ave S, where elevated levels of PCBs were found in paint chips collected from pavement (45,000 ug/kg) and in onsite catch basins (6,200 – 32,000 ug/kg dw). SPU required the property owner to clean the onsite drainage system, remove surface accumulations of paint chips containing PCBs, and continues to monitor the drainage system downstream to determine whether PCBs migrate offsite. Downstream samples have not shown that elevated PCBs are leaving the facility and impacting the public drainage system downstream.
- Denver Ave S between 1st Ave S and 2nd Ave S where PCB concentrations were found as high as 40,300 mg/kg dw in an initial sample collected from surface soil along the roadway shoulder in June 2019. The affected soil was determined to encompass an area of about 38 feet by 530 feet with PCB concentrations ranging from 100 to 14,000 ug/kg dw in the top 0 to 6 inches of soil. SDOT removed the contaminated soil and SPU cleaned the storm drain system on Denver Ave S in July-August. SPU continues to monitor downstream of this location to address any PCBs that may be found in the drainage system. PCBs identified downstream will be addressed via the line cleaning program.

Additional suspected sources have been identified by SPU through source trace sampling. These sources have generally been improperly stored industrial materials, uncovered metal scrap designated for recycling, or spills/stains from old equipment. SPU's business inspection program has addressed numerous potential sources through BMP implementation, reducing the prevalence of active industrial and commercial sources. Remaining known/suspected sources are largely properties with PCB-containing building materials, such as paints, caulk, or roofing. Rainwater runoff and building maintenance has a high potential to transport PCBs from these materials to adjacent drainage assets, which can then transport the pollutants to the LDW. SPU has worked closely with Ecology to identify PCB-containing building materials and participated in work groups to support the creation of guidance documents and regulations targeted at these sources. SPU continues to lead in this space, including working closely with Ecology and the EPA TSCA program to address these sources. In 2025, SPU plans to begin to issue property owners corrective action letters and referrals to the EPA TSCA program when buildings are identified or suspected of containing PCBs.

Like most contaminants, the concentrations identified through sampling are highest near active sources. Samples from private, on-site drainage assets typically show higher levels of PCBs than the adjacent public drainage system samples, and levels of PCBs typically fall as you move downstream towards the outfall. If multiple sources exist within the drainage basin, sampling occasionally indicates higher levels of PCBs present downstream, where the multiple sources may combine to result in a cumulative effect. This is more frequent in large basins with numerous sources, such as the Diagonal Ave S CSO/SD. This leads to challenging source trace sampling, where moving upstream results in lower levels of contamination.

During the prior SCIP period, SPU conducted a pilot study to determine if PCB source tracing was effective based on lower trigger levels. SPU generally uses the 2LAET value of 1,000 ug/kg dw as a source tracing trigger level to identify a discrete source of pollutants. To help identify additional sources of PCBs within the LDW, SPU trialed source tracing at levels between 750-1000 ug/kg dw within two basins which had elevated PCB results in the available sample data set, but no known sources. Those basins were the S Nevada St SD and the Highland Pkwy S SD. Samples in the S Nevada St SD had returned results as high as 933 ug/kg dw, while samples in the Highland Pkwy S SD indicated PCB levels as high as 800 ug/kg dw. This source tracing trial determined that source tracing is possible at levels lower than 1,000 ug/kg dw, but became more challenging as the basins being screened increased in size and/or as the PCB levels that were being traced fell.

For the S Nevada St SD, the total basin area is approximately 26 acres, with the basin encompassing five large warehouses and a relatively small portion of right-of-way. SPU collected grab samples from right-of-way catch basins and was able to trace elevated PCBs to a catch basin adjacent to painted bollards installed along the

roadway in front of a warehouse. These bollards were screened using a PCB scent detection dog, which confirmed that the yellow paint on the bollards appeared to be a source of PCBs impacting the MS4. SPU worked with the property owner where the bollards were located, who had them removed. The drainage system adjacent to the location was then cleaned by this property owner. SPU believes that we were successful in source tracing the PCBs within this basin due to the compact basin size, limited drainage assets, and few potential sources.

For the Highland Pkwy S SD, SPU collected grab samples at several drainage junctions, in an attempt to isolate the PCBs to a smaller section of the 296-acre basin. PCBs were identified in multiple sub-basins within the larger drainage area, at reduced levels. No discrete sources were identified through this screening process, but several businesses were identified as having PCBs present within their on-site drainage system. Assets identified as containing PCBs were cleaned and follow up sampling is planned to determine if PCB levels remain elevated. SPU believes that we were not successful in source tracing PCBs to discrete sources within this basin due to the general basin size, complexity of MS4 layout, and the presence of PCBs identified within several portions of the basin.

To support effective source tracing for PCBs moving forward, SPU plans to adapt the approach used in the SCIP2 phase. SPU plans to continue to use the 2LAET value as a trigger for PCB source tracing for major sources but plans to implement additional triggers to address lower-level sources. Basin attributes and analytical data spikes will be used to determine where discrete sources may exist Source tracing staff will target locations where PCBs are particularly elevated above adjacent sample values and upstream basin characteristics indicate that source tracing may be feasible, even where PCB results are substantially lower than the 2LAET value. This will include source tracing at levels below those identified in the prior source tracing trial, where the basins upstream of these sample results are smaller in size and have limited potential sources. As PCB values increase, source tracing can be completed where the basin characteristics upstream are more complex.

SPU plans to sub-divide larger drainage basins into sub-basins and conduct targeted source tracing within these sub areas. While this approach has been used before, annual sub-basin “end-of-pipe” sampling will be implemented in areas with ongoing PCB detections to expand the data available to analyze trends and facilitate more targeted source tracing at lower PCB concentrations. This will allow SPU to identify discrete sources that may be contributing PCBs to our drainage system that exceed the cleanup and near end of pipe targets for basins but fall below our traditional source tracing values. SPU has conducted this type of source tracing in the past but will formalize this source tracing process moving forward.

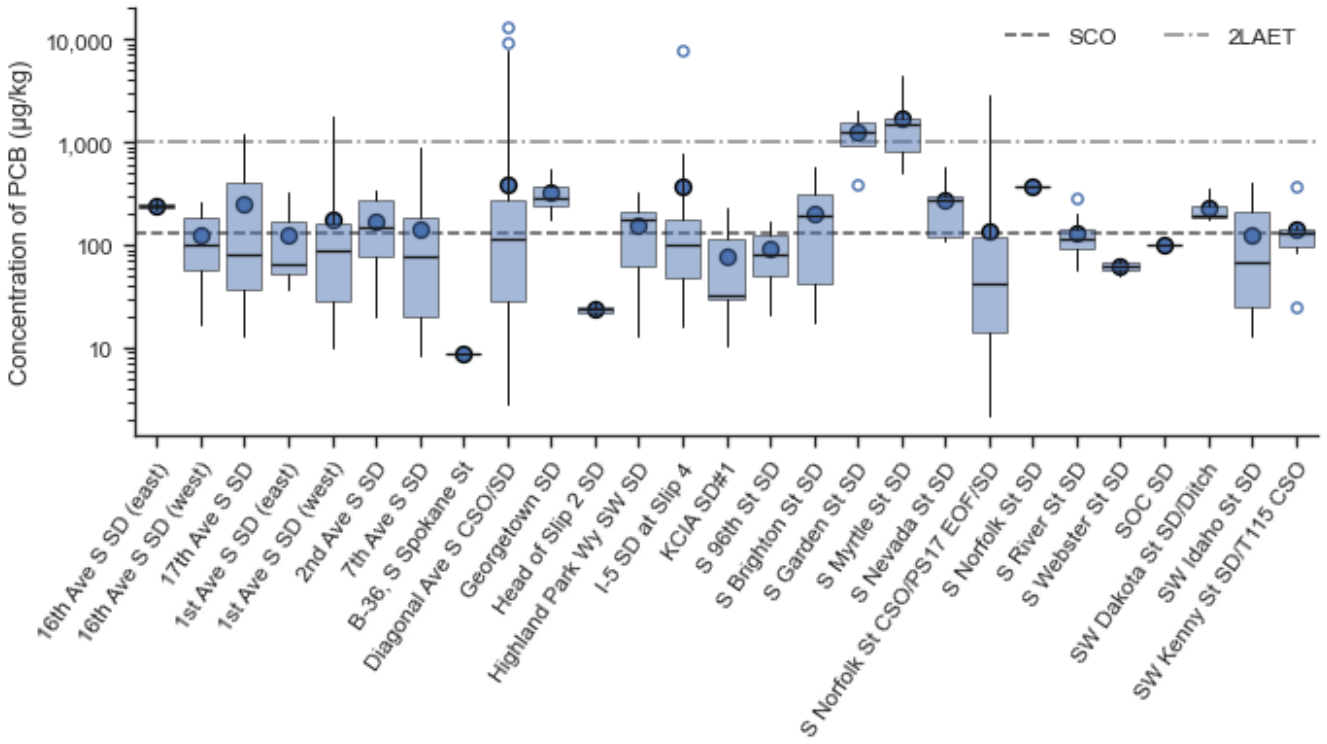


Figure 9: PCB box plots by drainage basin

4.1.2.10 Phthalates

Phthalate concentrations, particularly Bis(2-ethylhexyl)phthalate (BEHP), exceed the LAET/2LAET screening levels in storm drain solids collected throughout the LDW. Overall, BEHP was detected in 98 percent of the 568 samples collected in the MS4. These samples exceeded the LAET/2LAET screening levels in 68 and 63 percent of the samples, respectively. Butylbenzylphthalate (BBP) also consistently exceeds the LAET/2LAET screening levels in the storm drainage solids sampling conducted within the LDW. This chemical was detected in almost 69 percent of the 569 samples collected and exceeded the LAET/2LAET screening levels in 71 and 9 percent of samples collected, respectively. While 2LAET exceedances were less common with BBP compared to BEHP, the chemical's prevalence within the LDW remains an ongoing challenge.

Phthalates are a class of industrial compounds commonly used as softeners in plastics, as solvents, as oil in vacuum pumps and electric capacitors and transformers, and as carriers for fragrances and pesticides. Because they are a regional concern extending beyond the Duwamish Waterway, King County and SPU joined with the City of Tacoma in 2003 to test various commonly used products and materials to help identify sources of these chemicals. The intent of that testing was to use information about the phthalate content of common consumer products in conjunction with the source tracing efforts to identify specific sources of phthalates to the storm drains and the sanitary sewer. In addition, project staff hoped to identify specific products low in phthalates that they could recommend as replacement products to businesses and residents. The testing identified phthalates (BEHP, diethyl phthalate, and butyl benzyl phthalate) in a wide variety of products, including used motor oil from a commercial lube shop, used synthetic oil, various tire dressing and automotive care products, serpentine auto belts, used cigarette butts, packing peanuts, brake pads, brake pad dust, and tires (SPU and KCIW 2004, 2005).

Subsequently, the cities of Tacoma and Seattle, King County, Ecology, and EPA investigated to understand how phthalates reach Puget Sound sediments. This process evaluated the relative risk of phthalates found in sediment compared to other contaminants and within the broader context of phthalate risks from all exposure pathways (Floyd|Snider 2007). The group, known as the Sediment Phthalates Work Group or SPWG, concluded that phthalates are widespread in urban and other developed areas and that they are ubiquitous in water, soil, sediment, and air. They developed the conceptual model shown in Figure 10of how phthalates may reach the LDW sediments. The basic concept is that phthalates initially enter the environment primarily through off-gassing from manufactured products. Once in the atmosphere, they attach to particulates and deposit on land and water surfaces. These particles are then transported to water bodies like the LDW through stormwater runoff (Floyd|Snider 2007).

The Work Group published the following recommendations:

- Manage phthalate re-accumulation at cleanup sites using site-specific O&M plans. Suggestions included developing appropriate triggers for action based on size of impacted area, level of exceedances, and co-occurrence with other target pollutants, as well as continued monitoring, thin layer capping or removal, and outfall engineering.
- Conduct studies/research to further validate the work completed by the group and to define other pollutants transported via an air-stormwater-sediment pathway.
- Coordinate with Puget Sound Partnership and air agencies regarding the air-stormwater-sediment pathway and jointly evaluate effective solutions.
- Educate agency and community stakeholders regarding phthalates.
- Develop recommendations regarding plasticized PVC including environmentally sustainable alternatives to phthalates, adjusting Leadership in Energy and Environmental Design (LEED) standards to address plasticized PVC, considering building code modifications and tax or incentive mechanisms regarding product use.
- Coordinate with other phthalate risk initiatives from other exposure pathways (e.g., cosmetics, toys, medical devices).
- Evaluate stormwater source control and treatment options including costs/benefits for treatment versus repeated cleanup in impacted areas.
- Consider amending the Sediment Management Standards to include considerations for pervasive pollutants. This would establish protocols for addressing the cleanup triggers for phthalates and similar pollutants.

Most of these recommendations have not been implemented. Phthalates remain an ongoing challenge within the LDW and region wide. Sampling identified Phthalates within nearly all samples, including those collected within residential and undeveloped areas. Increased maintenance of drainage assets has resulted in a slight reduction in Phthalates present within near-end-of-pipe drainage samples, but these samples indicate that exceedances of cleanup standards remain common.

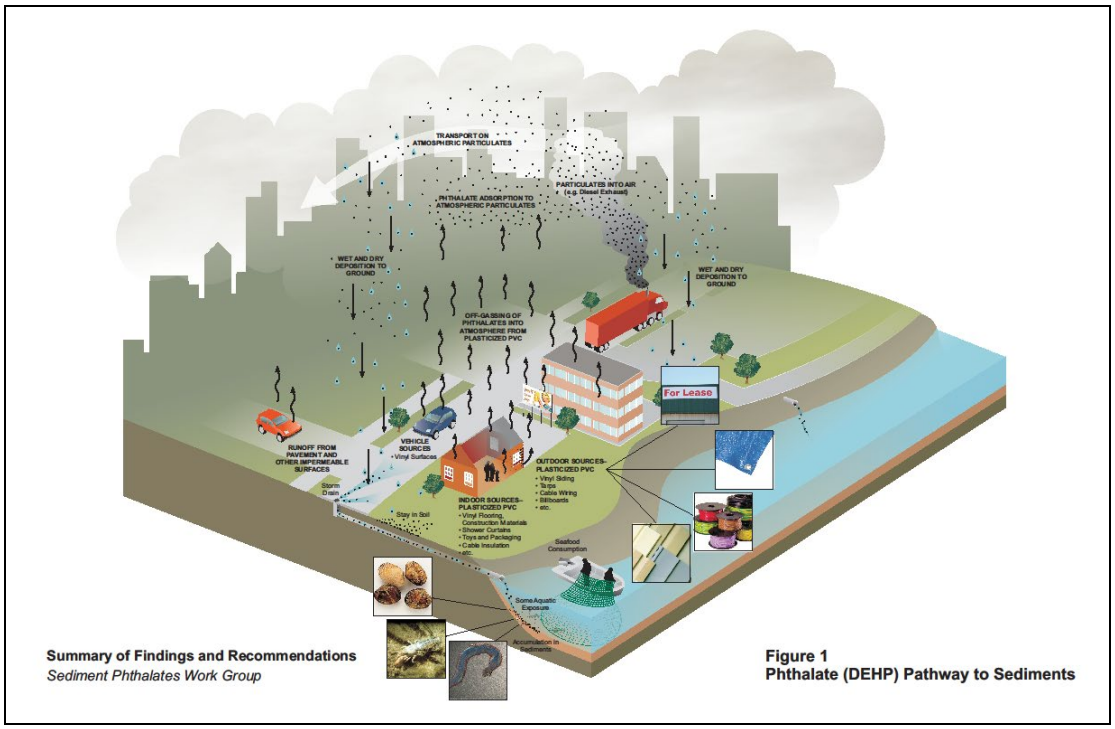


Figure 10: BEHP Pathways

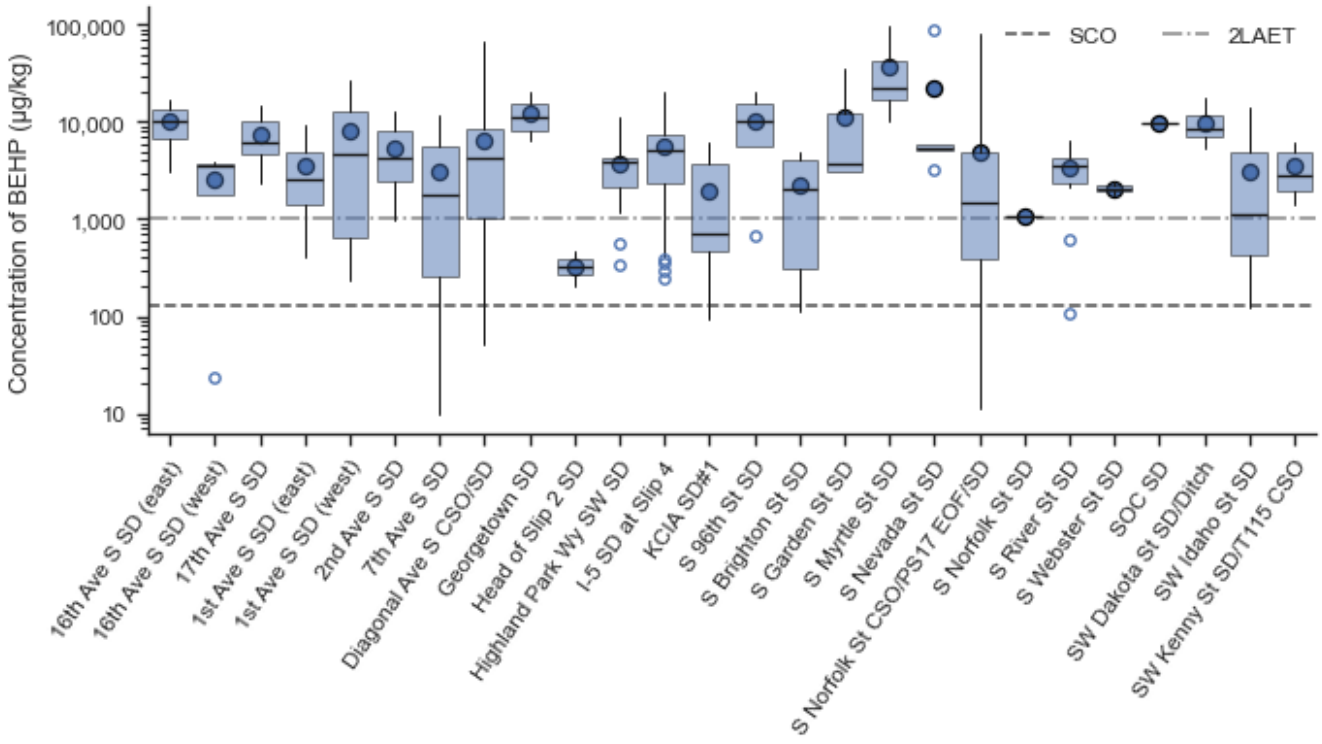


Figure 11: BEHP Boxplots by drainage basin

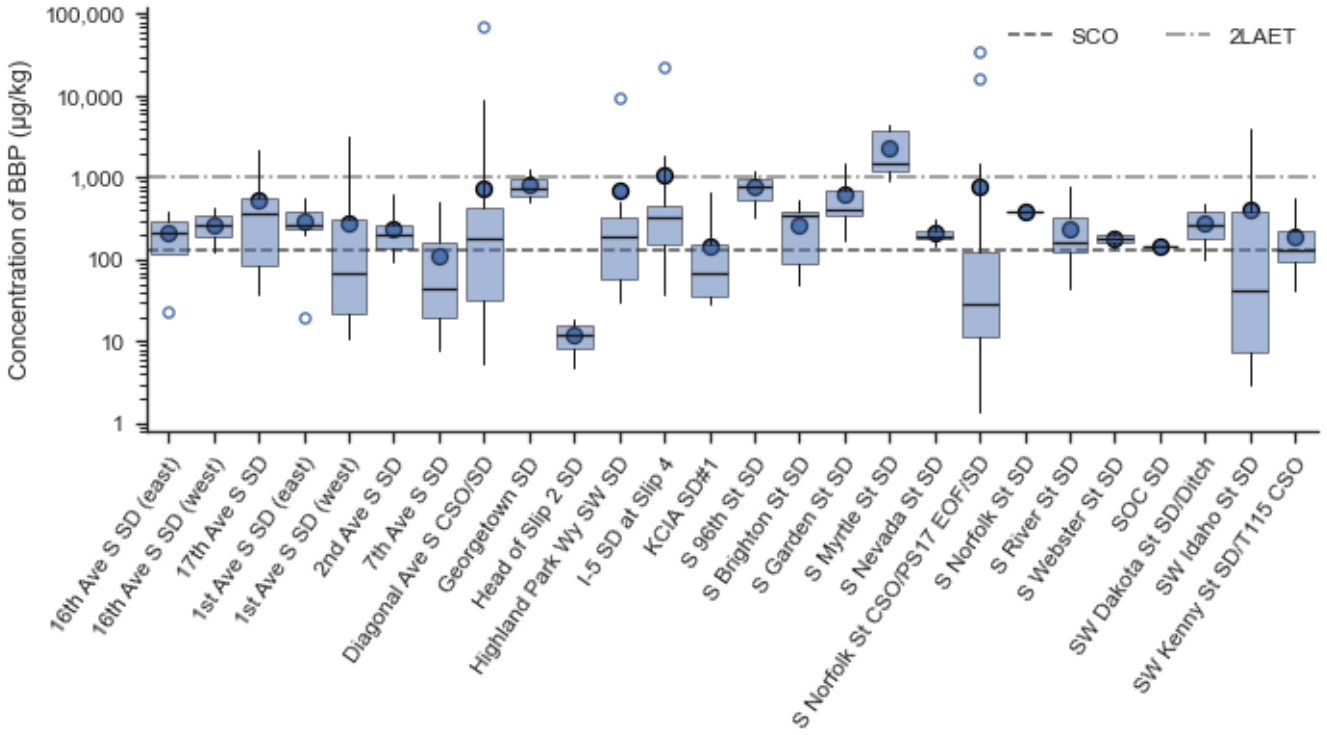


Figure 12: BBP Boxplots by drainage basin

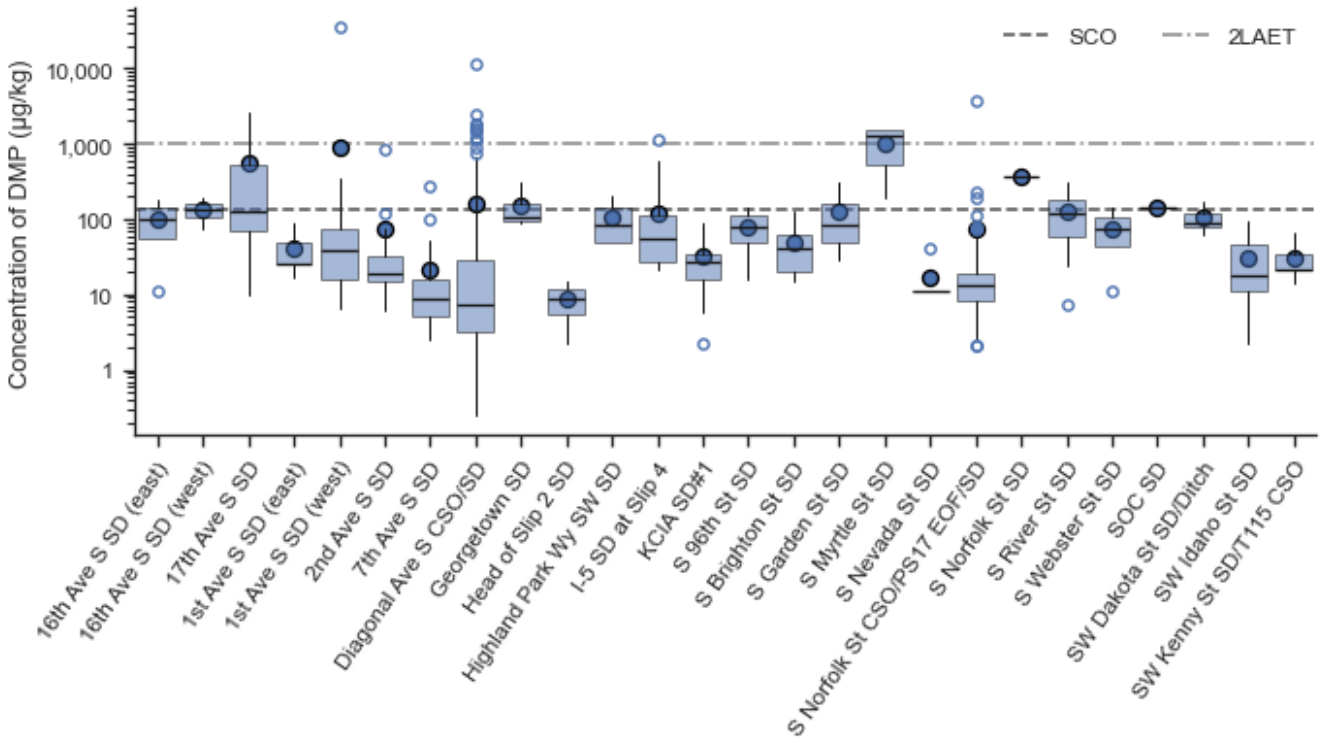


Figure 13: DMP Boxplots by drainage basin

4.1.2.11 Dioxins/Furans

SPU analyzed dioxins/furans in 30 solids samples collected in 2011 from City storm drains in the LDW. Concentrations ranged from 0.51 to 143 ng/kg TEQ, with an average of 29.5 ng/kg TEQ. The highest concentration (143 ng/kg TEQ) was found in a sample of sediment that had accumulated in the temporary stormwater storage tanks at the Terminal 117 site during the Early Action cleanup. The tanks received runoff from the streets adjacent to Terminal 117. The remaining samples contained less than 90 ng/kg TEQ. As discussed in SCIP2, dioxin/furan concentrations in samples collected from City-owned storm drains in the LDW Source Control Area are generally lower than most other samples collected from storm drains in the LDW and East Waterway but are comparable to the concentrations found in samples collected from combined sewers.

The data from the samples indicated widespread presence, but low concentrations, of dioxins/furans throughout the storm drains within the LDW. There was no discernable pattern to concentrations found in the sample results and their proximity to possible sources. Source tracing efforts for dioxins/furans was not effective, as concentrations were generally low and sources of these chemicals are not fully understood. Additionally, the costs associated with analyzing sediment data for dioxins/furans are prohibitively expensive, making the source tracing process very difficult, costly, and ineffective. SPU plans to collect a dozen or so Dioxin/Furan samples over the SCIP3 period to compare to samples collected in 2011. It is expected that samples will be characteristically similar to those collected in 2011, due to the prevalence of low-level sources in an urban environment. However, if results indicate elevated concentrations in discrete samples, SPU plans to consult with Ecology to conduct follow up source tracing.

4.2 Duwamish Drainage Basin Status

Source control activities conducted by the City of Seattle focus on the identification of contaminants present within the adjacent stormwater drainage basins and the City's efforts put into controlling these pollutants. There are a variety of means to reduce or eliminate discharges of contaminants, many of which have been discussed elsewhere in this document. The changes in the amounts of pollutants found within and transported by the stormwater drainage systems adjacent to the LDW are a key factor in determining the effectiveness of source control activities. To proceed with the in-river cleanup, the pollutant loads within these basins must be below the level at which Ecology and the EPA believe sediment recontamination is likely to occur. To provide sufficient data to Ecology and the EPA to support their analysis of recontamination potential (or assess "Source Control Sufficiency"), SPU collects stormwater solids samples throughout the LDW area. These samples are largely used to identify sources of pollutants and to understand the general characteristics of drainage basins.

SPU also collects inline samples (grabs and/or sediment traps) from maintenance holes located near the downstream end of the system in many of the storm drains owned or used by the City that discharge to the LDW. Samples are collected as close as possible to the downstream end of the City MS4. These so-called near end-of-pipe (NEP) samples are used to roughly characterize the quality of solids discharged from the City MS4 to the LDW. Ideally, a single NEP location would be sampled in each drainage system. However, due to the configuration of the City's MS4, multiple locations are often needed to capture representative solids samples. Lack of sediment accumulation in the system can also be problematic. In these situations, SPU sometimes collects grab samples from catch basins to represent portions of the drainage system where inline sampling was not feasible.

Appendix 13 of the 2019 Phase I Municipal Stormwater Permit (Permit) requires the City of Seattle to collect annual samples from Effectiveness Monitoring Locations in most of the basins located within the Lower Duwamish Waterway. These Effectiveness Monitoring Locations heavily overlap the NEP locations. In 2023, SPU submitted a G20 letter to Ecology, notifying them that the City became aware that several Effectiveness Monitoring Locations had not been sampled annually, as was required by the Permit. The locations that were

not sampled were missed for a variety of reasons, including Covid-19 field restrictions, as well as errors. SPU intends to monitor these sites long term to assist in evaluating trends, prioritizing source control activities, and assessing the effectiveness of its source control program. Contaminant levels for the LDW chemicals of concern (Arsenic, PCBs, cPAHs) are depicted in trend line graphs for each basin in section 4.3.1 NEP sampling locations are shown on Map 59. The 2019 Permit-required Effectiveness Monitoring Locations are listed in Table 13 below. The list of Effectiveness Monitoring Locations in the 2024 Permit, which became effective 8/1/2024 and will expire 7/31/2029, does not include Head of Slip 2 or Garden St due to the City's small contributing drainage area.

Table 13. Effectiveness Monitoring Locations

Storm Drain (SD) Outfall Name	Separated Stormwater Drainage Basin Area (acres)	Outfall Diameter (inches)
East side of waterway		
Diagonal Ave S	2,664	144
1st Ave S (east)	15	36
S River St	6.5	8
S Brighton St	17	30
S Myrtle St	6.2	30
Georgetown	5.9	24
Head of Slip 2	12	24
S Garden St	12	30
I5 SD at Slip 4	150	72
S Norfolk St	676	84
West side of waterway		
SW Dakota St	54	30
SW Idaho St	423	72
SW Kenny St	154	48
Highland Park Way SW	289	72
7th Ave S	238	72
17th Ave S	2.9	18
1st Ave S (west)	603	open channel

Time series for contaminants of concern in the LDW (PCBs, arsenic, cPAHs) in each of the Effectiveness Monitoring Locations is depicted below in section 4.3.1, by basin. Basins are outlined below depicting the effectiveness monitoring location trends, as well as tables depicting key statistics for pollutants in samples collected over the last ten years.

4.3 OUTFALL TO OUTFALL COMPARISONS

Another way to evaluate the storm drain solids data is to compare results between outfalls to assess whether contaminant concentrations are different between outfalls. Differences could indicate the presence of different sources in the drainage basins. SPU evaluated potential differences by comparing distributions for each chemical of concern by outfall, looking at the median concentrations and outlying values. By comparing contaminant levels obtained through sampling, we may prioritize source control efforts to target those basins with the highest concentrations of pollutants of concern.

SPU has used box plots to illustrate the statistical distributions of key contaminants amongst drainage basins. Box plots are a simple visual tool that display summary statistics (25^{th}/75^{th} percentiles, median concentrations, and outliers) from all samples (e.g., inline grabs, catch basins grabs, and sediment traps) by outfall over different time periods. Box plots for the following chemicals from the previous reporting periods, 2003 – June 30, 2014 (pre-SCIP) and July 1, 2014 through June 30, 2019 (SCIP1) were presented in Appendix B of SCIP2:

- Metals (arsenic, copper, lead, mercury, and zinc)
- PCBs
- Polycyclic aromatic hydrocarbons (LPAH, HPAH, and cPAH)
- Phthalates (bis[2-ethylhexyl]phthalate, butyl benzyl phthalate, and di methyl phthalate)
- Total petroleum hydrocarbons (TPH-oil).

Box plot distributions for the SCIP2 phase are shown in section 4.3.1. Box plots and the NEP trends described above in Section 4.2 may be used to characterize the drainage basin contaminant loading. For example, the S Myrtle St and S Garden St storm drains contained higher concentrations, and thus percentiles and median concentrations, of metals (copper, lead, mercury, and zinc) than other drains sampled in the LDW. Elevated concentrations are associated with operations of a metals recycling facility located in these basins. Other basins that exhibited unique chemical signatures include:

- Georgetown, S Webster St, and S Nevada St storm drains: LPAH, HPAH, and cPAH.
- S Garden St and S Myrtle St storm drains: PCBs and phthalates
- Georgetown SD: dimethyl phthalate
- S Nevada St SD: butylbenzylphthalate
- S Norfolk CSO/PS17 EOF/SD: TPH-Oil-AS

4.3.1 OUTFALL SOURCE CONTROL STATUS

SPU has determined that an outfall by outfall analysis provides valuable data to help to establish basin priorities and to illustrate ongoing source control needs. As such, an outfall by outfall assessment is contained below, utilizing data collected within the last ten years for chemical statistics. Basins are organized by into reaches, to align with the LDW cleanup plan, and near end of pipe/effectiveness monitoring location trend tables are provided for the LDW contaminants of concern. Each basin also contains a narrative describing the general basin characteristics as well as known sources identified within them. For the assessments of known sources, the narrative is focused on industrial or commercial businesses, or residential parcels which may be sources of contaminants to the basins. It is important to note that the analytical data displays concentrations of contaminants present within the samples collected. Concentration is valuable in understanding the proportion of settled solids that is comprised of a particular contaminant but needs to be understood in relation to the mass of solids that are present or leaving the drainage basin and reaching the LDW. If concentrations are high, but the mass available to sample, and thus potentially reaching to river is low, the risk of recontamination from

the basin is low. If the concentrations are elevated and the mass within the basin is high, the contaminant loading would be high and the risk of potential sediment recontamination is elevated. The mass transported in a basin can be reduced through implementation of Best Management practices, such as street and parcel sweeping, regular catch basin maintenance, covering bulk storage of erodible materials, and installation of treatment technologies.

Upper Reach Basins

The Upper Reach of the LDW contains twelve drainage basins which convey flows from City of Seattle property, or through SPU drainage pipes. The reach contains several large scale industrial and manufacturing facilities, portions of the King County International Airport, and sections of residential neighborhoods at the edge of the City. The Upper Reach sufficiency determination was issued in 2023, and formal cleanup of the in-river sediments began in 2024.

4.3.1.1 S Norfolk St CSO/PS17 EOF/SD

The S Norfolk St CSO/PS17 EOF/SD is a large basin on the southeastern edge of the LDW, covering 431 acres of land. See Map 6 within the Map Atlas. It provides drainage for an industrial portion of south Seattle located along Martin Luther King Jr. Way S, as well as sections of Interstate 5. The basin also serves a variety of distribution warehouses and manufacturing facilities connected to operations at the King County Airport, and accepts high flows via an overflow weir from the I5 at S Ryan St SD. The stormwater infrastructure in the basin is largely owned/operated by SPU on the eastern side of Interstate 5, but after entering an SPU stormwater retention pond on the western edge of the interstate, drainage flows through pipes owned by others to the LDW. The outfall into the LDW is owned and operated by the City of Tukwila.

Table 14: Summary statistics for select contaminants in the S Norfolk St CSO/PS17 EOF/SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	62	57	93	3.31	95.4	15	10	1.6	1.6
Copper	62	390	--	17.6	291	98.1	90.75	0	--
Lead	61	450	530	10	407	83.3	61.5	0	0
Mercury	61	0.41	0.59	0.009	0.494	0.11	0.079	3.3	0
Zinc	62	410	960	95.7	2,850	568	503	56.5	11.3
LPAH	61	5,200	--	18	79,127	2,799.8	432	4.9	--
HPAH	61	12,000	17,000	<19.2	360,160	12,734	3,145	4.9	4.9
cPAH	61	1,000[A]	--	<15.5	49,324	1,681	418	13.1	--
PCBs	68	130	1,000	<17	2,860[C]	198.6	94.7	42.7	1.5
BEHP	61	1,300	1,900	40	81,500	5,264.7	2,240	60.7	52.5
BBP	62	63	900	<14.3	16,000	477	121.5	72.6	4.8
DMP	62	71	160	<18	3,790	234.9	100	75.8	30.7
TPH-Oil-AS	40	2,000[B]	--	86.9	155,000[C]	6,285.8	1,835	47.5	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. Several samples collected from the stormwater mainline system outside of the City limits with unknown ownership are included in this data set to provide an accurate source control status. A ten-year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.
B. MTCA Method A soil cleanup level for industrial and unrestricted use.
C. Sample was collected from a private drainage line located out of the Seattle City Limits where a weir impounded solids entering the system from private property. Line was cleaned by SPU in 2023 to remove material.

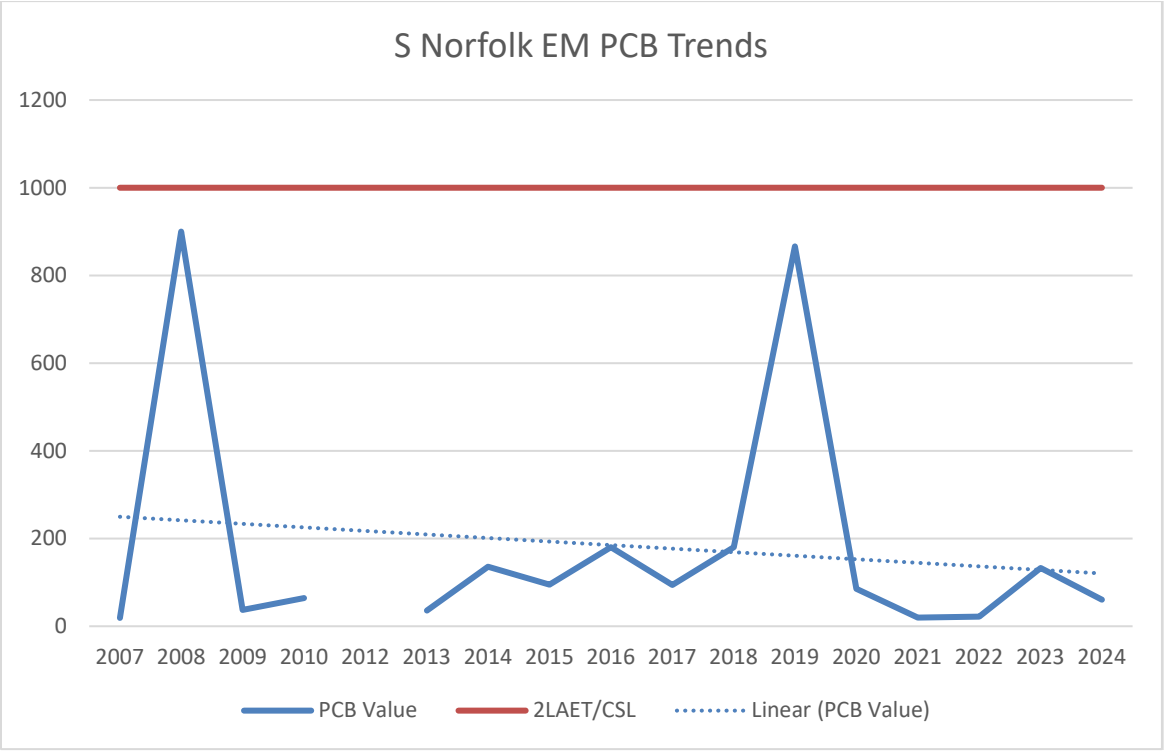
The S Norfolk St CSO/PS17 EOF/SD basin has experienced periodic spikes of PAHs, which resulted in SPU conducting targeted source trace sampling for PAHs from 2014-2017. Two potential sources were identified through this targeted sampling, including a coal tar coated parking lot and an asphalt paving facility. The coal tar parking lot was recoated in 2017 to reduce the potential for impacts from the surface on the drainage system. The asphalt paving company made major modifications to their site drainage system around 2017, reducing the potential for impacts to the stormwater drainage system. This business has since vacated the property located within the S Norfolk basin. Drainage mainlines have been cleaned several times over the years to address PAH concentrations within the system (see section 6.2).

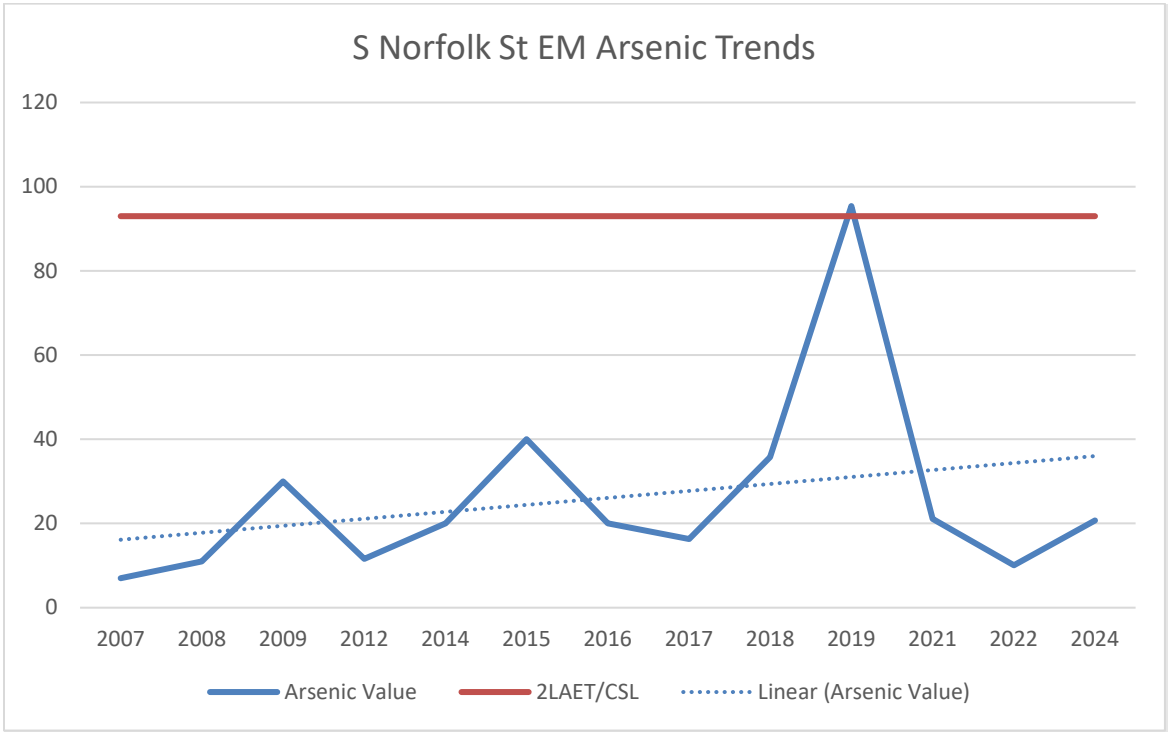
PCB values within the S Norfolk basin have generally been low, with occasional outliers. In 2021, Ecology reached out to SPU to request support in screening the S Norfolk basin for PCB sources due to increasing PCB concentrations within the LDW in river sediments just downstream of the outfall. Sampling identified elevated PCBs in a private mainline coming from a recently redeveloped property within the lower portion of the drainage basin, on the boundary of the City of Seattle. SPU worked closely with Ecology and adjacent property owners and businesses to clean this portion of the drainage system as well as pipes downstream to the river. For more information, see section 6.1.

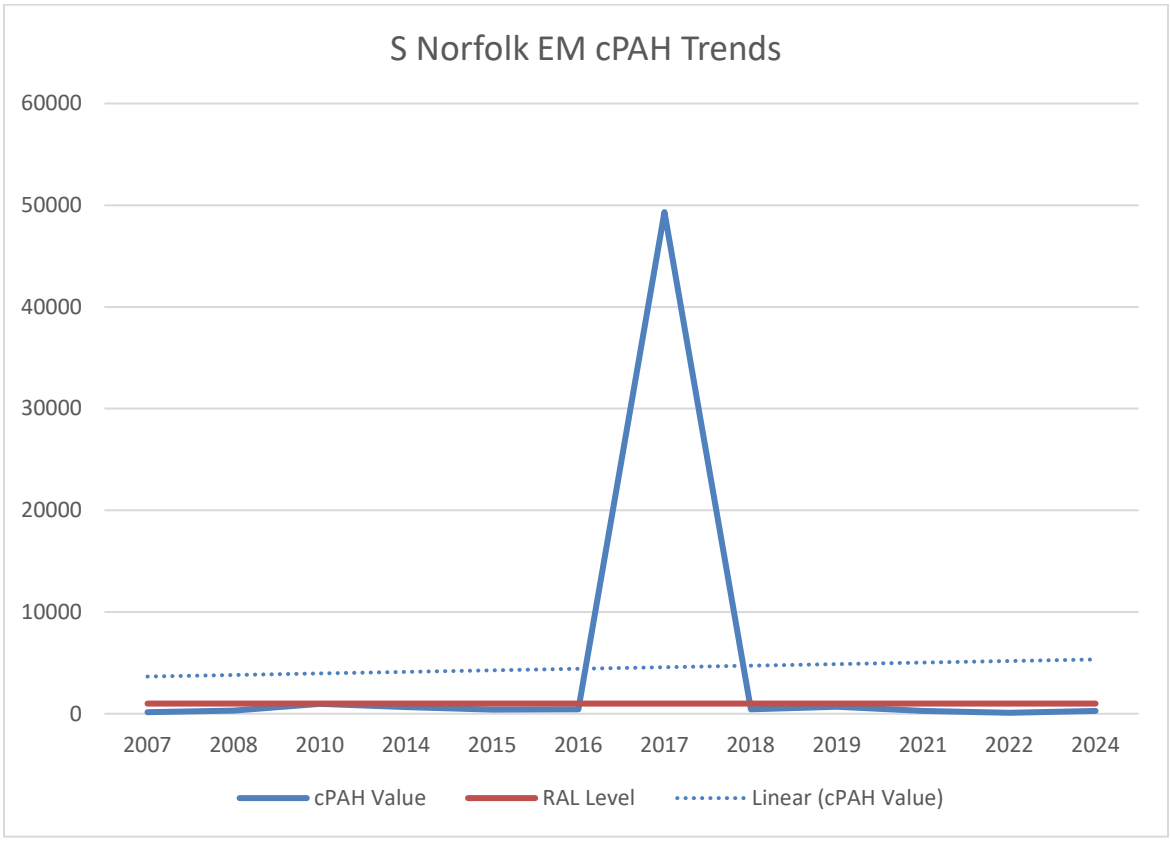
Known Sources within the S Norfolk St CSO/PS17 EOF/SD

As of June 30th, 2024, there are no known active, uncontrolled sources of pollutants impacting the S Norfolk St CSO/PS17 EOF/SD. SPU recently cleaned the lower portion of this basin to remove residual PCBs that were discovered in 2021. Follow-up sampling will be conducted when sufficient stormwater solids accumulate within this portion of the drainage basin.Those data will be used to determine if there are ongoing sources of PCBs within the lower basin.

Figure 14: Effectiveness Monitoring Location data trends for chemicals of concern in S Norfolk St CSO/PS17 EOF/SD




S Norfolk St EM Arsenic Trends
120
100
80
60
40
20
0
2007
2008
2009
2012
2014
2015
2016
2017
2018
2019
2021
2022
2024
Arsenic Value
2LAET/CSL
Linear (Arsenic Value)


S Norfolk EM cPAH Trends
60000
50000
40000
30000
20000
10000
0
2007
2008
2010
2014
2015
2016
2017
2018
2019
2021
2022
2024
cPAH Value
RAL Level
Linear (cPAH Value)

4.3.1.2 I5 SD at S Ryan St

The I5 SD at S Ryan St is owned and operated by WSDOT. The drainage basin is located at the very southern end of the City of Seattle and encompasses 407 acres. Map 7 within the Map Atlas, depicts the upper portion of both the I5 SD at S Ryan St and the upper portion of the S Norfolk St CSO/PS17 EOF/SD, which are connected through an overflow weir. The drainage basin conveys flows from residential areas of the City of Seattle , the City of Tukwila, along with substantial portions of Interstate 5. The drainage basin discharges into the LDW just upstream of the 102nd St bridge within the City of Tukwila. This drainage basin contains a high flow overflow weir which allows flows to spill into the S Norfolk St CSO/PS17 EOF/SD when this drainage mainline has insufficient capacity to convey all flows to the river. While this outfall is located outside the 5-mile stretch of the LDW, due to the interconnected nature of the I5 SD at S Ryan St with the S Norfolk basin, SPU elects to collect regular stormwater solid samples from a sediment trap located at the corner of Martin Luther King Jr. Way S and S Boeing Access Rd. This allows SPU to understand the contaminant characteristics of this basin which may overflow into the S Norfolk system. This sample location, called NST3, is included in both the S Norfolk St CSO/PS17 EOF/SD and I5 at S Ryan St SD data set. The table below is a summary of the data solely from this sample location.

Table 15: Summary statistics for select contaminants in the I5 at S Ryan St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	10	57	93	3.31	10.2	6.9	7	0	0
Copper	10	390	--	30.8	111	69.2	69.1	0	--
Lead	10	450	530	14.4	72.7	35.9	31.2	0	0
Mercury	10	0.41	0.59	0.03	0.47	0.097	0.053	10	0
Zinc	10	410	960	169	605	343.6	343.5	30	0
LPAH	10	5,200	--	82.3	49,780	5,295	310.85	10	--
HPAH	10	12,000	17,000	1,175	113,500	13,965	2,731	10	10
cPAH	10	1,000[A]	--	149.8	13,230	1,645	376	10	--
PCBs	10	130	1,000	<17	68.5	26.76	<19.9	0	0
BEHP	10	1,300	1,900	352	15,700	2,803	1,295	50	30
BBP	10	63	900	20	427	138	98.2	70	0
DMP	10	71	160	59.8	294	112.6	98.1	90	10
TPH-Oil-AS	7	2,000[B]	--	670	2,640	1,617	1,680	14.3	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A

ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.
B. MTCA Method A soil cleanup level for industrial and unrestricted use.

The I5 SD at S Ryan St is not an Effectiveness Monitoring basin per Appendix 13 of the City of Seattle's Municipal Stormwater NPDES permit.

Known Sources within the I5 at S Ryan SD

There are no known, active, uncontrolled sources of contaminants within the I5 at S Ryan St SD.

4.3.1.3 16th Ave S SD (East)

The 16th Ave S SD (East) is a relatively small drainage basin encompassing 3.2 acres along 16th Ave S north of the South Park bridge. See map number 4 in the Map Atlas. The outfall is owned and operated by the City of Tukwila but accepts flow from SPU drainage mainlines on East Marginal Way S and portions of 16th Ave S. This drainage basin once conveyed flow from adjacent aircraft manufacturing facilities, but these were disconnected from the drainage basin during a bridge and drainage system rerouting project completed in 2014. Currently, the drainage basin accepts roadway runoff and some downspout flow from warehouse roofs. Prior to the drainage system remodel, sampling indicated elevated metals, PAHs, PCBs, and oils within this drainage system. Sampling conducted since the drainage system remodel have largely shown lower levels of these contaminants. The drainage system was not cleaned during the rerouting, leaving residual contaminants present in portions of the system. Due to the rework of the drainage system, limited data is available for analysis. SPU will continue to collect annual samples from within this basin to better characterize the potential pollutant loading associated with it. This basin is not an Effectiveness Monitoring Location, but annual sampling is planned to support the LDW cleanup. Insufficient data is available for trend analysis for contaminants of concern.

Table 16: Summary statistics for select contaminants in the 16th Ave S SD (East).

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	3	57	93	7.26	13.8	9.67	7.96	0	0
Copper	3	390	--	124	240	199	234	0	--
Lead	3	450	530	67.7	144	106	107	0	0
Mercury	3	0.41	0.59	0.207	0.358	0.26	0.217	0	0
Zinc	3	410	960	792	1,340	1,141	1,290	100	66.7
LPAH	3	5,200	--	511.7	1,430	914	799	0	--
HPAH	3	12,000	17,000	2,798	8,582	4,740	2,839	0	0
cPAH	3	1,000[A]	--	390.6	840.2	566	466	0	--
PCBs	3	130	1,000	220.8	463	317	267	100	0
BEHP	3	1,300	1,900	3,150	29,300	16,517	17,100	100	100
BBP	3	63	900	100	391	197	100	100	0
DMP	3	71	160	100	185	137	125	100	33.3

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
TPH-Oil-AS	1	2,000[B]	--	11,400	11,400	11,400	11,400	100	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

B. MTCA Method A soil cleanup level for industrial and unrestricted use.

The 16th Ave S SD (East) basin continues to show elevated levels of metals, phthalates, and hydrocarbons in samples collected since the drainage system was replaced. The drainage system was cleaned by SPU in 2020 to address the residual pollutants that had not been removed during the rerouting of the basin. The basin will be cleaned again during the SCIP 3 phase to remove any remnant material that was missed during the last cleaning. A thorough CCTV video inspection will also be conducted to determine if any legacy inputs remain active, as phthalates and metals levels remain elevated above what would be expected from roadway runoff.

Known Sources within the 16th Ave S SD (East)

There are no known, active, uncontrolled sources of pollutants within the 16th Ave S SD (East) basin. The drainage basin conveys runoff from street and sidewalk surfaces to an outfall owned by the City of Tukwila, with currently no known inputs from the adjacent aircraft manufacturing facilities. The system previously conveyed runoff from these facilities but they were disconnected during a 2014 reroute. As the adjacent manufacturing facilities are known to have contaminants present on site, SPU plans to use CCTV video inspection of the drainage system during the next line cleaning conducted within the basin to verify that all connections from these properties have been disconnected.

4.3.1.4 KCIA SD #1

The KCIA SD #1 drainage basin is approximately 114 acres. It includes runoff from a primarily residential portion of the Beacon Hill neighborhood, a section of railroad right of way, and a small portion of the King County International Airport. See map number 5 in the Map Atlas. The largest portion of the drainage area is comprised of Seattle-owned MS4 serving a residential neighborhood and a small warehouse complex immediately adjacent to Interstate 5. Once the drainage system crosses into the King County International Airport property, King County takes over ownership of the drainage system, including the outfall into the LDW at the head of Slip 6. With few non-residential inputs within the portion of the basin operated by SPU, this is not an Effectiveness Monitoring basin, and limited source trace sampling data is available. Statistical analysis of available sample data for the KCIA SD#1 is below. No effectiveness monitoring trend data is available for this basin.

Table 17: Summary statistics for select contaminants in the KCIA SD#1.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	4	57	93	4.89	54.4	22.69	15.74	0	0
Copper	4	390	--	42.9	132	76.1	64.7	0	--
Lead	4	450	530	62.8	304	172.7	162	0	0
Mercury	4	0.41	0.59	0.023	0.187	0.092	0.078	0	0
Zinc	4	410	960	151	742	446	445	50	0
LPAH	4	5,200	--	490.4	1,104	709	621	0	--
HPAH	4	12,000	17,000	4,267	24,680	9,890	5,307	25	25
cPAH	4	1,000[A]	--	540	3,622	1,427	773	25	--
PCBs	4	130	1,000	33	225.6	129	128.8	50	0
BEHP	4	1,300	1,900	466	6,020	1,952	660.5	25	25
BBP	4	63	900	28.6	670	226	102.6	50	0
DMP	4	71	160	16.6	99.8	47.2	36.2	25	0
TPH-Oil-AS	3	2,000[B]	--	223	2,110	880.7	309	33.3	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten-year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

B. MTCA Method A soil cleanup level for industrial and unrestricted use.

The KCIA SD#1 samples included in the above table depict the chemical concentrations within the basin at the most downstream end of the SPU portion of the drainage system. Inputs from the King County International Airport would not be included within the data set. Sample data indicates the presence of fairly low levels of contaminants discharging from the SPU portion of this basin.

Known Sources within the KCIA SD#1

There are no known, active, uncontrolled sources of contaminants present within this basin. A portion of railroad right of way lies within the basin and these types of surfaces are commonly associated with elevated

PAH concentrations and metals. The sample data concentrations for these contaminants are fairly low compared to other locations with similar land use characteristics. The residential neighborhood in the upper portion of the basin, located within the City's MS4 area, is unlikely to contain a discrete source of any of the contaminants of concern within the LDW.

4.3.1.5 KCIA SD#2/PS 78 EOF

The KCIA SD#2/PS 78 EOF is a storm drainage basin entirely operated by King County. The City of Seattle, through SPU, utilizes this drainage system as an emergency overflow point for wastewater pump stations 44, 45, and 78. No SPU stormwater flows discharge into this system. In the event of an emergency overflow, sewage would impact oil water separator vaults on the King County International Airport, which would be cleaned to minimize impacts to the LDW. From 2019 to 2024, this system was impacted several times by emergency overflows of sewage due to wastewater pump stations 44 and 45 becoming overwhelmed. Upon investigation, it was determined that properties at the King County International Airport had improperly operated fuel spill diversion valves which directed large quantities of rainwater to the pump station. SPU and King County worked closely with the tenants involved to resolve this issue.

4.3.1.6 S 96th St SD

The S 96th St SD is approximately 99 acres and is located on the western side of the LDW, at the border of the City of Seattle and unincorporated King County. See map number 10 in the Map Atlas. The portion of the basin draining the City of Seattle is small and encompasses a mix of residential and industrial properties to the west of Highway 99. Large sections of this drainage basin lie in unincorporated areas of King County, who have the oversight of source control activities within these areas. SPU's portion of the basin discharges into a WSDOT owned pond located adjacent to a cloverleaf offramp for Highway 99, prior to entering the north fork of Hamm Creek. Portions of the basin overlay areas where substantial quantities of cement kiln dust were used as fill, resulting in the presence of residual contamination predating much of the existing industrial activity within the basin. This kiln dust solidifies similar to cement within the drainage pipes, substantially impacting SPU's ability to collect samples from within the drainage basin. To support the long-term monitoring of the basin's pollutant loading, SPU installed a sediment trap in 2023, just upstream from where SPU's system discharges into the WSDOT pond. As of June 30th, 2024, there is limited data available for trend analysis.

Table 18: Summary statistics for select contaminants in the S 96th St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	2	57	93	37.6	92.6	65.1	65.1	50	0
Copper	2	390	--	62.1	165	113.6	113.6	0	--
Lead	2	450	530	82.4	86.4	84.4	84.4	0	0
Mercury	2	0.41	0.59	0.065	0.166	0.116	0.116	0	0
Zinc	2	410	960	795	899	847	847	100	0
LPAH	1	5,200	--	1,170	1,170	1,170	1,170	0	--
HPAH	1	12,000	17,000	1,411	1,411	1,411	1,411	0	0

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
cPAH	1	1,000[A]	--	192.4	192.4	192.4	192.4	0	--
PCBs	2	130	1,000	<19.8	80.3	50.1	50.1	0	0
BEHP	1	1,300	1,900	676	676	676	676	0	0
BBP	1	63	900	320	320	320	320	100	0
DMP	1	71	160	97.5	97.5	97.5	97.5	100	0
TPH-Oil-AS	1	2,000[B]	--	747	747	747	747	0	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

C. Remedial Action Level (RAL) for the LDW.

D. MTCA Method A soil cleanup level for industrial and unrestricted use.

The S 96th St SD is not an effectiveness monitoring location and has insufficient data to provide a trends analysis for near end of pipe samples. SPU plans to continue to collect sediment trap samples from the trap installed in 2023 to allow for near end of pipe trend analysis moving forward.

Known Sources within the S 96th St SD

There are no known active, uncontrolled sources of pollutants to the S 96th St SD currently. Over the years, several sources of pollutants were identified by the source control staff, including two facilities which are now covered by Industrial Stormwater General Permits issued by Ecology. The cement kiln dust found throughout this basin is known to be a source of metals which may contaminate stormwater solids. However, due to the dispersed nature of the source, it is not viewed as controllable by the source control program. Metals contaminant levels are not seen as elevated to a level of concern requiring structural controls.

4.3.1.7 Duwamish Substation SD#1, #2, #3

The Duwamish Substation basins number 1, 2, and 3 are small drainage basins located outside of the City of Seattle, entirely on the Seattle City Light owned Duwamish Substation. These basins encompass 1.9, 1, and 0.6 acres respectively. See map number 11 in the Map Atlas. Each of these three basins drain a small portion of the site driveway, parking lot areas, and transmission pads, and all contain a couple storm drainage catch basins. The substation contains many transformers and other heavy electrical apparatuses which could be sources of contaminants such as copper, zinc, oils, and PCBs. The electrical equipment is largely stored on gravel pads and have minimal potential to impact the Duwamish Substation storm drainage basins. The site catch basins are cleaned regularly, resulting in insufficient accumulation of solids to allow for sampling. No analytical data is available for these basins, due to the high level of maintenance performed on the drainage assets and low volume of runoff that reaches them. SPU and SCL regularly attempt to sample these structures and plan to continue to do so into the future.

Known Sources within the Duwamish Substation SD 1, 2, 3

The Duwamish Substation is the sole facility that could impact the substation storm drains. The facility is a potential source of metals, PCBs, and oils, due to the electrical equipment stored and used on site. Equipment failure or incidental spills would be recognized quickly and responded to immediately to prevent drainage system impacts.

4.3.1.8 W Marginal Pl S SD

The W Marginal Pl S SD is an approximately 4.9 acre drainage basin located in front of the Duwamish Substation in the City of Tukwila. . The drainage basin is owned and operated by the City of Tukwila, who has ultimate responsibility for source control actions within the basin. Two catch basins located in the access driveway for the Duwamish Substation connect into the W Marginal Pl S SD and have the potential to transport pollutants from the substation facility into this drainage basin. As the catch basins at the Duwamish Substation are maintained at a high frequency, there has been insufficient settled material within the catch basins during sampling attempts. SPU and SCL will continue to attempt to sample these catch basins in the coming years to obtain analytical data to determine the contamination potential from this basin.

Known Sources within the W Marginal Pl S SD

There are no known, uncontrolled, active sources of pollutants within the W Marginal Pl S SD in areas controlled by the City of Seattle. Two catch basins in the driveway to the Duwamish Substation facility discharge into this drainage basin, but the drains are not in proximity to any foreseeable sources of contamination.

4.3.1.9 17th Ave S SD

The 17th Ave S SD is a storm drainage basin that came online in 2017 after the completion of the Early Action Area cleanup of Terminal 117. The drainage basin encompasses 2.9 acres of residential and light manufacturing parcels, as well as open space where the Basin Oil and Malarkey Asphalt facilities were previously located. See map number 9 in the Map Atlas. The basin includes biofiltration swales and filterra tree boxes which provide treatment to all runoff within the basin. After completion of the cleanup of Terminal 117, which was overseen by the Port of Seattle, SPU, and SCL, the EPA established a Long-Term Maintenance and Monitoring Plan (LTMMP) for an area that now includes the 17th Ave S SD. The LTMMP includes requirements to collect samples from the drainage basin. That includes annual samples from immediately upstream of the outfall, as well as periodic sampling of underdrains within the bioswales. This near end of pipe sediment trap was installed in 2017. As the entirety of the basin is treated by filtration media, the volume of settled solids available to sample is extremely low. Insufficient solids were available in 2018 to run any analysis. The first sample collected and analyzed from the 17th Ave S SD was collected in 2019. Sampling events have prioritized PCB analysis, as this was the primary chemical present at the location prior to cleanup. For the effectiveness monitoring data analysis, only PCBs had sufficient data to allow for trend plotting. Sampling data from 2019 until June 30th, 2024 is summarized below.

Table 19: Summary statistics for select contaminants in the 17th Ave S SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	9	57	93	5.15	29.8	14.5	12.2	0	0

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Copper	9	390	--	84.5	581	202	114	11.1	--
Lead	9	450	530	28.5	102	55.8	46.7	0	0
Mercury	9	0.41	0.59	0.02	0.29	0.11	0.09	0	0
Zinc	9	410	960	440	1,170	711	669	100	22
LPAH	9	5,200	--	185.9	644	386	383	0	--
HPAH	9	12,000	17,000	1,304	5,945	3,365	3,048	0	0
cPAH	9	1,000[A]	--	145.7	867	384.7	320.7	0	--
PCBs	35	130	1,000	<19.7	1,204	264	138	51.4	5.7
BEHP	9	1,300	1,900	2,370	89,000	16,582	6,870	100	100
BBP	9	63	900	97.9	2,240	633	444	100	22
DMP	9	71	160	49.3	2,640	658	243	89	56
TPH-Oil-AS	5	2,000[B]	--	1,250	2,500	1,946	2,030	60	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

B. MTCA Method A soil cleanup level for industrial and unrestricted use.

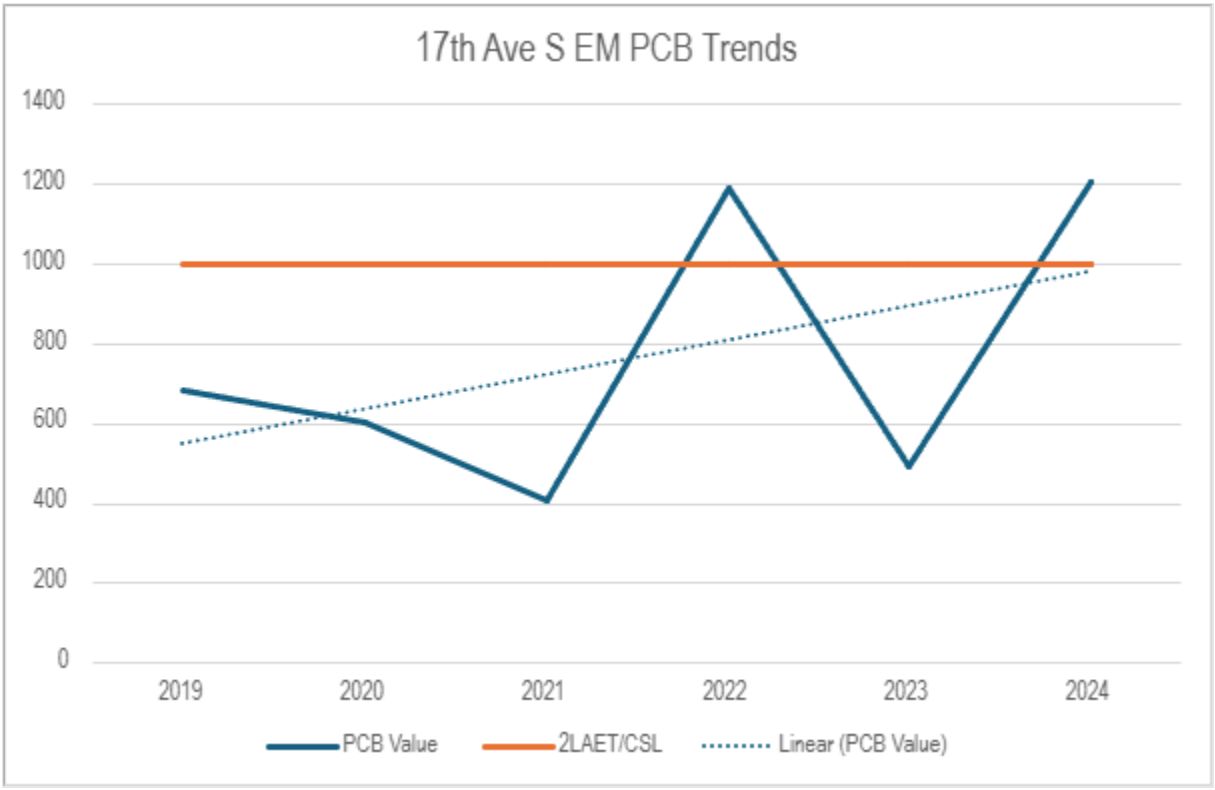
The area encompassed by the 17th Ave S SD is known to have been contaminated by operations at the now closed Malarkey Asphalt and Basin Oil facilities. The entire neighborhood underwent a formal cleanup including removal of contaminated soils and replacement with clean fill. When sufficient material has accumulated within the drainage system, samples have indicated that PCBs are present in moderate quantities. To address the PCBs present within this basin, SPU conducted targeted source tracing in 2023 and 2024 and collected samples from all structures where sufficient material could be found. This included samples that had not yet filtered through green stormwater infrastructure, meaning PCB results received were elevated above the levels that would actually reach the outfall. SPU also deployed a PCB scent detection canine during the 2023 screening. The PCB scent detection canine indicated that PCBs may be present in two locations within the neighborhood. In response, SPU and SDOT began regular street sweeping to remove any PCB contaminated soils prior to entering the drainage system. Line cleaning and more frequent catch basin cleaning have also been used to reduce the potential pollutant loading to the LDW. Additional site screening and responses are planned for the future to continue to address any residual PCBs identified within the basin.

Known Sources within the 17th Ave S SD

There are no known active, uncontrolled sources of contaminants within the 17th Ave S SD. PCB source tracing within the basin identified two locations where elevated PCB concentrations may be present within the soils at two properties. SPU is planning to address one of these locations, where soil around a dead tree may contain

moderate levels of PCBs. The other location is a private storage yard from where stormwater sheet flows to the roadway, which directs flow to a filterra treatment box. This filterra was fully cleaned and the filter media was replaced in 2024 to address these PCBs.

Figure 15: Effectiveness monitoring data trend for PCBs within the 17th Ave S SD



4.3.1.10 16th Ave S SD (West)

The 16th Ave S SD (West) basin encompasses 1.3 acres of right of way within the South Park neighborhood, immediately south of the South Park bridge. See map number 8 in the Map Atlas. The basin encompasses small portions of 14th Ave S and Dallas Ave S, including a small parking lot used as a commercial vehicle charging station. The basin enters a system of raingardens along the eastern side of the South Park bridge prior to discharging into the LDW. The right of way runoff flows through SPU owned drainage mainlines prior to entering the raingardens, which are owned and operated by King County. As the basin is small in size and serves the right of way only, it is not included in the list of effectiveness monitoring locations within Appendix 13 of the City's Municipal Stormwater Permit. This drainage basin was installed in its current form in June of 2014, and has limited analytical available for analysis. The basin was sampled in June of 2023 to fill a data gap that had been identified. Of the selected contaminants of interest for the basin analysis, motor oil exceeded the MCTA method A cleanup level for industrial use at 3,560 mg/kg and zinc exceeded the SQS level at 588 mg/kg. All other highlighted contaminants were found to be below their SQS/LAET levels.

Middle Reach Basins

The Middle Reach of the LDW includes 16 drainage basins. SPU owns/operates 9 of these basins. SPU potentially discharges through seven additional basins where SPU's stormwater or emergency overflows from sanitary mainlines may reach the LDW. This Reach, which runs from approximately the Duwamish Waterway Park in the south to Slip 2 in the north, is slated to begin active in-water sediment cleanup around 2027. It contains a large number of smaller drainage basins that provide conveyance for heavily industrialized blocks, as well as several larger basins, that encompass mixed use neighborhoods.

4.3.1.11 KCIA SD #3/PS44 EOF

The KCIA SD#3 basin is a 296 acre King County owned and operated drainage basin located on the northern central portion of the King County International Airport. This drainage basin serves King County properties only and accepts no stormwater runoff from SPU's system. The drainage basin provides pump station 44 with an emergency overflow point, in the event that the sanitary pump station becomes overwhelmed. This pump station overflowed several times during the last SCIP period. When the cause was investigated, it was found to be the result of improper use of a diversion valve by a tenant of the King County International Airport, which was sending large volumes of stormwater to SPU's sanitary sewer. SPU issued a notice of violation to the tenant and required structural and operational changes at the site, which has addressed these overflows.

As no stormwater from SPU's system discharges into or through this basin, SPU does not have a stormwater source control obligation for KCIA SD#3/PS44 EOF. As such, there is no SPU sample data available for this basin.

4.3.1.12 I5 SD at Slip 4

The I5 SD at Slip 4 is a 150-acre stormwater drainage basin that is largely owned by WSDOT. The basin is located along a portion of Interstate 5 at the northern end of the King County International Airport. See map number 18 in the Map Atlas for more information. The drainage basin conveys SPU stormwater flows from two small residential areas on Beacon Hill, which enters the WSDOT owned portion of the basin adjacent to the interstate. Three blocks of industrial properties on the southern side of the interstate also discharge into this basin. SPU collects an annual sample using a Norton-style sediment trap from within the WSDOT owned portion of the mainline system to understand the pollutant loading and contaminant potential of the solids being transported by the drainage system. This sample location is upstream from the outfall near Airport Way S, which allows for accurate characterization of the sources of pollutants that may be coming from the SPU portions of this system. Downstream of the sample point are several King County owned parcels which discharge parking lot areas into the WSDOT system. SPU's sample data would not characterize the contaminant loading potential from these properties. SPU does not own this drainage basin and discharges from the outfall into the LDW are WSDOT's obligation However, the basin is included within the Effectiveness Monitoring Locations table of Appendix 13 of the City's Municipal Stormwater Permit (both the 2019 and 2024 Permits), so samples are retrieved and analyzed annually. The analytical trends of this data are shown below.

Table 20: Summary statistics for select contaminants in the I5 SD at Slip 4.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	13	57	93	2.43	16.1	9.81	11	0	0
Copper	13	390	--	4.66	483	132.8	68	7.7	--
Lead	13	450	530	23.5	176	107.3	99.6	0	0
Mercury	13	0.41	0.59	0.011	0.07	0.038	0.038	0	0
Zinc	13	410	960	41	1,090	396	370	38.5	7.7
LPAH	12	5,200	--	41.1	1,522	682	606	0	--
HPAH	12	12,000	17,000	174	8,260	3,465	3,021	0	0
cPAH	12	1,000[A]	--	25.6	970	411	337	0	--
PCBs	12	130	1,000	<19	281.8	91.5	89.5	16.7	0
BEHP	13	1,300	1,900	248	20,000	5,641	4,100	69	69
BBP	13	63	900	<19.2	22,300	1,933	280	84.6	7.7
DMP	13	71	160	<19.2	1,160	204	97	77	15
TPH-Oil-AS	11	2,000[B]	--	168	3,540	1,234	844	18.2	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

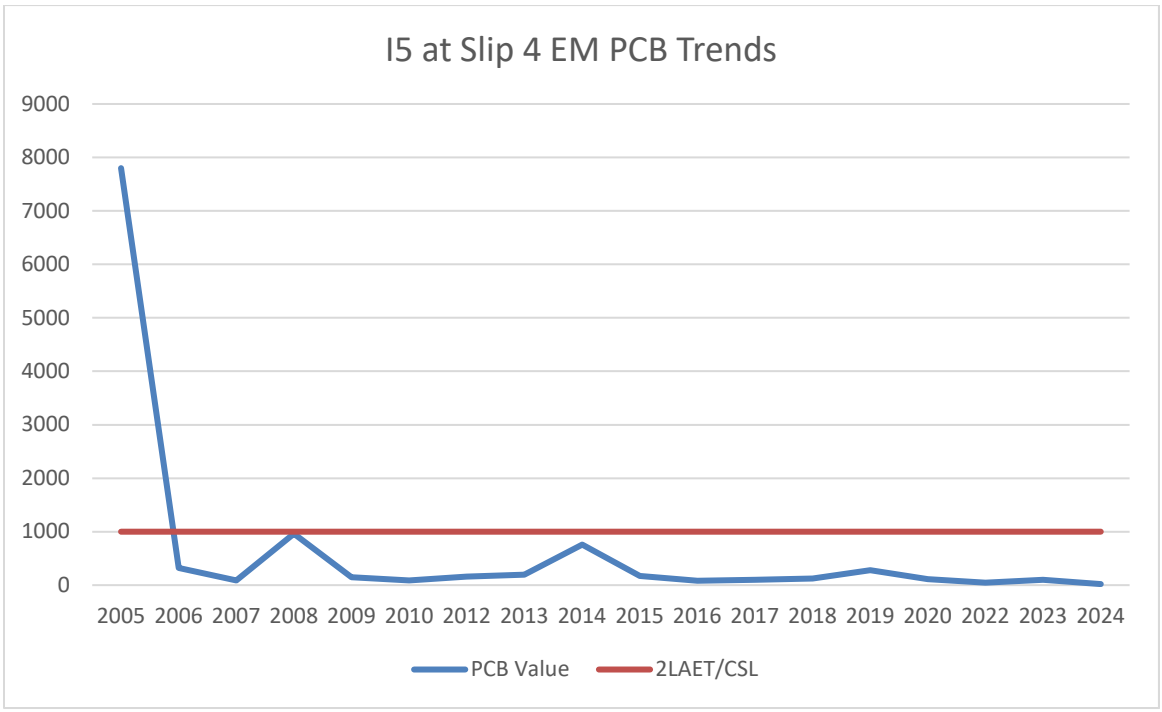
B. MTCA Method A soil cleanup level for industrial and unrestricted use.

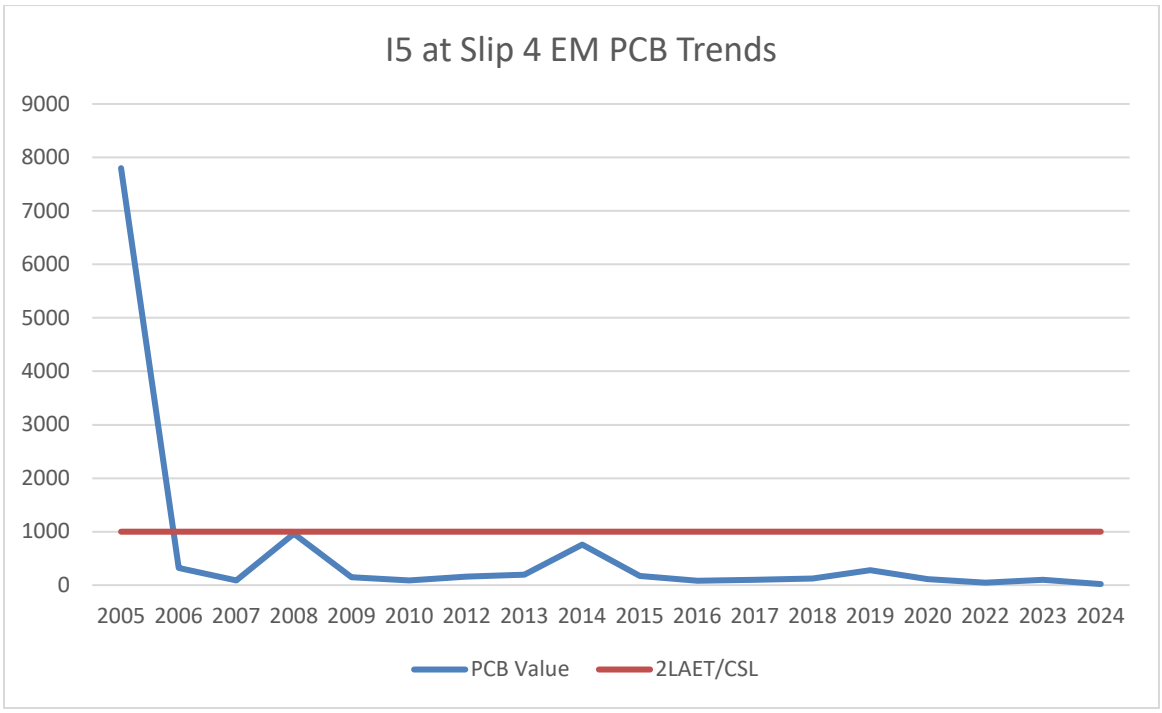
Sampling data from within the I5 SD at Slip 4 has generally shown that contamination levels are low within the basin. Phthalates have been found to be at some of the lowest levels anywhere within the city limits. Contaminants of concern such as PAHs, PCBs, and metals have also generally been quite low. It is suspected that the low levels of contaminants found are due to the lack of discrete pollutant-generating sources within the basin. While the sample data indicates consistently low levels of contamination, several businesses near the sample location have had incidental spills over the years, demonstrating that source control inspections remain important even where sampling does not indicate elevated concentrations of pollutants.

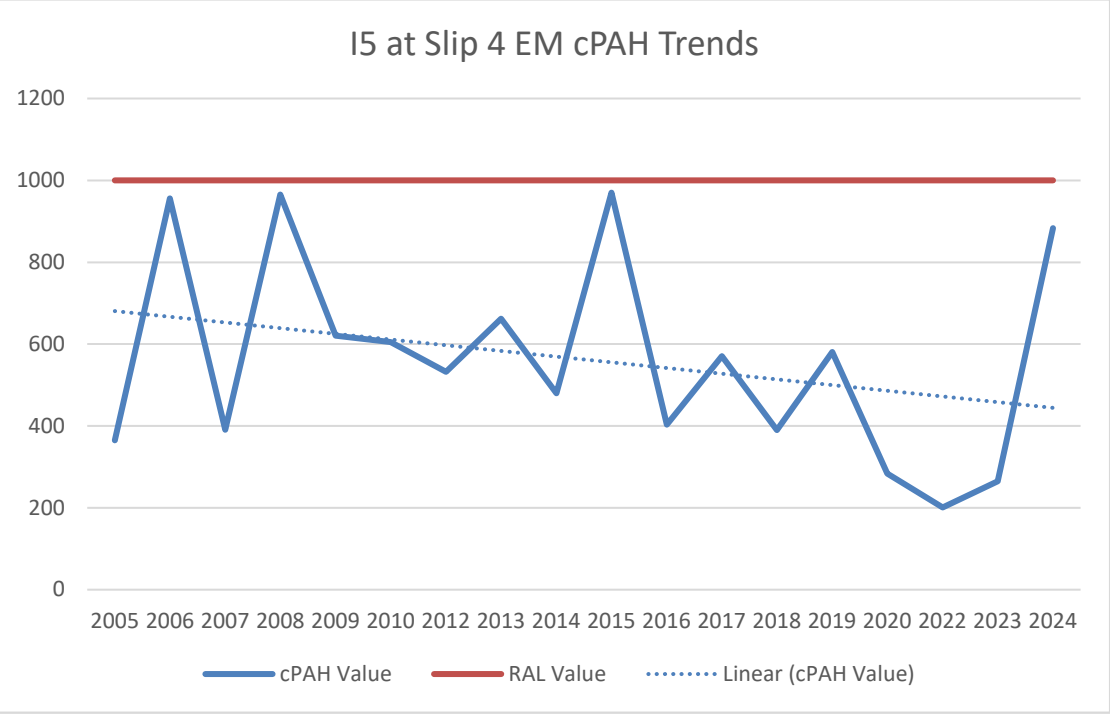
Known Sources within the I5 SD at Slip 4 Basin

There are no known, uncontrolled sources of pollution within the basin. Two industrial facilities located immediately adjacent to the drainage system operated under Ecology-issued Permits and could pose risks of contamination if their BMPs were not being implemented. SPU plans to continue to inspect these facilities based on their potential risk to the stormwater system, in accordance with the standard business inspection protocol.

Figure 16: Effectiveness Monitoring Data Trends for the I5 SD at Slip 4







4.3.1.13 Georgetown SD

The Georgetown Storm drain is a 4.5 acre drainage basin, owned and operated by the City of Seattle. The basin is located on the eastern side of the Lower Duwamish Waterway. It runs from the old Georgetown Steam Plant facility along the northern end of the King County International Airport property and discharges to an outfall at Slip 4 of the LDW. For more information, see map number 19 in the Map Atlas. This basin was originally installed to convey non-contact cooling water flows from the Seattle City Light owned Georgetown Steam Plant to the LDW through a wood stave flume. Today, this drainage system is now comprised of concrete and Polyvinyl pipe, and conveys flows from the Steam Plant, two parking lot areas along Ellis Ave S, and an unimproved right-of-way adjacent to the King County International Airport. SPU collects an annual sample of settled solids from within this drainage system at a maintenance hole and vault structure located immediately north of East Marginal Way S, within the unimproved right-of-way. This sample point serves as the Effectiveness Monitoring Location for the basin. Effectiveness monitoring data trends as well as the basin wide statistics for settled solids are displayed below.

Table 21: Summary statistics for select contaminants in the Georgetown SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	7	57	93	2.94	9.08	7.56	7.99	0	0
Copper	7	390	--	86.8	241	157	161	0	--
Lead	7	450	530	65.7	178	118.4	110	0	0
Mercury	7	0.41	0.59	0.085	0.24	0.167	0.164	0	0

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Zinc	7	410	960	432	1,180	765	741	100	28.6
LPAH	7	5,200	--	2,304	98,770	33,828	8,323	57	--
HPAH	7	12,000	17,000	17,635	632,420	189,834	45,297	100	100
cPAH	7	1,000[A]	--	2,430	68,382	24,060	6,634	100	--
PCBs	7	130	1,000	178	439	270	253	100	0
BEHP	7	1,300	1,900	6,290	20,100	10,559	9,090	100	100
BBP	7	63	900	494	3,560	1,419	731	100	42.9
DMP	7	71	160	89.5	3,560	1,040	156	100	42.9
TPH-Oil-AS	7	2,000[B]	--	2,430	10,700	5,314	4,090	100	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

B. MTCA Method A soil cleanup level for industrial and unrestricted use.

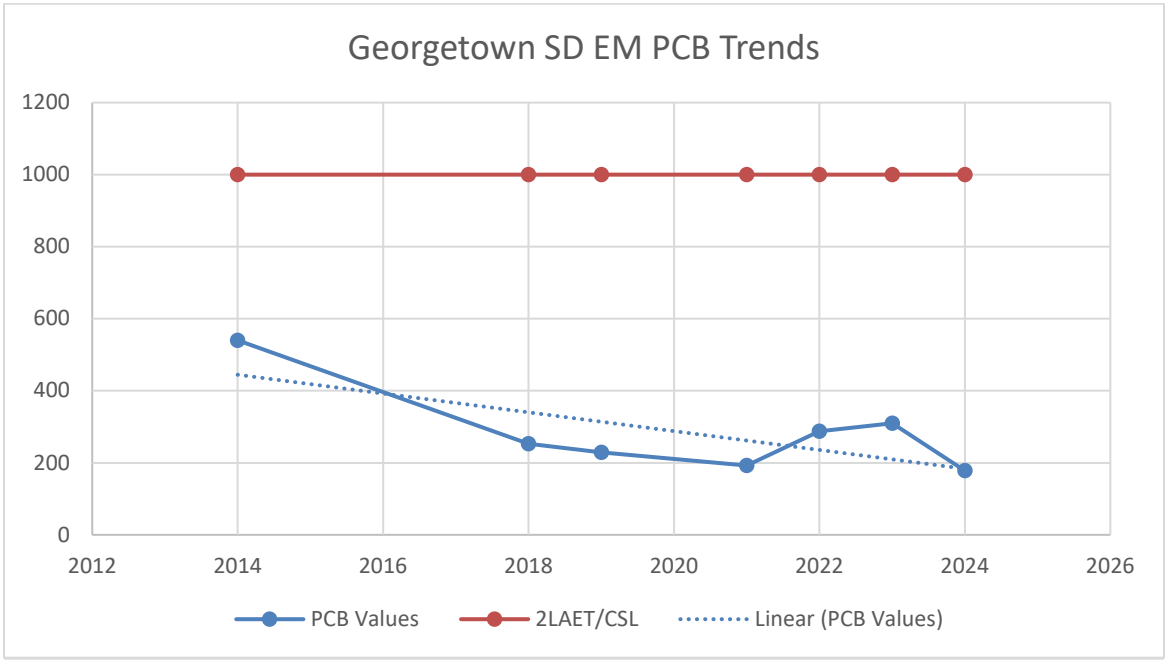
Sampling data from Georgetown SD consistently indicates elevated PAH values are present within the settled solids. The Georgetown Steam Plant was suspected of being one of the primary sources of PAHs within the basin, as the plant had a coal tar roof and coal tar is comprised primarily of PAHs. This roof was recoated in 2023 to address the source, after which the downstream drainage system lines were cleaned through the SPU line cleaning for source control program.

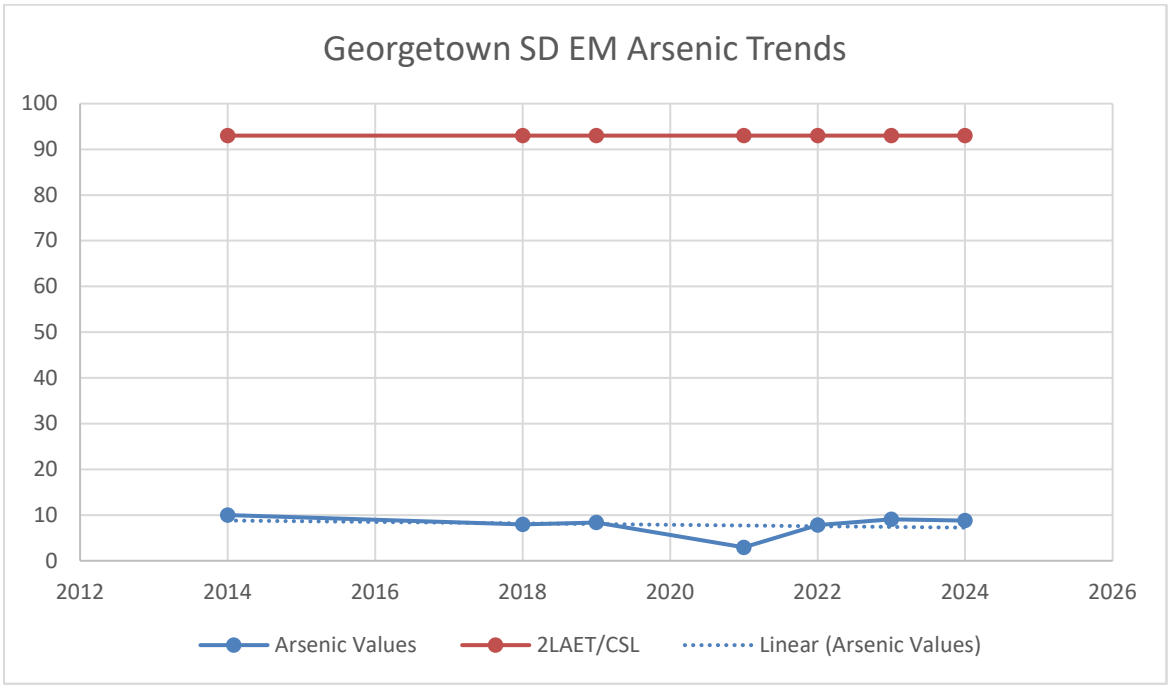
Known Sources within the Georgetown SD

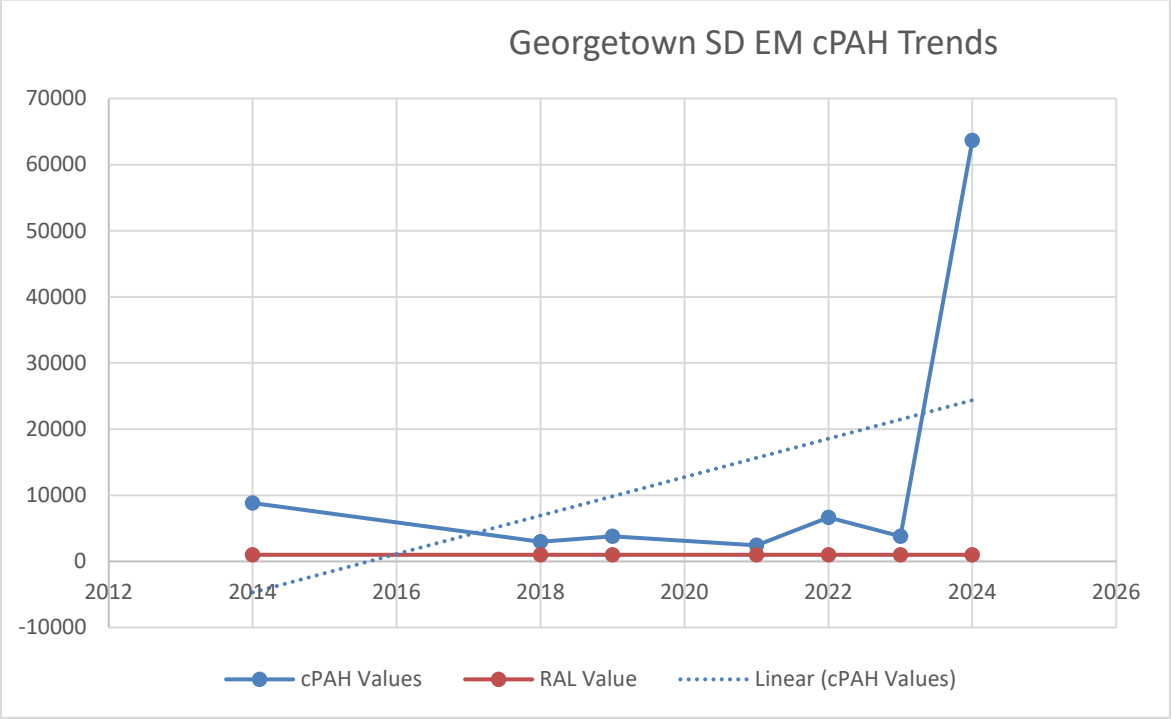
There are no active, known, uncontrolled sources within the Georgetown Stormdrain. As noted above, the roof of the Georgetown Steam Plant was known to be a source of PAHs impacting this drainage system. This roof was recoated in 2023, with the downstream drainage system cleaned after the roof coating was completed. Sampling conducted in 2024 showed continuing elevated PAH values within the basin, which was not expected. See the cPAH EM trends graph below. Staff who conducted the sampling noted that it was difficult to obtain sufficient material for sampling. It is possible that the material that SPU was able to sample in 2024 was comprised of remnant coal tar that was not removed from the pipe but which had adhered to the pipe surface. An additional possibility is that the line cleaning did not remove all of the settled solids within the drainage system due to a unique design characteristic within the pipe. Unlike many drainage mainlines, this system contains portions comprised of a rectangular chamber with a trough on the bottom which carries the stormwater flows. This design leaves a shelf on both sides of the flow path that can accumulate solids and is difficult to clean using standard jetting, which was conducted in 2023. As such, SPU plans to clean the Georgetown stormdrain within the SCIP3 phase and to use CCTV video inspection to determine if remnant coal

tar or other solids are present after completion. This cleaning will include cleaning of the bench present within maintenance hole access points to support full removal of accumulated solids.

Figure 17: Effectiveness Monitoring Data Trends for the Georgetown SD.







4.3.1.14 North Boeing Field SD

The North Boeing Field SD is a stormwater drainage system owned by the City of Seattle. This drainage system once provided drainage conveyance for the northern end of the King County International Airport and carried flows to an outfall within Slip 4 of the LDW. This entire drainage system was decommissioned in 2012, when SPU was able to conduct a video inspection of the mainline and verify that there were no active connections to it. Portions of the system were plugged, with the drains that once connected to this system being rerouted to the adjacent KCIA#3 SD/PS#44 EOF system. As this system has been fully decommissioned, there should not be any active sources of pollutants impacting the system. Accordingly, SPU does not have any recent analytical data for stormwater solids from this system.

Known Sources within the North Boeing Field SD.

There are no known, active, uncontrolled sources of contaminants within the North Boeing Field SD. The basin had been fully decommissioned, with no known inputs of stormwater to the mainline system, thereby no longer conveying flows to Slip 4 or the LDW. In conversations related to source control activities elsewhere in the LDW from late 2024, SPU has become aware that drainage system modifications may have been conducted at the King County International Airport without being permitted by the City of Seattle. These drainage system modifications may have resulted in new stormwater connections to the North Boeing Field SD which have the potential to carry pollutants into this drainage system. SPU plans to conduct a CCTV inspection of the North Boeing Field SD in the summer of 2025 to verify that the basin is still fully decommissioned. If active connections are observed, SPU will work with King County to disconnect these new connections from the system.

4.3.1.15 S Garden St SD

The S Garden St SD serves 1.5 acres of right-of-way and adjacent industrial properties along S Garden St. The drainage basin is a mix of public and privately owned mainline conveyance. SPU owns and operates approximately 305 linear feet of mainline on S Garden St. Seattle Iron and Metals, a large metal recycling facility, operates the downstream 406 linear feet of mainline to the outfall at the western end of S Garden St, along the eastern bank of the LDW. See map number 17 of the Map Atlas for more information. The primary source of runoff to this system is from two parcels operated by Seattle Iron and Metal's scrap metal recycling operation, and road runoff along S Garden St. A Filterra stormwater treatment system owned and maintained by Seattle Iron and Metals is located near the western end of S Garden St and provides treatment for road runoff entering the S Garden St SD.

SPU collects an annual settled solids sample using a sediment trap installed within the S Garden St SD system, near to the transition between SPU ownership and Seattle Iron and Metals ownership. This sediment trap was installed in 2023 and data generated prior to this date was from grab sampling conducted at the same location.

Table 22: Summary statistics for select contaminants in the S Garden St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	5	57	93	12.1	26.5	17.9	17.2	0	0
Copper	5	390	--	225	662	449	446	60	--
Lead	5	450	530	228	654	752	352	40	20
Mercury	5	0.41	0.59	0.04	1.67	0.64	0.4	40	40
Zinc	5	410	960	1,120	3,100	2,116	2,040	100	100
LPAH	5	5,200	--	112	1,505	752	352	0	--
HPAH	5	12,000	17,000	1,453	6,278	3,655	3,654	0	0
cPAH	5	1,000[A]	--	175	549	387	394	0	--
PCBs	5	130	1,000	388	6,730	2,328	1,386	100	80
BEHP	5	1,300	1,900	3,080	35,100	15,074	4,340	100	100
BBP	5	63	900	175	1,520	703	425	100	40
DMP	5	71	160	28.3	389	177	110	60	40
TPH-Oil-AS	4	2,000[B]	--	1,430	12,800	7,320	7,525	75	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

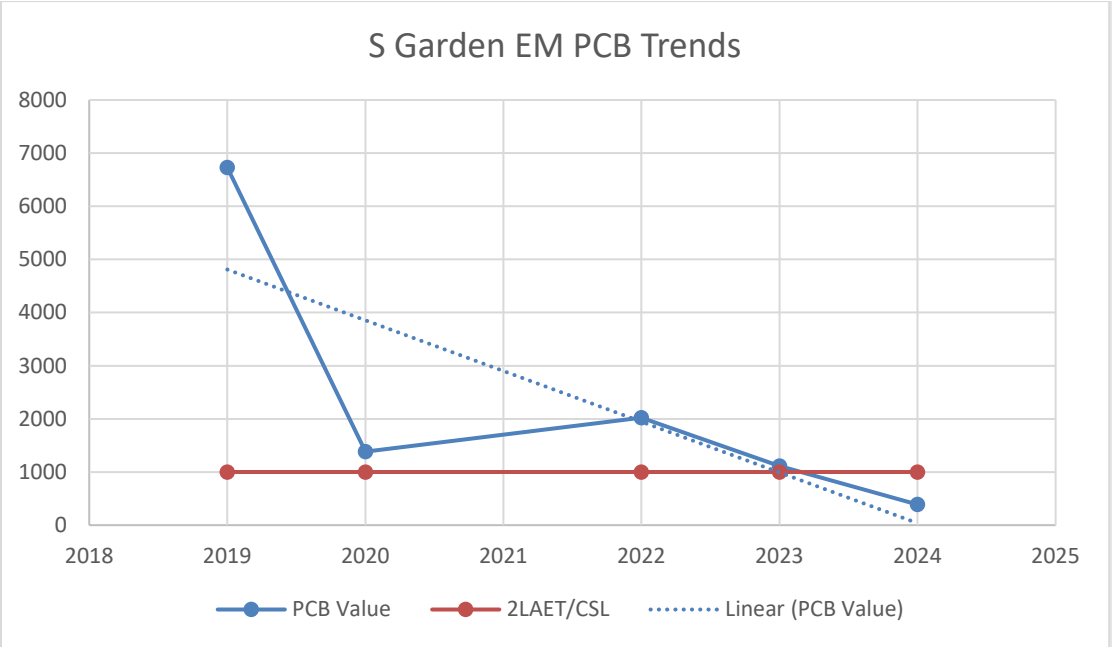
B. MTCA Method A soil cleanup level for industrial and unrestricted use.

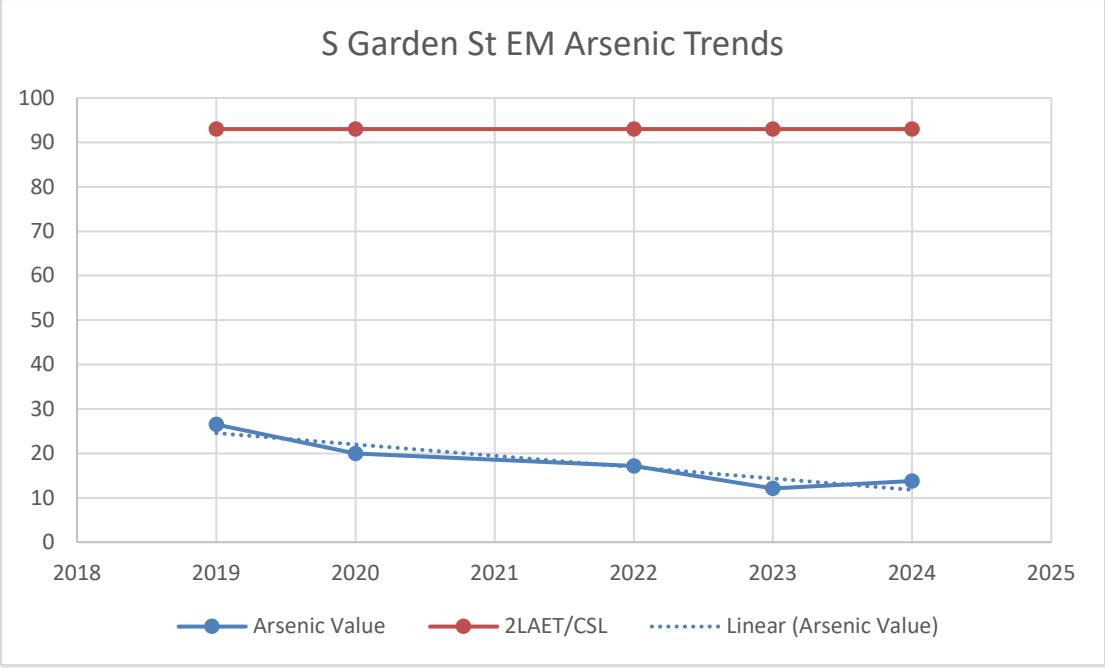
Known Sources within the S Garden St SD.

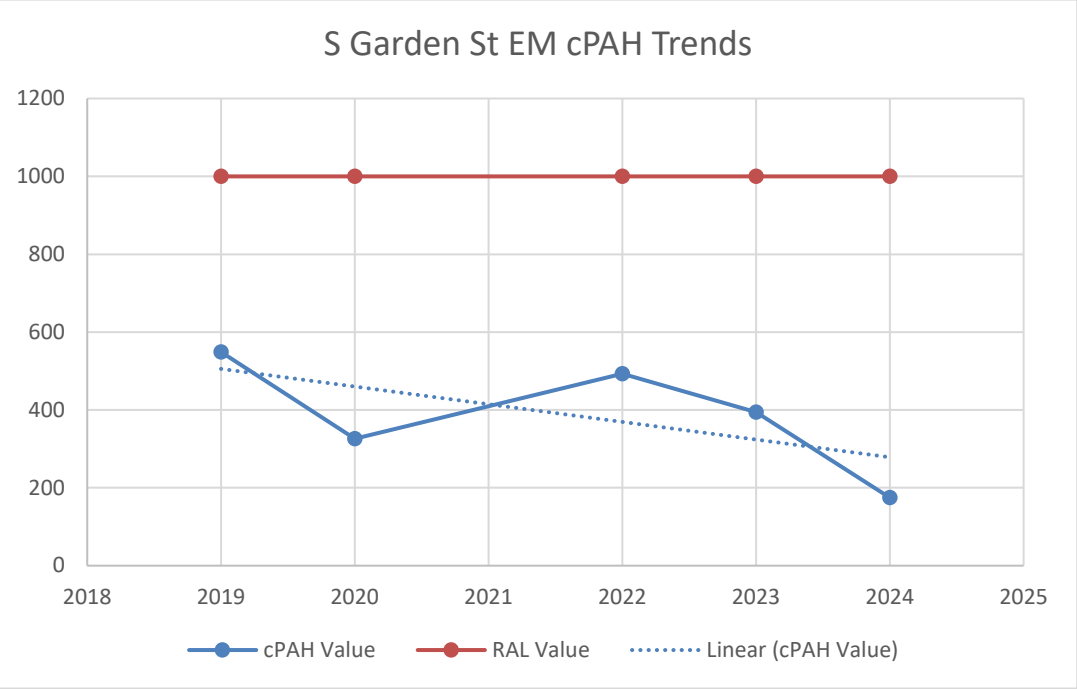
The S Garden St SD has consistently show elevated levels of metals, PCBs, and phthalates in samples collected from the drainage system. The basin is bordered to the north and west by Seattle Iron and Metals, a scrap metal recycling facility known to be a source of metals, phthalates, PCBs, and other pollutants. This metal recycling facility has an individual (i.e., site-specific) Industrial SNPDES Permit issued by Ecology. While the site has a robust treatment system for runoff from its property, adjacent properties are impacted by air deposition of pollutants from the business operation and directly from scrap metal debris that is either accidentally or illicitly deposited during transport. For many years, the City of Seattle has worked to address sources of pollutants to the S Garden St SD but struggled to do so due to several factors. S Garden St is adjacent to two railroad rights of way, one at the entry to the roadway and another which runs along the northern side of the street. The railroad rights-of-way were in very poor condition, with substantial potholing at the entrance to S Garden St off 8th Ave S. This poor condition prevented maintenance equipment, such as street sweepers and vactor trucks used for drainage system maintenance, from accessing the area. After years of coordination, SDOT was able to convince the owner of the railroad line to allow for a partial repair of the road surface in 2023 in proximity to the rail lines, which has allowed access for these maintenance vehicles.

Illegal storage and parking of vehicles associated with an adjacent warehousing business along S Garden St further limited the ability for the City to access and maintain the drainage assets in S Garden St. SDOT and SPU worked with the business to eliminate the illegal storage but lacked the ability to restrict parking in the location. Periodically, the business would remove vehicles from the location to allow for maintenance and sweeping, but this was inconsistent. Over time, this resulted in a heavy accumulation of debris on the pavement. Much of this debris was transported to the location from stormwater flowing from adjacent potholes, as well as open top rail cars used by Seattle Iron and Metals to transport metal scrap. In late 2023, the tenant in the warehouse vacated the property and the parking of vehicles that had prevented access to S Garden St ceased. Since late 2023, SPU has increased maintenance activities on S Garden St, including periodic sweeping. Seattle Iron and Metals has also been able to access the roadway with maintenance equipment to clean and maintain the Filterra stormwater treatment structure in the location. The repair of the railroad right-of-way and improved access associated with fewer parked vehicles has greatly reduced the pollutant loading in the basin. SPU and SDOT are coordinating to sustain the current access and maintenance conditions to support continued pollutant load reduction. Effectiveness Monitoring Location data trends are displayed below for the S Garden St SD.

Figure 18: Effectiveness Monitoring Data Trends for the S Garden St SD.







4.3.1.16 S Myrtle St SD

The S Myrtle St SD provides conveyance for 8.6 acres of heavy industrial properties located along the western end of S Myrtle St within the Georgetown neighborhood. The basin lies to the north of the Seattle Iron and Metals facility and conveys runoff from S Myrtle St, the primary access route for this business. Several other industrial facilities border the basin, which also contains the Whitehead Tyee, Perkins, and Myrtle Street MTCA cleanup sites. The drainage mainline system is solely owned and operated by Seattle Public Utilities, and accepts runoff from the S Myrtle St right-of-way, as well as from private stormwater lateral lines draining private parcels along the roadway. For more information about the drainage basin layout, see map number 16 in the Map Atlas.

S Myrtle St SD has well documented impacts from the adjacent industrial properties and heavy use of the right-of-way. Substantial quantities of data have been collected from the drainage system within this basin to characterize the pollutant loading potential, identify sources of contaminants, and to determine how to control them. Adjacent properties are inspected frequently to support source control activities at these businesses. To help address pollutant loading potential, SPU required Seattle Iron and Metals to install a Filterra treatment unit adjacent to Seattle Iron and Metals' property in 2011 to treat stormwater flow from the driveway area of the business.

In 2016, Ecology added Appendix 13 to the Phase 1 Municipal Stormwater permit, which included specific source control BMPs for the S Myrtle St SD. The City of Seattle is required to conduct weekly sweeping of S Myrtle St to reduce solids transport to the storm drains along the roadway. Appendix 13 also requires quarterly inspections of public catch basins within the basin and establishes maintenance thresholds for catch basin cleaning. While the standard cleaning threshold of a catch basin is when 60% of the sump is full, catch basins within this basin are cleaned when the sump exceeds 30%. Due to increased preventative scheduled maintenance implemented by SPU, the catch basins rarely accumulate measurable sediment.

From 2017 to 2020, SPU conducted a sediment trap effectiveness study within the S Myrtle St SD. SPU trialed several forms of sediment trap to determine which design was most effective in representing the settled solids loading in the basin. This process allowed the City to refine its custom sediment trap design. The study traps

were removed in 2020 and replaced with permanent sample collection traps. SPU collects annual effectiveness monitoring samples using Trent style bowl sediment traps installed in two maintenance holes near the end of the mainline system on S Myrtle St. The data are used to characterize the pollutant loading potential within the basin. Additional grab sampling is conducted upstream in the basin when sufficient solids are observed. Data analysis and effectiveness monitoring data are available below.

Table 23: Summary statistics for select contaminants in the S Myrtle St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	10	57	93	7.3	20.7	15.3	16.2	0	0
Copper	9	390	--	459.4	2,855	910	693	10	--
Lead	9	450	530	205	672	441	498	55.6	33.3
Mercury	9	0.41	0.59	0.03	27.2	3.61	0.74	66.7	66.7
Zinc	9	410	960	1,310	3,960	2,886	2,940	100	100
LPAH	9	5,200	--	257	3,840	1,484	1,492	0	--
HPAH	9	12,000	17,000	632	26,090	7,154	5,682	11	11
cPAH	10	1,000[A]	--	459	2,855	910	693	10	--
PCBs	10	130	1,000	506	4,450	1,742	1,668	100	80
BEHP	9	1,300	1,900	4,100	98,700	29,278	21,100	100	100
BBP	9	63	900	914	4,500	2,096	1,570	100	100
DMP	9	71	160	196	1,570	919	1,000	100	100
TPH-Oil-AS	7	2,000[B]	--	2,520	34,000	16,471	15,000	100	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

B. MTCA Method A soil cleanup level for industrial and unrestricted use.

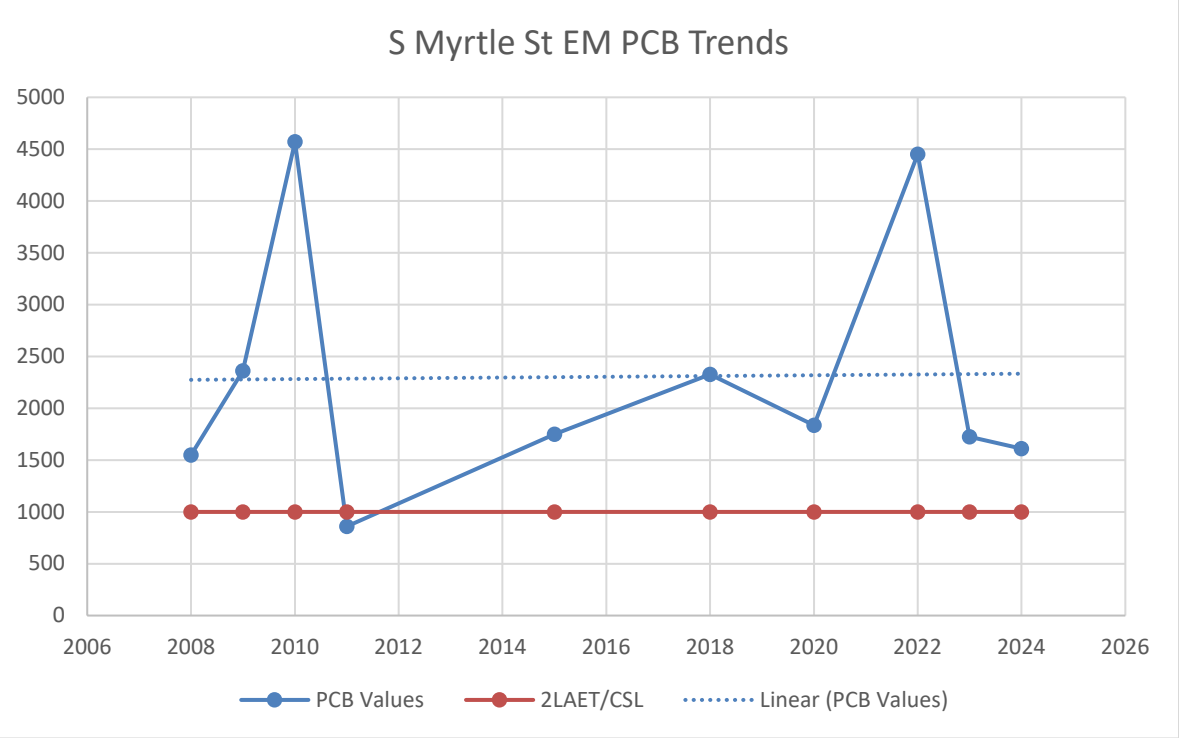
Contaminant levels of settled solids within the S Myrtle St SD consistently exceed cleanup standards for PCBs, metals, Phthalates, and oils. The high frequency of business inspections conducted by SPU and Ecology staff, in addition to regular sweeping and drainage asset cleaning, indicate that implementation of Best Management Practices is insufficient to address the pollutant potential within the basin. As such, SPU has begun planning for the installation of structural treatment for stormwater being conveyed by the S Myrtle St SD. In 2024, SPU completed an initial assessment that looked at factors such as site suitability, conveyance requirements, contributing area, and potential treatment technologies that could help address contaminants in the basin. In 2025, SPU will begin options analysis with the goal of selecting an alternative that will be designed to improve

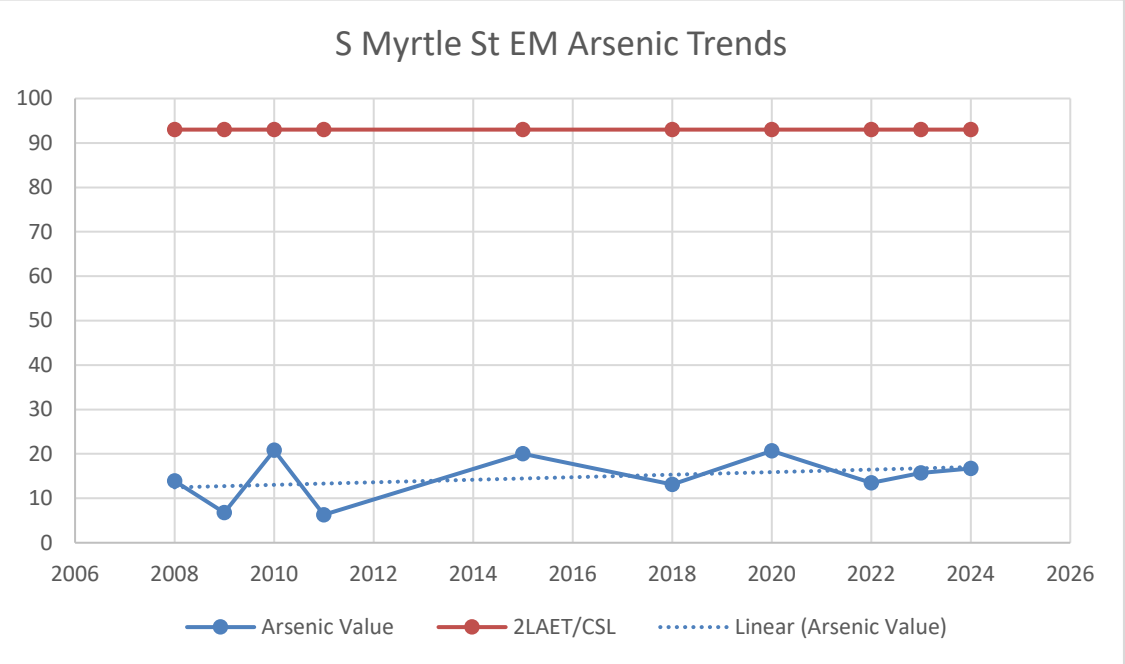
contaminant trends within S Myrtle St SD. This document will be shared with Ecology via technical memorandum in 2027.

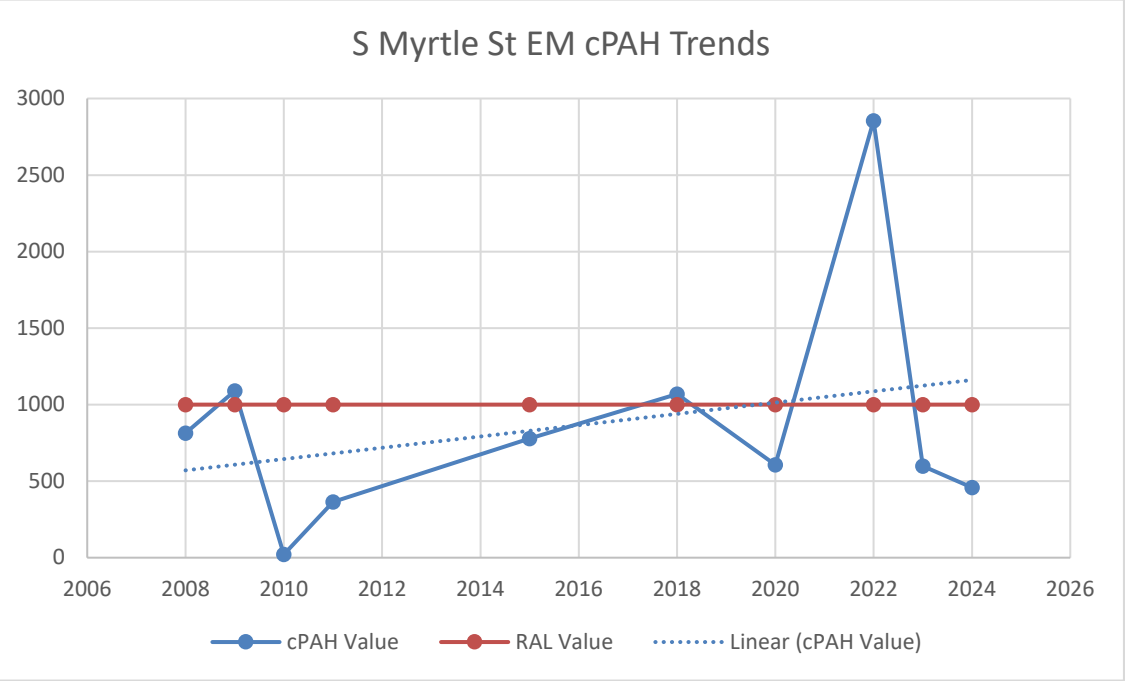
Known sources within the S Myrtle St SD.

The S Myrtle St SD has several known sources of pollutants. Three MTCA cleanup sites are located adjacent to the basin area, including the Whitehead Tyee site, the Perkins site, and the S Myrtle Street site. These locations are associated with legacy industrial operations that left contaminated soil and groundwater present within the basin. Additionally, several heavy industrial businesses operate within the basin. Seattle Iron and Metals, a metal recycling facility operates on the southern edge of this basin. While onsite runoff is treated through a robust stormwater treatment system owned and operated by Seattle Iron and Metals that is monitored prior to discharge, air deposition of contaminants from the site impacts the S Myrtle St right of way. The business regularly uses the roadway shoulder to store roll-off containers which house metal scrap when in use. These types of containers have frequently been found to be contaminated with remnant motor oils, PCB-containing oils, mercury, and other metals. These contaminants may be transported during rain events to the ground surfaces, where they can enter stormwater conveyance structures. Additionally, customers attempting to recycle metals at the site are commonly turned away from the business due to improper material sorting or preparation and frequently abandon these scrap materials along the right-of-way adjacent to the recycling facility. Unhoused populations regularly camp along this portion of roadway and leave waste material in areas where rainwater can transport pollutants as well. The City of Seattle Illegal Dumping program makes frequent visits to the location to address abandoned material to reduce impacts to stormwater.

Figure 19: Effectiveness Monitoring Data Trends for the S Myrtle St SD.







4.3.1.17 S Brighton St SD

The S Brighton St SD is owned and operated by SPU and covers 19 acres of industrial land and right-of-way along the southern end of Slip 3. The basin includes the majority of Fox Ave S, as well as S Brighton St on the eastern side of the LDW. At the intersection of S Brighton St and Fox Ave S, the mainline turns west and crosses beneath the Seatac Marine Services property to the outfall. Several heavy industrial and manufacturing facilities are located within the basin, including Seatac Marine Services, Dawn Food Products, Cascade Columbia Distribution, and Emerald Services. For additional information, see map number 15 in the Map Atlas. S Brighton St SD is

included in the list of Effectiveness Monitoring Locations within Appendix 13 of the City of Seattle's Municipal Stormwater Permit.

Table 24: Summary statistics for select contaminants in the S Brighton St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	6	57	93	5.36	46	29.1	31.5	0	0
Copper	6	390	--	131	239	180.5	177.5	0	--
Lead	6	450	530	40	186	130.5	131.5	0	0
Mercury	6	0.41	0.59	0.079	0.30	0.24	0.27	0	0
Zinc	6	410	960	355	1,330	905	985	83.3	66.7
LPAH	6	5,200	--	255	1,116	714	728	0	--
HPAH	6	12,000	17,000	2,422	8,863	5,442	5,327	0	0
cPAH	6	1,000[A]	--	286	1,068	578	512	16.7	--
PCBs	7	130	1,000	46	562	279	291	86	0
BEHP	6	1,300	1,900	292	4,950	3,389	4,055	83	83
BBP	6	63	900	103	521	349	367	100	0
DMP	6	71	160	17	126	75.3	75.7	50	0
TPH-Oil-AS	6	2,000[B]	--	2,160	5,610	3,550	3,355	100	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

B. MTCA Method A soil cleanup level for industrial and unrestricted use.

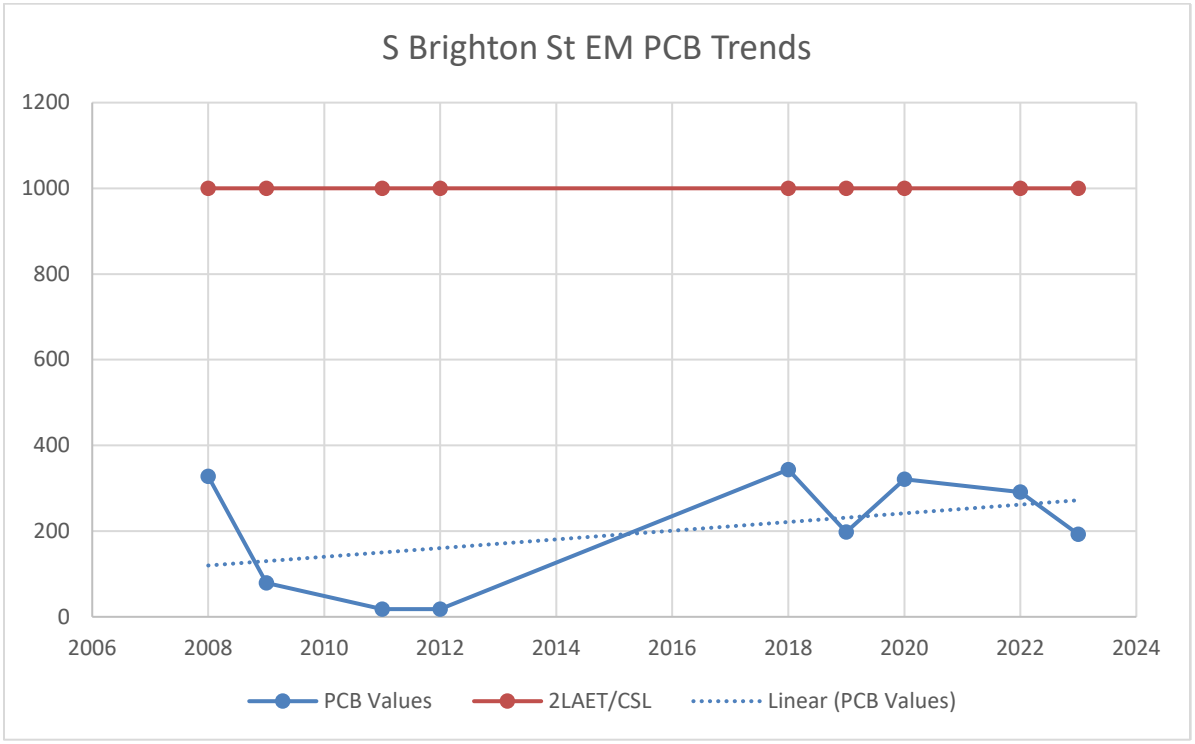
The S Brighton St SD has generally had low to moderate levels of metals and PCBs present in settled solids. Samples have been characteristically similar to samples from other industrial areas of the City without specific sources of contamination. The basin contains two MTCA cleanup sites, Dawn Food Products and the Fox Ave Building. Both sites have had their cleanups started and are not suspected of being the source for any contamination found in samples collected within the basin. Sample contaminant trends found in the effectiveness monitoring samples are highlighted below. PCB and Arsenic values have been relatively static, while cPAH values have been increasing in recent years. To address this gradual increase, SPU plans to conduct line cleaning within the basin during the SCIP3 phase, to support source identification, if any are identifiable.

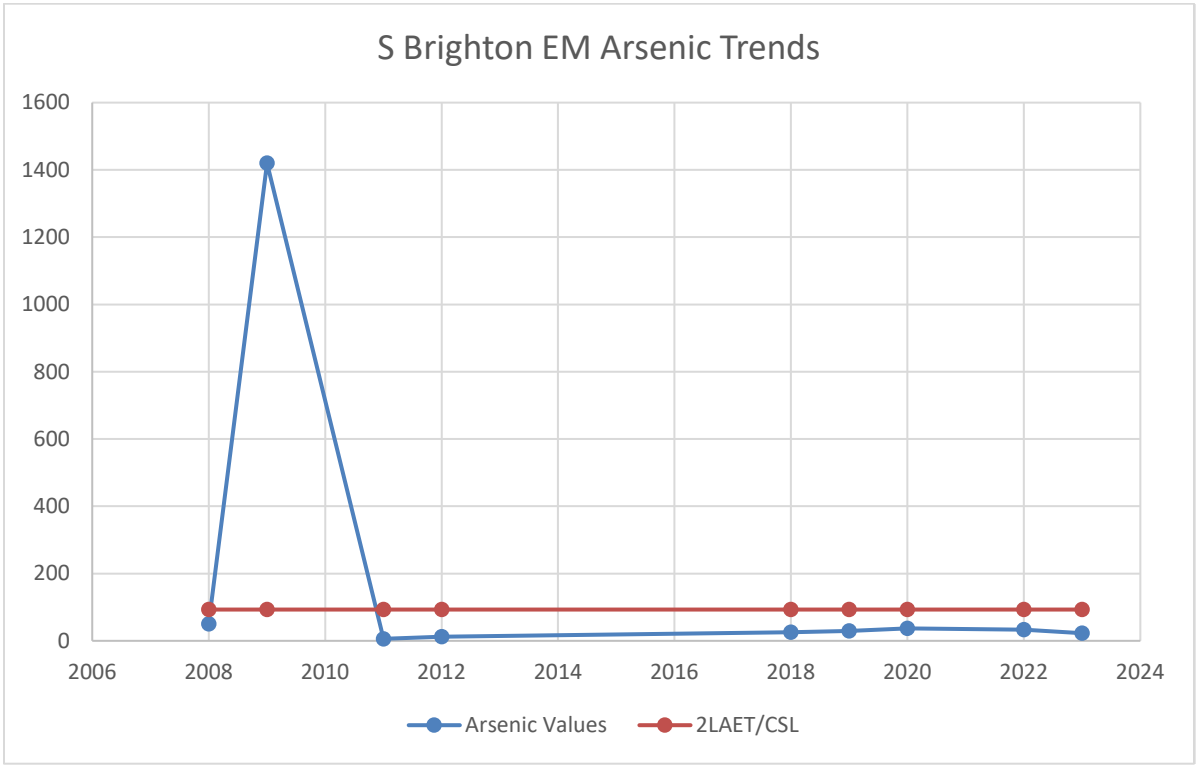
Known sources within the S Brighton St SD.

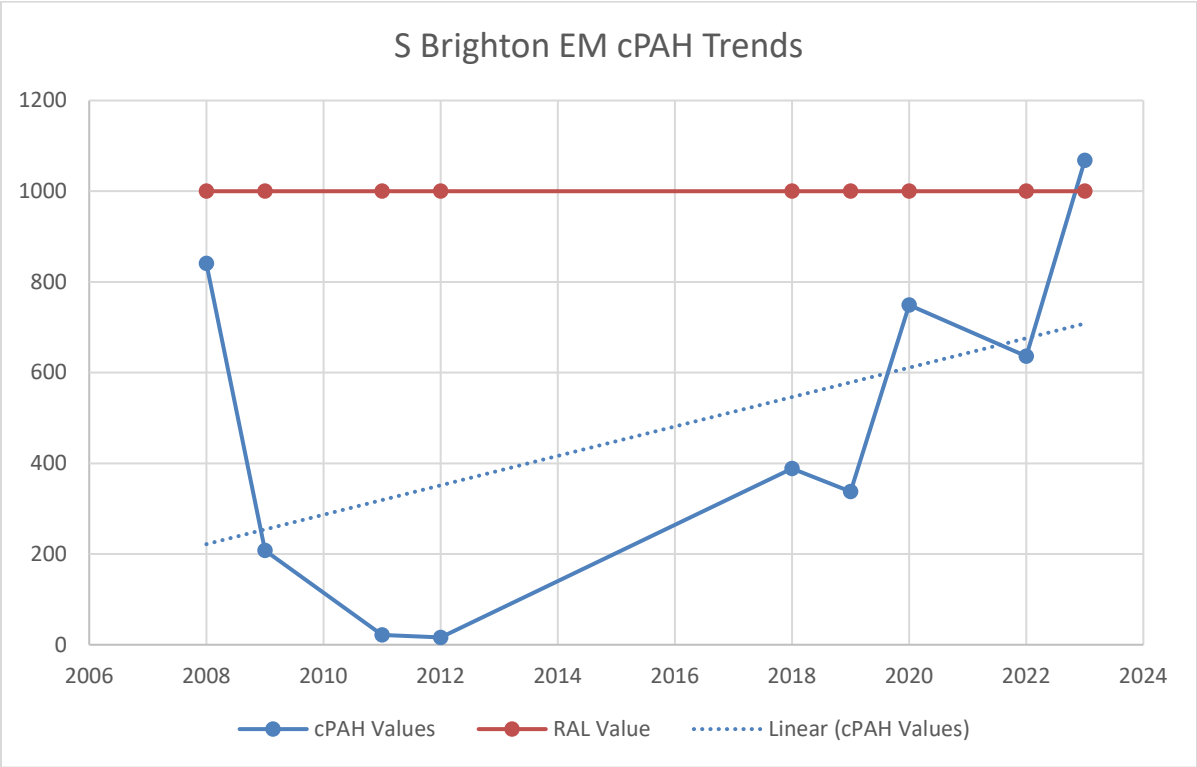
There are no active, uncontrolled, known sources of contaminants present within the S Brighton St SD. The two MTCA sites located within the basin are known to be contaminated with metals, hydrocarbons, and PAHs. While

the known contaminants present at these sites are similar to those identified as elevated within the effectiveness monitoring samples, a direct connection cannot be assumed.

Figure 20: Effectiveness Monitoring Data Trends for the S Brighton St SD.







4.3.1.18 S River St SD

The S River St SD is located along the northern side of Slip 3 and provides conveyance to 7.6 acres of industrial parcels bordered on the north and east by East Marginal Way S. The drainage basin is owned and operated by SPU, with an outfall located immediately to the west of the River St Boat Launch. The S River St basin is occupied primarily by industrial parcels used as laydown yards or for distribution warehouses. A rail line runs along the southern and eastern sides of the basin, with runoff from the rail line flowing into the S River St SD. For additional information about the layout of the S River St SD, see map number 14 in the Map Atlas.

Table 25: Summary statistics for select contaminants in the S River St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	14	57	93	3.67	22	12.3	11	0	0
Copper	14	390	--	8.98	151	90.6	97.8	0	--
Lead	14	450	530	1.42	94.8	55	66.6	0	0
Mercury	14	0.41	0.59	0.02	0.13	0.07	0.06	0	0
Zinc	14	410	960	35.5	727	406	434	57	0
LPAH	14	5,200	--	20	2,330	763	521	0	--
HPAH	14	12,000	17,000	57.2	23,539	6,872	5,770	14.3	7.1
cPAH	14	1,000[A]	--	17.9	1,602	696	626	21.4	--

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
PCBs	14	130	1,000	<19.9	200	109	112.5	28.6	0
BEHP	14	1,300	1,900	108	6,400	3,577	3,750	86	86
BBP	14	63	900	<19.9	790	288	255	86	0
DMP	14	71	160	7.3	314	182	190	86	64
TPH-Oil-AS	12	2,000[B]	--	28.9	6,300	2,549	2,550	66.7	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

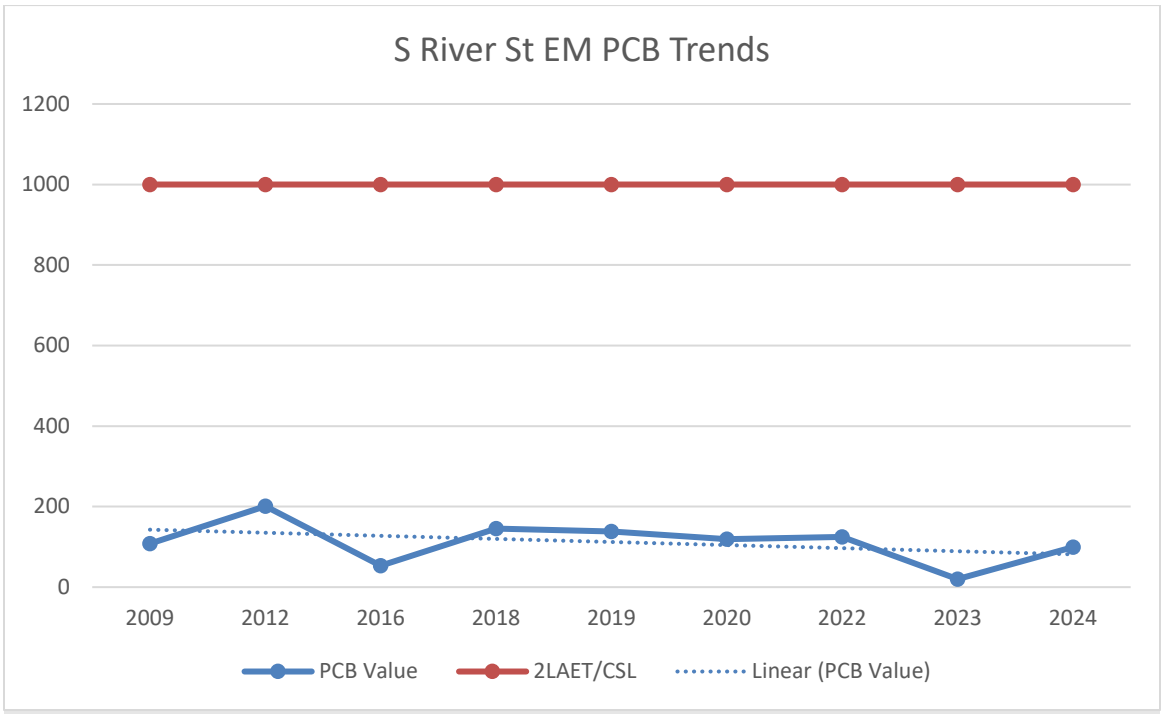
B. MTCA Method A soil cleanup level for industrial and unrestricted use.

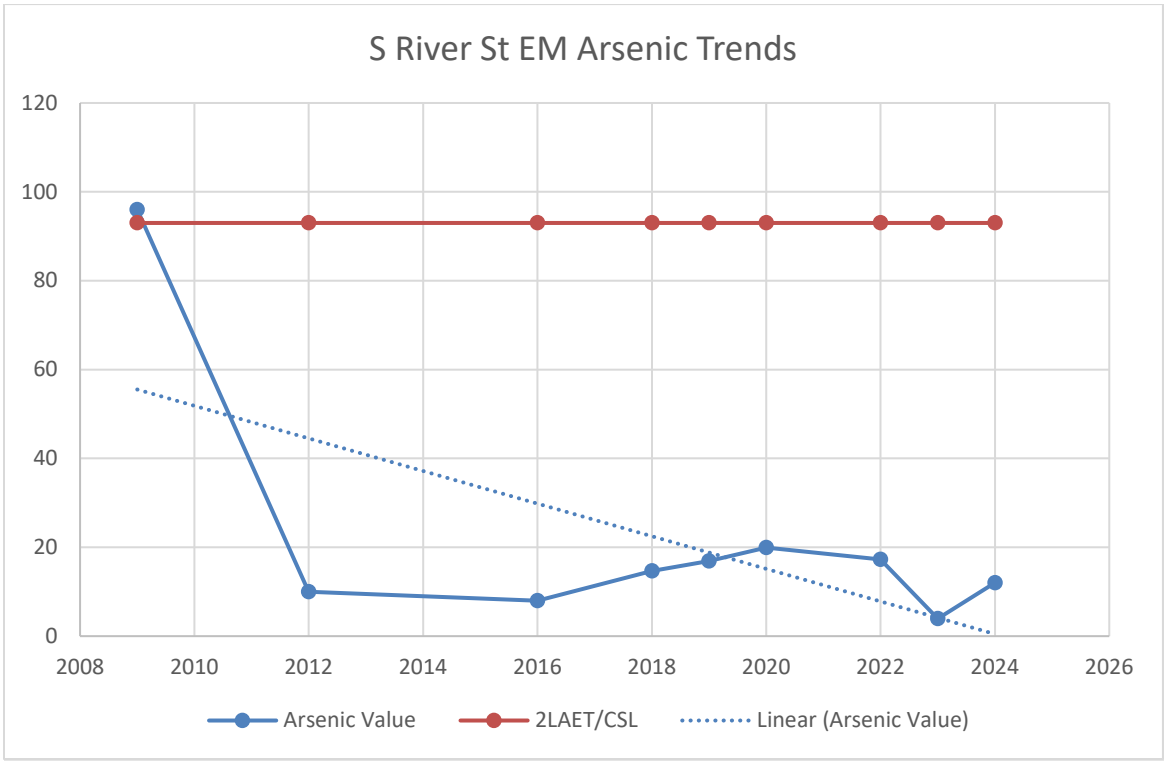
The S River St SD has generally had low to moderate levels of contaminants present within the settled solids collected within the last ten years. The levels of metals have consistently been low, with no samples exceeding the SCO/LAET values other than zinc. Zinc is commonly found in most solids samples adjacent to roadways throughout the industrial areas of the City, and is a primary ingredient in forklift tires. PCB levels have steadily fallen in samples collected within the basin over time. cPAH values have greatly fluctuated over the years, rising and falling sporadically, with the low points aligning with line cleaning activities within the basin. Sampling from 2024 indicates that cPAH values have increased again, even though the basin was cleaned in 2023. It is suspected that this is due to the removal of accumulated dirt and other solids from the drainage system, which were replaced by settled solids associated with the railroad runoff. Over time, other solids will comprise a higher proportion of the samples collected, resulting in lower cPAH levels. As reported in other sections, this relationship is frequently encountered in samples collected within industrial areas of the City. Effectiveness monitoring data trends, tracking the contaminants present in near end of pipe samples from within the S River St SD basin, is displayed below.

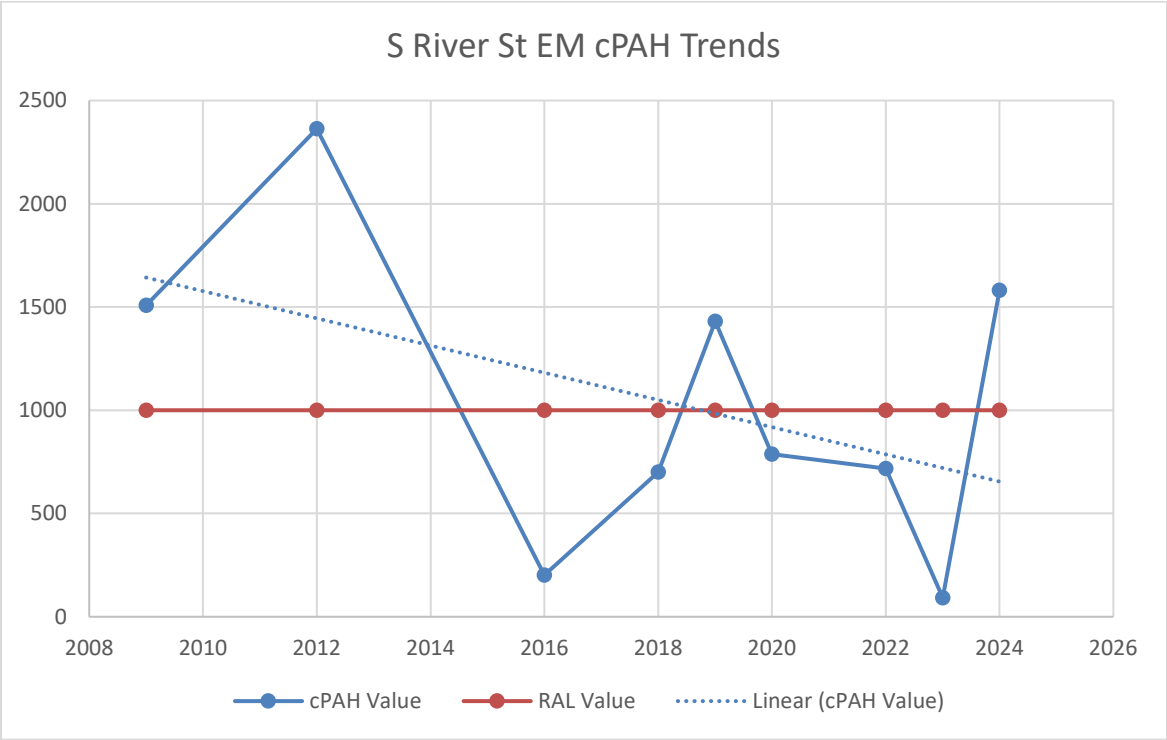
Known sources within the S River St SD.

Within the S River St SD, there is one known source of cPAHs, and no other known, uncontrolled sources of contaminants present. Railroad ties and rights-of-way are known to be sources of PAHs, which are transported from the railroad to adjacent streets and drains during rain events. A railroad line runs along the southern and eastern edges of the S River St SD. The rail lines pond during heavy rainfall and sheet flow to SPU owned catch basins along S River St. In 2016, SPU also identified PCBs, hydrocarbons, and PAHs in a catch basin that had an active cross connection from an adjacent business' interior workshop. SPU worked with the business to replumb their interior sinks and clean the affected structures. Follow up sampling has not found these contaminants present in this property's drainage system.

Figure 21: Effectiveness Monitoring Data Trends for the S River St SD.







4.3.1.19 1st Ave S SD (East)

The 1st Ave S SD (East) provides conveyance for runoff from the north side of the 1st Ave S bridge runup, as well as several industrial properties beneath the bridge. The main trunk line within the basin is owned by WSDOT including the outfall. The basin also excepts flow from SPU mainlines located along S Michigan St and East Marginal Way S. The basin encompasses 15 acres of right-of-way and industrial properties and is primarily used as laydown and maintenance yards. For additional information about the 1st Ave S SD (East), see map 13 in the Map Atlas.

The 1st Ave S SD (East) basin is an Effectiveness Monitoring Location in Appendix 13 of the City's Municipal Stormwater Permit. The 1st Ave S SD (East) basin is one of the basins where annual effectiveness monitoring samples were missed and was included in the 2023 G20 letter to Ecology. To support the effectiveness monitoring activities within the basin, SPU collects an annual sample at the downstream end of SPU's mainline, prior to the discharge into the WSDOT owned portion of the basin. Sample data in the effectiveness monitoring table depicts the characteristics at this location in the basin, rather than the near end of pipe characteristics. WSDOT may have data available to characterize the near end of pipe contaminants.

Table 26: Summary statistics for select contaminants in the 1st Ave S SD (East).

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	5	57	93	5.49	22.6	10.3	6.66	0	0

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Copper	5	390	--	64.6	252	131	88.4	0	--
Lead	5	450	530	16.8	121	60.8	30.9	0	0
Mercury	5	0.41	0.59	0.02	0.16	0.08	0.05	0	0
Zinc	5	410	960	310	1,480	724	446	60	40
LPAH	5	5,200	--	25.2	1,051	620	692	0	--
HPAH	5	12,000	17,000	333	5,821	3,827	3,957	0	0
cPAH	5	1,000[A]	--	43.1	601	300	285	0	--
PCBs	5	130	1,000	99.4	328.5	172	99.6	40	0
BEHP	5	1,300	1,900	415	9,410	4,183	4,660	80	60
BBP	5	63	900	<19.8	441	239	256	80	0
DMP	5	71	160	<19.9	94.1	48.4	20	40	0
TPH-Oil-AS	4	2,000[B]	--	489	3,610	2,510	2,970	75	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

A. Remedial Action Level (RAL) for the LDW.

B. MTCA Method A soil cleanup level for industrial and unrestricted use.

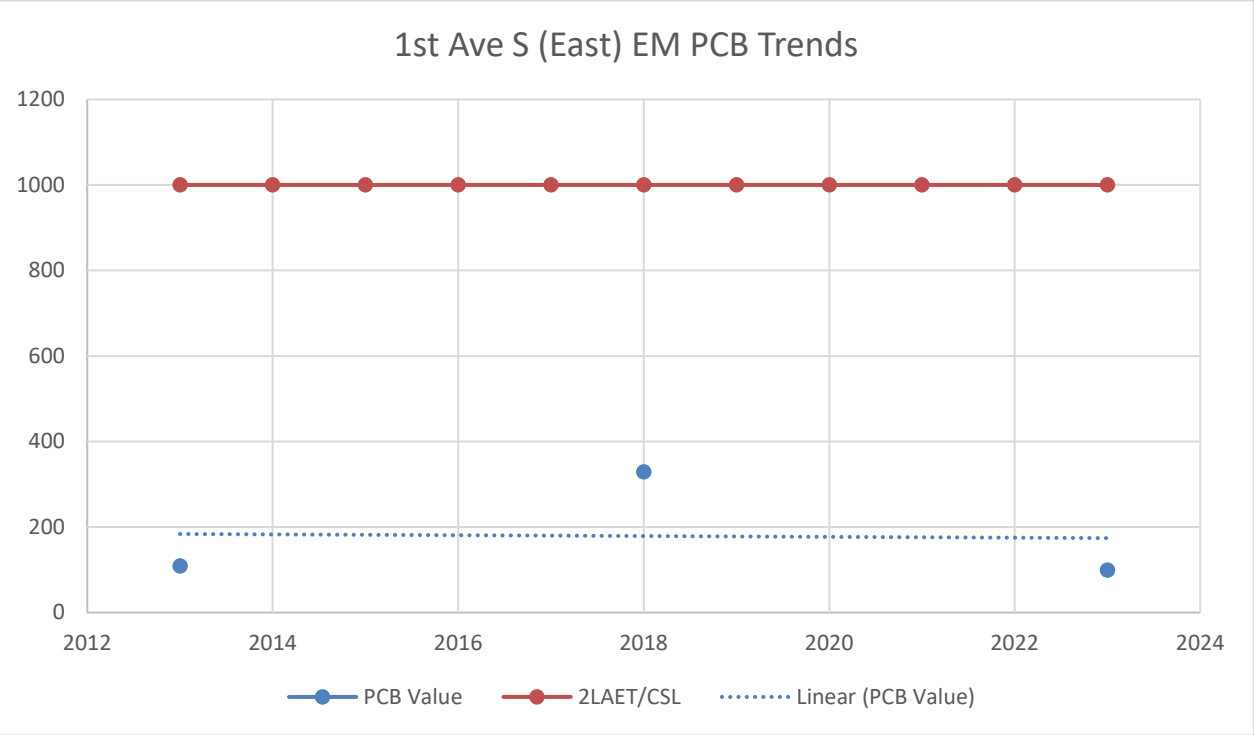
Contaminant levels within the 1st Ave S SD (East) basin in the portion that is owned and operated by SPU are quite low. All metals and PAH values fall below their cleanup standards, except zinc. Zinc exceeded the SCO in 60% of samples, and CSL in 40%. PCBs exceeded the SCO in 40% of samples but were generally low compared to other urban industrial samples collected in the LDW. Phthalates were elevated within the basin which is not uncommon within the LDW. The SPU owned sections of the basin primarily provide conveyance for roadways, with very limited potential pollutant sources present. Effectiveness monitoring data for the basin are provided in Table 22 below. Sample data for the 2024 effectiveness monitoring sample is not yet available at the time of drafting this SCIP 3 report.

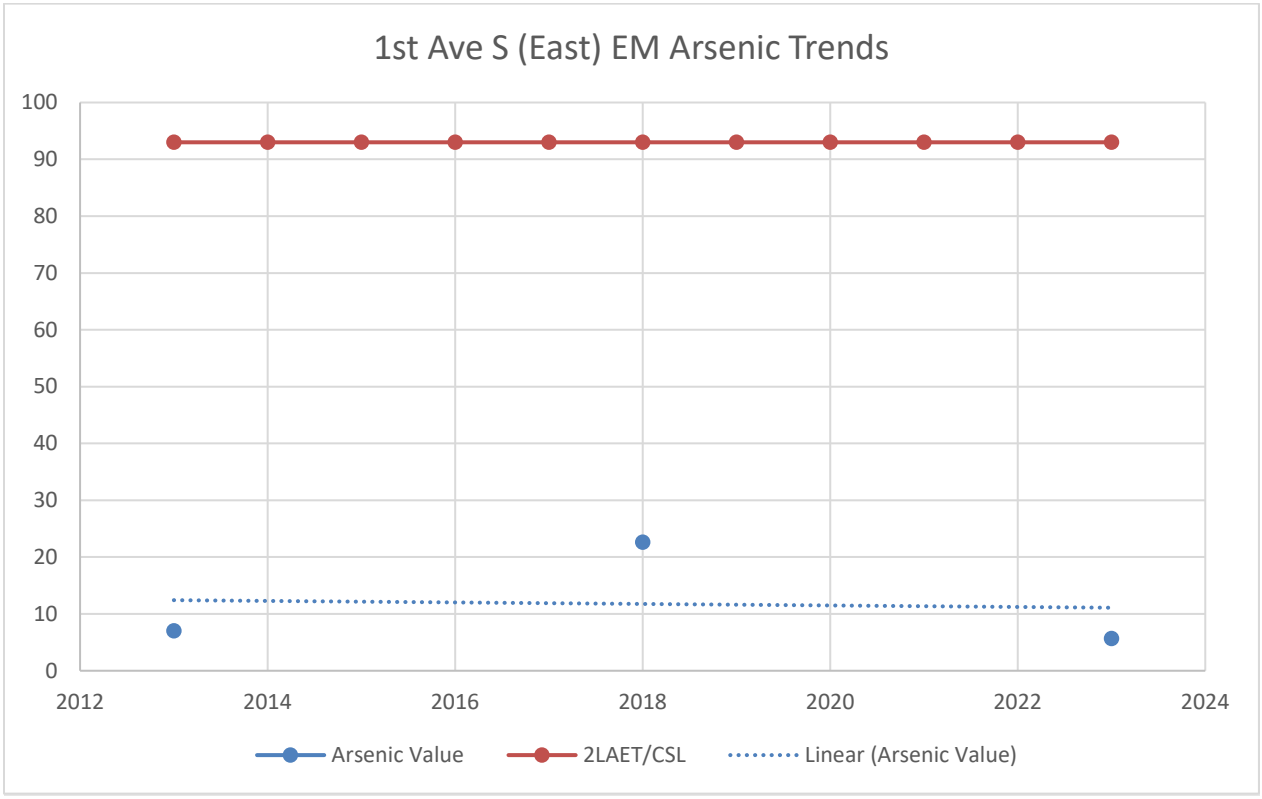
Known sources within the 1st Ave S SD (East).

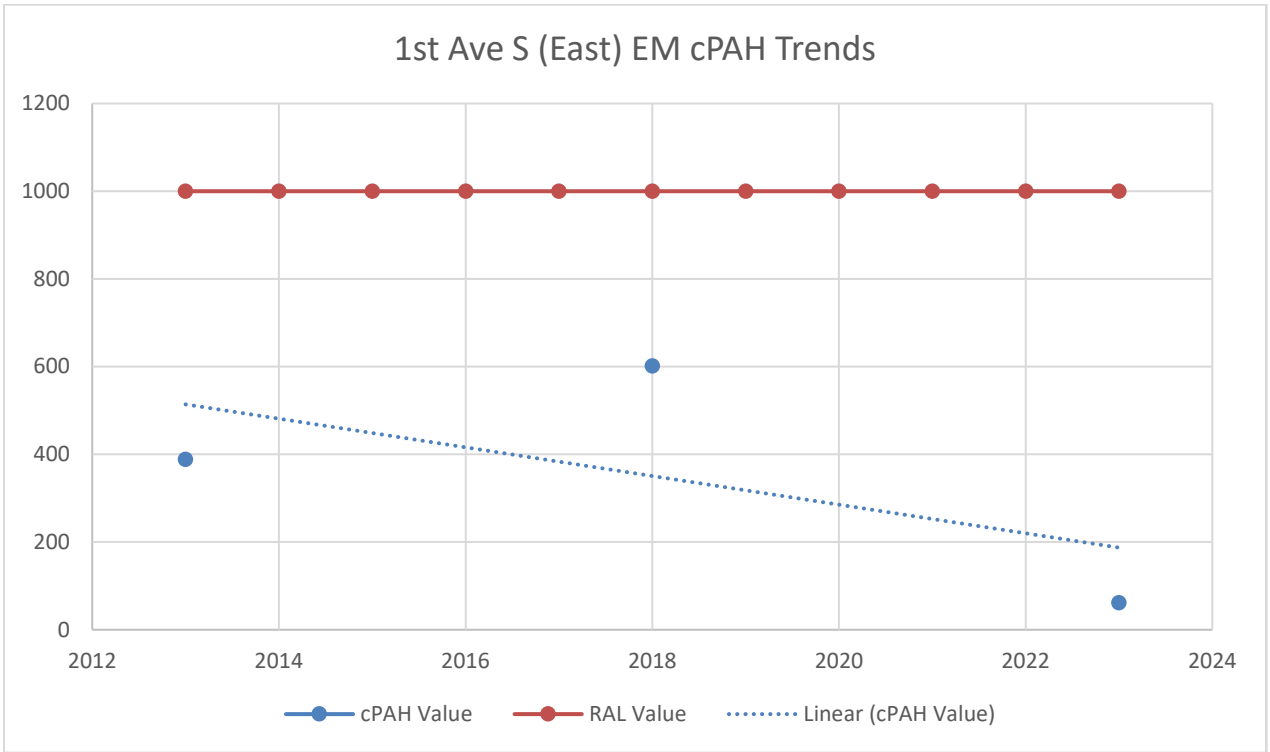
There are no known, active, uncontrolled sources of contamination within the 1st Ave S SD (East) basin. Sampling does not indicate discrete sources of contamination within the SPU owned and operated portion of the basin. In-river sediment sampling has shown that PCB values are increasing in proximity to the basin outfall, which is also in proximity to a King County CSO outfall and several parcels that directly discharge stormwater to the river. SPU's sampling does not support that the 1st Ave S SD (East) basin is the source of the PCBs found in the river sediments. As the CSO outfall conveys flows from King County's Georgetown Wet Weather Treatment Facility, it is unlikely that the CSO outfall is the source of this contamination as well. Several of the adjacent direct discharge properties are known to have PCBs present on site and, at this time, SPU believes that these are likely

the source of PCBs present in the river sediments. Further in-basin sampling is planned for the SCIP 3 phase to support this source tracing process.

Figure 22: Effectiveness Monitoring Data Trends for the 1st Ave S SD (East).




1st Ave S (East) EM Arsenic Trends
100
90
80
70
60
50
40
30
20
10
0
2012
2014
2016
2018
2020
2022
2024
Arsenic Value
2LAET/CSL
Linear (Arsenic Value)


1st Ave S (East) EM cPAH Trends
1200
1000
800
600
400
200
0
2012
2014
2016
2018
2020
2022
2024
cPAH Value
RAL Value
Linear (cPAH Value)

4.3.1.20 Head of Slip 2 SD

The Head of Slip 2 SD is a privately-owned drainage basin which conveys flow from a large warehouse complex located to the east of East Marginal Way S, immediately north of the 1st Ave S bridge. The stormwater flows within the basin are nearly entirely from private property, with SPU contributing runoff through seven catch basins along East Marginal Way S and one catch basin on 1st Ave S. The total runoff area of the basin covers 12 acres, with approximately 1.5 acres being road runoff through SPU's system. Ultimately, the basin discharges through a privately-owned outfall located adjacent to the CalPortland facility at the head of Slip 2. Additional information about the Head of Slip 2 SD basin layout is available on map 12 of the Map Atlas.

This basin was included in the Effectiveness Monitoring Locations list contained within the 2019 Municipal Stormwater Permit. SPU submitted a G20 letter to Ecology in 2023, noting that this basin had not been sampled annually in accordance with the Permit; however, SPU sampled this basin once the issue was identified and the G20 submitted. As the basin largely serves private properties and the SPU contribution is limited to roadway runoff from a small portion of East Marginal Way S and 1st Ave S, Ecology removed this basin from the Effectiveness Monitoring Locations list in the 2024 Municipal Stormwater Permit. As the basin conveys very little of SPU's flows, limited source trace sampling data are available. SPU plans to periodically sample the basin to continue to monitor for changes in sources and to support the sufficiency evaluation that Ecology and the EPA will be conducting over the coming years.

Table 27: Summary statistics for select contaminants in the Head of Slip 2 SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	2	57	93	4.48	14.8	9.64	9.64	0	0
Copper	2	390	--	32.9	62.5	47.7	47.7	0	--
Lead	2	450	530	12.7	79.8	46.3	46.3	0	0
Mercury	2	0.41	0.59	0.013	0.029	0.02	0.02	0	0
Zinc	2	410	960	111	198	154.5	154.5	0	0
LPAH	2	5,200	--	38.6	207.5	123.1	123.1	0	--
HPAH	2	12,000	17,000	227	303.6	265.3	265.3	0	0
cPAH	2	1,000[A]	--	33.2	85.3	59.3	59.3	0	--
PCBs	2	130	1,000	<19.9	27.3	23.6	23.6	0	0
BEHP	2	1,300	1,900	200	458	329	329	0	0
BBP	2	63	900	20	94.3	57.2	57.2	50	0
DMP	2	71	160	20	94.3	57.2	57.2	50	0
TPH-Oil-AS	2	2,000[B]	--	494	500	497	497	0	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A

ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

The Head of Slip 2 SD has limited storm solids sample data, therefore trends are not available for this basin. In the data that is available, the settled solids have very low levels of contaminants present, with only Butyl benzyl phthalate and dimethyl phthalate present above the SCO.

Known sources within the Head of Slip 2 Basin.

There are no known, active, uncontrolled sources of contaminants located within the Head of Slip 2 SD.

4.3.1.21 7th Ave S SD

The 7th Ave S SD is a stormwater drainage basin located predominantly within the South Park neighborhood of Seattle. The basin is approximately 238 acres and primarily consists of industrial and residential parcels. The drainage system carries natural flows coming off of the hillsides adjacent to the City border with unincorporated King County near the White Center neighborhood. The upper end of the system conveys a small portion of Durham creek, stormwater from the City of Seattle Joint Training Facility, runoff from Highway 509, and residential and industrial properties near Marra Farm. Flows from this upper portion of the basin discharge into the pond at Marra Farm, which can overflow into a ditch and culvert drainage system along 4th Ave S. From here, the basin continues north, adjacent to the Southpark landfill site, then crosses beneath West Marginal Way S before entering a largely industrial portion of neighborhood along 7th Ave S. Flows from industrial parcels and rights-of-way enter the main trunk line on 7th Ave S, before the drainage system reaches the newly constructed South Park Pump Station, where it is pumped out of an outfall into the LDW. Additional information on the layout of the 7th Ave S SD may be found on map number 24 in the Map Atlas.

The South Park Pump Station construction was completed in 2023. The pump station was designed to improve drainage within the 7th Ave S SD basin by allowing the system to discharge into the LDW during high tide events. Previously, drainage was impounded within the drainage mainlines, resulting in surface ponding within the industrial portion of the basin. For more information on the South Park Pump Station project, see section 7.6.1. This pump station will eventually pump some stormwater flows to the South Park Water Quality facility, which will be located at 816 S Kenyon St, for stormwater treatment. For more information on the South Park Water Quality Facility, please see section 7.6.1.

The 7th Ave S SD is included within the Effectiveness Monitoring Locations list in Appendix 13, requiring annual sampling at a near end of pipe location. The drainage system underwent extensive modification from 2019 – 2023 during the South Park Drainage Improvements project with new drainage mainlines and assets added to the basin. During the improvement project, the existing drainage structures were cleaned via the line cleaning for source control program. SPU collects samples regularly from three sediment traps within the basin and has extensive data from roadside catch basins used in source tracing activities. Effectiveness monitoring data is included in Figure 23 below.

Table 28: Summary statistics for select contaminants in the 7th Ave S SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	44	57	93	4.1	30.1	14.4	11.1	0	0
Copper	44	390	--	8.72	756	91.7	77.5	2.27	--
Lead	44	450	530	3.37	143	45.9	42.2	0	0
Mercury	44	0.41	0.59	0.011	0.26	0.09	0.06	0	0
Zinc	44	410	960	52.1	1,450	353.5	268	34.1	2.27
LPAH	43	5,200	--	6.5	3,700	336.7	175	0	--
HPAH	43	12,000	17,000	7	16,170	2,172	1,431	2.33	0
cPAH	43	1,000[A]	--	17.2	1,828	270.3	177.5	7	--
PCBs	48	130	1,000	<9.3	866	134.8	78.8	33.3	0
BEHP	44	1,300	1,900	9.7	11,500	2,967	1,685	54.6	50
BBP	44	63	900	18	488	127	98.5	63.6	0
DMP	44	71	160	9.8	580	84.1	58.6	45.5	9.1
TPH-Oil-AS	30	2,000[B]	--	17.8	3,690	1,504	1,665	33.3	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

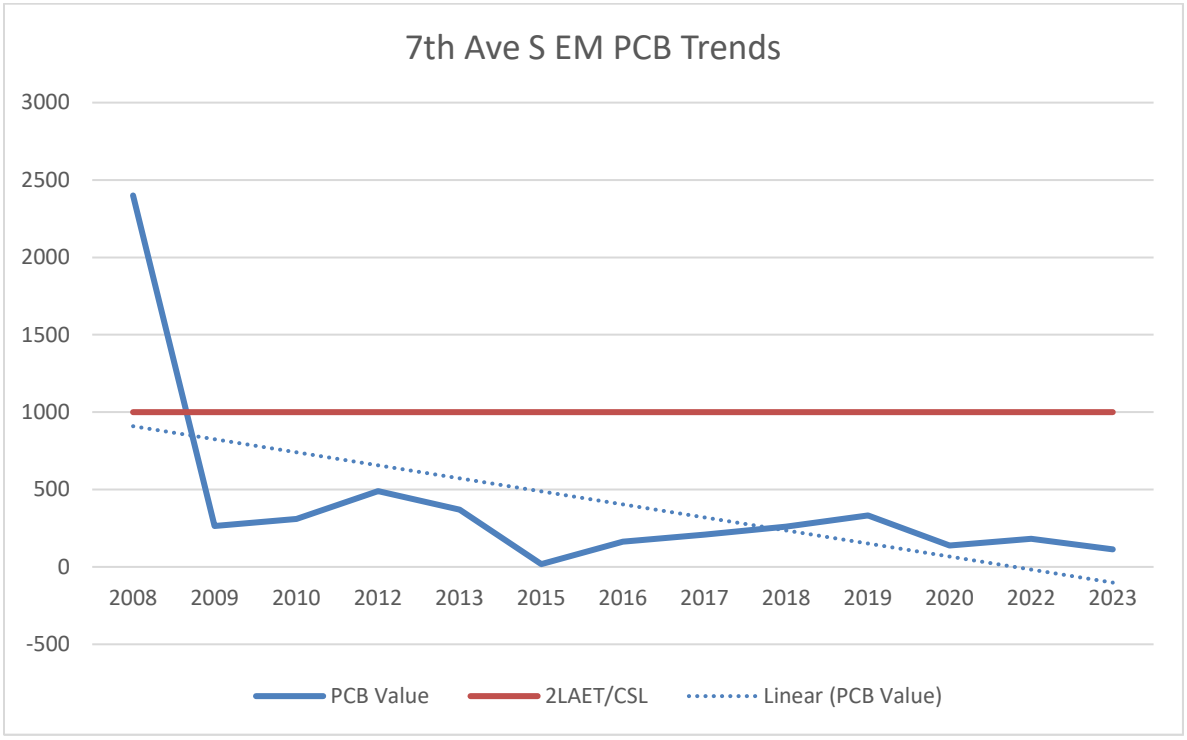
The 7th Ave S SD encompasses several industrial parcels which have had elevated contaminant levels in legacy sampling, including sites exceeding for metals contaminants, PCBs, and phthalates. Over time, as SPU source control inspectors have worked with the businesses to implement BMPs and clean the drainage system, contaminant levels have fallen within the basin. SPU continues to work with the business community to improve BMP implementation. As noted above, SPU is also planning to pump stormwater to the South Park Water Quality Facility for treatment, which will further reduce the contaminant loading potential from the basin. Additionally, phase 2 of the South Park Drainage Improvements project, currently in the planning stage, will be implemented over the course of the SCIP 3 phase, which will improve drainage conveyance and should reduce solids loading to the basin.

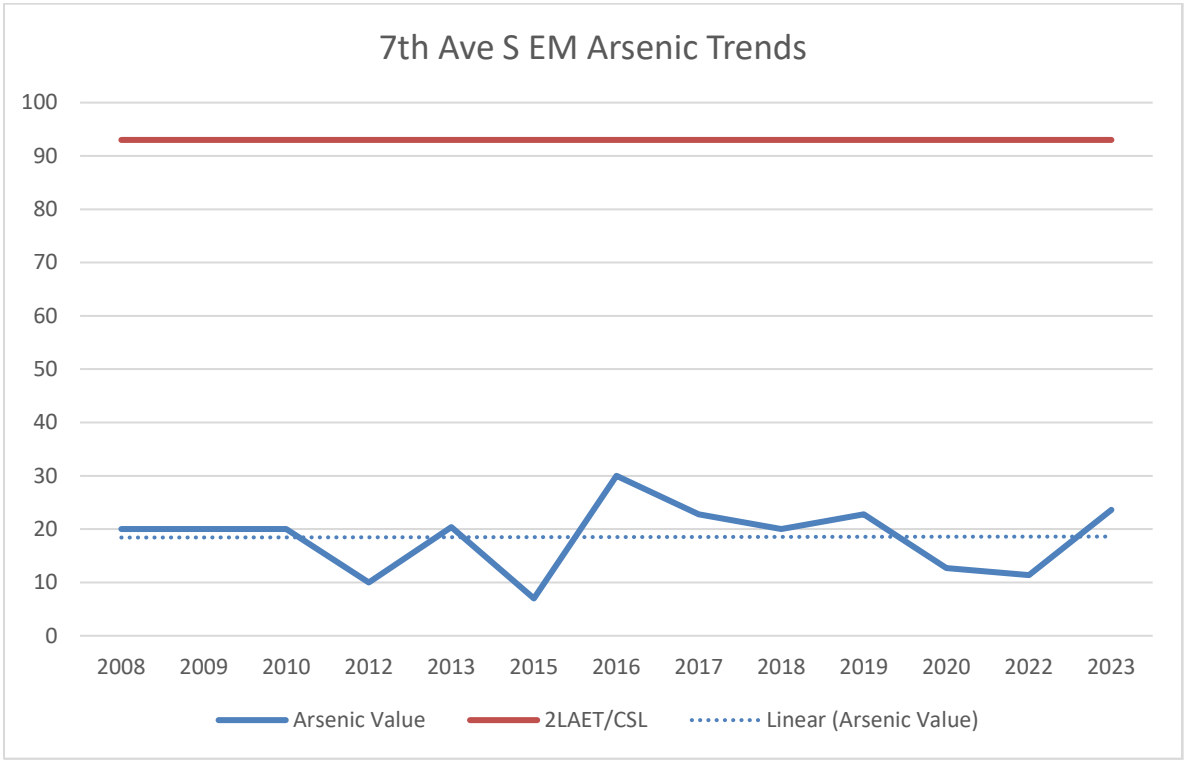
Known sources within the 7th Ave S SD.

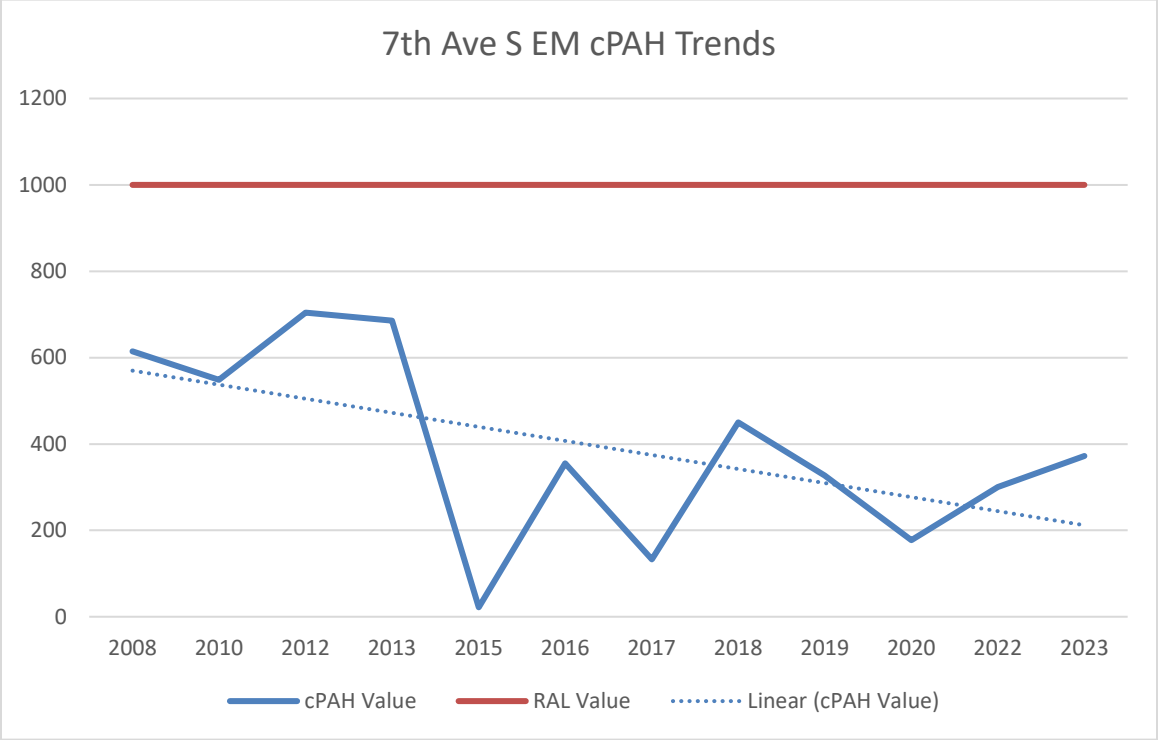
There are no known, active, uncontrolled sources within the 7th Ave S SD. Over the years, SPU has identified many sources within this basin, but these sites have been controlled through SPU and Ecology action. A discussion of the historical sources within this basin is included in the SCIP 2 document. SPU is aware of several

suspected PCB containing buildings within this basin and is in the process of working with the EPA's TSCA group to require BMP implementation and potential site remediation.

Figure 23: Effectiveness Monitoring Data Trends for the 7th Ave S SD.







4.3.1.22 S Webster St SD

The S Webster St SD is a very small drainage basin located within the South Park industrial area of south Seattle. The basin is comprised of a single catch basin in the right of way near the intersection of S Webster St and S Riverside Dr. This catch basin is slated to be removed and replaced during the South Park Drainage Improvements Phase 2 project, which will incorporate the drainage from this basin into the 7th Ave S SD. As this basin contains a single catch basin within the right of way and is not included in the effectiveness monitoring data requirements of the NPDES permit, SPU has limited sample data available for analysis.

Table 29: Summary statistics for select contaminants in the S Webster St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	2	57	93	3.7	8	5.85	5.85	0	0
Copper	2	390	--	51.9	66.3	59.1	59.1	0	--
Lead	2	450	530	17.8	19	18.4	18.4	0	0
Mercury	2	0.41	0.59	0.01	0.03	0.02	0.02	0	0
Zinc	2	410	960	159	201	180	180	0	0
LPAH	2	5,200	--	5,517	8,390	6,953	6,953	100	--
HPAH	2	12,000	17,000	24,733	62,100	43,417	43,417	100	100

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
cPAH	2	1,000[A]	--	2,958	7,983	5,470	5,470	100	--
PCBs	2	130	1,000	75	99.9	87.45	87.45	0	0
BEHP	2	1,300	1,900	1,740	2,400	2,070	2,070	100	50
BBP	2	63	900	228	280	254	254	100	0
DMP	2	71	160	99.9	280	190	190	100	50
TPH-Oil-AS	2	2,000[B]	--	1,700	1,890	1,795	1,795	0	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

Limited sampling data collected from the S Webster St SD indicated elevated PAHs and Phthalates present within the single right of way catch basin that comprises the basin. Adjacent properties are used for office, residential, and industrial activities, and the right of way in this location is heavily traveled by the adjacent industrial properties. The existing roadway condition adjacent to the catch basin is poor and vast amounts of settled solids have accumulated within potholes and road surface cracks near this drain. These solids are transported to the catch basin during rain events, potentially contributing pollutants related to traffic and vehicle use. As the basin is planned to be decommissioned and drainage from the location will be incorporated into the 7th Ave S SD system, SPU will fully clean the existing catch basin and associated lateral pipes during this SCIP 3 phase.

Known sources within the S Webster St SD.

There are no known, active, uncontrolled private sources of contaminants to the S Webster St SD. Right of way runoff is suspected to be the source of elevated Phthalate and PAHs values within the basin, with the ultimate source of these pollutants being industrial vehicle traffic. This basin will be incorporated into the 7th Ave S SD which will include partial treatment of stormwater. SPU believes that the contaminants identified will be controlled through these drainage layout modifications. SPU plans to collect source trace samples from the 7th Ave S SD basin after the South Park Drainage Improvements Phase 2 project to identify active sources within what is currently the S Webster St SD drainage area.

4.3.1.23 2nd Ave S SD

The 2nd Ave S SD is a drainage basin located within the South Park industrial area of south Seattle, encompassing 18.4 acres of industrial and right of way lands. In the southern end of the basin, roadway runoff from West Marginal Way S/Highway 99 drains into a ditch and culvert system of unknown ownership located along 2nd Ave S at S Holden St. The drainage mainline runs north along the western edge of 2nd Ave S through a mix of ditch

and piped culvert sections until it reaches a vault located to the west of 250 S Webster St. Here SPU installed a tide gate to control backwatering and to reduce flooding associated with this system. The drainage continues north to the intersection of 2nd Ave S and S Fontenelle St, where the drainage system becomes privately owned and passes through private properties as it continues north to the River Mile 2.2 Inlet, immediately north of the Industrial Container Services property. Additional information regarding the layout of the 2nd Ave S SD may be found in map number 23 within the Map Atlas.

This basin was incorrectly labeled by the EPA and Ecology as owned and operated by SPU during the initial LDW planning and regulatory process. This ownership labeling was changed in 2012 when SPU provided documentation indicating that portions of the basin, including the outfall, were installed by others. While SPU does own portions of drainage mainline that discharge into the ditch and culvert system that runs along the western side of 2nd Ave S, the ditch and culvert system in this location was installed to convey flows from Highway 99 and has unknown ownership. The outfall for this basin, once located at the corner of 2nd Ave S and S Fontenelle St, was moved when private property owners north of this location enclosed the receiving watercourse within a culvert system and filled-in the surrounding land to expand their usable property space. This modification resulted in the outfall moving north into the River Mile 2.2 Inlet.

The 2nd Ave S SD outfall discharges within the River Mile 2.2 Inlet, a heavily contaminated area of the LDW. The sediment in this inlet is considered to be one of the most highly contaminated areas of the waterway, with PCB levels greatly exceeding those found elsewhere within the in-river cleanup area. Sampling data collected from the drainage system upstream of the private portion of the basin do not concentrations of contaminants similar to those found downstream at the River Mile 2.2 Inlet. The 2nd Ave S SD is not an effectiveness monitoring basin and largely conveys private property runoff through privately owned drainage conveyance. Samples have been collected at the intersection of 2nd Ave S and S Fontenelle St to determine what contaminants may be present in proximity to SPU's stormwater inputs. Drainage lines downstream of this sample location would be impacted by additional, private inputs only. Differences in pollutants found are likely to be a result of these private inputs and contaminants pushed into the drainage system from the River Mile 2.2 Inlet itself. As this basin is not an effectiveness monitoring basin and there are substantial portions which are not owned or operated by SPU, no effectiveness monitoring trend charts are available for this basin.

Table 30: Summary statistics for select contaminants in the 2nd Ave S SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	2	57	93	8.64	20.5	14.57	14.57	0	0
Copper	2	390	--	182	213	197.5	197.5	0	--
Lead	2	450	530	114	173	143.5	143.5	0	0
Mercury	2	0.41	0.59	0.12	0.15	0.14	0.14	0	0
Zinc	2	410	960	749	1,310	1,030	1,030	100	50
LPAH	2	5,200	--	314	352	333	333	0	--
HPAH	2	12,000	17,000	2,423	2,837	2,630	2,630	0	0
cPAH	2	1,000[A]	--	313.3	353.8	333.5	333.5	0	--
PCBs	3	130	1,000	300.8	349.8	319	309.8	100	0
BEHP	2	1,300	1,900	7,070	9,320	8,195	8,195	100	100

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
BBP	2	63	900	192	220	206	206	100	0
DMP	2	71	160	41.1	99.9	70.5	70.5	50	0
TPH-Oil-AS	2	2,000[B]	--	4,520	4,670	4,595	4,595	100	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

The 2nd Ave S SD samples collected from within the portion of the basin that accepts SPU stormwater flows has shown fairly typical levels of contaminant presence for areas with industrial runoff. The River Mile 2.2 Inlet is heavily impacted by metals, PCBs, and PAHs, many of which were present in the SPU samples collected upstream, but at substantially lower levels than those found within the inlet. As such, sampling indicates that the high levels of contamination observed within the inlet are unlikely to have come from the 2nd Ave S SD upstream of 2nd Ave S and S Fontenelle St. Due to the high levels of contamination present in sediment adjacent to the basin outfall, and the forthcoming sufficiency evaluation and inlet remediation planning, SPU intends to collect samples from the 2nd Ave S SD on an annual basis for the next several years, if able.

Known sources within the 2nd Ave S SD.

There are no known, active, uncontrolled sources of contamination present within the portions of the 2nd Ave S SD into which SPU discharges stormwater. The drainage system conveys stormwater runoff from industrial properties along 2nd Ave S, through portions of SPU owned/operated drainage mainlines and through private or unknown ownership conveyance. Due to the unknown ownership of large portions of the system, there is a potential that contaminants could be found within the system without a discrete ownership responsibility falling on any agency or property owner. To support the source control sufficiency evaluation and to reduce the potential for impacts to the LDW, SPU is planning to collect samples from within the portion of the basin upstream of 2nd Ave S and S Fontenelle St and will utilize the line cleaning program in portions of the system where SPU may own or operate the system. In the event that contaminants are found within other portions of the drainage system, SPU will consult with Ecology and EPA to determine what options may exist to minimize potential impacts to the LDW.

4.3.1.24 1st Ave S SD (West)

The 1st Ave S SD (West) basin is a large stormwater drainage basin located in the southwest corner of Seattle's LDW drainage basin area. The basin encompasses 606 acres of industrial, commercial, and residential parcels. It also includes substantial portions of rights of way including sections of highway 509, highway 99, and many arterial streets. Large sections of the drainage basin are owned and operated by SPU, but the outfall and lowest portion of the basin are owned and operated by WSDOT. Several City of Seattle facilities, including the South

Transfer Station, South Household Hazardous Waste Facility, and Westcrest Park, are located within this basin. The South Transfer Station and South Household Hazardous Waste Facility have Ecology NPDES Industrial Stormwater General Permits for their operations, which require regular sampling of stormwater discharges and inspection.

Due to the size and variety of potential sources within the basin, SPU has relied on several sediment traps within the basin and the regular collection of grab samples to support source identification. Large portions of stormwater infrastructure in the basin have been cleaned through the line cleaning for source control program several times. This has allowed SPU to establish a reliable understanding of areas with active sources of pollutants. The basin is included on the Effectiveness Monitoring Locations list within Appendix 13 of the City's Municipal Stormwater Permit. It has been sampled regularly utilizing two sediment traps installed within a WSDOT owned water quality pond. In 2022, it was found that beavers had moved into this pond and had buried one of the sediment traps while eating the sample bottle from the other. Grab sampling and upstream sediment traps were used for the Effectiveness Monitoring Locations in 2023 and 2024 to provide sufficient data. SPU continues to work with WSDOT to address the beaver dams which will allow for the reinstallation of the 1st Ave S SD (West) Effectiveness Monitoring Location sediment traps.

Table 31: Summary statistics for select contaminants in the 1st Ave S SD (West).

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	38	57	93	2.66	20	10.1	9.87	0	0
Copper	38	390	--	18.6	467	122	82.3	2.63	--
Lead	38	450	530	5	261	75.9	75.5	0	0
Mercury	38	0.41	0.59	0.02	1.29	0.16	0.12	2.63	2.63
Zinc	38	410	960	144	2,940	669	393	47.4	26.3
LPAH	38	5,200	--	54	2,184	558.7	313.7	0	--
HPAH	38	12,000	17,000	252	15,418	3,921	2,121	5.4	0
cPAH	37	1,000[A]	--	80.2	1,787	459	263	8.1	--
PCBs	51	130	1,000	<17.6	1,950	231	99.5	31.4	7.8
BEHP	38	1,300	1,900	210	28,600	5,890	3,505	55.3	55.3
BBP	38	63	900	39	778	195.4	127.5	92	0
DMP	38	71	160	39	563	154	99.8	84.2	26.3
TPH-Oil-AS	28	2,000[B]	--	377	17,100	3,874	2,115	55.6	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

a. Remedial Action Level (RAL) for the LDW.

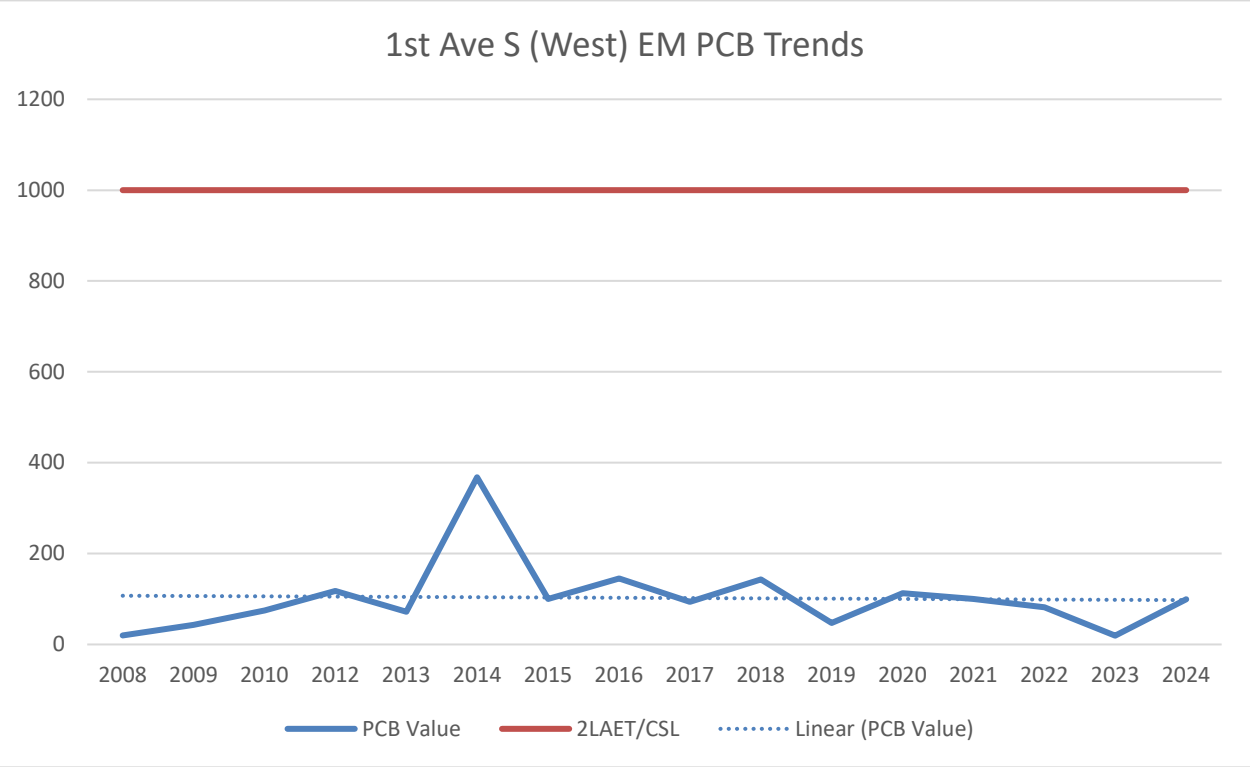
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

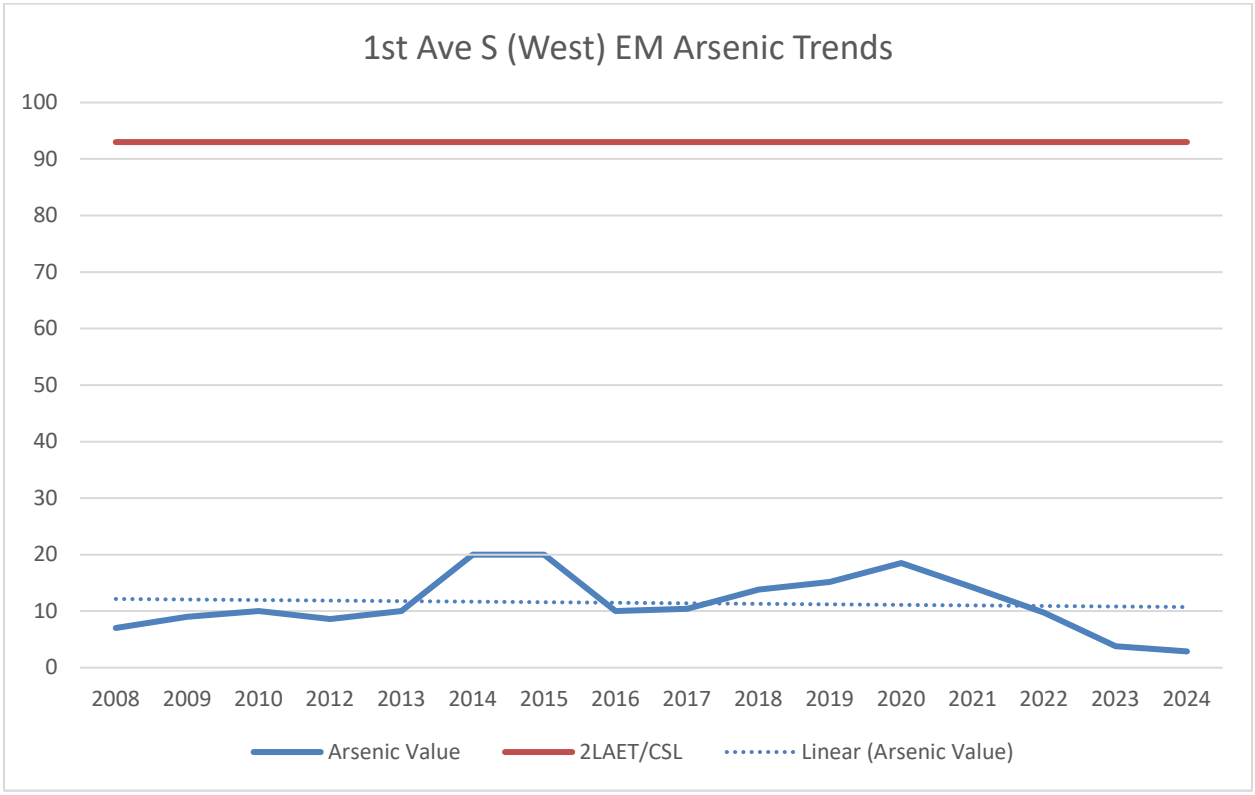
Samples from within the 1st Ave S SD (West) have gradually been trending down for key contaminants, with PCB and cPAH levels generally falling or stabilizing below the levels of concern. Source tracing and source control inspections have been very successful within this basin, with several known sources being controlled over the years. This basin includes numerous cleanup sites on Ecology Contaminated Site List, including many where the cleanup has started and a few which are awaiting cleanup. While general contaminant levels have fallen across the basin, some metals and Phthalates remain elevated in samples collected near the end of the pipe. Several sections of the drainage system within this basin are challenging to clean via the line cleaning for source control program. This is due to tide gates and impoundment from the WSDOT owned drainage ponds adjacent to the 1st Ave S bridge and State Route 509. SPU was able to work with WSDOT to establish a process to allow for cleaning several sections of pipe which had previously been difficult to clean. SPU was able to conduct a first pass cleaning on these systems adjacent to the South Transfer Station in 2024. These pipes will be cleaned and inspected via CCTV video in 2025 to verify that settled solids have been removed.

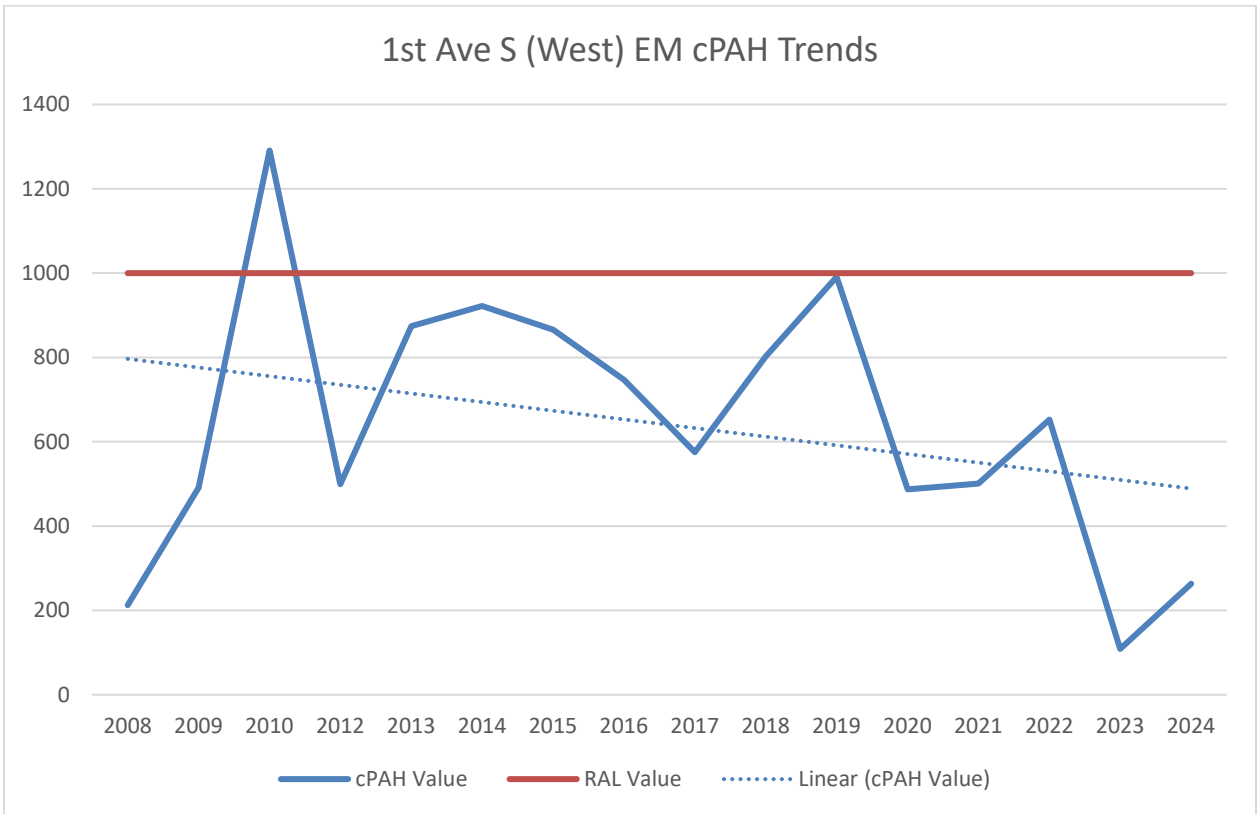
Known sources within the 1st Ave S (West) SD.

There are no known, active, uncontrolled sources within the 1st Ave S (West) SD. There are numerous sites on Ecology's contaminated sites list within this basin, including several sites that are owned by SPU. Many of the sites have started cleanup and should be controlled. SPU is in the process of planning the cleanup for the South Transfer Station site, which should help to further contain legacy contaminants at the property. In 2022, SPU sampled a sediment trap (1st-ST8) within the upper portion of this basin, along Myers Way S. PCBs within this sample were 1,020 ug/kg dw. A follow up sample collected in 2023 contained 916 ug/kg dw of PCBs. In February and March of 2024, the portion of the basin upstream of the sediment trap was screened, with twelve settled solids samples collected from right-of-way catch basins and maintenance holes. Samples did not indicate a source for the PCBs found within the sediment trap.

Figure 24: Effectiveness Monitoring Data Trends for the 1st Ave S (West) SD.




1st Ave S (West) EM Arsenic Trends
100
90
80
70
60
50
40
30
20
10
0
2008
2009
2010
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Arsenic Value
2LAET/CSL
Linear (Arsenic Value)


1st Ave S (West) EM cPAH Trends
1400
1200
1000
800
600
400
200
0
2008
2009
2010
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
cPAH Value
RAL Value
Linear (cPAH Value)

4.3.1.25 Highland Park Wy SW SD

The Highland Park Way SW SD is a large drainage basin which encompasses 296 acres of mixed industrial and residential properties. The basin provides drainage conveyance for several large residential neighborhoods located at the top of the West Duwamish Greenbelt. The basin then crosses into the industrial areas of the tidal flats at the bottom of the hill. Several large industrial facilities are located within this lower portion of the basin, including distribution warehouses, port terminals, waste transfer facilities, and metal fabrication businesses. The basin is splayed out in a manner which divides inputs into two distinct sections, one from the upper residential subbasin and another which primarily carries industrial runoff. For more information regarding the drainage basin layout, see map number 21 in the Map Atlas.

The Highland Park Wy SW SD includes several large portions of privately owned drainage mainlines located within private properties to the west of State Route 509, as well as large sections of WSDOT owned drains. Several portions of storm drain managed by SPU within the southern section of the basin collect private runoff from private properties, stormwater ponds managed by businesses, and culvert systems. SPU operates several sediment traps within this basin to characterize the flows from the residential portions of the basin and from the lower industrial section. The Highland Park Wy SW SD is included within the Effectiveness Monitoring Locations list, with an annual sediment trap grab located just upstream of the outfall. Data trends and statistics for the Highland Park Wy SW SD may be found below.

Table 32: Summary statistics for select contaminants in the Highland Park Wy SW SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	22	57	93	5.19	55	22.7	17.25	0	0
Copper	22	390	--	19.5	162	95	110.5	0	--
Lead	22	450	530	11	703	152	133	4.6	4.6
Mercury	22	0.41	0.59	0.017	0.27	0.15	0.17	0	0
Zinc	22	410	960	85	1,090	592	688	68.2	13.6
LPAH	22	5,200	--	27	1,410	540	613	0	--
HPAH	22	12,000	17,000	192	7,096	2,400	2,386	0	0
cPAH	22	1,000[A]	--	51.7	717.5	245	243	0	--
PCBs	22	130	1,000	13	469	161.2	169.2	59.1	0
BEHP	22	1,300	1,900	340	11,200	3,781	3,660	86.4	77.3
BBP	22	63	900	20	9,520	658.4	190.5	95.5	4.55
DMP	22	71	160	19	330	120.1	104.9	81.8	22.7
TPH-Oil-AS	17	2,000[B]	--	765	5,480	2,420	2,380	70.6	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A

ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

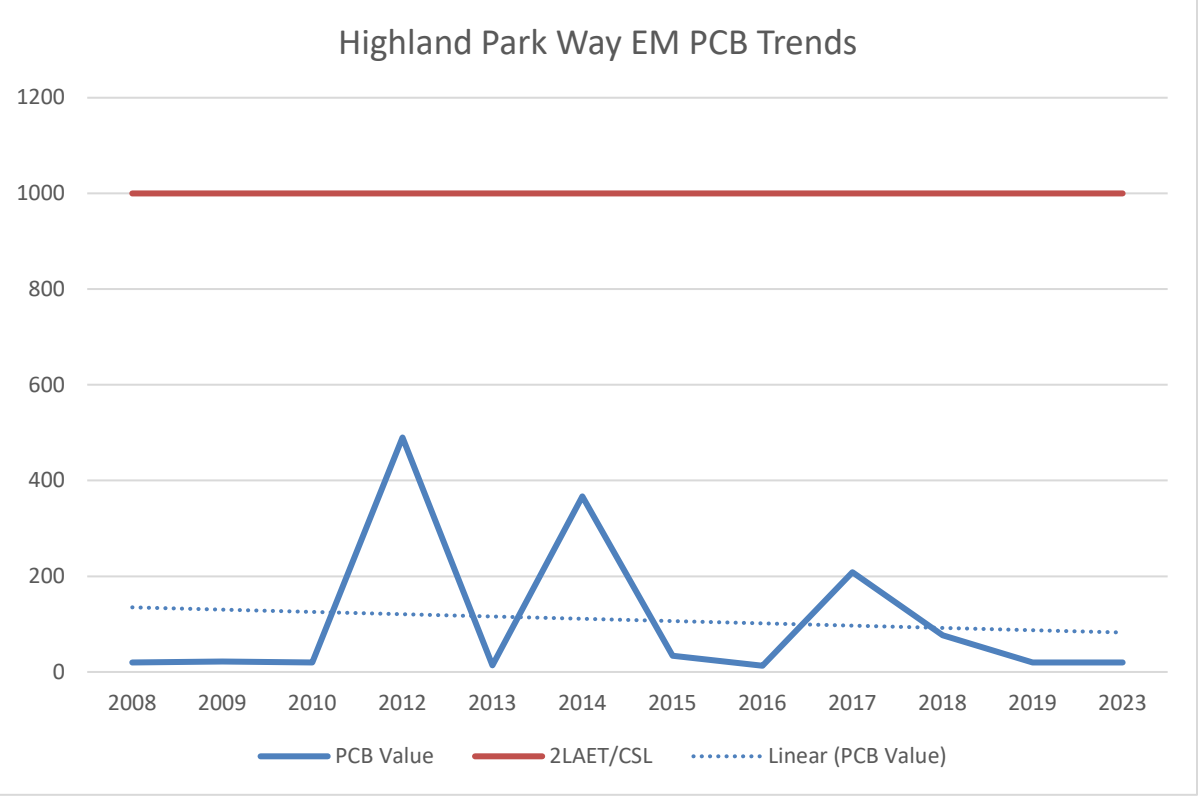
a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

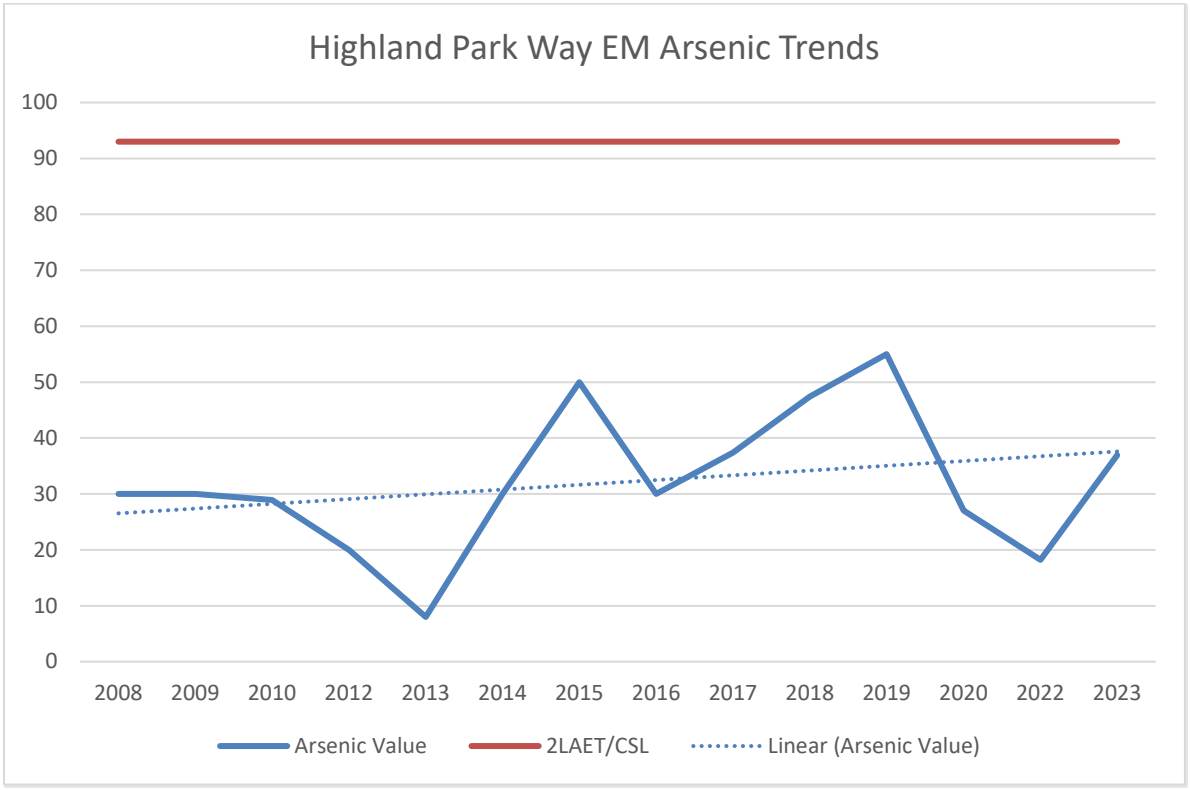
The Highland Park Wy SW SD has contained substantial sources of pollutants which SPU has sought to control over the years. The ages of the industrial facilities within the basin and the condition of the drainage system has increased the potential pollutant loading within the system. Over time, SPU has cleaned the structures within the system several times, including some privately owned assets that may be contributing contaminants. Several of these non-conforming private drainage structures were found to be in poor condition, so were unable to be cleaned. To reduce impacts to the downstream system, SPU regularly collects samples to determine the potential impacts and requires cleaning and repair of these non-conforming structures by private property owners when issues are identified.

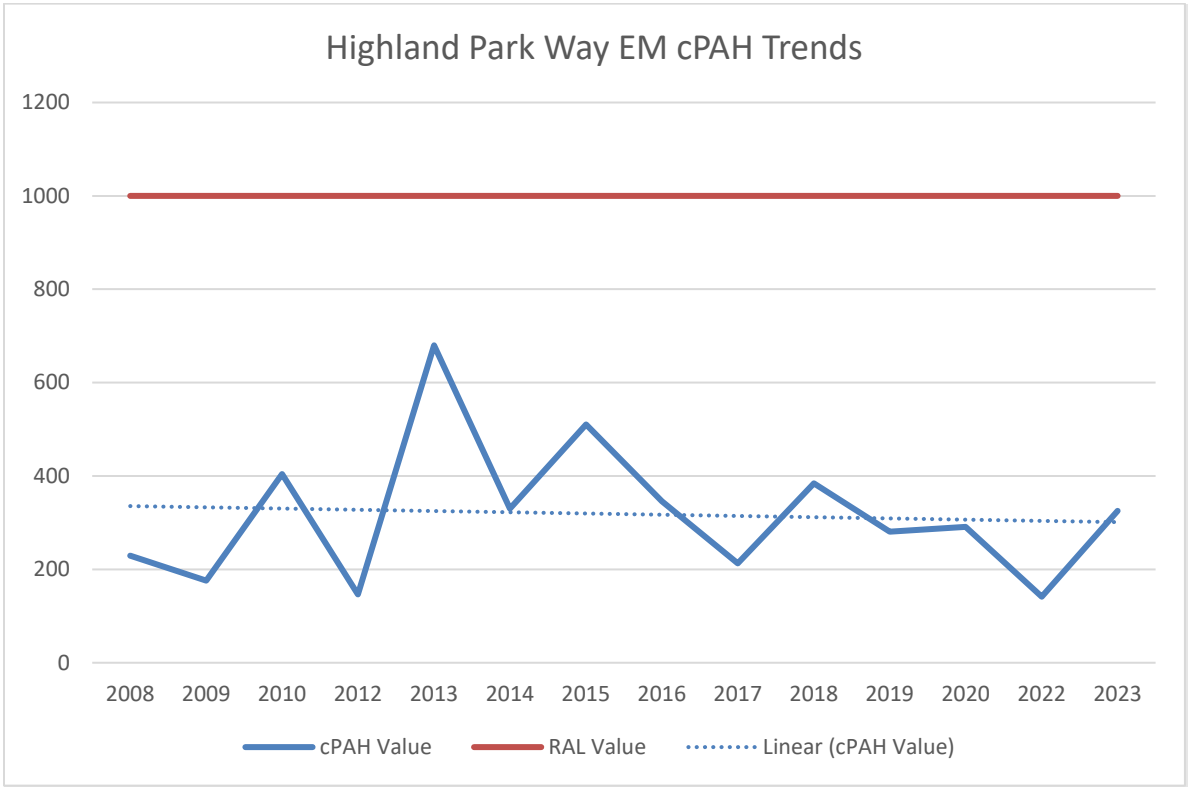
Known sources within the Highland Park Wy SW SD.

SPU identified that PCBs were present in a property located at 7000 Highland Park Way SW during sampling conducted in 2017. SPU notified the business occupying the property, who cleaned the site drainage system and modified their operations to minimize risk. Follow up sampling has not found elevated PCBs at the property. SPU has also identified accumulations of hydrocarbons and phthalates within private culverts in the southeastern portion of the basin. SPU has worked with the property owners to address these contaminants within the upstream private culverts and within a private stormwater pond off of West Marginal Way SW. The last known active uncontrolled source within the basin was a hydroexcavation waste disposal facility located at 7200 Detroit Ave SW. This facility closed in 2024 due to economic pressure and failure to comply with environmental regulations, including stormwater regulations which SPU enforced on the property.

Figure 25: Effectiveness Monitoring Data Trends for the Highland Park Wy SW SD.




Highland Park Way EM Arsenic Trends
100
90
80
70
60
50
40
30
20
10
0
2008
2009
2010
2012
2013
2014
2015
2016
2017
2018
2019
2020
2022
2023
Arsenic Value
2LAET/CSL
Linear (Arsenic Value)


Highland Park Way EM cPAH Trends
1200
1000
800
600
400
200
0
2008
2009
2010
2012
2013
2014
2015
2016
2017
2018
2019
2020
2022
2023
cPAH Value
RAL Value
Linear (cPAH Value)

4.3.1.26 SW Kenny St SD/T115 CSO

The SW Kenny St SD/T115 CSO basin is a 154 acre drainage basin that primarily provides runoff conveyance to the undeveloped West Duwamish Greenbelt and West Marginal Way SW right of way. Several smaller industrial properties along West Marginal Way SW contribute drainage to the basin as it conveys flows from the north and the south of SW Front Street. At this location, the basin combines into a single main trunk line to the outfall at the street end in the northeast corner of Terminal 115. Drainage on the riverfront parcels to the north and the south of the outfall has been disconnected from the basin. These parcels have their own drainage systems and outfalls which are managed by the property owners. This basin is also a combined sewer overflow point for a King County operated combined sewer system covering approximately 100 acres. For additional information regarding the drainage system layout of the SW Kenny St SD, see map number 20 in the Map Atlas.

The SW Kenny St SD/T115 CSO basin has limited potential inputs from industrial and commercial properties reducing the possible sources that could be traced by staff. The potential industrial and commercial sources to the basin are limited to six properties located on the western side of West Marginal Way SW, with the rest of the contributing drainage area limited to right-of-way runoff and hillside sheet flow from undeveloped land. To establish the pollutant loading potential within the basin, and to allow for an assessment of the effectiveness of the source control activities, the SW Kenny St SD/T115 CSO basin was included within the Effectiveness Monitoring Location Table in Appendix 13 of the City's Municipal Stormwater Permit. This monitoring has been supported by a sediment trap installed immediately upstream from the outfall structure, located on the Terminal 115 property beneath a stack of shipping containers. In 2023, it was found that the installed sediment trap had been knocked out of the pipe wall by tidal debris. A new sediment trap was installed in the same location to allow for sampling in 2024.

Table 33: Summary statistics for select contaminants in the SW Kenny St SD/T115 CSO.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	11	57	93	6.16	30.7	18.4	19	0	0
Copper	11	390	--	55.4	172	93.3	83.9	0	--
Lead	11	450	530	34.1	694	168.5	53.7	18.2	18.2
Mercury	10	0.41	0.59	0.093	0.447	0.199	0.147	10	0
Zinc	11	410	960	299	3,220	836	499	63.6	18.2
LPAH	11	5,200	--	110	560	367.4	354.7	0	--
HPAH	11	12,000	17,000	1,094	4,296	2,496	2,454	0	0
cPAH	11	1,000[A]	--	122.1	455.5	276.4	251.8	0	--
PCBs	11	130	1,000	24.6	370.9	132.5	132.8	54.6	0
BEHP	11	1,300	1,900	1,400	6,280	3,270	2,770	100	72.7
BBP	11	63	900	99.4	571	202.1	160	100	0
DMP	11	71	160	28.8	160	85.7	98.4	63.6	0
TPH-Oil-AS	8	2,000[B]	--	1,650	7,350	3,386	2,370	75	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

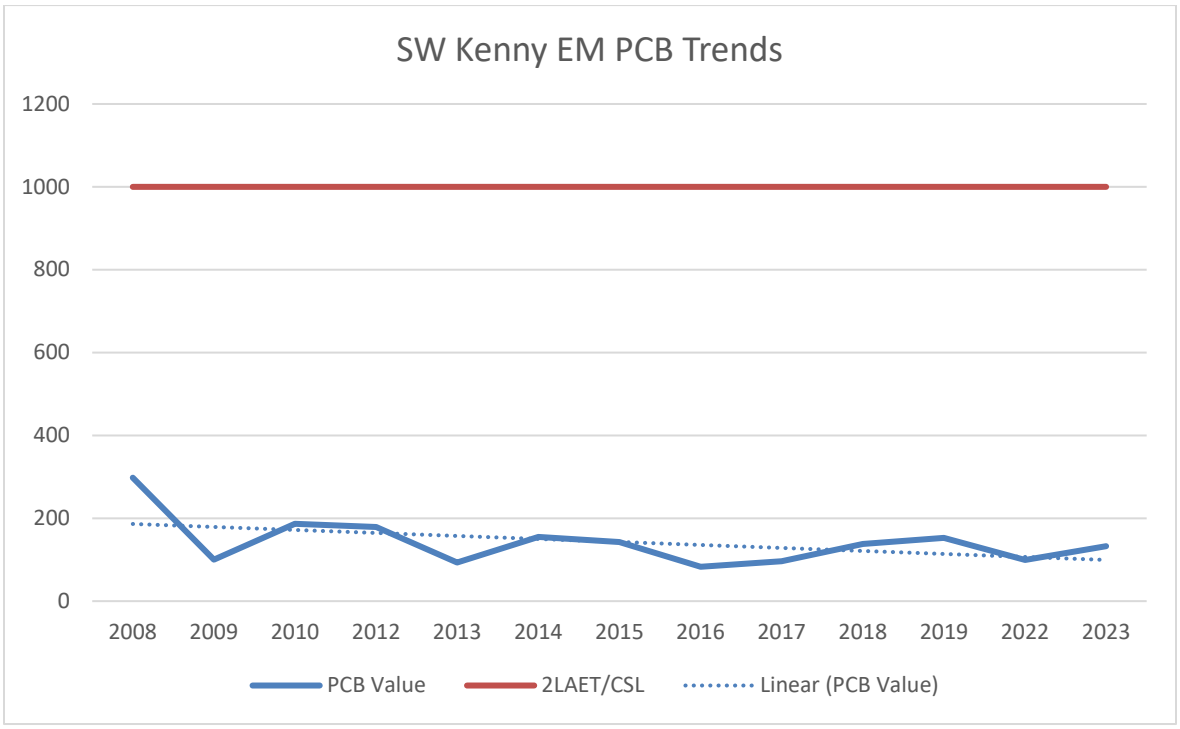
a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

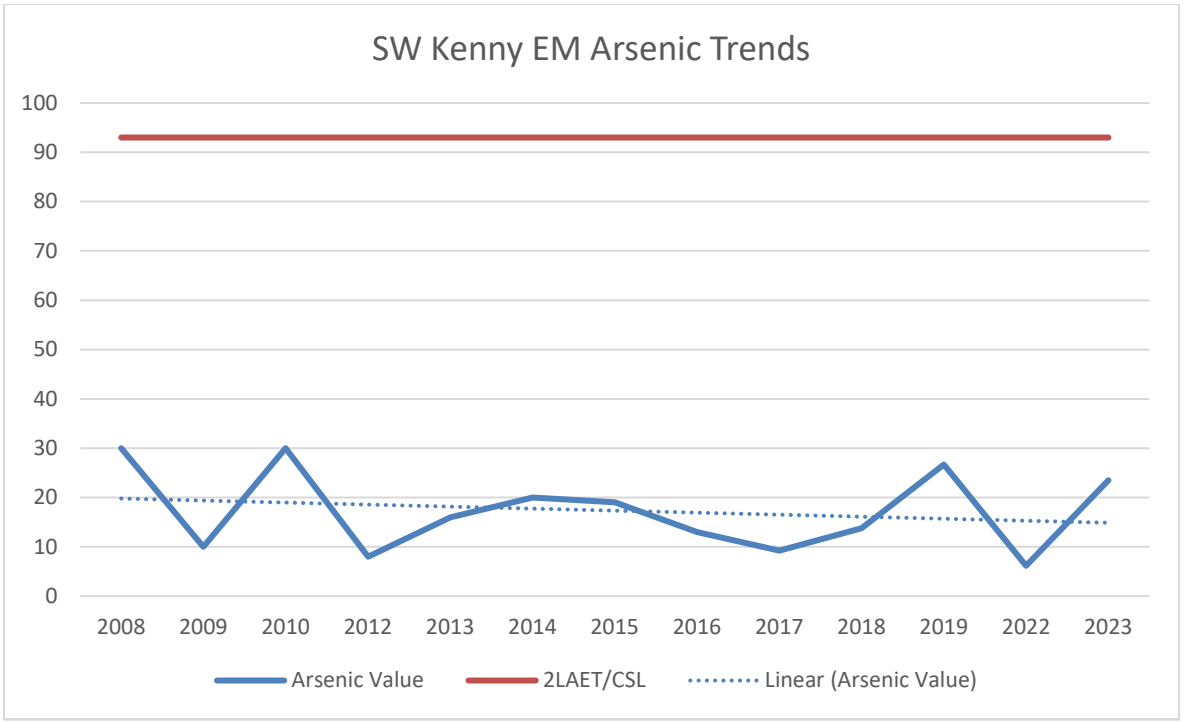
Samples from within the SW Kenny St SD were collected largely from the near end of pipe sediment trap and the roadside catch basins adjacent to this trap location on SW Front St. The properties to the north and south, as well as vehicle traffic accessing them, would be the sole contributor of pollutants to the right of way catch basins on SW Front St. Samples of these drains showed elevated Phthalates and PCBs, while the near end of pipe/effectiveness monitoring samples had lower levels of these contaminants. SPU cleaned these drains in 2017 to determine if contaminant presence would reoccur, indicating an active source. Samples collected since the cleaning in 2017 indicate a reoccurrence of these contaminants at fairly low levels, demonstrating that the adjacent properties may be active sources of moderate levels of Phthalates and PCBs. SPU plans to clean these structures again during the SCIP 3 period and work with the adjacent property owners to prevent runoff from the adjacent properties from impacting these catch basins. Contaminant loading levels continue to trend downward for key contaminants. Trend data for effectiveness monitoring samples is available below in Figure 26.

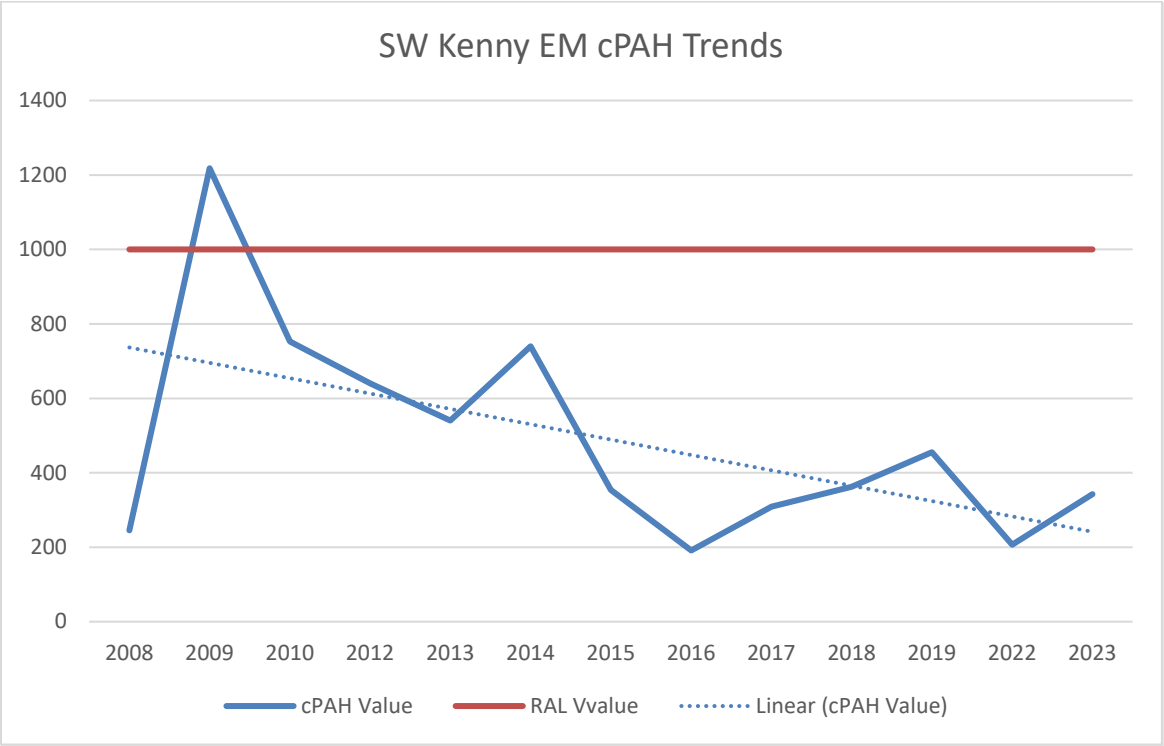
Known sources within the SW Kenny St SD/T115 CSO.

There are no known, active, uncontrolled sources of contamination to the SW Kenny St SD. The basin has very limited potential sources, many of which are unlikely to contribute the contaminants identified within the drainage system. Based on sample data collected from roadside catch basins, there appear to be contributions from the adjacent heavy industrial properties to the north and south, which are Ecology-permitted facilities and intended to contain stormwater to their properties. Additionally, the West Duwamish Greenbelt has several pockets of legacy Cement Kiln Dust which was disposed of along the hillside in the early 20th Century. Cement Kiln Dust is a potential source of metals to the drainage system, but no direct connection is evident within this basin.

Figure 26: Effectiveness Monitoring Data Trends for the SW Kenny St SD/T115 CSO.







Lower Reach Basins

4.3.1.27 Diagonal Ave S CSO/SD

The Diagonal Ave S CSO/SD basin is the largest stormwater drainage basin located within the LDW Source Control Area. This drainage basin covers 415 acres of City-owned Combined drainage basin, 1,500 acres of King County combined sewer area, and 2,666 acres of SPU drainage basin. The drainage portion of the basin area can be split into two sections. The upper portion of the basin is approximately 1,700 acres of drainage area and is comprised of a mix of residential, commercial, and industrial parcels. The lower portion of the basin is approximately 950 acres and stretches from Interstate 5 west to the eastern shore of the LDW. This lower area of the basin contains a mix of industrial and commercial properties and right-of-way. For additional drainage basin layout information, please see maps number 26 (upper basin) and 27 (lower basin) in the map atlas.

The Diagonal Ave S CSO/SD has been widely sampled to identify potential sources of pollution. Regular sediment trap samples are collected from a variety of locations within the basin to bracket the pollutants present and to facilitate source tracing activities. These traps are installed in locations where large portions of drainage area funnel into a single main drainage line prior to entering the trunk line. The trunk line runs diagonally across the lower basin to the outfall located at the street end of S Oregon Street. Due to the size of the basin, source tracing is less effective using samples from the primary trunk line given the number of inputs, high flow volume and amount of solids within the system. The dispersed trap's data has allowed SPU to trace pollutants to sub-portions of the drainage system where more feasible source tracing can occur. SPU has utilized several of these sub-basin traps to identify neighborhoods where contaminants are present and to support targeted, sub-basin specific source tracing.

Table 34: Summary statistics for select contaminants in the Diagonal Ave S CSO/SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	99	57	93	1.62	452	18.8	9.39	4	3
Copper	101	390	--	20.1	10,900	221	96.5	3	--
Lead	101	450	530	3.26	40,500[c]	584	58.5	3	2
Mercury	101	0.41	0.59	0.01	4.72	0.21	0.075	10.9	7.9
Zinc	101	410	960	55.3	10,100	596	392	46.5	13.9
LPAH	100	5,200	--	7.4	34,846	1,260	490.6	4	--
HPAH	100	12,000	17,000	64	75,571	5,444	2,779	10	5
cPAH	96	1,000[A]	--	15	12,194	608	321.3	11.5	--
PCBs	111	130	1,000	<11	46,060[d]	1,058	194	57.7	11.7
BEHP	100	1,300	1,900	142	59,000	5,864	4,365	69	67
BBP	100	63	900	12.9	10,900	509	199	80	7
DMP	100	71	160	14	11,600	353	99.5	69	27
TPH-Oil-AS	79	2,000[B]	--	111	10,100	596	392	44.3	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.
c. Inline grab sample collected in 2019 in Diagonal Ave S CSO/SD from discrete deposit beneath a lateral entering at ST2 from the adjacent property. Lead in the three sediment trap samples collected at this location were below the SCO.
d. See Section 6.1 S Snoqualmie Sub-Basin discussion for more information on this sample.

Sample data from within the Diagonal Ave S CSO/SD basin fluctuates heavily due to the large size of the drainage basin. This leads to difficulties in source tracing chemical exceedances when they occur. Due to the sheer volume of flow and associated solids loading from this basin, SPU assumes that any substantial increase in contaminant results, even if well below the CSL/2LAET, may be a traceable, discrete source. With such a large drainage area, sampling often suggests that multiple mid-level sources of chemicals of concern are present and may be coming from different branches and sub-basins within the system. The standard source tracing process assumes that when a single discrete source is present, the results will increase as sample collection nears the source location. Within this basin, there is occasionally an increase in concentration as sampling efforts work upstream until the main trunk system splits, after which the concentration in samples collected in the branches upstream decrease. Additionally, this basin is heavily tidally influenced, which may transport contaminants from

one branch into another, resulting in false positives within some sub-basins. To work around these challenges, SPU tries to collect samples from the larger sub-basins within the Diagonal Ave S CSO/SD and treats these samples as near-end-of-pipe samples to characterize the sub-basins. Discrete source tracing efforts are then conducted within the sub-basins to understand potential sources. An example of sub-basin screening is discussed in Section 6.1.

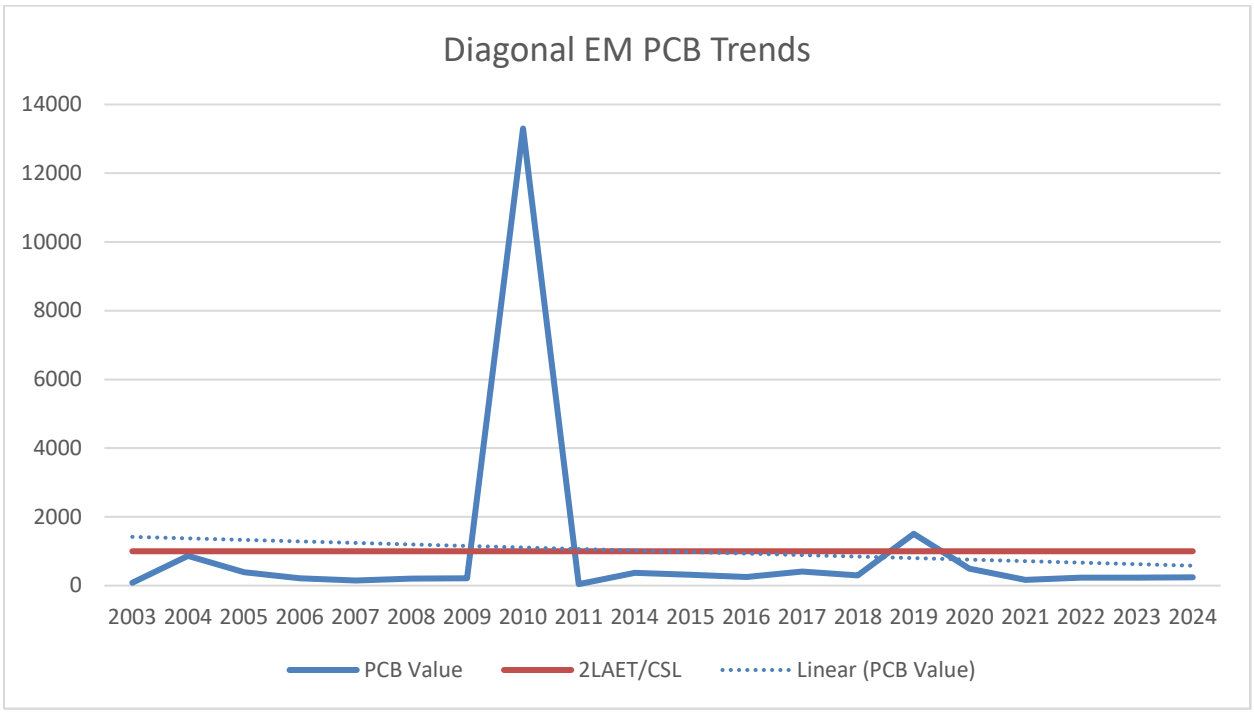
Overall, sample contaminant concentrations from within the Diagonal Ave S CSO/SD have been trending downward, with periodic spikes of contamination. Due to the variable nature of the sample results and size of the basin, sources can be extremely difficult to trace. PCB results have trended slightly downward over time, with spikes in 2010 and 2019 which affect the data trend analysis. The spike in 2019 coincided with a PCB spill identified upstream from the outfall on Denver Ave S, but the Aroclors present in the spill did not match those of the near end of pipe samples, indicating that additional sources may have been present. SPU has never identified the source of the 2010 spike in PCB values. PAHs have generally trended downward since the initial samples were collected within the basin. The results largely stay below remedial action levels or the CSL despite regular sample results that are above the SCO. Metals contaminant levels have been quite low for the basin, with occasional rare exceedances of the CSL found in the upstream basin areas. Contaminant levels have generally trended downward or plateaued within the basin. However, progress to bring those concentrations down even further is becoming more difficult using source tracing and source control. SPU plans to continue to implement the source control program measures within this basin but has begun to assess options to treat stormwater flows from the basin to further reduce pollutant loading potential. This assessment is in the feasibility phase as of 2024 and more information is expected in *2025*.

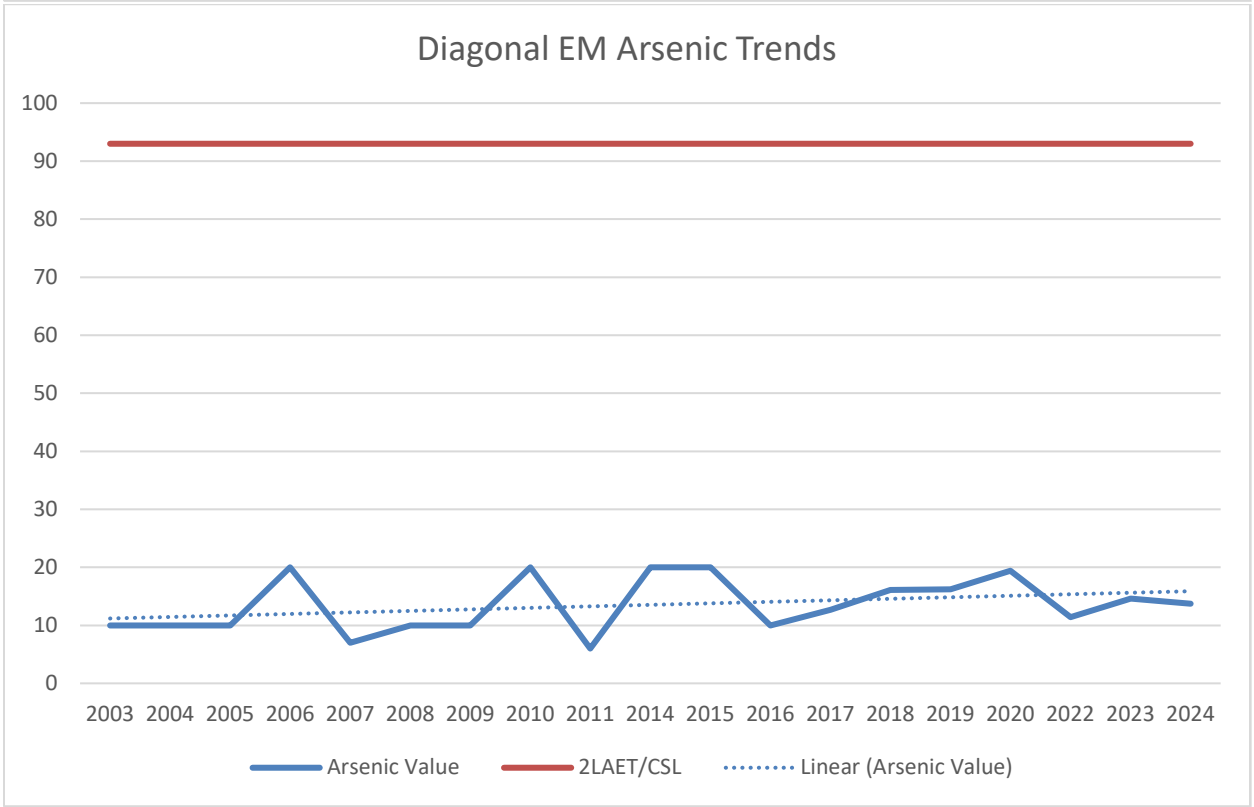
To support the pollutant loading assessment and Ecology's sufficiency evaluation, and to meet the requirements of Appendix 13 of the City's Municipal Stormwater General Permit, SPU collects annual samples from an effectiveness monitoring location with the Diagonal Ave S CSO/SD basin, located near the intersection of S Oregon St and East Marginal Way S. The analytical trends for key contaminants of concern are displayed in figure 27 below. SPU compares the pollutant levels from this sample location to those found in the near-end-of-pipe sample locations at the downstream ends of the sub-basins within the greater Diagonal Ave S CSO/SD.

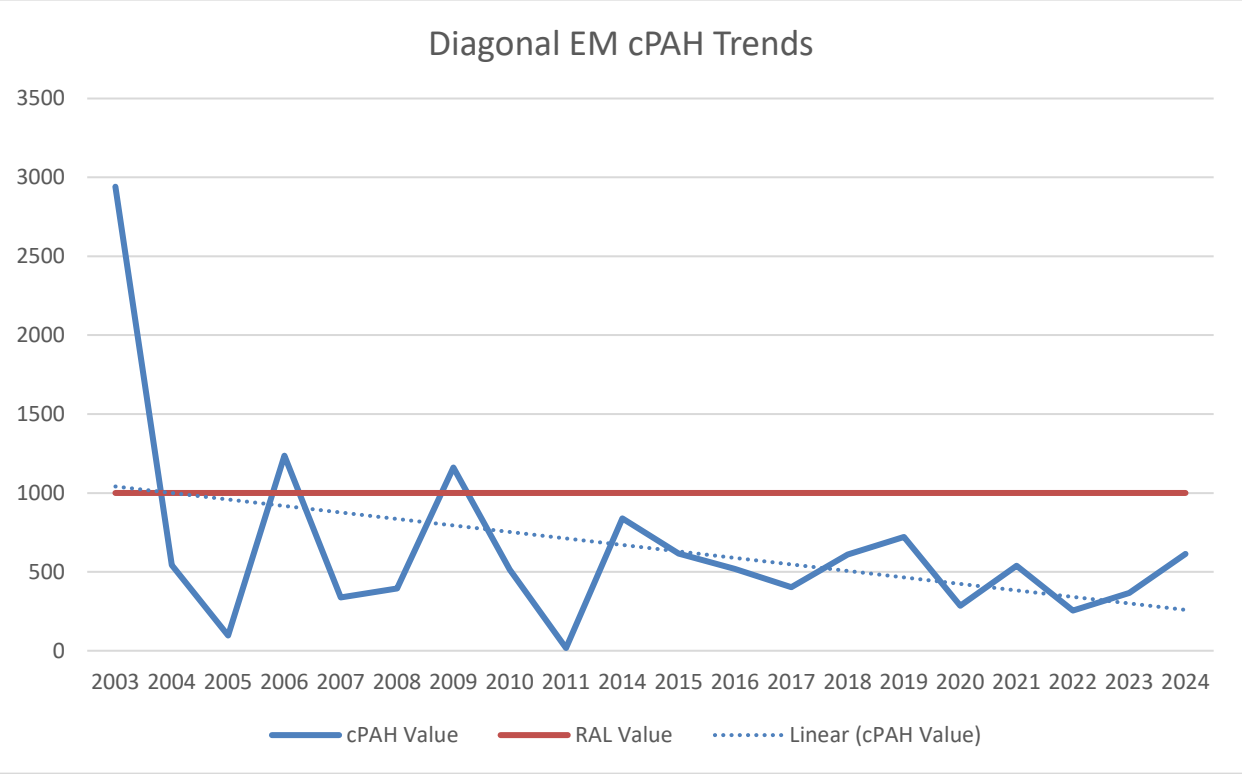
Known sources within the Diagonal Ave S CSO/SD.

There are known, uncontrolled, active sources of contaminants within the Diagonal Ave S CSO/SD. While no specific sources of contaminants have been definitively identified, there are many suspected sources within the Diagonal Ave S CSO/SD. SPU has identified several structures within this basin that are suspected of containing PCBs in their building materials. Several warehouses within the basin were identified by inspectors and the canine PCB detection team as likely to contain these contaminants, and samples collected adjacent to the buildings indicate elevated PCBs are reaching the adjacent drainage infrastructure. These facilities have been discussed with the EPA TSCA staff who are planning to coordinate source control activities and remediations with SPU in 2025.

Figure 27: Effectiveness Monitoring Data Trends for the Diagonal Ave S CSO/SD.







4.3.1.28 S Nevada St SD

The S Nevada St SD is a small industrial drainage basin located in the northwest corner of the eastern shore of the LDW. The basin encompasses several large Port of Seattle warehouse and transloading facilities, as well as a multi-tenant warehouse complex along S Nevada St. Drainage from S Nevada St and a small portion of East Marginal Way S also discharge to this basin. The basin outfall is located beneath Port of Seattle Terminal 106 which is currently occupied by the Ecology-permitted Con-Global Industries cargo facility. The total area of the basin is 26 acres. For more information about the drainage basin area and layout, see map number 25 in the Map Atlas.

The collection of samples from the S Nevada St SD has presented unique challenges since the beginning of source control program implementation. SPU has made dozens of attempts to sample the main stormwater line to characterize NEP contaminant presence, but there has been insufficient volume of solids to collect a sample. The drainage system utilizes a 21-inch diameter pipe to drain the 26 acres of basin area, which is too small to install a Norton-style bottle sediment trap. SPU investigated installing the custom designed low profile "Trent" trap within the basin but was unable to due to periodic discharges of grout and cement which were observed within the mainline in 2019 and 2020. Subsequent investigations designed to identify the source of these materials was inconclusive, but SPU suspects it was from illicit disposal of materials by customers of an adjacent cement facility. The investigation was completed in 2021, with no confirmed source identified. Once completed, it was requested that the trap installation be delayed during construction activities at an adjacent warehouse. A large warehouse that had occupied the northern side of the basin was demolished during the SCIP2 phase, and replaced by a new, multi-story logistics warehouse complex, whose construction was completed in August 2024. While not an Effectiveness Monitoring Location listed in Appendix 13 of the Permit, SPU plans to install a "Trent" trap within the system in 2025.

Table 35: Summary statistics for select contaminants in the S Nevada St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	14	57	93	8.8	29.6	14.3	12.4	0	0
Copper	14	390	--	91.3	306	161	136	0	--
Lead	13	450	530	32.6	289	115	98.1	0	0
Mercury	14	0.41	0.59	0.026	0.348	0.102	0.064	0	0
Zinc	14	410	960	478	2,160	1,067	924	100	50
LPAH	14	5,200	--	194.2	95,672	17,230	2,640	36	--
HPAH	14	12,000	17,000	804	425,890	69,490	10,458	50	36
cPAH	14	1,000[A]	--	82.3	42,327	7,728	1,120	50	--
PCBs	14	130	1,000	<19.5	1,602	470	348	78.6	7.1
BEHP	14	1,300	1,900	1,110	90,300	17,273	8,635	93	93
BBP	14	63	900	<19.9	3,080	660	304	93	21
DMP	14	71	160	<19.9	499	157	99.9	93	21
TPH-Oil-AS	13	2,000[B]	--	1,130	13,100	5,314	3,740	92	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024. Samples are solely right-of-way catch basin samples due to inability to collect inline samples in the S Nevada St SD. Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

Existing analytical data for the basin is almost entirely from right-of-way catch basin samples collected in the eastern half of the basin. These samples, often composites of multiple catch basins, indicated a PCB, Phthalate, and PAH source within the area. Samples showed PCB presence on both the northern and southern sides of the S Nevada St roadway, specifically in areas adjacent to yellow-painted bollards around gas and water infrastructure, as well as on yellow-painted loading dock shields; some yellow pigments are known to contain inadvertent PCBs. SPU worked with property owners in the area to remove and replace the bollards, which should help to reduce PCB presence. PAHs and other contaminants present in the samples are suspected to originate from several sources including a railroad right-of-way located at the far eastern end of the basin, utility poles along S Nevada St, as well as rooftop coatings from the warehouses in the area. Due to extensive construction within the basin during the SCIP2 phase, sample data are limited for this period. Sample statistics for the last ten years are shown below.

Sample data for the S Nevada St SD indicates that there are persistently elevated Phthalates, particularly BEHP, within the right-of-way catch basins. While Phthalates are widespread throughout the entirety of the LDW, the consistency of the elevated BEHP indicates a likely discrete source within the basin. SPU long suspected that the

warehouse structure that was demolished along the north side of the roadway was a source of Phthalates, as the roof of the building was coated in a flexible sealant which was observed to be peeling off during several site inspections. The demolition of this warehouse and construction of the new logistics distribution center was completed in the fall of 2024. SPU plans to collect additional right-of-way catch basin samples to determine if the prior structure was the source of these pollutants.

Known sources within the S Nevada St SD.

SPU identified a single source of PCBs within the S Nevada St SD during basin screening conducted in 2019 and 2020. Yellow paint on bollards and loading dock shields was identified as containing elevated PCBs. Upon notifying the property owner of this, the bollards and shields were removed and replaced with new material, and the adjacent drainage system was cleaned. Follow up sampling has not yet been conducted, as a large-scale construction project commenced immediately afterwards and prevented access to the location where the PCBs were identified. Follow up sampling is planned for 2025, after which SPU will determine if this known source may be considered fully controlled.

4.3.1.29 South Operations Center SD

The South Operations Center SD, previously known as Herring's House SD, is a small 6-acre drainage basin which is entirely comprised of City of Seattle-owned properties. The basin had historically been occupied by a bus depot and maintenance facility but now houses Seattle Public Utilities' South Operation Center. The drainage system conveys runoff from the parking lot and roof drains at the South Operations Facility. Drainage is routed through an oil/water separator within the parking area of the facility, then beneath Herring's House/T'ul'altxw Park to a 30" outfall into the LDW. No runoff from the park enters the drainage system prior to the outfall. For more information about the drainage basin layout, see map 30 in the Map Atlas.

The South Operations Center was purchased by SPU in late 2016 and converted to support utility operations within the southern half of Seattle. Prior to this purchase, the drainage basin exclusively served private property. As such, sample data predating SPU's acquisition of the basin is not available. To minimize the risk of contaminant loading and transport within the drainage system, SPU regularly conducts maintenance on assets within the system, including annual inspections and as-needed cleaning of catch basin structures and the oil/water separator located at the downstream end of the system. Filter socks and other solids interception devices are used due to the handling, loading and storage of bulk materials onsite.

In the SCIP2 document, this basin was identified as a data gap which required sampling. A settled solid sample was collected in 2024 to address this data gap and is tabulated below. However, a single data point is insufficient to obtain a statistically significant understanding of the contaminants present at the site and within the basin. Additional sampling will be conducted during the SCIP3 phase to provide a more reliable analysis of the basin characteristics.

Table 36: Summary statistics for select contaminants in the South Operation Center SD.

	Count	SCO/ LAET	CSL/ 2LAET	Result	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	1	57	93	8.8	0	0
Copper	1	390	--	100	0	--
Lead	1	450	530	50.6	0	0

	Count	SCO/ LAET	CSL/ 2LAET	Result	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Mercury	1	0.41	0.59	0.121	0	0
Zinc	1	410	960	736	100	0
LPAH	1	5,200	--	617	0	--
HPAH	1	12,000	17,000	10,204	0	0
cPAH	1	1,000[A]	--	1,020	100	--
PCBs	1	130	1,000	99.7	0	0
BEHP	1	1,300	1,900	9,960	100	100
BBP	1	63	900	567	100	0
DMP	1	71	160	567	100	100
TPH-Oil-AS	1	2,000[B]	--	5,410[c]	100	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes data from a single sample collected out of the settling bay of an oil/water separator. This structure is intended to capture settleable materials and oils, so chemical analysis of the solids from the settling bay are not indicative of the contaminant loading to the LDW but is indicative of potential sources within the basin.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.
c. Sample was collected from an oil/water separator settling chamber, designed to capture oils to prevent them from reaching the downstream drainage system. Sample results for Oil are expected to be artificially high due to this.

The single sample available from the South Operations Center SD was collected from settled solids within the initial settling chamber of an oil/water separator located in the southeast corner of the South Operation Center parking lot. All other site drainage structures were inspected but each had insufficient solids to sample. Oil/water separators are designed to settle heavier solids by slowing the flow of runoff through the structure, while capturing floating materials (such as oils) behind baffles. Sample data from an oil/water separator provides insight into the potential sources upstream within the basin. However, this is not a representative sample of pollutant loads discharging to the adjacent LDW, because the structure is designed to capture, treat and remove the contaminants that were identified through the sampling. See Figure 28 below for a simplified oil/water separator diagram.

Known sources within the South Operations Center SD.

There are no known, uncontrolled, active sources of contaminants within the South Operations Center SD. Potential sources within this basin are limited to historic contamination of soils, bulk storage of drainage and sewer components, or contaminants from vehicles and equipment parked at the SPU South Operations Center. Any identified source is immediately addressed at the site. Stormwater assets have been regularly cleaned at the facility, and SPU plans to conduct further cleaning of pipes on the property to remove residual contaminants if present.

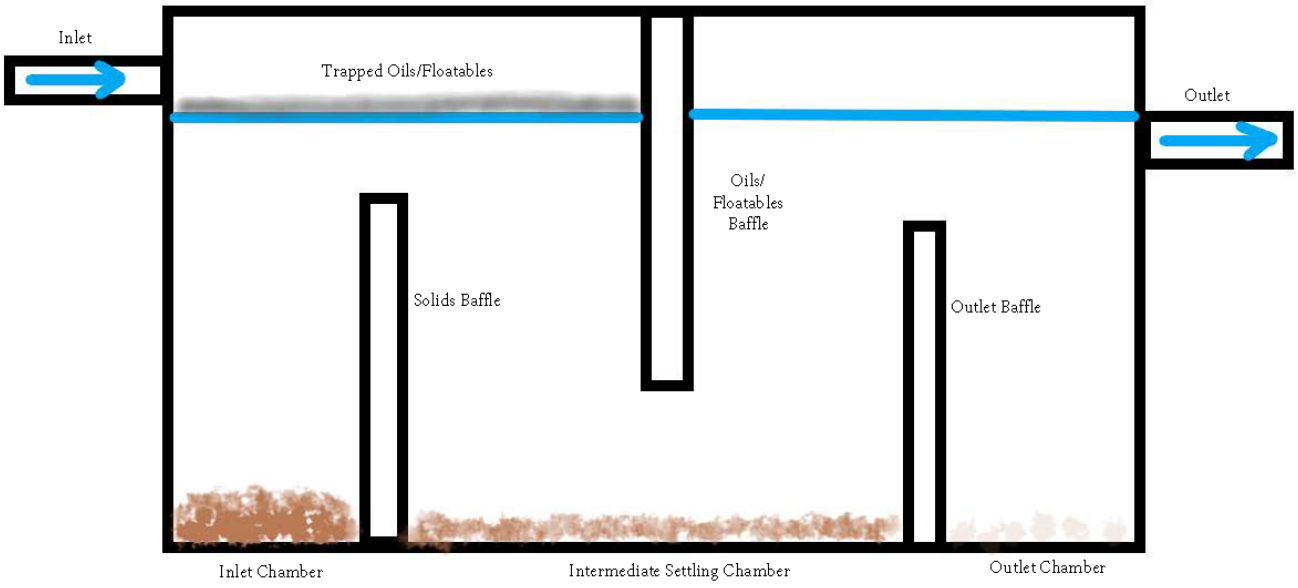


Figure 28: Oil Water Separator Diagram

4.3.1.30 SW Idaho St SD

The SW Idaho St SD is a moderately large, 423-acre drainage basin primarily covering a large residential neighborhood at the top of the West Duwamish Greenbelt. The drainage system collects runoff from the residential area as well as South Seattle College, then flows north into the Puget Creek ravine, after which the drainage mainline flows east to West Marginal Way SW. Puget Creek runs freely in its natural channel through the majority of the basin, but flows into the SW Idaho St SD adjacent to West Marginal Way SW. Once the drainage system reaches West Marginal Way SW, it flows north to SW Idaho St, where it turns east again along SW Idaho St. It then bisects the General Recycling of Washington facility before discharging to the outfall. For additional information about the drainage system layout, see map number 29 in the Map Atlas.

SPU has collected samples from several locations within the SW Idaho St SD annually for many years. This includes sediment traps located in the piped system near the end of the residential area, from within Puget Creek, as well as near the end of the piped system along West Marginal Way SW. Several additional samples have also been collected from within the system over the years, including on-site samples at South Seattle College, as well as sporadic sampling within rights-of-way in the basin. The SW Idaho St SD is included within the Effectiveness Monitoring Locations list in the City's Municipal Stormwater Permit, with a sample collected annually near the end of the pipe. A summary of the basin statistics for key contaminants is shown below, in Table 37.

Table 37: Summary statistics for select contaminants in the SW Idaho St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	23	57	93	6	249	22.5	11.3	4.4	4.4
Copper	23	390	--	19.9	763	89	38.7	4.4	--
Lead	23	450	530	9.2	907	84	52.9	4.4	4.4
Mercury	23	0.41	0.59	0.012	2.68	0.219	0.099	4.4	4.4
Zinc	23	410	960	74	6,110	674	260	30	17
LPAH	22	5,200	--	20	3,545	671	111	0	--
HPAH	24	12,000	17,000	94.3	26,400	3,960	701	8.3	8.3
cPAH	24	1,000[A]	--	29.2	3,880	539	99.9	16.7	--
PCBs	25	130	1,000	<17	384	126.5	70.2	32	7.1
BEHP	24	1,300	1,900	122	9,830	2,545	924	46	46
BBP	24	63	900	17	4,030	452	99	75	8.3
DMP	24	71	160	18.9	498	121	99	62.5	25
TPH-Oil-AS	16	2,000[B]	--	87.8	8,490	1,611	445	31	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

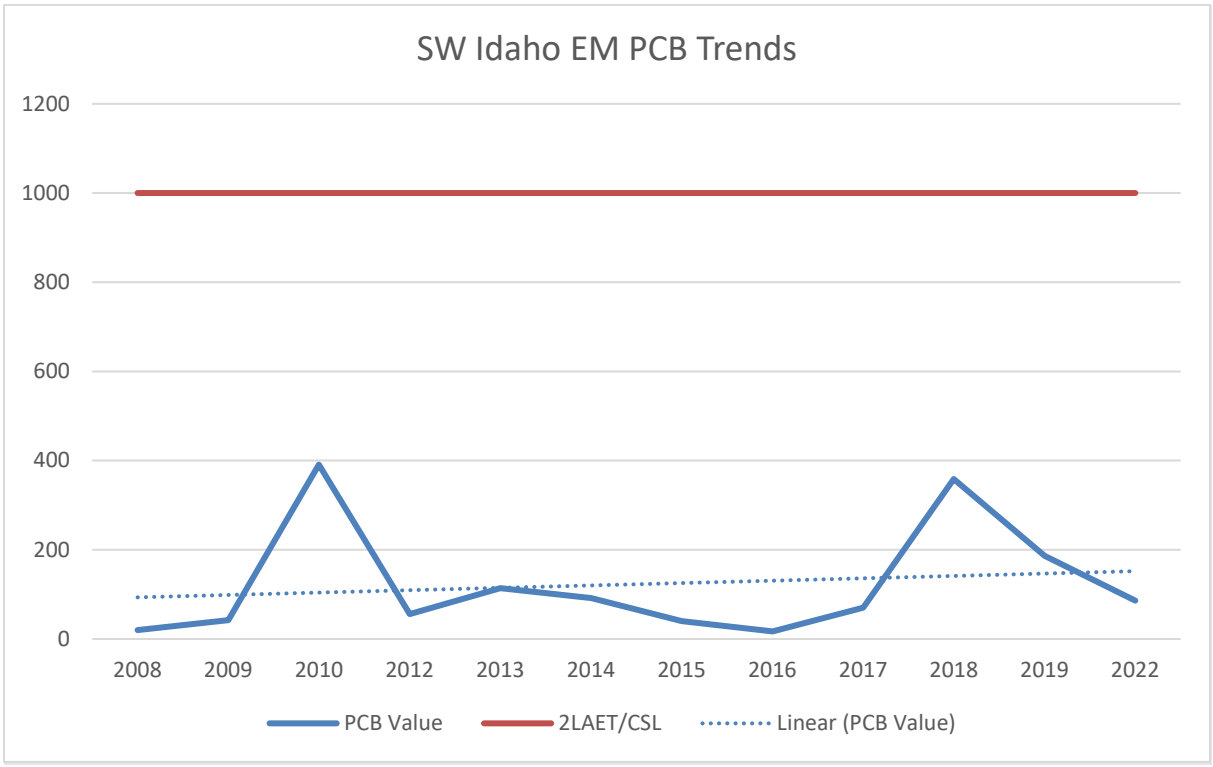
Sample results indicate that the SW Idaho St SD generally has low levels of contaminants present, with periodic increases in nearly all contaminants. Like most of the LDW drainage basins, Phthalates are common within the SW Idaho St SD, although levels tend to be lower than in more industrialized basins. PAHs and PCBs have typically been quite low, with rare exceedances of the CSL/2LAET levels. Samples collected from the upper basin in 2023 and 2024 showed a substantial increase in PAH concentrations compared to the typical levels found in prior years. The increase in PAHs corresponds to a business which moved into a lot in the residential area of the basin, which was found to be washing equipment into Puget Creek. The business was inspected in 2024 and issued a corrective action letter to address these discharges. Follow-up sampling will be used to determine if the business inspection helped effectively address the PAH increase observed.

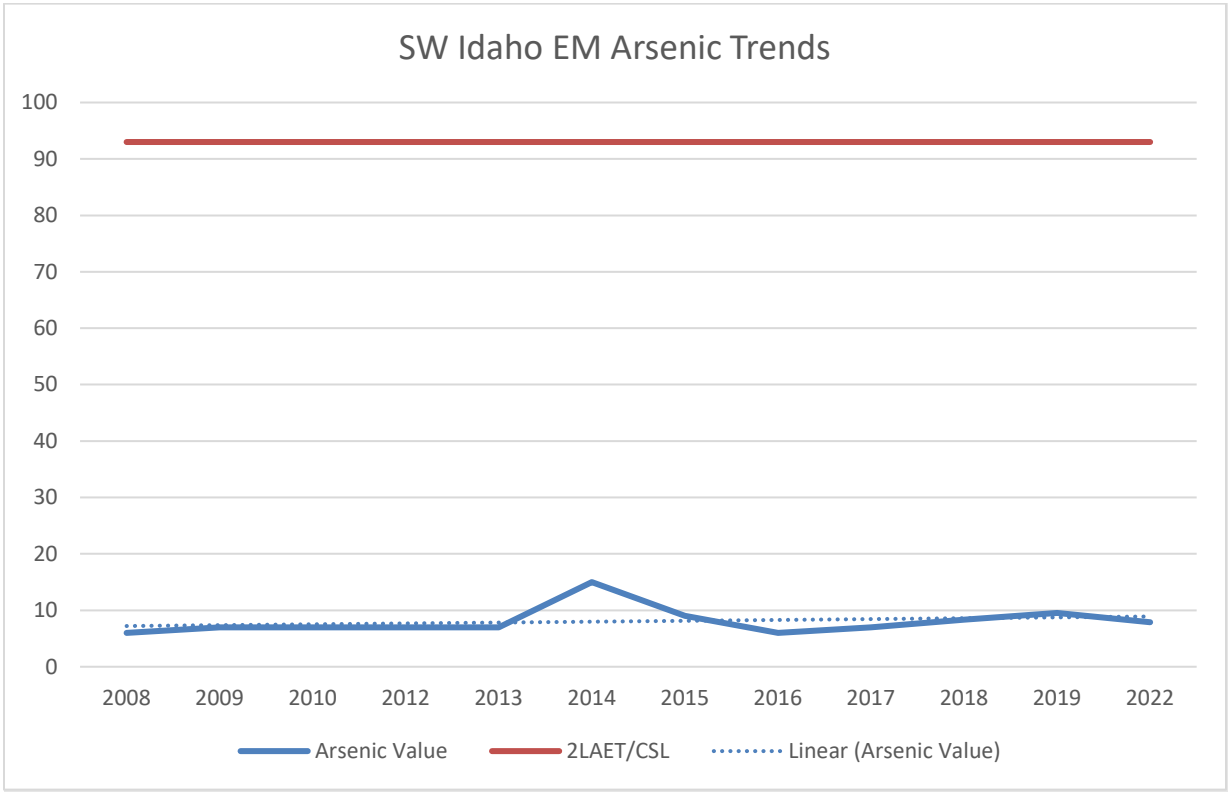
Effectiveness monitoring sample result trends for the LDW contaminants of concern are displayed below. In 2023, the sediment trap from within the basin was dislodged from the drainage mainline and lost. Additional sediment trap and grab samples were collected upstream of the trap location but were excluded from the trend analysis due to the different composition of settled solids in these locations. The Effectiveness Monitoring Location sediment trap was reinstalled in 2023 and was sampled in 2024.

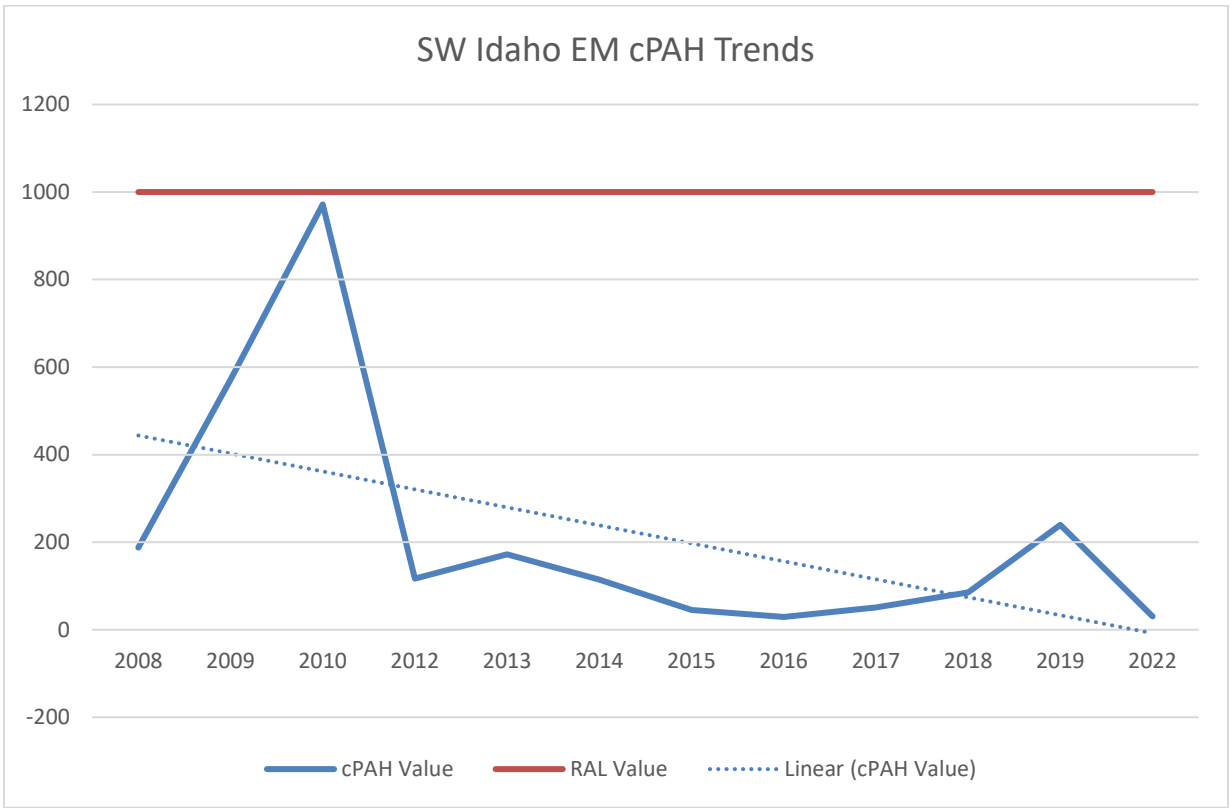
Known Sources within the SW Idaho St SD.

There is a single, known, potentially active, controlled source of contamination within the SW Idaho St SD. A window and gutter company was identified as a potential source of contaminants to the drainage system after a water quality complaint was received about improper storage and washing of equipment and material. The business adjusted their operation after SPU conducted an inspection of the site, but sample data after site modifications are not yet available. No other discrete sources are known within the basin.

Figure 29: Effectiveness Monitoring Data Trends for the SW Idaho St SD.




SW Idaho EM Arsenic Trends
100
90
80
70
60
50
40
30
20
10
0
2008
2009
2010
2012
2013
2014
2015
2016
2017
2018
2019
2022
Arsenic Value
2LAET/CSL
Linear (Arsenic Value)


SW Idaho EM cPAH Trends
1200
1000
800
600
400
200
0
-200
2008
2009
2010
2012
2013
2014
2015
2016
2017
2018
2019
2022
cPAH Value
RAL Value
Linear (cPAH Value)

4.3.1.31 SW Dakota St SD

The SW Dakota St SD conveys flows from 47 acres of industrial property and right-of-way in the northwest corner of the western shore of the LDW. The majority of flow in this basin comes from West Marginal Way SW and is comprised of hillside runoff and seeps which flow to roadway catch basins. Approximately four blocks of industrial properties at the far north end of the basin contribute to the drainage system, with several warehouses, manufacturers, and construction-related businesses located within the area. A large Seattle Parks and Recreation facility, known as Westbridge, is located at the southern end of the industrial properties. The industrial drainage contributions in the north flow south along West Marginal Way SW to SW Dakota St. At this location, the flows join the southern portion of the basin. The drainage system turns east and discharges into a restored flood plain and ditch system at tuʔəlaltxʷ (toolalt) Village Park. This is the former location of Terminal 105 which was used for metals storage and commercial moorage from the early 1970s until 1986 before it was converted into a park. The park was heavily modified from 1997 to 2012, with the restoration of the slough that likely existed on the property prior to the industrial uses. For more information regarding the layout of the basin, see map number 28 in the Map Atlas.

Sampling of the basin has been conducted since the LDW was added to the National Priorities List, becoming a Superfund site. The intersection of West Marginal Way SW and SW Dakota St continues to be sampled and is the basin's designated Effectiveness Monitoring Location. Additional samples have been collected from right-of-way catch basins and the industrial properties within the drainage basin over the years. Sampling of the SW Dakota St SD has historically been challenging, with low volumes of settled solids in the upper portions of the basin, and tidal influences in the lowest portions. The slough system on the tuʔəlaltxʷ Village Park impounds inflow coming from the SW Dakota St SD at a culvert immediately downstream of the Effectiveness Monitoring Location, resulting in solids settling out upstream of the restoration area. Standing water in this portion of the drainage basin prevents safe installation and recovery of sediment traps but allows for consistent grab sampling. SPU has utilized the line cleaning for source control program to remove accumulated sediments in this sample location and support source tracing of active sources within the basin. SPU plans to clean this system during the SCIP3 phase to refresh the sediments to be sampled and continue this source tracing process. Sample data statistics for samples collected in the last year are tabulated below.

Table 38: Summary statistics for select contaminants in the SW Dakota St SD.

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
Arsenic	6	57	93	8.95	19.5	15.4	17.2	0	0
Copper	6	390	--	129	254	179	161	0	--
Lead	6	450	530	88.2	141	119	118	0	0
Mercury	6	0.41	0.59	0.074	0.262	0.207	0.236	0	0
Zinc	6	410	960	921	1,890	1,262	1,125	100	66.7
LPAH	6	5,200	--	386	902	606	519	0	--
HPAH	6	12,000	17,000	3,091	7,147	4,436	4,075	0	0
cPAH	6	1,000[A]	--	394	716	495	439	0	--
PCBs	6	130	1,000	178.8	359	228	194	100	0
BEHP	6	1,300	1,900	5,420	17,800	9,925	8,490	100	100

	Count	SCO/ LAET	CSL/ 2LAET	Min	Max	Mean	Median	% of samples greater than SCO/ LAET	% of samples greater than CSL/ 2LAET
BBP	6	63	900	176	489	316	308	100	0
DMP	6	71	160	90.3	499	215	152	100	50
TPH-Oil-AS	6	2,000[B]	--	2,380	6,970	3,833	2,880	100	--

BEHP = bis(2-ethylhexyl)phthalate, BBP = butyl benzyl phthalate, DMP = dimethyl phthalate, TPH-Oil-AS = total petroleum hydrocarbons motor oil range acid silica cleaned, PCBs = polychlorinated biphenyls, PAH = polycyclic aromatic hydrocarbons, cPAH = carcinogenic PAH

All units in dry weight. Metals and TPH-oil: mg/kg Organics, except cPAH: ug/kg cPAH: ug TEQ/kg

Includes all samples collected in the MS4 between July 1, 2014 and June 30, 2024 2024 (i.e., inline grabs, inline traps, and catch basins in the right-of-way). Samples collected in private drainage structures and from the ground surface were excluded. A ten year sample horizon was used to provide sufficient data for recently collected samples to support analysis and information on potential active sources.

a. Remedial Action Level (RAL) for the LDW.
b. MTCA Method A soil cleanup level for industrial and unrestricted use.

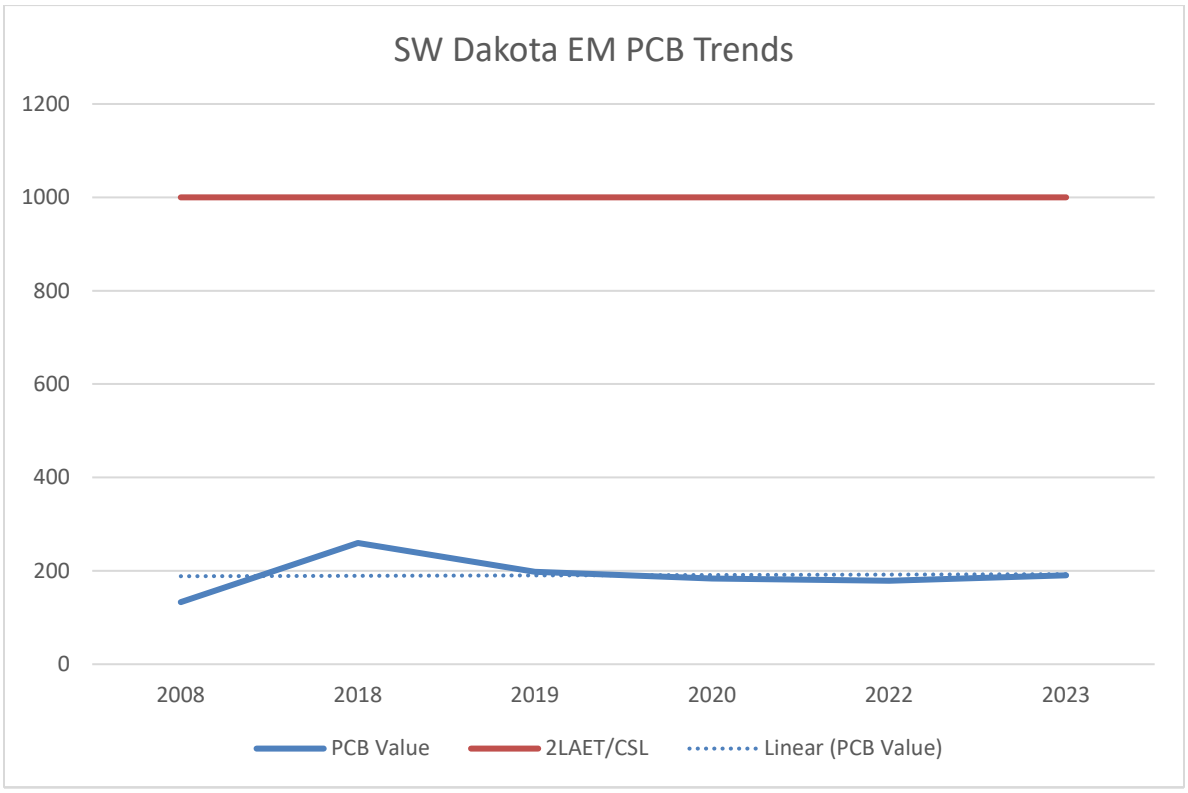
Samples collected from the SW Dakota St SD indicate that metals are not present in elevated concentrations within this basin with the exception of zinc, which is quite common around industrialized parcels. Phthalates are very commonly found within the basin, which is typical of the LDW. However, phthalates are found at levels higher than would be expected given the limited potential sources. Motor oil is elevated as well, which can likely be attributed to the large proportion of right of way drainage area contributing to the basin. The sample collection location, which impounds floatable material, can skew motor oil results as well. PCBs, while present at levels below the 2LAET, are consistently elevated above the low levels that would be expected if no discrete sources existed within the basin. Source tracing efforts in the drainage area have not yet identified any sources of PCBs but periodic basin screening will continue in an attempt to identify a potential source.

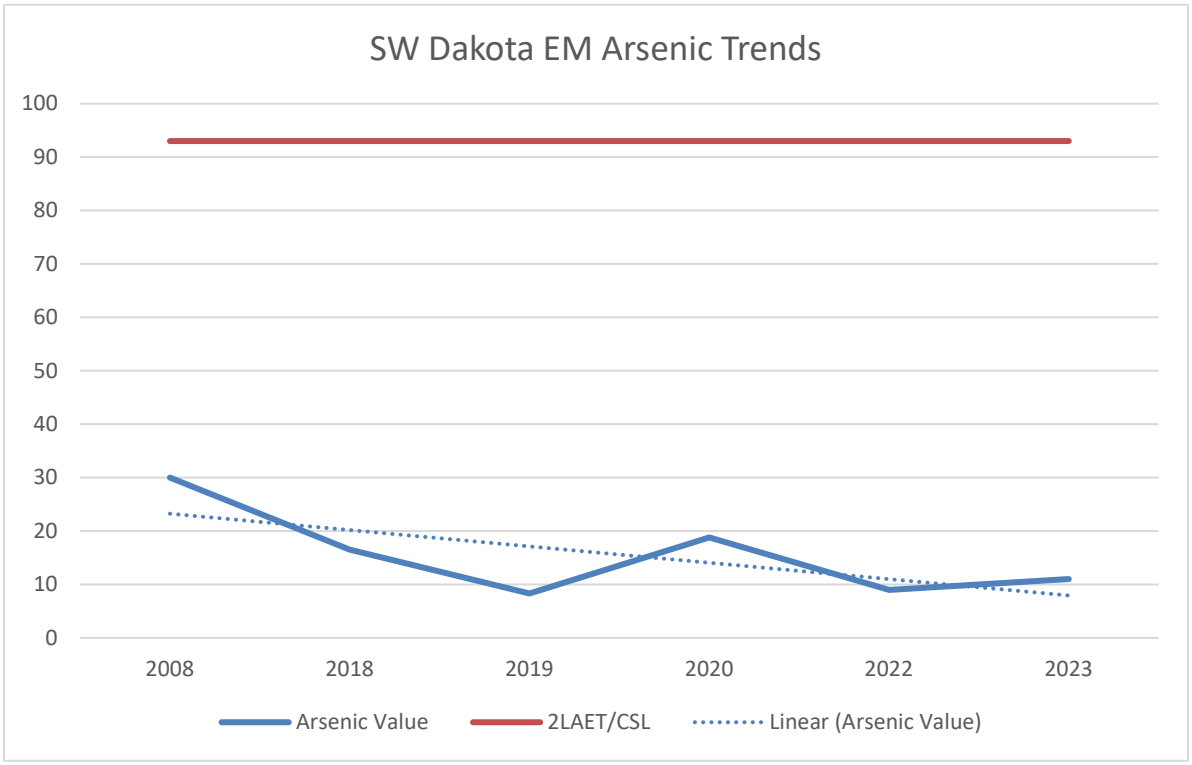
Sample data trends for the Effectiveness Monitoring Locations are contained below. Trends indicate that contaminant concentrations near the outfall are relatively consistent, even after line cleaning activities have removed residual historical settled solids. SPU suspects that the proximity of the sample location to a railroad right-of-way has led to a steady inflow of cPAHs to the monitoring location. Immediately after cleaning the system in 2019, an increase in cPAH values occurred which is likely due to PAHs from railroad ties and other associated materials combined with a lack of other solids within the sample location.

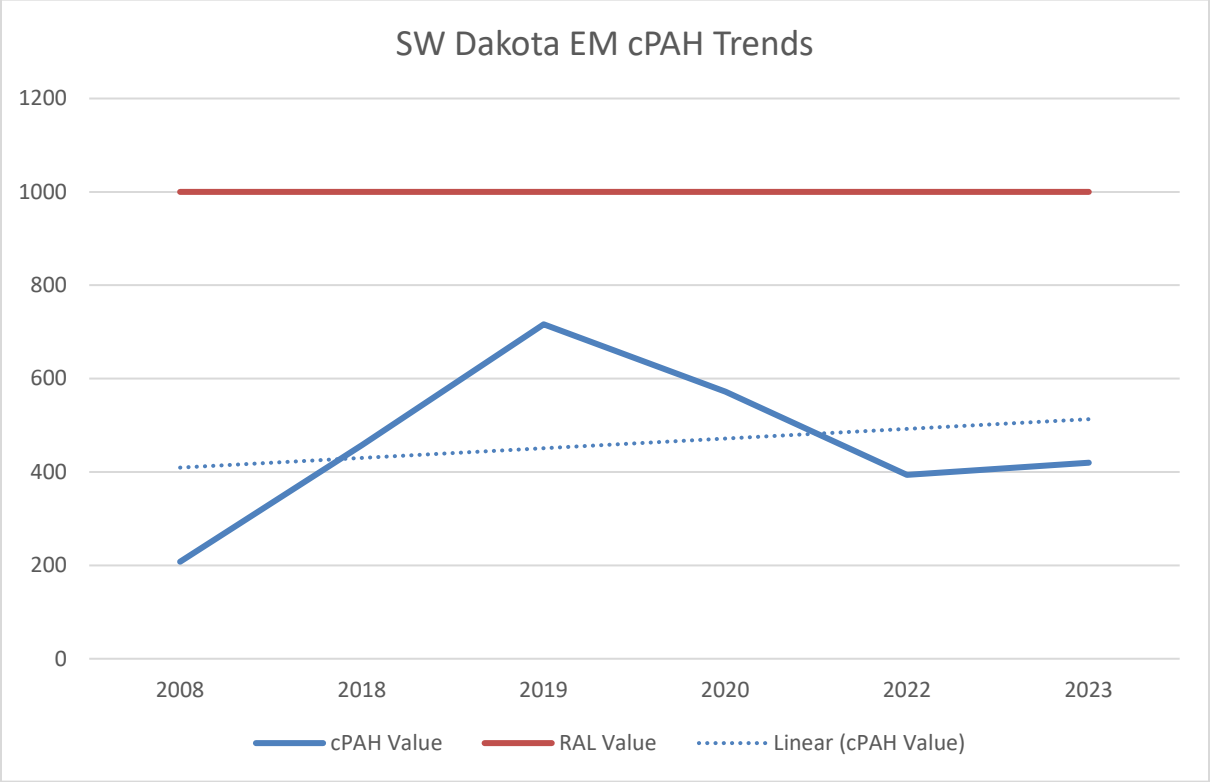
Known sources within the SW Dakota St SD.

There are no known, active, uncontrolled sources within the SW Dakota St SD. Source tracing in the industrial blocks of the basin has yet to identify any discrete sources. The downstream portion of the basin, which accepts sheet flow and seeps from the West Duwamish Greenbelt, is not known to contain any active sources as well. The West Duwamish Greenbelt is known to contain portions of hillside where industrial dumping was carried out during the initial development of the area. Materials discharged include cement kiln dust and trash/debris. These are not expected to be primary sources of pollutants to this drainage basin.

Figure 30: Effectiveness Monitoring Data Trends for the SW Dakota St SD.







5. STATUS OF DATA GAPS IDENTIFIED IN PREVIOUS SCIP

All existing data gaps that were identified during the previous SCIP (Seattle 2020) were investigated, with those efforts summarized below:

- 16th Ave S SD - West. This basin covers a small portion of the South Park neighborhood along 14th Ave S, immediately south of the South Park Bridge. The basin is comprised of four blocks covering a commercial corridor which discharges through a series of swales owned by King County prior to reaching the LDW. SPU's drainage system collects roadway and parking lot runoff and is conveyed into the King County drainage system. A composite sample of five catch basins was collected from this drainage system on June 6th, 2023.
- W Marginal Pl S SD. This basin serves several roadside catch basins outside of the City of Seattle city limits. It is owned and operated by the City of Tukwila. The system is adjacent to a Seattle City Light substation (Duwamish Substation) and collects runoff from several catch basins within the fenced driveway of the substation facility. These driveway catch basins are located upgradient from the substation facility so may only accept sheet flow from the driveway area at the facility. The drains are on a monitoring schedule to regularly clean accumulated solids and will be sampled in the event of any spills or incidents which may result in a discharge to them. No spills or incidents were registered at the site during the SCIP2 phase, so the drainage assets have not needed to be sampled.
- I5 SD at S Ryan St. This drainage system, owned and operated by the Washington State Department of Transportation (WSDOT), collects runoff from Interstate 5 and conveys it to the LDW immediately south of the City of Seattle city limits. The drainage system also contains an overflow structure which accepts stormwater flow from the portion of the S Norfolk St CSO/PS EOF/SD located east of the interstate. SPU regularly collects settled solid source tracing samples from this Norfolk basin, including immediately

upstream from the overflow weir. These samples provide insight into the condition of the discharges that may be conveyed by the I5 SD at S Ryan St from SPU's drainage system. SPU has repeatedly attempted to sample from the WSDOT drainage system close to the outfall into the LDW, but the system is submerged, preventing safe sample collection.

- South Operations Center SD. Previously called the Herrings's House SD, SPU purchased the property served by this drainage system in 2016 and modified the existing bus dispatch yard to serve as the SPU's South Operations Center. The drainage system at the property conveys parking lot and roof runoff through an oil/water separator then discharges into the LDW just north of Kellogg Island. The drainage system was sampled in 2024.

6. LINE CLEANING PROGRAM

SPU initiated a storm drain line cleaning effort in 2008 to remove contaminated materials that have accumulated in the system and prevent them from reaching the LDW. Storm drainage lines are selected for cleaning based on contaminant concentrations in NEP samples and the time period that has lapsed since the lines were last cleaned. Additional prioritization is given where there may be known elevated loading of contaminants of concern, and where there has been difficulty in finding active contaminant sources. Line cleaning removes accumulated, potentially historic contamination from the system, allowing for post-cleaning solids samples to provide a gauge of any active pollutant sources. When a pollutant is found in pre-cleaning sampling but not found after several years of post-cleaning sampling, it is likely that the pollutant was a legacy contamination trapped in the drainage system. When pre-cleaning sampling and post cleaning sampling both show the same contaminants, it is probable that there is an active source of pollutants in the basin, which may be traced through source trace sampling.

Prior to 2018, SPU allocated approximately $250,000 per year to fund both the source tracing and line cleaning programs. This was increased to about $500,000 in 2018. SPU subsidized the line cleaning program from 2018 until 2021 using Ecology grant funds allocated to support our source tracing programs. When the grant funding expired in 2021, Seattle Public Utilities chose to continue to fund the line cleaning activities at the increased $500,000 amount to assist the targeted source tracing activities and to prevent contaminants found within our drainage system from reaching the LDW. This resource commitment continued annually throughout the SCIP2 phase and is anticipated to continue into the future.

6.1 PROGRAM EXAMPLES

Line cleaning is used in concert with targeted business inspections and source trace sampling to find, trace, and remove contamination. Line cleaning allows SPU to remove solids and associated pollutants from storm drain lines so they are no longer a potential source of pollution. Following line cleaning, SPU has a clean pipe that can be resampled over time to determine if there are still sources of pollutants discharging into the pipe. To better describe how line cleaning fits into the overall source control program, SPU has included the following program examples.

S Snoqualmie Sub-basin

Part of the broader Diagonal Duwamish SD basin, the South Snoqualmie Sub Basin drains an area of industrial businesses and distribution warehouses just north of the Georgetown neighborhood. In 2012, Source Control inspectors collected a sediment sample from a maintenance hole (MH18) within this basin and found high levels of PCBs and mercury. Maintenance holes are access points along a storm drain line. MH18 was cleaned to remove the settled contaminated solids to prevent them from traveling further downstream. Following the cleaning, targeted sampling was conducted in the upstream area to try to find the potential source. Twenty-eight samples were collected upstream from both private and public property, and two PCB sources were

identified on private property and eliminated through the City's progressive enforcement process. One of the property owners was required to clean the drainage system from their property to MH18 to remove contamination found leaving their property. Unfortunately, the PCB sources that were controlled did not match the PCB Aroclor that was found in MH18, so they were not considered the primary contamination source. Additional upstream businesses were inspected to determine if any operational or storage conditions may be the sources of the pollutants, but none were found during this screening process.

With no matching upstream contamination found, the most likely source was residual contamination within the storm drain system. A second round of upstream sampling was conducted in 2016, and targeted business inspections were conducted within the sub-basin. MH18 and associated lines have been cleaned six times in ten years (beginning in 2013) to remove any trapped contamination so that it does not accumulate and reach downstream (see Table 13 below). MH18 was placed on a frequent sampling schedule, to track contaminant level fluctuations associated with the cleaning activity. Concentrations decreased after the initial round of line cleaning and inspections in 2013 but spiked a second time in 2018. By 2020, PCB and mercury levels had fallen to levels commonly seen in the industrial areas of the city. The upstream drainage area was cleaned in fall of 2020 to remove any remaining residual contamination that may impact the MH18 structure. Samples collected in 2022 indicated an increase in both the mercury and PCB values but not as high as levels that have been observed in this location previously. Follow up samples were collected in May of 2024, and found relatively low levels of PCBs

Table 39: S Snoqualmie Sub-Basin MH18 PCB Sample Results

	2008	2012	2013*	2014*	2016	2018*	2019*	2020*	2022*^
PCBs (ug/kg dw)	460	45900	6560	3060	4350	46060	3075	297.3	985/593
Mercury (mg/kg dw)	0.48	7.6	3.48	0.44	1.14	4.72	0.888	0.14	0.224/1.52

* Years where MH18 was cleaned

^A sample and duplicate was collected in 2022 to determine if chemistry was connected to disparate contaminants present in the structure rather than more uniform contaminant presence.

S Norfolk St CSO/PS EOF/SD PCB Tracing

In 2021, Ecology's LDW planner contacted SPU to request assistance in tracing the source of PCBs that were found to have increased in waterway sediment samples near the S Norfolk St CSO/EOF/SD outfall. While SPU's existing sediment traps upstream of the outfall did not indicate a PCB source within the upper, SPU-owned drainage system, SPU began targeted source trace sampling within the entirety of the basin, including areas not owned by SPU. On October 7th, 2021, SPU sampled a maintenance hole (MH74) in the center of S Norfolk St, west of Airport Way S, and found that it contained 2,860 ug/kg of PCBs. Samples collected the same day indicated that the SPU drainage system upstream of this location did not contain elevated PCBs. A sediment trap sample collected downstream of the PCB contamination in November 2021 returned with 112.1 ug/kg PCBs, indicating that the elevated PCBs identified may be concentrated at one location in the drainage system.

SPU continued to coordinate with Ecology to conduct a sample screening in the lower S Norfolk St CSO/EOF/SD basin in 2022. Several samples were collected in February 2022 adjacent to industrial facilities along East Marginal Way S, including a maintenance hole immediately downstream of where the elevated PCB levels were found. This downstream maintenance hole sample had 49.5 ug/kg PCBs, indicating that the PCBs had not been transported and settled into this area of the pipe. SPU assisted Ecology as they collected additional samples in this lower basin, none of which indicated a source of PCBs in the area.

With MH74 indicating the presence of elevated levels of PCBs but no additional samples indicating an active source, Ecology began discussions with SPU and other agencies/municipalities to determine how to address the identified contamination. It was agreed that the PCBs found within the system should be removed by targeted line cleaning within the basin, to prevent it from reaching the Lower Duwamish Waterway.

While the PCB contamination that was discovered was not located within an SPU-owned MS4 system, SPU determined that they were the jurisdiction with the expertise to conduct this line cleaning operation. In consultation with Ecology, Tukwila, and The Boeing Company, SPU agreed to jet and clean much of the downstream portion of the drainage mainline system. Cleaning of the drainage system began in late November 2022, starting with the southern end of the King County International Airport. Due to seasonal rainfall and heavy baseflow which can impact the effectiveness of line cleaning, SPU was unable to clean several sections of this system in 2022. Much of the remaining system was cleaned during the dry season in 2023 including the area with elevated PCBs, with the remaining, lowest portion of the basin cleaned in the summer of 2024. The cleaning in 2024 included recleaning of areas adjacent and downstream of the elevated PCBs. One segment of the drainage basin has yet to be cleaned, and The Boeing Company has committed to cleaning this portion, which runs beneath their parking lot. Cleaning was completed in the fall of 2024.

4.4 Progress To Date

As of 2024, SPU has cleaned over 307,000 feet of city-owned storm drain lines in the LDW Source Control Area, as well as associated catch basins, maintenance holes and other structures (e.g., vaults, gates). SPU also required adjacent property owners who had discharged contaminants to the City system to clean an additional 2,000 feet of pipe. Over 185,000 liner feet of drainage mainline were cleaned within this SCIP2 period. The average linear footage cleaned in a line cleaning season has increased in recent years. This is due to a higher sustained funding level for line cleaning activities, basins with smaller diameter lines being targeted for cleaning, and because many lines have previously been cleaned by the program reducing the total volume of accumulated solids that need to be removed. Line cleaning activities are summarized in Table 14 and cleanings from the SCIP2 phase are shown on Map 54.

Table 40: Summary of SPU line cleaning in the LDW.

Date	Outfalls	Linear feet	Cost	Tons removed[g]	Description	Pollutants Targetted
2002-2003	Diagonal Ave S CSO/SD[a]	6,000	$846,000	669	Storm drain mainline and laterals (Denver Ave S, 1st Ave S, and S Dakota St) at downstream end of system	PCBs, PAH, mercury
2005	S Norfolk CSO/PS 17 EOF/SD	2,200	NA[f]	NA[f]	MLK Jr Wy S south of S Norfolk St in advance of replacing damaged pipe between MLK Jr WY S and I5 ditch	Sediment, PAH
2007-2008	Diagonal Ave S CSO/SD	NA	$30,900	960	Cleaned all CBs in ROW (approximately 3,500)	Metals and organic compounds
2008	Diagonal Ave S CSO/SD	890	$3,600	5	Airport Wy S line below Rainier Commons	Metals and organic compounds
2009-2010	S Myrtle St SD, Brighton Ave S CSO/SD, S Garden St SD	4,900	$97,000	80	Entire city owned MS4 system	PCBs, metals
2010	T117 Adjacent Streets, S River St SD, 2nd Ave S SD, and Diagonal Ave S SD/CSO	15,880	$145,000	154.2	Portions of separated storm and combined sewer adjacent to T117, entire S River St MS4 system, entire piped system in 2nd Ave S SD, but not the ditch. S Snoqualmie subbasin in the Diagonal Ave S CSO/SD.	PCBs, Metals, Mercury
2012-2013	SW Idaho St SD	15,000	$323,900	212	Entire city owned MS4 system	HPAH and sediment
2013	16th Ave S SD (east), 7th Ave S SD[c]	1,900	$934,000	744	Entire Seattle MS4 system in 16th Ave S SD (East), entire Seattle MS4 system in 7th Ave S SD	Benzyl alcohol and benzoic acid
2014	Diagonal Ave S CSO/SD	1,139	b	b	MS4 from private facility to sumped maintenance hole (MH18)	PCBs
2015	S Nevada St SD, Highland Park Wy SW SD[d]	22,120	$491,100	282	All but the last 1,100 feet at the downstream end of the system in Highland Park Way SW SD, Entire city owned MS4 system in S Nevada St.	PAH, Lead, Mercury
2016	SW Dakota St SD, S 96th St SD	5,560	$400,000	199	Entire city owned MS4 system in both SW Dakota St SD and S 96th St SD	Sediment, Chromium
2017	1st Ave S SD (west), SW Kenny St SD	17,700	$523,000	220	All city owned MS4 pipes in 1st Ave S SD (west). Could not clean culverts due to condition of	Sediment, arsenic

Date	Outfalls	Linear feet	Cost	Tons removed[g]	Description	Pollutants Targetted
					adjoining ditches. Entire city owned MS4 system in SW Kenny St SD.	
2018	Norfolk CSO/PS 17 EOF/SD, Diagonal Ave S CSO/SD	8,200	$318,000	173	Majority of MLK Way Jr sub-basin within S Norfolk CSO/PS 17 EOF/SD. Cleaned downstream of flush tank at Denver Ave S and S Bennett St in Diagonal Ave S CSO/SD	PAH, PCBs
2019	Diagonal Ave S CSO/SD	20,740	$570,400	104[e]	SW Dakota St and 6th Ave S sub-basins of Diagonal Ave S CSO/SD. Additional cleaning for Denver Ave S pipes affected by PCB spill	PCBs, Metals
2020	16th Ave S (East), Diagonal Ave S CSO/SD, S Myrtle St SD, S Nevada St SD	15,520	$478,278	111	Entire MS4 area of 16th Ave S (East) cleaned. Cleaned Denver Ave S sub-basin of Diagonal Ave S CSO/SD, entire S Myrtle St MS4 area, and entire S Nevada St SD.	PCBs, Metals, sediment
2021	S Norfolk CSO/PS 17 EOF/SD, Diagonal Ave S CSO/SD	64,844	$526,918	112	Residential upper sub-basin (Bush Pl S Sub-basin) cleaned in Diagonal Ave S CSO/SD. Remaining portions from 2018 in S Norfolk CSO/PS 17 EOF/SD.	PAH, Metals, sediment
2022	Diagonal Ave S CSO/SD, Georgetown SD, S 96th St SD, Highland Park Way SW SD,	60,181	$619,224	160	Targeted residential and commercial areas of Rainier valley in Diagonal Ave S CSO/SD, entire MS4 in Georgetown SD and S 96th St SD, and non-tidal sections of Highland Park Way SW SD.	PAH, PCBs, Metals
2023	S Norfolk St CSO/PS17 EOF/SD, 7th Ave S SD, Diagonal Ave S CSO/SD, S Brighton St SD, S Myrtle St SD, S River St SD	45, 052	$555,203	250	Cleaned lower non-SPU portion of S Norfolk St CSO/PS17 EOF/SD at KC Airport, Culvert system at 7th Ave S SD, Denver sub-basin in Diagonal Ave S CSO/SD, full MS4 at S Brighton St S, S Myrtle St SD, and S River SD.	PCBs, Metals, PAH, Lead, sediment
Totals		**307,826**	**$6,862,523**	**4,435.2**		

a. SPU source control project to support King County's Diagonal/Duwamish early action cleanup project.
b. Line cleaned by private property owner as directed by SPU.
c. Ecology provided $555,989 to support line cleaning
d. Ecology provided approximately $245,000 to support line cleaning.
e. Approximately 1,021 additional tons from line cleaning and contaminated soil excavated from site were combined for offsite disposal. Cannot estimate quantity from line cleaning alone.
f. Line cleaned under capital program; data not compiled
g. Wet tons. Solids dewatered to pass paint filter test.

7. CITYWIDE PROGRAMS

Citywide programs that support source control work in the LDW are described in Appendix F. This section summarizes key work completed during this reporting period (2020 - 2024).

7.1 Spill Response and Water Quality Investigations

Between July 1, 2020 and June 30, 2024, SPU responded to 265 spills in the separated areas of the LDW. The most commonly spilled materials were automotive fluids associated with vehicle collisions, mechanical failure, or maintenance issues. The remaining spills involved a variety of materials including hydraulic fluid, concrete/cement, paint, chemicals (e.g., solvents, acids, hazardous materials), and garbage. All reported spills were responded to by SPU Spill Response staff and impacted stormwater drainage assets were cleaned where contaminants were present to reduce potential impacts to the waterway.

During that same time period, SPU responded to 312 water quality complaints in the separated areas of the LDW. The most common complaints involved (1) sewage and wastewater-related problems, (2) garbage/trash/illegal dumping, (3) automotive-related fluids, and (4) business best management practice challenges.

SPU staff responding to these water quality investigations and spill incidents are the same as those conducting business inspections within the LDW. Staff participate in weekly meetings to discuss challenging incidents or trends in reported cases, and to share lessons learned from these responses. Trends and lessons learned through the responses to the spills and complaints are applied during the business inspection process to assist in preventing future spills and complaints. Staff are trained annually in spill response operations and waste handling regulations.

7.1.1 Denver Ave S PCB Spill

In June 2019, an SPU inspector discovered PCBs in the right-of-way along Denver Ave S between 1st Ave S and 2nd Ave S (Map 61). Sampling confirmed that surface soil along the north/west shoulder of Denver Ave S contained up to 40,300,000 ug/kg dw PCBs and solids in a storm drain inlet on Denver Ave S contained 6,970,000 ug/kg dw PCBs. The affected soil was determined to encompass an area of about 38 feet by 530 feet with PCB concentrations ranging from 100 to 14,000 ug/kg in the top 0 to 6 inches of soil. PCBs in the storm drain downstream of the inlet where soil initially entered the drainage system ranged from about 4,000 to 69,400 ug/kg dw PCBs. Both Ecology and EPA were notified. In July and August, SPU and SDOT conducted a cleanup under the Toxics Substance Control Act (Seattle 2019). Approximately 981 tons of non-regulated PCB-contaminated soil and 40 tons of regulated PCB-contaminated soil/storm drain solids were removed from the site and approximately 1,500 feet of pipe and associated structures (e.g., inlets, catch basins, maintenance holes, and vaults) on Denver Ave S were jetted and cleaned. Non-regulated waste was disposed of at the Columbia Ridge Landfill and regulated waste was disposed at the Chemical Waste Management Landfill, both located in Arlington, Oregon. SDOT backfilled and paved the road shoulder after contaminated soil was removed. Soil

Downstream of the spill location, SPU has collected regular samples from a sumped maintenance hole where material is trapped by a tide gate prior to discharging into the main stem of the Diagonal Drainage basin. PCBs were found during the spill response in this location at 62,561 ug/kg. After the initial cleaning of this structure, follow up sampling was conducted from the small volumes of sediment that deposit within the sump. Samples collected the following year from this location indicated 6,404 ug/kg dw PCBs, verifying that PCBs remained present in the drainage system but at much lower levels than the initial spill response. Samples collected

downstream from this sump on the other side of the tide gate did not indicate transport of the PCBs in the system. This structure has been cleaned three times through the line cleaning program since the spill to remove the accumulated settled solids. Samples collected in 2021 indicated diminishing PCB concentrations. Ongoing sampling will continue until PCB values are comparable to other industrial drainage basins in the area. Regular cleaning of this system has resulted in insufficient volumes of material to sample since 2021. SPU inspects the location annually to determine if sufficient material exists for follow up sampling. Sampling data for this location may be found on the Environmental Information Management System web page maintained by Ecology, at: https://apps.ecology.wa.gov/eim/search/Detail/Detail.aspx?DetailType=Location&SystemStationId=100107026&LocationUserIdSearchType=Equals&LocationUserId=SPU-MH52

7.1.2 RV Wastewater Pumpout Program

Between 2015 and 2019, it was noted that there had been a marked increase in discharges of sewage/blackwater from recreational vehicles (RVs). These substantial increases were connected to explosive growth in unhoused or RV housed populations. Blackwater from RVs contain high levels of bacteria, nutrients, surfactants and soaps, and other potential contaminants, which can expose residents and our environment to these hazards. To reduce the risks and impact from these incidents, SPU investigated a variety of solutions to assist these communities and reduce the occurrence of this illegal dumping. After exploring the available solutions, SPU chose to pilot an RV pumpout program, in partnership with non-governmental organizations. This pilot program brought a pump truck to RV encampments throughout the City on a regular basis to pump the blackwater from their sewage tanks and to provide outreach to these populations. In 2021, SPU obtained a grant from the Department of Ecology to support this program, expanding the frequency of service and stabilizing program staffing. With the increased frequency and expanded staff, incidents of illegal dumping were further reduced.

After observing the success of the program, the City of Seattle chose to make it permanent. Since the RV pumpout program was implemented, there has been a large reduction in the number of blackwater discharges year over year. Five years into program implementation, SPU has seen a reduction in illegal dumping of blackwater reports by more than 70% on an annual average. While these types of incident still occur, the substantial reduction in frequency reduces the bacterial and pollutant loading from these sources that may impact the Lower Duwamish Waterway. For 2024, less than 10 dumping incidents have been reported City wide as of October, compared to 99 total reported incidents at the high point for 2019. The individuals residing in these RVs are also provided with higher levels of service and outreach which would otherwise not occur.

7.1.3 South Park Flooding

On December 27th, 2022, the Duwamish River flooded a South Park neighborhood, damaging local homes and businesses. The flooding was caused by a combination of factors including higher-than-average tides further fueled by an extreme low pressure cell, rain-related runoff, and snow melt in the Duwamish waterway. While this area has faced prior flooding, the scale and scope of impacts from this event were unprecedented. Several field staff were on location during the event and began coordinating a response immediately to assist the community. SPU also received a request from the EPA to collect samples of floodwater to test for potential contamination.

Samples collected by SPU showed the floodwater in residential areas was similar to rainwater runoff and posed no increased risk of chemical contamination. Bacterial samples indicated that bacteria may have been present in much of the floodwaters, as is common during urban flooding events nationwide. SPU worked closely with EPA and Seattle King County Public Health staff to communicate the risks and precautions that impacted residents should take in the aftermath of the flooding.

Over the course of several months, SPU staff were on location to support the community recovery efforts. This support effort included housing, food, and other recovery assistance as well as installation of temporary flood barriers throughout the neighborhood to prevent further impacts.

In the aftermath of the immediate response, SPU began drafting a plan to prevent future inundation of the neighborhood, in coordination with community groups and partner agencies. In the short term, this plan addressed tidal inundation risks by establishing a series of temporary barriers and pumps that could be installed in the event of tidal and weather conditions similar to those experienced in late December, 2022. These barriers were installed during King Tide events in 2023 to protect the neighborhood. Longer term planning to prevent this type of inundation is ongoing, in close coordination with King County, the Army Corps of Engineers, and other external partners. More information and the current status of this planning may be found at: https://www.seattle.gov/utilities/your-services/sewer-and-drainage/flooding-response/south-park-flooding

7.2 Illicit Discharge Detection and Elimination

The goal of the Illicit Discharge Detection and Elimination (IDDE) Program is aimed at preventing, identifying and eliminating non-stormwater discharges to the City-owned MS4. SPU uses the term IDDE to mean its Dry Weather Screening Program. The City employs a systematic approach to finding illicit discharges and illicit connections using dry weather field screening and source tracing at key locations in the City-owned MS4. Field screening is designed to identify and characterize dry-weather flows (i.e., when flows in the conveyance system from stormwater are not expected) and attempt to identify pollutants which may indicate illicit discharges or connections. Screening parameters focused on during dry weather screening include fecal coliform, pH, conductivity, potassium, surfactants, fluoride, turbidity, color, odor, floatable material, ammonia, and temperature. During the SCIP 2 period, SPU conducted IDDE screening in the Diagonal Ave S CSO/SD drainage basin in 2022 and the Highland Park Way SW SD in 2024. Problems found and corrected during this screening are summarized in Table 41. Detailed information about the IDDE program and findings are provided in Appendix A.

Table 41: Summary of IDDE (Dry Weather Screening Program) findings in Lower Duwamish Waterway basins.

IDDE Problem	Number of Problems
Illicit connection	1
Illicit discharge	1

7.3 Street Sweeping

Street sweeping in Seattle is conducted jointly by SPU and the Seattle Department of Transportation (SDOT). SPU establishes program direction, provides water quality expertise, and funds routes located in areas that discharge to the City MS4 and combined basins which may impact city receiving water bodies. SDOT provides operational expertise, sweeping services, and funds routes in areas that discharge to the combined sewer system.

Between July 1, 2019 and June 30, 2024, SDOT swept 23 different routes within the LDW a total of 3,233 times, for a total of 11,256 broom miles. Streets, with the exception of S. Myrtle St., were swept approximately every other week (29 sweeping events per year). S. Myrtle St. is on a weekly sweeping schedule per the Appendix 13 requirements in the City's Municipal Stormwater Permit. Sweeping routes are shown on Map 55. SPU estimates that street sweeping removed approximately 34 tons of total suspended solids from the streets in the LDW each year, for a total of 170 tons in the last five years. Approximately 1,520 dry tons of debris including total suspended solids were removed, averaging 304 tons per year.

7.4 Site Investigations

Seattle Department of Transportation

SDOT encountered contaminated soil when excavating for a capital project to improve the street and public access on the east side of the Duwamish Waterway at 1st Ave S and S River St. Composite samples were collected at three locations at depths of 0 to 3 feet. Samples were analyzed for BTEX, TPH, metals, and PCBs. Results for two of the three samples were well below MTCA Method A cleanup levels and SMS screening levels for all chemicals. Arsenic (70 mg/kg), lead (484 mg/kg) and cPAH (870 ug TEQ/kg) exceeded the MTCA Method A cleanup levels for unrestricted use at one location. This site is listed on Ecology's Confirmed and Suspected Contaminated Site List as 101 S River St.

Seattle Parks Department

Seattle Parks and Recreation (SPR) investigated soil contamination at the Duwamish Waterway Park located at 10th Ave S and S Elmgrove St from 2014-2019 (Eco Compliance Corporation, 2019). Soil samples were collected from depths of 1-6 inches and 7-12 inches at approximately 61 locations on the site. Sample results for arsenic ranged from 4.1 to 104 mg/kg with the highest concentrations (41.7 – 104 mg/kg) found in six samples located in the northeast corner of the site (Figure 8). SPR pursued a voluntary cleanup of the property initially and is now working to clean up the site under an Agreed Order with Ecology. The site cleanup has been expanded to include the parcel to the east of the park site, which will eventually be incorporated into the park complex. More information is available in section 7.6.3 below.

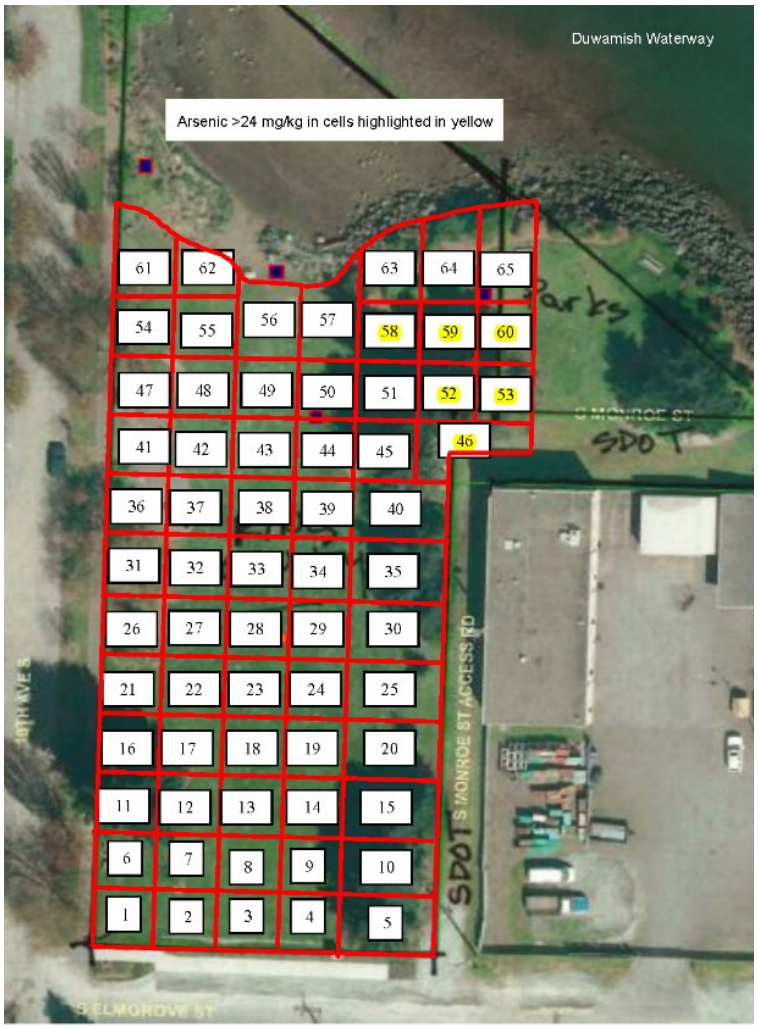


Figure 31: Soil sample locations at Duwamish Waterfront Park.

7.5 Transportation Programs

In 2015 Seattle voters passed Move Seattle, a nine-year, $930 million property tax levy which is a significant source of funding for the transportation budget. This levy provided funding for transportation projects through 2024 the majority of which have been planned and completed as of the drafting of this document. The Move Seattle funds supported pavement maintenance and corridor improvement projects. The Move Seattle 10-year Strategic Vision for Transportation set forth methods for identifying streets as priority corridors for investment and ranking projects proposed for these corridors. The Move Seattle methodology used several factors including leveraging opportunities, funding availability, community support, SDOT's existing commitments, geographic equity, and avoidance of major maintenance to prioritize capital projects. SDOT identified the Move Seattle priority projects and programs, listed below, that are located within the Lower Duwamish drainage basins and can reduce pollutants in the roadway runoff and/or improve the effectiveness of operational BMPs. SDOT is in the process of planning future projects based on funding from a follow up levy, called 2024 Seattle Transportation Levy, which was approved by voters in the fall of 2024.

Improvements to street conditions reduces the generation of solids and enhances the ability of street sweeping to remove solids and associated pollutants before they can enter the drainage system. These maintenance projects typically do not trigger stormwater code-required infrastructure upgrades. However, in some instances

SPU chooses to partner with SDOT to upgrade drainage and sanitary infrastructure, as the infrastructure improvements can be done more efficiently if implemented in concert with the roadway work. Additional information about specific locations and projects targeted by SDOT over the last five years are included in section 7.6.2.

7.5.1 Arterial Asphalt Concrete (AAC) Program

SDOT's Arterial Asphalt and Concrete Program resurfaces several major arterial streets each year with the larger goal of enhancing both mobility and safety citywide. The projects are prioritized and selected by SDOT's Pavement Engineering and Management Section based on pavement condition, volume and type of traffic, identified needs of residents and businesses, opportunities for coordination with other capital projects, and identified maintenance and liability concerns. These paving projects include enhancements such as improved curb ramps and sidewalks, providing a safer and more convenient pedestrian environment, as well as road markings and signal detectors to help bicycles and vehicles share the road more safely.

SDOT committed to repaving approximately 180 lane-miles between 2015-2024. As of 2023, 138 lane-miles had been repaved city wide, with an additional 40 lane-miles estimated to be completed by the end of 2024. The AAC program repaved approximately 32 miles of roadway in the LDW drainage basin as part of the AAC Program between 2015 and 2024. These programs are expected to continue under the newly approved transportation levy throughout the next SCIP phase.

7.5.2 Arterial Major Maintenance (AMM)

This is a program implemented by SDOT in-house Maintenance Operations crews. The program typically has funds to repair approximately 8 lane miles per year at about 65 targeted locations. The jobs typically consist of one to three blocks of mill and overlay or replacement of eight to ten concrete panels. No project exceeding $120,000 in value can be constructed by crews, so only projects that do not trigger drainage improvements per Seattle Stormwater Code are undertaken. About 65 percent of work is planned about a year in advance, the remainder is complaint-driven. For the planned portion of AMM projects there are several areas that are repaired annually because they fail repeatedly but have not been upgraded by an AAC project. AMM priority locations are near schools, hospitals, or bike routes or in an area where the work can be combined with other City departments. As much as 35 percent of the AMM budget is spent constructing ramps for ADA compliance. This program targets maintenance and repair needs on arterials city wide, including within the LDW drainage area.

7.5.3 Non-Arterial Street Resurfacing and Restoration (NASRR)

This is a program operated in the same manner as the AMM program except that the streets repaired are non-arterials. This is the only SDOT maintenance program that addresses pavement conditions on non-arterials, and its budget covers about 2 lane-miles per year. Similar to the AMM program, improvements to street conditions through the NASRR program reduce the generation of solids and enhances the ability of street sweeping to remove solids and other pollutants before they can enter the drainage system.

7.5.4 Slurry Sealing

Slurry seal is a type of protective seal coat which extends pavement life. It's a thin layer of asphalt emulsion blended with finely crushed stone for traction. The streets chosen for this process are selected based on pavement age, pavement maintenance history and inspection results from SDOT Maintenance Operations

Division. They are mostly low-volume, non-arterial streets. This program began in 2018 as an alternative to microsurfacing work, which was previously used to recoat roadway surfaces to extend the life of the surface. surface life Funding for this program was included in the 2024 Seattle Transportation Levy, with further work expected to occur during the SCIP3 phase.

7.6 Capital Projects

7.6.1 SPU

South Park Pump Station

The South Park Pump Station was designed to reduce chronic flooding problems in the lower 7th Ave S drainage system. The drainage system could not drain at high tide due to water pressure from the Lower Duwamish Waterway pushing on a tide gate flap, resulting in backwatering of the drainage system and potential surface ponding. A pump station was completed in 2023, allowing stormwater in the 7th Ave S drainage basin to be pumped into the LDW even at high tides, providing drainage capacity and relieving the backwatering condition. It is also intended to support ongoing local drainage and roadway improvements needed to improve drainage service in the lower basin. The pump station is located on a city owned parcel at 636/640 S Riverside Dr (Map 60). Completion of the pump station allows for the South Park Water Quality Project to begin, as the pump station will convey a portion of the flow from the 7th Ave S drainage basin to the South Park Water Quality Project for treatment.

South Park Drainage and Roadway Partnership Project Phase II

The South Park Drainage and Roadway Partnership Project is a cooperative effort between SPU and SDOT to improve the stormwater collection and conveyance system, reduce flooding, and improve roadway conditions in the lower 7th Ave S drainage basin. Phase 1 of the project included improvements on ten city blocks in the South Park neighborhood. Construction of phase I of this project began in 2021 and was completed in 2023. Phase II of the project is currently in design and will provide drainage and road surface improvements to approximately six additional blocks of the South Park neighborhood.

Phase II conveyance improvements in South Park will enable the right-of-way and connected properties to meet SPU's drainage level of service now that the stormwater pump station is complete. This project will construct right-of-way and drainage conveyance improvements for an additional 2,150 LF of roadway and drainage conveyance within the Lower Industrial Basin. This work aims to reduce flooding caused by storm events and the DWW staff time and resourcing needed for pump and bypass to protect customers, property, and DWW infrastructure during storms and future Duwamish River overtopping events. Additionally, roadway and drainage improvements should improve water quality within the project area by reducing the transport of soil from the roadway and shoulders to drainage assets.

South Park Water Quality Facility Project

The South Park Water Quality Facility is one of the projects included in SPU's Integrated Plan approved by Ecology and EPA in 2015 as part of the City's Long-Term CSO Control Plan. It will treat runoff from the 230-acre 7th Ave S drainage system. SPU originally intended to build the water quality facility in conjunction with the South Park Pump Station on the 636/640 S Riverside Dr site shown on Map 60. Unfortunately, SPU was unable to acquire the needed adjacent street end vacation to allow both the pump station and the water quality facility to be constructed at this location. Pump station construction was completed in 2023. In 2018, SPU conducted a preliminary feasibility analysis of passive (not requiring on-site operators to run the facility) treatment systems to inform how much space would be required to construct the facility. SPU searched the area adjacent to the

pump station for a property that could house the South Park Water Quality Facility. 816 S Kenyon St was identified as appropriate in size and in proximity to the pump station facility.

SPU acquired the 816 S Kenyon St property for the water quality facility in 2024. SPU has three consultant teams to support the site cleanup, water quality facility design, and community investment aspects of the project. In 2023, Ecology approved the project's remedial investigation/feasibility study work plan for remedial investigations on the identified property. Remedial investigations had been on hold during the property acquisition and are anticipated to occur in 2025. Continued analysis and selection of a preferred treatment technology for the water quality facility is anticipated to be completed in late 2024.

7.6.2 SDOT

Work completed over the last SCIP period is listed below. Several projects scheduled to begin during the SCIP2 phase are slated for completion during the SCIP 3 phase. For projects planned for initiation and completion during the SCIP3 phase, see the transportation section in Section 10.2.

South Park Drainage and Roadway Partnership (project completed Spring 2023)

The project constructed street improvements, including paving (designed for industrial loads), sidewalks, lighting improvements, street trees, landscaping, and ADA compliant curb ramps. Drainage improvements include installation of curbs and gutters to direct runoff to catch basins and inlets that drain to a piped stormwater conveyance system. The conveyance system drains to the South Park Pump Station and discharges to the Duwamish Waterway at the 7th Ave S outfall. The project constructed full depth pavement where the streets were currently paved and full roadway design and construction for streets that were gravel-surfaced. The project includes construction of Americans with Disabilities Act (ADA) compliant curb ramps and all pavement markings.

Georgetown to South Park Project (construction December 2024 – July 2025)

The Georgetown to South Park Project extends from S Bailey St and Ellis Ave S in the north, along 13th Ave S, S Albro St, and Ellis Ave S to East Marginal Way and 16th Ave S in the south. The project will reconstruct portions of existing roadway and sidewalk to form a multi-use trail, add new sidewalks where they do not currently exist, add a designated bicycle lane, and install landscaping and drainage work to City of Seattle standard plans. The project discharges to the Duwamish Waterway at the Slip 4 outfall.

Beacon Ave S and 15th Ave S AAC (project complete December 2022)

The project paved 15th Ave S between S Spokane St and S Angeline St, S Columbian Way between 14th Ave S and 15th Ave S, and S Spokane St between S Columbian Way to 18th Ave S. The improvements included milling and overlay of the exiting roadway pavement and the full depth replacement of failed portions of the existing pavement. The street has full sidewalks and curbs. Curb ramps were upgraded per ADA requirements. The project also installed bus stops and pedestrian crossing improvements and repaired sidewalks. The project discharges to the Diagonal outfall.

Beacon Safety Project (construction started July 2024)

The project includes repairing and replacing existing pavement via mill and overlay, performing concrete panel and asphalt spot repair as needed, restoration of any driveways impacted by the project, sidewalk replacement and restoration, installing bus islands, adding new and upgrading existing curb ramps to current ADA standards, tree planting and right-of-way landscaping, installing protected bike lanes, signal improvements, installing electrical conduit, and stormwater infrastructure improvements. The north terminus of the project is the intersection of S Charles St and Golf Dr S. The project area continues southbound along Golf Dr S, becoming 15th

Ave S, until it reaches Beacon Ave S. There, the project area follows Beacon Ave S until the south terminus at the intersection of Beacon Ave S and S Spokane St. The project discharges to the Diagonal outfall. Work is ongoing.

Georgetown to Downtown Protected Bicycle Lane (construction started October 2024)

SDOT proposes to construct a protected bike lane on Airport Way S, S Alaska St. and 6th Ave S between S Lucile St and Airport Way S and the intersection of the SODO Trail and S Forest St. There would also be curb ramp improvements, signal and utility upgrades, and pedestrian lights. The new protected bike lane will be located on Alaska Way/6th Ave S between S Lucille St and S Forest St. The project discharges to the Diagonal outfall. Work is ongoing.

MLK Jr Way Protected Bicycle Lane (project completed July 2024)

The project includes installing a protected bike lane, pedestrian crossing improvements, new curb bulbs, and associated drainage components, and performing repairs to existing sidewalks. The project is located within the right-of-way of Martin Luther King Jr. Way S from S Judkins St to Rainier Ave S. The project discharges to the Duwamish Waterway at the Diagonal outfall.

East Marginal Way North (construction March 2024 – March 2026)

The East Marginal Way Heavy Haul Corridor Improvements Project (EMWHHC) includes improvements on East Marginal Way S between S Atlantic Street and S Alaska Street. Improvements include upgrading a portion of the roadway to Heavy Haul standards, installing a protected bike lane and other pedestrian facilities, installing drainage infrastructure and replacing the existing water main for most of the project area. The project discharges to the East Duwamish Waterway at the S Hinds St and Lander St outfalls.

7.6.3 Seattle Parks and Recreation

Duwamish Waterway Park

The Duwamish Waterway Park property is a public park that has been operated by Seattle Parks and Recreation (SPR) since 1975 and was acquired by SPR from King County in 2019. The site was found to contain contaminated soil during remedial investigations. Between 2014-2019 SPR collected samples from within the Duwamish Waterway Park to characterize soils for possible contamination. The site was found to contain elevated cPAHs, arsenic and lead levels in soils, with the highest concentrations in the northern portion of the property, adjacent to the river. SPR conducted an independent remedial action at the property in 2020 through the Ecology administered Voluntary Cleanup Program, removing some contaminated soils and replacing them with clean fill material as well as upgrading park amenities. In 2021, SPR acquired the parcel to the east of the park property, which is currently occupied by a tenant business. This property acquisition added approximately 1 acre to the park property and is currently planned to undergo remediation and then be developed as an expansion of the Duwamish Waterway Park complex.

In 2022, Ecology terminated the Voluntary Cleanup Program project and began to move the project into a formal cleanup process through the Model Toxics Control Act. In 2023, Ecology issued an Agreed Order to Seattle Parks and Recreation establishing a formal agreement for site assessment and cleanup. SPR is moving forward under the framework of the Agreed Order, with Ecology oversight, to investigate and remediate contamination on the property. These activities will include the Duwamish Waterway Park addition to the east and will eventually result in a remediated and expanded public amenity. The current site status and information is available at: https://www.seattle.gov/parks/about-us/projects/duwamish-waterway-park

8. CITY-OWNED PROPERTY AND RIGHT-OF-WAY

Excluding the rights-of-way (ROW), the City owns approximately 2,474 acres of land in the LDW, most of which is managed by the Department of Finance and Administrative Services (FAS), although various City Departments (e.g., Seattle Public Utilities, Seattle Department of Transportation, Seattle City Light, Seattle Fire Department, and Seattle Parks Department) utilize these properties. City-owned parcels and rights-of-way within the LDW separated storm and combined sewer overflow basins are shown on Map 56.

All City departments implement pollution prevention/source control practices in accordance with the Source Control BMPs contained within Seattle's Stormwater Manual[13]. City-owned properties with pollutant-generating activities that could impact the drainage system are assessed and ranked using the same process established for other businesses. City properties are then scheduled for a business inspection in accordance with this ranking system rotation (i.e., every 2 years for high, every 4 years for medium, and every 6 years for low) and are inspected using the same process and pollution-prevention expectations as private businesses. An internal compliance process is available for City-owned facilities with compliance issues. See Appendix A for a description of ranking and inspection processes and citywide source control requirements. City facilities located in the LDW Source Control Area that are required to maintain and operate under a stormwater pollution prevention plan (SWPPP) are listed in Table 42.

Table 42: City-owned facilities with SWPPPs in LDW.

Facility	Department	Address	Drainage Basin
Operation Control Center	SPU	2700 Airport Wy S	Diagonal Ave S CSO/SD drainage basin, combined sewer
South Operations Center	SPU	4500 W Marginal Wy S	South Operations Center SD
South Service Center	SCL	3613 4th Ave S	Diagonal Ave S CSO/SD drainage basin, combined sewer
Sunny Jim Sign Shops	SDOT	4200 Airport Wy S	Diagonal Ave S CSO/SD drainage basin
Jefferson Park Horticulture	Parks	3801 Beacon Ave S	Diagonal Ave S CSO/SD drainage basin

8.1 Discovering and Reporting Contamination

Environmental issues affecting City-owned property or the right-of-way are typically discovered as part of a capital project when site conditions are assessed and options for disposing excavated material are evaluated, or when contaminants are encountered unexpectedly during construction. When the City discovers contamination, either on City-owned property or on projects located within the public right-of-way, Ecology is notified as required under the Model Toxics Control Act. Notifications are submitted to Ecology by the individual City department conducting the work. The City will also notify Ecology's designated source control manager (as identified by Ecology).

Sites are listed when available data indicate that hazardous substances are present in groundwater, surface water, soil, sediment, and/or air associated with the site. Sites are generally reported to Ecology by residents or by business owners and operators. Once listed, a site undergoes a site hazard assessment (SHA) to confirm the

[13] Seattle Source Control Manual available at: https://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/stormwater-code

presence of hazardous substances and to determine the relative risk the site poses to human health and the environment. Information from the SHA is then used to develop a Washington Ranking Method (WARM) score. Sites are given a score of 1 to 5 that represents the level of risk (1 being the highest). Sites are cleaned up as required by Ecology, or during any redevelopment activities occurring on these properties, as required by regulations.

Twenty-two listed sites are on City-owned property within the LDW Source Control Area. Current WARM ranking and status of these sites are summarized in Table 43. Thirteen of the City properties have been ranked and six received the lowest ranking (5). The South Park Landfill and Duwamish Waterway Park have a 2 ranking.

Table 43: City-owned properties on Ecology's confirmed and suspected site list.

Site Name	Site Address	City Department	State WARM Ranking	Status
Seattle City Hillman Shops	5952 Rainier Ave S	Finance and Administration	3	Cleanup started
Seattle Fire Station #14	3224 4th Ave S	Finance and Administration	5	Cleanup started
Seattle Fire Station #6	405 Martin Luther King Jr. Wy S	Finance and Administration	Not ranked	Cleanup started
Seattle SDOT Sunny Jim site	4200 Airport Wy S	Finance and Administration	4	Awaiting Cleanup
Seattle West Maintenance Headquarters	9200 8th Ave SW	Finance and Administration	4	Cleanup started
Seattle Public Utilities spoils yard	5821 1st Ave S	Georgetown LLC[a]	5	Awaiting cleanup
Seattle City Light 4th Ave S site	3814 4th Ave S	Seattle City Light	5	Awaiting cleanup
Seattle City Light Georgetown Steam Plant	7370 E Marginal Wy S	Seattle City Light	5	Cleanup Started
Seattle City Light South Service Center	3613 4th Ave S	Seattle City Light	5	NFA Letter from Ecology
Seattle City Light Duwamish Substation	10000 W Marginal Pl S	Seattle City Light	Not ranked	Awaiting cleanup
Gateway Park	7551 8th Ave S	Seattle City Light	Not Ranked	Awaiting Cleanup
Denver Ave S PCB spill	Denver Ave S between 1st Ave S and 2nd Ave S	Seattle Department of Transportation	Not ranked	Cleanup completed 2019
Puget Park	16th Ave SW and SW Edmunds St	Seattle Parks and Recreation	4	Cleanup started

Site Name	Site Address	City Department	State WARM Ranking	Status
Seattle Parks Colman School	1515 24th Ave S	Seattle Parks and Recreation	Not ranked	Awaiting Cleanup
Duwamish Waterway Park and Duwamish Waterway Park Addition	7900 10th Ave S	Seattle Parks and Recreation, Seattle Department of Transportation	2	Cleanup Started
640 S Riverside Drive property	640 S Riverside Dr	Seattle Public Utilities	Not ranked	Interim cleanup completed
Seattle Public Utilities Operations and Control Center	2700 Airport Wy S	Seattle Public Utilities	5	Cleanup started
S Kenyon St Bus Yard	110, 130, 150, 200 S Kenyon St	Seattle Public Utilities	Not ranked	Cleanup started
South Operations Center[d]	4500 W Marginal Wy SW	Seattle Public Utilities	Not ranked	Cleanup started
South Park Landfill	8200 2nd Ave S	Seattle Public Utilities	2	Cleanup started[c]
South Seattle Transfer Station (South Park Landfill)[b]	8100 2nd Ave S	Seattle Public Utilities	Not ranked	Cleanup started[c]
Independent Metals Plant 2[e]	816 S Kenyon St	Seattle Public Utilities	4	Cleanup Started

Source: Downloaded from Ecology website October 16, 2024: https://apps.ecology.wa.gov/tcpwebreporting/reports/cleanup/contaminated

a. SPU has leased this property to Georgetown LLC since 2006 for temporary storage of materials used in or excavated from SPU construction sites.
b. Transfer station is part of the South Park landfill cleanup.
c. Interim action has started on the landfill site. Remedial investigation/feasibility study is underway for the transfer station parcel.
d. Former Evergreen Trails property.
e. SPU purchased the former Independent Metals Plant 2 facility in 2024 to develop it as the South Park Water Quality Facility

Ten city-owned right-off-way properties are located within LDW Source Control Area. Current WARM ranking and status of these sites are summarized in Table 44. Ranking range from 1-5, while several portions of rights-of-way are not yet ranked.

Table 44: Public right-of-way locations on Ecology's confirmed and suspected site list as of October 2024.

Street Location	Adjacent Property	Address	State WARM Ranking
8th Ave S west of E Marginal Wy	Sternoff Metals	7201 E Marginal Wy S	5
Dallas Ave S, 17th Ave S, S Donovan St[a]	Terminal 117	8700 Dallas Ave	Superfund site
Delridge ROW[b]	Seattle City Light	5601 23rd Ave SW	Not ranked
Rainier Court	Rainier Court	3700 Rainier Ave S	4
S Fontanelle St[c]	None identified	S Fontanelle St and 5th Ave S	Not ranked
S Monroe St east of 5th Ave S	Marine Lumber	Northeast corner of 5th Ave S and S Monroe St	Not ranked
S Myrtle St west of E Marginal Wy S	Seattle Iron and Metals, Whitehead Tyee Property, Fox Ave Building	601 S Myrtle St 730 S Myrtle St 6900 Fox Ave S	Not listed Not ranked 1
Duwamish Trail Project[d]	None identified	S Portland St between 5th Ave S and 7th Ave S	4
S River St[e]	1st Ave S Bridge	101 S River St	Not ranked
Upper Hudson St[f]	McFarland	4815 15th Ave SW	2

a. City completed removal of PCB-contaminated soil from streets adjacent to Terminal 117 in 2016.
b. City Light discovered lead in soil under road pavement while completing cleanup on adjacent property (Ecology 2016c).
c. SDOT reported toluene, ethylbenzene, and xylenes contamination in soil (Ecology 2016a).
d. SDOT cPAH and lead in soil beneath the roadway (Ecology 2015a).
e. SDOT reported PAH contamination in soil between roadway and shoreline (Ecology 2016b).
f. Cement kiln dust (Ecology 2015b).

The sites listed above are highlighted on Map 57.

9. 2026 – 2031 PLAN

9.1 Business Inspections

Over the past 5 years, the number of businesses inspected has fluctuated due to the overall priority rankings assigned to businesses citywide, as well as the number of property vacancies within the LDW. Over time, the total number of business visits and inspections has fallen, with fewer businesses to inspect as well as higher compliance with Best Management Practices. During the SCIP 2 phase, SPU inspected about 70-120 businesses annually within the LDW, with the total number of inspections ranging from 100 to 150 per year.[14] It is expected that these trends will continue into the SCIP3 phase.

9.1.1 Upper Reach

During the prior SCIP phase, SPU prioritized businesses located within basins that discharged to the Upper Reach of the LDW. With construction of the cleanup in the upper reach beginning in the fall of 2024, the prioritization will shift to the middle reach. Businesses located within the Upper Reach will be inspected in accordance with

[14] When a business is found out of compliance with Best Management Practices, multiple inspections may be conducted at a business during each inspection cycle. Consequently, inspection counts are different from the number of businesses inspected.

their established priority ranking and in response to any legitimate water quality complaints or spill reports received. High risk businesses or businesses that may be sources of pollutants that are identified during source trace sampling will be inspected at an increased frequency to reduce the risk that they pose to the waterway. During the in-water cleanup, observed or discovered pollutant impacts may result in targeted inspections within the upper reach basins. SPU staff overseeing source control activities will meet on a bi-weekly basis with the sediment cleanup staff overseeing in-water work to support close coordination of these activities and will follow up on any observed issues.

9.1.2 Middle Reach

As the design and sufficiency evaluation for the Middle Reach will be carried out during this SCIP phase, SPU will prioritize inspections of businesses in the middle reach and work to inspect as many high and medium risk businesses within this basin by 2027, when the sufficiency recommendation is expected from Ecology. Extra inspections will be conducted in basins where pollutants are found in the NEP samples that may be coming from business operations, to reduce the risk of contaminants reaching the waterway. The middle reach contains several basins where NEP samples indicate ongoing discharges of pollutants that could be from business operations. The highest priority basins for business inspections at this time are presumed to be the S Myrtle St SD, 2nd Ave S SD, and S Garden St SD, which all contain or border high risk ranked businesses. Many of these high risk ranked businesses are permitted by other agencies, such as Ecology or King County Industrial Waste. Business inspections at these sites will be coordinated with these agencies to maximize the inspection effectiveness.

9.1.3 Lower Reach

SPU will continue to inspect businesses in the lower reach based on assigned priority with high ranked businesses inspected every 2 years, medium ranked every 4 years and low ranked every 6 years. In late 2027, SPU will shift priority inspections from the Middle Reach to the Lower Reach to support Ecology's sufficiency recommendation process. High and medium risk businesses within this reach of the river will be inspected at an increased frequency at this time. Special screenings of businesses within priority basins will be conducted where a potential link between COCs, NEP sample results, and business operations may exist.

9.1.4 Direct Dischargers

SPU inspects direct dischargers (sites that discharge directly to the waterway without entering the City's MS4) only after all NPDES permit inspection counts have been met. These inspections usually occur towards the end of the year and focus on high priority sites. Several heavy industrial facilities are located along the shores of the Middle and Lower reaches of the LDW and present risks of recontamination of the river if they fail to implement appropriate BMPs. It is anticipated that the level of effort to inspect direct dischargers will increase as the cleanup designs are finalized for the Middle and Lower reach to address identified hot spots and potential sources. This increased inspection work is anticipated to be accomplished in 2026-2031 and will be sustained through the in-water cleanup work for both of the reaches. As follow-up inspections required within MS4 basins fall due to improved business compliance, capacity for direct discharge inspections will increase.

9.2 Storm Drain Solids Sampling

The City intends to continue collecting storm drain solids samples to support its source control program and to inform future cleanup decisions. Data will be used to characterize the quality of storm drain solids discharged to

the waterway, as well as to identify new sources that may occur in the future as businesses relocate, industrial and other pollution-generating activities change, and properties redevelop.

City sampling efforts will include the following:

- Monitoring of existing sediment traps and sampling at near end-of-pipe locations to characterize the quality of storm drain solids discharged to the LDW.
- Sampling of private onsite catch basins when businesses are inspected and property owners' consent to sampling.
- Sampling of right-of-way catch basins and inline grabs with follow up source tracing where triggers are exceeded.
- Resampling storm drains following line cleaning to evaluate whether ongoing sources exist or identify new sources that may emerge in the future.
- Installation of new sediment traps to characterize the quality of solids discharged to the waterway and support sufficiency analyses.

The data generated from source tracing efforts will be evaluated using a variety of methods to determine analytical trends, identify sources, and support assessment of potential changes in storm drain solids chemistry as source control progresses. While it is hoped that concentration levels will decline over time, the analysis will also continue to be used to support source tracing efforts by identifying differences in chemical signatures between drainage systems that could indicate that these systems are being affected by specific sources.

9.2.1 Basin Prioritization

SPU updated the ranking/prioritization of outfalls using results from the storm drain solids samples collected over the past 5 years. SPU also incorporated new waterway sediment data compiled from studies conducted after the RI was completed, as well as new samples collected as part of the LDW design activities under AOC#3 (EPA 2016). The ranking process used the following lines of evidence:

- Comparison of storm drain solids data to offshore sediment data to identify where elevated levels of contaminants were found in both offshore sediment in the vicinity of the outfall (within 200 feet) and storm drain solids samples collected from near the end of pipe or point of discharge to the waterway.
- Storm drain to storm drain comparisons to assess whether one storm drain exhibited a different contaminant signature than other drains in the LDW.[15]
- Results of the sediment transport/bed composition model (ST/BCM) that was developed during the Feasibility Study to assess recontamination potential (see Appendix J of the Feasibility Study, AECOM 2012b).

These data were used in conjunction with the following secondary criteria to select priority basins:

- Knowledge of ongoing sources and pollution-generating activities in each drainage basin that has been gained through the business inspection program.
- Drainage basin size, which provides an indication of pollutant loading potential.
- Multiple and recurring exceedances of the primary screen source tracing triggers for COCs identified in waterway sediment, which indicates the need for additional source tracing.

[15] If the median value for a chemical at one outfall exceeds two times the median of the median values for all outfalls, SPU believes that there may be a unique source of this chemical in that drainage basin. See Table 46.

- Land use characteristics such as percentage of industrial use in the basin.

Results are summarized in Table 46. The areas where SPU intends to focus its inspection and source tracing efforts over the next five years include:

Upper Reach	*Middle Reach*	*Lower Reach*
▪ 17th Ave S SD	▪ S Myrtle St SD	▪ SW Dakota St SD
▪ S Norfolk St CSO/PS EOF/SD	▪ S Garden St SD	▪ Diagonal Ave S CSO/SD
	▪ Georgetown SD	

The S Norfolk St CSO/PS EOF/SD remains a focus of source tracing efforts as a follow up on PCB source tracing that was conducted in 2021-2024 in coordination with Ecology's sufficiency determination process. The drainage system near the outfall was cleaned to remove PCBs that were identified during source trace sampling in coordination with Ecology. Follow up sampling will be conducted to verify that the PCBs identified were legacy contaminants and not from an active source. Additional information on this effort is included in Section 6.1.

Table 45: 2 Times Median Contaminant Values for Key Contaminants in All Basins

Arsenic	**20 mg/kg**
Benzoic Acid	**1,459 ug/kg**
Benzyl Alcohol	**280 ug/kg**
Bis(2-ethylhexyl)Phthalate	**7,300 ug/kg**
Butylbenzyl Phthalate	**380 ug/kg**
Copper	**194.4 mg/kg**
cPAH	**675.29 ug/kg**
Dimethylphthalate	**136 ug/kg**
HPAH	**5,576 ug/kg**
Lead	**140.6 mg/kg**
LPAH	**869.8 ug/kg**
Mercury	**0.16 mg/kg**
Motor Oil	**3,200 mg/kg**
PCBs	**210 ug/kg DW**
Zinc	**858 mg/kg**

Table 46: Summary of outfall prioritization.

Outfall	Area[a] acres	Owner	No. of SD samples[b]	No. of NEP samples	No. of offshore samples	Inline NEP to Offshore Exceedance Matches[c]	>SCO in Offshore Samples	Median > 2x Median in All Outfalls sampled[d]	Source Identified [n]
Upper Reach									
16th Ave S SD (east)	3.2	Tukwila	2	2	4	Zn, BEHP, BA, cPAH	Zn, HPAH, cPAH, PCBs, BA, SVOC[g]	BEHP, Hg, PCBs, Zn	No
KCIA SD#2/PS 78 EOF	0[k]	King County	0	0	16	EOF has not discharged in past 10 years	As, Zn, LPAH, HPAH, cPAH, PCBs, BEHP, BBP, BAl, BA, SVOC[h]	EOF has not discharged in past 10 years	--
KCIA SD#1	86	King County	10	8	10-12	cPAH, Bal, BA	cPAH, BEHP, DMP, BAl, BA, SVOC[i]	cPAH, HPAH, LPAH	No
Norfolk CSO/PS17 EOF/SD	676	Tukwila	96	16	36	BEHP, BBP	PCBs, BEHP, BBP, SVOCs[o]	--	No
I-5 SD at S Ryan St	55	WSDOT	3	1	3	--	PCBs[q]	Pb	Highway runoff
16th Ave S SD (west)	1.3	King County	3	2	3-16	No offshore Exceendance	--	Cu, Zn	No
17th Ave S SD	2.9	SPU	34	6	4-16	--[e]	None post-cleanup	--	No
S 96th St SD	42	Unknown	3	1	2	--	BBP, dioxins/furans [r]	As, BA, BBP, BEHP, DMP, LPAH, Zn	No
Duwamish substation SD #3	1.9	SCL	1	1	3-5	--	--	DMP	No
Duwamish substation SD #2	1.3	SCL	1	1	11	--	BAl	LPAH, HPAH, cPAH, DMP	No
Duwamish substation SD #1	<1	SCL	0	0	7	--	--	No data	No
W Marginal Pl S SD	4.8	Tukwila	1	0	6	--	BAl	Cu, Pb, Zn, LPAH, HPAH, cPAH, BBP	No
Middle Reach									
Head of Slip 2 SD	12	Private	2	2	2-3	--	BAl, PCBs[s]	--	No
1st Ave S SD, east	15	SPU	7	3	2	--	PCBs[p]	--	No
S River St SD	6	SPU	15	7	5-6	--	PCBs, BAl	cPAH, DMP, HPAH	Yes
S Brighton St SD	17	SPU	11	4	4-6	BAl	cPAH, BAl	Hg	No

Outfall	Area[a] acres	Owner	No. of SD samples[b]	No. of NEP samples	No. of offshore samples	Inline NEP to Offshore Exceedance Matches[c]	>SCO in Offshore Samples	Median > 2x Median in All Outfalls sampled[d]	Source Identified [n]
S Myrtle St SD	6	SPU	6	3	6	Hg, Zn, PCBs, BEHP, BBP, Bal, BA hexachlorobenzene	Hg, Zn, PCBs, BEHP, BBP, BAl, BA, hexachlorobenzene	BA, Bal, BEHP, BBP, Cu, cPAH, DMP, Pb, LPAH, Hg, PCBs, Zn	Yes
S Garden St SD	1.5	Private	4	3	7-26	PCBs, BAl	PCBs, BAl, acenaphthene, dibenzofuran	BBP, Cu, Pb, Ag, PCBs, Zn	Yes
I-5 SD at Slip 4	150	WSDOT	35	30	5-10	Zn, PCBs[J], BEHP, BBP, BAl	Zn, PCBs, BEHP, BBP, BAl	--	No
Georgetown SD	6	SPU	6	6	5-10	BEHP, BBP, Bal, Zn	Zn, PCBs, BEHP, BBP, BAl	LPAH, HPAH, cPAH, PCBs, BBP, BEHP, DMP, Hg, TPH-Oil-AS	No
KCIA SD#3/PS 44 EOF	0	King County	0	0	5-10	--	Zn, PCBs, BEHP, BBP, BAl	--	
SW Kenny St SD/T115 CSO	154	SPU	8	4	8	BAl	cPAH, BBP, BAl, hexachlorobenzene	As, Hg, BAl	No
Highland Park Wy SW SD	289	SPU	19	11	6-11	BEHP, DMP	PCBs, BEHP, BBP, DMP	Hg	No
1st Ave S SD, west	603	WSDOT	58	15	10	PCBs, BBP	PCBs, BBP	--	No
2nd Ave S SD	18.4	Private	19	3	24-27	Zn, DMP, BEHP, BA, BAl	Cd, Cu, Cr, Pb, Hg, Ag, Zn, LPAH, HPAH, cPAH, PCBs, BEHP, BBP, DMP, BAl, SVOC[k]	TPH-Oil-AS	No
S Webster St SD	<1	SPU	2	2	5-7	BAl	BAl	BA, cPAH, DMP, HPAH, LPAH	No
7th Ave S SD	238	SPU	53	15	5-6	BEHP, BAl	Hg, LPAH, HPAH, cPAH, PCBs, BEHP, BBP, BAl, SVOC[l],	BAl	No
Lower Reach									
S Nevada St SD	23	Port	5	0	1	--	--	HPAH, LPAH, PCBs, Zn	No[u]
Diagonal Ave S CSO/SD	2,664	SPU	233	39	21	PCBs[f], BEHP, BBP, DMP, HPAH	PCBs, LPAH, HPAH, BEHP, BBP, DMP, SVOC[m]	--	No
SW Dakota St SD	47	SPU	6	5	1	BEHP, BAl, Zn	Zn, PCBs, BEHP, BBP, BAl	BAl, BEHP, Ag, Zn	No
SW Idaho St SD	423	SPU	30	8	7	BAl, 2,4-dimethylphenol	BAl, phenol, 2,4-dimethylphenol	BAl	No

Outfall	Area[a] acres	Owner	No. of SD samples[b]	No. of NEP samples	No. of offshore samples	Inline NEP to Offshore Exceedance Matches[c]	>SCO in Offshore Samples	Median > 2x Median in All Outfalls sampled[d]	Source Identified [n]
South Operations Center SD	6	SPU	1[t]	1	0	--	--	BA, BAl, BEHP, cPAH, DMP, HPAH	No

Note: Highlighted rows are considered priorities

SD = storm drain CSO = combined sewer overflow EOF = emergency overflow PS = pump station NEP = near end-of-pipe
BEHP = bis(2-ethylhexyl)phthalate BBP = butyl benzyl phthalate DMP = dimethyl phthalate BAl = benzyl alcohol BA = benzoic acid
Cu = copper Hg = mercury Zn = zinc

a. City MS4 drainage area
b. Catch basin grabs, inline grabs, and sediment traps collected from 2003-2019. Does not include samples collected in drains before line cleaning.
c. CSL exceedance in near end-of-pipe inline sample and SCO exceedance in waterway sediment sample located within 200 feet of outfall
d. Median concentration in all MS4 samples not affected by line cleaning exceeds 2x the median of the median concentrations measured in all outfalls
e. Near end-of-pipe sample analyzed only for PCBs due to limited sample volume
f. 3 of 24 post cleanup samples exceeded SCO for PCBs within 200 ft of the outfall. 1 each in 2005 and 2006 and one in 2011 at DUD_1A. The 2012 sample at DUD-1A did not exceed SCO, Single 2LAET exceedance in NEP sample from 2010.
g. Benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene. Zn exceeded SCO in one sample located 170 feet upstream of outfall. Zn did not exceed SCO in any samples located within 40-120 ft of outfall
h. Acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, total benzofluoranthenes, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene
i. Benzo(g,h,i)perylene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenol
j. 1 of 25 samples exceeded 2LAET (7,800 ug/kg dw in 2005). None of the samples collected in 2006-2019 exceeded 2LAET.
k. 1,4-dichlorobenzene, 1,2-dichlorobenzene, 1,2,4-trichlorobenzene, 2-methylphenol, 4-methyl phenol, 2,4-dimethylphenol, 2-methyl naphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, total benzofluoranthenes, dibenzofuran, di-n-butylphthalate, pentachlorophenol, phenol, n-nitrosodiphenylamine
l. 2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, total benzofluoranthenes, 2,4-dimethylphenol, hexachlorobenzene
m. Chrysene, fluoranthene, phenanthrene, pyrene, 2,4-dimethylphenol, 1,4-dichlorobenzene, phenol
n. Source(s) of problem has been identified. Further source tracing not necessary.
o. 1,4-dichlorobenzene, fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene. Note, PCB exceedances all occurred in sampled collected 90-120 feet downstream of the outfall or directly offshore in area that was not dredged in 1999.
p. Exceedance at station 170 feet downstream of outfall opposite the Michigan CSO.
q. One of 11 samples collected 40 feet upstream of outfall
r. Composite sample collected 100-200 feet offshore of the outfall by Corps of Engineers in 2013. No exceedances in 2 other samples collected 40-80 feet from the outfall.
s. Exceeded SCO in 1997 sample 30 feet offshore of outfall but not in 2011 sample collected nearby.
t. Sample collected from an Oil/Water Separator, from influent chamber prior to filtration. Sample results not indicative of potential load to the LDW.
u. SPU suspected that it has identified the source of PCBs and PAHs within the basin but has not yet collected samples since the suspected source was controlled.

9.2.2 Planned Sampling Activities

Source sampling activities planned for 2026-2032 are summarized in Table 47. Sampling activities are divided into the following categories:

- Maintain existing traps, particularly those used for long-term monitoring. Other traps used to assist in source tracing may be removed following completion of source tracing activities. SPU will notify Ecology before removing any long-term monitoring traps if no grab sample location or other NEP sampling location is available.
- Resample inline and/or catch basin locations following cleaning to determine whether additional source tracing is needed.
- Sample to fill data gaps. Remaining data gaps are largely in smaller areas (1-5 acres) outside of the City of Seattle City Limits that discharge to other jurisdiction's drainage systems (W Marginal Pl S SD) or areas that have been difficult to sample due to lack of solids in the system (e.g., I5 SD at S Ryan St). Additional data gaps exist in the upper portions of larger drainage basins away from obvious sources of pollutants, such as the residential and commercial areas of basins, such as the Diagonal Ave S CSO/SD.
- Sampling to identify sources, particularly in areas where 1) previous samples have exceeded SMS screening levels or 2) existing data indicate concentrations of specific chemicals are higher than observed in other storm drains in the LDW.
- Install sediment traps or establish inline grab sampling locations in smaller basins where contaminants are present but SPU has not been able to regularly collect NEP samples. Outfalls that do not already have NEP traps or regular grab locations typically serve small basins (e.g., <10 acres) and may have pipe diameters too small for both the larger Norton style sediment traps and the low-profile Trent bowl traps. Given the small contributing area, it has traditionally been difficult to obtain enough material for analysis in these locations.
- Work with neighboring jurisdictions or other entities (e.g., WSDOT) to support their establishment of NEP sampling locations within their drainage systems which discharge into or immediately adjacent to the LDW within the City of Seattle.

Each outfall has been evaluated to determine whether it has a high potential to contribute to recontamination of waterway sediment following cleanup. Priority assignments (4th column on Table 47) are based on an analysis of stormwater solids chemistry, exceedances of source tracing screening levels in inline samples collected near the downstream end of the drainage system, and comparisons with chemistry in surface sediment samples collected within 200 feet of the outfalls. Detailed chemical by chemical analyses of priority rankings are provided in Appendix E and a detailed discussion of sources Identified to date are provided in Appendix C.

Table 47: Summary of Planned Source Tracing Activities by Outfall (2026 – 2031).

Outfall	Drainage Area [a] (acres)	Owned by or installed by	Priority	Maintain existing traps	Resample following cleaning	Sample to fill data gap	Source tracing	Install NEP trap	Maintain overflow records [d]	IDDE screening
Upper Reach										
16th Ave S SD (east)	11.5	Tukwila	N	✓						✓
KCIA SD#2/PS78 EOF	0	King County	N						✓	
KCIA SD #1	86	King County	N			✓				
Norfolk CSO/PS17 EOF/SD	676	Tukwila	N	✓	✓		✓		✓	
I-5 SD at S Ryan St	54.9	WSDOT	N							
16th Ave S SD (west)	3.5	King County	N							
17th Ave S SD	2.9	SPU	N	✓			✓			
S 96th St SD	12	Private	N	✓			✓			✓
Duwamish substation SDs	3.8	SCL	N		✓	✓				
W Marginal Pl S SD	5	Tukwila	N			✓				
Middle Reach										
Head of Slip 2 SD	12	Private	N							
1st Ave S SD, east	16	SPU	N		✓		✓			✓
S River St SD	7.6	SPU	N				✓			
S Brighton St SD	18	SPU	N		✓					
S Myrtle St SD	5.9	SPU	Y	✓						
S Garden St SD	12	Private	Y	✓						
I-5 SD at Slip 4	150	WSDOT	N	✓						
Georgetown SD	5.8	SPU	Y		✓		✓			✓
KCIA SD#3/PS 44 EOF	296	King County	N						✓	
North Boeing Field SD [b]	--	SPU	N			✓				✓
SW Kenny St SD/T115 CSO	155	SPU	N	✓						✓
Highland Park Wy SW SD	289	SPU	N	✓						✓
1st Ave S SD, west	603	WSDOT	N	✓	✓					
2nd Ave S SD	38	Private	N				✓			✓
S Webster St SD [c]	<1	SPU	Y							
7th Ave S SD	238	SPU	N	✓			✓			
Lower Reach										
S Nevada St SD	22	SPU	Y		✓		✓	✓		

Outfall	Drainage Area [a] (acres)	Owned by or installed by	Priority	Maintain existing traps	Resample following cleaning	Sample to fill data gap	Source tracing	Install NEP trap	Maintain overflow records [d]	IDDE screening
Diagonal Ave S CSO/SD	2,664	SPU	Y	✓			✓		✓	✓
SW Dakota St SD	44.8	SPU	N				✓			
SW Idaho St SD	412	SPU	N	✓			✓			✓
South Operations Center SD	6	SPU	N		✓					

ND = No data Y = Yes N = No SD = storm drain CSO = combined sewer overflow EOF = emergency overflow
PS = pump station NEP = near end-of-pipe IDDE =illicit discharge detection and elimination

a. City MS4 drainage area
b. Given findings from video inspection, SPU will investigate whether this outfall can be taken out of service, since there are no longer any active connections to this system.
c. Outfall will be decommissioned during phase 2 of the South Park Roadway and Drainage improvements, with flows incorporated into the 7th Ave S drainage system.
d. Maintain CSO and SSO records to support source evaluations

Table 47 summarizes results for all lines of evidence (e.g., outfall to outfall comparisons, inline near-end-of-pipe storm drain solids to waterway sediment comparisons, and the Feasibility Study recontamination predictions) and lists the source control/tracing activities planned for each outfall over the next 5 years. Outfalls are also assigned a priority ranking. The highest priority outfalls include S Myrtle St SD, S Garden St SD, Georgetown SD, S Webster St SD, and Diagonal Ave S CSO/SD. The priority basins for the SCIP3 phase heavily overlap those of the SCIP2 phase. A brief discussion of each of these high priority outfalls is provided in the following sections. Detailed descriptions of planned activities in other storm drains owned by or used by the City of Seattle are provided in Appendix C.

S Myrtle St SD

The S Myrtle St SD, which serves an 8.6-acre industrial basin located between Slip 3 and Slip 4 (Map 16), is heavily impacted by activities at an adjacent metal recycling facility located on the south side of S Myrtle St and its storage yard located on the north side of S Myrtle St. See the discussion of Seattle Iron and Metals Company (SIMC) in Appendix D for more details.

Chemicals that exceeded both the CSL/2LAET in near end-of-pipe inline samples and SCO in offshore sediment included mercury, zinc, PCBs, bis(2-ethylhexyl)phthalate, Benzyl Alcohol, Benzoic Acid, and butyl benzyl phthalate. SPU had hoped that site modifications required by a 2019 legal action would reduce pollutant loading within this basin, but contaminant levels found within basin sampling indicate an ongoing issue. Actions that the City will take in this basin over the next five years include:

- Continue to annually sample the sediment trap located near the downstream end of the system.[16]
- SPU will continue working with SIMC to control track out issues from their site and will continue to inspect the two Filterra™ stormwater treatment units that SIMC installed to the driveway on S Myrtle St to ensure that SIMC maintains these units.
- Continue to monitor sediment levels in the catch basins on S Myrtle St each quarter and clean them when sediment depths exceed 35 percent of the sump depth.
- SDOT will continue to sweep S Myrtle St on a weekly basis as part of the City's ongoing Street Sweeping for Water Quality Program.
- Plan and construct a facility(s) to help reduce pollutant loading within the S Myrtle St SD.

S Garden St SD

The S Garden St SD serves a 12-acre industrial basin located between Slip 3 and Slip 4 (Map 17), but only 1.5 acres is within the City MS4 drainage system. The remaining area is part of the Seattle Iron and Metals Corporation's private drainage system and outfall. Like the S Myrtle St SD, the City's portion of this drainage system is also heavily impacted by metal recycling operations. See the discussion of Seattle Iron and Metals Company (SIMC) in Appendix D for more details.

Samples collected during the early portion of the SCIP2 phase continued to find elevated metals, phthalates, and PCBs. Road surface repairs and the vacation of an adjacent warehouse in 2023 and 2024 allowed for increased maintenance of drainage assets and street sweeping of S Garden St, which has dramatically reduced the pollutants found in NEP/Effectiveness Monitoring Samples. While in system sampling has shown improvements, SCO exceedances have been observed in eight of the 11 samples collected offshore of this outfall (PCBs, dibenzofuran, acenaphthene, and benzyl alcohol). Actions that the City will take in this basin over the next five years include:

[16] SPU removed sediment trap pilot traps and left the low-profile Trent traps in place within the lowest two MHs for long term monitoring.

- Continue to collect sediment trap samples near the end of the SPU owned portion of the basin to support NEP/Effectiveness Monitoring Sampling.
- Regularly sweep the road surface and work with SDOT to modify on street parking regulations to support sweeping activities.
- Monitor track-out of auto-shredding residuals on S Garden St and require controls, as necessary.
- Coordinate with Ecology inspectors on SIMC inspections and conduct joint inspections, as necessary.
- Inspect the Filterra™ unit to make sure it is maintained appropriately.
- Jet, clean, and CCTV the drainage system upstream of the SIM property to determine if additional inputs exist to the drainage system.

Georgetown SD

The Georgetown SD was constructed in 2009 to replace the old flume from the Georgetown Steam Plant. The basin serves an area of about 4.5 acres and includes the roof of the Georgetown Steam Plant, a short section of S Myrtle St and adjacent parcels, and areas immediately adjacent to the storm drain (catch basin in parking lot at Washington National Guard property and service drains from the motel at the downstream end of the system).

Inline samples continue to find elevated PAHs within the basin. SPU and SCL suspected that the PAHs may be coming from the roof of the Georgetown Steam Plant, which was coated with coal tar. In 2023, SCL removed the coal tar from the roof and recoated it with a non-leaching material. SPU conducted line cleaning within the basin immediately following the roof recoating. Follow up sampling in 2024 found even higher levels of PAHs, which SPU suspects is due to a lack of other settled material within the drainage system and remnant PAHs from the prior roofing material. Over the next five years, SPU intends to conduct the following activities in the Georgetown SD basin:

- Annually collect grab samples from the effectiveness monitoring location near the end of the pipe.
- SPU will jet and clean the drainage system early in the SCIP3 phase to remove any remaining PAHs from the steam plant roof.
- Once re-cleaned, SPU will conduct source trace sampling to identify any remaining PAH sources.

S Webster St SD

The S Webster St SD drainage basins is a very small (<1 acre) basin located within the South Park Industrial Area of the LDW. The basin is solely comprised of a single catch basin accepting roadway runoff and a private lateral line which accepts rooftop runoff from a small office building. The catch basin sample from this basin indicated elevated Benzyl Alcohol and PAHs. While the potential loading from this catch basin is quite small and would not typically be considered a high priority, the basin is slated to be decommissioned, with runoff from this location being rerouted to the 7th Ave S SD. Due to the elevated PAHs identified within this basin, SPU feels that it is important to address any potential sources prior to routing the runoff into the 7th Ave S SD.

Over the next five years, SPU intends to:
- Conduct source tracing adjacent to the S Webster St SD.
- Remove the existing drainage assets and install a new series of catch basins within this location which discharge into the 7th Ave S SD.
- Jet and clean the decommissioned drainage line from the existing catch basin to the outfall.

Diagonal Ave S CSO/SD

The Diagonal Ave S CSO/SD drainage basin, which covers an area of about 2,666 acres, is the largest drainage basin in the City (Maps 26 and 27). Land use in the basin is a mixture of residential (23 percent), commercial

(9 percent), industrial (19 percent), vacant/park (10 percent), and right-of-way (39 percent). The upper portion of the basin east of I-5 is mostly residential with commercial businesses clustered along the major transportation corridors (Rainier Ave S, Beacon Ave S, and S Jackson St). The lower portion of the basin west of I-5 is mostly industrial.

SPU has conducted extensive source tracing in this basin over the past 22 years, and although overall concentrations in the Diagonal Ave S CSO/SD drainage system have been comparable to other storm drains in the LDW, given the large area served, this outfall likely contributes a significant load of chemical pollutants to the waterway. Most of the spills and water quality complaints that SPU receives within the LDW occur in this basin. SPU also continues to look for sources of PCBs and mercury in the S Snoqualmie St sub-basin.

Over the next five years, SPU intends to conduct the following activities in the Diagonal Ave S CSO/SD drainage basin:

- Continue to monitor the sediment traps currently installed in this system (ST1, ST2).
- Continue to work with the EPA TSCA staff to address buildings that have been identified as likely to contain PCBs within their building materials.
- Continue to sample the 144-inch diameter trunkline downstream of Denver Ave S and the Denver Ave S sub-basin to monitor PCB levels following the cleanup of the spill that occurred in 2019. When PCBs are found, the drainage lines in proximity will be cleaned.
- Monitor mercury and PCBs in the S Snoqualmie St sub-basin to assess whether source control actions have been effective. Clean impacted structures and source trace exceedances.
- Conduct source tracing in the Bush Pl sub-basin to locate source(s) of HPAHs.
- Source trace elevated PCBs identified at the ST2 sample location, by screening the S Dakota Sub-basin.
- Work with King County and Ecology staff to assess potential stormwater treatment facilities for the Diagonal Ave S CSO/SD basin to treat storm event flows.

9.2.3 Other Source Tracing Activities

Detection Dog

During the previous SCIP period, SPU and the University of Washington Center for Biological Diversity successfully pilot tested the use of a specially trained detection dog to identify PCBs in the field. Work was funded under Ecology's Stormwater Financial Assistance Program (WQC-2016-SeaPUD-00196).

Ecology funded additional work in 2020-2021 under Grant No. WQC-2018-SeaPUD-00233), further proving the detection dog concept. SPU has hired the canine detection dog team on several occasions since for targeted source tracing of PCBs, including within the Diagonal Ave S CSO/SD and 17th Ave S SD. SPU plans to continue to hire the detection dog to screen basins and sub-basins where PCB sources are suspected, but are not identifiable through source trace sampling.

Buildings identified through canine screening have been compiled into a list of known/suspected PCB containing buildings, which has been provided to the EPA TSCA PCB coordinator. SPU and the EPA have held numerous planning meetings to determine how to address these sources. SPU had begun drafting corrective action letters for properties where PCBs are suspected and plans to begin issuing these letters in 2025. SPU, Ecology, and the EPA will work to support property owners as they navigate the regulations and remediation process for these properties.

10.LONG-TERM MONITORING AND EFFECTIVENESS EVALUATION

As described earlier, SPU routinely collects inline samples (grabs or sediment traps) at maintenance holes located near the downstream end of each drainage system. These near end-of-pipe samples are used for two purposes. The first is to support source tracing activities by identifying where elevated levels of contaminants are present in the mainlines of the MS4 drainage system. Near end-of-pipe samples are also used to characterize the quality of storm drain solids discharged to the waterway. Long term monitoring at these locations will assist in assessing source control sufficiency. For the past 8-10 years, SPU has collected these near end-of-pipe samples each year.

Over the next five years, the City will continue to monitor these locations to help identify where discharges from City-owned outfalls could contribute to an exceedance of the LDW sediment RALs following cleanup. Sediment traps are currently installed in 13 of the approximately 32 outfalls that are either owned or used by the City to discharge stormwater and/or wastewater to the LDW (see Map 58). SPU has also collected inline grab samples from near the downstream end of the City MS4 in an additional 8 drainage systems. SPU will continue to retrieve and redeploy the existing traps every year. Outfalls where traps are installed and will be maintained over the next five years are listed in Table 48.

Table 48: Existing sediment traps that SPU will operate/maintain over the next five years.

Drainage System	No. of Traps
Upper Reach	
Norfolk CSO/PS17 EOF/SD	4
17th Ave S SD	1
S 96th St SD	1
16th Ave S SD (east)	1
Middle Reach	
S Myrtle St SD	1
S Garden St SD	1
I-5 SD at Slip 4	1
SW Kenny St SD/T115 CSO	1
Highland Park Wy SW	2
1st Ave S SD (west)	5
7th Ave S SD	3
Lower Reach	
Diagonal Ave S CSO/SD	2
SW Idaho St SD	3
Total	26

SPU will continue collecting inline grab samples at near end-of-pipe locations in most of the other storm drains that it owns or uses in the LDW. During the next five years, SPU plans to install sediment traps at a few remaining locations where feasible, using the new, lower-profile trap that SPU recently developed that is more suited to these small diameter pipe systems. Locations where SPU intends to install sediment traps over the next five years are listed in Table 49.

Table 49: Locations where new sediment traps will be installed over the next 5 years.

Drainage System	Proposed Location		Proposed Install Date[c]
	Primary Location[a]	Other Potential Location[b]	
Upper Reach			
Middle Reach			
S Brighton St SD	MH222 / 599155	MH223 / 599156	2025
Lower Reach			
S Nevada St SD	Nev-St1/597360	597361	2025
Diagonal Ave S CSO/SD	595430	595429	2026

a. Existing inline grab location / SPU equipment number (EQNUM)
b. Potential alternate location if primary location is unsuitable for trap installation.
c. Inline grab samples will be collected if possible, in the years prior to trap installation.

10.1 LINE CLEANING

Over the next 5 years, SPU will allocate approximately $500,000 per year for line cleaning activities. Given the variability in costs, it is difficult to estimate the length of line cleaning this will support. In the past 8 years, line cleaning costs have varied from $20 to over $40 per foot of pipe cleaned. Cleaning costs are affected by a number of factors, including:

1) the amount of sediment that has accumulated in the system.
2) the ease of dewatering the sediment removed from the system prior to disposal (finer sediment is harder and requires more time to dewater than coarse sediment).
3) the amount of base flow in the system, which requires more extensive set up to bypass base flow around the work area.
4) the degree of tidal influence from the waterway, which limits access to the pipe for cleaning.
5) the number of arterial (high traffic) streets involved, which increases the cost for traffic control.
6) the level and type of contaminants presence in the storm drain solids, which necessitates additional treatment to dispose decant water to the sanitary sewer system.

In more recent years, SPU has been able to clean substantially more linear feet of mainline system because the areas targeted have had smaller diameter pipes and lower volumes of sediment. Many areas targeted for cleaning have been cleaned before, further reducing the amount of material to be removed. SPU suspects that the line cleaning program will continue to exceed the 4,000 linear feet annual requirement in Appendix 13.

In 2026, SPU intends to focus on completing work in the following areas:

- ***1st Ave S SD (west)***. Finish cleaning the 30- to 36-inch pipes on S Kenyon St between Occidental Ave S and 2nd Ave S. These pipes are continuously backwatered due to a reverse grade in a downstream pipe and must be dewatered prior to cleaning. These lines were cleaned in 2024 but due to backwatering, CCTV was unable to be completed. Recleaning this portion will allow SPU to verify that solids were fully removed. CCTV should also enable SPU to better understand the function of the WSDOT owned weir wall that is impounding flows in the area.

Drainage systems or sections of drainage systems that SPU intends to clean in the next five years are described below:

- ***Georgetown SD***. Clean the Georgetown storm drain from the Georgetown steam plant to Slip 4 a second time, as follow up to sampling conducted in 2024 after the steam plant roof replacement. This section of

storm drainage was cleaned in 2023 to coincide with a project to recoat the roof of the steam plant which was previously coated in coal tar.

- ***Diagonal Ave S SD, SW Dakota St Subbasin***. Clean pipes on 6th Ave S, 7th Ave S, and S Dakota St. In 2023, a sediment trap at the downstream end of this sub-basin showed elevated PCB concentrations, which SPU suspects may be tied to remodeling activities conducted at an adjacent warehouse. Cleaning should remove any contaminants that were shed by the warehouse during this renovation.
- ***North Boeing Field SD.*** This storm drain was video inspected in 2012 and found to have been decommissioned, with no active connections. SPU plans to CCTV this storm drainage line to verify that no new connections have been made to the system without SPU's knowledge.
- ***Highland Park Way SW SD.*** The Highland Park Way SW storm drain has periodically exhibited elevated PCB and hydrocarbon levels in source trace sampling. SPU has identified a potential PCB source which is believed to be related to legacy contamination from improper storage. Cleaning the Highland Park system fully should address any residual legacy contamination present.
- ***16th Ave S SD (East).*** This storm drain was cleaned in 2020 to remove residual solids that had settled in the basin prior to a rerouting that was completed in 2014. Ongoing elevated PAH and metals values exceed what would be expected in a basin primarily serving the right of way. Cleaning will be followed by CCTV video inspection to determine if there are additional inputs to the basin.
- ***S Garden St SD.*** SPU intends to clean the S Garden St SD upstream of the Seattle Iron and Metals facility, then follow up with a CCTV video inspection to identify any unmapped inputs to the drainage mainline.
- ***2nd Ave S SD.*** This storm drain discharges through a privately owned culvert system to the River Mile 2.2 inlet, one of the most contaminated areas within the LDW. Upstream samples from a portion of the drainage basin with unknown ownership has indicated the presence of PAHs and SVOCs, with no known sources. Tidal influences may carry pollutants into this portion of the drainage basin from the contaminated inlet. Line cleaning may help remove these contaminants and could be coordinated with downstream remediation work and the installation of a tide gate near the outfall.

Other cleaning work to be completed in the SCIP3 phase includes:

- ***Maintenance Hole 18*** at the intersection of 6th Ave S and S Snoqualmie St.
- ***Tide gate vault*** at the intersection of Colorado Ave S and S Denver St.
- SPU will explore permanent decant facility locations for use by the line cleaning program. SPU has been utilizing a location off Myers Way which is owned by Seattle's FAS department. This location may be designated for alternative uses, which would require a new location for SPU's decant facility.

10.2 TRANSPORTATION

SDOT has identified capital projects and several paving program projects that will be conducted in the LDW during 2026-2031. Schedule and actual completion of projects depend upon funding, project scopes, and competing work priorities. A transportation levy was passed by voters in 2024, which will allow SDOT to plan improvements for the City including the Duwamish valley, but many of these have not yet been planned or scoped. Because of this uncertainty, projects in these programs are typically planned up to two years in advance. Known projects are listed in Table 50. Project descriptions follow.

Table 50: SDOT activities in the LDW (2026-2031).

Project / Program	Location	Length (miles)	Timeframe
Beacon Safety Project	Portions of Beacon Ave, Golf Dr S, and 15th Ave S.	1.0	2024-2025
Georgetown to Downtown Protected Bike Lane	S Alaska St, 6th Ave S, and Airport Way S	1.8	2024-2025
Georgetown to South Park Project	Ellis Ave S from Airport Way S to East Marginal Way S and 16th Ave S	1.3	2024-2025
Georgetown Flume Off Leash Park	Open Space between S Myrtle St and East Marginal Way S	0.1	2025-2026
8th Ave Street end Access	8th Ave S	2.2	2026-2030
South Park Drainage and Conveyance Phase II	5th Ave S and S Holgate	0.41	2026-2027
Highland Park Way SW Path	Highland Park Way SW between West Marginal Way SW and SW Othello St	0.4	2026-2027
East Marginal Way S Paving	East Marginal Way S between 1st Ave S and 16th Ave S	1.4	2027-2029

Beacon Safety Project (construction July 2024 – June 2025)

The Beacon Safety Project includes numerous components such as roadway, sidewalk, and curb ramp repairs and replacements. It also includes installing bus islands and protected bike lanes, tree plantings and right-of-way landscaping, as well as stormwater infrastructure improvements. The project improves a geographic area between the intersection of S Charles St and Golf Dr S in the north, portions of Golf Dr S, 15th Ave S, and Beacon Ave S to the intersection of Beacon Ave S and S Spokane St in the south. The project discharges to the Duwamish Waterway through the Diagonal Ave S CSO/SD.

Georgetown to Downtown Protected Bicycle Lane (construction October 2024 – May 2025)

SDOT proposes to construct a protected bike lane on Airport Way S, S Alaska St, and 6th Ave S between S Lucile St and Airport Way S and the intersection of the SODO Trail and S Forest St. Curb ramp improvements, signal and utility upgrades, and pedestrian lights would also be installed. The new protected bike land would primarily be located on S Alaska St and 6th Ave S between S Lucille St and S Forest St. The project discharges to the Duwamish Waterway through the Diagonal Ave S CSO/SD.

Georgetown to South Park Project (construction December 2024 – July 2025)

The Georgetown to South Park Project extends from S Bailey St and Ellis Ave S in the north, along 13th Ave S, S Albro St, and Ellis Ave S to East Marginal Way and 16th Ave S in the south. The project will reconstruct portions of existing roadway and sidewalk to form a multi-use trail, add new sidewalks where they do not currently exist, add a designated bicycle lane, and install landscaping and drainage improvements to City of Seattle standard plans. The project discharges to the Duwamish Waterway in Slip 4 through both the I5 SD at Slip 4 and the Georgetown SD.

Georgetown Flume Off Leash Park (construction start April 2025 – January 2026)

The project proposes a multi-use trail/park within the Georgetown neighborhood. The location to be improved is an undeveloped area between S Myrtle St and East Marginal Way S. The project will create an off-leash dog area, pedestrian trail, and install a stormwater bio-retention cell. This project discharges to the Duwamish Waterway at the Georgetown SD outfall into Slip 4.

Highland Park Way SW Path (construction September 2026 – May 2027)

The project is very early in design stage. This project involves the widening and substantial safety upgrades of the current path/sidewalk along Highland Park Way SW between West Marginal Way SW and S Othello St, including any necessary drainage and other utility infrastructure. The project discharges to the Duwamish River at the Highland Park Way SW SD outfall just north of 1st Ave S Bridge.

East Marginal Way S Paving – 1st Ave S to 16th Ave S (construction May 2027 – May 2029)

There are currently no design plans available. The project area extends along E Marginal Way from 1st Ave S to 16th Ave S. The project will likely be a continuation of East Marginal Way north/central projects focusing on upgrading the roadway to Heavy Haul road standards along with necessary drainage and other utility infrastructure improvements.

8th Ave S/Gateway Park – (construction February 2029 – April 2030)

The project area is along 8th Ave S from E Marginal Way to Gateway Park at Duwamish River. It will involve pedestrian access to Duwamish Waterway at the Gateway Park property and any required stormwater drainage/treatment improvements associated with the access improvements.

11.REPORTING

As required by Appendix 13 of the 2024 Phase I MS4 Permit, the City will submit a report (in response to Annual Report question 102) describing the status of source control activities to Ecology by March 31 each year.. The annual "102 report" will 1) document actions taken by the City to minimize the potential for contaminant concentrations to exceed the RALs established for the LDW, 2) identify ongoing efforts and plans to integrate LDW source control priorities into ongoing citywide activities, 3) describe results of source tracing and characterization monitoring efforts in the LDW, and 4) describe the source control actions that the City will be taking during the next annual reporting period.

The City intends to discuss the content of the 102 report with Ecology staff after each annual report submittal to verify that City priorities and those of Ecology Source Control staff are aligned and that there is clear prioritization and communication of work plans. At a minimum, the City's annual report (including the 102 report) will document City actions including:

- Numbers of source tracing samples including sample data and coordinates.
- Feet of line cleaned and description of activities.
- Miles of street swept and sweeping frequency.
- Summaries of source control effectiveness evaluations and if necessary, descriptions of any changes in priorities for City's source control program.
- Status of planned capital projects (e.g., stormwater retrofits).

Additionally, as required by Appendix 13 of the MS4 permit, source tracing and characterization data will be uploaded to Ecology's EIM database by May 31 each year.

SPU will also continue to share information about business inspections and source tracing efforts at the Duwamish Inspector Group meetings. The City remains committed to working collaboratively with Ecology to identify priorities, establish plans, and implement control measures to address sources of pollution tothe LDW. The City will continue to work cooperatively with Ecology to refine the most effective methods to share information and to communicate City activities to regulators and members of the public. SPU expects this collaboration to continue for the foreseeable future.

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