WATER ENVIRONMENT SERVICES

Water Quality Protection
Surface Water Management
Wastewater Collection & Treatment

Gregory L. Geist
Director

October 31, 2019

Mr. Pablo Martos, Senior MS4 Permit Writer
Oregon Dept. of Environmental Quality, NW Region
700 NE Multnomah Street, Ste. 600
Portland, OR 97232

RE: **Water Environment Services and the Cities of Happy Valley and Rivergrove NPDES MS4 Discharge Permit 2018-19 Annual Report**

Dear Mr. Martos:

Here is the 2018-19 Annual Report for WES and the Cities of Happy Valley and Rivergrove as required by our NPDES Municipal Separate Storm Sewer System Discharge Permit, renewed in March 2012. A hard copy will follow via USPS. For your convenience, we have also forwarded an electronic copy to each basin coordinator.

We look forward to your comments. Please call if you have any questions or need additional information at (503) 742-4581.

Sincerely,

Ron Wierenga
Environmental Services Manager
Water Environment Services

Enclosures

cc: Ms. Kristi Asplund
Ms. Nancy Gramlich
Ms. Andrea Matzke
Mr. Wade Peerman

NPDES MS4 Discharge Permit

Annual Report

for

Water Environment Services and the Cities of Happy Valley and Rivergrove

for

July 1, 2018 – June 30, 2019

This Page Intentionally Left Blank

November 1, 2019

Water Environment Services

and the

Cities of Happy Valley and Rivergrove

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) DISCHARGE PERMIT No. 101348

We, the undersigned, hereby submit this National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater System Annual Report in accordance with NPDES Permit Number 101348. We certify under penalty of law that this document and all attachments were prepared under our direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Gregory L. Geist, Director
Water Environment Services

10/30/19
Date

Jason Tuck, City Manager
City of Happy Valley

10/30/19
Date

John Leuthauser
City Manager / City Recorder
City of Rivergrove

10-22-2019
Date

This Page Intentionally Left Blank

Table of Contents

List of Tables

Appendices

SECTION 1 MS4 PERMIT REQUIREMENTS FOR ANNUAL REPORTING

This annual report provides a summary of MS4 Permit program implementation activities by Water Environment Services (WES) and the Cities of Rivergrove and Happy Valley from July 1, 2018 to June 30, 2019. WES is a municipal partnership formed under ORS 190 by the Clackamas County Service District No. 1 (CCSD#1), the Surface Water Management Agency of Clackamas County (SWMACC) and the Tri-City Service District. WES administers MS4 activities in SWMACC and CCSD#1, both of which are service districts under the municipal partnership. In October 2016, SWMACC transferred its assets to WES. Clackamas County Service District No. 1 joined the municipal partnership on July 1, 2018. Table 1 (below) includes the 2018-19 MS4 Permit annual report submittal requirements found in Permit Schedule (B)(5) and the location in this document with the applicable program implementation information and data.

Table 1: MS4 Permit Annual Report Submittal Requirement Locations in the Document

Summary of Schedule B(5) Requirements for 2018-19	Document Section Where Annual Report Requirement is Met:
a. The status of implementing the stormwater management program and each SWMP program element, including progress in meeting the measurable goals identified in the SWMP.	Section 1.1 and Appendix A
b. Status or results, or both, of any public education program effectiveness evaluation conducted during the reporting year and a summary of how the results were or will be used for adaptive management.	Section 1.2
c. A summary of the adaptive management process implementation during the reporting year, including any proposed changes to the stormwater management program (e.g., new Best Management Practices) identified through implementation of the adaptive management process.	Section 1.3
d. Any proposed changes to SWMP program elements that are designed to reduce TMDL pollutants to the maximum extent practicable (MEP).	Section 1.4
e. A summary of total stormwater program expenditures and funding sources over the reporting fiscal year, and those anticipated in the next fiscal year.	Section 1.5
f. A summary of monitoring program results, including monitoring data that are accumulated throughout the reporting year and any assessments or evaluations conducted.	Section 1.6
g. Any proposed modifications to the monitoring plan that are necessary to ensure that adequate data and information are collected to conduct stormwater program assessments	Section 1.7
h. A summary describing the number and nature of enforcement actions, inspections, and public education programs, including results of ongoing field screening and follow-up activities related to illicit discharges.	Section 1. 8
i. A summary, as it relates to MS4 discharges, describing land use changes, Urban Growth Boundary (UGB) expansion, land annexations, and new development activities that occurred within these areas during the reporting year. The number	Section 1.9

of new post-construction permits issued and an estimate of the total new and replaced impervious surface area related to development projects that commenced during the reporting year must also be included.

j. A summary, as related to MS4 discharges, describing concept planning or other activities conducted in preparation of UGB expansion or land annexation, if anticipated for the following year. Section 1.10

1.1 SCHEDULE B(5)(A) -- THE STATUS OF IMPLEMENTING THE STORMWATER MANAGEMENT PROGRAM AND EACH STORMWATER MANAGEMENT PLAN (SWMP) PROGRAM ELEMENT, INCLUDING PROGRESS IN MEETING THE MEASURABLE GOALS IDENTIFIED IN THE SWMP.

See Appendix A in this annual report for this data and information. This appendix includes the tracking measures and measurable goal status from BMPs in the Stormwater Management Plans.

1.2 SCHEDULE B(5)(B). -- STATUS OR RESULTS, OR BOTH, OF ANY PUBLIC EDUCATION PROGRAM EFFECTIVENESS EVALUATION CONDUCTED DURING THE REPORTING YEAR AND A SUMMARY OF HOW THE RESULTS WERE OR WILL BE USED FOR ADAPTIVE MANAGEMENT.

MS4 Permit Schedule A(4)(d)(vi) contains a requirement to create a Public Education Effectiveness Evaluation (Evaluation) and to submit it to the DEQ no later than July 1, 2015. CCSD#1, the SWMACC, Clackamas County, and the Cities of Rivergrove and Happy Valley submitted the Evaluation to DEQ on June 30, 2015. The results of this Evaluation were used in the adaptive management of the education and outreach program; see the June 30, 2015 Evaluation for more information.

1.3 SCHEDULE B(5)(C) – A SUMMARY OF THE ADAPTIVE MANAGEMENT PROCESS IMPLEMENTATION DURING THE REPORTING YEAR, INCLUDING ANY PROPOSED CHANGES TO THE STORMWATER MANAGEMENT PROGRAM (E.G., NEW BMPS) IDENTIFIED THROUGH IMPLEMENTATION OF THE ADAPTIVE MANAGEMENT PROCESS.

Permit Schedule D(10)(a) defines adaptive management as a structured, iterative process designed to refine and improve stormwater programs over time by evaluating results and adjusting actions on the basis of what has been learned. Our October 2012 "Outline for Adaptive Management Approach" was used to guide our adaptive management process in 2018-19. A review of BMP implementation and an analysis of environmental monitoring data was performed. The draft Shared MS4 Permit SWMP is a recent product of our Adaptive Management Approach. At the present time, Clackamas County, WES, and the Cities of Rivergrove and Happy Valley implement their MS4 permit programs through three separate SWMPs. To improve coordination and overall program effectiveness, a single, combined, Shared MS4 Permit SWMP (Shared SWMP) was created. The Shared SWMP was submitted to DEQ with WES' MS4 Permit renewal application package in February 2017, but as of October 2019, DEQ still had not authorized the implementation of the Shared SWMP.

An extensive Adaptive Management-based process was undertaken as the three SWMPs were integrated into one Shared SWMP. This process, which was facilitated and supported by Otak, Inc., included a project kickoff meeting, three separate Workshops, three separate Visioning sessions, and over a dozen other meetings to receive input and direction which was subsequently used to determine the depth and breadth of the program which is described in the Shared SWMP. Attendees at the Workshops, Visioning sessions, and meetings included numerous staff from Clackamas County's WES, DTD and BCS, the City of Happy Valley and the City of Rivergrove.

WES completed a Gap Analysis in October 2016 which compared the Coordinated Participants' current SWMPs with requirements in the March 2012 MS4 permit to ensure that the February 2017 Shared SWMP fully complies with the MS4 permit.

A substantial number of modifications were made to various BMPs (Best Management Practices) during the process of integrating the three existing SWMPs into the Shared SWMP. The Shared SWMP has thirty-six (36) BMPs, many of which have new, improved measurable goals and tracking measures. For a summary of these modifications, please see Appendix B of the February 2017 MS4 Permit Renewal Application Package: https://dochub.clackamas.us/documents/drupal/2da8983d-d7e4-4241-9184-9ded9357e491

1.4 SCHEDULE B(5)(D) -- ANY PROPOSED CHANGES TO SWMP PROGRAM ELEMENTS THAT ARE DESIGNED TO REDUCE TMDL POLLUTANTS TO THE MAXIMUM EXTENT PRACTICABLE (MEP).

Please see section 1.3 (above). As the three existing SWMPs were integrated into the draft Shared SWMP, many BMPs were modified, and several of these proposed modifications are expected to reduce levels of TMDL pollutants which are discharged. Examples include:

- Portions of some proposed Construction Site Runoff BMPs are expected to reduce levels of these pollutants in stormwater: total phosphorus (Tualatin River only), settleable volatile solids (Load Allocation for Tualatin River's dissolved oxygen TMDL), mercury, and DDT and dieldrin (Johnson Creek only).
- Portions of some proposed Post-Construction Site Runoff BMPs, BMP PREV-6 ("Storm System Retrofit Program"), and BMPs MAINT-3 & MAINT-4 & MAINT-7 ("Structural Stormwater Facility Operations and Maintenance" BMPs) are expected to reduce levels of these pollutants in stormwater: E. coli, total phosphorus (Tualatin River only), settleable volatile solids (Load Allocation for Tualatin River's dissolved oxygen TMDL), mercury, and DDT and dieldrin (Johnson Creek only).

1.5 SCHEDULE B(5)(E) -- A SUMMARY OF TOTAL STORMWATER PROGRAM EXPENDITURES AND FUNDING SOURCES OVER THE REPORTING FISCAL YEAR, AND THOSE ANTICIPATED IN THE NEXT FISCAL YEAR.

WES and the City of Happy Valley dedicated sufficient resources to implement the Stormwater Management Plan. WES dedicated over 21,270 employee hours or 12.5 full-time employees (FTEs) to the Surface Water Program, and the City of Happy Valley has five FTEs in the Public Works Department who, in part, perform MS4 duties.

WES' Operating and Construction Fund resources, including Fund Balances, budgeted in the recent past, during the reporting period and in the current fiscal year are below:

Table 2: Stormwater Resources and Requirements for CCSD#1 (The former area of WES which is now Rate Zone 3 under the WES 190 Municipal Partnership)

CCSD#1	2016-17 Actual	2017-18 Actual	2018-19 Estimate	2019-20 Budget
Resources	**16,563,769**	**18,295,829**	**0**	**0**
Materials & Services	3,419,047	3,510,339	0	0
Capital Outlay	159,147	2,206,210	0	0
Transfers	0	0	0	0
Special Payments (footnote #1)	0	12,579,280	0	0
Contingency	0	0	0	0
Ending Fund Balance (footnote #2)	12,985,575	0	0	0
Total Requirements	**16,563,769**	**18,295,829**	**0**	**0**

1 Special Payments represent the contribution of CCSD#1's assets to the WES 190 Municipal Partnership on 7/1/2018. WES was created in 2016 as a government partnership between CCSD#1 and TCSD. SWMACC joined the partnership in June 2017. In 2017-18, there is a zero CCSD#1 ending fund balance due to the integration of the district into the WES 190 Municipal Partnership. The next reporting period in 2019-20 will be the last year for CCSD#1 Surface Water Fund, whose assets were transferred to the WES Surface Water Fund on 7/1/2018.

WES collects System Development Charges from new development and dedicates those revenues to planning, design, and construction of additional stormwater infrastructure capacity needed to accommodate growth. The current SDC rate is $205 per ESU.

Table 3: Stormwater Resources and Requirements for WES (formerly SWMACC, CCSD#1 and Tri-City Service District)

Formerly Tri-City, SWMACC, and CCSD#1 (see footnote #1)	**2016-17 Actual**	**2017-18 Actual**	**2018-19 Estimate**	**2019-20 Budget**
Resources	**696,673**	**13,341,385**	**19,688,390**	**21,428,937**
Materials & Services	134,240	134,538	3,722,987	5,435,236
Capital Outlay	0	0	1,945,224	825,000
Transfers	0	0	1,000,000	3,000,000
Contingency	0	0	0	1,112,250
Special Payments (footnote #2)	562,433	0	0	0
Ending Fund Balance (footnote #3)	0	13,206,847	13,020,179	11,056,451
Total Requirements	**696,673**	**13,341,385**	**19,688,390**	**21,428,937**

1 The WES 190 Municipal Partnership includes the three service districts of CCSD#1, SWMACC and Tri-City, but the Tri-City Service District does not have a surface water program.

2 *Special Payments* represent the contribution of SWMACC's assets to the WES 190 Municipal Partnership on July 1, 2017.

3 FY 2017-18 Ending Fund Balance includes contribution of CCSD#1's FY 2017-18 surface water reserves of $12,579,280, shown as a special payment on CCSD#1's schedule on the preceding page.

Annual funding for the Stormwater Management Program for WES (CCSD#1 and SWMACC) came from four sources (unaudited numbers):

Monthly Stormwater Utility Fees	$ 4,568,517
Maintenance Fees	$ 341,804
Systems Development Charges (SDCs)	$ 140,543
Stormwater and Erosion Control Permit Fees	$ 202,014

In 2018-19, customers in the North Clackamas unit of WES' CCSD#1 service area, which is now Rate Zone 2, paid a monthly program fee of $6.95 per Equivalent Service Unit (ESU) and customers in WES' SWMACC service area, which is Rate Zone 3, paid a monthly fee of $4.25 per ESU. An ESU is a single-family residence or 2,500 square feet of impervious surface for nonresidential customers. Fees were increased to $7.30 per ESU in Rate Zone 2 and $4.45 per ESU in Rate Zone 3, respectively, soon after this reporting period ended on June 30, 2019.

New single-family residential customers in Rate Zone 2, since 1998, also paid a monthly maintenance agreement fee of $3 per ESU which is dedicated for maintenance of local subdivision stormwater conveyance, detention, treatment, and infiltration facilities.

Only a portion of Rate Zone 3 revenues come from the MS4-permitted area. Rate Zone 3 also includes unincorporated Clackamas County and the Stormwater WPCF-permitted area that fall within Rate Zone 3.

SDCs are collected from new development and dedicated to planning, design, and construction of additional stormwater infrastructure capacity needed to accommodate growth. The current SDC rate is $205 per ESU.

City of Happy Valley

MS4 Permit Program Funding Sources:

- **Permit fees for development** of land (plan review and inspection) are based upon the construction value of the project. In 2018-19, the City generated $1,137,319 in fees from 30 land development permits (The City expects to receive a similar amount of permit fee revenue in 2019-20). Only a portion of these $1,137,319 support the implementation of the MS4 Permit Program, such as erosion control and plan review.
- Twenty **Erosion Control Permits** yielded $28,630 in revenue in 2017-2018. The City expects to receive a range from $15,000 to $20,000 in Erosion Control Permit revenue in 2019-20. The $28,630 of MS4 permit program revenue is a subset of $1,137,319.
- $97,470 from the **Streets Maintenance** portion of the budget for street sweeping. Street sweeping is also conducted to improve road safety and for aesthetic reasons.
- Approximately $4,534 from the City of Happy Valley's **General Operating Budget** was dedicated by the City of Happy Valley during 2018-19 to administer the overall MS4 Permit Program (e.g., attendance at monthly Watershed Protection Program meetings, compiling data for this annual report). The City of Happy Valley expects to dedicate a similar amount of money from this portion of this budget during 2019-20 for administration of the overall MS4 Permit Program.

MS4 Permit Program Expenditures:

- **Street Sweeping Program:** The City of Happy Valley spent $97,470 on their street sweeping program in 2018-19. The City of Happy Valley expects to spend a similar amount of money on street sweeping in 2019-20.
- **Erosion Control Program**: Erosion Control Permit fee revenue is spent by the City of Happy Valley to administer this program. The City spent approximately $28,630 to administer this program in 2018-19 and the City expects to spend a similar amount in 2019-20.
- **MS4 Permit Program Administration:** The City of Happy Valley spent approximately $4,534 during 2018-19 to administer the overall MS4 Permit Program (e.g., attendance at monthly Watershed Protection Program meetings and MS4 data compilation). The City expects to spend a similar amount of money during 2019-19 for administration of the overall MS4 Permit Program.

1.6 SCHEDULE B(5)(F) -- A SUMMARY OF MONITORING PROGRAM RESULTS, INCLUDING MONITORING DATA THAT ARE ACCUMULATED THROUGHOUT THE REPORTING YEAR AND ANY ASSESSMENTS OR EVALUATIONS CONDUCTED.

See Appendix B for the summary of the monitoring program's results and for information about any assessments or evaluations which were conducted.

1.7 SCHEDULE B(5)(G) -- ANY PROPOSED MODIFICATIONS TO THE MONITORING PLAN THAT ARE NECESSARY TO ENSURE THAT ADEQUATE DATA AND INFORMATION ARE COLLECTED TO CONDUCT STORMWATER PROGRAM ASSESSMENTS

No additional modifications are proposed in this annual report. WES, Clackamas County, and the Cities of Rivergrove and Happy Valley are co-owners of a combined Comprehensive Clackamas County NPDES MS4 Stormwater Monitoring Plan (Monitoring Plan). Other co-owners of this Monitoring Plan include, but aren't limited to, the Cities of Milwaukie and Oregon City. This Monitoring Plan was revised most recently in January 2017 and was implemented on July 1, 2017. Please see the January 2017 Monitoring Plan for more information.

1.8 SCHEDULE B(5)(H) -- A SUMMARY DESCRIBING THE NUMBER AND NATURE OF ENFORCEMENT ACTIONS, INSPECTIONS, AND PUBLIC EDUCATION PROGRAMS, INCLUDING RESULTS OF ONGOING FIELD SCREENING AND FOLLOW-UP ACTIVITIES RELATED TO ILLICIT DISCHARGES.

See the sections of the BMP table in Appendix A which apply to BMP #1 (titled "Conduct Dry Weather Inspections" for illicit discharges) and BMP #12 (titled "Facilitate Public Reporting of Illicit Discharges…") for portions of the response to this requirement. See the following table (below) for the responses to the other portions of this requirement.

Table 4: Illicit Discharge Events

Date of illicit discharge	***Inspection Date***	***Incident Description, including follow-up activity***	***Enforcement action taken?***
7/17/18	7/18/18	Citizen reported greenish liquid in storm catch basins at a restaurant parking lot. Liquid appeared to be algae in plugged catch basin. Instructed restaurant to clean parking-lot storm water drains and water quality manhole.	Yes
7/24/18 (See related SSO dated 7/30/18	7/24/18	<u>Sanitary Sewer Overflow</u> WES staff repaired and replaced the sewer line that collapsed from directional bore drilling on 162nd Avenue. 150 gallons spilled. WES contained and cleaned the surface debris and confirmed that the overflow did not reach the Rock Creek MS4 waterway. OERS Case No. 2018-1650. See related sanitary sewer overflow dated 7/30/19.	No
Unknown	8/1/18	City of Portland Bureau of Environmental Services (BES) notified WES that a metal plating company was suspected of violating BES's industrial wastewater discharge permit. The City appropriately took the lead on the investigation and enforcement with WES staff assistance as the permit for this site is BES administered. WES and BES confirmed non-compliance. The City revoked the company's City-issued industrial pretreatment permit for pumping industrial waste into WES' sanitary sewer line that flowed into the City's sanitary system while issuing a non-discharging categorical industrial user permit until the metal plating company proves compliance. WES determined that WES' stormwater system was not affected.	Yes (by BES)
7/25/18	7/25/18	Vandalism of an employee's vehicle at a food manufacturer resulted in a gasoline spill into a private storm catch basin. Informed the company's manager, who was also the reporter of spill, since the vandalism occurred at a private catch basin, the company was responsible for cleaning the catch basin and would need to call a company out to have it	No

Date of illicit discharge	*Inspection Date*	*Incident Description, including follow-up activity*	*Enforcement action taken?*
		cleaned. WES' stormwater system were unaffected as WES catch basins nearest to the incident were dry.	
7/29/18	7/30/18	Citizen witnessed brown goop or sludge draining into the Clackamas River that had a strong odor coming from a waterfall type drainage area located East of Riverside Park in Clackamas. WES staff inspected the drainage area located near the park and could not find the source of reported material. Assumed to be an illicit discharge to a storm drain from a transient source. This material reappeared during a later inspection (see 8/28/18).	No
7/30/18	7/30/18	<u>Sanitary Sewer Overflow</u> Construction debris from directional bore that occurred the week before. WES staff CCTV-monitored the line to ensure that the line was free of construction debris. 150 gallons spilled. The closest waterway was not affected. OERS Case No. 2018-1650. See related sanitary sewer overflow dated 7/24/18.	No
8/22/18	None needed	A resident of a subdivision reported that a landscaping company was spraying "too close" to a stormwater swale. WES staff contacted the landscaping company, which was the responsible party), clarified the boundaries, discussed the activity, and provided information on prevention practices to avoid this in the future.	No
Unknown	8/23/18	WES received complaint of an illicit discharge to the storm system located near Sieben Creek. WES staff confirmed that slurry from quartz countertop cutting left the driveway at the responsible party's home and flowed down the curb line to a storm drain. WES staff instructed the homeowner to have the contractor perform clean up. WES issued the contractor a Notice of Non-Compliance.	Yes
8/28/18 related to 7/29/18 incident	9/7/18	WES received a complaint of odors coming from storm catch basins on SE 106th Avenue. WES staff found a smelly, oily discharge in catch basins. Material was traced to a manufacturer that had a direct connection to their private storm system from their industrial wastewater treatment system. WES issued the manufacturer a Notice of Noncompliance and ordered them to terminate the connection and clean the affected private/public storm system from source to the Clackamas River outfall. Clean up activities were completed by November 2018.	Yes
8/30/18	8/30/18	PGE reported a transformer oil spill from a vehicle hitting a utility pole. Oil went into catch basins. The pole did not fall to the ground, but PGE estimated 15 gallons were released. After investigation, WES learned that the oil spill was outside of WES service district and contacted Oak Lodge Water Services. OERS Case No. 2018-1997	No

Date of illicit discharge	*Inspection Date*	*Incident Description, including follow-up activity*	*Enforcement action taken?*
9/4/18	9/5/18	WES received a complaint about a restaurant overflowing their waste oil container resulting in a spill reaching SE 122nd Avenue. WES staff visited the restaurant and instructed the manager to have the rendering company retrieve the overfull oil container and to clean up the spilled oil using dry methods. Clean up efforts were deemed satisfactory during a later inspection.	Yes
9/4/18	9/5/18	Neighbor reported that another neighbor had dumped oil into catch basins on SE Arbor Valley Drive. WES staff found cooking oil in two catch basins on the west side of street. WES had no proof linking the discharge to the source so, in response, WES sent a blanket letter describing the illicit discharge and its implication to surrounding homes.	No
9/9/18	9/9/18	Sanitary Sewer Overflow WES staff reported 50 gallons of sewage water that went into the stormwater catch basin on SE 172nd Avenue. Rags and debris in the sanitary sewer line caused the overflow. WES contained and cleaned the overflow before reaching the Rock Creek waterway and removed the rags and debris to unblock the sewer line. WES CCTV monitored the sewer line to ensure that no other issues with the collection system and confirmed that the line did not need repair. OERS Case No. 2018-2086.	No
9/23/18	9/23/18	Sanitary Sewer Overflow WES staff reported that an unknown number of gallons overflowed from the sanitary sewer manhole located on May Street in Milwaukie. Grease had blocked the sewer line. WES staff contained and cleaned the overflow and confirmed that the overflow did not reach the closest waterway. WES staff unblocked the sewer line using a hydro-cleaner and CCTV monitored the surrounding sewer lines to ensure proper operation of the collection system. OERS Case No. 2018-2211.	No
10/15/18	10/15/18	WES staff traced a flow of turbid, sediment-laden water to a water main break repair that another water agency was performing. During the repair, WES staff witnessed the repair crew pumping dirty trench water onto the road surface that drained into WES' storm water system near Kellogg Creek. Once this was discovered, WES staff instructed the repair crew to stop the pumping. OERS Case No. 2018-2368.	No
11/17/18	11/17/18	Sanitary Sewer Overflow to MS4 WES staff responded to a call and found a blockage in a sanitary line just north of SE Sunnyside Road. Sewage had entered the Sieben Creek MS4 waterway. The amount spilled was unknown. The blockage was cleared at 3:00 p.m. that day. WES staff cleaned up the area, posted signs in the area of the spill, and notified OERS of the spill. OERS Case No. 2018-2600.	No

Date of illicit discharge	*Inspection Date*	*Incident Description, including follow-up activity*	*Enforcement action taken?*
11/28/18	11/29/18	WES staff documented blue paint leaving a residence that flowed onto Capps Road. The curb line was affected, but paint did not reach the catch basin. Property owners cleaned curb line and removed material; sent photos as proof same day.	No
12/8/18	12/8/18	A company accidentally dumped approximately 200 gallons of wash water its tank on Evelyn Street that flowed into the storm drain. The company contained the discharge using air bags at a downstream manhole before the wash water made its way downstream. Hence, no waterway was affected.	No
12/18/18	12/18/18	A company reported that 15 to 20 gallons of gasoline spilled onto an asphalt lot after someone attempted to siphon gas from a delivery truck. WES staff responded but found no evidence the gasoline had reached the storm system. OERS Case No. 2018-2816.	No
12/31/18	12/31/18	A municipal water main leak that was reported at 2:30 am and water was shut down by 8:00 am. Water was flowing out of pavement and into catch basin west of break. To contain the spill, WES inserted a silt bag was inserted into the catch basin and placed two bio bags in front of catch basin. WES then used a vactor truck to remove the spilled chlorinated water and dirt from the repair. WES cleaned up all silt and debris between leak and catch basin before removing silt bag.	No
1/2/19	1/2/19	<u>Sanitary Sewer Overflow</u> A motor home dumped its waste and grease into WES' sanitary sewer line on SE 82nd Avenue clogging the sewer line. The backup caused 200 gallons to overflow from WES' sanitary sewer manhole. WES staff contained and cleaned the surface debris and unclogged the sanitary sewer line using a hydro cleaner. WES staff confirmed that the overflow did not reach the Phillips Creek waterway. WES staff CCTV monitored the sewer line as a follow-up to ensure the proper operation of the collection system. OERS Case No. 2019-0018.	No
1/15/19	1/16/19	A restaurant dumped material from a sewer drain blockage out the back door onto the parking lot. Line crews instructed restaurant to clean up the spill. In an follow up inspection WES staff discovered that the restaurant, which has had issues in the past, did not have a grease trap. WES issued the restaurant a Notice of Violation for not having a grease trap connected to kitchen fixtures and the illicit discharge of non-stormwater to the storm system. WES also instructed the restaurant to hire a clean-up company that would capture all wash waters using a vactor truck and to	Yes

Date of illicit discharge	*Inspection Date*	*Incident Description, including follow-up activity*	*Enforcement action taken?*
		clean the two storm drains that were impacted. WES notified the County Health Department, which conducted its own inspection.	
1/28/19	1/28/19	<u>Sanitary Sewer Overflow</u> Construction contractor had installed a plug in the sewer line located on SE 147th Avenue to install a new sewer below the location. 500 gallons spilled. The construction company had been pumping out sewer line flow regularly, but this time could not control the overflow. WES staff instructed the company to clean the surface debris and confirmed that the contractor's cleanup did not reach the Rock Creek waterway. OERS Case No. 2019-0213.	No
2/12/19	2/12/19	Clackamas County Sheriff's Office reported a motorhome leaking oil and/or gasoline onto the ground that may have flowed into the storm drain. During its investigation WES staff could not find evidence of fuel or oil in the surrounding catch basins. OERS Case No. 2019-0348.	No
2/19/19	2/19/19	A company reported that it had spilled approximately 55 gallons of cherry juice onto the ground and was possibly flowing into a storm drain on SE 130th Ave. The cherry juice was contained and cleaned up. No waterway was affected.	No
2/20/19	2/20/19	A caller reported that a parked motor home was discharging grey water or sewage. WES staff informed the motor home to disconnect the hose from the motor home.	No
4/1/19	4/1/19	Truck collided with propane tank resulting in fire and release of approximately 5000 gallons of propane and an unknown amount of diesel into a storm drains on private property. This private storm sewer system discharged into the storm system that drained to the Carli Creek waterway. Fire Dept. worked to protect drains from suppression flows using native soils, booms, and bread. WES staff placed absorbent booms in the Carli Creek storm water facility's step pools. Carli Creek and the Clackamas River were likely affected.	No
4/24/19	4/24/19	A concrete contractor discharged concrete slurry onto SE Oetkin. Company crews were dispatched to clean up the slurry using dry methods & properly disposed of the debris. The next day, WES staff confirmed that the contractor had contained and cleaned up the construction debris properly.	Yes
5/23/19	5/23/19	A resident requested that WES install a "filter" on the storm drain located at the end of her driveway as the resident believed that the parked car was leaking oil into the storm drain. WES staff who examined the catch basin could not confirm the discharge and found no evidence of oil in the	No

Date of illicit discharge	*Inspection Date*	*Incident Description, including follow-up activity*	*Enforcement action taken?*
		catch basin or on the driveway. WES staff followed up with the customer.	
6/4/19	6/4/19	WES crews were called out after hours to investigate if fire suppression flows from the railroad-tie fire near SE 98th Avenue were entering the storm ditch. Flows of water and foam had entered the storm ditch, which serves as a tributary to Cow Creek, located on railroad property. WES instructed the rail road company to hire a cleanup company, which removed water and foam from the ditch with a vactor truck, removed burnt ties from ditch, and placed absorbent sheeting on water surface in ditch. WES confirmed satisfactory clean-up the next day. OERS Case No. 2019-1436.	No

1.9 SCHEDULE B(5)(I) -- A SUMMARY, AS IT RELATES TO MS4 DISCHARGES, DESCRIBING LAND USE CHANGES, URBAN GROWTH BOUNDARY (UGB) EXPANSION, LAND ANNEXATIONS, AND NEW DEVELOPMENT ACTIVITIES THAT OCCURRED WITHIN THESE AREAS DURING THE REPORTING YEAR. THE NUMBER OF NEW POST-CONSTRUCTION PERMITS ISSUED AND AN ESTIMATE OF THE TOTAL NEW AND REPLACED IMPERVIOUS SURFACE AREA RELATED TO DEVELOPMENT PROJECTS THAT COMMENCED DURING THE REPORTING YEAR MUST ALSO BE INCLUDED.

Land Use Changes:

- Number of zone changes approved in Happy Valley: 4
- Number of new residential building lots approved in Happy Valley: 66
    - Nine were created by partition
    - Eight were by subdivision
    - Forty-nine were created by planned-unit development
- Number of Approved Zone Changes in Clackamas County[1]: 1
- Number of New Land Partitions: 15
- Number of New Land Subdivisions: 9

[1] These land use statistics capture the entire unincorporated area of Clackamas County regulated by the MS4 permit, which is primarily comprised of lands in the Oak Lodge Water Services district and in the WES service area.

UGB Expansion:

- During 2018-19, the UGB was not expanded in or near the Cities of Happy Valley or Rivergrove, or WES' MS4-permitted service area.

Land Annexations:

- Acreage annexed into WES' retail service area: 51
- Acreage de-annexed from WES' retail service area: None
- Acreage annexed into the City of Happy Valley: 25.75

New development activities (Number of New Post-Construction Permits Issued, etc.):

- Number of development permits reviewed by Clackamas County[2]: 43
- Number of building division permits in Happy Valley: 239
- Number of engineering division development permits in Happy Valley: 13
- Total number of plans reviewed and approved by WES: 99
- Number of building division site plan reviews in Happy Valley: 234
- Number of engineering division site plan reviews in Happy Valley: 60
- Number of new units of multi-family housing approved in Happy Valley: 34
- Square feet of new commercial/office development approved in Happy Valley: 329,430

Estimated total new and replaced impervious surface area related to development projects:

- 40.84 acres

When the lands described here in section 1.9 were developed, post-construction stormwater management program requirements implemented by the City of Happy Valley, Clackamas County, and/or WES reduced storm sewer system pollution levels to the maximum extent practicable. For more information, see the post-construction program-related sections of this annual report.

[2] ibid

1.10 SCHEDULE B(5)(J) -- A SUMMARY, AS RELATED TO MS4 DISCHARGES, DESCRIBING CONCEPT PLANNING OR OTHER ACTIVITIES CONDUCTED IN PREPARATION OF UGB EXPANSION OR LAND ANNEXATION, IF ANTICIPATED FOR THE FOLLOWING YEAR.

City of Happy Valley

The City is currently working on the Pleasant Valley North Carver Comprehensive Plan, which is an approximately 2,700-acre plan area. The City is aiming to adopt the plan in the summer of 2020. When these lands are developed in the future, post-construction stormwater management program requirements will be implemented by the City of Happy Valley and/or WES to reduce storm sewer system pollution levels to the maximum extent practicable.

Clackamas County

No concept planning or other activities were conducted in preparation of UGB expansion or land annexation in 2018-19 and none is expected in 2019-20.

Appendix A

MS4 Best Management Practices

This Page Intentionally Left Blank

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
1	**Component #1: Illicit Discharge Detection and Elimination**	**Conduct Dry Weather Inspections**	**1**	**1**	WES (formerly, SWMACC and CCSD#1)	Number of outfalls inspected during dry-weather	37	37 dry weather inspections were conducted.
2	**Component #1: Illicit Discharge Detection and Elimination**	**Conduct Dry Weather Inspections**	**1**	**1**	WES (formerly, SWMACC and CCSD#1)	Number and type of illicit discharges that were encountered and controlled	0	No illicit discharges were found during outfall inspections.
3	**Component #1: Illicit Discharge Detection and Elimination**	**Conduct Dry Weather Inspections**	**1**	**1**	WES (formerly, SWMACC and CCSD#1)	Status of updating procedures to address new permit requirements	Attained	On February 15, 2017, we updated our written summary of the current Priority Locations for conducting dry-weather storm sewer system field screening work. The written procedures did not need to be updated in 2018-19 because the procedures were up to date and effective.
4	**Component #1: Illicit Discharge Detection and Elimination**	**Conduct Dry Weather Inspections**	**1**	**1**	WES (formerly, SWMACC and CCSD#1)	Inspect major or priority outfalls for the presence of illicit discharges at least once per year	Attained	Of the 37 dry weather inspections conducted, 32 were at major outfalls. The remaining five were minor outfalls.
5	**Component #1: Illicit Discharge Detection and Elimination**	**Conduct Dry Weather Inspections**	**1**	**1**	WES (formerly, SWMACC and CCSD#1)	Update maps of major outfalls on an annual basis	Attained	An updated map of major outfalls is found in a written procedures (updated February 15, 2017) of the current Priority Locations for conducting dry-weather storm sewer system field screening work.
6	**Component #1: Illicit Discharge Detection and Elimination**	**Conduct Dry Weather Inspections**	**1**	**1**	WES (formerly, SWMACC and CCSD#1)	Update dry weather field screening program to address new permit requirements by November 1, 2012	Attained	The dry weather field screening program was updated to address new permit requirements by November 1, 2012.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
7	**Component #1: Illicit Discharge Detection and Elimination**	**Implement the Spill Response Program**	**2**	**2**	WES (formerly, SWMACC and CCSD#1)	Number of reported spills to the MS4 system	22	There were 30 illicit discharges reported that staff investigated; see Section 1.8 for more information. Of those 30 illicit discharges, 22 were spills, 7 were sanitary sewer overflows, and one additional spill was outside WES's MS4 permitted area in Oak Lodge Water Services.
8	**Component #1: Illicit Discharge Detection and Elimination**	**Implement the Spill Response Program**	**2**	**2**	WES (formerly, SWMACC and CCSD#1)	Number and type of response to the reported spills	22	Of the 30 reported illicit discharges, 22 were confirmed non-stormwater related spills, 7 were sanitary sewer overflows, and an additional reported illicit discharge was outside WES' MS4 permitted area. The source of those 22 non-stormwater illicit discharges related to algae liquid (1 spill), City of Portland-related IPT permit violation (2 related spills), diesel and fire suppression combination (1 spill), construction debris including slurry and construction water runoff (2 spills), pesticide spraying (1 spill), electric transformer oil (1 spill), cooking oil alone (2 spills), paint (1 spill), wash water alone (1 spill), gasoline alone (1 spill), chlorinated water from a municipal water line break (1 spill), grease alone (1 spill), wash water and grease combination (1 spill), oil and gasoline combination (1 spill), cherry juice (1 spill), motor home waste (1 spill), propane, diesel and fire suppression combination (1 spill), and fire suppression alone (2 spills). Please, see Section 1.8 for additional information.
9	**Component #1: Illicit Discharge Detection and Elimination**	**Implement the Spill Response Program**	**2**	**2**	WES (formerly, SWMACC and CCSD#1)	Implement the spill response program and associated protocols.	Attained	WES has developed and maintains an appropriate spill response program. The spill response standard operating procedure has been reviewed for improvements and WES staff has been trained on its use.
10	**Component #1: Illicit Discharge Detection and Elimination**	**Respond to reports involving illicit discharges**	**3**	**3**	WES (formerly, SWMACC and CCSD#1)	Number of alleged illicit discharges and non-stormwater (i.e., fire suppression flows and dechlorinated flows from swimming pools) discharges which were reported each year	22	Of the 30 reported illicit discharges, 22 were confirmed non-stormwater related spills, 7 were sanitary sewer overflows, and an additional reported illicit discharge was outside WES' MS4 permitted area. The source of those 22 non-stormwater illicit discharges related to algae liquid (1 spill), City of Portland-related IPT permit violation (2 related spills), diesel and fire suppression combination (1 spill), construction debris including slurry and construction water runoff (2 spills), pesticide spraying (1 spill), electric transformer oil (1 spill), cooking oil alone (2 spills), paint (1 spill), wash water alone (1 spill), gasoline alone (1 spill), chlorinated water from a municipal water line break (1 spill), grease alone (1 spill), wash water and grease combination (1 spill), oil and gasoline combination (1 spill), cherry juice (1 spill), motor home waste (1 spill), propane, diesel and fire suppression combination (1 spill), and fire suppression alone (1 spill). Please, see Section 1.8 for additional information.
11	**Component #1: Illicit Discharge Detection and Elimination**	**Respond to reports involving illicit discharges**	**3**	**3**	WES (formerly, SWMACC and CCSD#1)	Number of illicit discharges that were controlled	22 Spills 7 Sanitary Sewer Overflows	Of the 29 illicit discharges that were confirmed and were located in the MS4 permitted area, all were controlled by either WES staff or the responsible party. Oak Lodge Water Services controlled the additional spill that fell outside WES' permitted area. Please, see Section 1.8 for additional information.
12	**Component #1: Illicit Discharge Detection and Elimination**	**Respond to reports involving illicit discharges**	**3**	**3**	WES (formerly, SWMACC and CCSD#1)	Respond to reports involving alleged illicit discharges within two weeks.	Attained	All illicit discharges were responded to within two weeks of receiving the report. Please, see Section 1.8 for additional information.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
13	**Component #2: Industrial and Commercial Facilities**	**Screen Existing and New Industrial Facilities**	**4**	**4**	WES (formerly, SWMACC and CCSD#1)	Track the number of existing or new industrial facilities subject to a stormwater industrial NPDES permit during the permit term.	26 1200Z permits One 1200A permit	Approximately 26 facilities in CCSD#1 have a 1200Z permit and one additional facility has a 1200A permit. Ten industrial facilities were referred to DEQ per permit schedule A.4.6 for potential 1200-Z permitting.
14	**Component #2: Industrial and Commercial Facilities**	**Screen Existing and New Industrial Facilities**	**4**	**4**	WES (formerly, SWMACC and CCSD#1)	Review new industrial development applications once during the permit term to identify additional facilities needing to obtain 1200Z permits.	Attained	This review of building permit applications for new industrial facilities was completed in March 2017
15	**Component #2: Industrial and Commercial Facilities**	**Address Other Industrial Facilities**	**5**	**5**	WES (formerly, SWMACC and CCSD#1)	The number of inspections performed, and where applicable, monitoring data collected	127 Inspections 1 sample collected	58 inspections were peformed by WES staff from the list of prioritized commercial/industrial facilities. The Pacific NW Pollution Prevention Resource Center (PPRC) conducted 69 additional inspections. PPRC provided the following technical assistance/pollution prevention inspections on WES' behalf in WES' retail service area: I) EcoBiz program at 22 auto repair shops, 5 car wash facilities, and 13 landscaping service contractors, and II) 14 multi-family housing properties (apartment complex, for example). In addition, 15 other commercial and industrial facilities in WES' retail service area received technical assistance/pollution prevention inspections from the PPRC under contract w/the CRWP in 2018-19.
16	**Component #2: Industrial and Commercial Facilities**	**Address Other Industrial Facilities**	**5**	**5**	WES (formerly, SWMACC and CCSD#1)	The number of letters, enforcement actions, or other contacts made	4	Four additional facilities were inspected in 2018-19. Three of the four facilities were inspected to determine if their process wastewater required a discharge permit, which they did not. The sixth inspection was conducted at a restaurant in response to a complaint of greasy wastewater discharged to into the parking lot catch basin. During the inspection, WES discovered that the grease removal device had been disconnected. Enforcement was taken with a requirement to install a grease removal device.
17	**Component #2: Industrial and Commercial Facilities**	**Address Other Industrial Facilities**	**5**	**5**	WES (formerly, SWMACC and CCSD#1)	Number of pretreatment inspections performed (CCSD#1-only)	28 permitted 2 non-permitted	For 2018-19, the Industrial Permits group conducted a total of 26 inspections of permitted industrial users. Of the 26 inspections in this period, 3 facilities were inspected twice. The second inspections were conducted as part of DEQ's Pretreatment Compliance audit in December 2018. One industry was inspected a third time as part of a pre-permit renewal inspection. In addition, two non-discharging, unpermitted categorical industrial manfacturing facilities were inspected.
18	**Component #2: Industrial and Commercial Facilities**	**Address Other Industrial Facilities**	**5**	**5**	WES (formerly, SWMACC and CCSD#1)	Notify and work with industries to improve stormwater management if an inspection is conducted that indicates improvement is needed.	Attained	Refer to enforcement actions response listed above or contact Watershed Protection staff at (503) 742-4567.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
19	**Component #3 Construction Site Runoff**	**Conduct Procedures for Site Planning**	**6**	**6**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Annual number of permitted, active construction projects (i.e., those projects disturbing 800 sq. ft. or more)	473	221 Active construction projects in WES. There were 239 building division permits and 13 engineering division development permits in Happy Valley.
20	**Component #3 Construction Site Runoff**	**Conduct Procedures for Site Planning**	**6**	**6**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Annual number of site plan reviews and approved plans	393	99 site plan reviews and approved plans in WES' portion of the WES, Happy Valley and Rivergrove area. In addition,there were 234 building division site plan reviews and 60 engineering division site plan reviews in Happy Valley.
21	**Component #3 Construction Site Runoff**	**Conduct Procedures for Site Planning**	**6**	**6**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Review all applicable erosion and sediment control plans submitted as part of the building permit.	Attained	All applicable erosion and sediment control plans were reviewed, approved and permitted.
22	**Component #3 Construction Site Runoff**	**Implement Requirements for Structural and Non-Structural Best Management Practices**	**7**	**7**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Annual number of permitted, active construction projects (i.e., those projects disturbing 800 sq. ft. or more)	473	See tracking measure comment in BMP #6.
23	**Component #3 Construction Site Runoff**	**Implement Requirements for Structural and Non-Structural Best Management Practices**	**7**	**7**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Annual number of site plan reviews and approved plans	393	See tracking measure comment in BMP #6.
24	**Component #3 Construction Site Runoff**	**Implement Requirements for Structural and Non-Structural Best Management Practices**	**7**	**7**	WES (formerly, SWMACC and CCSD#1) Happy Valley	WES and Happy Valley require structural and non-structural BMPs for erosion prevention and sediment control on all construction sites disturbing 800 sq. ft. of land or more	Attained	All construction sites disturbing 800 sq. ft. of land or more require structural and non-structural BMPs for erosion prevention and sediment control.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
25	**Component #3 Construction Site Runoff**	**Conduct Training for Construction Site Operators**	**8**	**8**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Track the number and type of educational and training events the District conducts and/or participates in annually	2	Two existing employees within WES division of Environmental Services completed the necessary course training to become re-certified as a Certified Erosion Sediment Control Lead (CESCL) and Erosion & Sediment Control Inspector. Additional training will be provided as needed. WES has made the Erosion Prevention and Sediment Control Planning and Design Manual available on the County website while providing in-the-field training during ERCO inspections. The City of Happy Valley did not sponsor training courses this year for construction site operators.
26	**Component #3 Construction Site Runoff**	**Conduct Training for Construction Site Operators**	**8**	**8**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Conduct training for new employees as appropriate and whenever there is a significant update to the Erosion Prevention and Sediment Control Planning and Design Manual.	Attained	No new WES employees. Additional training will be provided as needed. .
27	**Component #3 Construction Site Runoff**	**Identify Priorities for Inspecting Sites and Conducting Enforcement Actions**	**9**	**9**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Annual number of permitted sites and percentage of sites inspected	100%	Inspected 100% of 252 permitted sites in Happy Valley and 221 permitted sites in WES' ERCO service area.
28	**Component #3 Construction Site Runoff**	**Identify Priorities for Inspecting Sites and Conducting Enforcement Actions**	**9**	**9**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Annual number of erosion control inspections conducted	3,204	WES inspections - 2063 Happy Valley Building Division Inspections - 557 Happy Valley Engineering Division Inspections - 584
29	**Component #3 Construction Site Runoff**	**Identify Priorities for Inspecting Sites and Conducting Enforcement Actions**	**9**	**9**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Annual number of enforcement actions	70	6 Happy Valley enforcement actions and 64 WES Erosion Control enforcement actions
30	**Component #3 Construction Site Runoff**	**Identify Priorities for Inspecting Sites and Conducting Enforcement Actions**	**9**	**9**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Inspect construction sites disturbing 800 s.f. of land or more a minimum of three times during construction to verify proper implementation of required BMPs	Attained	100% of the erosion control permits that WES and Happy Valley issued were inspected a mininum of three times.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
31	**Component #3 Construction Site Runoff**	**Identify Priorities for Inspecting Sites and Conducting Enforcement Actions**	**9**	**9**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Monitor compliance with the erosion control regulations for sites disturbing 800 s.f. of land or more and, when necessary, issue deficiency notices, charge re-inspection fees, issue fines and stop land-disturbing development work at the site until provisions of the regulations are met	Attained	In Happy Valley, two of the six erosion control cases resulted in fines. WES posted 6 stop-work orders, and 4 were subject to reinspection fees or fines.
32	**Component #4 Education and Outreach**	**Public Education to Reduce Discharges of Pesticides, Herbicides and Fertilizers**	**10**	**10**	WES (formerly, SWMACC and CCSD#1)	Track program messages delivered, type of communication piece, and where appropriate, the number of people affected.	15	WES' weaved more than 15 messages about this pollutant in articles, ads, television campaigns and coverage, social media posts and educational events. Included **(1)** the planning in 2018-19 and execution in 2019-20 of WES "Clean Water Partners" Campaign in KPTV's 170 messages about reducing use of pesticides, herbicides and fertilizers and other harmful chemicals, 3,748,800 television impressions, 750,154 banner ad impressions, 985 website clicks, 27,280 Facebook impressions, 5,505 Facebook video views and reached 17,000 to 400,000 residents per publication. **(2)** "WES Works to protect our rivers and streams while planning for the future," ClackCo Quarterly, Feb. 2019. **(3)** The related Carli Creek project, which became a Clackamas River pollutant firewall, appeared in the "ClackCo Quarterly" August 2018 article, "Protecting the Clackamas River - The Carli Creek Water Quality and Habitat Project is Underway and the May 2019 article, "New Carli Creek Water Quality Facility protects Clackamas River from Harmful Pollutants"; in The Wetlands Conservancy March 2019 article, "A Cleaner Clackamas River;" and in the Clackamas Review" article, "Carli Creek Protects Clackamas River from Pollutants," Clackamas Review, March 26 2019. The project also appeared on KATU-TV, "After Seven Years, Carli Creek Water Project Completed," in March 2019 where 20,000 viewers saw initial segment, not counting repeat newscasts or station website views; on KOIN-TV, "Carli Creek Water Project Completed," where 30,000 viewers watched the initial segment not counting repeats, station website views, and Youtube's 46,000 subscribers in March 2019; and in the County's Cable Channel and Youtube Channel with 2,930 subscriber, "Carli Creek Water Quality Project Commemoration" video on April 2, 2019. Includes Facebook post with link: "Carli Creek Water Quality Project is now working to keep harmful pollutants out of Carli Creek and the Clackamas River, which provides drinking water for 400,000 people," March 24, 2019. **(4)** Other directly-related social media posts include Facebook link "Tour a Certified Backyard Habitat to help reduce use of pesticides," August, 16, 2019, 8,693 followers; Facebook link: WES RiverHealth Stewardship Grant Program supports Backyard Habitat Certification Program, November 11, 2018, and Facebook post with YouTube link: Oh, BEEhave! Pesticides, herbicides, and fertilizers can help control pesky weeds and insects but are toxic, June 28, 2019. **(5)** The Children's Clean Water Festival where WES staff shared with over 1,400 fourth-grade students how little it takes to contaminate a body of water , May 5, 2019. **(6)** the WES-funded Lower Columbia Estuary Partnership educated teachers, students, and parents within the North Clackamas School District on how land use impacts watershed conditions: • 374 students from 4 schools received 3 science lessons each, 1,048 total instructional hours • 13 classes participated in outdoor field trips involving a canoe trip and watershed health service project and • 13 teachers and 37 parents/volunteer chaperones supported the outdoor field trips.
33	**Component #4 Education and Outreach**	**Public Education to Reduce Discharges of Pesticides, Herbicides and Fertilizers**	**10**	**10**	WES (formerly, SWMACC and CCSD#1)	Continue to maintain relevant public education materials on the County's website	Attained	Various articles, ads, videos, and brochures were displayed on website: 1. Article: Think of Me, Your Friend, the Bee! Pesticides, herbicides, and fertilizers can help control pesky weeds and insects, but every pesticide (including organic) has some level of toxicity. 2. Backyard Habitat Certification Program page. 3. Garden Awareness Chemical Flier. 4. Love your Lawn without pesticides fact sheet. 5. Moss on Roofs: Pesticide-free control. 6. Weed and Pesticide Information and Tips. 7. Got Weeds? Get help from CRISP. 8. Parting with Pesticides Pledge Program for the Clackamas Watershed. In 2016, the Clackamas County Service District No. 1 awarded the Lower Columbia Estuary Partnership with a three-year contract to provide watershed health education services to teachers, students, and parents within the North Clackamas School District. ◦300 web page views of WES Education page with the following articles: "Clean up After your Pet," Think of Me, Your Friend the Bee(about pesticides, herbicides), Clear Storm Drains, Water Pollution Prevention for Property Managers. ◦1570 web page views for WES Watershed Health web page
34	**Component #4 Education and Outreach**	**Public Education to Reduce Discharges of Pesticides, Herbicides and Fertilizers**	**10**	**10**	WES (formerly, SWMACC and CCSD#1)	Prepare a minimum of one relevant article per year for inclusion with Clackamas County customer billing statements	Attained	WES published three sanitary sewer focused articles unrelated to this pollutant for its paperless billing audience. To focus on this pollutant and expand its audience, WES used social media and ClackCo to promote the reduction of pesticide, herbicide and fertilizer use, which resulted in a larger ratepayer audience. 1. Facebook post with link "Tour a Certified Backyard Habitat to help reduce use of pesticides," August, 16, 2018. 8,693 Facebook followers. 2. Facebook post with link: WES RiverHealth Stewardship Grant Program supports Backyard Habitat Certification Program, November 4, 2018. 3. Facebook post with YouTube link: John Nagy explains how WES protects public storm systems, October 7, 2018. 4. Facebook post with link: WES RiverHealth Stewardship Grant Program supports Backyard Habitat Certification Program, November 11, 2018. 5. Facebook post with YouTube link: Oh, BEEhave! Pesticides, herbicides, and fertilizers can help control pesky weeds and insects. However, Water Environment Services (WES) wants you to know that every pesticide (including organic) has some level of toxicity that can be harmful to honey bees, earthworms, aquatic bugs, fish and people, June 28, 2019. 6. Water Environment Services participated in The Children's Clean Water Festival, an environmental education event engaging over 1,400 fourth-grade students. WES staff shared how little it takes to contaminate a body of water.7. Stewardship of the Environment 8. Yard and garden chemicals can contaminate our community's water 9. Carli Creek Project: Reducing Pollution, Protecting the environment
35	**Component #4 Education and Outreach**	**Public Education to Reduce Discharges of Pesticides, Herbicides and Fertilizers**	**10**	**10**	WES (formerly, SWMACC and CCSD#1)	Pursue additional relevant USGS studies if the opportunity presents itself. SWMACC is conduct a watershed action plan to guide its activities.	Attained	No additional USGS studies were funded during the 2018-19 MS4 permit year. Note that CCSD#1, the SWMACC, and the Cities of Rivergrove and Happy Valley contributed funds towards a USGS pesticide monitoring study, which assessed pesticide concentrations in creek water, creek bed sediments, and discharges from MS4 outfalls, during the current 2012-2017 MS4 permit term. This monitoring study satisfies the pesticide monitoring requirement in table B-1 of the MS4 permit. The USGS wrote an article about this study which was published in the Journal of Environmental Monitoring Assessment, a scientific journal, in May 2016. Not long after the SWMACC/City of Rivergrove SWMP was created, WES' strategic priorities changed, and the decision was made to not create a Tualatin River Watershed Action Plan. So this Plan has never been available to guide our activities. The February 2017 Shared MS4 Permit SWMP does not include this Measurable Goal, and WES looks forward to the day when WES is able to implement the Shared SWMP.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
36	**Component #4 Education and Outreach**	**Proper Disposal Practices to Reduce Discharges of Pesticides, Herbicides and Fertilizers**	**11**	**11**	WES (formerly, SWMACC and CCSD#1)	Number of calls received and referred to Metro annually.	0	WES did not receive customer inquiries about hazardous materials. Hence, WES did not refer any customer to Metro.
37	**Component #4 Education and Outreach**	**Proper Disposal Practices to Reduce Discharges of Pesticides, Herbicides and Fertilizers**	**11**	**11**	WES (formerly, SWMACC and CCSD#1)	Refer all pesticide/herbicide disposal related calls to Metro.	Not Attained	There were no customer who were referred to Metro because WES received no inquiries on disposing hazardous materials.
38	**Component #4 Education and Outreach**	**Facilitate Public Reporting of Illicit Discharges and Spills and Other Types of Improper Disposal of Materials**	**12**	**12**	WES (formerly, SWMACC and CCSD#1)	Describe news articles reported per year when appropriate	9	1. Website article: "Protecting the Clackamas River" with information to Prepare, Contain, Cover, Report information. 2. Rebates offered for Local Businesses to Protect the Clackamas River: When Chemicals Spill on a Property or Street. 3. Spill prevention/response advertisement on billboard along Highway 212 (near intersection with SE 98th Ave) in October 2018. 4. "Protecting the Clackamas River - The Carli Creek Water Quality and Habitat Project is Underway." 5. "WES Works to protect our rivers and streams while planning for the future," ClackCo Quarterly, Feb. 2019. 4. "New Carli Creek Water Quality Facility protects Clackamas River from Harmful Pollutants," ClackCo Quarterly, May 2019. 5. KATU-TV Coverage "After seven years, Carli Creek Water Project Completed" March 2019 (estimated 20,000 viewers saw initial segment, not counting repeats on subsequent newscasts or station website views). 6. KOIN-TV coverage "Carli Creek Water Project Completed," March 2019. (estimated 30,000 viewers saw initial segment, not counting repeats on subsequent newscasts, station website views, or Youtube channel with has 46,000 subscribers). 7. "Carli Creek Protects Clackamas River from Pollutants," Clackamas Review, March 26 2019. 8. "A Cleaner Clackamas River," The Wetlands Conservancy, March 19, 2019.
39	**Component #4 Education and Outreach**	**Facilitate Public Reporting of Illicit Discharges and Spills and Other Types of Improper Disposal of Materials**	**12**	**12**	WES (formerly, SWMACC and CCSD#1) Public & Government Affairs	Describe type of public complaints received. Resulting follow up actions per year will be kept in a database.	Illicit Discharge complaints	Information about the illicit dishcarge complaints, including results, are maintained in the WES' Maintenance Management System, Lucity software.
40	**Component #4 Education and Outreach**	**Facilitate Public Reporting of Illicit Discharges and Spills and Other Types of Improper Disposal of Materials**	**12**	**12**	WES (formerly, SWMACC and CCSD#1)	Include a relevant article in The Citizen News (for the County) once a permit term (where permit term is from March 2012 through March 1, 2017)	Attained	1. Website article: "Protecting the Clackamas River" with information to Prepare, Contain, Cover, Report information. 2. Rebates offered for Local Businesses to Protect the Clackamas River: When Chemicals Spill on a Property or Street. 3. Spill prevention/response advertisement on billboard along Highway 212 (near intersection with SE 98th Ave) in October 2018.
41	**Component #4 Education and Outreach**	**Facilitate Public Reporting of Illicit Discharges and Spills and Other Types of Improper Disposal of Materials**	**12**	**12**	WES (formerly, SWMACC and CCSD#1)	Continue to include area for public complaints on the County's website and track number of complaints for reporting	Attained	WES provides a problem-reporting form on its website. Data is tracked by WES customer service team and WES field technicians.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
42	**Component #4 Education and Outreach**	**Participate in a Public Education Effectiveness Evaluation**	**13**	**13**	WES (formerly, SWMACC and CCSD#1)	Report on activities annually.	Attained	WES submitted its evaluation of WES's efforts in June 2015.
43	**Component #4 Education and Outreach**	**Participate in a Public Education Effectiveness Evaluation**	**13**	**13**	WES (formerly, SWMACC and CCSD#1)	Provide/compile information regarding a public education effectiveness evaluation over the permit term.	Attained	Completed and submitted its public education effectivenss evaluation to DEQ in June 2015. WES also conducted multiple non-scientific surveys during various public education events throughout the permit term, including surveys pre/post tours and field trips.
44	**Component #4 Education and Outreach**	**Training for Employees**	**14**	**14**	WES (formerly, SWMACC and CCSD#1)	Track the number of employees receiving training in stormwater management annually.	62	Sixty-two employees received stormwater management training in 11 different workshops relevant to stormwater management.
45	**Component #4 Education and Outreach**	**Training for Employees**	**14**	**14**	WES (formerly, SWMACC and CCSD#1)	Attend relevant stormwater management related training based on need and availability	Attained	Sixty-two employees attended the ACWA Annual Conference, ACWA Stormwater Summit, ORWEF Water Environment School, PNCWA Annual Conference, Street Maintenance and Collection Systems, Erosion Control & Storm Water Management Summit, NASSCP PACP Re-Certification Training, Managing Storm Water in Oregon, Johnson Creek Science Symposium, River Restoration NW Symposium, and Lowering the Temperature.
46	**Component #4 Education and Outreach**	**Training for Employees**	**14**	**14**	WES (formerly, SWMACC and CCSD#1)	Check in with the Fire Department regarding stormwater issues during the permit's 5-year term.	Attained	Attained. The check-in meeting with Clackamas Fire District No. 1 occurred on December 3, 2014. During this meeting, WES staff verified that CFD#1 staff have been using the valve correctly.
47	**Component # 5 Public Involvement and Participation**	**Provide for Public Participation with SWMP and Benchmark Submittals**	**15**	**15**	WES (formerly, SWMACC and CCSD#1)	Provide for public participation with the SWMP and pollutant load reduction benchmarks prior to the permit renewal application deadline	Attained	The public comment period for documents related to the MS4 permit renewal application submittal ran from January 20, 2017 to February 21, 2017. WES submitted these documents to DEQ on February 24, 2017.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
48	**Component # 5 Public Involvement and Participation**	**Provide for Public Participation with SWMP and Benchmark Submittals**	**15**	**15**	WES (formerly, SWMACC and CCSD#1)	Provide for public participation with the monitoring plan due to the Department by September 1, 2012	Attained	This public participation opportunity was provided in 2012.
49	**Component # 6 Post-Construction Site Runoff**	**Planning Procedures for New Development and Significant Redevelopment**	**16**	**16**	WES (formerly, SWMACC and CCSD#1)	The number and type of flow control, water quality treatment or infiltration facilities installed in accordance with the requirements	38	Includes water quality, infiltration and flow control ponds.
50	**Component # 6 Post-Construction Site Runoff**	**Planning Procedures for New Development and Significant Redevelopment**	**16**	**16**	WES (formerly, SWMACC and CCSD#1)	Narrative to describe the status of the private facility database	Attained	The upgrades to the GIS and maintenance management system software and databases is undergoing installation and testing. These systems will be used for the private facility database for commercial/industrial properties. In the interim, the enhanced notification efforts begun in 2015-2016 continue to improve tracking accuracy and aid in the removal of properties that do not have a private system. In 2018 an additional FTE was hired to provide resources to start a series of prioritized onsite inspections. These inspections have increased maintenance compliance and will help revise the dataset.
51	**Component # 6 Post-Construction Site Runoff**	**Planning Procedures for New Development and Significant Redevelopment**	**16**	**16**	WES (formerly, SWMACC and CCSD#1)	Narrative to describe results of tracking compliance with private facility maintenance agreements	Attained	134 Commercial Maintenance Agreements in the MS4 area 59 CMA properties submitted reports in calendar year 2018 569 structures cleaned See BMP 28 in this table for information about WES' SCAP.
52	**Component # 6 Post-Construction Site Runoff**	**Planning Procedures for New Development and Significant Redevelopment**	**16**	**16**	WES (formerly, SWMACC and CCSD#1)	Continue to implement and enforce controls for stormwater quality treatment from new and re-development	Attained	WES continues to implement and enforce controls for stormwater quality treatment from new and re-development.
53	**Component # 6 Post-Construction Site Runoff**	**Planning Procedures for New Development and Significant Redevelopment**	**16**	**16**	WES (formerly, SWMACC and CCSD#1)	Track the location, type, and drainage area of new water quality facilities using GIS	Attained	WES staff tracks areas that drain to water quality and flow control facilities by mapping project areas from as-builts. Staff completed redesigning the GIS database, the subsequent data migration and continues improving existing GIS data. Staff has not mapped new stormwater projects during the GIS upgrade; however, new progress will be mapped this year.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
54	**Component # 6 Post-Construction Site Runoff**	**Planning Procedures for New Development and Significant Redevelopment**	**16**	**16**	WES (formerly, SWMACC and CCSD#1)	Continue with work to compile a database of private facilities	Attained	Please see response comment immediately above.
55	**Component # 6 Post-Construction Site Runoff**	**Planning Procedures for New Development and Significant Redevelopment**	**16**	**16**	WES (formerly, SWMACC and CCSD#1)	Annually, check in on compliance with terms of private facility maintenance agreements	Attained	WES made further enhancements to the Storm Drain Cleaning Assistance Program (SCAP) for private facilities (See BMP 28). Since reporting from commercial properties is due by December 31st of each year, the following information is for calendar year 2018 rather than permit year 2018-19. WES sent two mailings in 2018 to not only the properties within the MS4 area that had Commercial Maintenance Agreements, but rather to all commercial/industrial stormwater accounts. The letter was to remind them of the cleaning and reporting requirements. The second mailing targeted properties that had not responded to the first mailing. More properties with agreements responded with reports than last year and our onsite inspection program progress for 2018-19 has helped to increase compliance. (Total cleaning of all private commercial/industrial facilities through SCAP (See BMP 28) and other methods: 377 businesses reported, 2024 structures inspected and cleaned, and over 64,000 gallons of material removed.)
56	**Component # 6 Post-Construction Site Runoff**	**Update Procedures for New Development and Significant Redevelopment**	**17**	**17**	WES (formerly, SWMACC and CCSD#1)	Track status of adopting proposed changes to the stormwater standards for new and re-development.	Attained	The revised Stormwater Standards took effect on July 1, 2013. In July 2018 WES started a project to update WES's stormwater standards which includes the MS4 requirement to capture and treat 80 percent of annual average runoff volume, which roughly equates to 1" of rainfall on a development site. The project is anticipated to take about 12 months to complete, and the process will include internal staff involvement from applicable divisions of WES, Clackamas County engineering & planning, City of Happy Valley and regional stakeholders.
57	**Component # 6 Post-Construction Site Runoff**	**Update Procedures for New Development and Significant Redevelopment**	**17**	**17**	WES (formerly, SWMACC and CCSD#1)	CCSD#1: Complete updates to standards to meet new permit requirements by June 30, 2013	Attained	The revised Stormwater Standards took effect on July 1, 2013. In July 2018 WES started a project to update WES' stormwater standards which includes the MS4 requirement to capture and treat 80% of the annual average runoff volume, which roughly equates to 1" of rainfall on a development site. The new standards will prioritize Low Impact Development Approach (LIDA) to mitigate stormwater runoff. The project is anticipated to take about 12 months to complete, and the process will include internal staff involvement from applicable divisions of WES, Clackamas County engineering & planning, City of Happy Valley and regional stakeholders.
58	**Component # 6 Post-Construction Site Runoff**	**Update Procedures for New Development and Significant Redevelopment**	**17**	**17**	WES (formerly, SWMACC and CCSD#1)	CCSD#1: Complete guidance manual for developers to facilitate the implementation of the new standards by June 30, 2013	Attained	The 2013 stormwater guidance standards, whose milestone was attained, are now under review. In July 2018 Water Environments Services started a project to update WES' stormwater standards. The new standards will prioritize Low Impact Development Approach (LIDA) to mitigate stormwater runoff. The project is anticipated to take about 12 months to complete, and the process will include internal staff involvement from applicable divisions of WES, Clackamas County engineering & planning, City of Happy Valley and regional stakeholders.
59	**Component # 6 Post-Construction Site Runoff**	**Update Procedures for New Development and Significant Redevelopment**	**17**	**17**	WES (formerly, SWMACC and CCSD#1)	SWMACC: Policy development and implementation by November 1, 2014.	Attained	The 2013 stormwater guidance standards, whose milestone was attained, are now under review. In July 2018 Water Environments Services started a project to update WES's stormwater standards which includes the MS4 requirement to capture and treat 80% of the annual average runoff volume, which roughly equates to 1" of rainfall on a development site. The new standards will prioritize Low Impact Development Approach (LIDA) to mitigate stormwater runoff. The project is anticipated to take about 12 months to complete, and the process will include internal staff involvement from applicable divisions of WES, Clackamas County engineering & planning, City of Happy Valley and regional stakeholders.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
60	**Component # 6 Post-Construction Site Runoff**	**Sizing Tool Development to Address Hydro-modification**	**18**	**N/A**	WES (formerly, CCSD#1)	Net impervious area treated by LID	31.6 acres	Development Services approved 6 development permits which treated stormwater runoff by LID BMPs with the net impervious area of 31.6 acres.
61	**Component # 6 Post-Construction Site Runoff**	**Sizing Tool Development to Address Hydro-modification**	**18**	**N/A**	WES (formerly, CCSD#1)	Number of applications submitted using sizing tool	6	Six development projects utilized the BMP Sizing Tool to mitigate stormwater runoff.
62	**Component # 6 Post-Construction Site Runoff**	**Sizing Tool Development to Address Hydro-modification**	**18**	**N/A**	WES (formerly, CCSD#1)	Customer feedback and community relations about the simplified tool (for development engineers) that sizes LID BMPs (in order to address the duration of elevated flow levels in addition to addressing flow volumes and peaks; and in order to address the long-term impacts of increased runoff from development).	Attained	As part of the ongoing update to the SW standards, WES in partnership with Brown and Caldwell will conduct a robust public outreach and comment period on proposed changes alongside WES Staff, meeting with major WES stakeholders such as regional watershed councils, and community planning organizations.
63	**Component # 6 Post-Construction Site Runoff**	**Sizing Tool Development to Address Hydro-modification**	**18**	**N/A**	WES (formerly, CCSD#1)	The primary goal is to develop, by June 30, 2013, a tool to assist development engineers with the design/sizing of stormwater management facilities in order to reduce target pollutants and stream degradation impacts (i.e., hydromodification) associated with the development of impervious surfaces.	Attained	In July 2018 Water Environments Services started a project to update WES's stormwater standards which includes the MS4 requirement to capture and treat 80% of the annual average runoff volume, which roughly equates to 1" of rainfall on a development site. The new standards will prioritize Low Impact Development Approach (LIDA) to mitigate stormwater runoff. The project is anticipated to take about 12-months to complete, and the process will include internal staff involvement from applicable divisions of WES, Clackamas County engineering & planning, City of Happy Valley and regional stakeholders.
64	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Street Sweeping**	**19**	**18**	Happy Valley DTD	Number of miles that were swept in Happy Valley	2,722	1,106 miles in Happy Valley 1,616 miles in Clackamas County

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
65	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Street Sweeping**	**19**	**18**	Happy Valley DTD	Mass or volume of material removed during sweeping in Happy Valley	1,305 cubic yards	Happy Valley removed 594 cubic yards and Clackamas County removed 711 cubic yards of street sweeping debris.
66	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Street Sweeping**	**19**	**18**	Happy Valley DTD	For DTD, see tracking measures in the DTD MS4 NPDES SWMP.	See DTD 2018-19 MS4 Annual Report	No comment.
67	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Street Sweeping**	**19**	**18**	Happy Valley DTD	City of Happy Valley Roads: Sweep approximately 100 lane miles of curbed streets per year on average	Attained	Happy Valley exceeded their goal.
68	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Street Sweeping**	**19**	**18**	Happy Valley DTD	SWMACC: See DTD's MS4 NPDES SWMP	See DTD 2018-19 MS4 Annual Report	No comment.
69	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Operations & Maintenance for Public Streets**	**20**	**19**	Happy Valley DTD	Mass or volume of material removed by the City of Happy Valley "Adopt-a-Road" program	0	Happy Valley no longer has an Adopt-a-Road program as part of its operations and maintenance of public streets . Instead, the City captures litter through its street sweeping.
70	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Operations & Maintenance for Public Streets**	**20**	**19**	Happy Valley DTD	Number of illegal solid waste dumps that are removed in the City of Happy Valley	Unknown	Happy Valley partners with Metro's RID Patrol program to remove the illegal dump sites in the City. Metro tracks the amount of material removed in Happy Valley. Please contact Metro at (503) 797-1700 or (503) 234-3000 for more information. DTD relies on Park's Dump Stopper program to remove illegal dumps. Dump Stopper statistics (including the removal of 44,880 pounds of solid waste, 185 Tires, 6 cars and 410 pounds of scrap metal in 2018-19), however, do not discern County roads and ROW cleanups from all illegal dump cleanups. Additionally, Dump Stoppers focuses on forested, rural areas of middle and eastern Clackamas County that are outside of the former CCSD#1 and SWMACC service areas with the exception of Oregon Department of Fish and Wildlife ponds located in western Clackamas County. Looking ahead, DTD may pursue Metro's RID Patrol program to capture statistics for illegal dumps cleanups on County roads within the Portland Metropolitan area.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
71	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Operations & Maintenance for Public Streets**	**20**	**19**	Happy Valley DTD	Mass or volume of material that is removed by the elimination of illegal solid waste dumping sites in the City of Happy Valley	Unknown	See row 70's response.
72	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Operations & Maintenance for Public Streets**	**20**	**19**	Happy Valley DTD	Amount of sand applied and then removed by Happy Valley as a result of a snow/ice event and time of removal after the event	Sand Applied -- 50 cubic yards Sand Picked up -- 29 cubic yards	Sand was removed within 10 days.
73	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Operations & Maintenance for Public Streets**	**20**	**19**	Happy Valley DTD	Remove illegal solid waste dumps as they are discovered	Attained	Metro partners with Happy Valley to remove the illegal dump sites in the City. Metro tracks the amount of material removed in Happy Valley.
74	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Operations & Maintenance for Public Streets**	**20**	**19**	Happy Valley DTD	Collect sand applied for ice/snow events within 10 days of the end of the event	Attained	No comment.
75	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Operations & Maintenance for Public Streets**	**20**	**19**	Happy Valley DTD	DTD: See DTD's MS4 NPDES SWMP	See DTD's 2018-19 MS4 Annual Report	See DTD's 2018-19 MS4 Annual Report for the work DTD performed on County-maintained roads.
76	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Proper Road Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers**	**21**	**20**	Happy Valley DTD	Happy Valley - The quantity of herbicide products used per zip code. This is the same data that will be reported to Oregon's Department of Agriculture per the Pesticide Use Reporting System.	0	Happy Valley used no herbicides. See DTD's 2018-19 MS4 Annual Report for the County's pesticide, herbicide and fertilizer use in County-maintained roads.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
77	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Proper Road Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers**	**21**	**20**	Happy Valley DTD	DTD: See tracking measures in the DTD MS4 NPDES SWMP	See DTD's 2018-19 MS4 Annual Report	No comment.
78	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Proper Road Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers**	**21**	**20**	Happy Valley DTD	Happy Valley Roads: Continue to implement the integrated pest management portion of the ODOT Routine Road Maintenance Manual	Attained	Happy Valley is continuing to implement the IPM portion of the ODOT Routine Road Maintenance Manual
79	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Proper Road Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers**	**21**	**20**	Happy Valley DTD	DTD: See DTD's MS4 NPDES SWMP for measurable goals	See DTD 2018-19 MS4 Annual Report	No comment.
80	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Landscape Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers**	**22**	**21**	WES (formerly, SWMACC and CCSD#1) Happy Valley DTD	The number of meetings conducted	9	These six meetings were held with each of the following school districts and special service districts (all of which are not MS4 co-permittees): Clackamas Community College, Clackamas Educational Service District, North Clackamas School District, Sunrise Water Authority, Clackamas River Water, and Clackamas Fire District No. 1. WES sent a letter to each public agency after the meetings were held. Happy Valley held three IPM meetings.
81	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Landscape Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers**	**22**	**21**	WES (formerly, SWMACC and CCSD#1) Happy Valley DTD	The results and follow-up activities conducted as a result of the meetings	0	No results are available and no follow-up activities were conducted as a result of the meetings which were held in 2018-19 or in any other year during this permit term.
82	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Landscape Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers**	**22**	**21**	WES (formerly, SWMACC and CCSD#1) Happy Valley DTD	Check back in with all County & City of Happy Valley buildings and facilities that were visited (during the last permit cycle) at least once during this permit cycle	Attained	This check-in process occurred during meetings which were held during this time period: June 2016 to February 2017. WES sent a letter to each public agency after the meetings were held.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
83	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Landscape Maintenance Practices to Reduce the Discharge of Pesticides, Herbicides and Fertilizers**	**22**	**21**	WES (formerly, SWMACC and CCSD#1) Happy Valley	Develop and implement an Integrated Pest Management plan by December 31, 2012	Attained	SWMACC and CCSD#1, both of which are now part of the WES ORS 190 partnership, and the City of Happy Valley and implemented this IPM plan in 2018-19.
84	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Control Infiltration and Cross Connections to the District's Stormwater System**	**23**	**22**	WES (formerly, SWMACC and CCSD#1)	Number of cross-connections/ sanitary discharges identified	0	There were no cross connections found this reporting year.
85	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Control Infiltration and Cross Connections to the District's Stormwater System**	**23**	**22**	WES (formerly, SWMACC and CCSD#1)	The number and type of inspections performed, abatement actions and enforcement actions taken	4,516 Assets inspected for SSO's	Through preventative maintenance activities within the MS4, staff visually inspects structures for condition assessment to include evidence of cross connections. WES staff looks for evidence of cross connection during daily inspection and cleaning activities. Staff also conducts routine video servalliance using closed-circuit television activities of the sanitary system in an effort to find and eliminate any cross connection.
86	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Control Infiltration and Cross Connections to the District's Stormwater System**	**23**	**22**	WES (formerly, SWMACC and CCSD#1)	Eliminate any identified sanitary discharges to the storm system.	Attained	Seven sanitary sewer overflows entered the MS4 permit area but none of these discharges were conveyed through infiltration or cross-connections. All debris was removed from sewer, and all MS4 assets were cleaned. Please, see Section 1.8 in the narrative for more information.
87	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Flood Management Projects and Water Quality**	**24**	**N/A**	WES (formerly, CCSD#1)	Number of retrofits constructed that address water quality treatment	3	Carli Creek retrofit project became operational in 2018-19. Added water quality units to two outfalls during conveyence repair projects.
88	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Flood Management Projects and Water Quality**	**24**	**N/A**	WES (formerly, CCSD#1)	Number of flood management projects implemented or constructed and the percentage of those projects that include water quality Components	2	Diamond Court and Nella way were both chronic drainage projects that resulted in localized flooding. We addressed the drainage issue and also added hydrodynamic separators to provide some water quality treatment. Both of these projects were planned and constructed in 2018-19.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
89	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Flood Management Projects and Water Quality**	**24**	**N/A**	WES (formerly, CCSD#1)	Ensure all planned stormwater CIPs include consideration of water quality.	Attained	See row 88's response.
90	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Detention Pond Retrofit Program**	**25**	**N/A**	WES (formerly, CCSD#1)	Track pilot testing activities	3	Opti equipment, which was planned, constructed and test piloted before 2018-19, is fully operational in three detention ponds. Performance data shows an increase in retention time and a decrease in wet weather discharges from the ponds.
91	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Detention Pond Retrofit Program**	**25**	**N/A**	WES (formerly, CCSD#1)	Number, type, and location of retrofits	3	See row 90's response.
92	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Detention Pond Retrofit Program**	**25**	**N/A**	WES (formerly, CCSD#1)	The primary goal of the retrofit program is to retrofit existing ponds to improve their function to better meet watershed health goals. The goal will be to conduct 2 to 5 retrofits per year.	Attained	See row 90's response.
93	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Maintenance of Conveyance System Components and Structural Controls**	**26**	**23**	WES (formerly, SWMACC and CCSD#1)	Miles of ditches and storm lines maintained	4,554 linear feet	WES used video surveillance using closed-circuit television on 4,454 linear feet of storm pipe. WES staff cleaned storm pipe as needed. Happy Valley maintained 100 linear feet of ditch line. For ditch cleaning that DTD has performed, please, see DTD's MS4 Annual Report.
94	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Maintenance of Conveyance System Components and Structural Controls**	**26**	**23**	WES (formerly, SWMACC and CCSD#1)	Number and type of components inspected and/or cleaned	4,549 storm structures includes the inspection and/or cleaning of 361 water quality structures	WES cleaned inspected 303 ponds, CCTV inspected 30 line segments, 361 water quality structures, and conducted vegetation control on 383 ponds. Happy Valley cleaned 33 catch basins.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
95	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Maintenance of Conveyance System Components and Structural Controls**	**26**	**23**	WES (formerly, SWMACC and CCSD#1)	Mass or volume of material removed during cleaning	270 Cubic Yards	WES' vactor-truck loads include both stormwater and sanitary sewer debris that WES hauls alway to a decant facility and, therefore, WES cannot accurately report the volume of material removed from MS4 sediment manholes. Therefore, the 270 cubic yards includes sediment from stormwater manholes and catch basins and sewage debris from sanitary sewer manholes. The County estimates 250 cubic yards removed using the number of pounds dryed at the decant facility per load, which is then multipled by the the total number of truck loads hauled away for the year. Happy Valley removed approximately three cubic yards of material from catch basins.
96	**Component # 7 Pollution Prevention for Municipal Operations BMPs**	**Maintenance of Conveyance System Components and Structural Controls**	**26**	**23**	WES (formerly, SWMACC and CCSD#1)	CCSD#1: Clean storm lines and ditches on an as-needed basis. Identify inspection frequency.	Attained	WES inspects its conveyance system components and structural controls using a preventative maintenance schedule.
97	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Maintenance of Conveyance System Components and Structural Controls**	**26**	**23**	WES (formerly, SWMACC and CCSD#1)	CCSD#1: Maintain structural water quality facilities on a 3-year cycle.	Attained	Water quality structures are scheduled for inspection annually and cleaning is scheduled as needed on a three-year cycle.
98	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Maintenance of Conveyance System Components and Structural Controls**	**26**	**23**	WES (formerly, SWMACC and CCSD#1)	CCSD#1: Conduct conveyance system assessment by January 31, 2013.	Attained	WES continues to improve its computerized maintenance management system and its GIS system to evaluate its conveyance system. WES has updated its Lucity software, updated its WES Works software and contracts with the County for its GIS system improvements.
99	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Conduct Catch Basin Cleaning and Maintenance**	**27**	**24**	WES (formerly, SWMACC and CCSD#1)	Track the percent of District owned or District operated/maintained catch basins cleaned per year	39.60%	3,439 Catch basins were cleaned
100	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Conduct Catch Basin Cleaning and Maintenance**	**27**	**24**	WES (formerly, SWMACC and CCSD#1)	Track the volume of debris removed during cleaning activities	Approximately 250 Cubic Yards	WES' vactor-truck loads include both stormwater and sanitary sewer debris that WES hauls alway to a decant facility and, therefore, WES cannot accurately report the volume of material removed from MS4 catchbasins. Therefore, the 270 cubic yards includes sediment from stormwater manholes and catch basins and sewage debris from sanitary sewer manholes. The County estimates 250 cubic yards removed using the number of pounds dryed at the decant facility per load, which is then multipled by the the total number of truck loads hauled away for the year. Happy Valley removed approximately three cubic yards of material from catch basins.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
101	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Conduct Catch Basin Cleaning and Maintenance**	**27**	**24**	WES (formerly, SWMACC and CCSD#1)	Clean 15% of District owned or District operated/maintained public catch basins each year. The 50 percent cited in the Stormwater Management Plan is a typo.	Attained	WES cleaned 39.6 % of all catch basins (or 3,439 catch basins).
102	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Conduct Catch Basin Cleaning and Maintenance**	**27**	**24**	WES (formerly, SWMACC and CCSD#1)	Schedule repair or replacement of catch basins based on inspection results	Attained	All repairs were made as found by inspections.
103	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Storm Drain Cleaning Assistance Program**	**28**	**25**	WES (formerly, SWMACC and CCSD#1)	Number of agreement holders compared with the number of annual reports received and the number devices being serviced by the vendor	134 Active Commercial Maintenance Agreements in the MS4 area 59 properties submitted reports 569 structures cleaned (225 by the vendor)	SCAP and other commercial private storm drain cleaning tracking has been changed to calendar year reporting rather than permit year. The information cited is the 2018 calendar year.
104	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Storm Drain Cleaning Assistance Program**	**28**	**25**	WES (formerly, SWMACC and CCSD#1)	Total number of businesses serviced by the vendor with total number of devices maintained and volume of debris removed	By Vendor: 29 businesses, 225 devices & over 2600 gallons. By Vendor and Others: 377 businesses, 2024 structures and over 64,000 gallons	SCAP and other commercial private storm drain cleaning tracking has been changed to calendar year reporting rather than permit year. The information cited is the 2018 calendar year.
105	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Storm Drain Cleaning Assistance Program**	**28**	**25**	WES (formerly, SWMACC and CCSD#1)	Continue to provide assistance to commercial and industrial facilities to support their water quality facility maintenance.	Attained	WES continued to partner with the cities of Milwaukie, Gresham, Fairview, Wood Village and the Oak Lodge Sanitary District on a Storm Drain Cleaning Assistance Program (SCAP) for private stormwater facilities. The program consisted of a fall and a spring mailing. To improve compliance, in Fall 2018 WES staff started a series of prioritized onsite inspections that included assessments and guidance on avoiding possible onsite practices that could serve as sources of pollution to the MS4. Where deficiences were identified by WES staff, corrections were required of the properties.
106	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Private Water Quality Facility Maintenance Program**	**29**	**26**	WES (formerly, SWMACC and CCSD#1)	Number of structures inspected and cleaned	4,549 storm structures includes the inspection and/or cleaning of 3472 catch basins, 31 drywells and 361 water quality structures inspected and/or cleaned	A portion of the data provided includes WES' single-family residential area program.

Row No.	Surface Water Management Plan Component	Best Management Practice (BMP)	Former CCSD#1 BMP #	Former SWMACC BMP #	Jurisdiction	Tracking Measures and Measurable Goals (as listed in the 2012 SWMP)	2018 -19 Tracking Measure or Measurable Goal Response	2018 -19 Response Comment
107	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Private Water Quality Facility Maintenance Program**	**29**	**26**	WES (formerly, SWMACC and CCSD#1)	Inspect 70% of our maintenance agreement sub-divisions annually	100%	100% of maintenance agreement sub-division water quality facilities were inspected.
108	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Private Water Quality Facility Maintenance Program**	**29**	**26**	WES (formerly, SWMACC and CCSD#1)	Cleaning and repair schedules will be developed based on inspection outcomes	Attained	Any repairs or cleaning were schedule or completed based on the inspections.
109	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Private Water Quality Facility Maintenance Program**	**29**	**26**	WES (formerly, SWMACC and CCSD#1)	All non-maintenance agreement cleaning and repairs will be request or service driven	Attained	Any repairs or cleaning were schedule or completed based on the inspections.
110	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Private Water Quality Facility Maintenance Program**	**29**	**26**	WES (formerly, SWMACC and CCSD#1)	Emergency driven cleaning and maintenance will be addressed within 24 hours of the call being received	Attained	All emergency request were responded when the request was received.
111	**Component #8 Structural Stormwater Facility Operations and Maintenance**	**Private Water Quality Facility Maintenance Program**	**29**	**26**	WES (formerly, SWMACC and CCSD#1)	All non-emergency requests for service will be addressed within 72 hours of the call received	Attained	All non-emergency request were responded to or completed within the 72 hour time frame

Appendix B

MS4 Pollutant Monitoring Results

This Page Intentionally Left Blank

National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4) Discharge Permit No. 101348

Annual
MONITORING REPORT

Fiscal Year 2018-19
(July 1, 2018 – June 30, 2019)

Prepared for:
Oregon Department of Environmental Quality

Submitted by:
Clackamas County Water Environment Services (WES)
on behalf of Clackamas County and the cities of Rivergrove and Happy Valley

Submitted on:
November 1, 2019

This page intentionally blank

Table of Contents

List of Appendices

List of Tables

List of Figures

This page intentionally blank

1 Summary of Monitoring Activities

The following annual monitoring report describes environmental monitoring activities conducted by Clackamas County Water Environment Services (WES), on behalf of Clackamas County and the cities of Rivergrove and Happy Valley during the 2018-19 reporting year. WES' Surface Water Management Service Area includes the former Clackamas County Service District #1 (CCSD#1) and the Surface Water Management Agency of Clackamas County (SWMACC).

Environmental monitoring activities are conducted in part to comply with National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer (MS4) Permit requirements. The 2018-19 reporting year extends from July 1, 2018 to June 30, 2019. CCSD#1 and SWMACC are still listed as co-permittees on the administratively extended NPDES MS4 permit, and thus monitoring locations pertaining to these former service districts are still referenced throughout this report.

WES also provides environmental monitoring for the City of Gladstone via an intergovernmental agreement (IGA).

Data summaries for the following monitoring activities are included in this annual report:

1. Stormwater Monitoring (five land-use based stormwater monitoring locations), and
2. Instream Monitoring (nine fixed instream locations)

Monitoring results are summarized and graphed in Section 3 (Stormwater Monitoring) and Section 4 (Instream Monitoring). Appendix A includes a tabulation of monitoring results, baseline statistics, and comparison to water quality standards or criteria (as applicable).

For detailed background on monitoring objectives, locations, methods and strategy, refer to the Comprehensive Clackamas County NPDES MS4 Monitoring Plan (CCCSMP), dated January 2017. The 2017 CCCSMP was prepared following completion of monitoring activities outlined in the 2012 NPDES MS4 Permit. While this annual report includes only data collected on behalf of WES, Clackamas County, and the cities of Happy Valley and Rivergrove, the 2017 CCCSMP serves as an established agreement to conduct a coordinated monitoring effort. Data collected by other participating co-permittees' service areas including the cities of Gladstone, Oregon City, West Linn, Wilsonville, and Milwaukie and Oak Lodge Water Services District (OLWSD) collectively address the monitoring requirements and needs of the 2017 CCCSMP.

Monitoring objectives addressed by monitoring activities in the CCCSMP are listed below. Monitoring activities reflected in this annual report are listed below each applicable monitoring objective. Please note that biological sampling and geomorphic condition sampling are conducted by WES, but such activities were not conducted during the 2018-19 reporting year.

1. *Evaluate the source(s) of the 2004/2006 303(d) listed pollutants applicable to the co-permittee's permit area;*

   Stormwater Monitoring: Five land use-based locations are monitored for 303(d) pollutants including metals, nutrients, and sediment (as a surrogate for organics). See Section 3.

2. *Evaluate the effectiveness of Best Management Practices (BMPs) in order to help determine BMP implementation priorities;*

   Instream Monitoring: Paired instream sampling locations on Kellogg Creek are used to compare upstream and downstream water quality conditions and can be used to evaluate stormwater program effectiveness and BMP implementation when assessed during rainfall events, as observed by resulting water quality. See Section 4.

   Stormwater Monitoring: Five land use-based locations are monitored. Long term monitoring may inform BMP effectiveness for specific contributing drainage areas and parameters. See Section 3.

3. *Characterize stormwater based on land use type, seasonality, geography or other catchment characteristics;*

   Stormwater Monitoring: Five land use-based locations are monitored. Results are used to characterize runoff quality for contributing land use categories. See Section 3.

4. *Evaluate status and long-term trends in receiving waters associated with MS4 discharges;*

   Instream Monitoring: Nine instream locations are monitored, each with a long-term period of record. Trends are assessed every five years minimum, and can be performed for both wet and dry weather conditions. See Section 4.

5. *Assess the chemical, biological, and physical effects of MS4 stormwater discharges on receiving waters; and,*

   Instream Monitoring: Nine instream locations are monitored. Chemical effects of MS4 discharges may be assessed by comparing results reflecting wet and dry weather conditions. See Section 4. Biological and physical effects are assessed with instream biological and geomorphic condition monitoring, but such efforts were not conducted during the 2018-19 reporting year.

   Stormwater Monitoring: Five land use-based locations are monitored. Chemical effects of MS4 discharges may be assessed by comparing stormwater monitoring results with instream monitoring results. See Section 3.

6. *Assess progress towards meeting TMDL pollutant load reduction benchmarks.*

   Stormwater Monitoring: Five land use-based locations are monitored. Historical land-use event mean **concentration** (EMC) data, used in the development of TMDL benchmarks is compared with current land use-based stormwater monitoring results to indicate whether programs are improving water quality.

1.1 Stormwater Monitoring Sites

Number of sites: 5

Focus of data evaluation for this annual report:

- How do data from different land uses compare to each other?
- How do data compare with criteria values?
- How do data compare with historical land use-based EMCs?

Number of sampling events required per year: 3

Sampling method: Timed composite grab samples (individual grabs for parameters analyzed in the field)

Rain Gauge: City of Portland HYDRA rainfall network stations 145 and station 4

FY 18-19 Sampling Summary – Sampling Event #1

Sampling Location	WES Sampling Location ID	Receiving Water	Land Use Represented	Date	Time first sample was collected	Time last sample was collected	Rainfall total during the storm (in.)	Antecedent Rainfall condition met? (Y/N)[1]
Outfall #19 at SE Webster Rd.	102	Kellogg Creek	Residential	11/27/18	5:20 am	7:20 am	0.65	Y
Outfall #12 at SE Pheasant Ct.	101	Mt Scott Creek	Mixed Use	11/27/18	5:05 am	7:25 am	0.65	Y
Sunnyside Village Apartments	105	Sieben Creek	Multi-family Residential	10/26/18	5:20 am	7:26 am	0.29	N
SE Oregon Trail near SE Sieben Park Way	103	Sieben Creek	Commercial	10/26/18	5:28 am	7:29 am	0.29	N
Rivergrove Boat Ramp at SW Dogwood Dr.	203	Tualatin River	Residential	11/27/18	4:40 am	6:45 am	0.65	Y

FY 18-19 Sampling Summary – Sampling Event #2

Sampling Location	WES Sampling Location ID	Receiving Water	Land Use Represented	Date	Time first sample was collected	Time last sample was collected	Rainfall total during the storm (in.)	Antecedent Rainfall condition met? (Y/N)
Outfall #19 at SE Webster Rd.	102	Kellogg Creek	Residential	1/8/19	7:25 am	9:25 am	0.27	Y
Outfall #12 at SE Pheasant Ct.	101	Mt Scott Creek	Mixed Use	1/8/19	7:40 am	9:40 am	0.27	Y
Sunnyside Village Apartments	105	Sieben Creek	Multi-family Residential	11/27/18	5:42 am	7:58 am	0.65	Y
SE Oregon Trail near SE Sieben Park Way	103	Sieben Creek	Commercial	11/27/18	5:40 am	7:55 am	0.65	Y
Rivergrove Boat Ramp at SW Dogwood Dr.	203	Tualatin River	Residential	2/1/19	8:30 am	10:30 am	0.26	Y

[1] The antecedent rainfall condition as noted in the CCCSMP (Section 5.2.2) and NPDES MS4 Permit states that as possible, samples must be collected after a minimum 24 hour antecedent dry period.

FY 18-19 Sampling Summary – Sampling Event #3

Sampling Location	WES Sampling Location ID	Receiving Water	Land Use Represented	Date	Time first sample was collected	Time last sample was collected	Rainfall total during the storm (in.)	Antecedent Rainfall condition met? (Y/N)
Outfall #19 at SE Webster Rd.	102	Kellogg Creek	Residential	3/12/19	3:20 am	5:20 am	0.52	Y
Outfall #12 at Pheasant Ct.	101	Mt Scott Creek	Mixed Use	3/12/19	3:10 am	5:10 am	0.52	Y
Sunnyside Village Apartments	105	Sieben Creek	Multi-family Residential	1/8/19	7:34 am	9:34 am	0.27	Y
SE Oregon Trail near SE Sieben Park Way	103	Sieben Creek	Commercial	1/8/19	7:36 am	9:36 am	0.27	Y
Rivergrove Boat Ramp at SW Dogwood Dr.	203	Tualatin River	Residential	3/12/19	3:20 am	5:20 am	0.52	Y

Parameters analyzed in the lab:	Parameters analyzed in the field:
• Total and dissolved copper • Total and dissolved lead • Total and dissolved zinc • Ammonia-nitrogen • Nitrate-nitrogen • Total phosphorus • Ortho-phosphorus • E. *coli* • Hardness • Total solids • Total dissolved solids • Total suspended solids • Volatile solids (site #203 only)	• Dissolved oxygen • Specific conductivity • pH • Temperature

Summary of any noteworthy issues (e.g., missed samples, etc.)

- Based on tabulated data for the 2018-19 reporting period (Appendix A), there is a potential QA/QC issue associated with the following sampling events:
    - Sieben Creek (SE Oregon Trail Dr. Outfall) commercial monitoring location (Location #103) for the 11/27/18 sampling event. The total dissolved solids result is greater than the total solids result. This result has been flagged with red font within Appendix A.
    - Sieben Creek (Sunnyside Village Apartments) multi-family monitoring location (Location #105) for the 11/27/18 sampling event. The total dissolved solids result is greater than the total solids result. This result has been flagged with red font within Appendix A.
- WES was unable to adhere to the recommended antecedent dry weather period as documented in the CCCSMP and NPDES MS4 permit for all storm events during the 2018-19 reporting period. However, the antecedent dry period is listed as a recommendation not a requirement, so storm events collected and reported on are still valid.

Map of sampling sites

- Stormwater monitoring locations specific to WES, Clackamas County, and the cities of Happy Valley and Rivergrove are provided in Appendix B Figure B-1.
- Locations are consistent with those documented in the 2017 CCCSMP.

1.2 Instream Monitoring Sites

Number of sampling locations: 9

Focus of evaluation for this annual report:

- How do data compare with instream water quality criteria and goals outlined in WES' Strategic Plan?
- How do this year's (2018-19) data compare with previously collected data?
- How do upstream and downstream sites on a water body compare with each other?

Number of sampling events required per year: 9

Number of sampling events conducted (for most locations): 12

Sampling method: Grab

Rain Gauge: City of Portland HYDRA rainfall network stations 145 and station 4

FY 18-19 Summary of Sampling Locations

Sampling Location	WES Sampling Location ID	Former Service District	Receiving Water Body	Monitoring Data Range[1]	Upstream or Downstream Site
SE 120th Ave. and Carpenter Drive	05	CCSD#1	Carli Creek	1994 – present	
Hwy 212/ 224	07	CCSD#1	Sieben Creek	1994 – present	
Hwy 212/ 224 (near mouth)	16	CCSD#1	Rock Creek	1998 – present	
SE 84th Ave.	11 (CCSD)	CCSD#1	Phillips Creek	1994 – present	
Hwy 224 at North Clackamas Park	15	CCSD#1	Mt. Scott Creek	1994 – present	
SE Rusk Rd.	14	CCSD#1	Kellogg Creek	1994 – present	US
SE Last Rd.	24	CCSD#1	Cow Creek	2002 – present	
Rowe Middle School (SE Lake Rd.)	27	CCSD#1	Kellogg Creek	2012 – present	DS
SW Mossy Brae Rd.	11 (SWMACC)	SWMACC	Pecan Creek	1996 – present	

1. The date range on the monitoring data may vary by parameter.

FY 18-19 Summary of Sampling Events

Sampling Date	Locations Sampled	Wet or Dry Weather condition?	Rainfall total during the storm (in.), if applicable
07/26/18	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 27	Dry	NA
08/15/18	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 27	Dry	NA
09/18/18	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 27	Dry	NA
10/10/18	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 27	Dry	NA
10/26/18	24	Wet	0.29
11/15/18	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 27	Dry	NA
12/6/18	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 24, 27	Dry	NA
1/15/19	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 24, 27	Dry	NA
2/11/19	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 24, 27	Wet	0.77
2/28/19	24	Dry	NA
3/19/19	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 24, 27	Dry	NA
4/24/19	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 24, 27	Dry	NA
5/21/19	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 24, 27	Dry	NA
6/12/19	5, 7, 11 (CCSD), 11(SWMACC), 14, 15, 16, 27	Dry	NA

Parameters analyzed in the lab:	Parameters analyzed in the field:
• Total and dissolved copper • Total and dissolved lead • Total and dissolved zinc • Ammonia-nitrogen • Nitrate-nitrogen • Total phosphorus • Ortho-phosphorus • *E. coli* • Hardness • Total solids • Total dissolved solids • Total suspended solids • Volatile solids (Pecan Creek only)	• Dissolved oxygen • Specific conductivity • pH • Temperature

Summary of any noteworthy issues (e.g., missed samples, etc.)

- Based on tabulated data for the 2018-19 reporting period (Appendix A), there are potential QA/QC issues associated with the following sampling events:
    - Sieben Creek monitoring location (Location #07) for the 8/15/18 sampling event. The total dissolved solids result is greater than the total solids result. This result has been flagged with red font within Appendix A.
    - Rock Creek monitoring location (Location #16) for the 8/15/18 sampling event. The total dissolved solids result is greater than the total solids result. This result has been flagged with red font within Appendix A.

    - Pecan Creek (SW Mossy Brae Rd.) monitoring location (Location #11) for the 8/15/18 and 12/6/18 sampling events. The dissolved zinc result is greater than the total zinc result. This result has been flagged with red font within Appendix A.
- Total phosphorus data for the November 15, 2018 sampling event was provided as laboratory report, separate from the monitoring data compiled by WES for use in this report.
- There was a reported sewage spill on November 17, 2018 that potentially affected Sieben Creek at Hwy 212/224 (Location #07) (refer to OERS 2018-2600). For several days prior to November 17th, the spill entered the creek on the north side of SE Sunnyside Road at SE 140th. The November 15, 2018 monitoring event reflects elevated ammonia and ortho-phosphate levels that may be related to the spill. Elevated conductivity readings are also reported, indicating the presence of non-stormwater discharge. However, bacteria levels were not elevated compared with previous and subsequent routine sampling results at this location.
- Cow Creek (at SE Last Road) monitoring location (Location #24) only had a total of 8 storm events collected for the 2018-19 reporting period. The required sampling frequency per the CCCSMP is 9 events/ year. However, the other eight instream monitoring locations each had 12 events monitored, and the total number of data points (i.e. sampling events x locations) for the 2018-19 reporting year has been adhered to (see 2017 CCCSMP Section 7.2).
- Pecan Creek (at SW Mossy Brae Road) monitoring location (SWMACC Location #11) observed elevated bacteria readings during routine instream monitoring from July – November 2018 and again in June 2019. WES plans to investigate, which will include collecting water samples in upstream locations in the watershed to attempt to trace the elevated bacteria to its source(s).
- Phillips Creek (at SE 84th Avenue) monitoring location (CCSD#1 Location #11) observed elevated total metal (copper, lead and zinc) concentrations during the September 18, 2018 monitoring event. Other water quality parameters (i.e., pH, conductivity, temperature, etc.) were not elevated, and field observations during the sampling event did not indicate presence of an illicit discharge. As metals concentrations were not elevated during subsequent monitoring events, source control measures were not initiated.

Map of sampling sites

- Instream monitoring locations specific to WES, Clackamas County, and the cities of Happy Valley and Rivergrove are provided in Appendix B, Figure B-2.
- Locations are consistent with those documented in the 2017 CCCSMP.

2 Water Quality Criteria for Comparison

Instream and stormwater monitoring results presented in Sections 3 and 4 are compared to water quality criteria and benchmarks to assess results and impacts to overall watershed health (see Table 2.1).

Selecting appropriate comparison criteria can be challenging for various reasons. Local instream water quality data are best compared with Oregon Water Quality Standards, but these standards are only available for a limited number of pollutants. In addition, the water quality standards for some pollutants vary depending on the measurement of additional analytes. For example, some metals criteria are dependent on the hardness concentration of the water. The need to consider multiple variables to assess a single parameter further limits the ability to directly compare monitoring data to water quality standards. Finally, water quality standards apply only to data collected from directly instream and they do not apply to stormwater data collected from the municipal storm system.

NPDES MS4 permits do not contain numeric effluent limits for pollutants and instead are based on controlling pollution to the "maximum extent practicable" per federal regulations. The use of "criteria" in this report for stormwater monitoring is solely intended to compare to stormwater data and aid in understanding the relative quality of the data. For the purposes of this report, we used stormwater comparison criteria from the most recently issued industrial stormwater permit (1200-Z) to provide a general guide for evaluating the data. However, it should be noted that the industrial stormwater benchmarks were developed to regulate stormwater runoff from industrial sites with known pollutant generating activities and potentially elevated levels of pollutants. That land-use characteristic is not consistent with stormwater monitoring locations sampled for this report.

Table 2-1: Comparison Criteria Used for Data Evaluation Purposes

Parameter	Units	Instream		Parameter	Units	Stormwater	
		Criteria Value	Reference Source			Criteria Value	Reference Source
Copper (dissolved)	µg/L	Varies with hardness	-- [1, 2]	Copper (total)	µg/L	20	--[5]
Lead (dissolved)	µg/L	Varies with hardness	-- [1]	Lead (total)	µg/L	15	--[5]
Zinc (dissolved)	µg/L	Varies with hardness	-- [1]	Zinc (total)	µg/L	120	--[5]
Dissolved oxygen	mg/L	6.5	--[3]	Dissolved oxygen	mg/L	none	NA
E.coli	MPN/100 mL	406	-- [1]	*E.coli*	MPN/100 mL	406	--[5]
Phosphorus (total)	mg/L	0.14	-- [4]	Phosphorus (total)	mg/L	none	NA
TSS	mg/L	none	NA	TSS	mg/L	100	--[5]
pH	S.U.	6.5 to 8.5	-- [6]	pH	S.U.	5.5 – 9.0	--[5]

1. *OR Water Quality Criteria.*
2. *The copper criteria are now based on the biotic ligand model (BLM) which requires additional parameters for evaluation. For purposes of this annual report, the copper criteria were calculated based on hardness instead of using the BLM.*
3. *Minimum target for cool water habitat.*
4. *Tualatin TMDL for most sources to the Tualatin River below Dairy Creek.*
5. *1200-Z Benchmark.*
6. *Typical comparison criteria.*

3 Stormwater Data Results

This section presents an evaluation of data results from WES' stormwater monitoring efforts during FY 2018-19. The focus of the evaluation is to address the following questions:

- How do data from different land uses compare to each other?
- How do data compare with criteria values?
- How do data compare with historical land use-based EMCs?

3.1 Results Summary

The following plots (Figures 3-1 to 3-10) show stormwater data collected by contributing land use during the 2018-19 reporting year for the following parameters: total copper, lead and zinc; E. *coli*; and total suspended solids (TSS). Actual data for these parameters along with temperature; dissolved oxygen; nitrate-nitrite; total and ortho phosphorus; dissolved copper, lead, zinc and hardness; are provided in Appendix A.

A total of five stormwater monitoring locations are reflected in the following plots, including two residential land use monitoring locations, a multi-family residential location, a commercial location, and a mixed-use location. Three storm events were collected at each location, and the results for each event are plotted.

Plots include data ranges reflecting historical land-use based event mean concentrations (EMCs). The historical land-use based EMCs reflect regional stormwater data collected from 1990-1996 and supplemented in 2008 as part of a larger Oregon Association of Clean Water Agencies (ACWA) study. These land-use-based EMCs were used to represent untreated stormwater runoff quality when TMDL pollutant load reduction benchmarks were developed as required under the effective 2012 NPDES MS4 permit. For each parameter, two plots (one residential and one commercial) are provided to compare stormwater monitoring results against the respective historical land use EMC data.

Comparison criteria values consistent with Table 2-1 are also reflected on the plots.

Total Copper

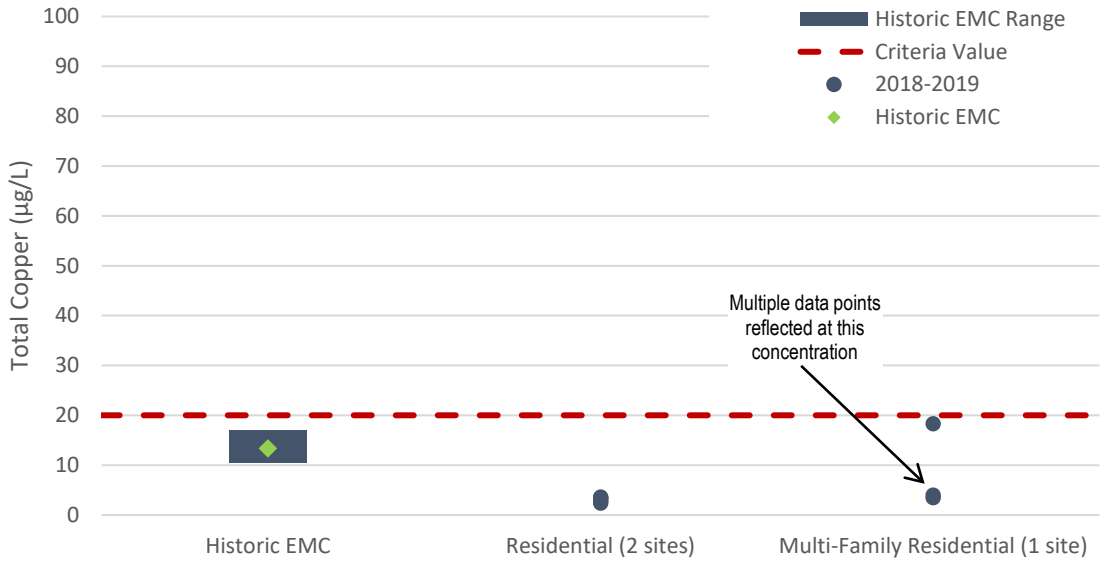

Figure 3-1: Residential Stormwater Monitoring Comparison, Total Copper

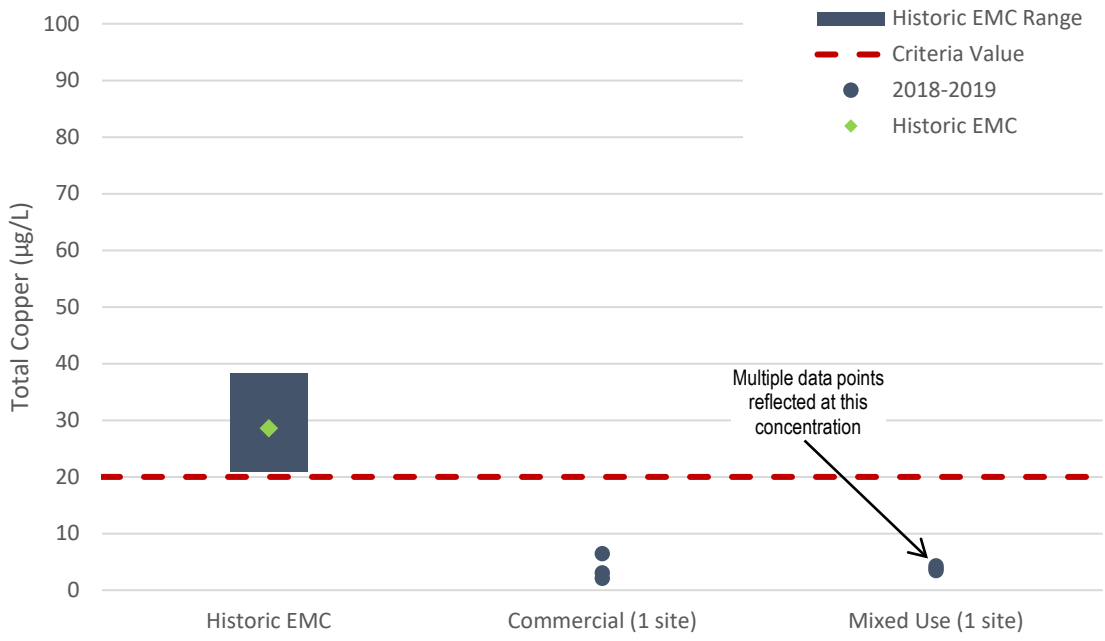

Figure 3-2: Commercial Stormwater Monitoring Comparison, Total Copper

Total Lead

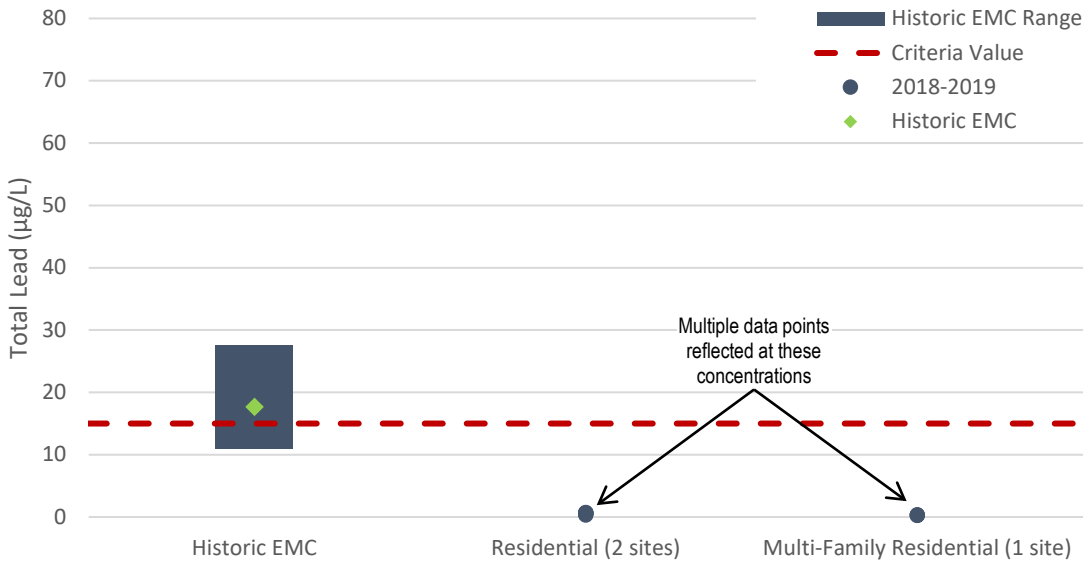

Figure 3-3: Residential Stormwater Monitoring Comparison, Total Lead

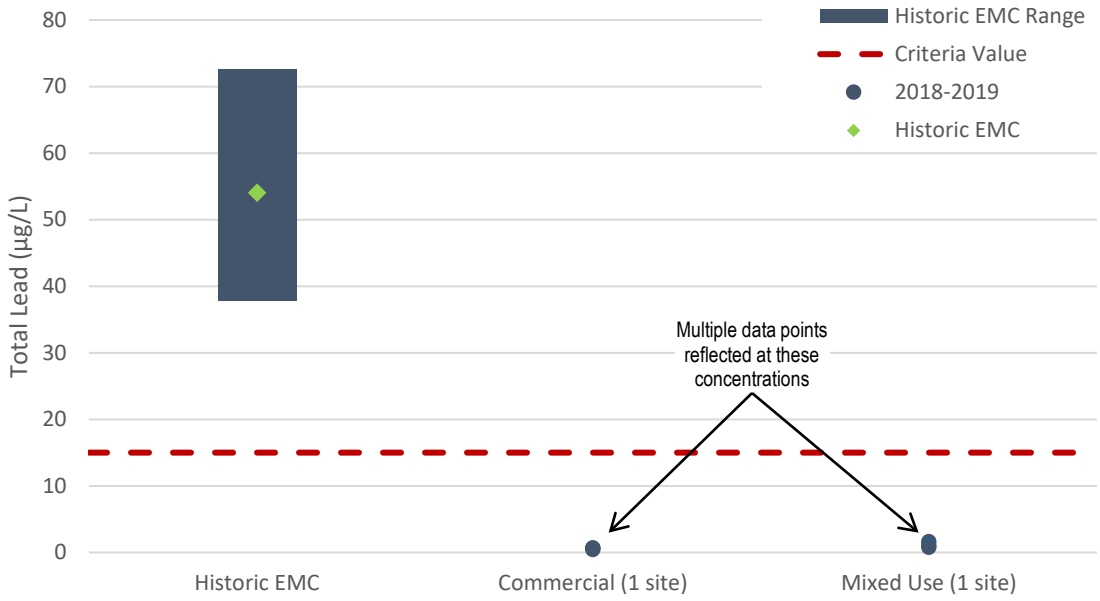

Figure 3-4: Commercial Stormwater Monitoring Comparison, Total Lead

Total Zinc

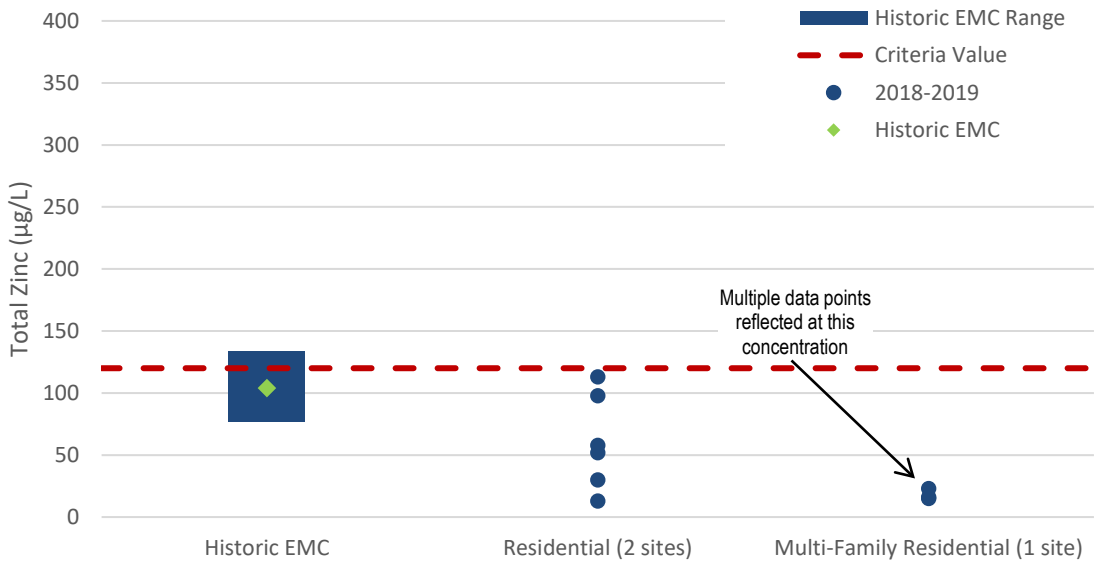

Figure 3-5: Residential Stormwater Monitoring Comparison, Total Zinc

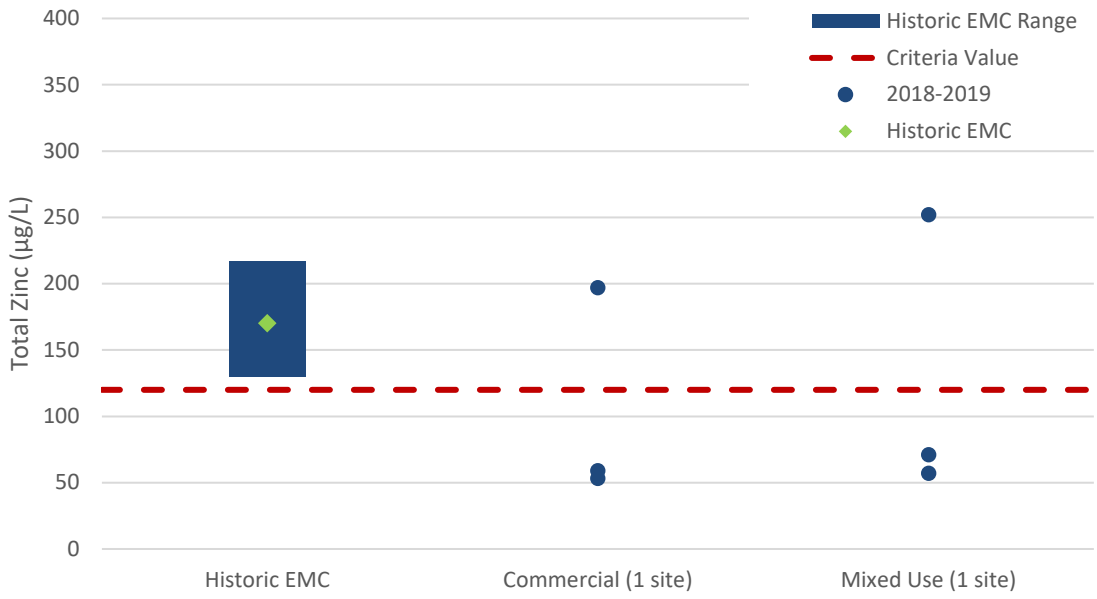

Figure 3-6: Commercial Stormwater Monitoring Comparison, Total Zinc

Total Suspended Solids

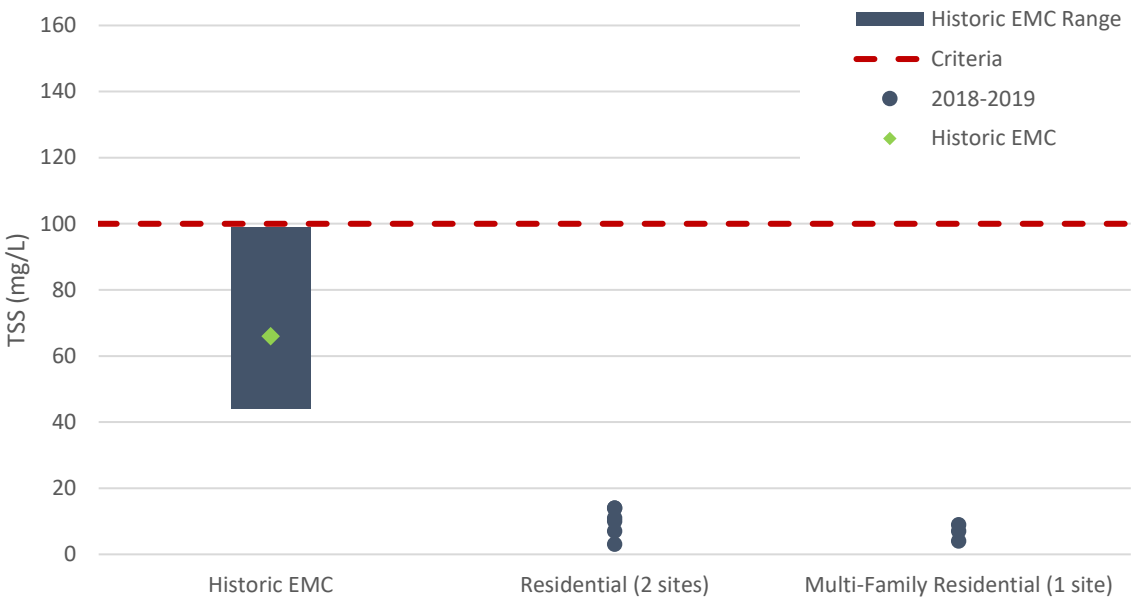

Figure 3-7: Residential Stormwater Monitoring Comparison, Total Suspended Solids

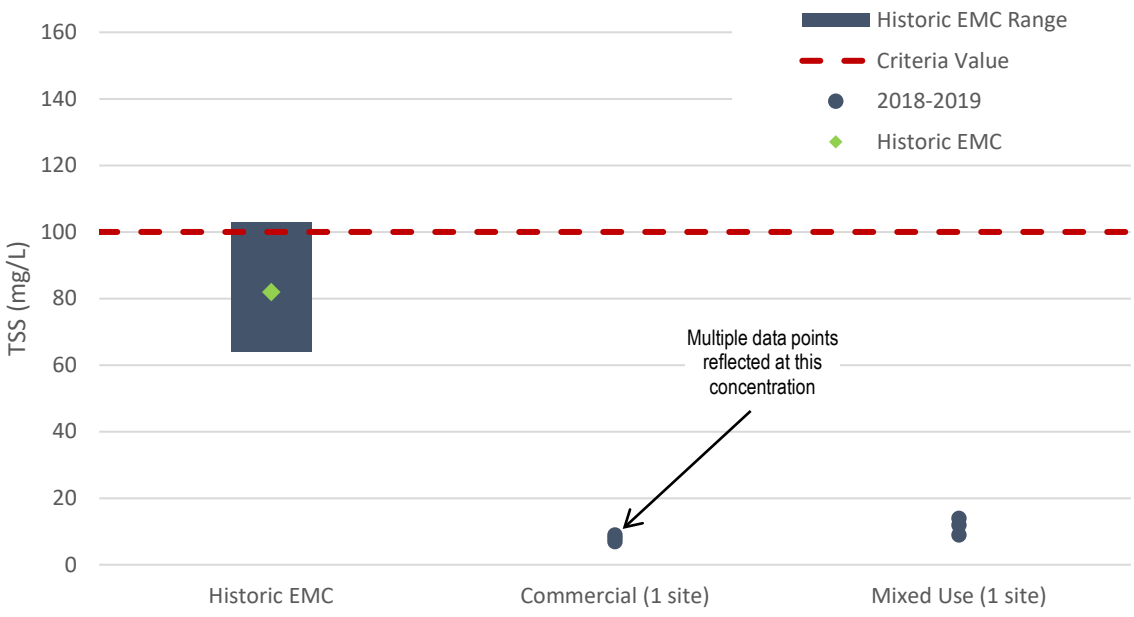

Figure 3-8: Commercial Stormwater Monitoring Comparison, Total Suspended Solids

Bacteria (*E. coli*)

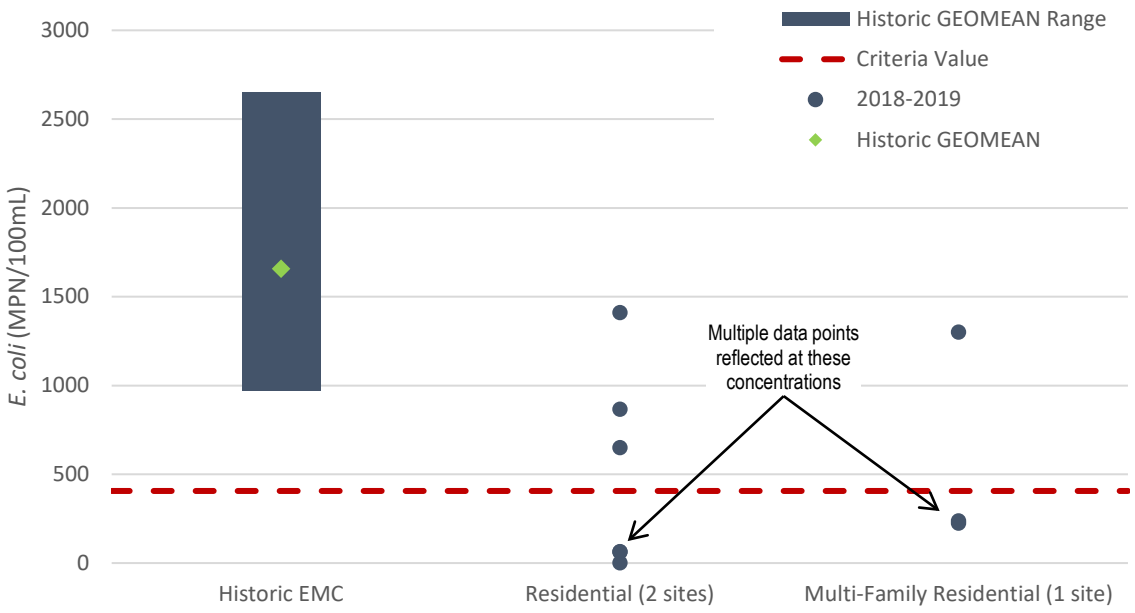

Figure 3-9: Residential Stormwater Monitoring Comparison, Bacteria

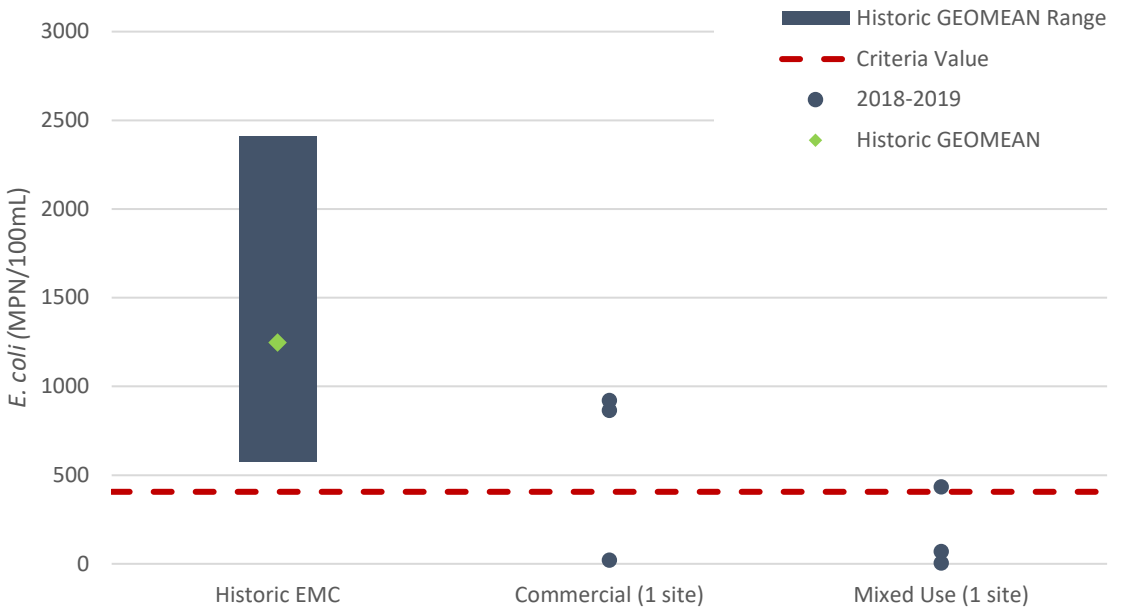

Figure 3-10: Commercial Stormwater Monitoring Comparison, Bacteria

3.2 Evaluation

Figures 3-1 to 3-10 compare land-use-based stormwater monitoring results for five select parameters.

How do data from different land uses compare to each other?

Given the limited number of data points, and the variability of the data, no specific observations were noted when comparing results by land use.

How do data compare with criteria values?

- None of the 2018-19 monitoring data for total copper, total lead, or TSS exceeded the water quality comparison criteria values from Table 2-1.
- E. coli exceeded the water quality criteria value for select sampling events during the 2018-19 monitoring period, with total water quality exceedances of 44% and 50% for residential and commercial samples, respectively.
- Total zinc exceeded the water quality criteria value for 33% of sampling events for commercial samples during the 2018-19 monitoring period. Residential samples did not contain any exceedances for total zinc.
- Figure 3-11 reflects the percent exceedance of 2018-19 stormwater monitoring data with respect to water quality comparison criteria values from Table 2-1. Note that there were no water quality exceedances for total copper, total lead, nor TSS for residential or commercial land use.

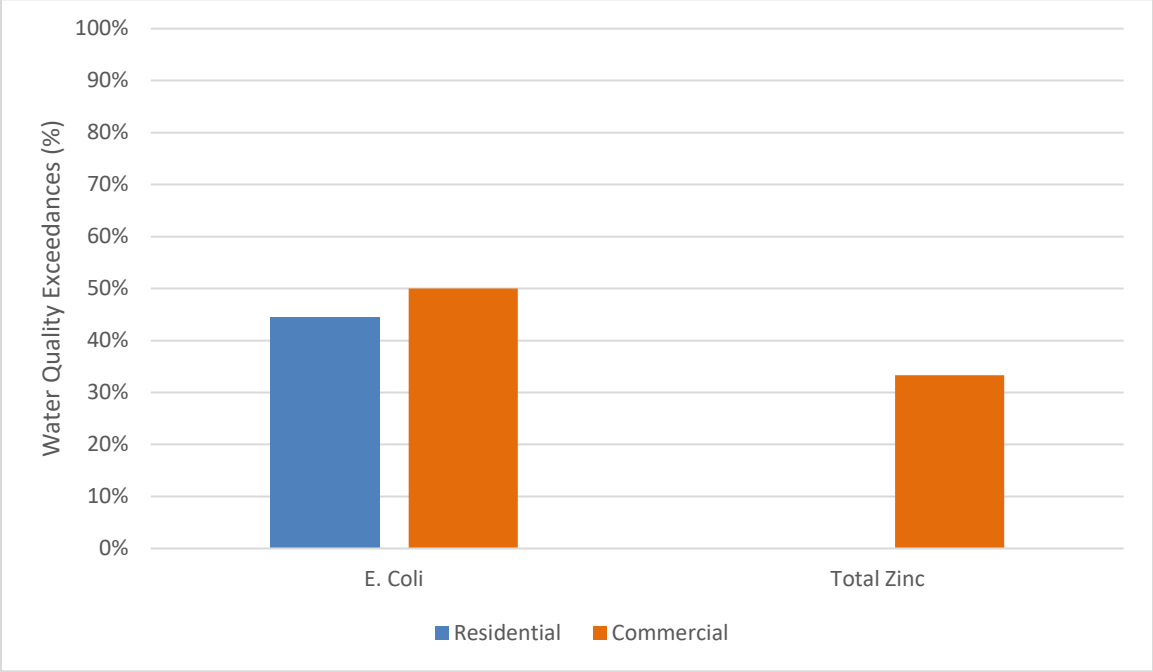

Figure 3-11: 2018-19 Stormwater Monitoring Data Percent Exceedance of Water Quality Comparison Criteria

How do data compare with historical land-use-based EMCs?

- The 2018-19 monitoring data from the commercial and residential sites for total copper, total lead and TSS were consistently lower than the historical EMC data ranges. The only exception to this was at the multi-family residential site (Sieben Creek, Location #105) during the 10/26/18 sampling event where the total copper result was greater than the historic EMC range, although still below the water quality criteria value.
- The 2018-19 monitoring results for total lead reflect greatest difference from historical EMC data ranges. Total lead results are several orders of magnitude lower than historic for commercial and residential sites.
- 2018-19 monitoring data for total zinc and *E. coli* were generally consistent with the historical EMC data. E. coli results for both residential and commercial land use are less than the historic geomean.
- The compilation of stormwater monitoring data collected since 2012 (the current NPDES MS4 permit period) could be used to further evaluate current runoff quality and determine whether more recent data reflects improvement over baseline or historic EMCs. Future TMDL benchmark efforts could then use updated land use EMCs, reflecting improvements and progress towards meeting TMDL wasteload allocations (WLAs).

4 Instream Data Results

This section presents an evaluation of data results from WES' instream monitoring efforts during 2018-19 reporting period. The focus of the evaluation is to address the following questions:

- How do data compare with instream water quality criteria and goals outlined in WES' Strategic Plan?
- How do this year's (2018-19) data compare with previously collected data?
- How do upstream and downstream sites on a water body compare with each other?

Table 4-1 outlines the TMDL and 303(d) parameters by waterbody and has been included for reference.

Table 4-1: Summary of TMDL and 303(d) Parameters Applicable to WES Monitoring Locations

Monitored water body	Bacteria	Temperature	Dissolved oxygen (DO)	Ammonia	Phosphorus	pH/chlorophyll a	Mercury	PCBs	TCE	PAHs	DDE/DDT	Pesticides (dieldrin, eldrin aldehyde, endosulfan)	Arsenic	Thallium	Iron	Lead	Copper	Manganese	Zinc
TMDLs																			
Willamette River (and tributaries) (2006)	✓	✓					✓												
Johnson Creek (2006)	✓	✓					✓				✓	✓							
Tualatin River (1998/2001/2012)	✓	✓	✓	✓	✓	✓	✓												
2012 (effective) 303(d) list																			
Johnson Creek											✓	✓				✓			
Kellogg Creek			✓																
Willamette River (direct and tributaries)			✓				✓									✓	✓		
Fanno Creek			✓						✓				✓	✓	✓	✓	✓		✓
Tualatin River				✓			✓									✓	✓		✓

DDE = dichlorodiphenyldichloroethylene

DDT = dichlorophenyltrichloroethane

PAH = polycyclic aromatic hydrocarbon

PCB = polychlorinated biphenyl

TCE = trichloroethylene

4.1 Results Summary – Water Quality Criteria

Table 4-2 summarizes the percentage of instream monitoring data from the 2018-2019 reporting year that exceeded instream water quality criteria as defined in Table 2-1. WES' strategic plan includes a metric for 30% of streams to meet/ exceed water quality standards. As shown in Table 4-2, exceedances vary by parameter and location, with each monitoring location exceeding standards for a minimum of one parameter. The largest number of exceedances occurred for *E. coli.*

Table 4-2: Percentage of 2018-19 instream monitoring data exceeding water quality criteria[1]

Waterbody	Dissolved oxygen	E. *coli*	Copper, Dissolved		Lead, Dissolved		Zinc, Dissolved		Total Phosphorus
			Chronic	Acute	Chronic	Acute	Chronic	Acute	
Carli Creek	0%	8%	0%	0%	0%	0%	8%	8%	0%
Sieben Creek	0%	8%	0%	0%	0%	0%	0%	0%	8%
Phillips Creek	17%	17%	0%	0%	0%	0%	0%	0%	0%
Kellogg Creek – US	0%	42%	0%	0%	0%	0%	0%	0%	8%
Kellogg Creek – DS	0%	25%	0%	0%	0%	0%	0%	0%	0%
Mt Scott Creek	8%	17%	0%	0%	0%	0%	0%	0%	8%
Rock Creek	0%	8%	0%	0%	0%	0%	0%	0%	8%
Cow Creek	0%	0%	13%	13%	0%	0%	25%	25%	0%
Pecan Creek	0%	50%	0%	0%	0%	0%	0%	0%	8%

1. Water quality exceedances for metals are based on actual monitored hardness values for each monitoring event.

4.2 Results Summary – Historical Comparison

The following plots (Figures 4-1 to 4-7) compare current (2018-19) and historical instream water quality data by monitoring location. Historical data reflects data collected at each monitoring location for the available period of record. Section 1.2 lists the historical monitoring date ranges for each sampling location. Note that not all parameters were sampled historically for the same period of record at each monitoring location (e.g. dissolved lead and dissolved oxygen).

Box and whisker plots were developed for each of the following parameters: dissolved copper, lead and zinc; *E. coli*; total suspended solids (TSS); total phosphorus and dissolved oxygen. 2018-19 data for additional parameters including temperature, nitrate-nitrite, total and ortho phosphorus, total copper, total lead, total zinc, and hardness are provided in Appendix A.

Box and whisker plots graphically show the distribution of a data set including maximum and minimum values, median values, and the upper and lower quartiles. The upper and lower quartiles are calculated based on the medians of the upper and lower half of the data sets. The highest and lowest values in the data set represent the whiskers on the plot. For this effort, the box and whisker plots include data combined from both wet and dry weather conditions to provide sufficient data to allow for creation of a box and whisker plot for a single year (2018-2019) of monitoring data. Future efforts may include compilation and comparison of more than a single year of data, which would allow for additional data evaluations (i.e., dry versus wet weather conditions to assess MS4 impacts on receiving waters).

It should be noted that the historical data set reflects previous guidelines of the CCCSMP, specifically collection of a certain number of samples (typically three events per year) during rainfall conditions. As such, the historic data set may reflect elevated pollutant concentrations due to the contribution of MS4

runoff. During the 2018-19 reporting year, rainfall conditions occurred during only one or two monitoring events, so the collective data set does not reflect the presence of MS4 runoff for most samples.

Criteria values consistent with Table 2-1 are reflected in the figures. As instream water quality standards for dissolved metals are hardness dependent, chronic instream water quality comparison criteria values based on a hardness of both 50 mg/L and 100 mg/L are plotted for reference. Calculated chronic and acute criteria based on actual hardness for each monitoring event is provided in Appendix A.

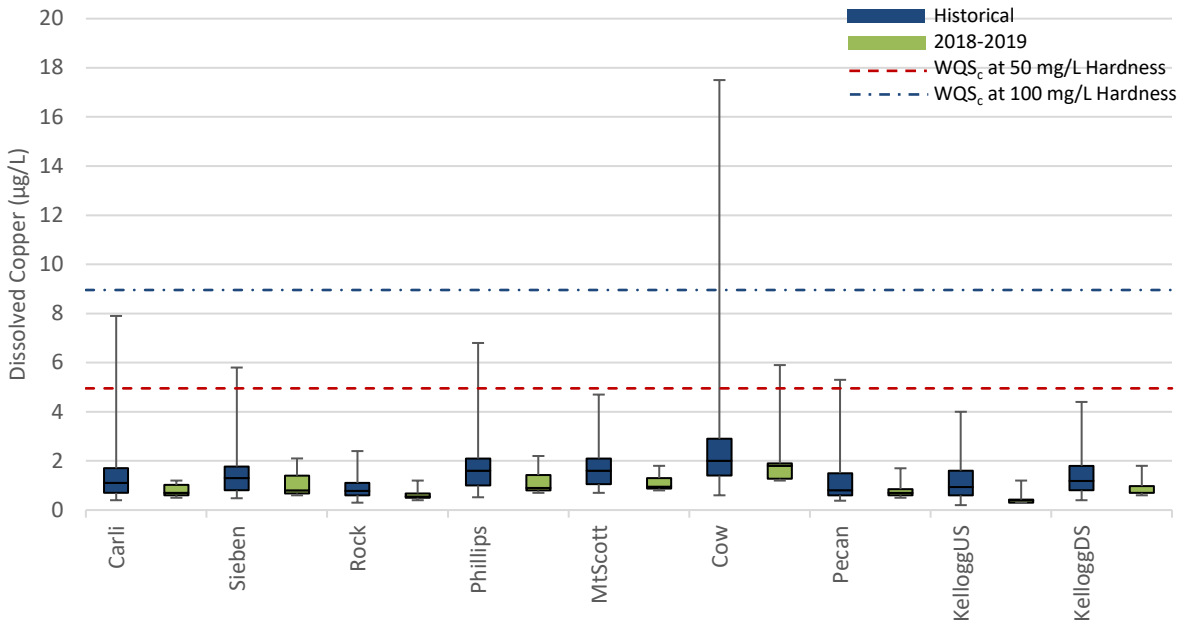

Figure 4-1: Instream Monitoring Historical Comparison, Dissolved Copper

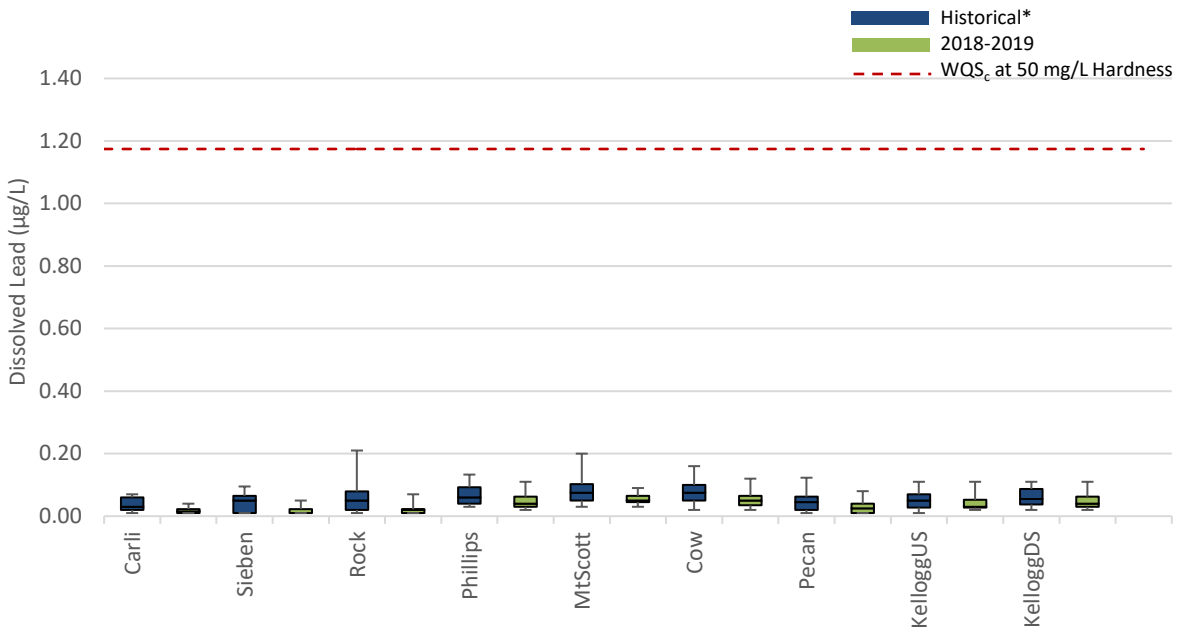

Figure 4-2: Instream Monitoring Comparison, Dissolved Lead
**Historical data is from 2016-2018*

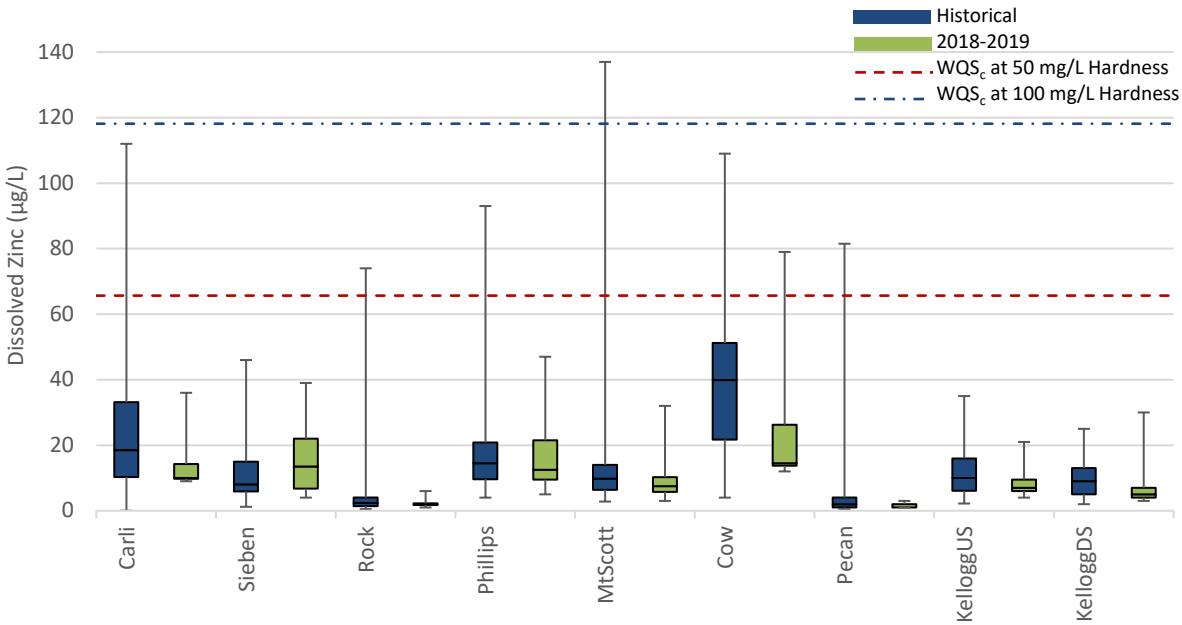

Figure 4-3: Instream Monitoring Historical Comparison, Dissolved Zinc

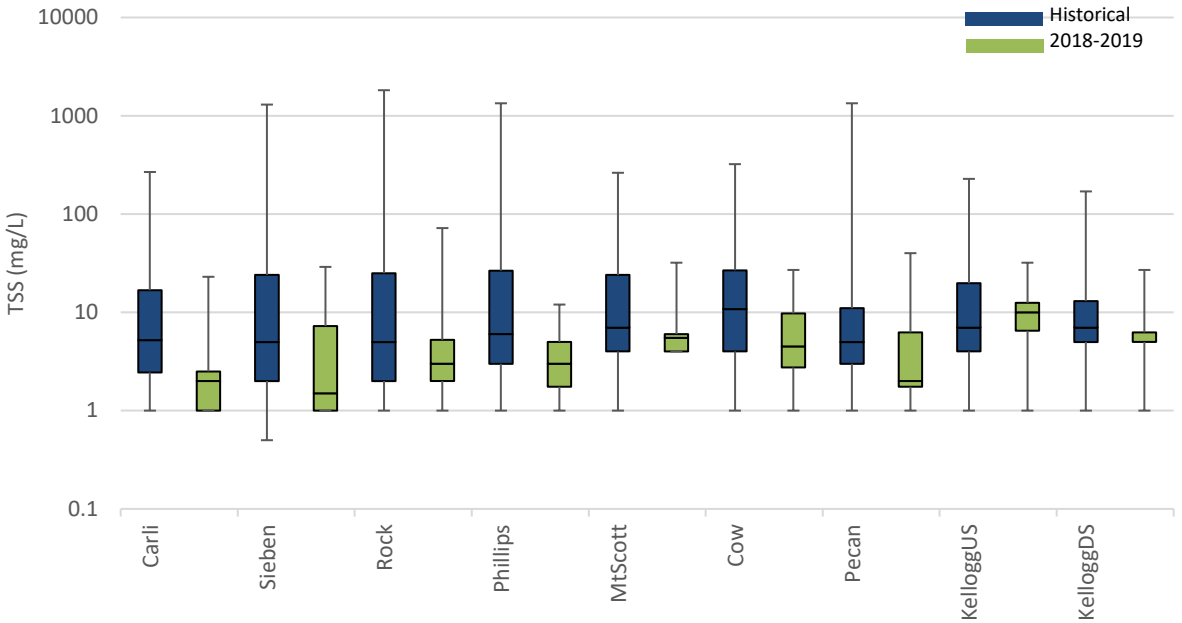

Figure 4-4: Instream Monitoring Historical Comparison, Total Suspended Solids

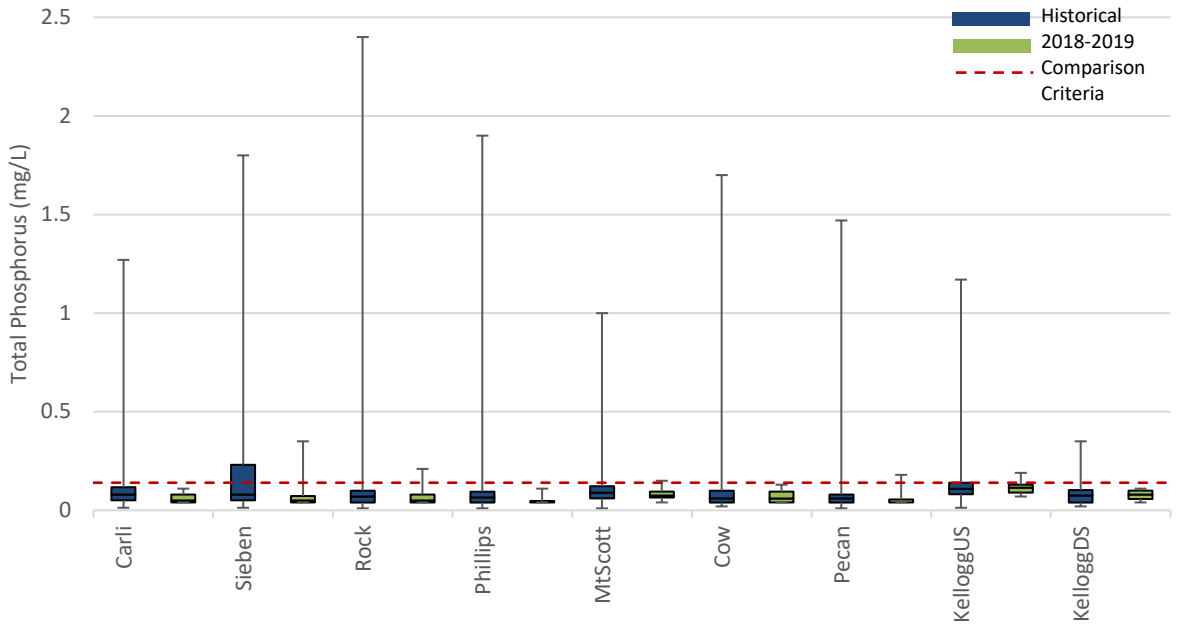

Figure 4-5: Instream Monitoring Historical Comparison, Total Phosphorus

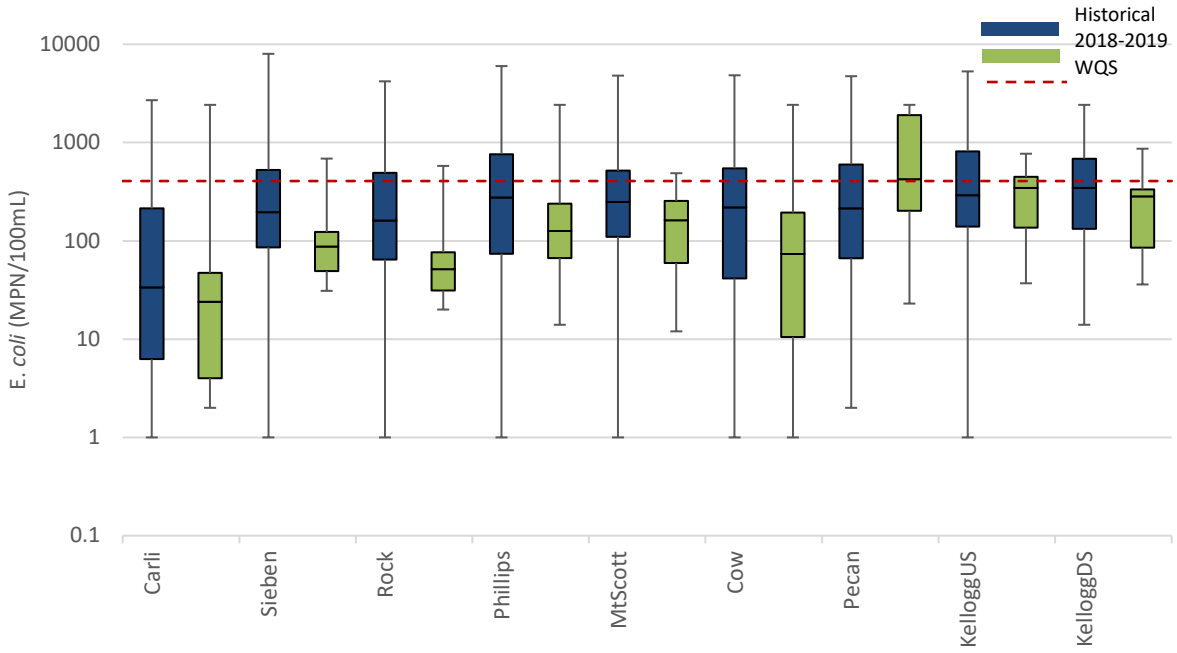

Figure 4-6: Instream Monitoring Historical Comparison, Bacteria

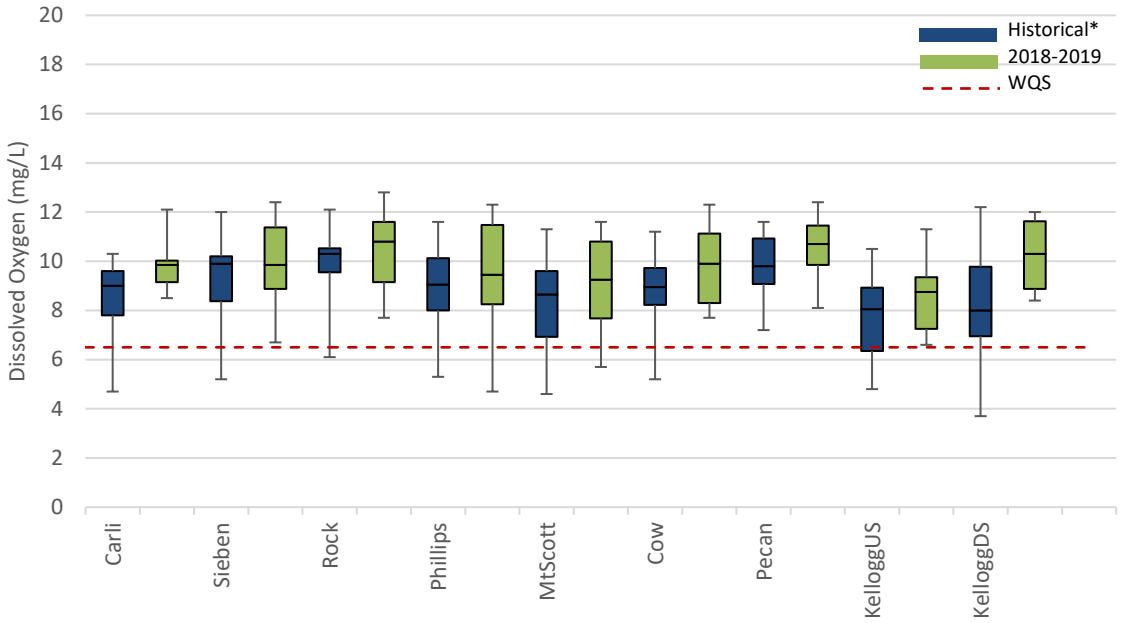

Figure 4-7: Instream Monitoring Comparison, Dissolved Oxygen
**Historical data is from 2016-2018*

4.3 Evaluation

The data evaluations below are based on Table 4-2, which summarizes current (2018-19) monitoring data exceedances of water quality criteria by parameter and location, and on Figures 4-1 to 4-7, which show box and whisker plots comparing current and historical data.

With respect to water quality criteria for metals, Table 4-2 exceedances are based on actual hardness levels measured during the sampling event. Figures 4-1 to 4-7 compare historical and current data to the chronic water quality criteria based on hardness values of 50 mg/L and 100 mg/L.

How do (2018-19) data compare with instream water quality criteria and goals outlined in WES's Strategic Plan?

- Per Table 4-2, the most exceedances of the water quality comparison criteria were for bacteria. Bacteria exceedances occurred in every stream monitored except for Cow Creek. The Pecan Creek location had the highest percentage of bacteria exceedances (50%). For comparison purposes, during the 2017-18 reporting period, bacteria exceedances occurred in every stream monitored except Rock Creek, but none of the streams had a percentage exceedance of 50% or greater.
- Per Table 4-2, the Kellogg Creek – US and Cow Creek monitoring locations reported the greatest number of water quality exceedances for parameters monitored.
- No current exceedances of the chronic or acute water quality criteria were observed for dissolved lead.
- Per Table 4-2, dissolved oxygen exceedances occurred in only two of the streams monitored. For comparison purposes, 2017-18 monitoring data showed dissolved oxygen exceedances for every stream except for Pecan Creek.

- All locations had historical and/or current exceedances of the bacteria criteria; however, for all locations besides Pecan Creek, the median value did not exceed the criteria.
- Based on the nine streams monitored during 2018-19, results indicate that WES' strategic plan goal of having 30% of streams meet/ exceed water quality standards was not met. Each stream exceeded water quality criteria during at least one monitoring event for one parameter. Sieben Creek collectively had the least number of water quality exceedances.

How do this year's data compare with historical data or last year (2017-18) data?

For the most part, the current (2018-19) monitoring results were in the same range or less than results from the historical data. However, this observation may be due to rainfall events (and thus the contribution of MS4 runoff) no longer being targeted and reflected in the current data set, whereas the historical data set reflects a greater number of rainfall events.

As described above, there were less water quality exceedances for select parameters than last year's data set. Specifically, during 2018-19, there were less exceedances collectively for dissolved oxygen and total phosphorus than during 2017-18. The total percentage of water quality exceedances on Cow Creek did increase from last years results, but that may be due to the collection of less monitoring events in 2018-19 (8 events) versus 2017-18 (11 events).

How do upstream and downstream sites on a water body compare with each other?

- Historical data sets are generally consistent between the upstream and downstream Kellogg Creek monitoring locations for all parameters.
- For dissolved copper, the current and historical data sets and median values are higher at the downstream location than upstream, indicating the potential for deteriorating water quality.
- For dissolved zinc, TSS, total phosphorus, dissolved oxygen, and bacteria, the current and historical data sets and median values at the downstream location are equal to or lower than the upstream location (higher in the case of DO), indicating the potential for improving water quality or the presence of a pollutant source discharge further upstream in the watershed.

5 Adaptive Management Considerations

As required by the permit, documented approaches to adaptive management of stormwater programs were submitted by permittees to DEQ on November 1, 2012. Separate approaches were submitted by CCSD#1 and the City of Happy Valley; SWMACC; and the City of Rivergrove, and Clackamas County. The approaches include two elements:

1. An **annual** process to determine if the stormwater program is being implemented in accordance with the DEQ-approved Stormwater Management Plan (SWMP). The annual process may include program adjustments, if needed.

2. A comprehensive process at the **end of the permit term** and submitted as part of the permit renewal package, to identify proposed program modifications including modification, addition, or removal of BMPs incorporated into the SWMP or modifications to the monitoring program. Such program modifications are based on a more in-depth evaluation of submitted program documentation and studies, including monitoring data.

The 2018-19 reporting year is the second year implementing the 2017 CCCSMP and reflects results of a comprehensive adaptive management process implemented by WES, on behalf of the regulated

Districts, cities and County, and other participants in the CCCSMP. Specific to review of the monitoring program and monitoring data collected, the following section outlines the future monitoring data analyses considerations and potential stormwater management program refinements considering the monitoring data presented herein.

5.1 Future Data Analyses

Data evaluation and results presented in Sections 3 and 4 provide insights into the water quality of municipal stormwater outfalls and receiving waters within the MS4-permitted area and help to identify additional evaluations that could be helpful in providing additional insights. Based on results and conclusions in this annual monitoring report, recommended future monitoring and data evaluation include the following:

- Continued instream data review and comparison based on wet versus dry weather conditions. Current instream data analysis did not include comparison by weather conditions, although the 2016-2017 monitoring report did conduct this review specific for the 2012-2017 CCCSMP implementation period. Periodic review and analysis of wet versus dry weather conditions can continue to inform how/ if MS4 sources are contributing to instream water quality conditions.
- Review monitoring data based on a classification of instream locations by the degree impact from MS4 discharges.
- Future instream monitoring needs. With the recent completion of the Carli Creek water quality facility in the summer of 2018, the addition of a Carli Creek instream monitoring location downstream of the facility could help inform effectiveness of the facility for pollutant removal.
- Comprehensive stormwater monitoring comparison with historic EMCs. Per Section 3, comparison of the current land use-based stormwater monitoring results with historic land use-based EMCs indicates that for select parameters, the historic EMCs may be overestimating the pollutant load generated from that land use. Compilation of additional stormwater data for the same monitoring sites may indicate whether modifications to land use EMCs in future TMDL benchmark efforts is warranted.

5.2 Potential Program Revisions

Ongoing review of monitoring data can help identify future stormwater management program revisions and capital project needs. Once the administrative extension period has concluded and the Clackamas NPDES MS4 permit is reissued, program modifications will be considered and implemented through the adaptive management process and in consideration of results from the annual monitoring report.

Appendix A

Data Tables

This page intentionally blank

Table A-1. WES (CCSD #1) Instream Water Quality Monitoring Results (2018-2019)

Carli Creek

				Water Quality Standard Comparison																Additional Parameters of Concern								Supporting Parameters		
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	WQ Std (MPN per 100ml)	Total Phosphorus (mg/L)[5]	WQ Std (mg/L)	Copper, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Lead, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Zinc, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia[7] (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	pH[8]	Conductivity (uS/cm)
#05 SE 120th & Carpenter Dr. MH	7/26/18	N	Routine	16.7	18	10.0	6.5	1.30	10	41	406	<0.04	0.14	0.6	9.94	15.08	<0.01	2.87	73.75	10	131.03	129.97	205	2	181	<0.05	0.08	0.9	0.170	13.00	113	7.1	281.0
#05 SE 120th & Carpenter Dr. MH	8/15/18	N	Routine	17.5	18	8.5	6.5	1.10	10	4	406	<0.08	0.14	0.6	10.09	15.33	0.04	2.93	75.17	9	132.99	131.91	195	1	192	<0.05	0.09	0.9	0.310	14.00	115	7	263.0
#05 SE 120th & Carpenter Dr. MH	9/18/18	N	Routine	16.5	18	8.7	6.5	0.90	10	28	406	0.04	0.14	1.0	9.49	14.32	0.02	2.71	69.51	15	125.11	124.09	193	1	186	<0.05	0.07	1.4	0.180	20.00	107	7.2	292.0
#05 SE 120th & Carpenter Dr. MH	10/10/18	N	Routine	16.6	18	8.7	6.5	1.00	10	28	406	0.08	0.14	1.2	8.65	12.93	0.02	2.41	61.77	14	114.12	113.20	178	2	166	<0.05	0.07	2.0	0.290	18.00	96	6.8	233.0
#05 SE 120th & Carpenter Dr. MH	11/15/18	N	Routine	15.8	18	12.1	6.5	0.93	10	71	406	0.07	0.14	0.7	9.79	14.83	0.01	2.82	72.34	10	129.06	128.01	197	1	160	<0.05	0.11	0.9	0.190	14.00	111	7.3	200.0
#05 SE 120th & Carpenter Dr. MH	12/6/18	N	Routine	13.7	18	9.3	6.5	1.10	10	2	406	0.05	0.14	0.7	8.65	12.93	<0.01	2.41	61.77	10	114.12	113.20	183	4	159	<0.05	0.07	0.9	0.130	13.00	96	7.4	268.0
#05 SE 120th & Carpenter Dr. MH	1/15/19	N	Routine	12.6	18	9.6	6.5	1.20	10	7	406	0.05	0.14	0.7	8.42	12.55	<0.01	2.33	59.67	10	111.09	110.19	199	1	142	<0.05	0.1	1.0	0.130	14.00	93	7.2	227.0
#05 SE 120th & Carpenter Dr. MH	3/19/19	N	Routine	12.6	18	10.0	6.5	1.10	10	2	406	<0.04	0.14	0.5	8.34	12.42	<0.01	2.30	58.97	9	110.08	109.19	192	2	157	<0.05	0.07	14.1	0.510	18.00	92	6.8	228.0
#05 SE 120th & Carpenter Dr. MH	4/24/19	N	Routine	12.9	18	10.1	6.5	1.12	10	4	406	0.08	0.14	0.6	8.49	12.68	0.02	2.35	60.37	11	112.10	111.20	188	5	155	<0.05	0.06	2.30	0.360	17.00	94	7.3	222.0
#05 SE 120th & Carpenter Dr. MH	5/21/19	N	Routine	13.7	18	9.8	6.5	0.79	10	>2420	406	<0.04	0.14	1.2	7.32	10.76	0.03	1.95	49.92	20	96.75	95.97	155	2	128	<0.05	0.06	2.5	0.300	25.00	79	7.2	195.2
#05 SE 120th & Carpenter Dr. MH	6/12/19	N	Routine	15.6	18	9.9	6.5	0.95	10	20	406	0.05	0.14	0.6	9.64	14.58	0.01	2.76	70.93	9	127.09	126.06	221	1	182	<0.05	0.07	1.2	0.320	17.00	109	7.1	257.0
Median[4]				15.6		9.8		1.10		20		0.05		0.7			0.01			10.0			193	2	160	0.025	0.070	1.20	0.290	17.00	96	7.2	233.0
Maximum[4]				17.5		12.1		1.30		>2420		0.08		1.2			0.04			20.0			221	5	192	0.025	0.11	14.1	0.510	25.00	115	7.4	292.0
Minimum[4]				12.6		8.5		0.79		2		0.02		0.5			0.005			9.0			155	1	128	0.025	0.06	0.9	0.130	13.00	79	6.8	195.2
Water Quality Exceedance (number of samples)				0		0		0		1		0			0	0		0	0		0	0											
#05 SE 120th & Carpenter Dr. MH	2/11/19	Y	Routine	6.2	18	11.5	6.5	0.29	10	66	406	0.11	0.14	1.1	2.36	3.09	0.040	0.44	11.40	36	31.49	31.23	79	23	44	<0.05	0.03	4.10	1.060	66.00	21	6.6	65.8
Water Quality Exceedance (number of samples)				0		0		0		0		0			0	0		0	0		1	1											

Sieben Creek

				Water Quality Standard Comparison																Additional Parameters of Concern								Supporting Parameters		
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Total Phosphorus (mg/L)[5]	WQ Std (mg/L)	Copper, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Lead, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Zinc, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia[7] (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	pH[8]	Conductivity (uS/cm)
#07 Sieben Creek at Hwy 212/214	7/26/18	N	Routine	17.2	18	8.5	6.5	1.9	10	93	406	<0.04	0.14	0.7	6.60	9.60	<0.01	1.70	43.71	5	87.33	86.62	157	<1	143	<0.05	0.1	0.9	0.14	7.0	70	7.5	186.6
#07 Sieben Creek at Hwy 212/214	8/15/18	N	Routine	17.3	18	8.2	6.5	1.3	10	115	406	<0.08	0.14	0.7	6.60	9.60	<0.01	1.70	43.71	4	87.33	86.62	148	<1	151	<0.05	0.09	0.9	0.09	6.0	70	7.2	181.4
#07 Sieben Creek at Hwy 212/214	9/18/18	N	Routine	11.5	18	9.7	6.5	1.1	10	107	406	<0.04	0.14	1.4	5.46	7.78	0.01	1.33	34.17	6	72.28	71.70	129	1	122	<0.05	0.08	1.6	0.10	7.0	56	7.3	151.6
#07 Sieben Creek at Hwy 212/214	10/10/18	N	Routine	11.8	18	10.0	6.5	0.9	10	148	406	0.07	0.14	1.4	4.70	6.60	0.02	1.10	28.13	7	62.31	61.81	112	2	99	<0.05	0.06	1.7	0.22	8.0	47	7.2	127.6
#07 Sieben Creek at Hwy 212/214	11/15/18	N	Routine	8.8	18	9.5	6.5	0.9	10	75	406	0.35	0.14	2.1	7.08	10.38	0.05	1.86	47.84	39	93.63	92.87	181	1	147	4.4	0.28	2.5	0.22	47.0	76	7.6	248.0
#07 Sieben Creek at Hwy 212/214	12/6/18	N	Routine	4.8	18	11.3	6.5	1.7	10	31	406	0.07	0.14	0.7	5.71	8.17	0.01	1.41	36.20	10	75.55	74.94	153	1	113	<0.05	0.07	0.8	0.12	12.0	59	7.8	155.8
#07 Sieben Creek at Hwy 212/214	1/15/19	N	Routine	4.6	18	12.4	6.5	1.9	10	47	406	<0.04	0.14	0.6	5.29	7.52	0.01	1.28	32.82	15	70.09	69.52	119	5	112	<0.05	0.09	0.8	0.10	19.0	54	6.9	166.4
#07 Sieben Creek at Hwy 212/214	3/19/19	N	Routine	8.7	18	11.6	6.5	1.6	10	50	406	<0.04	0.14	0.6	5.46	7.78	<0.01	1.33	34.17	12	72.28	71.70	153	14	111	<0.05	0.04	0.7	0.23	16.0	56	7.4	152.7
#07 Sieben Creek at Hwy 212/214	4/24/19	N	Routine	10.0	18	6.7	6.5	1.7	10	39	406	0.06	0.14	0.6	5.46	7.78	<0.01	1.33	34.17	22	72.28	71.70	173	29	111	<0.05	0.04	1.0	0.25	36.0	56	7.5	150.6
#07 Sieben Creek at Hwy 212/214	5/21/19	N	Routine	12.0	18	10.7	6.5	1.0	10	185	406	<0.04	0.14	1.6	4.61	6.47	0.03	1.07	27.47	22	61.19	60.69	114	3	92	<0.05	0.04	2.1	0.23	29.0	46	7.4	130.1
#07 Sieben Creek at Hwy 212/214	6/12/19	N	Routine	17.0	18	9.0	6.5	1.4	10	82	406	<0.04	0.14	0.9	5.62	8.04	<0.01	1.38	35.52	16	74.46	73.86	172	1	134	<0.05	0.07	1.2	0.23	21.0	58	7.5	163.5
Median[4]				11.5		9.7		1.4		82		0.02		0.7			0.01			12.0			153	1	113	0.025	0.07	1.0	0.22	16.0	56	7.4	155.8
Maximum[4]				17.3		12.4		1.9		185		0.35		2.1			0.05			39.0			181	29	151	4.4	0.28	2.5	0.25	47.0	76	7.8	248.0
Minimum[4]				4.6		6.7		0.9		31		0.02		0.6			0.005			4.0			112	0.5	92	0.025	0.04	0.7	0.09	6.0	46	6.9	127.6
Water Quality Exceedance (number of samples)				0		0		0		0		1			0	0		0	0		0	0											
#07 Sieben Creek at Hwy 212/214	2/11/19	Y	Routine	5.2	18	12.0	6.5	0.6	10	687	406	0.12	0.14	1.2	3.02	4.05	0.050	0.61	15.77	38	40.18	39.85	105	24	66	<0.05	0.03	3.50	0.66	69.0	28	6.5	83.9
Water Quality Exceedance (number of samples)				0		0		0		1		0			0	0		0	0		0	0											

Phillips Creek

				Water Quality Standard Comparison																Additional Parameters of Concern								Supporting Parameters		
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Total Phosphorus (mg/L)[5]	WQ Std (mg/L)	Copper, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Lead, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Zinc, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia[7] (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	pH[8]	Conductivity (uS/cm)
#11 Phillips Creek at SE 84th Ave.	7/26/18	N	Routine	19.5	18	7.5	6.5	1.0	10	105	406	<0.04	0.14	0.9	7.64	11.28	0.04	2.05	52.69	5	100.89	100.07	167	3	146	<0.05	0.07	1.2	0.26	8	83	7.6	205.0
#11 Phillips Creek at SE 84th Ave.	8/15/18	N	Routine	19.3	18	4.7	6.5	2.8	10	411	406	<0.08	0.14	0.9	7.79	11.53	0.02	2.11	54.08	5	102.94	102.11	161	2	159	<0.05	0.07	1.6	0.22	10	85	6.8	207.0
#11 Phillips Creek at SE 84th Ave.	9/18/18	N	Routine	14.0	18	8.5	6.5	0.7	10	147	406	<0.04	0.14	1.3	6.28	9.09	0.06	1.60	40.97	8	83.08	82.41	138	1	131	<0.05	0.05	62.9	49.06	3747	66	7.3	177.1
#11 Phillips Creek at SE 84th Ave.	10/10/18	N	Routine	13.9	18	9.1	6.5	0.7	10	210	406	0.07	0.14	1.5	5.37	7.65	0.06	1.31	33.49	10	71.19	70.61	122	5	106	<0.05	0.04	2.1	0.50	16	55	7.4	144.0
#11 Phillips Creek at SE 84th Ave.	11/15/18	N	Routine	10.0	18	9.8	6.5	0.8	10	70	406	<0.04	0.14	0.8	6.92	10.12	0.03	1.81	46.46	10	91.54	90.79	151	1	120	<0.05	0.73	1.1	0.26	11	74	7.6	185.0
#11 Phillips Creek at SE 84th Ave.	12/6/18	N	Routine	6.2	18	11.3	6.5	0.8	10	32	406	<0.04	0.14	0.9	6.20	8.96	0.04	1.57	40.28	19	82.01	81.35	139	<1	117	<0.05	0.03	1.1	0.15	25	65	7.4	183.7
#11 Phillips Creek at SE 84th Ave.	1/15/19	N	Routine	5.8	18	12.3	6.5	0.95	10	79	406	<0.04	0.14	0.7	6.03	8.70	0.03	1.52	38.92	13	79.87	79.22	153	2	117	<0.05	0.08	1.0	0.16	16	63	6.9	162.7
#11 Phillips Creek at SE 84th Ave.	3/19/19	N	Routine	10.3	18	12.2	6.5	0.82	10	14	406	<0.04	0.14	0.7	6.28	9.09	0.03	1.60	40.97	29	83.08	82.41	154	5	120	<0.05	<0.03	0.9	0.27	36	66	7.7	176.1
#11 Phillips Creek at SE 84th Ave.	4/24/19	N	Routine	11.7	18	11.2	6.5	0.8	10	57	406	0.04	0.14	0.8	6.44	9.34	0.03	1.65	42.33	15	85.21	84.52	151	3	123	<0.05	0.03	1.1	0.21	20	68	7.3	186.4
#11 Phillips Creek at SE 84th Ave.	5/21/19	N	Routine	13.6	18	8.9	6.5	0.62	10	172	406	<0.04	0.14	1.7	5.12	7.26	0.09	1.23	31.48	41	67.88	67.33	119	5	96	<0.05	<0.04	2.3	0.35	64	52	7.5	140.1
#11 Phillips Creek at SE 84th Ave.	6/12/19	N	Routine	18.6	18	6.1	6.5	0.79	10	326	406	<0.04	0.14	1.4	6.20	8.96	0.07	1.57	40.28	12	82.01	81.35	169	3	130	<0.05	0.04	1.7	0.34	17	65	7.5	168.7
Median[4]				13.6		9.1		0.77		105		0.02		0.9			0.04			12.00			151	3	120	0.025	0.04	1.2	0.26	17	66	7.4	177.1
Maximum[4]				19.5		12.3		2.80		411		0.07		1.7			0.09			41.00			169	5	159	0.025	0.73	62.9	49.06	3747	85	7.7	207.0
Minimum[4]				5.8		4.7		0.62		14		0.02		0.7			0.02			5.00			119	0.5	96	0.025	0.015	0.9	0.15	8	52	6.8	140.1
Water Quality Exceedance (number of samples)				3		2		0		1		0			0	0		0	0		0	0											
#11 Phillips Creek at SE 84th Ave.	2/11/19	Y	Routine	5.8	18	12.0	6.5	0.5	10	>2420	406	0.11	0.14	2.2	5.12	7.26	0.11	1.23	31.48	47	67.88	67.33	186	12	135	<0.05	<0.03	4.8	0.95	66	52	7	203.0
Water Quality Exceedance (number of samples)				0		0		0		1		0			0	0		0	0		0	0											

Table A-1. WES (CCSD #1) Instream Water Quality Monitoring Results (2018-2019)

Kellogg Creek - Upstream Location

				Water Quality Standard Comparison																Additional Parameters of Concern								Supporting Parameters		
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Total Phosphorus (mg/L)[5]	WQ Std (mg/L)	Copper, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Lead, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Zinc, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	pH[8]	Conductivity (uS/cm)
#14 Kellogg Creek at SE Rusk Rd.	7/26/18	N	Routine	16.6	18	6.6	6.5	2.5	10	435	406	0.07	0.14	0.3	7.40	10.89	0.02	1.97	50.61	4	97.79	96.99	193	5	172	<0.05	0.06	0.5	0.25	6	80	7.2	201.0
#14 Kellogg Creek at SE Rusk Rd.	8/15/18	N	Routine	16.4	18	6.8	6.5	2.2	10	488	406	<0.08	0.14	0.3	7.48	11.02	0.02	2.00	51.30	3	98.82	98.02	182	7	169	<0.05	0.06	0.6	0.27	5	81	6.6	198.1
#14 Kellogg Creek at SE Rusk Rd.	9/18/18	N	Routine	13.6	18	7.3	6.5	2.1	10	365	406	0.11	0.14	0.3	7.40	10.89	0.02	1.97	50.61	5	97.79	96.99	187	10	170	<0.05	0.07	0.7	0.37	8	80	6.9	204.0
#14 Kellogg Creek at SE Rusk Rd.	10/10/18	N	Routine	13.3	18	7.1	6.5	2.1	10	160	406	0.13	0.14	0.4	7.16	10.51	0.03	1.89	48.53	7	94.67	93.90	185	10	162	<0.05	0.07	0.8	0.47	10	77	7	197.1
#14 Kellogg Creek at SE Rusk Rd.	11/15/18	N	Routine	11.1	18	8.1	6.5	2.5	10	65	406	<0.04	0.14	0.3	7.40	10.89	0.03	1.97	50.61	6	97.79	96.99	191	9	153	<0.05	0.09	0.7	0.52	8	80	7.1	199.1
#14 Kellogg Creek at SE Rusk Rd.	12/6/18	N	Routine	7.7	18	8.9	6.5	2.3	10	37	406	0.12	0.14	0.4	7.00	10.25	0.03	1.84	47.15	8	92.58	91.83	187	1	147	0.08	0.07	0.6	0.19	10	75	6.9	208.0
#14 Kellogg Creek at SE Rusk Rd.	1/15/19	N	Routine	7.3	18	9.5	6.5	2.3	10	172	406	0.13	0.14	0.5	6.84	9.99	0.06	1.78	45.77	6	90.49	89.75	192	12	162	0.1	0.15	1.0	0.47	10	73	6.7	202.0
#14 Kellogg Creek at SE Rusk Rd.	3/19/19	N	Routine	11.0	18	9.7	6.5	2.2	10	51	406	0.09	0.14	0.4	7.00	10.25	0.05	1.84	47.15	6	92.58	91.83	187	14	153	<0.05	0.06	0.8	0.59	9	75	7.4	177.9
#14 Kellogg Creek at SE Rusk Rd.	4/24/19	N	Routine	12.2	18	9.3	6.5	2.2	10	326	406	0.13	0.14	0.4	6.92	10.12	0.04	1.81	46.46	6	91.54	90.79	193	5	153	<0.05	0.08	0.6	0.29	8	74	7.2	186.0
#14 Kellogg Creek at SE Rusk Rd.	5/21/19	N	Routine	13.7	18	8.8	6.5	2.1	10	687	406	0.13	0.14	0.5	6.92	10.12	0.06	1.81	46.46	6	91.54	90.79	188	17	153	0.06	0.09	1.2	0.79	11	74	7.1	193.4
#14 Kellogg Creek at SE Rusk Rd.	6/12/19	N	Routine	15.0	18	8.7	6.5	2.6	10	770	406	0.09	0.14	0.3	7.24	10.63	0.03	1.92	49.22	5	95.71	94.94	209	11	154	0.06	0.09	0.8	0.67	10	78	7.3	201.0
Median[4]				13.3		8.7		2.2		326		0.11		0.40			0.03			6			188	10	154	0.025	0.07	0.7	0.47	9.00	77	7.1	199.1
Maximum[4]				16.6		9.7		2.6		770		0.13		0.50			0.06			8			209	17	172	0.10	0.15	1.2	0.79	11.00	81	7.4	208.0
Minimum[4]				7.3		6.6		2.1		37		0.04		0.30			0.02			3			182	1	147	0.025	0.06	0.5	0.19	5.00	73	6.6	177.9
Water Quality Exceedance (number of samples)				0		0		0		4		0			0	0		0	0		0	0										
#14 Kellogg Creek at SE Rusk Rd.	2/11/19	Y	Routine	6.3	18	11.3	6.5	1.1	10	435	406	0.19	0.14	1.2	4.09	5.67	0.11	0.92	23.51	18	54.35	53.91	124	32	83	0.06	0.04	2.7	1.12	32	40	6.9	105.0
Water Quality Exceedance (number of samples)				0		0		0		1		1			0	0		0	0		0	0										

Mt Scott Creek

				Water Quality Standard Comparison																Additional Parameters of Concern								Supporting Parameters		
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Total Phosphorus (mg/L)[5]	WQ Std (mg/L)	Copper, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Lead, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Zinc, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia[7] (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	pH[8]	Conductivity (uS/cm)
#15 Mt. Scott Creek in NCCP	7/26/18	N	Routine	20.3	18	7.0	6.5	1.40	10	119	406	0.07	0.14	0.8	8.57	12.81	0.03	2.38	61.07	3	113.11	112.20	181	4	169	<0.05	0.13	1.1	0.25	6	95	7.6	230.0
#15 Mt. Scott Creek in NCCP	8/15/18	N	Routine	19.8	18	5.7	6.5	0.41	10	435	406	<0.08	0.14	0.9	8.42	12.55	0.03	2.33	59.67	3	111.09	110.19	175	5	168	<0.05	0.11	1.2	0.25	6	93	7.2	224.0
#15 Mt. Scott Creek in NCCP	9/18/18	N	Routine	14.5	18	7.9	6.5	0.43	10	219	406	0.12	0.14	1.2	7.32	10.76	0.06	1.95	49.92	5	96.75	95.97	160	4	148	<0.05	0.08	1.7	0.24	9	79	7.2	201.0
#15 Mt. Scott Creek in NCCP	10/10/18	N	Routine	13.6	18	8.0	6.5	0.48	10	205	406	0.11	0.14	1.8	5.62	8.04	0.09	1.38	35.52	6	74.46	73.86	119	6	107	<0.05	0.07	2.4	0.44	10	58	7.3	145.5
#15 Mt. Scott Creek in NCCP	11/15/18	N	Routine	9.0	18	10.0	6.5	0.59	10	55	406	0.07	0.14	0.8	7.95	11.79	0.05	2.16	55.48	6	104.99	104.14	171	5	141	<0.05	0.08	2.7	1.44	28	87	7.3	205.0
#15 Mt. Scott Creek in NCCP	12/6/18	N	Routine	5.3	18	11.2	6.5	0.65	10	12	406	0.07	0.14	1.0	7.16	10.51	0.05	1.89	48.53	10	94.67	93.90	164	4	127	<0.05	0.04	1.3	0.23	14	77	7.2	193.1
#15 Mt. Scott Creek in NCCP	1/15/19	N	Routine	4.5	18	11.6	6.5	0.73	10	23	406	0.09	0.14	0.9	7.00	10.25	0.06	1.84	47.15	11	92.58	91.83	165	6	105	<0.05	0.1	1.4	0.31	18	75	6.8	200.0
#15 Mt. Scott Creek in NCCP	3/19/19	N	Routine	10.1	18	10.7	6.5	0.52	10	61	406	<0.04	0.14	0.8	7.24	10.63	0.03	1.92	49.22	12	95.71	94.94	158	6	131	<0.05	0.03	1.0	0.28	15	78	7.5	191.0
#15 Mt. Scott Creek in NCCP	4/24/19	N	Routine	12.7	18	9.9	6.5	0.45	10	78	406	0.08	0.14	0.9	7.00	10.25	0.05	1.84	47.15	9	92.58	91.83	172	6	130	<0.05	0.04	1.4	0.35	14	75	7.4	184.0
#15 Mt. Scott Creek in NCCP	5/21/19	N	Routine	13.8	18	8.6	6.5	0.46	10	488	406	0.04	0.14	1.6	5.46	7.78	0.09	1.33	34.17	9	72.28	71.70	131	13	103	<0.05	0.05	2.5	0.60	16	56	7.3	190.3
#15 Mt. Scott Creek in NCCP	6/12/19	N	Routine	19.8	18	6.9	6.5	0.43	10	276	406	0.05	0.14	1.0	7.40	10.89	0.05	1.97	50.61	6	97.79	96.99	175	4	138	0.06	0.08	1.4	0.42	11	80	7.5	200.0
Median[4]				13.6		8.6		0.48		119		0.07		0.9			0.05			6			165	5	131	0.025	0.080	1.4	0.31	14.00	78	7.3	200.0
Maximum[4]				20.3		11.6		1.40		488		0.12		1.8			0.09			12			181	13	169	0.06	0.13	2.7	1.44	28.00	95	7.6	230.0
Minimum[4]				4.5		5.7		0.41		12		0.02		0.8			0.03			3			119	4	103	0.025	0.03	1.0	0.23	6.00	56	6.8	145.5
Water Quality Exceedance (number of samples)				3		1		0		2		0			0	0		0	0		0	0										
#15 Mt. Scott Creek in NCCP	2/11/19	Y	Routine	5.0	18	11.1	6.5	0.48	10	248	406	0.15	0.14	1.7	4.70	6.60	0.08	1.10	28.13	32	62.31	61.81	169	32	108	<0.05	<0.03	4.6	1.46	61	47	7.2	176.5
Water Quality Exceedance (number of samples)				0		0		0		0		1			0	0		0	0		0	0										

Rock Creek

				Water Quality Standard Comparison																Additional Parameters of Concern								Supporting Parameters		
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Total Phosphorus (mg/L)[5]	WQ Std (mg/L)	Copper, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Lead, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Zinc, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia[7] (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	pH[8]	Conductivity (uS/cm)
#16 Rock Creek near Mouth	7/26/18	N	Routine	17.5	18	8.7	6.5	0.9	10	57	406	0.04	0.14	0.5	7.00	10.25	<0.01	1.84	47.15	1	92.58	91.83	145	2	133	<0.05	0.09	0.7	0.15	2	75	7.6	185.4
#16 Rock Creek near Mouth	8/15/18	N	Routine	17.2	18	8.4	6.5	0.7	10	68	406	<0.08	0.14	0.5	7.32	10.76	<0.01	1.95	49.92	<1	96.75	95.97	137	3	140	<0.05	0.09	0.9	0.09	1	79	7.2	188.1
#16 Rock Creek near Mouth	9/18/18	N	Routine	12.0	18	9.7	6.5	0.6	10	43	406	0.08	0.14	0.6	6.92	10.12	<0.01	1.81	46.46	1	91.54	90.79	144	1	132	<0.05	0.09	0.8	0.11	2	74	7.4	184.2
#16 Rock Creek near Mouth	10/10/18	N	Routine	11.9	18	7.7	6.5	0.7	10	20	406	0.08	0.14	0.9	6.03	8.70	0.02	1.52	38.92	2	79.87	79.22	135	2	120	<0.05	0.07	1.1	0.22	3	63	7.5	159.5
#16 Rock Creek near Mouth	11/15/18	N	Routine	9.2	18	11.6	6.5	0.8	10	61	406	0.06	0.14	0.5	6.76	9.86	0.01	1.76	45.08	2	89.44	88.71	141	2	113	<0.05	0.09	0.6	0.18	2	72	7.7	176.3
#16 Rock Creek near Mouth	12/6/18	N	Routine	5.2	18	11.3	6.5	2.4	10	32	406	0.06	0.14	0.6	5.87	8.44	0.02	1.46	37.56	2	77.71	77.08	149	1	111	<0.05	0.05	0.8	0.09	2	61	7.6	173.3
#16 Rock Creek near Mouth	1/15/19	N	Routine	4.3	18	12.8	6.5	2.30	10	46	406	<0.04	0.14	0.6	4.53	6.33	0.03	1.04	26.81	2	60.06	59.57	126	6	93	<0.05	0.06	0.9	0.18	6	45	6.7	137.6
#16 Rock Creek near Mouth	3/19/19	N	Routine	9.1	18	11.6	6.5	1.40	10	29	406	<0.04	0.14	0.4	4.27	5.93	0.02	0.97	24.82	3	56.65	56.19	121	5	85	<0.05	0.03	0.6	0.21	3	42	7.7	115.6
#16 Rock Creek near Mouth	4/24/19	N	Routine	10.8	18	11.1	6.5	1.0	10	20	406	0.04	0.14	0.5	4.53	6.33	0.02	1.04	26.81	2	60.06	59.57	126	4	87	<0.05	0.04	0.7	0.18	3	45	7.6	115.7
#16 Rock Creek near Mouth	5/21/19	N	Routine	12.9	18	10.5	6.5	0.64	10	102	406	<0.04	0.14	0.9	4.95	6.99	0.05	1.17	30.14	3	65.66	65.13	120	6	95	<0.05	0.05	1.2	0.29	4	50	7.6	135.7
#16 Rock Creek near Mouth	6/12/19	N	Routine	17.0	18	9.3	6.5	0.57	10	345	406	<0.04	0.14	0.5	6.12	8.83	0.01	1.54	39.60	2	80.94	80.28	161	3	125	0.05	0.07	0.7	0.22	2	64	7.6	165.5
Median[4]				11.9		10.5		0.8		46		0.04		0.5			0.02			2			137	3	113	0.025	0.07	0.8	0.18	2.00	63	7.6	165.5
Maximum[4]				17.5		12.8		2.4		345		0.08		0.9			0.05			3			161	6	140	0.05	0.09	1.2	0.29	6.00	79	7.7	188.1
Minimum[4]				4.3		7.7		0.6		20		0.02		0.4			0.005			0.5			120	1	85	0.025	0.030	0.6	0.09	1.00	42	6.7	115.6
Water Quality Exceedance (number of samples)				0		0		0		0		0			0	0		0	0		0	0										
#16 Rock Creek near Mouth	2/11/19	Y	Routine	4.8	18	12.2	6.5	1.6	10	579	406	0.21	0.14	1.2	3.47	4.73	0.07	0.74	18.96	6	46.18	45.80	163	72	75	<0.05	0.03	3.6	1.36	24	33	7	107.5
Water Quality Exceedance (number of samples)				0		0		0		1		1			0	0		0	0		0	0										

Table A-1. WES (CCSD #1) Instream Water Quality Monitoring Results (2018-2019)

Cow Creek

				Water Quality Standard Comparison																Additional Parameters of Concern								Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Total Phosphorus (mg/L)[5]	WQ Std (mg/L)	Copper, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Lead, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Zinc, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	pH[8]	Conductivity (uS/cm)
#24 Cow Creek at SE Last Road	12/6/18	N	Routine	5.2	18	10.6	6.5	0.26	10	3	406	<0.04	0.14	2.2	5.79	8.31	0.05	1.44	36.88	14	76.63	76.01	120	2	100	<0.05	0.03	2.5	0.16	16	60	6.9	217.0
#24 Cow Creek at SE Last Road	1/15/19	N	Routine	4.2	18	11.2	6.5	0.19	10	31	406	<0.04	0.14	1.2	7.08	10.38	0.02	1.86	47.84	15	93.63	92.87	158	8	73	<0.05	0.04	1.6	0.12	20	76	7	414.0
#24 Cow Creek at SE Last Road	2/28/19	N	Routine	4.2	18	12.3	6.5	0.44	10	13	406	<0.04	0.14	1.2	6.92	10.12	0.02	1.81	46.46	21	91.54	90.79	137	1	107	<0.05	<0.04	1.5	0.48	25	74	6.5	181.9
#24 Cow Creek at SE Last Road	3/19/19	N	Routine	9.2	18	9.2	6.5	0.15	10	1	406	<0.04	0.14	1.8	8.96	13.44	0.05	2.52	64.58	14	118.14	117.18	180	3	141	<0.05	<0.03	2.2	0.57	21	100	6.7	230.0
#24 Cow Creek at SE Last Road	4/24/19	N	Routine	12.0	18	8.3	6.5	0.08	10	140	406	0.08	0.14	1.3	9.11	13.69	0.04	2.57	65.99	12	120.14	119.16	192	5	149	<0.05	0.03	1.8	0.24	17	102	7.2	227.0
#24 Cow Creek at SE Last Road	5/21/19	N	Routine	13.9	18	8.3	6.5	0.12	10	>2420	406	0.09	0.14	1.8	6.92	10.12	0.08	1.81	46.46	13	91.54	90.79	147	4	118	0.05	0.1	2.4	0.31	18	74	7.2	169.1
Median[4]				7.2		9.9		0.155		31		0.02		1.6			0.05			14			153	4	113	0.025	0.03	2.0	0.28	19	75	7.0	222.0
Maximum[4]				13.9		12.3		0.44		>2420		0.09		2.2			0.08			21			192	8	149	0.05	0.10	2.5	0.57	25	102	7.2	414.0
Minimum[4]				4.2		8.3		0.045		1		0.02		1.2			0.02			12			120	1	73	0.025	0.015	1.5	0.12	16	60	6.5	169.1
Water Quality Exceedance (number of samples)				0		0		0		0		0			0	0		0	0		0	0											
#24 Cow Creek at SE Last Road	10/26/18	Y	Routine	15.1	18	7.7	6.5	0.17	10	356	406	0.11	0.14	5.9	1.46	1.82	0.12	0.24	6.04	79	19.60	19.44	67	15	53	<0.05	0.06	8.5	1.04	113	12	6.6	34.2
#24 Cow Creek at SE Last Road	2/11/19	Y	Routine	4.8	18	11.1	6.5	0.20	10	116	406	0.13	0.14	1.8	3.02	4.05	0.06	0.61	15.77	42	40.18	39.85	96	27	51	<0.05	0.03	5.9	1.84	73	28	6.5	83.1
Median[4]				10.0		9.4		0.19		236		0.12		3.9			0.09			61			82	21	52	0.025	0.05	7.2	1.44	93	20	6.6	58.7
Maximum[4]				15.1		11.1		0.20		356		0.13		5.9			0.12			79			96	27	53	0.05	0.06	8.5	1.84	113	28	6.6	83.1
Minimum[4]				4.8		7.7		0.17		116		0.11		1.8			0.06			42			67	15	51	0.025	0.03	5.9	1.04	73	12	6.5	34.2
Water Quality Exceedance (number of samples)				0		0		0		0		0			1	1		0	0		2	2											

Kellogg Creek - Downstream Location

				Water Quality Standard Comparison																Additional Parameters of Concern								Supporting Parameters			
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Total Phosphorus (mg/L)[5]	WQ Std (mg/L)	Copper, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Lead, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Zinc, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia[7] (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	pH[8]	Conductivity (uS/cm)
#27 Rowe Middle School SE Lake R	7/26/18	N	Routine	19.1	18	8.4	6.5	1.60	10	866	406	0.06	0.14	0.6	8.11	12.04	0.02	2.22	56.87	3	107.03	106.16	189	5	163	<0.05	0.1	0.9	0.26	7	89	7.1	221.0
#27 Rowe Middle School SE Lake R	8/15/18	N	Routine	18.7	18	8.4	6.5	1.30	10	687	406	<0.08	0.14	0.7	8.03	11.91	0.03	2.19	56.17	3	106.01	105.15	175	6	167	<0.05	0.1	0.9	0.19	5	88	7.1	212.0
#27 Rowe Middle School SE Lake R	9/18/18	N	Routine	13.6	18	9.0	6.5	1.30	10	411	406	0.07	0.14	0.8	7.64	11.28	0.04	2.05	52.69	4	100.89	100.07	176	5	160	<0.05	0.08	1.1	0.25	7	83	7.7	210.0
#27 Rowe Middle School SE Lake R	10/10/18	N	Routine	13.2	18	9.5	6.5	1.20	10	261	406	0.11	0.14	1.2	6.36	9.22	0.06	1.62	41.65	4	84.14	83.46	147	5	134	<0.05	0.07	1.6	0.34	7	67	7.5	168.5
#27 Rowe Middle School SE Lake R	11/15/18	N	Routine	9.9	18	10.7	6.5	1.50	10	68	406	0.08	0.14	0.6	7.87	11.66	0.04	2.13	54.78	4	103.97	103.12	179	5	152	<0.05	0.08	0.9	0.28	9	86	7.6	207.0
#27 Rowe Middle School SE Lake R	12/6/18	N	Routine	5.8	18	11.6	6.5	1.30	10	36	406	0.1	0.14	0.7	7.48	11.02	0.04	2.00	51.30	7	98.82	98.02	174	1	139	<0.05	0.05	1.0	0.17	9	81	7.6	210.0
#27 Rowe Middle School SE Lake R	1/15/19	N	Routine	5.7	18	11.7	6.5	1.40	10	91	406	0.09	0.14	0.9	7.32	10.76	0.07	1.95	49.92	7	96.75	95.97	196	7	147	<0.05	0.1	1.2	0.29	11	79	6.8	240.0
#27 Rowe Middle School SE Lake R	3/19/19	N	Routine	10.6	18	12.0	6.5	1.10	10	68	406	0.05	0.14	0.7	7.32	10.76	0.03	1.95	49.92	7	96.75	95.97	177	5	144	<0.05	0.04	0.9	0.29	10	79	7.6	192.0
#27 Rowe Middle School SE Lake R	4/24/19	N	Routine	12.1	18	11.1	6.5	1.13	10	291	406	0.1	0.14	0.7	7.40	10.89	0.03	1.97	50.61	6	97.79	96.99	187	5	145	<0.05	0.07	1.1	0.32	17	80	7.7	191.7
#27 Rowe Middle School SE Lake R	5/21/19	N	Routine	13.6	18	9.9	6.5	0.95	10	308	406	0.05	0.14	1.3	6.20	8.96	0.08	1.57	40.28	7	82.01	81.35	151	8	124	<0.05	0.07	1.8	0.43	12	65	7.5	159.6
#27 Rowe Middle School SE Lake R	6/12/19	N	Routine	19.1	18	8.5	6.5	1.50	10	276	406	<0.04	0.14	0.7	7.56	11.15	0.04	2.03	52.00	4	99.85	99.04	209	6	156	<0.05	0.09	1.1	0.25	9	82	7.8	207.0
Median[4]				13.2		9.9		1.30		276		0.07		0.7			0.04			4			177	5	147	0.025	0.08	1.10	0.28	9.00	81	7.6	207.0
Maximum[4]				19.1		12.0		1.60		866		0.11		1.3			0.08			7			209	8	167	0.025	0.10	1.80	0.43	17.00	89	7.8	240.0
Minimum[4]				5.7		8.4		0.95		36		0.02		0.6			0.02			3			147	1	124	0.025	0.04	0.90	0.17	5.00	65	6.8	159.6
Water Quality Exceedance (number of samples)				3		0		0		3		0			0	0		0	0		0	0											
#27 Rowe Middle School SE Lake R	2/11/19	Y	Routine	5.3	18	11.7	6.5	0.60	10	299	406	0.11	0.14	1.8	4.87	6.86	0.11	1.15	29.47	30	64.55	64.03	163	27	113	<0.05	0.03	3.8	1.18	50	49	7.1	170.6
Water Quality Exceedance (number of samples)				0		0		0		0		0			0	0		0	0		0	0											

Notes

General: Red font indicates that the dissolved values are higher than the total. Potential QA/QC need.
NS = Not Sampled

1) WQ Standard of 18 C per DEQ's Temperature Water Quality Standard Implementation IMD 2008 for salmon and trout rearing and migration.
2) No DO TMDL for the Willamette River; 6.5 mg/L selected as target minimum DO concentration for cool water habitat.
3) Table 20 - Protection of human health for water and fish ingestion.
4) Non-detects were replaced with one half the detection limit for statistical calculations.
5) WQ Standard of 0.14 mg/L selected based on the load allocation referenced in the Tualatin TMDL for most sources downstream of Dairy Creek.
6) Acute and chronic water quality standards for metals based on hardness only. The current copper WQ standards now reflect use of the biotic ligand model (BLM), but was not evaluated for this report.
7) Ammonia high seal used at all locations on 4/24/2019, instead of Ammonia Low Seal for all other sampling events
8) Ideal pH range is between 6.5 and 8.5.

Table A-2. WES (CCSD #1) Stormwater Monitoring Results (2018-2019)

Mt Scott Creek (Lower) - Stormwater Outfall Monitoring - Mixed Use

		Water Quality Standard Comparison														Additional Parameters of Concern									Supporting Parameters		
WES ID and Location	Date	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	WQ Std (MPN per 100ml)	Copper, Total (ug/L)	WQ Criteria (ug/L)[5]	Lead, Total (ug/L)	WQ Criteria (ug/L)[5]	Zinc, Total (ug/L)	WQ Criteria (ug/L)[5]	Total Solids (mg/L)	Total Suspended Solids[5] (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosph-orus (mg/L)	Ortho-phosphate (mg/L)	Copper, Dissolved (ug/L)	Lead Dissolved (ug/L)	Zinc, Dissolved (ug/L)	Hardness (mg/L)	pH[5]	Conductivity (uS/cm)
#101 SE Pheasant Ct. Outfall	11/27/18	11.1	18	10.6	6.5	0.22	10	435	406	3.9	20	1.61	15	71	120	36	12	10	<0.05	0.10	0.06	3.9	0.13	53	7	6.6	83.1
#101 SE Pheasant Ct .Outfall	1/8/19	6.7	18	12.1	6.5	0.12	10	70	406	3.5	20	1.05	15	57	120	34	14	13	<0.05	0.07	<0.04	3.5	0.04	37	6	6.6	16.9
#101 SE Pheasant Ct. Outfall	3/12/19	6.8	18	11.9	6.5	0.13	10	5	406	4.3	20	0.76	15	252	120	36	9	15	0.07	0.05	<0.04	4.3	0.06	210	8	6.3	32.8
Median [4]		6.8		11.9		0.1		70		3.9		1.05		71		36	12	13	0.025	0.07	0.02	3.9	0.06	53	30	6.6	32.8
Maximum [4]		11.1		12.1		0.2		435		4.3		1.61		252		36	14	15	0.07	0.10	0.06	4.3	0.13	210	8	6.6	83.1
Minimum [4]		6.7		10.6		0.12		5		3.5		0.76		57		34	9	10	0.025	0.05	0.02	3.5	0.04	37	2.5	6.3	16.9
WQ Exceedance (number of samples)		0		0		0		1		0		0		1													

Kellogg Creek (Upstream) - Stormwater Outfall Monitoring - Residential

		Water Quality Standard Comparison														Additional Parameters of Concern									Supporting Parameters		
WES ID and Location	Date	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Total (ug/L)	WQ Criteria (ug/L)[5]	Lead, Total (ug/L)	WQ Criteria (ug/L)[5]	Zinc, Total (ug/L)	WQ Criteria (ug/L)[5]	Total Solids (mg/L)	Total Suspended Solids[5] (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosph-orus (mg/L)	Ortho-phosphate (mg/L)	Copper, Dissolved (ug/L)	Lead, Dissolved (ug/L)	Zinc, Dissolved (ug/L)	Hardness (mg/L)	pH[5]	Conductivity (uS/cm)
#102 SE Webster Rd. Outfall	11/27/18	10.9	18	10.4	6.5	0.35	10	1410	406	3.4	20	0.76	15	113	120	17	14	17	<0.05	0.07	0.06	1.7	0.06	86	8	6.4	86.1
#102 SE Webster Rd. Outfall	1/8/19	7.1	18	11.6	6.5	0.55	10	649	406	2.7	20	0.48	15	52	120	50	7	32	<0.05	0.05	<0.04	1.6	0.05	40	12	6.5	26.5
#102 SE Webster Rd. Outfall	3/12/19	6.4	18	12.3	6.5	0.37	10	62	406	3.5	20	0.62	15	98	120	43	10	20	<0.05	<0.04	<0.04	2.4	0.04	87	10	6.3	40.4
Median [4]		7.1		10.4		0.35		649		3.4		0.62		98		43	10	20	<0.05	0.05	0.02	1.7	0.05	86	10	6.4	40.4
Maximum [4]		10.9		12.3		0.55		1410		3.5		0.76		113		50	14	32	<0.05	0.07	0.06	2.4	0.06	87	12	6.5	86.1
Minimum [4]		6.4		10.4		0.35		62		2.7		0.48		52		17	7	17	<0.05	0.02	0.02	1.6	0.04	40	8	6.3	26.5
WQ Exceedance (number of samples)		0		0		0		2		0		0		0													

Sieben Creek - Stormwater Outfall Monitoring - Commerical

		Water Quality Standard Comparison														Additional Parameters of Concern									Supporting Parameters		
WES ID and Location	Date	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Total (ug/L)	WQ Criteria (ug/L)[5]	Lead, Total (ug/L)	WQ Criteria (ug/L)[5]	Zinc, Total (ug/L)	WQ Criteria (ug/L)[5]	Total Solids (mg/L)	Total Suspended Solids[5] (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosph-orus (mg/L)	Ortho-phosphate (mg/L)	Copper, Dissolved (ug/L)	Lead, Dissolved (ug/L)	Zinc, Dissolved (ug/L)	Hardness (mg/L)	pH[5]	Conductivity (uS/cm)
#103 SE Oregon Trail Dr. Outfall	10/26/18	16	18	4.8	6.5	0.56	10	22	406	6.5	20	0.68	15	197	120	116	7	103	0.21	0.14	0.08	4.5	0.22	162	51	6.5	167.3
#103 SE Oregon Trail Dr. Outfall	11/27/18	11.8	18	9.8	6.5	<0.09	10	921	406	3.1	20	0.66	15	59	120	20	9	24	<0.05	<0.04	0.03	1.8	0.07	45	13	6.7	37.2
#103 SE Oregon Trail Dr. Outfall	1/8/19	7.7	18	11.4	6.5	0.14	10	866	406	2.1	20	0.42	15	53	120	51	8	29	<0.05	0.06	<0.04	1.3	0.06	40	14	6.7	33.7
Median [4]		11.8		9.8		0.14		866		3.1		0.66		59		51	8	29	0.025	0.06	0.03	1.8	0.07	45	14	6.7	37.2
Maximum [4]		16.0		11.4		0.56		921		6.5		0.68		197		116	9	103	0.21	0.14	0.08	4.5	0.22	162	51	6.7	167.3
Minimum [4]		7.7		4.8		0.045		22		2.1		0.42		53		20	7	24	0.025	0.02	0.020	1.3	0.07	40	13	6.5	33.7
WQ Exceedance (number of samples)		0		1		0		2		0		0		1													

Sieben Creek - Stormwater Outfall Monitoring - Multi-Family Residential

		Water Quality Standard Comparison														Additional Parameters of Concern									Supporting Parameters		
WES ID and Location	Date	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate (mg/L)	WQ Std[3] (mg/L)	E. *coli* (MPN per 100ml)	Water Quality Std (MPN per 100ml)	Copper, Total (ug/L)	WQ Criteria (ug/L)[5]	Lead, Total (ug/L)	WQ Criteria (ug/L)[5]	Zinc, Total (ug/L)	WQ Criteria (ug/L)[5]	Total Solids (mg/L)	Total Suspended Solids[5] (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosph-orus (mg/L)	Ortho-phosphate (mg/L)	Copper, Dissolved (ug/L)	Lead, Dissolved (ug/L)	Zinc, Dissolved (ug/L)	Hardness (mg/L)	pH[5]	Conductivity (uS/cm)
#105 Sunnyside Village @Pond	10/26/18	15.4	18	6.4	6.5	0.35	10	236	406	18.3	20	0.27	15	23	120	96	4	86	0.07	0.09	0.05	14.8	0.05	20	36	6.8	169.0
#105 Sunnyside Village @Pond	11/27/18	11.5	18	9.3	6.5	0.37	10	1300	406	4.0	20	0.41	15	15	120	45	9	48	<0.05	0.08	0.06	2.9	0.06	14	24	6.8	51.8
#105 Sunnyside Village @Pond	1/8/19	6.7	18	11.6	6.5	0.15	10	225	406	3.5	20	0.28	15	16	120	41	7	27	<0.05	0.06	<0.04	2.1	0.02	12	12	6.5	20.5
Median [4]		11.5		9.3		0.4		236		4.0		0.28		16		45	7	48	0.025	0.08	0.05	2.9	0.05	14	24	6.8	51.8
Maximum [4]		15.4		11.6		0.4		1300		18.3		0.41		23		96	9	86	0.07	0.09	0.06	14.8	0.06	20	36	6.8	169.0
Minimum [4]		6.7		6.4		0.2		225		3.5		0.27		15		41	4	27	0.025	0.06	0.02	2.1	0.02	12	12	6.5	20.5
WQ Exceedance (number of samples)		0		1		0		1		0		0		0													

Notes

General: Red font indicates that the dissolved values are higher than the total. Potential QA/QC need.

1) WQ Standard of 18 C per DEQ's Temperature Water Quality Standard Implementation IMD 2008 for salmon and trout rearing and migration.
2) No DO TMDL for the Willamette River; 6.5 mg/L selected as target minimum DO concentration for cool water habitat.
3) Table 20 - Protection of human health for water and fish ingestion.
4) Non-detects were replaced with one half the detection limit for statistical calculations.
5) Water quality criteria values based on the stormwater discharge benchmarks in the current 1200-Z permit. The benchmark for TSS is 100 mg/L. The benchmark for pH is 5.5 to 9.0.

Table A-3. WES (SWMACC) Instream Water Quality Monitoring Results (2018-2019)

Pecan Creek

				Water Quality Standard Comparison																Additional Parameters of Concern								Supporting Parameters		
WES ID and Location	Date	Rain Event (Y/N)	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	WQ Std (MPN per 100ml)	Total Phosphorus (mg/L)[5]	WQ Std (mg/L)	Copper, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Lead, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Zinc, Dissolved (ug/L)[6]	WQ Std (Chronic) (ug/L)	WQ Std (Acute) (ug/L)	Total Solids (mg/L)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Ammonia[7] (mg/L)	Ortho-phosphate (mg/L)	Copper, Total (ug/L)	Lead, Total (ug/L)	Zinc, Total (ug/L)	Hardness (mg/L)	pH[8]	Conductivity (uS/cm)
#11 Pecan Creek at SW Mossy Brae Rd.	7/26/18	N	Routine	16.2	18	8.3	6.5	2.10	10	649	406	<0.04	0.14	0.6	6.28	9.09	<0.01	1.60	40.97	2	83.08	82.41	155	2	140	<0.05	0.07	0.7	0.17	2	66	6.8	179.7
#11 Pecan Creek at SW Mossy Brae Rd.	8/15/18	N	Routine	16.6	18	8.1	6.5	2.00	10	>2420	406	<0.08	0.14	0.6	6.60	9.60	<0.01	1.70	43.71	2	87.33	86.62	161	1	147	<0.05	0.07	0.8	0.12	1	70	6.8	187.3
#11 Pecan Creek at SW Mossy Brae Rd.	9/18/18	N	Routine	10.3	18	10.2	6.5	1.60	10	1730	406	<0.04	0.14	0.8	5.79	8.31	<0.01	1.44	36.88	1	76.63	76.01	137	2	126	<0.05	0.06	1.0	0.10	2	60	6.5	169.9
#11 Pecan Creek at SW Mossy Brae Rd.	10/10/18	N	Routine	10.8	18	9.9	6.5	1.00	10	461	406	0.07	0.14	0.8	4.53	6.33	0.02	1.04	26.81	1	60.06	59.57	120	2	104	<0.05	0.06	1.2	0.24	3	45	6.3	134.7
#11 Pecan Creek at SW Mossy Brae Rd.	11/15/18	N	Routine	7.6	18	11.1	6.5	1.20	10	2420	406	<0.04	0.14	0.5	4.87	6.86	<0.01	1.15	29.47	1	64.55	64.03	117	<1	90	<0.05	0.07	0.6	0.20	<1	49	6.3	142.9
#11 Pecan Creek at SW Mossy Brae Rd.	12/6/18	N	Routine	3.8	18	12.4	6.5	0.92	10	167	406	<0.04	0.14	0.7	3.56	4.86	0.03	0.76	19.61	2	47.36	46.98	106	1	86	<0.05	0.04	0.8	0.23	1	34	6.3	116.0
#11 Pecan Creek at SW Mossy Brae Rd.	1/15/19	N	Routine	4.6	18	12.2	6.5	1.00	10	23	406	<0.04	0.14	0.7	3.11	4.19	0.04	0.64	16.40	2	41.39	41.05	108	7	73	<0.05	0.06	0.9	0.19	3	29	6.8	154.3
#11 Pecan Creek at SW Mossy Brae Rd.	3/19/19	N	Routine	7.6	18	11.3	6.5	0.88	10	36	406	<0.04	0.14	1.0	3.56	4.86	0.03	0.76	19.61	3	47.36	46.98	119	11	86	<0.05	0.03	1.4	0.34	3	34	6.6	109.2
#11 Pecan Creek at SW Mossy Brae Rd.	4/24/19	N	Routine	9.2	18	11.0	6.5	0.75	10	214	406	0.05	0.14	0.6	3.65	5.00	0.04	0.79	20.25	2	48.54	48.14	115	3	80	<0.05	0.04	0.9	0.33	3	35	6.6	102.8
#11 Pecan Creek at SW Mossy Brae Rd.	5/21/19	N	Routine	11.0	18	10.4	6.5	0.78	10	291	406	<0.04	0.14	1.7	3.65	5.00	0.04	0.79	20.25	2	48.54	48.14	106	6	79	<0.05	0.05	2.2	0.35	4	35	6.5	113.3
#11 Pecan Creek at SW Mossy Brae Rd.	6/12/19	N	Routine	16.0	18	9.7	6.5	1.20	10	>2420	406	<0.04	0.14	0.7	5.37	7.65	0.02	1.31	33.49	1	71.19	70.61	168	2	133	<0.05	0.06	0.9	0.39	2	55	6.8	170.9
Median[4]				10.3		10.4		1.00		461		0.02		0.7			0.02			2			119	2	90	0.025	0.060	0.90	0.230	2	45	6.6	142.9
Maximum[4]				16.6		12.4		2.10		>2420		0.07		1.7			0.04			3			168	11	147	0.025	0.07	2.2	0.390	4	70	6.8	187.3
Minimum[4]				3.8		8.1		0.75		23		0.02		0.5			0.005			1			106	0.5	73	0.025	0.03	0.6	0.100	0.5	29	6.3	102.8
Water Quality Exceedance (number of samples)				0		0		0		6		0			0	0		0	0		0	0											
#11 Pecan Creek at SW Mossy Brae Rd.	2/11/19	Y	Routine	5.4	18	11.9	6.5	0.81	10	387	406	0.18	0.14	1.4	3.11	4.19	0.08	0.64	16.40	2	41.39	41.05	131	40	76	<0.05	0.03	3.40	1	11	29	6.6	106.4
Water Quality Exceedance (number of samples)				0		0		0		0		1			0	0		0	0		0	0											

Notes

General: Red font indicates that the dissolved values are higher than the total. Potential QA/QC need.
NS = Not Sampled

1) WQ Standard of 18 C per DEQ's Temperature Water Quality Standard Implementation IMD 2008 for salmon and trout rearing and migration
2) No instream monitoring locations specifically referenced in the Tualatin River TMDL - 6.5 mg/L selected as target minimum DO concentration for cool water habitat
3) Table 20 - Protection of human health for water and fish ingestion.
4) Non-detects were replaced with one half the detection limit for statistical calculations.
5) WQ Standard of 0.14 mg/L selected based on the load allocation referenced in the Tualatin TMDL for all sources downstream of Dairy Creek
6) Acute and chronic water quality standards for metals based on hardness only. The current copper WQ standards now reflect use of the biotic ligand model (BLM), but was not evaluated for this report.
7) Ammonia high seal used at all locations on 4/24/2019, instead of Ammonia Low Seal for all other sampling events
8) Ideal pH range is between 6.5 and 8.5.

Table A-4. WES (SWMACC) Stormwater Monitoring Results (2018-2019)

Direct to Tualatin River - Stormwater Outfall Monitoring - Residential

			Water Quality Standard Comparison														Additional Parameters of Concern									Supporting Parameters		
WES ID and Location	Date	Visit Type (Routine/ Storm)	Temp (C)	WQ Std[1] (C)	DO (mg/L)	WQ Std[2] (mg/L)	Nitrate-Nitrite (mg/L)	WQ Std[3] (mg/L)	*E.coli* (MPN per 100ml)	WQ Std (MPN per 100ml)	Copper, Total (ug/L)	WQ Criteria (ug/L)[5]	Lead, Total (ug/L)	WQ Criteria (ug/L)[5]	Zinc, Total (ug/L)	WQ Criteria (ug/L)[5]	Total Solids (mg/L)	Total Suspended Solids[5] (mg/L)	Total Dissolved Solids (mg/L)	Ammonia (mg/L)	Total Phosph-orus (mg/L)	Ortho-phosphate (mg/L)	Copper, Dissolved (ug/L)	Lead Dissolved (ug/L)	Zinc, Dissolved (ug/L)	Hardness (mg/L)	pH[5]	Conductivity (uS/cm)
#203 River Grove Boat Ramp	11/27/18	Storm	11.1	18	9.4	6.5	0.38	10	866	406	3.6	20	0.65	15	30	120	39	3	24	<0.05	0.07	0.06	2.4	0.09	24	15	6.4	30.5
#203 River Grove Boat Ramp	2/1/19	Storm	7.3	18	9.4	6.5	4.8	10	1	406	2.4	20	0.34	15	13	120	215	11	148	0.05	0.10	0.05	1.5	0.02	9	92	6.5	253
#203 River Grove Boat Ramp	3/12/19	Storm	7.0	18	9.0	6.5	1.7	10	63	406	3.0	20	0.70	15	58	120	132	14	77	<0.05	0.06	0.04	1.8	0.06	47	41	6.2	156.4
Median[4]			7.3		9.4		1.7		63		3.0		0.65		30		132	11	77	0.025	0.07	0.05	1.8	0.06	24	41	6.4	156.4
Maximum[4]			11.1		9.4		4.8		866		3.6		0.70		58		215	14	148	0.05	0.10	0.06	2.4	0.09	47	92	6.5	253
Minimum[4]			7.0		9		0.38		1		2.4		0.34		13		39	3	24	0.025	0.06	0.04	1.5	0.02	9	15	6.2	30.5
WQ Exceedance (number of samples)			0		0		0		1		0		0		0													

Notes

General: Red font indicates that the dissolved values are higher than the total. Potential QA/QC need.

1) WQ Standard of 18 C per DEQ's Temperature Water Quality Standard Implementation IMD 2008 for salmon and trout rearing and migration.
2) 6.5 mg/L selected as the standard for the direct discharge to Tualatin River.
3) Table 20 - Protection of human health for water and fish ingestion.
4) Non-detects were replaced with one half the detection limit for statistical calculations.
5) Water quality criteria values based on the stormwater discharge benchmarks in the current 1200-Z permit. The benchmark for TSS is 100 mg/L. The benchmark for pH is 5.5 to 9.0.

Appendix B

Maps

This page intentionally blank

Number	Jurisdiction	Site Description (WES ID)	Receiving Water	Associated Land Use	Sampling Frequency
1	CCSD #1	Outall #19 at SE Webster Rd (#102)	Kellogg Creek	Residential	3 / Year
2	CCSD #1	Outfall #12 at Pheasant Ct (#101)	Mt. Scott Screek	Mixed Use	3 / Year
3	CCSD #1	Sunnyside Village Apartments (#105)	Unamed tributary to Sieben Creek	Multi-family Residential	3 / Year
4	CCSD #1	SE Oregon Trail Dr near SE Sieben Park Way (#103)	Unamed tributary to Sieben Creek	Commercial	3 / Year
5	SWMACC	Rivergrove Boat Ramp at SW Dogwood Dr (#203)	Tualatin River	Residential	3 / Year

NORTH

0 1 2 4 Miles

Brown AND Caldwell

OCTOBER 2019

FIGURE B-1. STORMWATER MONITORING LOCATIONS

NPDES MS4 Monitoring Annual Report

WES Surface Water Mgmt. Service Area*, Happy Valley, Rivergrove, and Clackamas County

*Includes former CCSD #1 and SWMACC service districts

Stormwater Monitoring Locations

Urban Growth Boundary

Oak Lodge Water Services District

CCSD #1

Rivergrove

SWMACC

Gladstone

Happy Valley

Milwaukie

Oregon City

West Linn

Wilsonville

Number	Jurisdiction	Site Description (WES ID)	Stream Name
1	CCSD #1	SE 120th Ave and Carpenter Dr (manhole) (#05)	Carli Creek
2	CCSD #1	Hwy 212/224 (#07)	Sieben Creek
3	CCSD #1	Hwy 212/224 (#16)	Rock Creek
4	CCSD #1	SE 84th Ave (#11)	Phillips Creek
5	CCSD #1	Hwy 224 (#15)	Mt. Scott Creek
6	CCSD #1	SE Rusk Rd (#14)	Kellogg Creek
7	CCSD #1	SE Last Rd (#24)	Cow Creek
8	CCSD #1	Rowe Middle School (SE Lake Rd) (#27)	Kellogg Creek
9	SWMACC	SW Mossy Brae Rd (#11)	Pecan Creek

NORTH

0 1 2 4 Miles

Brown AND Caldwell

OCTOBER 2019

FIGURE B-2. INSTREAM MONITORING LOCATIONS

NPDES MS4 Monitoring Annual Report

WES Surface Water Mgmt. Service Area*, Happy Valley, Rivergrove, and Clackamas County

*Includes former CCSD #1 and SWMACC service districts

- Instream Monitoring Locations
- Urban Growth Boundary
- Oak Lodge Water Services District
- CCSD #1
- Rivergrove
- SWMACC
- Gladstone
- Happy Valley
- Milwaukie
- Oregon City
- West Linn
- Wilsonville