West Point Treatment Plant and CSO System

Application for Renewal of the NPDES Permit (WA002918-1)

King County Department of Natural Resources and Parks
Wastewater Treatment Division

January 2019

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Table of Contents

Attachment 1

NPDES Form 2A, Parts A–D
(including Maps & Process Flow Schematics)

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

West Operations Section Conveyance and Treatment System

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

File Name: Q:\WTD\Projects\JOA\Projects\WestOperations_11x17_20181005.mxd oneilsh/crosss

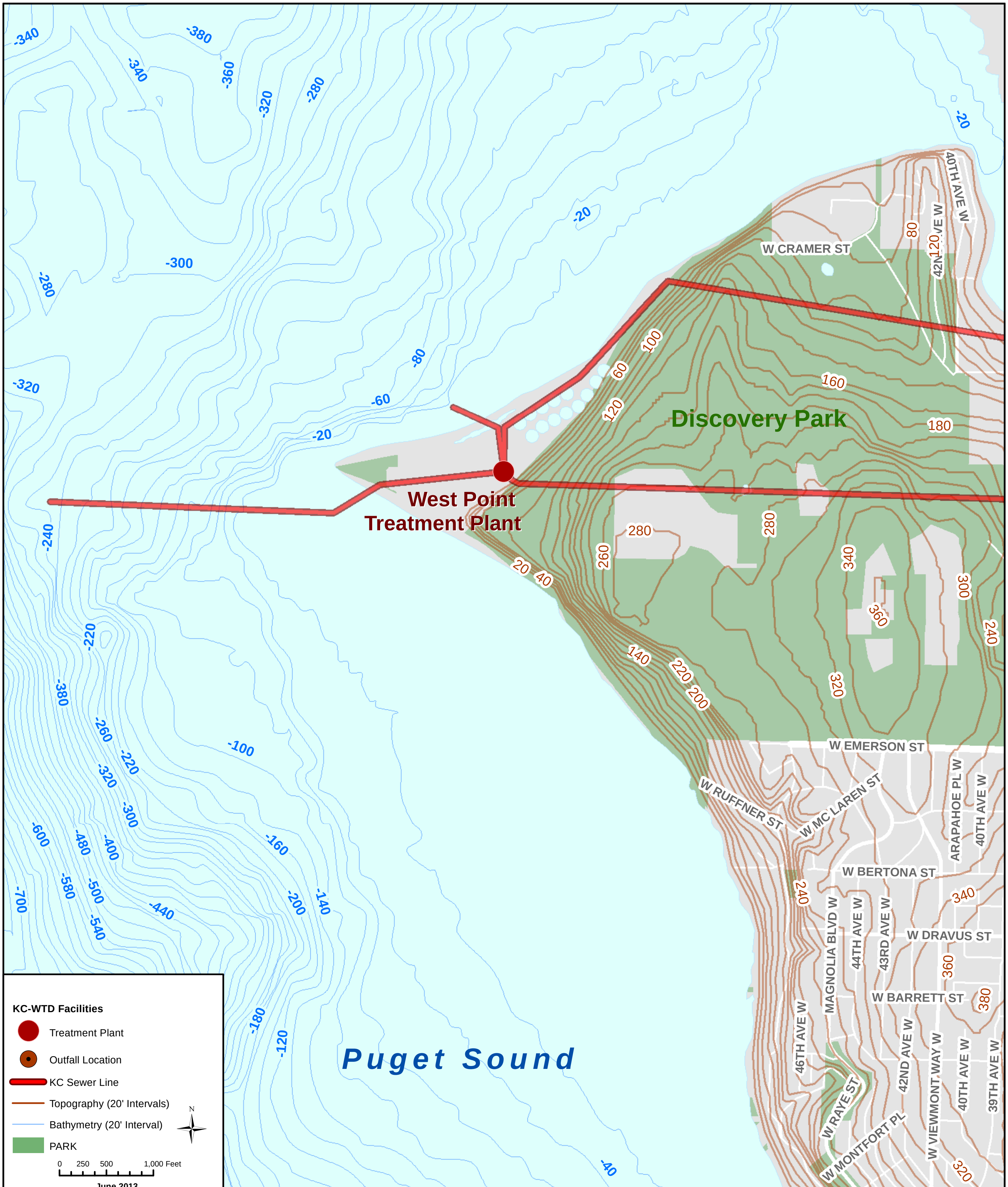
West Point Treatment Plant Service Area

Locations of SPU and WTD CSO Outfalls

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

File Name: Q:\\WTD\Projects\JOA\Projects\SPU_KC_cso.mxd - Shari Cross

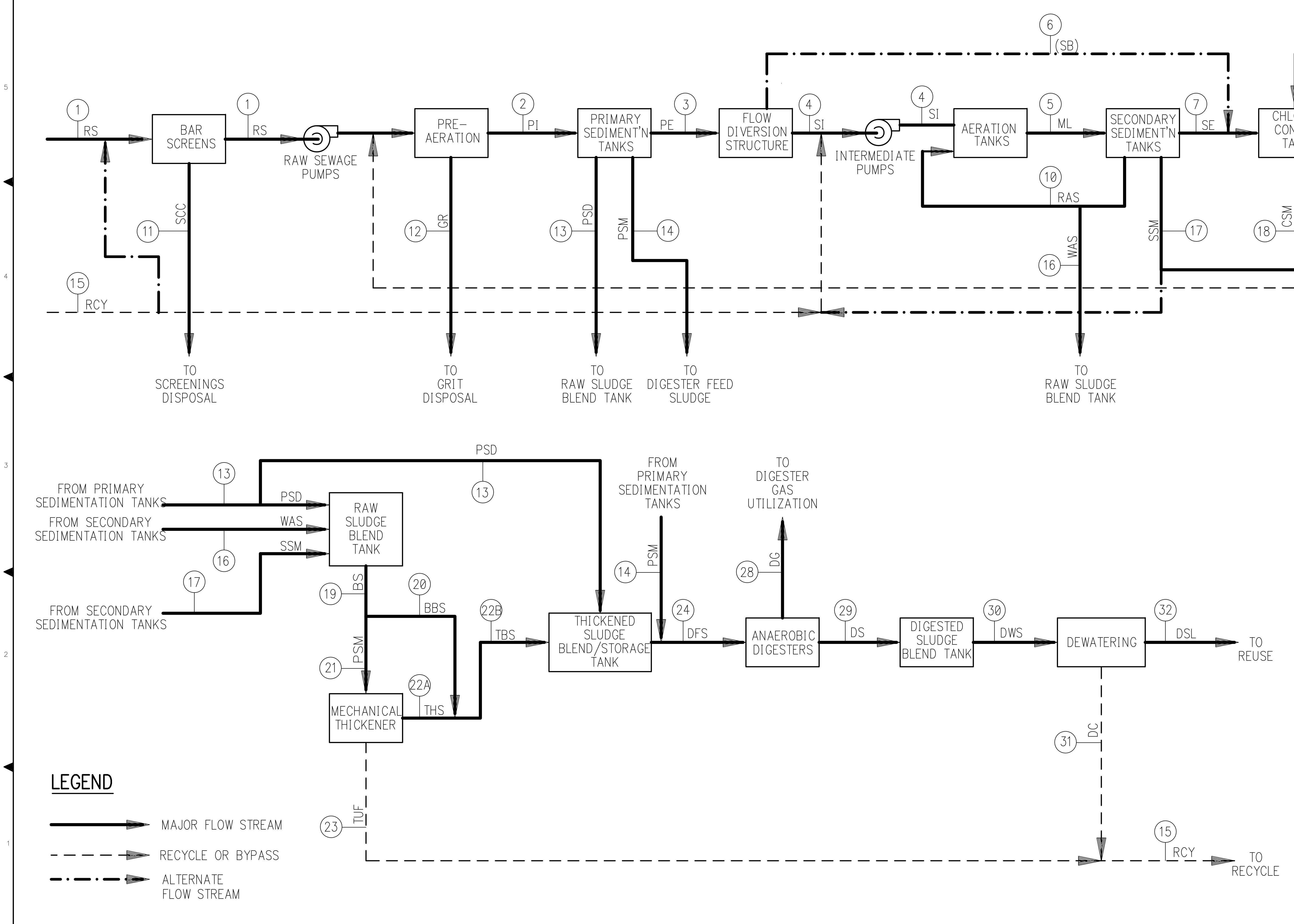
King County Wastewater and Seattle Public Utilities CSO's



King County
Department of
Natural Resources and Parks
Wastewater Treatment
Division

File Name: q:\\wtd\projects\NPDES_permits\2013NPDES_Permit_WestPoint.xmd - peter keum

West Point Treatment Plant



FLOW SHEET IDENTIFIER	STREAM IDENTIFIER	
1	RAW SEWAGE	(RS)
2	PRIMARY INFLUENT	(PI)
3	PRIMARY EFFLUENT	(PE)
4	SECONDARY INFLUENT	(SI)
5	MIXED LIQUOR	(ML)
6	SECONDARY BYPASS	(SR)
7	SECONDARY EFFLUENT	(SE)
8	SODIUM HYPOCHLORITE	(NaOCL)
9	PLANT EFFLUENT	(PLE)
10	RETURN ACTIVATED SLUDGE	(RAS)
11	SCREENINGS	(SCC)
12	GRIT	(GR)
13	PRIMARY SLUDGE	(PSD)
14	PRIMARY SCUM	(PSM)
15	RECYCLE	(RCY)
16	WASTE ACTIVATED SLUDGE	(WAS)
17	SECONDARY SCUM	(SSM)
18	CHLORINE SCUM	(CSM)
19	BLENDED SLUDGE	(BS)
20	BYPASS BLENDED SLUDGE	(BBS)
21	THICKENER FEED SLUDGE	(TFS)
22A	THICKENED SLUDGE	(THS)
22B	THICKENED BLENDED SLUDGE	(TBS)
23	THICKENER UNDERFLOW	(TUF)
24	DIGESTER FEED SLUDGE	(DFS)
~~25~~	~~RECUPERATIVE THICKENER FEED~~	~~(RCF)~~
~~26~~	~~RECUPERATIVE THICKENED SLUDGE~~	~~(RCT)~~
~~27~~	~~RECUPERATIVE THICKENER FILTRATE~~	~~(RTC)~~
28	DIGESTER GAS	(DG)
29	DIGESTED SLUDGE	(DS)
30	DEWATERING SLUDGE FEED	(DWS)
31	CENTRATE	(DC)
32	DEWATERED SLUDGE	(DSL)

NO:	REVISION	BY	APP'D	DATE
	UPDATE	STH	STH	MAY 13
	NEW DRAWING – COMBINES G30, G31 (RENO)	JLR		APR 00

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 ——— 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

ENGR: ENGR:

DESIGNED: MMR FILE NO.: W87
DRAWN: CAD CHECKED: DTR
RECOMMENDED: APPROVED:
ORIG. CONTRACT: W/F49-91
FACILITY DRAWING ISSUED: DECEMBER 1996

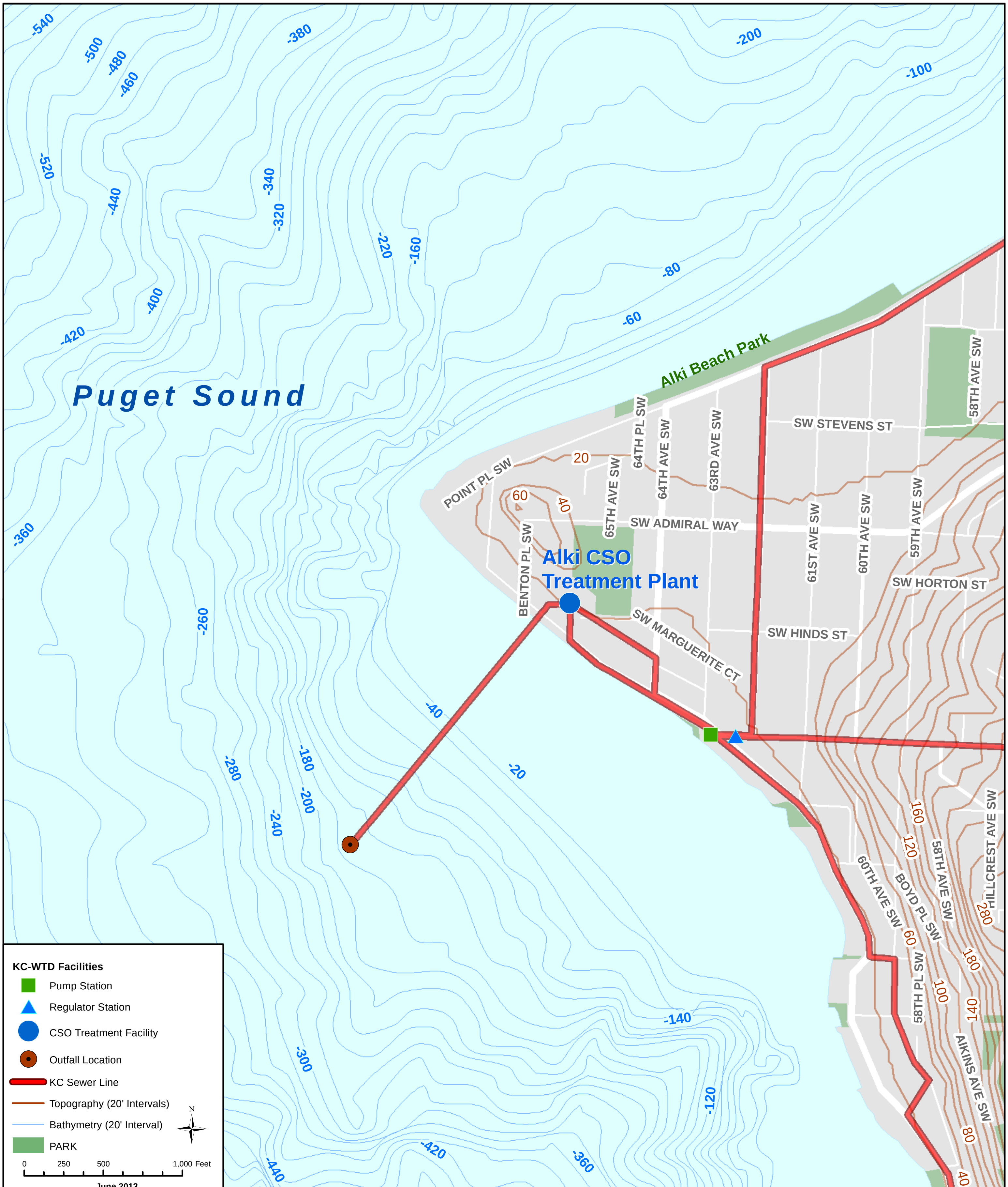
King County

PLANT CODE: 700 PATH: DMS/GENERAL CAD CONTROL DATE: 21 May 2013
WEST POINT TREATMENT PLANT SECONDARY TREATMENT FACILITIES

WEST POINT PROCESS FLOW DIAGRAM

FILE NAME: G30A.DWG
SCALE: NONE
DRAWING NO: G30A

ORIGINAL INFORMATION ISSUED: APR 1991 DRAWING#: G30A FILE: F0080.0081.DLV
NO REFERENCE FILE
GRID AREAS ALL



King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

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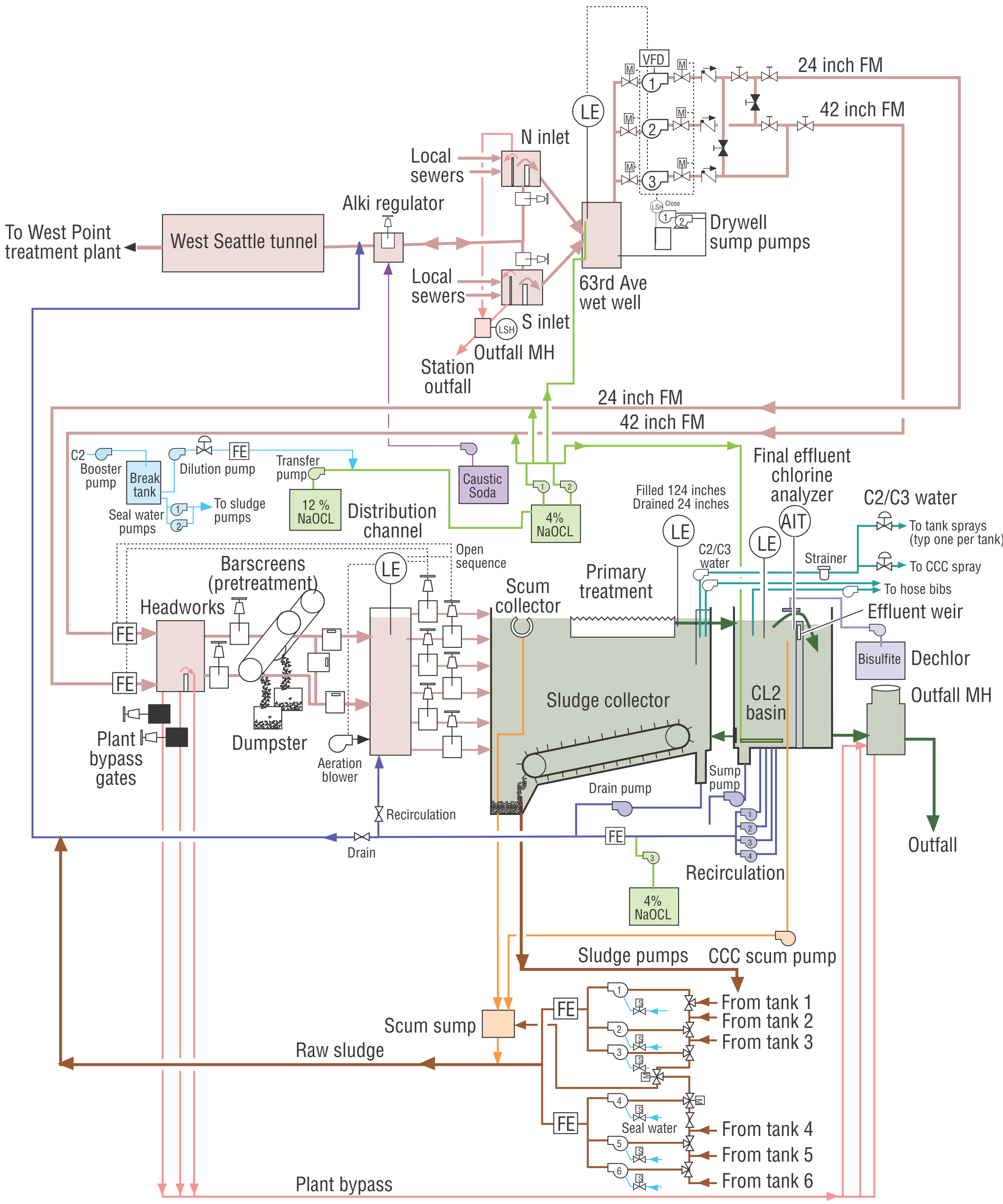
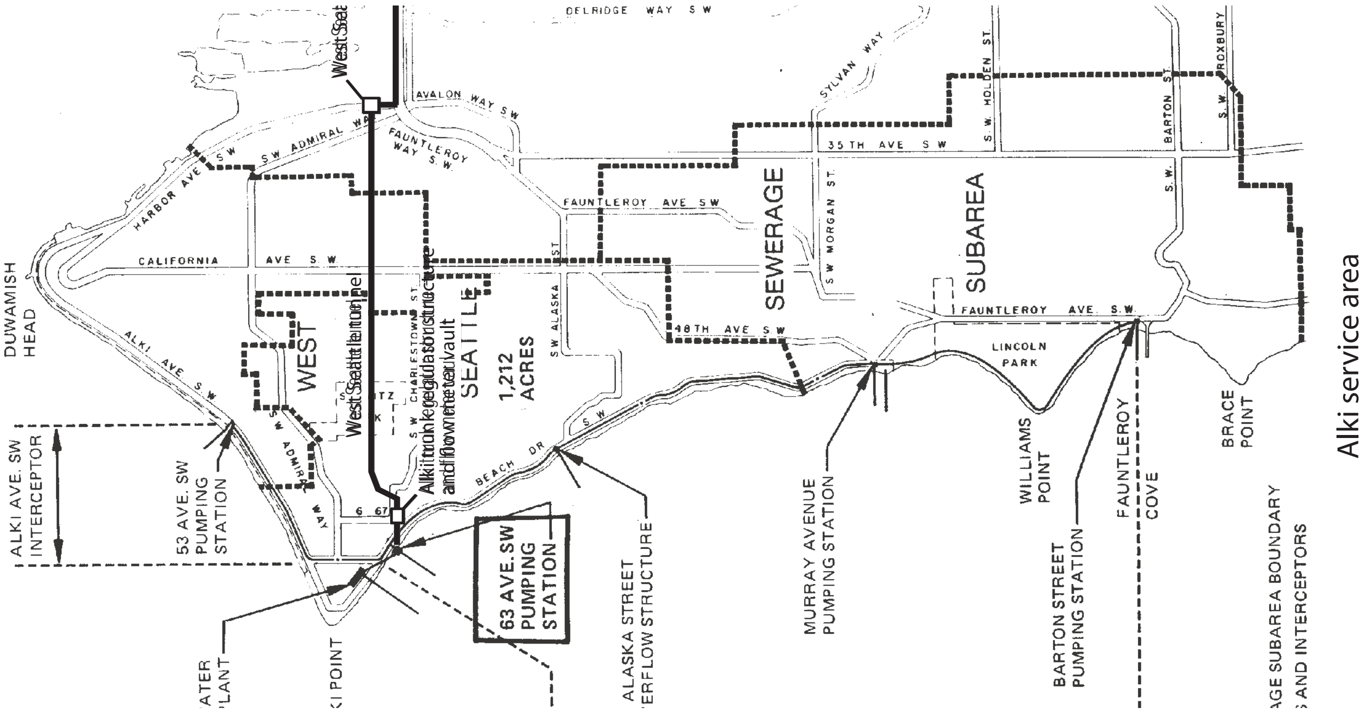
File Name: q:\\wtd\projects\NPDES_permits\2013NPDESPermit_Alki.xmd - peter keum

Data Source: King County

Alki
CSO Treatment Facility

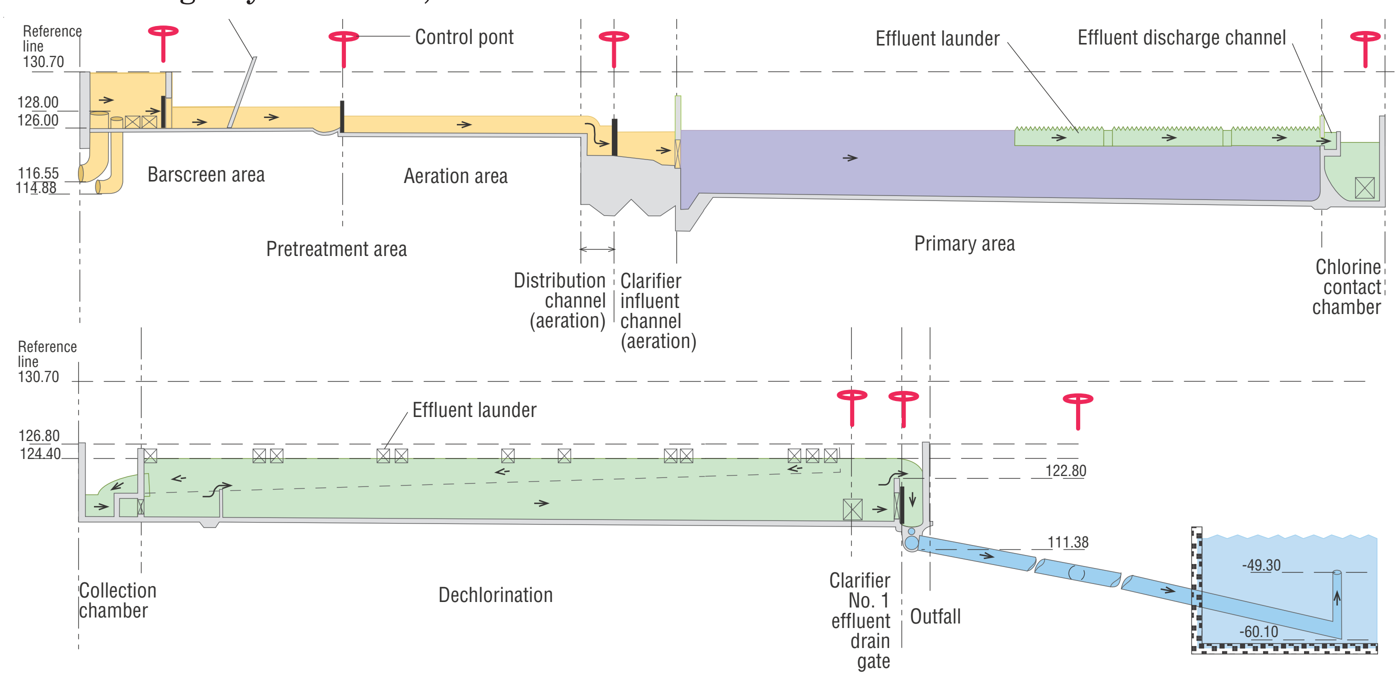


Alki CSO Treatment Facility

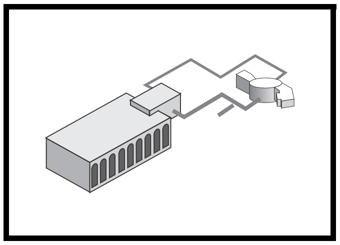


Plant hydraulic profile

The plant hydraulic profile shows the water surface elevations for the plant processes. This assumes a flow of 65 mgd, with six clarifier tanks in operation, and no hydraulic limitations due to equipment failure. The influent elevation is enough that the wastewater can flow by gravity through the plant's primary process. The effluent flows by gravity to the Puget Sound outfall. Under emergency conditions, influent flows can be diverted to the outfall



Alki CSO Treatment Facility

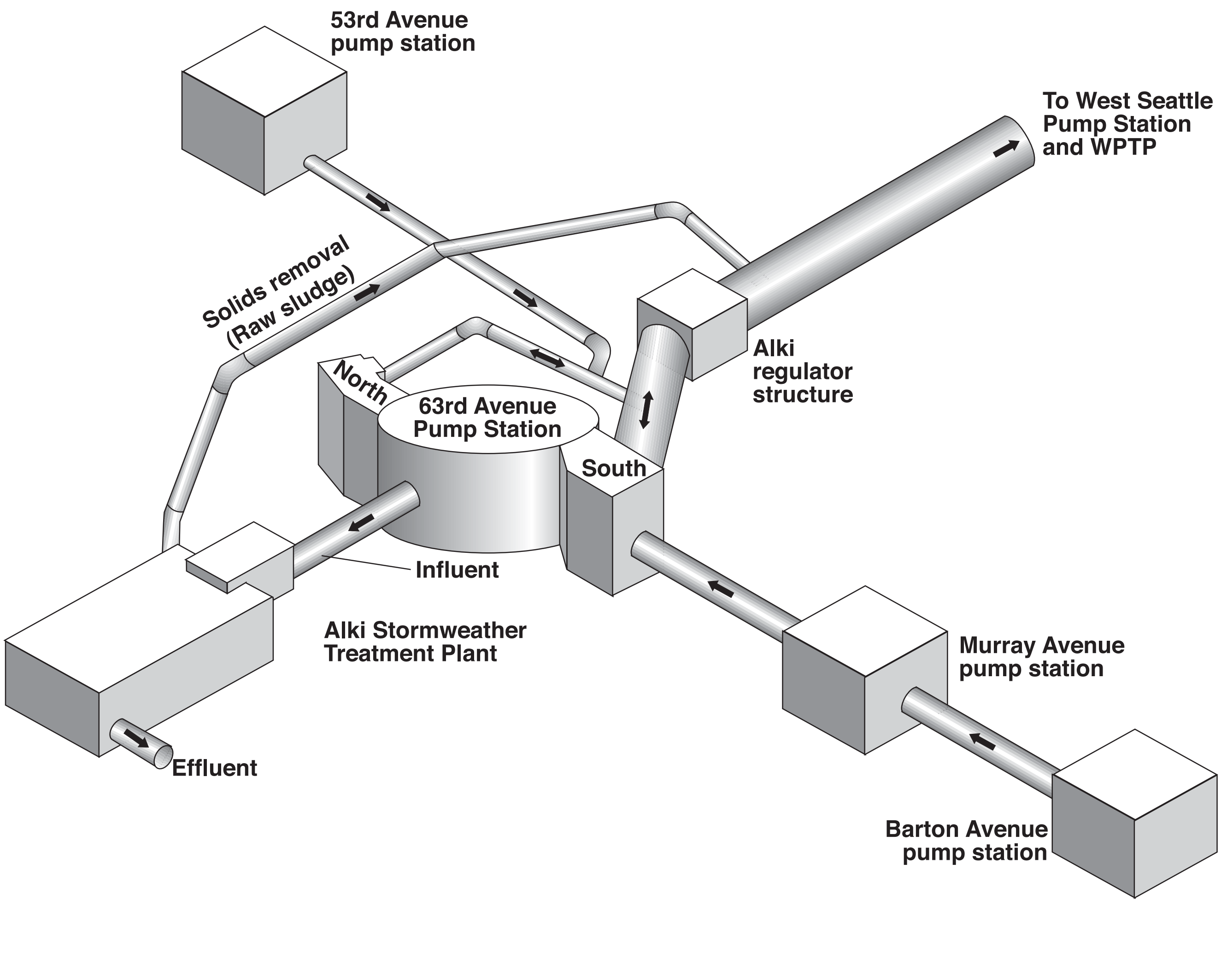


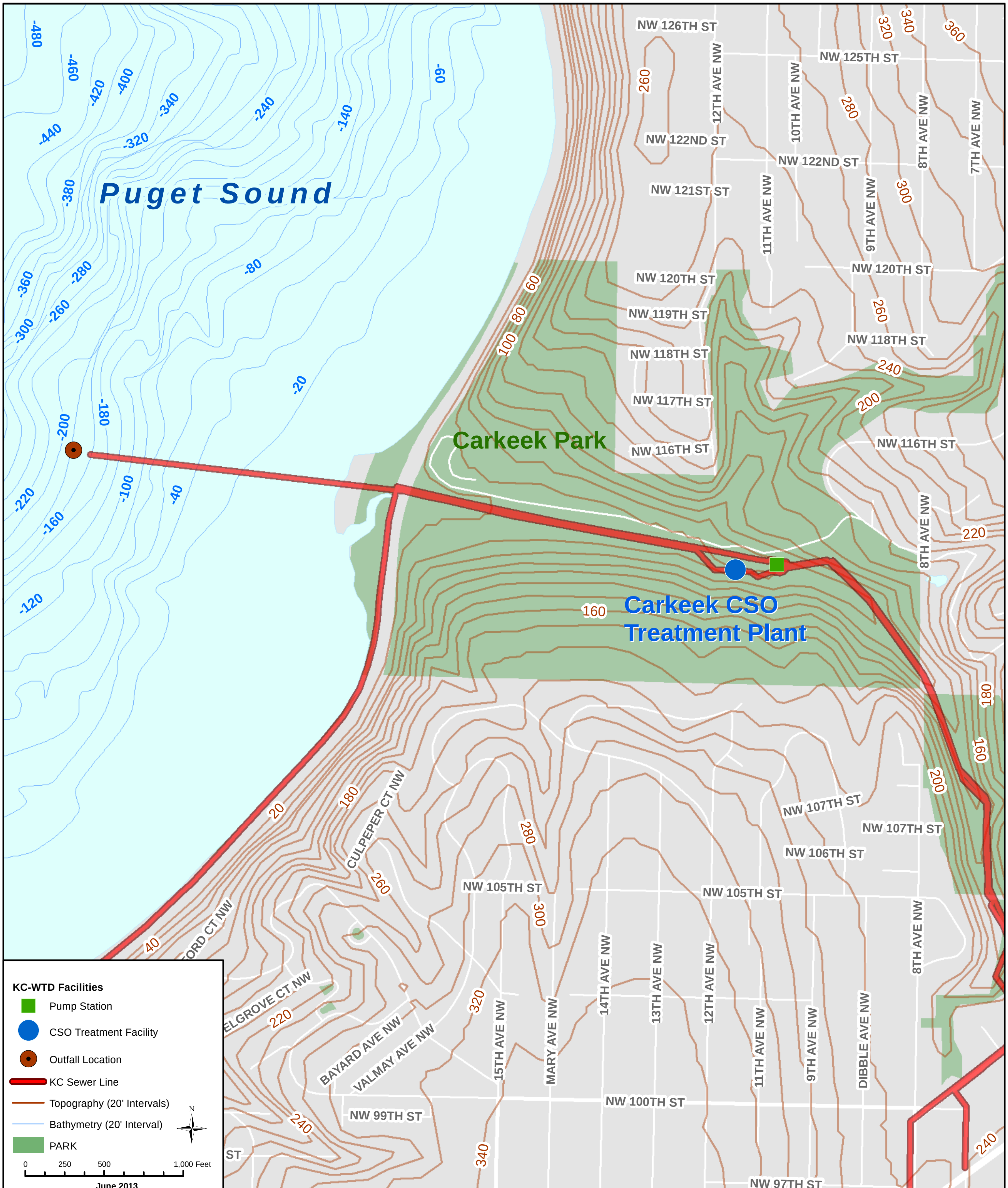
1.3 Influent Flow to Alki CSO Treatment Plant

Three pump stations: 53rd Avenue (from the northeast), and Murray Avenue and Barton Street (from the south) feed the flow to the West Seattle tunnel. The West Seattle Pump Station transfers the flow from the West Seattle tunnel to the Elliott Bay Interceptor and on to the West Point Treatment Plant. The flow to the West Seattle tunnel (7.2 million gallon storage capacity) is limited to 45 mgd by the Alki trunk regulator structure (currently fully open in HAND) or 19 mgd in AUTO. Excess CSO flows back up in the Alki trunk and at elevation 106.00 spill over the inlet weir into the 63rd Avenue Pump Station wet well. The 63rd Avenue Pump Station transfers these flows through two force mains to the Alki plant.

Any solids or drainage from the Alki plant are returned to the Alki trunk (downstream of the Alki trunk regulator) through a plant drain force main. These flows are conveyed to the West Point Treatment Plant for secondary treatment.

The Alki trunk regulator vault is equipped to add disinfectant and caustic soda to the flow. The 63rd Pump Station north and south inlet/diversion structures are equipped to add disinfectant





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Wastewater Treatment Division

File Name: q:\\wtd\projects\NPDES_permits\2013NPDES_Permit_Carkeek.mxd - peter keum

Carkeek CSO Treatment Facility

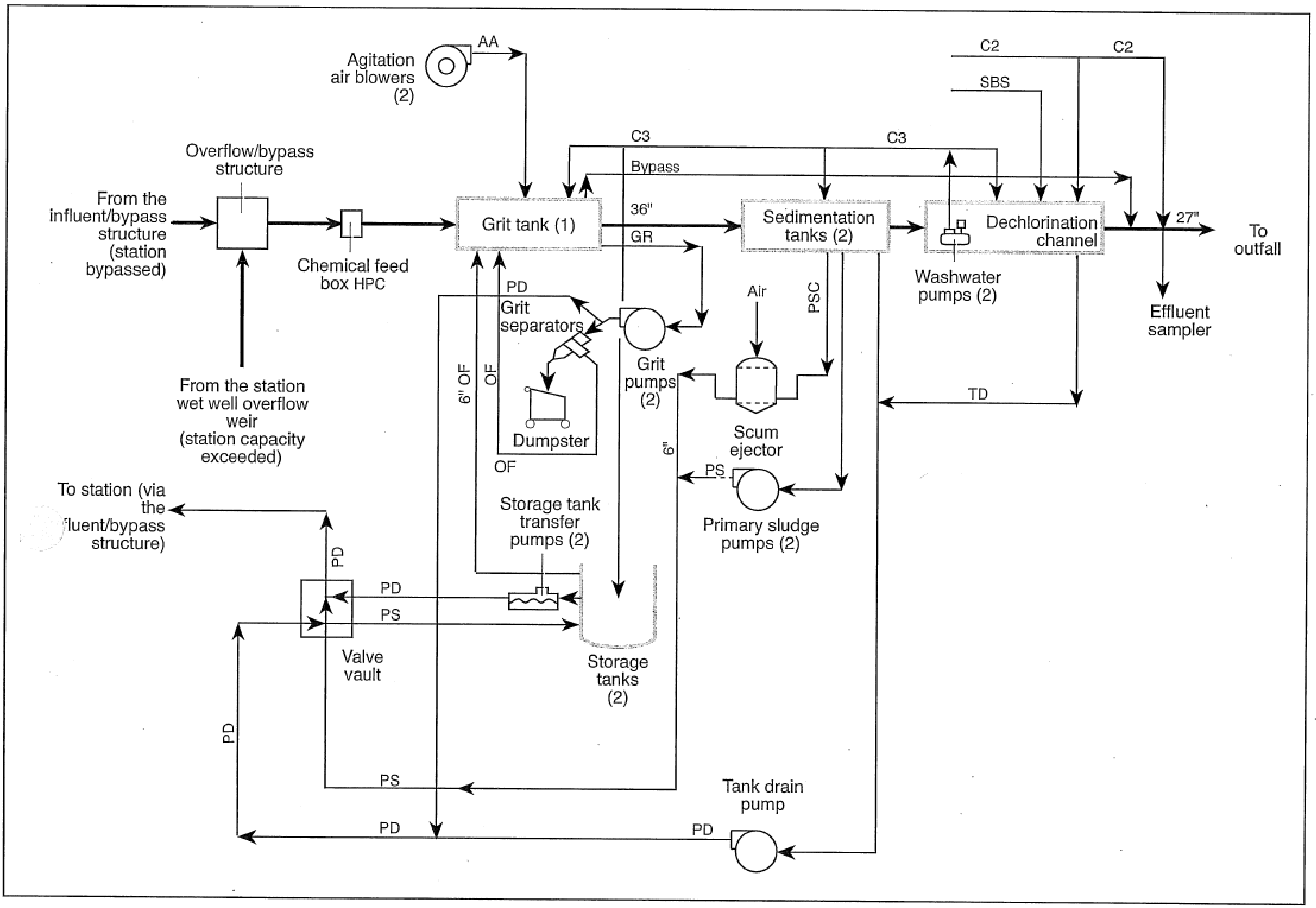


Figure 2-1. Simplified Schematic of Flow Through the Carkeek CSO Treatment Plant

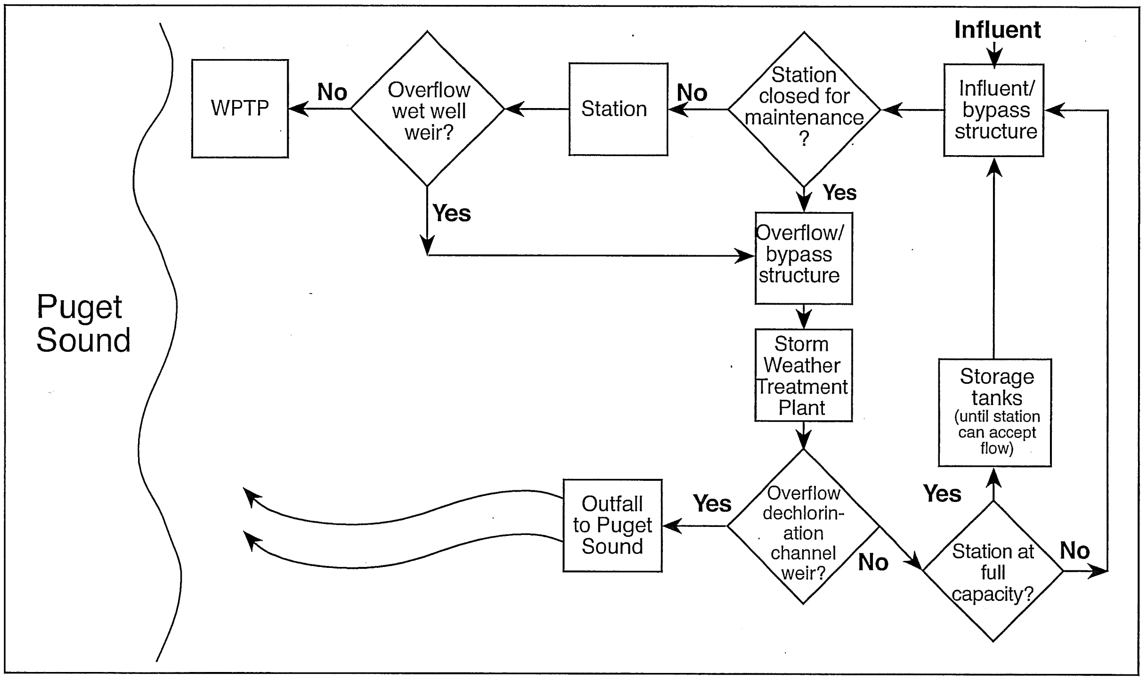


Figure 1-3. Overview of Flow Through the Carkeek Pump Station

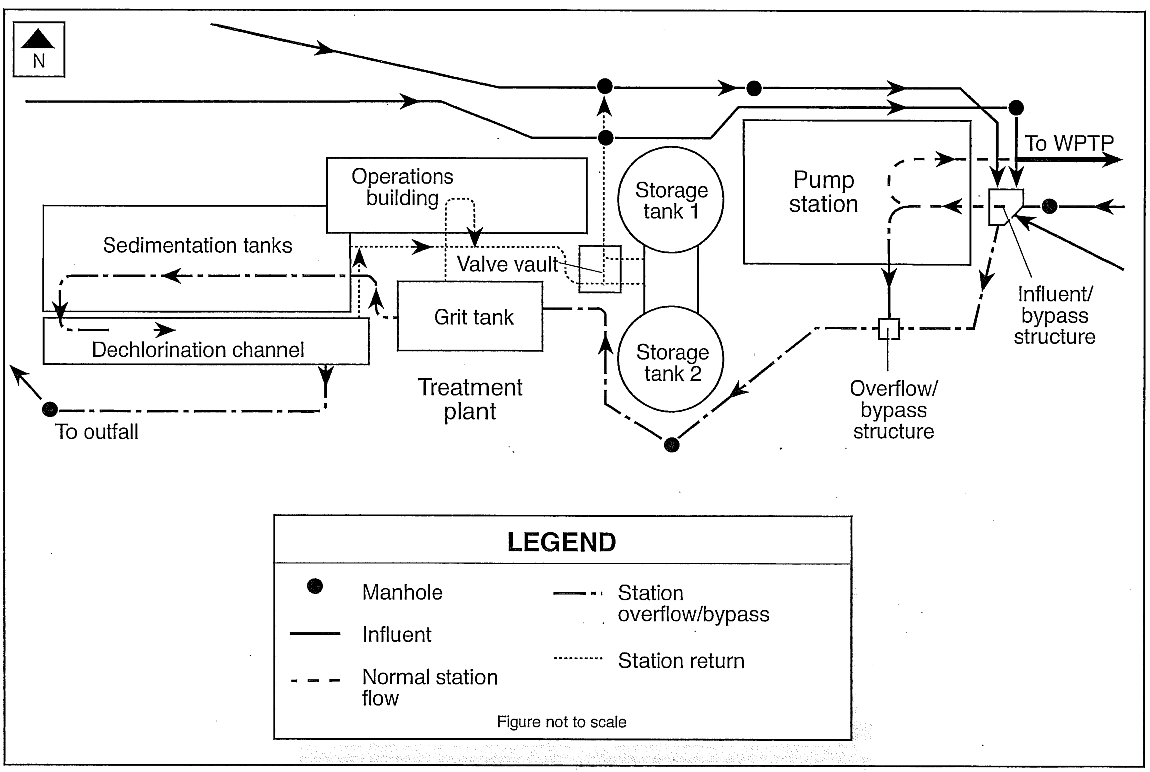
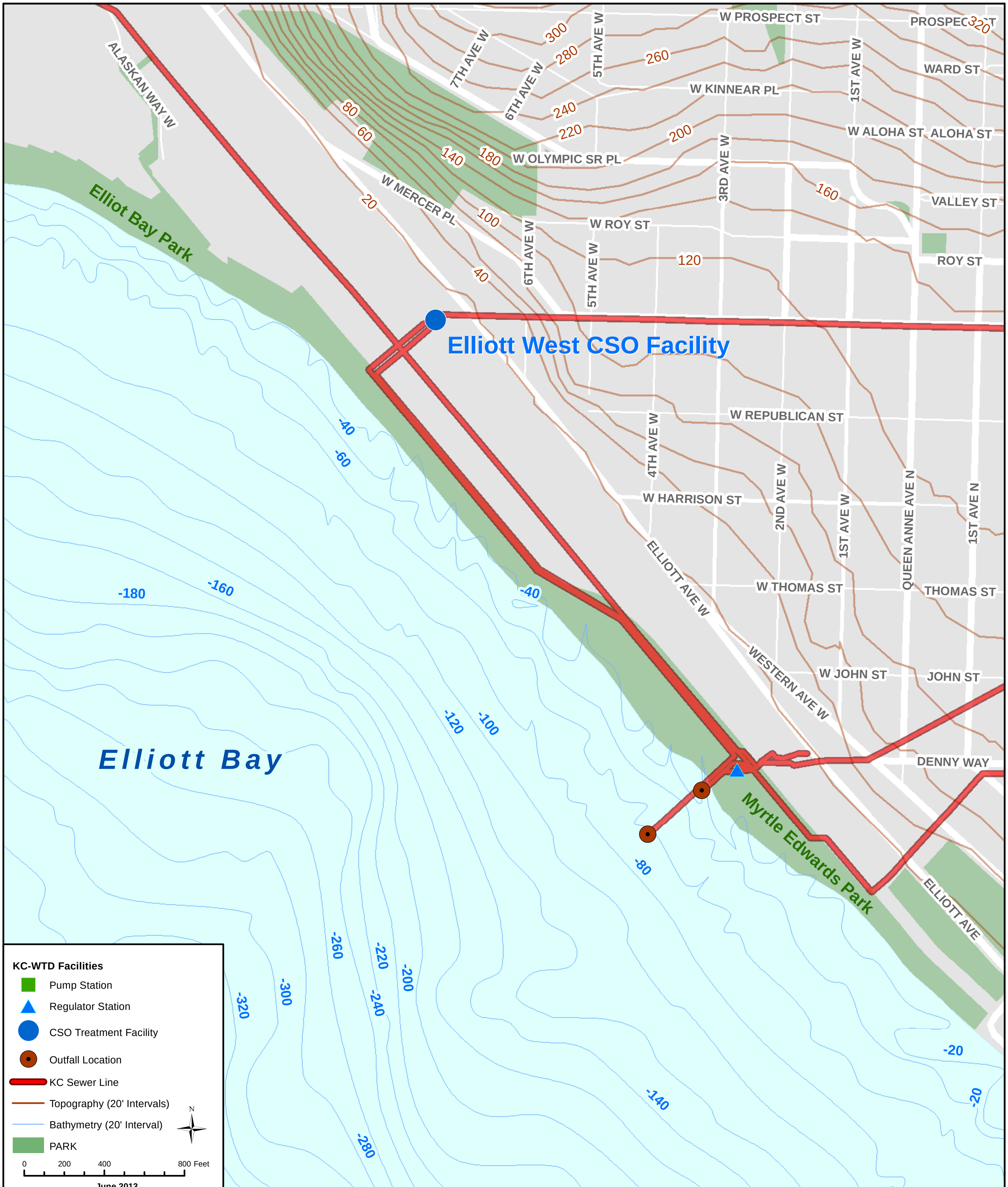


Figure 1-4. Simplified Plan View of Flow Through the Carkeek Pump Station and Carkeek CSO Treatment Plant



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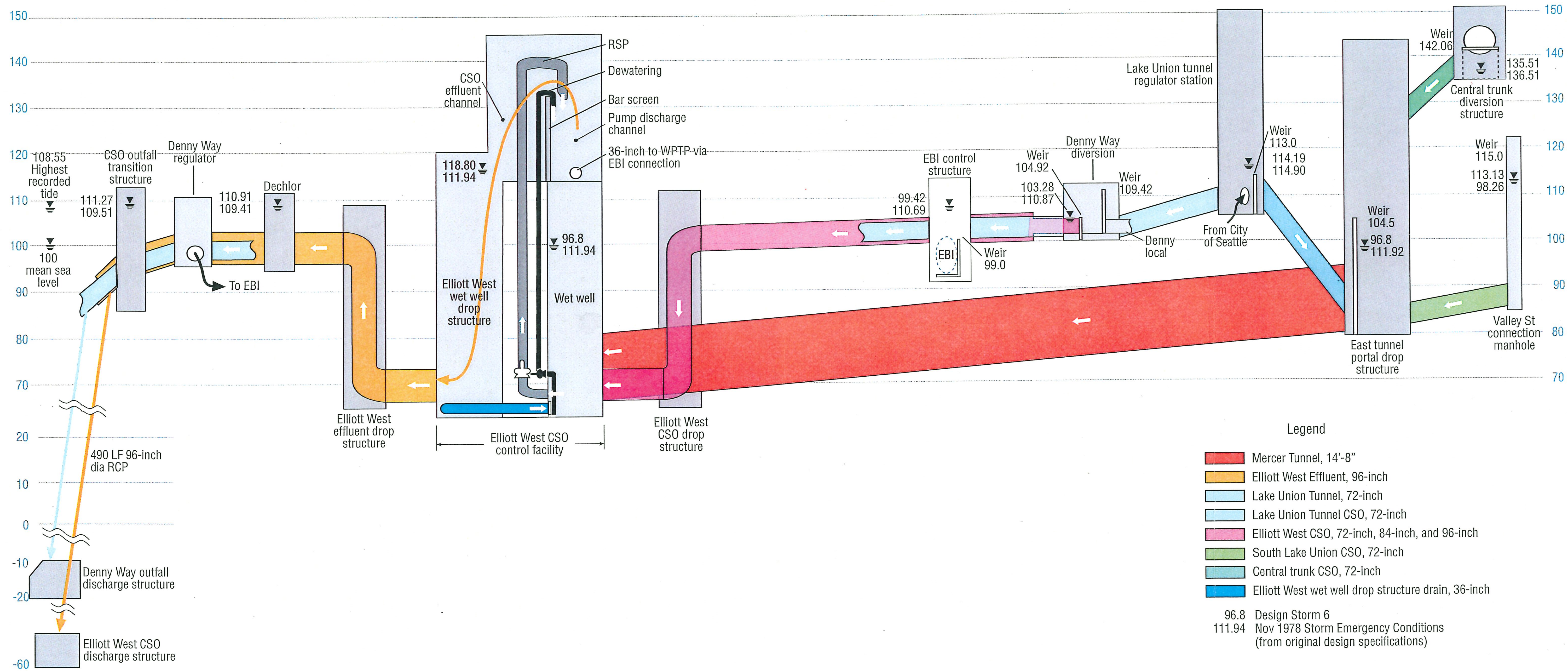
File Name: q:\\wtd\projects\NPDES_permits\2013NPDESPermit_ElliottWest.mxd - peter keum

Data Source: King County

Elliott West
CSO Treatment Facility



TP1334.5/30/13

Pump discharge and CSO effluent channels

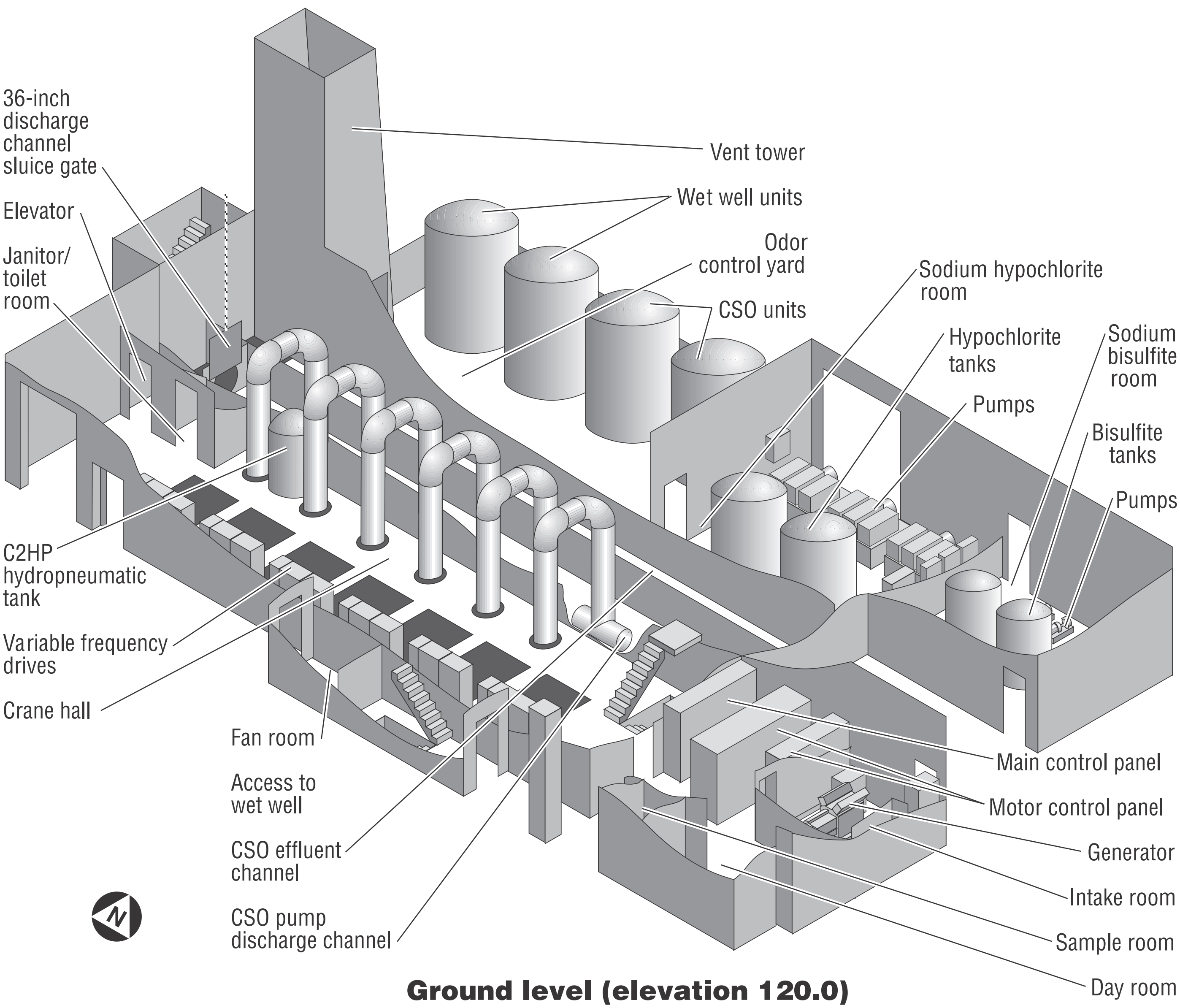
The pump discharge and CSO effluent channel areas are monitored for hazardous gases and low oxygen levels.

Pump discharge channel. This channel receives the combined sewer overflows pumped by the main effluent pumps.

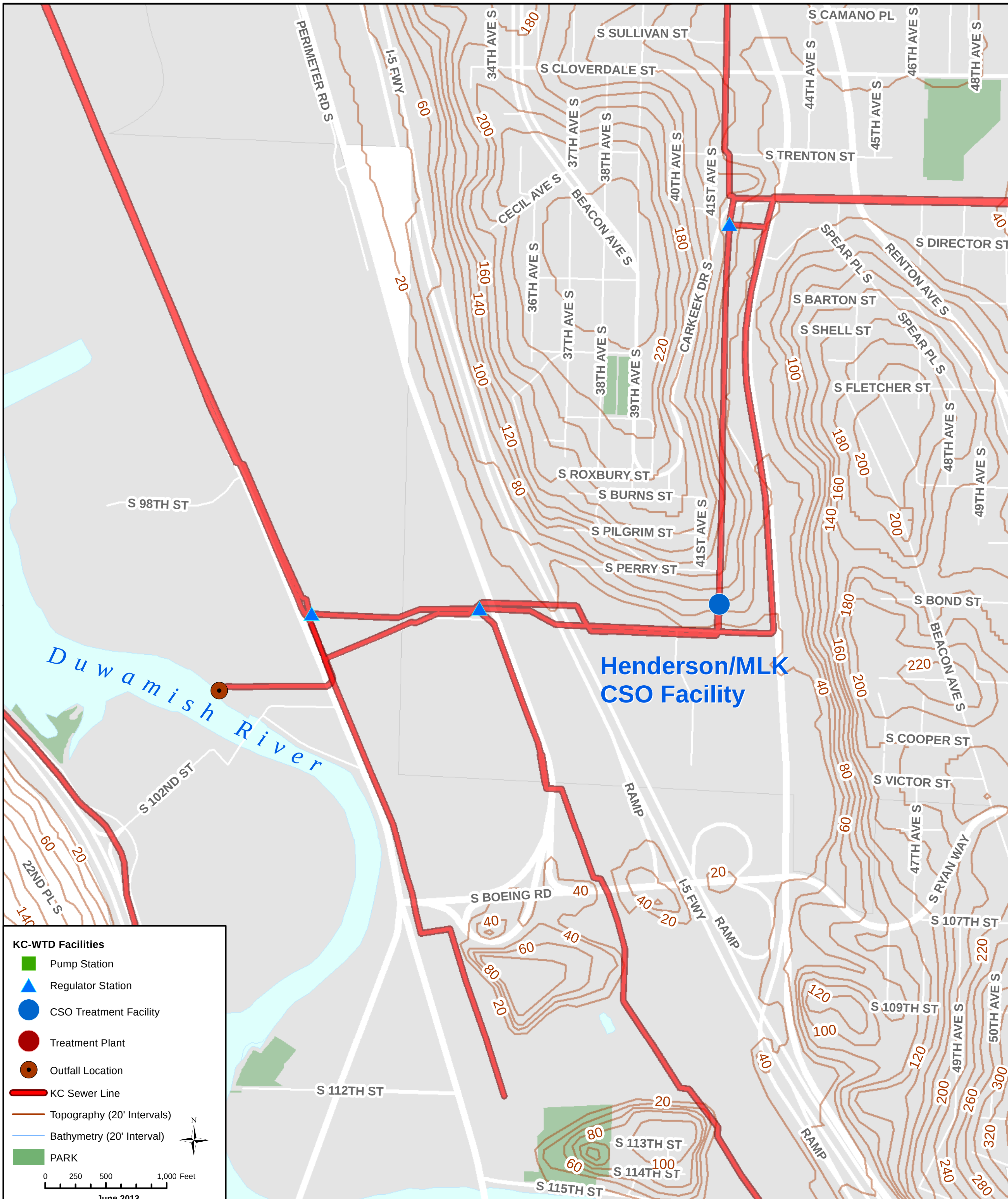
CSO effluent channel. This channel receives overflow from the pump discharge channel through the two bar screens. The flows are treated with sodium hypochlorite, which is injected into a mixing chamber at the end of the CSO effluent channel.

Odor control yard

The odor control yard includes two wet well carbon odor control units (OCUs) and two CSO OCUs. Each OCU includes a exhaust fan, local control panel, and manometer. Treated air is discharged through the vent tower.



Ground level (elevation 120.0)



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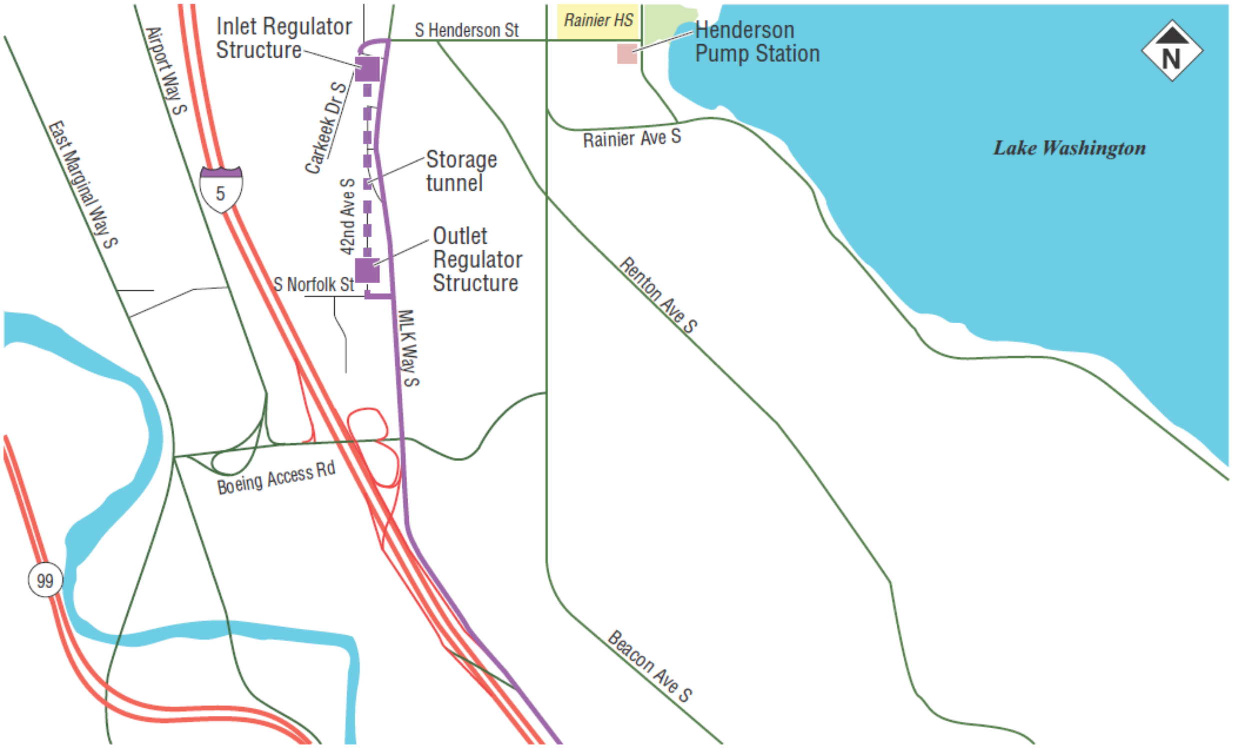
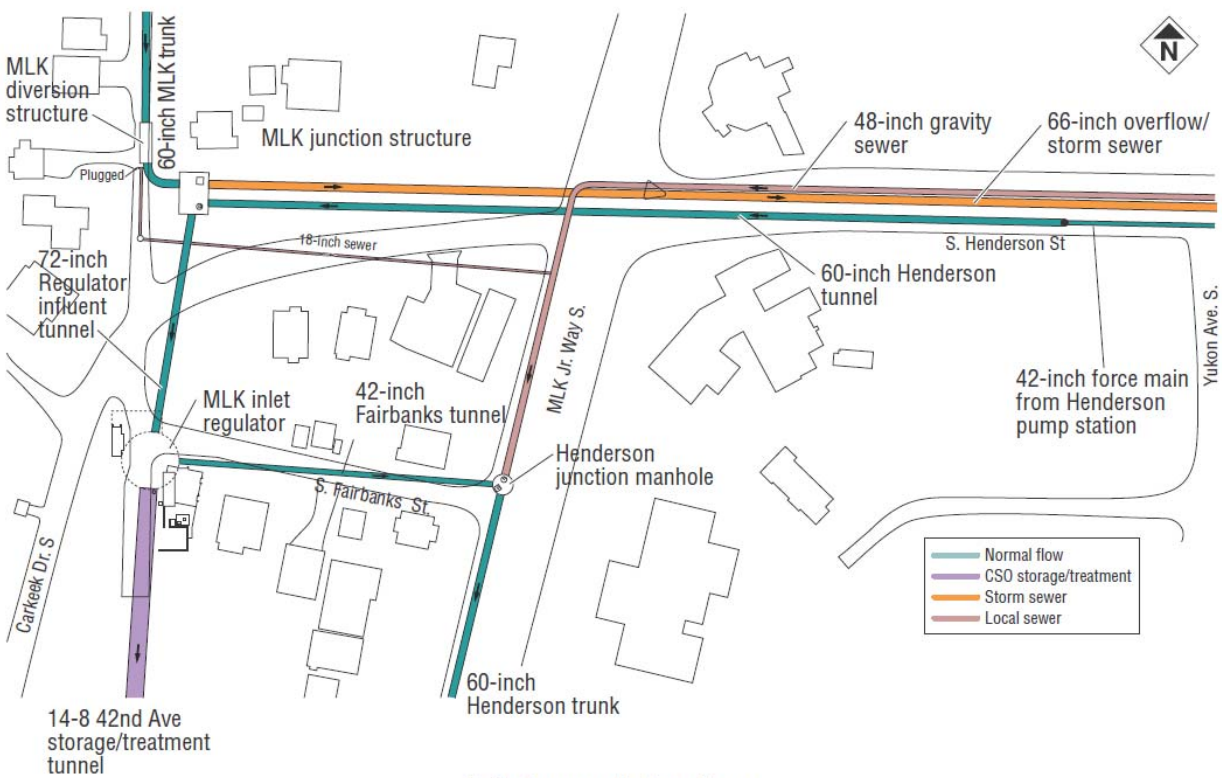
Wastewater Treatment Division

File Name: q:\\wtd\projects\NPDES_permits\npdes_permits_june13.xmd - peter keum

Data Source: King County

Henderson/MLK CSO Treatment Facility

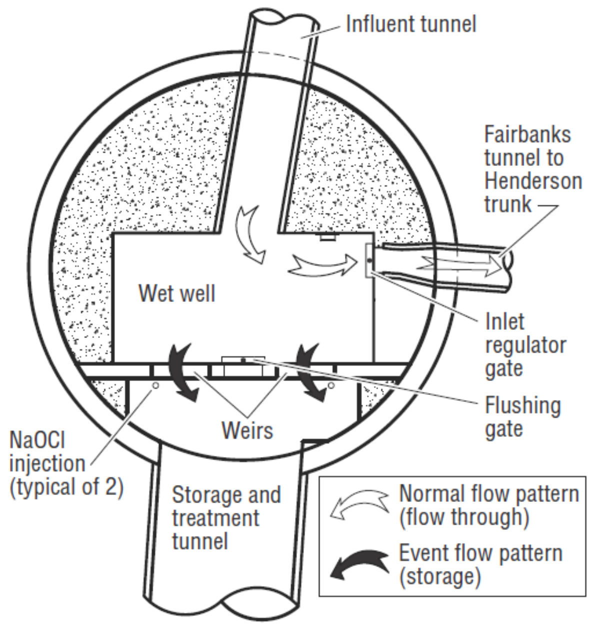




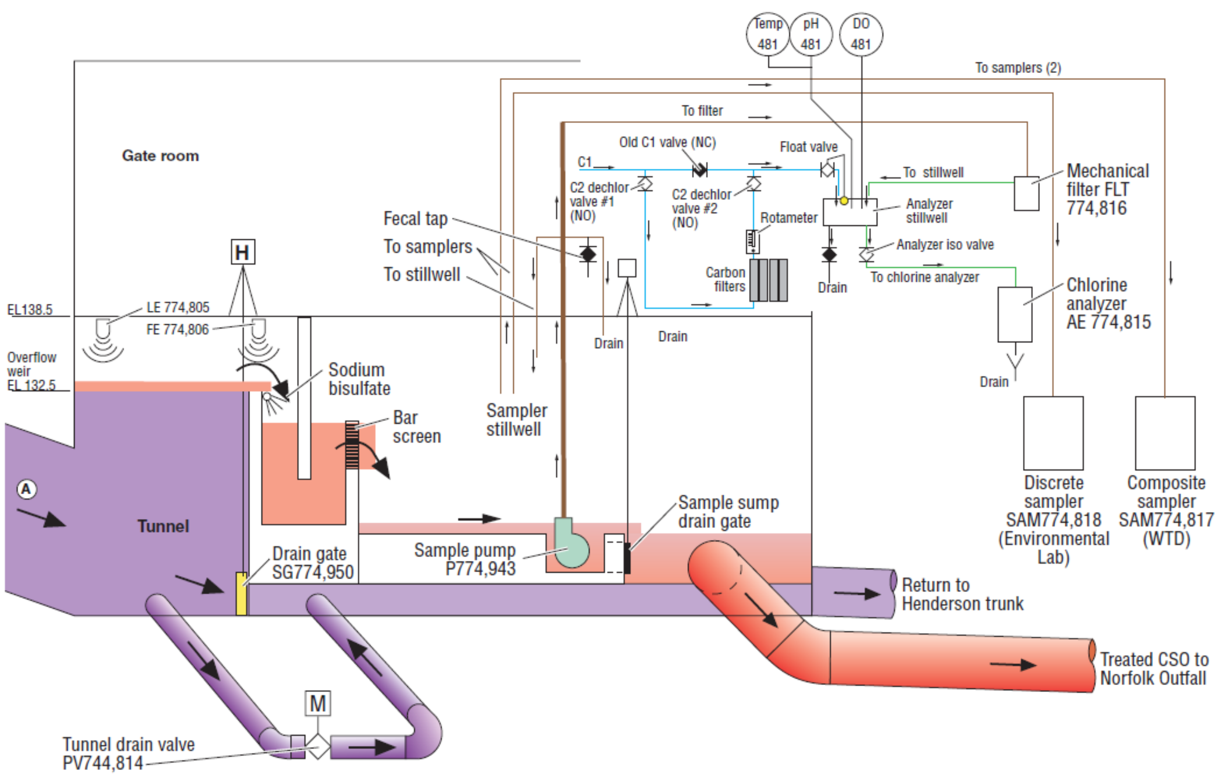
Inlet regulator flow

tunnel

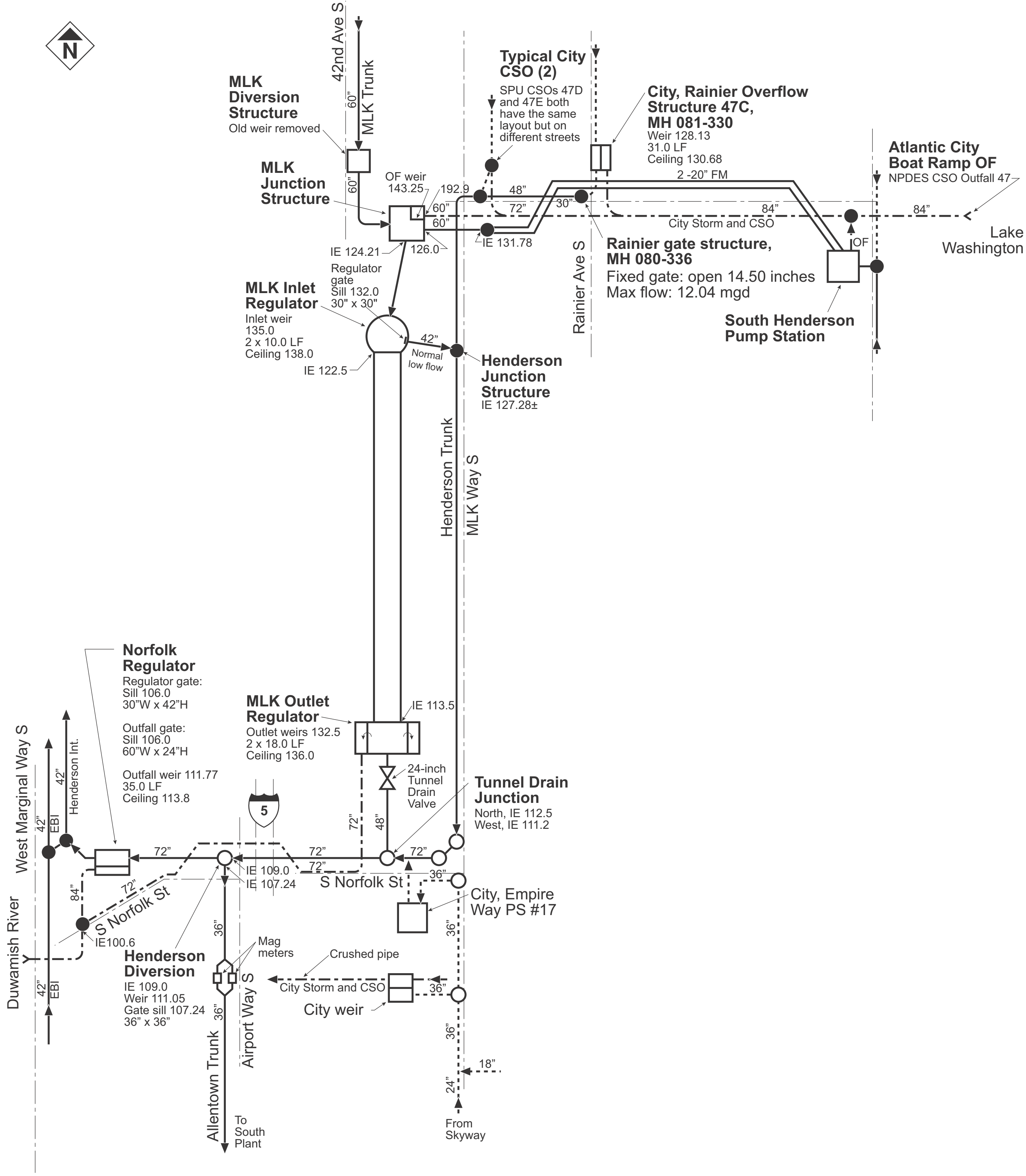
Inlet regulator flow



Inlet regulatore flow patterns



Outlet regulator effluent flow and sample lines



MLK CSO one-line drawing

Use F11 to navigate through fields.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

This form is equivalent to EPA NPDES Form 3510-2A

FORM **2A** NPDES

DEPARTMENT OF ECOLOGY State of Washington

NPDES FORM 2A APPLICATION OVERVIEW

APPLICATION OVERVIEW

Form 2A has been developed in a modular format and consists of a "Basic Application Information" packet and a "Supplemental Application Information" packet. The Basic Application Information packet is divided into two parts. All applicants must complete Parts A and C. Applicants with a design flow greater than or equal to 0.1 mgd must also complete Part B. Some applicants must also complete the Supplemental Application Information packet. The following items explain which parts of Form 2A you must complete.

BASIC APPLICATION INFORMATION:

A. **Basic Application Information for all Applicants.** All applicants must complete questions A.1 through A.8. A treatment works that discharges effluent to surface waters of the United States must also answer questions A.9 through A.12.

B. **Additional Application Information for Applicants with a Design Flow ≥ 0.1 mgd.** All treatment works that have design flows greater than or equal to 0.1 million gallons per day must complete questions B.1 through B.6.

C. **Certification.** All applicants must complete Part C (Certification).

SUPPLEMENTAL APPLICATION INFORMATION:

D. **Expanded Effluent Testing Data.** A treatment works that discharges effluent to surface waters of the United States and meets one or more of the following criteria must complete Part D (Expanded Effluent Testing Data):

1. Has a design flow rate greater than or equal to 1mgd,
2. Is required to have a pretreatment program (or has one in place), or
3. Is otherwise required by the permitting authority to provide the information.

E. **Toxicity Testing Data.** A treatment works that meets one or more of the following criteria must complete Part E (Toxicity Testing Data):

1. Has a design flow rate greater than or equal to 1 mgd,
2. Is required to have a pretreatment program (or has one in place), or
3. Is otherwise required by the permitting authority to submit results of toxicity testing.

F. **Industrial User Discharges and RCRA/CERCLA Wastes.** A treatment works that accepts process wastewater from any significant industrial users (SIUs) or receives RCRA or CERCLA wastes must complete Part F (Industrial User Discharges and RCRA/CERCLA Wastes). SIUs are defined as:

1. All industrial users subject to Categorical Pretreatment Standards under 40 Code of Federal Regulations (CFR) 403.6 and 40 CFR Chapter I, Subchapter N (see instructions); and
2. Any other industrial user that:
   a. Discharges an average of 25,000 gallons per day or more of process wastewater to the treatment works (with certain exclusions); or
   b. Contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the treatment plant; or
   c. Is designated as an SIU by the control authority.

G. **Combined Sewer Systems.** A treatment works that has a combined sewer system must complete Part G (Combined Sewer Systems).

ALL APPLICANTS MUST COMPLETE PART C (CERTIFICATION)

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

BASIC APPLICATION INFORMATION

PART A. BASIC APPLICATION INFORMATION FOR ALL APPLICANTS:

All treatment works must complete questions A.1 through A.8 of this Basic Application Information Packet.

A.1. Facility Information.

Facility Name **West Point Wastewater Treatment Plant and CSO System**

Mailing Address **201 S. Jackson St., MS-KSC-NR-0500, Seattle, WA 98104-3855**

Facility Address (not P.O. Box) **1400 Utah Street W, Seattle, WA 98199**

Location **47.660863 / -122.430406**
(Latitude/Longitude as decimal degrees (NAD83/WGS84)

Telephone Number **(206) 477-4601**

E-mail address **Mark.Isaacson@kingcounty.gov**

Contact Person **Mark Isaacson**

Title **Director, Wastewater Treatment Division**

UBI Number __________

A.2. Applicant Information. If the applicant is different from the above, provide the following:

Applicant Name **King County Wastewater Treatment Division**

Mailing Address **201 S. Jackson St., MS-KSC-NR-0700, Seattle, WA 98104-3855**

Telephone Number **(206) 477-4550**

E-mail address **Christie.True@kingcounty.gov**

Contact Person **Christie True, P.E.**

Title **Director, King County Department of Natural Resources and Parks**

Is the applicant the owner or operator (or both) of the treatment works? ☒ owner ☒ operator

Indicate whether correspondence regarding this permit should be directed to the facility or the applicant.
☒ facility ☐ applicant

Can the facility obtain broadband internet access for WQWebDMR (http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html)?
☒ yes ☐ no

A.3. Existing Environmental Permits. Provide the permit number of any existing environmental permits that have been issued to the treatment works (include state-issued permits).

NPDES	**WA – 002918-1**	PSD	**Title V Air Operating Permit 10088**
UIC		Other	
RCRA		Other	

A.4. Collection System Information. Provide information on municipalities and areas served by the facility. Provide the name and population of each entity and, if known, provide information on the type of collection system (combined vs. separate) and its ownership (municipal, private, etc.).

Name	Population Served	Type of Collection System	Ownership
See Attachment			

Total population served __________

West Point Treatment Plant and CSO System

Application for Renewal of the NPDES Permit (WA002918-1)

January 2019

Supplemental Information for EPA Form 2A-Part A.4 (Collection System Information)

A. Municipalities and Areas Served: The following municipalities or utilities contribute some or all of their wastewater to the West Point conveyance system.

- City of Seattle
- City of Lake Forest Park
- City of Brier
- City of Edmonds
- City of Mountlake Terrace
- Alderwood Water and Sewer District
- Highlands Sewer District
- Olympic View Water and Sewer District
- Northshore Utility District
- Ronald Wastewater District
- Southwest Suburban Sewer District
- Valley View Sewer District

King County owns all interceptors that receive wastewater from the individual collection systems operated by the organizations listed above. The estimated service area covers approximately 62,538 acres (98 sq. miles).

B. – Population Served: King County's Wastewater Treatment Division (WTD) recently updated the estimates of population, and wastewater flows and loads for the specific West Point Treatment Plant, Brightwater Treatment Plant, and South Treatment Plant service areas (King County 2018). The assessment is based on information from the Puget Sound Regional Council (PSRC) 2013 Land Use Forecast data (which itself is based on U.S. Census Bureau national census data from 2000 and 2010), and the U.S. Census Bureau's annual American Community Survey (ACS) data from 2016. WTD used the PSRC information to generate decadal population projections in the service sub-areas out to 2060. WTD also specifically adjusted the 2020 population estimate using the recent ACS data. Based on the projected 2010 and 2020 population, interpolation results in an estimated residential population of the West Point service area in 2018 of approximately 754,900 and a total of residential and employment population of 1,414,000. Since 2010, the Puget Sound region has experienced significant growth, outpacing the PSRC 2013 projections for the 2010 to 2020 period.

References

King County. 2018. West Point Treatment Plant Peak Flow and Wasteload Projections, 2010−2060. (December). King County Department of Natural Resources and Parks, Wastewater Treatment Division.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.5. **Indian Country.**

a. Is the treatment works located in Indian Country?

☐ Yes ☒ No

b. Does the treatment works discharge to a receiving water that is either in Indian Country or that is upstream from (and eventually flows through) Indian Country?

☐ Yes ☒ No

A.6. **Flow.** Indicate the design flow rate of the treatment plant (i.e., the wastewater flow rate that the plant was built to handle). Also provide the average daily flow rate and maximum daily flow rate for each of the last three years. Each year's data must be based on a 12-month time period with the 12th month of "this year" occurring no more than three months prior to this application submittal.

a. Design flow rate **215 max mo** mgd

	Two Years Ago	Last Year	This Year
b. Annual average daily flow rate	**97.9**	**99.2**	**89.9 (through Oct.)**
c. Maximum daily flow rate	**342.0**	**364.7**	**298.0 (through Oct.)**

A.7. **Collection System.** Indicate the type(s) of collection system(s) used by the treatment plant. Check all that apply. Also estimate the percent contribution (by miles) of each.

☒ Separate sanitary sewer **45** %

☒ Combined storm and sanitary sewer **55** %

A.8. **Discharges and Other Disposal Methods.**

a. Does the treatment works discharge effluent to waters of the U.S.? ☒ Yes ☐ No

If yes, list how many of each of the following types of discharge points the treatment works uses:

i. Discharges of treated effluent **1**

ii. Discharges of untreated or partially treated effluent **4 (CSO plants, Part A.9-12 forms)**

iii. Combined sewer overflow points **39 (Part G forms)**

iv. Constructed emergency overflows (prior to the headworks) **1 (West Pt., Part A.9-12 form)**

v. Other **Pump stations - emergency overflows** **2 (Part A.9-12 forms)**

b. Does the treatment works discharge effluent to basins, ponds, or other surface impoundments that do not have outlets for discharge to waters of the U.S.? ☐ Yes ☒ No

If yes, provide the following <u>for each surface impoundment</u>:

Location : ____________________
(Latitude/Longitude as decimal degrees (NAD83/WGS84))

Annual average daily volume discharge to surface impoundment(s) ____________ mgd

Is discharge ☐ continuous or ☐ intermittent?

c. Does the treatment works land-apply treated wastewater? ☐ Yes ☒ No

If yes, provide the following <u>for each land application site</u>:

Location : ____________________
(Latitude/Longitude as decimal degrees (NAD83/WGS84))

Number of acres: ____________________

Annual average daily volume applied to site: ____________ mgd

Is land application ☐ continuous or ☐ intermittent?

d. Does the treatment works discharge or transport treated or untreated wastewater to another treatment works? ☐ Yes ☒ No

If yes, describe the mean(s) by which the wastewater from the treatment works is discharged or transported to the other treatment works (e.g., tank truck, pipe).

If transport is by a party other than the applicant, provide:

Transporter Name

Mailing Address

Contact Person

Title

Telephone Number ( )

For each treatment works that receives this discharge, provide the following:

Name

Mailing Address

Contact Person

Title

Telephone Number ( )

If known, provide the NPDES permit number of the treatment works that receives this discharge

Provide the average daily flow rate from the treatment works into the receiving facility. mgd

e. Does the treatment works discharge or dispose of its wastewater in a manner not included in A.8. through A.8.d above (e.g., underground percolation, well injection): ☐ Yes ☒ No

If yes, provide the following for each disposal method:

Description of method (including location and size of site(s) if applicable):

Annual daily volume disposed by this method:

Is disposal through this method ☐ continuous or ☐ intermittent?

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. **If you answered "no" to question A.8.a,** go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

a. Outfall number **DNS #1**

b. Location

Seattle	**98199**
(City or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47.661111	**-122.446389**
(Latitude) Provide these as decimal degrees (NAD83/WGS84)	(Longitude)

c. Distance from shore (if applicable) **3600** ft.

d. Depth below surface (if applicable) **240** ft.

e. Average daily flow rate ________ mgd

f. Does this outfall have either an intermittent or a periodic discharge? ☐ Yes ☒ No (go to A.9.g.)

If yes, provide the following information:

Number f times per year discharge occurs: ________

Average duration of each discharge: ________

Average flow per discharge: ________ mgd

Months in which discharge occurs: ________

g. Is outfall equipped with a diffuser? ☒ Yes ☐ No

A.10. Description of Receiving Waters.

a. Name of receiving water **Puget Sound**

b. Name of watershed (if known) ________

United States Soil Conservation Service 14-digit watershed code (if known): **WRIA-8**

c. Name of State Management/River Basin (if known): ________

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ________

d. Critical low flow of receiving stream (if applicable)
acute **N/A** cfs chronic **N/A** cfs

e. Total hardness of receiving stream at critical low flow (if applicable): **N/A** mg/l of $CaCO_3$

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.11. Description of Treatment

a. What level(s) of treatment are provided? Check all that apply.

☐ Primary ☒ Secondary

☐ Advanced ☒ Other. Describe: **CSO treatment for flows >300 mgd**

b. Indicate the following removal rates (as applicable):

Design BOD5 removal or Design CBOD5 removal	**85% (80% in wet season)**	%
Design SS removal	**85% (80% in wet season)**	%
Design P removal	**N/A**	%
Design N removal	**N/A**	%
Other **CSO treatment**	**Same as secondary treatment**	%

c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe:

Sodium hypochlorite

If disinfection is by chlorination is dechlorination used for this outfall? ☒ Yes ☐ No

d. Does the treatment plant have post aeration? ☒ Yes ☐ No

A.12. Effluent Testing Information.

All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than one and one-half years apart.

Outfall number: **001** Data for Jan. 2014 through Jun. 2018, minus Feb. through May 2017

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)	7.8	s.u.			
pH (Maximum)	6.0	s.u.			
Flow Rate	364.7	MGD	95.7	MGD	1319
Temperature (Winter)	20.4	C	15.5	C	634
Temperature (Summer)	23.5	C	20.4	C	777

* For pH please report a minimum and a maximum daily value

POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD5	105	mg/L	19	mg/L	1319	SM5210B	1.7
	CBOD5	81	mg/L	9	mg/L	1319	SM5210B-	1.7
FECAL COLIFORM		22,000	#/ 100mL	51	#/ 100mL	1319	SM 9221 E2+C-A1-MPN	N/A
TOTAL SUSPENED SOLIDS (TSS)		170	mg/L	11	mg/L	1319	SM2540D	0.61

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. **If you answered "no" to question A.8.a,** go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

a. Outfall number **051 Alki Wet Weather Treatment Station Outfall**

b. Location **Seattle** (City or town, if applicable) **98199** (Zip Code)

King (County) **WA** (State)

47.566434 / -122.415673 (Lattitutde) Provide these as decimal degrees (NAD83/WGS84) (Longitude)

c. Distance from shore (if applicable) **700** ft.

d. Depth below surface (if applicable) **150** ft.

e. Average daily flow rate **N/A** mgd

f. Does this outfall have either an intermittent or a periodic discharge? Only in emergency situations or for Maintenance cleanings ☒ Yes ☐ No (go to A.9.g.)

If yes, provide the following information:

Number f times per year discharge occurs: **4 – 6/yr (2014-2016)**

Average duration of each discharge: **N/A**

Average flow per discharge: **18.9** mgd

Months in which discharge occurs: **Oct.-Apr.**

g. Is outfall equipped with a diffuser? ☒ Yes ☐ No

A.10. Description of Receiving Waters.

a. Name of receiving water **Puget Sound**

b. Name of watershed (if known) ____

United States Soil Conservation Service 14-digit watershed code (if known): ____

c. Name of State Management/River Basin (if known): **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ____

d. Critical low flow of receiving stream (if applicable)
acute **N/A** cfs chronic **N/A** cfs

e. Total hardness of receiving stream at critical low flow (if applicable): **N/A** mg/l of $CaCO_3$

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.11. Description of Treatment

a. What levels of treatment are provided? Check all that apply.

☒ Primary ☐ Secondary

☐ Advanced ☐ Other. Describe: ______________________________

b. Indicate the following removal rates (as applicable):

Design BOD5 removal or Design CBOD5 removal **N/A** %

Design SS removal **N/A** %

Design P removal **N/A** %

Design N removal **N/A** %

Other ______________ **N/A** %

c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe:

Sodium hypochlorite

If disinfection is by chlorination is dechlorination used for this outfall? ☒ Yes ☐ No

d. Does the treatment plant have post aeration? ☐ Yes ☒ No

A.12 Effluent Testing Information.

All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.

Outfall number: **051 (see Attachment #6 Flow and Wasteload Assessment)**

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)		s.u.			
pH (Maximum)		s.u.			
Flow Rate					
Temperature (Winter)					
Temperature (Summer)					

* For pH please report a minimum and a maximum daily value

POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD5							
	CBOD5							
FECAL COLIFORM								
TOTAL SUSPENDED SOLIDS (TSS)								

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. **If you answered "no" to question A.8.a,** go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

c. Outfall number **046 Carkeek Wet Weather Treatment Station Outfall**

d. Location **Seattle** (City or town, if applicable) **98199** (Zip Code)

King (County) **WA** (State)

47.712560 / -122.387616
(Lattitutde) Provide these as decimal degrees (NAD83/WGS84) (Longitude)

c. Distance from shore (if applicable) **2000** ft.

d. Depth below surface (if applicable) **200** ft.

e. Average daily flow rate **N/A** mgd

f. Does this outfall have either an intermittent or a periodic discharge? Only in emergency situations or for Maintenance cleanings ☒ Yes ☐ No (go to A.9.g.)

If yes, provide the following information:

Number f times per year discharge occurs: **4 – 8/yr (2014-2016)**

Average duration of each discharge: **N/A**

Average flow per discharge: **2.5** mgd

Months in which discharge occurs: **Oct.-Mar.**

g. Is outfall equipped with a diffuser? ☒ Yes ☐ No

A.10. Description of Receiving Waters.

d. Name of receiving water **Puget Sound**

e. Name of watershed (if known) ______

United States Soil Conservation Service 14-digit watershed code (if known): ______

f. Name of State Management/River Basin (if known): **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

d. Critical low flow of receiving stream (if applicable)
acute **N/A** cfs chronic **N/A** cfs

e. Total hardness of receiving stream at critical low flow (if applicable): **N/A** mg/l of $CaCO_3$

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.11. Description of Treatment

a. What levels of treatment are provided? Check all that apply.

☒ Primary ☐ Secondary

☐ Advanced ☐ Other. Describe: ____________________

b. Indicate the following removal rates (as applicable):

Design BOD5 removal or Design CBOD5 removal **N/A** %

Design SS removal **N/A** %

Design P removal **N/A** %

Design N removal **N/A** %

Other ____________ **N/A** %

c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe:

Sodium hypochlorite

If disinfection is by chlorination is dechlorination used for this outfall? ☒ Yes ☐ No

d. Does the treatment plant have post aeration? ☐ Yes ☒ No

A.12 Effluent Testing Information. All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.

Outfall number: **046 (see Attachment #6 Flow and Wasteload Assessment)**

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)		s.u.			
pH (Maximum)		s.u.			
Flow Rate					
Temperature (Winter)					
Temperature (Summer)					

* For pH please report a minimum and a maximum daily value

POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD5							
	CBOD5							
FECAL COLIFORM								
TOTAL SUSPENDED SOLIDS (TSS)								

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. **If you answered "no" to question A.8.a,** go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

e. Outfall number: **027b Elliott West Wet Weather Treatment Station Outfall**

f. Location:
- **Seattle** (City or town, if applicable) — **98199** (Zip Code)
- **King** (County) — **WA** (State)
- **47.617530 / -122.361883** (Lattitutde) Provide these as decimal degrees (NAD83/WGS84) (Longitude)

c. Distance from shore (if applicable): **490** ft.

d. Depth below surface (if applicable): **60** ft.

e. Average daily flow rate: **N/A** mgd

f. Does this outfall have either an intermittent or a periodic discharge? Only in emergency situations or for Maintenance cleanings ☒ Yes ☐ No (go to A.9.g.)

If yes, provide the following information:

Number f times per year discharge occurs: **4 – 8/yr (2014-2016)**

Average duration of each discharge: **N/A**

Average flow per discharge: **16.9** mgd

Months in which discharge occurs: **Oct.-May**

g. Is outfall equipped with a diffuser? ☐ Yes ☒ No

A.10. Description of Receiving Waters.

g. Name of receiving water: **Puget Sound**

h. Name of watershed (if known): ______

United States Soil Conservation Service 14-digit watershed code (if known): ______

i. Name of State Management/River Basin (if known): **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

d. Critical low flow of receiving stream (if applicable)
acute **N/A** cfs chronic **N/A** cfs

e. Total hardness of receiving stream at critical low flow (if applicable): **N/A** mg/l of $CaCO_3$

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.11. Description of Treatment

a. What levels of treatment are provided? Check all that apply.

☒ Primary ☐ Secondary

☐ Advanced ☐ Other. Describe: ______

b. Indicate the following removal rates (as applicable):

Design BOD5 removal or Design CBOD5 removal **N/A** %

Design SS removal **N/A** %

Design P removal **N/A** %

Design N removal **N/A** %

Other ______ **N/A** %

c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe:

Sodium hypochlorite

If disinfection is by chlorination is dechlorination used for this outfall? ☒ Yes ☐ No

d. Does the treatment plant have post aeration? ☐ Yes ☒ No

A.12 Effluent Testing Information. All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.

Outfall number: **027b (see Attachment #6 Flow and Wasteload Assessment)**

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)		s.u.			
pH (Maximum)		s.u.			
Flow Rate					
Temperature (Winter)					
Temperature (Summer)					

* For pH please report a minimum and a maximum daily value

POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD5							
	CBOD5							
FECAL COLIFORM								
TOTAL SUSPENDED SOLIDS (TSS)								

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. **If you answered "no" to question A.8.a,** go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

g. Outfall number **Henderson/MLK Wet Weather Treatment Station Outfall (shares CSO 044a)**

h. Location
Seattle (City or town, if applicable) **98199** (Zip Code)
King (County) **WA** (State)
47.511952 / -122.297376
(Lattitutde) Provide these as decimal degrees (NAD83/WGS84) (Longitude)

c. Distance from shore (if applicable) **0** ft.

d. Depth below surface (if applicable) **0** ft.

e. Average daily flow rate **N/A** mgd

f. Does this outfall have either an intermittent or a periodic discharge? Only in emergency situations or for Maintenance cleanings ☒ Yes ☐ No (go to A.9.g.)

If yes, provide the following information:

Number f times per year discharge occurs: **0 – 3/yr (2014-2017)**

Average duration of each discharge: **N/A**

Average flow per discharge: **4.3** mgd

Months in which discharge occurs: **N/A**

g. Is outfall equipped with a diffuser? ☐ Yes ☒ No

A.10. Description of Receiving Waters.

j. Name of receiving water **Duwamish River**

k. Name of watershed (if known) **Green WRIA 9**

United States Soil Conservation Service 14-digit watershed code (if known): ______

l. Name of State Management/River Basin (if known): **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

d. Critical low flow of receiving stream (if applicable)
acute **N/A** cfs chronic **N/A** cfs

e. Total hardness of receiving stream at critical low flow (if applicable): **N/A** mg/l of $CaCO_3$

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.11. Description of Treatment

a. What levels of treatment are provided? Check all that apply.

☒ Primary ☐ Secondary

☐ Advanced ☐ Other. Describe: ______________________

b. Indicate the following removal rates (as applicable):

Design BOD5 removal or Design CBOD5 removal	**N/A**	%
Design SS removal	**N/A**	%
Design P removal	**N/A**	%
Design N removal	**N/A**	%
Other ______________	**N/A**	%

c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe:

Sodium hypochlorite

If disinfection is by chlorination is dechlorination used for this outfall? ☒ Yes ☐ No

d. Does the treatment plant have post aeration? ☐ Yes ☒ No

A.12 Effluent Testing Information. All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.

Outfall number: **(shares CSO 044a) (see Attachment #6 Flow and Wasteload Assessment)**

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)		s.u.			
pH (Maximum)		s.u.			
Flow Rate					
Temperature (Winter)					
Temperature (Summer)					

* For pH please report a minimum and a maximum daily value

POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD5							
	CBOD5							
FECAL COLIFORM								
TOTAL SUSPENDED SOLIDS (TSS)								

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. **If you answered "no" to question A.8.a,** go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

i. Outfall number **DNS # 2 Emergency Bypass Outfall**

j. Location

Seattle (City or town, if applicable) — **98199** (Zip Code)

King (County) — **WA** (State)

47.663712 / -122.431056
(Lattitutde) Provide these as decimal degrees (NAD83/WGS84) (Longitude)

c. Distance from shore (if applicable) **600** ft.

d. Depth below surface (if applicable) **40** ft.

e. Average daily flow rate **0** mgd

f. Does this outfall have either an intermittent or a periodic discharge? Only in emergency situations or for Maintenance cleanings ☒ Yes ☐ No (go to A.9.g.)

If yes, provide the following information:

Number f times per year discharge occurs: **0* - only in emergencies**

Average duration of each discharge: **N/A**

Average flow per discharge: **N/A** mgd

Months in which discharge occurs: **N/A**

g. Is outfall equipped with a diffuser? ☐ Yes ☒ No

A.10. Description of Receiving Waters.

m. Name of receiving water **Puget Sound**

n. Name of watershed (if known) ______

United States Soil Conservation Service 14-digit watershed code (if known): ______

o. Name of State Management/River Basin (if known): **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

d. Critical low flow of receiving stream (if applicable)
acute **N/A** cfs chronic **N/A** cfs

e. Total hardness of receiving stream at critical low flow (if applicable): **N/A** mg/l of $CaCO_3$

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.11. Description of Treatment

a. What levels of treatment are provided? Check all that apply.

☐ Primary ☐ Secondary

☐ Advanced ☒ Other. Describe: **Untreated**

b. Indicate the following removal rates (as applicable):

Design BOD5 removal or Design CBOD5 removal **N/A** %

Design SS removal **N/A** %

Design P removal **N/A** %

Design N removal **N/A** %

Other ____________ **N/A** %

c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe:

N/A

If disinfection is by chlorination is dechlorination used for this outfall? ☐ Yes ☐ No

d. Does the treatment plant have post aeration? ☐ Yes ☐ No

A.12 Effluent Testing Information. All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.

Outfall number: **002 – no data collected**

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)		s.u.			
pH (Maximum)		s.u.			
Flow Rate					
Temperature (Winter)					
Temperature (Summer)					

* For pH please report a minimum and a maximum daily value

POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD5							
	CBOD5							
FECAL COLIFORM								
TOTAL SUSPENDED SOLIDS (TSS)								

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. **If you answered "no" to question A.8.a,** go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

k. Outfall number: DNS#050 Lake Ballinger PS Emergency Overflow

l. Location: Shoreline (City or town, if applicable) 98043 (Zip Code)

King (County) WA (State)

47.780684 / -122.322353 (Lattitutde) Provide these as decimal degrees (NAD83/WGS84) (Longitude)

c. Distance from shore (if applicable): N/A ft.

d. Depth below surface (if applicable): ______ ft.

e. Average daily flow rate: N/A mgd

f. Does this outfall have either an intermittent or a periodic discharge? Only in emergency situations or for Maintenance cleanings ☒ Yes ☐ No (go to A.9.g.)

If yes, provide the following information:

Number f times per year discharge occurs: 0* - only in emergencies

Average duration of each discharge: N/A

Average flow per discharge: N/A mgd

Months in which discharge occurs: N/A

g. Is outfall equipped with a diffuser? ☐ Yes ☒ No

A.10. Description of Receiving Waters.

p. Name of receiving water: McAleer Creek

q. Name of watershed (if known): ______

United States Soil Conservation Service 14-digit watershed code (if known): ______

r. Name of State Management/River Basin (if known): WRIA 8

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

d. Critical low flow of receiving stream (if applicable)
acute N/A cfs chronic N/A cfs

e. Total hardness of receiving stream at critical low flow (if applicable): N/A mg/l of $CaCO_3$

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.11. Description of Treatment

a. What levels of treatment are provided? Check all that apply.

☐ Primary ☐ Secondary

☐ Advanced ☒ Other. Describe: **Untreated**

b. Indicate the following removal rates (as applicable):

Design BOD5 removal or Design CBOD5 removal **N/A** %

Design SS removal **N/A** %

Design P removal **N/A** %

Design N removal **N/A** %

Other ________________ **N/A** %

c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe:

N/A

If disinfection is by chlorination is dechlorination used for this outfall? ☐ Yes ☐ No

d. Does the treatment plant have post aeration? ☐ Yes ☐ No

A.12 Effluent Testing Information. All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.

Outfall number: **050 – no data collected**

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)		s.u.			
pH (Maximum)		s.u.			
Flow Rate					
Temperature (Winter)					
Temperature (Summer)					

* For pH please report a minimum and a maximum daily value

POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD5							
	CBOD5							
FECAL COLIFORM								
TOTAL SUSPENDED SOLIDS (TSS)								

FACILITY NAME AND PERMIT NUMBER:

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WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. **If you answered "no" to question A.8.a,** go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

m. Outfall number: Richmond Beach Pump Station Emergency Overflow

n. Location: Shoreline (City or town, if applicable) 98020 (Zip Code)

King (County) WA (State)

47.773226 / -122.399110

(Lattitutde) Provide these as decimal degrees (NAD83/WGS84) (Longitude)

c. Distance from shore (if applicable): 1580 ft.

d. Depth below surface (if applicable): 100 ft.

e. Average daily flow rate: N/A mgd

f. Does this outfall have either an intermittent or a periodic discharge? Only in emergency situations or for Maintenance cleanings ☒ Yes ☐ No (go to A.9.g.)

If yes, provide the following information:

Number f times per year discharge occurs: 0* - only in emergencies

Average duration of each discharge: N/A

Average flow per discharge: N/A mgd

Months in which discharge occurs: N/A

g. Is outfall equipped with a diffuser? ☒ Yes ☐ No

A.10. Description of Receiving Waters.

s. Name of receiving water: Puget Sound

t. Name of watershed (if known): ______

United States Soil Conservation Service 14-digit watershed code (if known): ______

u. Name of State Management/River Basin (if known): WRIA 8

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

d. Critical low flow of receiving stream (if applicable)
acute N/A cfs chronic N/A cfs

e. Total hardness of receiving stream at critical low flow (if applicable): N/A mg/l of $CaCO_3$

FACILITY NAME AND PERMIT NUMBER:

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A.11. Description of Treatment

a. What levels of treatment are provided? Check all that apply.

☐ Primary ☐ Secondary

☐ Advanced ☒ Other. Describe: Untreated

b. Indicate the following removal rates (as applicable):

Design BOD5 removal or Design CBOD5 removal N/A %

Design SS removal N/A %

Design P removal N/A %

Design N removal N/A %

Other ____________ N/A %

c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe:

N/A

If disinfection is by chlorination is dechlorination used for this outfall? ☐ Yes ☐ No

d. Does the treatment plant have post aeration? ☐ Yes ☐ No

A.12 Effluent Testing Information. All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.

Outfall number: No data collected

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)		s.u.			
pH (Maximum)		s.u.			
Flow Rate					
Temperature (Winter)					
Temperature (Summer)					

* For pH please report a minimum and a maximum daily value

POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD5							
	CBOD5							
FECAL COLIFORM								
TOTAL SUSPENDED SOLIDS (TSS)								

END OF PART A.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE

FACILITY NAME AND PERMIT NUMBER:

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BASIC APPLICATION INFORMATION

PART B. ADDITIONAL APPLICATION INFORMATION FOR APPLICANTS WITH A DESIGN FLOW GREATER THAN OR EQUAL TO 0.1 MGD (100,000 gallons per day).

All applicants with a design flow rate ≥ 0.1 mgd must answer questions B.1 through B.6. All others go to Part C (Certification).

B.1. Inflow and Infiltration. Estimate the average number of gallons per day that flow into the treatment works from inflow and/or infiltration.

Estimated to be approximately 17.5 MGD dry weather and 27.5 MGD wet weather non-storm gpd

Briefly explain any steps underway or planned to minimize inflow and infiltration.

See Attachment

B.2. Topographic Map. Attach to this application a topographic map of the area extending at least one mile beyond facility property boundaries. This map must show the outline of the facility and the following information. (You may submit more than one map if one map does not show the entire area.)

a. The area surrounding the treatment plant, including all unit processes.

b. The major pipes or other structures through which wastewater enters the treatment works and the pipes or other structures through which treated wastewater is discharged from the treatment plant. Include outfalls from bypass piping, if applicable.

c. Each well where wastewater from the treatment plant is injected underground.

d. Wells, springs, other surface water bodies, and drinking water wells that are: 1) within ¼ mile of the property boundaries of the treatment works, and 2) listed in public record or otherwise known to the applicant.

e. Any areas where the sewage sludge produced by the treatment works is stored, treated, or disposed.

f. If the treatment works receives waste that is classified as hazardous under the Resource Conservation and Recovery Act (RCRA) by truck, rail, or special pipe, show on the map where the hazardous waste enters the treatment works and where it is treated, stored, and/or disposed.

B.3. Process Flow Diagram or Schematic. Provide a diagram showing the processes of the treatment plant, including all bypass piping and all backup power sources or redunancy in the system. Also provide a water balance showing all treatment units, including disinfection (e.g., chlorination and dechlorination). The water balance must show daily average flow rates at influent and discharge points and approximate daily flow rates between treatment units. Include a brief narrative description of the diagram.

B.4. Operation/Maintenance Performed by Contractor(s).

Are any operational or maintenance aspects (related to wastewater treatment and effluent quality) of the treatment works the responsibility of a contractor? ☐ Yes ☒ No

If yes, list the name, address, telephone number, and status of each contractor and describe the contractor's responsibilities (attach additional pages if necessary).

Name:

Mailing Address:

Telephone Number: ( )

Responsibilities of Contractor:

B.5. Scheduled improvements and Schedules of Implementation. Provide information on any uncompleted implementation schedule or uncompleted plans for improvements that will affect the wastewater treatment, effluent quality, or design capacity of the treatment works. If the treatment works has several different implementation schedules or is planning several improvements, submit separate responses to question B.5 for each. (If none, go to question B.6.)

a. List the outfall number (assigned in question A.9) for each outfall that is covered by this implementation schedule.

N/A

b. Indicate whether the planned improvements or implementation schedule are required by local, State, or Federal agencies.

☐ Yes ☐ No

West Point Treatment Plant and CSO System

Application for Renewal of the NPDES Permit (WA002918-1)

January 2019

Supplemental Information for EPA Form 2A, Part B.1 (Infiltration and Inflow)

Steps Underway or Planned to Reduce Infiltration and Inflow:
The following is a description of the Regional Infiltration and Inflow (I/I) Control Program of the King County Wastewater Treatment Division (WTD). WTD created the I/I program in 1999 as part of the Regional Wastewater Services Plan (RWSP) to explore the feasibility of I/I control. The I/I program focuses on portions of the system that have wastewater flow capacity shortages, and has developed data to assess where I/I reduction might be a more cost effective solution than increasing pipe and/or pump station capacity. In response to the RWSP I/I Control Program policies, WTD staff conducted a comprehensive 6-year I/I control study which culminated in the Executive's recommendation for a regional I/I program in 2006. The Executive's recommendation, based on findings of pilot testing and a benefit/cost analysis, called for implementation of two or three initial demonstration projects to gain more information prior to the development of a comprehensive I/I reduction program. Selected I/I reduction projects in Bellevue and Issaquah were cancelled in 2010 due to budget limitations. WTD completed the Skyway I/I reduction project in 2014, with the results indicating that the project will delay the need for larger conveyance or storage facilities.

In 2015, WTD convened a "Task Force" of representatives from the Engineering and Planning Subcommittee of the Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC) to build on the prior work and explore more comprehensive and system wide I/I reduction elements of the regional I/I program. The Task Force identified a number of I/I reduction concepts for further evaluation, and WTD subsequently contracted with Brown and Caldwell (BC) in mid-2016 to develop frameworks for potential programs based on the concepts, and develop an implementation plan for moving forward with new regional program elements. The programs identified are related to side sewer standards, sewer inspection requirements, and private side sewers in the separated sanitary conveyance system. The scope of work that BC assisted WTD to execute consists of the following tasks:

1. Develop approach to achieve common sewer and side sewer standards
    a. Verification that the sewer and side sewer standards King County and MWPAAC developed in 2004 are still accurate and can be used as a benchmark for assessing standards and procedures in the regional system.
    b. Assessment of local agency sewer and side sewer standards as compared to recognized best management practices.

    c. Development of an approach to achieve common sewer and side sewer standards.
2. Examine potential for standardized sewer and side sewer inspection program
    a. Evaluation of existing sewer and side sewer inspection programs throughout the regional service area.
    b. Identification of best practices for a sewer and side sewer inspection program that includes consideration of uniform inspector training procedures.
3. Evaluation of private side sewer programs
    a. Identification of the types, strengths, and weaknesses of private side sewer programs utilized by other utilities (e.g., inspection, insurance, enforcement, and financial aid).
    b. Evaluation of a side sewer inspection and certification program, and development of a framework for implementation of a private side sewer inspection program, for the regional service area.
    c. Evaluation of and framework for implementation of a side sewer insurance program.
    d. Evaluation of and framework for implementation of a side sewer maintenance program.
    e. Evaluation of and framework for implementation of a side sewer grant or loan program.

BC has completed about 95 percent of the scope of work including documentation on the results of the evaluations and recommendations for consideration by MWPAAC.

After consideration of the recommendations in late 2018, MWPAAC made an advisory recommendation to continue with further analysis of three programs; common side sewer best management practices, an inspection training and certification program, and a private side sewer program that includes financial assistance. In 2019, WTD will work with BC and MWPAAC to develop a new scope of work for this further analysis, which is expected to evaluate program components in more detail and include defining program goals, roles and responsibilities, costs, implications, schedule, and other program development tasks. This effort is expected to span a few years and may result in implementation plans to support the Regional I/I Control Program.

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c. If the answer to B.5.b is "Yes," briefly describe, including new maximum daily inflow rate (if applicable).

d. Provide dates imposed by any compliance schedule or any actual dates of completion for the implementation steps listed below, as applicable. For improvements planned independently of local, State, or Federal agencies, indicate planned or actual completion dates, as applicable. Indicate dates as accurately as possible.

Implementation Stage	Schedule MM/DD/YYYY	Actual Completion MM/DD/YYYY
- Begin Construction	/ /	/ /
- End Construction	/ /	/ /
- Begin Discharge	/ /	/ /
- Attain Operational Level	/ /	/ /

e. Have appropriate permits/clearances concerning other Federal/State requirements been obtained? ☐ Yes ☐ No

Describe briefly:

B.6. EFFLUENT TESTING DATA (GREATER THAN OR EQUAL TO 0.1 MGD ONLY).

Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods (See attachment A). In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum effluent testing data must be based on at least three pollutant scans and must be no more than four and one-half years old.

Outfall Number: 001 Data for Jan. 2014 through Jun. 2018, minus Feb. through May 2017

POLLUTANT	MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS							
AMMONIA (as N)	34.7	mg/L	22.2	mg/L	152	SM 4500-NH3 E	0.018
CHLORINE (TOTAL RESIDUAL, TRC)	0.33	mg/L	0.097	mg/L	1320	SM 4500-Cl E	0.009
DISSOLVED OXYGEN	7.74	mg/L	7.27	mg/L	4	SM 4500-O G	0.2
TOTAL KJELDAHL NITROGEN (TKN)	45.4	mg/L	26.3	mg/L	152	SM 4500-Norg B	0.23
NITRATE PLUS NITRITE NITROGEN	21.7	mg/L	3.48	mg/L	54	Hach 10020	0.01
OIL and GREASE	46.8	mg/L	5.46	mg/L	17	EPA 1664 A,B	1.4-1.5
PHOSPHORUS (Total)	14.9	mg/L	2.84	mg/L	170	SM 4500-P E	0.06
TOTAL DISSOLVED SOLIDS (TDS)	810	mg/L	627	mg/L	4	SM 2540 C	30.9
OTHER Total alkalinity	216	mg/L	195	mg/L	15	SM 2320 B	0.3

END OF PART B.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

BASIC APPLICATION INFORMATION

PART C. CERTIFICATION

All applicants must complete the Certification Section. Refer to instructions to determine who is an officer for the purposes of this certification. All applicants must complete all applicable sections of Form 2A, as explained in the Application Overview. Indicate below which parts of Form 2A you have completed and are submitting. By signing this certification statement, applicants confirm that they have reviewed Form 2A and have completed all sections that apply to the facility for which this application is submitted.

Indicate which parts of Form 2A you have completed and are submitting:

☒ Basic Application Information packet

Supplemental Application Information packet:

☒ Part D (Expanded Effluent Testing Data)

☒ Part E (Toxicity Testing: Biomonitoring Data)

☒ Part F (Industrial User Discharges and RCRA/CERCLA Wastes)

☒ Part G (Combined Sewer Systems)

ALL APPLICANTS MUST COMPLETE THE FOLLOWING CERTIFICATION.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Permittee

Name and Title of Responsible Official: Christie True, Director, King County Department of Natural Resources and Parks

Signature: [signature]

Telephone number: (206) 477-4550

E-mail address: Christie.True@kingcounty.gov

Date signed:

Co-Permittee (if applicable)

Name and official title:

Signature:

Telephone number: (   )

E-mail address:

Date signed:

Upon request of the permitting authority, you must submit any other information necessary to assure wastewater treatment practices at the treatment works or identify appropriate permitting requirements.

SEND COMPLETED FORMS TO[1]:

[1]If unknown, contact an Ecology regional wastewater permit coordinator at: http://www.ecy.wa.gov/programs/wq/permits/permit_coord.html

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART D. EXPANDED EFFLUENT TESTING DATA

Refer to the directions on the cover page to determine whether this section applies to the treatment works.

Effluent Testing: 1.0 mgd and Pretreatment Works. If the treatment works has a design flow greater than or equal to 1.0 mgd or it has (or is required to have) a pretreatment program, or is otherwise required by the permitting authority to provide the data, then provide effluent testing data for the following pollutants. Provide the indicated effluent testing information and any other information required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analyses conducted using 40 CFR Part 136 methods. In addition, these data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. Indicate in the blank rows provided below any data you may have on pollutants not specifically listed in this form. At a minimum, effluent testing data must be based on at least three pollutant scans and must be no more than four and one-half years old. The applicant should also review Attachment A.

Data for Jan. 2014 through Jun. 2018, minus Feb. through May 2017

Outfall number: 001 (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
METALS (TOTAL RECOVERABLE), CYANIDE, PHENOLS, AND HARDNESS.											
ANTIMONY	0.79	ug/L	1.42	lb/d	0.468	ug/L	0.533	lb/d	16	EPA 200.8	0.3
ARSENIC	2.32	ug/L	4.59	lb/d	1.7	ug/L	1.83	lb/d	16	EPA 200.8	0.05-0.1
BERYLLIUM	<1	ug/L	<0.25	lb/d	<0.1	ug/L	<0.108	lb/d	16	EPA 200.8	0.1
CADMIUM	0.24	ug/L	<0.45	lb/d	<0.0751	ug/L	<0.0847	lb/d	16	EPA 200.8	0.05
CHROMIUM	0.95	ug/L	2.22	lb/d	0.708	ug/L	0.836	lb/d	16	EPA 200.8	0.2
COPPER	12.4	ug/L	25.4	lb/d	9.21	ug/L	10.1	lb/d	16	EPA 200.8	0.2-0.4
LEAD	1.75	ug/L	3.93	lb/d	0.805	ug/L	1.06	lb/d	16	EPA 200.8	0.1
MERCURY	0.0616	ug/L	0.126	lb/d	0.00858	ug/L	0.0138	lb/d	16	EPA 1631E	0.0002-0.002
NICKEL	3.55	ug/L	5.26	lb/d	2.55	ug/L	2.56	lb/d	16	EPA 200.8	0.1
SELENIUM	0.7	ug/L	<1.25	lb/d	<0.539	ug/L	<0.573	lb/d	16	EPA 200.8	0.5
SILVER	0.08	ug/L	<0.162	lb/d	<0.0509	ug/L	<0.553	lb/d	16	EPA 200.8	0.04
THALLIUM	<1	ug/L	<0.25	lb/d	<0.0813	ug/L	<0.0903	lb/d	16	EPA 200.8	0.04-0.1
ZINC	51.5	ug/L	104	lb/d	37.7	ug/L	42	lb/d	16	EPA 200.8	0.5-2.5
CYANIDE	15.9	ug/L	<13.2	lb/d	<0.00623	ug/L	<5.89	lb/d	16	SM 4500-CN-I	0.002-0.005
TOTAL PHENOLIC COMPOUNDS	0.047	mg/L	<117	lb/d	<0.0402	mg/L	<44.3	lb/d	16	EPA 420.1	0.037-0.04
HARDNESS (AS CaCO3)	-	-	-	-	-	-	-	-	-	-	-
Use this space (or a separate sheet) to provide information on other metals requested by the permit writer											

FACILITY NAME AND PERMIT NUMBER:
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Outfall number: 001 (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/ MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
VOLATILE ORGANIC COMPOUNDS											
ACROLEIN	<5	ug/L	<12.5	lb/d	<5	ug/L	<6.58	lb/d	9	EPA 624	5
ACRYLONITRILE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
BENZENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
BROMOFORM	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
CARBON TETRACHLORIDE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
COLORBENZENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
CHLOROBIDBROMO-METHANE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
CHLOROETHANE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
2-CHLORO-ETHYLVINYL ETHER	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
CHOLOROFORM	1.5	ug/L	<3.15	lb/d	1.12	ug/L	<1.32	lb/d	9	EPA 624	1
DICHLOROBROMO-METHANE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
1,1-DICHLOROETHANE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
1,2-DICHLOROETHANE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
1,2-DICHLOROETHYLENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
TRANS-1,2-DICHLORO-ETHYLENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
1,1-DICHLOROETHYLENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
1,2-DICHLOROPROPANE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
1,3-DICHLOROPROPYLENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
ETHYLBENZENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
METHYL BROMIDE	<5	ug/L	<12.5	lb/d	<5	ug/L	<6.58	lb/d	9	EPA 624	5
METHYL CHLORIDE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
METHYLENE CHLORIDE	<5	ug/L	<12.5	lb/d	<5	ug/L	<6.58	lb/d	9	EPA 624	5
1,1,2,2-TETRACHLORO-ETHANE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
TETRACHLORO-ETHYLENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
TOLUENE	1.5	ug/L	<2.5	lb/d	<1.06	ug/L	<1.32	lb/d	9	EPA 624	1

FACILITY NAME AND PERMIT NUMBER:

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Outfall number: **001** (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
1,1,1-TRICHLOROETHANE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
1,1,2-TRICHLOROETHANE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
TRICHLOROETHYLENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
VINYL CHLORIDE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA 624	1
Use this space (or a separate sheet) to provide information on other metals requested by the permit writer											
ACID-EXTRACTABLE COMPOUNDS											
P-CHLORO-M-CRESOL	<1.3	ug/L	<2.92	lb/d	<0.443	ug/L	<0.783	lb/d	9	EPA625	0.25-1.3
2-CHLOROPHENOL	<1.3	ug/L	<2.92	lb/d	<0.443	ug/L	<0.783	lb/d	9	EPA625	0.25-1.3
2,4-DICHLOROPHENOL	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
2,4-DIMETHYLPHENOL	0.775	ug/L	<1.58	lb/d	<0.294	ug/L	<0.536	lb/d	9	EPA625	0.12-0.63
4,6-DINITRO-O-CRESOL	<2.5	ug/L	<5.62	lb/d	<0.878	ug/L	<1.55	lb/d	9	EPA625	0.5-2.5
2,4-DINITROPHENOL	<3.8	ug/L	<8.54	lb/d	<1.32	ug/L	<2.32	lb/d	9	EPA625	0.74-3.8
2-NITROPHENOL	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
4-NITROPHENOL	<2.5	ug/L	<5.62	lb/d	<0.878	ug/L	<1.55	lb/d	9	EPA625	0.5-2.5
PENTA CHLOROPHENOL	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
PHENOL	<2.5	ug/L	<5.62	lb/d	<0.878	ug/L	<1.55	lb/d	9	EPA625	0.5-2.5
2,4,6-TRICHLORO PHENOL	<2.5	ug/L	<5.62	lbd/	<0.878	ug/L	<1.55	lb/d	9	EPA625	0.5-2.5
Use this space (or a separate sheet) to provide information on other metals requested by the permit writer											
BASE-NEUTRAL COMPOUNDS											
ACENAPHTHENE	<0.25	ug/L	<0.562	lb/d	<0.088	ug/L	<0.155	lb/d	9	EPA625	0.5-2.5
ACENAPHTYLENE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38
ANTHRACENE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38
BENZIDINE	<37.5	ug/L	<84.3	lb/d	<12.9	ug/L	<22.6	lb/d	9	EPA625	5-37.5
BENZO(A) ANTHRACENE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

Outfall number: **001** (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
BENZO(J)FLUORANTHENE	<1	ug/L	<2.25	lb/d	<0.35	ug/L	<0.616	lb/d	9	EPA625	0.2-1
BENZO(r,s,t)PENTAPHENE	<3.1	ug/L	<6.97	lb/d	<1.1	ug/L	<1.94	lb/d	9	EPA625	0.62-3.1
BENZO(A)PYRENE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
3.4 BENZO-FLUORANTHENE	<1	ug/L	<2.25	lb/d	<0.35	ug/L	<0.616	lb/d	9	EPA625	0.2-1
BENZO(GHI)PERYLENE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
BENZO(K)FLUORANTHENE	<1	ug/L	<2.25	lb/d	<0.35	ug/L	<0.616	lb/d	9	EPA625	0.2-1
BIS (2-CHLORO ETHOXY) METHANE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
BIS (2-CHLOROETHYL)-ETHER	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.28-0.58
BIS (2-CHLOROISO-PROPYL) ETHER	<1.3	ug/L	<2.92	lb/d	<0.443	ug/L	<0.783	lb/d	9	EPA625	0.25-1.3
BIS (2-ETHYLHEXYL) PHTHALATE	1.1	ug/L	2.75	lb/d	0.598	ug/L	0.897	lb/d	9	EPA625	0.12-0.63
4-BROMOPHENYL PHENYL ETHER	<0.25	ug/L	<0.562	lb/d	<0.088	ug/L	<0.155	lb/d	9	EPA625	0.5-2.5
BUTYL BENZYL PHTHALATE	<0.38	ug/L	<0.854	lb/d	<0.137	ug/L	<0.242	lb/d	9	EPA625	0.074-0.38
2-CHLORO NAPHTHALENE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38
4-CHLORPHENYL PHENYL ETHER	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38
CHRYSENE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38
DIBENZO(a,j) ACRIDINE	<3.1	ug/L	<6.97	lb/d	<1.1	ug/L	<1.94	lb/d	9	EPA625	0.62-3.1
DIBENZO(a,h) ACRIDINE	<3.1	ug/L	<6.97	lb/d	<1.1	ug/L	<1.94	lb/d	9	EPA625	0.62-3.1
DIBENZO(a,e) PYRENE	<3.1	ug/L	<6.97	lb/d	<1.1	ug/L	<1.94	lb/d	9	EPA625	0.62-3.1
DIBENZO(a,h) PYRENE	<3.1	ug/L	<6.97	lb/d	<1.1	ug/L	<1.94	lb/d	9	EPA625	0.62-3.1
DI-N-BUTYL PHTHALATE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
DI-N-OCTYL PHTHALATE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38
DIBENZO(A,H) ANTHRACENE	<1	ug/L	<2.25	lb/d	<0.35	ug/L	<0.616	lb/d	9	EPA625	0.2-1

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

Outfall number: **001** (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
1,2-DICHLORO BENZENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA625	1
1,3-DICHLORO BENZENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA625	1
1,4-DICHLORO BENZENE	<1	ug/L	<2.5	lb/d	<1	ug/L	<1.32	lb/d	9	EPA625	1
3,3-DICHLORO BENZIDINE	<2.5	ug/L	<5.62	lb/d	<0.876	ug/L	<1.54	lb/d	9	EPA625	0.495-2.5
DIETHYL PHTHALATE	0.63	ug/L	<1.42	lb/d	<0.292	ug/L	<0.44	lb/d	9	EPA625	0.12-0.63
DIMETHYL PHTHALATE	<0.25	ug/L	<0.562	lb/d	<0.088	ug/L	<0.155	lb/d	9	EPA625	0.5-2.5
2,4-DINITROTOLUENE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
2,6-DINITROTOLUENE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
1,2-DIPHENYLHYDRAZINE	<1.3	ug/L	<2.92	lb/d	<0.443	ug/L	<0.783	lb/d	9	EPA625	0.25-1.3
FLUORANTHENE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38
FLUORENE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38
HEXACHLORO BENZENE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38
HEXACHLOROBUT ADIENE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
HEXACHLOROCYCLO-PENTADIENE	<2.5	ug/L	<5.62	lb/d	<0.878	ug/L	<1.55	lb/d	9	EPA625	0.5-2.5
HEXA CHLOROETHANE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
INDENO(1,2,3-CD) PYRENE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
ISOPHORONE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
3-METHYL-CHOLANTHRENE	<2.5	ug/L	<5.62	lb/d	<0.878	ug/L	<1.55	lb/d	9	EPA625	0.5-2.5
NAPHTHALENE	1	ug/L	<2.25	lb/d	<0.354	ug/L	<0.625	lb/d	9	EPA625	0.2-1
NITROBENZENE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
N-NITROSODI-N-PROPYLAMINE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
N-NITROSODI-METHYLAMINE	<2.5	ug/L	<5.62	lb/d	<0.878	ug/L	<1.55	lb/d	9	EPA625	0.5-2.5
N-NITROSODI-PHENYLAMINE	<1.3	ug/L	<2.92	lb/d	<0.443	ug/L	<0.783	lb/d	9	EPA625	0.25-1.3
PERYLENE	<0.63	ug/L	<1.42	lb/d	<0.222	ug/L	<0.39	lb/d	9	EPA625	0.12-0.63
PHENANTHRENE	0.38	ug/L	<0.854	lb/d	<0.136	ug/L	<0.24	lb/d	9	EPA625	0.074-0.38
PYRENE	<0.38	ug/L	<0.854	lb/d	<0.132	ug/L	<0.232	lb/d	9	EPA625	0.074-0.38

1,2,4-TRICHLOROBENZENE	**<0.38**	**ug/L**	**<0.854**	**lb/d**	**<0.132**	**ug/L**	**<0.232**	**lb/d**	**9**	**EPA625**	**0.074-0.38**
Use this space (or a separate sheet) to provide information on other metals requested by the permit writer											

END OF PART D.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE

Attachment 2

NPDES Form 2A, Part E (Toxicity Testing Data)

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART E. TOXICITY TESTING DATA

POTWs meeting one or more of the following criteria must provide the results of whole effluent toxicity tests for acute or chronic toxicity for each of the facility's discharge points: 1) POTWs with a design flow rate greater than or equal to 1.0 mgd; 2) POTWs with a pretreatment program (or those that are required to have one under 40 CFR Part 403); or 3) POTWs required by the permitting authority to submit data for these parameters.

- At a minimum, these results must include quarterly testing for a 12-month period within the past 1 year using multiple species (minimum of two species), or the results from four tests performed at least annually in the four and one-half years prior to the application, provided the results show no appreciable toxicity, and testing for acute and/or chronic toxicity, depending on the range of receiving water dilution. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136.
- In addition, submit the results of any other whole effluent toxicity tests from the past four and one-half years. If a whole effluent toxicity test conducted during the past four and one-half years revealed toxicity, provide any information on the cause of the toxicity or any results of a toxicity reduction evaluation, if one was conducted.
- If you have already submitted any of the information requested in Part E, you need not submit it again. Rather, provide the information requested in question E.4 for previously submitted information. If EPA methods were not used, report the reasons for using alternate methods. If test summaries are available that contain all of the information requested below, they may be submitted in place of Part E.

If no biomonitoring data is required, do not complete Part E. Refer to the Application Overview for directions on which other sections of the form to complete.

E.1. Required Tests.

Indicate the number of whole effluent toxicity tests conducted in the past four and one-half years.

☒ chronic ☒ acute

E.2. Individual Test Data. Complete the following chart for each whole effluent toxicity test conducted in the last four and one-half years. Allow one column per test (where each species constitutes a test). Copy this page if more than three tests are being reported.

	Test number: See Attachment #2	Test number: ______	Test number: ______
a. Test information.			
Test Species & test method number			
Age at initiation of test			
Outfall number			
Dates sample collected			
Date test started			
Duration			
b. Give toxicity test methods followed.			
Manual title			
Edition number and year of publication			
Page number(s)			
c. Give the sample collection method(s) used. For multiple grab samples, indicate the number of grab samples used.			
24-Hour composite			
Grab			
d. Indicate where the sample was taken in relation to disinfection. (Check all that apply for each.			
Before disinfection			
After disinfection			
After dechlorination			

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

	Test number: ______	Test number: ______	Test number: ______
e. Describe the point in the treatment process at which the sample was collected.			
Sample was collected:			
f. For each test, include whether the test was intended to assess chronic toxicity, acute toxicity, or both			
Chronic toxicity			
Acute toxicity			
g. Provide the type of test performed.			
Static			
Static-renewal			
Flow-through			
h. Source of dilution water. If laboratory water, specify type; if receiving water, specify source.			
Laboratory water			
Receiving water			
i. Type of dilution water. If salt water, specify “natural” or type of artificial sea salts or brine used.			
Fresh water			
Salt water			
j. Give the percentage effluent used for all concentrations in the test series.			
k. Parameters measured during the test. (State whether parameter meets test method specifications)			
pH			
Salinity			
Temperature			
Ammonia			
Dissolved oxygen			
l. Test Results.			
Acute:			
Percent survival in 100% effluent	%	%	%
LC_{50}			
95% C.I.	%	%	%
Control percent survival	%	%	%
Other (describe)			

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

Chronic:			
NOEC	%	%	%
IC_{25}	%	%	%
Control percent survival	%	%	%
Other (describe)			
m. Quality Control/Quality Assurance.			
Is reference toxicant data available?			
Was reference toxicant test within acceptable bounds?			
What date was reference toxicant test run (MM/DD/YYYY)?	/ /	/ /	/ /
Other (describe)			

E.3. Toxicity Reduction Evaluation. Is the treatment works involved in a Toxicity Reduction Evaluation?

☐ Yes ☒ No If yes, describe: ____

E.4. Summary of Submitted Biomonitoring Test Information. If you have submitted biomonitoring test information, or information regarding the cause of toxicity, within the past four and one-half years, provide the dates the information was submitted to the permitting authority and a summary of the results.

Date submitted: ___/___/____ (MM/DD/YYYY)

Summary of results: (see instructions)

N/A

END OF PART E.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

Supplemental Information for EPA Form 2A, Part E (Toxicity Testing Data)

Part E.2, Summary of Individual Toxicity Test Data in 2017:

The following WET testing summary has been prepared in support of King County's application for renewal of NPDES #WA0029181. Testing was conducted by the King County Environmental Laboratory (KCEL) in compliance with Sections S8 and S9 of the permit. Full reports (narrative, raw data, and supporting CETIS reports) have been provided to King County Wastewater Treatment Division (WTD) and uploaded to PARIS as .pdf and .mbd files.

ACUTE TOXICITY TEST RESULTS

Test Organism	**Endpoint**	**1st Quarter**	**3rd Quarter**
		March 21, 2017	**July 18, 2017**
Daphnia pulex	% Survival in 100% Effluent	100	100
	NOEC (% Effluent)	100	100
	LC50 (% Effluent)	>100	>100
Fathead Minnow	% Survival in 100% Effluent	93	95
	NOEC (% Effluent)	100	100
	LC50 (% Effluent)	>100	>100

1st Quarter (March 21, 2017)

Daphnia pulex (#8267)

Survival was 100% in the control and all effluent concentrations. The NOEC was 100% effluent. An LC50 could not be calculated due to insufficient mortality. The unionized ammonia level in 100% effluent reached a maximum of 0.193 mg N/L during the 48 h test.

Fathead Minnow (#8266)

Survival was 100% in the control, 3.6% (ACEC) and 12.5% effluent. Survival was 95% in 25% and 50% effluent and 93% in 100% effluent. The No Observed Effect Concentration (NOEC) was 100% effluent. An LC50 could not be calculated due to insufficient mortality. The unionized ammonia level in the 100% effluent reached a maximum of 0.623 mg N/L during the 96 h test. During the test, pH was stabilized with a CO_2/air mixture in the headspace under an acrylic cover.

All tests met acceptability criteria regarding control survival and reference toxicant control limits.

3rd Quarter (July 18, 2017)

Daphnia pulex (#8382)

Survival was 100% in the control and all effluent concentrations. The NOEC was 100% effluent. An LC50 could not be calculated due to insufficient mortality. The unionized ammonia level in 100% effluent reached a maximum of 0.572 mg N/L during the 48-hour test.

Fathead Minnow (#8381)

Survival was 93% in the control, 98% in the 50% effluent; 95% in 3.6% (ACEC) and 100% effluent; 88% in 12.5% effluent; and 85% in 25% effluent. The No Observed Effect Concentration (NOEC) was 100% effluent. An LC50 could not be calculated due to insufficient mortality. The unionized ammonia level in the 100% effluent reached a maximum of 0.330 mg N/L during the 96-hour test. During the test, pH was stabilized with a CO_2/air mixture in the headspace under an acrylic cover.

All tests met acceptability criteria regarding control survival and reference toxicant control limits.

CHRONIC TOXICITY TEST RESULTS

Test Organism	Endpoint	2nd Quarter April 4, 2017	4th Quarter October 24, 2017
Topsmelt	Survival NOEC (% Effluent)	50	50
	Growth NOEC (% Effluent)	50	25
	Growth IC25 (% Effluent)	>50	53
	Control vs ACEC*	Not significant	Not significant
Mysid Shrimp	Survival NOEC (% Effluent)	50	25
	Growth NOEC (% Effluent)	12.5	25
	Growth IC25 (% Effluent)	24.6	30.5
	Control vs ACEC*	Not significant	Not significant

* Growth in the ACEC (3.6% effluent) was not significantly ($p > 0.05$; 1-tailed t-Test) reduced relative to the control.

2nd Quarter (April 4, 2017)

Topsmelt (#8274)

7-day survival was 80% in the HMM control and 25% effluent concentration. Survival was 92% in the CCEC (0.53% effluent) and ACEC (3.6% effluent). Survival was 72% in 25% effluent and 76% in 50% effluent. There were no survivors in 100% effluent.

Because the standard deviation for proportion alive was > 0.2 in 12.5% and 50% effluent, the mean weights per organism are based on the number of surviving topsmelt as explained in Appendix C of WA DOE WQ-R-95-80, 2016. Growth (based on the number of survivors) in the

ACEC was not reduced relative to the control. The Chronic Statistical Power Standard (CSPS) for the ACEC was found to be 0%, which is less than the maximum allowable difference of 39%. The IC25 for growth was > 50 % effluent (using the number of surviving topsmelt). Using the initial number of topsmelt at the start of the test the IC25 was 55.7% effluent.

The unionized ammonia level in 100% effluent reached a maximum of 1.416 mg N/L during the 7-day test.

Mysid (#8275)

Survival was 95% in 0% (HMM control) and 25% effluent. Survival was 98% in 0.53% (CCEC) effluent and 93% in 3.6% (ACEC) effluent. Survival was 90% in 12.5% effluent and 83% in 50% effluent. There were no survivors in 100% effluent.

Growth in the ACEC was not significantly reduced relative to the control ($p > 0.05$; 1-tailed t-Test). The CSPS for the ACEC was found to be 4.5%, which is less than the maximum allowable difference of 39%. The IC25 for growth was 24.6% effluent.

The unionized ammonia level in 100% effluent reached a maximum of 1.391 mg N/L during the 7-day test.

Both the topsmelt and mysid tests met acceptability criteria regarding control survival and mean control weight (Chapman *et al*., 1995; US EPA, 2002). In addition, the LC50 (survival) and IC25 (growth) in the topsmelt and IC25 for the mysids were within the control limits of the mean ± 2SD (Chapman *et al*. 1995; US EPA, 2002).

4th Quarter (October 24, 2017)

Topsmelt (#8525)

Survival was 96% in the HMM control. Survival was 100 % in the 12.5% and 25% effluent concentrations. Survival was 92% in the CCEC (0.53% effluent) and 96% in the ACEC (3.6% effluent) and 50% effluent concentration. There were no survivors in 100% effluent.

Growth in the ACEC was not reduced significantly from the control ($p > 0.05$; 2-tailed t-test). The Chronic Statistical Power Standard (CSPS) for the ACEC was found to be 3%, which is less than the maximum allowable difference of 39%. The IC25 for growth was 53 % effluent (using the number of initial topsmelt).

The unionized ammonia level in 100% effluent reached a maximum of 1.446 mg NH_3-N/L during the 7-day test

Mysid (#8526)

Survival was 95% in 0% (HMM control), 0.53% (CCEC), 3.6% (ACEC), and 12.5% effluent. Survival was 98% in 25% effluent and 65% in 50% effluent. There were no survivors in 100% effluent.

Growth in the ACEC was not reduced relative to the control ($p > 0.05$; 2-tailed t-test). The CSPS for the ACEC was found to be 0%, which is less than the maximum allowable difference of 39%. The IC25 for growth was 33.6% effluent.

The unionized ammonia level in 100% effluent reached a maximum of 2.156 mg NH_3-N/L during the 7-day test.

Both the topsmelt and mysid tests met acceptability criteria regarding control survival and mean control weight (Chapman *et al*., 1995; US EPA, 2002). In addition, the LC50 (survival) and IC25 (growth) in the topsmelt and IC25 for the mysids were within the control limits of the mean ± 2SD (Chapman *et al*. 1995; US EPA, 2002).

References

Chapman, G., D. Denton and J. Lazorchak. 1995. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to west coast marine and estuarine organisms. 1st Edition. EPA/600/R-95-136.

USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. 5th edition. EPA-821-02-012, October, 2002. US Environmental Protection Agency, Office of Water (4303T), Washington, DC.

US EPA. 2002. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to marine and estuarine organisms. 3rd Edition. EPA-821-R-02-014, October, 2002. US Environmental Protection Agency, Office of Water (4303T), Washington, DC.

WA DOE. 2016. Lab guidance and whole effluent toxicity test review criteria. Publication no. WQ-R-95-80. WA State Department of Ecology, Water Quality Program, Olympia, WA.

Attachment 3

NPDES Form 2A, Part F (Industrial User Discharges)

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART F. INDUSTRIAL USER DISCHARGES AND RCRA/CERCLA WASTES

All treatment works receiving discharges from significant industrial users or which receive RCRA,CERCLA, or other remedial wastes must complete part F.

GENERAL INFORMATION:

F.1. Pretreatment Program. Does the treatment works have, or is subject ot, an approved pretreatment program?

☒ Yes ☐ No

F.2. Number of Significant Industrial Users (SIUs) and Categorical Industrial Users (CIUs). Provide the number of each of the following types of industrial users that discharge to the treatment works.

a. Number of non-categorical SIUs. 25

b. Number of CIUs. 16

SIGNIFICANT INDUSTRIAL USER INFORMATION::

Supply the following information for each SIU. If more than one SIU discharges to the treatment works, copy questions F.3 through F.8 and provide the information requested for each SIU.

F.3. Significant Industrial User Information. Provide the name and address of each SIU discharging to the treatment works. Submit additional pages as necessary.

Name: See Attachment #3 tables

Mailing Address: ______

F.4. Industrial Processes. Describe all the industrial processes that affect or contribute to the SIU's discharge.

See Attachment #3 tables

F.5. Principal Product(s) and Raw Material(s). Describe all of the principal processes and raw materials that affect or contribute to the SIU's discharge.

Principal product(s): See Attachment #3 tables

Raw material(s): ______

F.6. Flow Rate.

a. Process wastewater flow rate. Indicate the average daily volume of process wastewater discharge into the collection system in gallons per day (gpd) and whether the discharge is continuous or intermittent.

See Attachment #3 tables gpd (______ continuous or ______ intermittent)

b. Non-process wastewater flow rate. Indicate the average daily volume of non-process wastewater flow discharged into the collection system in gallons per day (gpd) and whether the discharge is continuous or intermittent.

See Attachment #3 tables gpd (______ continuous or ______ intermittent)

F.7. Pretreatment Standards. Indicate whether the SIU is subject to the following:

a. Local limits ☐ Yes ☐ No

b. Categorical pretreatment standards ☐ Yes ☐ No

If subject to categorical pretreatment standards, which category and subcategory?

See Attachment #3 tables

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

F.8. Problems at the Treatment Works Attributed to Waste Discharge by the SIU. Has the SIU caused or contributed to any problems (e.g., upsets, interference) at the treatment works in the past three years?

☐ Yes ☐ No If yes, describe each episode.

See Attachment #3 tables

RCRA HAZARDOUS WASTE RECEIVED BY TRUCK, RAIL, OR DEDICATED PIPELINE:

F.9. RCRA Waste. Does the treatment works receive or has it in the past three years received RCRA hazardous waste by truck, rail or dedicated pipe?

☐ **Yes** ☒ **No (go to F.12)**

F.10. Waste Transport. Method by which RCRA waste is received (check all that apply):

☐ Truck ☐ Rail ☐ Dedicated Pipe

F.11. Waste Description. Give EPA hazardous waste number and amount (volume or mass, specify units).

EPA Hazardous Waste Number	Amount	Units

CERCLA (SUPERFUND) WASTEWATER, RCRA REMEDIATION/CORRECTIVE ACTION WASTEWATER, AND OTHER REMEDIAL ACTIVITY WASTEWATER:

F.12. Remediation Waste. Does the treatment works currently (or has it been notified that it will) receive waste from remedial activities?

☒ Yes (complete F.13 through F.15.) ☐ No

F.13. Waste Origin. Describe the site and type of facility at which the CERCLA/RCRA/or other remedial waste originates (or is expected to originate in the next five years).

Wastewater from groundwater remediation sites is received at various locations within the service area of the West Point Treatment Plant. None of the sites are considered SIUs, but are regulated under control documents with the following declining level of significance: Major Discharge Authorization, Minor Discharge Authorization, Letter of Authorization, Verbal (i.e., email) Authorization, and No Control Document Required assessment. See attached table for further information.

F.14. Pollutants. List the hazardous constituents that are received (or are expected to be received). Include data on volume and concentration, if known. (Attach additional sheets if necessary.)

It depends on the particular groundwater remediation site, but wastewaters are primarily received from projects with groundwater contaminated with petroleum hydrocarbons, chlorinated solvents (typically, perchloroethylene-based contaminants from dry cleaners), and on occasion trace metal contamination. Daily discharge volumes depend on the site, but are typically less than 25,000 gpd per location.

F.15. Waste Treatment.

a. Is this waste treated (or will be treated) prior to entering the treatment works?

☒ Yes ☐ No

If yes, describe the treatment (provide information about the removal efficiency):

A wastewater equalization/particle settling tank is a common process. For petroleum or chlorinated solvent contaminated sites, either granular activated carbon or air stripping are common additional treatment processes.

b. Is the discharge (or will the discharge be) continuous or intermittent?

☒ Continuous ☐ Intermittent If intermittent, describe discharge schedule.

END OF PART F.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE

Part F.3.										Part F.6.					Part F.7.		Part F.8.
Company Name	Address	City	Zip	Customer Type	Treatment Plant	Permit No.	Status	Type	Locator	Process Wastewater (gpd)	Continuous / Intermittent	Non-Process Wastewater (gpd)	Continuous / Intermittent	REGULATION	Local Limits (Yes / No)	Categorical Standards (Yes / No)	Treatment Works Problems Attributable to SIU (Yes / No)
ASKO Processing Inc.	434 N. 35TH STREET	SEATTLE	98103	ELECTROPLATING - CFR 413	WEST POINT	7728-04	ACTIVE	PERMIT	A1013	48,500	Continuous	0	NA	413 GT 10000	No	Yes	No
Alaskan Copper Works - 6th Ave.	3200 6TH AVENUE S.	SEATTLE	98134	METAL FINISHING - CFR 433	WEST POINT	7238-06	ACTIVE	PERMIT	A4010	5,000	Continuous	0	NA	433 PSES	No	Yes	No
Alaskan Copper Works - 6th Ave.	3200 6TH AVENUE S.	SEATTLE	98134	METAL FINISHING - CFR 433	WEST POINT	7238-06	ACTIVE	PERMIT	A40102	200	Intermittent	0	NA	KCLL LT 5000	Yes	No	No
Art Brass Plating Inc.	5516 3RD AVENUE S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7722-06	ACTIVE	PERMIT	A4013	38,900	Continuous	0	NA	433 PSNS	No	Yes	No
Art Brass Plating Inc.	5516 3RD AVENUE S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7722-06	ACTIVE	PERMIT	A40132					433 PSNS	No	Yes	No
BNSF Railway Co. - Interbay Facility	1809 WEST EMERSON PLACE	SEATTLE	98119	TRANSPORTATION FACILITY	WEST POINT	7872-02	ACTIVE	PERMIT	A4153	288,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
BNSF Railway Co. - Interbay Facility	1809 WEST EMERSON PLACE	SEATTLE	98119	TRANSPORTATION FACILITY	WEST POINT	7872-02	ACTIVE	PERMIT	A41531	105,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Boeing Commercial Airplane - North Field	7500 E. MARGINAL WAY S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7594-06	ACTIVE	PERMIT	A42292	50,000	Intermittent	0	NA	433 PSNS	No	Yes	No
Boeing Commercial Airplane - North Field	7500 E. MARGINAL WAY S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7594-06	ACTIVE	PERMIT	A42296	10,000	Intermittent	0	NA	KCLL LT 5000	Yes	No	No
Boeing Commercial Airplane - North Field	7500 E. MARGINAL WAY S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7594-06	ACTIVE	PERMIT	A42299	500	Intermittent	0	NA	KCLL LT 5000	Yes	No	No
Boeing Commercial Airplane - North Field	7500 E. MARGINAL WAY S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7594-06	ACTIVE	PERMIT	A4229C	6,500	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Boeing Commercial Airplane - North Field	7500 E. MARGINAL WAY S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7594-06	ACTIVE	PERMIT	A4229D	10,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Boeing Company - Plant 2 Facility	7755 E. MARGINAL WAY S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7811-04	ACTIVE	PERMIT	A40232	4,500	Intermittent	0	NA	KCLL LT 5000	Yes	No	No
Boeing Company - Plant 2 Facility	7755 E. MARGINAL WAY S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7811-04	ACTIVE	PERMIT	A4023H	4,000	Intermittent	0	NA	433 PSNS	No	Yes	No
Boeing Company - Plant 2 Facility	7755 E. MARGINAL WAY S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7811-04	ACTIVE	PERMIT	A4023I	30,000	Intermittent	0	NA	433 PSNS	No	Yes	No
Carsoe US Inc.	1112 NW LEARY WAY	SEATTLE	98107	METAL FINISHING - CFR 433	WEST POINT	7931-01	ACTIVE	PERMIT	IW1325A	500	Intermittent	0	NA	433 PSNS	No	Yes	No
Ceradyne Inc., a 3M Company - Seattle	6701 6TH AVENUE S.	SEATTLE	98108	GLASS MANUFACTURING	WEST POINT	7507-05	ACTIVE	PERMIT	A4121	9,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Darigold Inc. - Rainier Plant	4058 RAINIER AVENUE S.	SEATTLE	98118	FOOD PROCESSING-DAIRY	WEST POINT	7116-06	ACTIVE	PERMIT	A50311	240,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
Emerald Services Inc. - Airport Way Facility	1500 AIRPORT WAY S.	SEATTLE	98134	CENTRALIZED WASTE TREATMENT-CFR 437	WEST POINT	7884-02	ACTIVE	PERMIT	A42241	170,000	Continuous	0	NA	437D(ABC) PSES	No	Yes	No
Foss Maritime Company	660 W. EWING STREET	SEATTLE	98119-1587	BOAT/SHIPYARD	WEST POINT	7703-05	ACTIVE	PERMIT	A44011	10,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Foss Maritime Company	660 W. EWING STREET	SEATTLE	98119-1587	BOAT/SHIPYARD	WEST POINT	7703-05	ACTIVE	PERMIT	A44012	416,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
GM Nameplate Inc.	2040 15TH AVENUE W.	SEATTLE	98119	METAL FINISHING - CFR 433	WEST POINT	7187-07	ACTIVE	PERMIT	A42511	3,000	Intermittent	0	NA	433 PSNS	No	Yes	No
GM Nameplate Inc.	2040 15TH AVENUE W.	SEATTLE	98119	METAL FINISHING - CFR 433	WEST POINT	7187-07	ACTIVE	PERMIT	A42512	500	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
GM Nameplate Inc.	2040 15TH AVENUE W.	SEATTLE	98119	METAL FINISHING - CFR 433	WEST POINT	7187-07	ACTIVE	PERMIT	A42514	680	Intermittent	0	NA	433 PSNS	No	Yes	No
GM Nameplate Inc.	2040 15TH AVENUE W.	SEATTLE	98119	METAL FINISHING - CFR 433	WEST POINT	7187-07	ACTIVE	PERMIT	A42517	500	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
GM Nameplate Inc.	2040 15TH AVENUE W.	SEATTLE	98119	METAL FINISHING - CFR 433	WEST POINT	7187-07	ACTIVE	PERMIT	A42518	600	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Glacier Northwest Inc. - Kenmore Facility	6423 NE 175TH STREET	KENMORE	98155	CEMENT/READYMIX	WEST POINT	7740-04	ACTIVE	PERMIT	A2075	110,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Industrial Container Services - WA LLC	7152 1ST AVENUE S.	SEATTLE	98108	BARREL CLEANING	WEST POINT	7929-01	ACTIVE	PERMIT	A4073	360,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Kerry Inc.	7224 1ST AVENUE S.	SEATTLE	98108	FOOD PROCESSING-OTHER	WEST POINT	7854-02	ACTIVE	PERMIT	A45311	56,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
King County WTD - Georgetown Wet Weather Treatment Station Construction Project	6185 FOURTH AVENUE SOUTH	SEATTLE	98108	CONSTRUCTION DEWATERING	WEST POINT	7937-01	ACTIVE	PERMIT	IW1348A	941,900	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
King County WTD - Georgetown Wet Weather Treatment Station Construction Project	6185 FOURTH AVENUE SOUTH	SEATTLE	98108	CONSTRUCTION DEWATERING	WEST POINT	7937-01	ACTIVE	PERMIT	IW1348B	941,900	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
King County WTD - Georgetown Wet Weather Treatment Station Conveyance Construction	6185 FOURTH AVENUE SOUTH	SEATTLE	98108	CONSTRUCTION DEWATERING	WEST POINT	7939-01	ACTIVE	PERMIT	IW1367A	360,000	Intermittent	5,000	Intermittent	KCLL GT 5000	Yes	No	No

Part F.3.										Part F.6.					Part F.7.		Part F.8.
Company Name	Address	City	Zip	Customer Type	Treatment Plant	Permit No.	Status	Type	Locator	Process Wastewater (gpd)	Continuous / Intermittent	Non-Process Wastewater (gpd)	Continuous / Intermittent	REGULATION	Local Limits (Yes / No)	Categorical Standards (Yes / No)	Treatment Works Problems Attributable to SIU (Yes / No)
King County WTD - Georgetown Wet Weather Treatment Station Conveyance Construction	6185 FOURTH AVENUE SOUTH	SEATTLE	98108	CONSTRUCTION DEWATERING	WEST POINT	7939-01	ACTIVE	PERMIT	IW1367B	360,000	Intermittent	5,000	Intermittent	KCLL GT 5000	Yes	No	No
King County WTD - Georgetown Wet Weather Treatment Station Conveyance Construction	6185 FOURTH AVENUE SOUTH	SEATTLE	98108	CONSTRUCTION DEWATERING	WEST POINT	7939-01	ACTIVE	PERMIT	IW1367C	360,000	Intermittent	5,000	Intermittent	KCLL GT 5000	Yes	No	No
King County WTD - Georgetown Wet Weather Treatment Station Conveyance Construction	6185 FOURTH AVENUE SOUTH	SEATTLE	98108	CONSTRUCTION DEWATERING	WEST POINT	7939-01	ACTIVE	PERMIT	IW1367D	360,000	Intermittent	5,000	Intermittent	KCLL GT 5000	Yes	No	No
King County WTD - Georgetown Wet Weather Treatment Station Conveyance Construction	6185 FOURTH AVENUE SOUTH	SEATTLE	98108	CONSTRUCTION DEWATERING	WEST POINT	7939-01	ACTIVE	PERMIT	IW1367E	360,000	Intermittent	5,000	Intermittent	KCLL GT 5000	Yes	No	No
King County WTD - Georgetown Wet Weather Treatment Station Conveyance Construction	6185 FOURTH AVENUE SOUTH	SEATTLE	98108	CONSTRUCTION DEWATERING	WEST POINT	7939-01	ACTIVE	PERMIT	IW1367F	360,000	Intermittent	5,000	Intermittent	KCLL GT 5000	Yes	No	No
Lafarge - Seattle Plant	5400 W. MARGINAL WAY SW	SEATTLE	98106	SOLID WASTE - TRANSFER FAC	WEST POINT	7925-01	ACTIVE	PERMIT	A45941	72,000	Intermittent	0	NA	437B PSNS	No	Yes	No
Lafarge - Seattle Plant	5400 W. MARGINAL WAY SW	SEATTLE	98106	SOLID WASTE - TRANSFER FAC	WEST POINT	7925-01	ACTIVE	PERMIT	A45942	23,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Lafarge - Seattle Plant	5400 W. MARGINAL WAY SW	SEATTLE	98106	SOLID WASTE - TRANSFER FAC	WEST POINT	7925-01	ACTIVE	PERMIT	A45943	23,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Lafarge - Seattle Plant	5400 W. MARGINAL WAY SW	SEATTLE	98106	SOLID WASTE - TRANSFER FAC	WEST POINT	7925-01	ACTIVE	PERMIT	A45944	500	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Lineage Logistics, Seattle-Michigan Facility	206 SW MICHIGAN STREET	SEATTLE	98106	FOOD PROCESSING-SEAFOOD	WEST POINT	7896-01	ACTIVE	PERMIT	A42301	90,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
Machinists, Inc. Plant 5	7701 7TH AVENUE S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7892-03	ACTIVE	PERMIT	IW1158A	3,000	Intermittent	0	NA	433 PSNS	No	Yes	No
Magnetic and Penetrant Services Co.	8135 1ST AVENUE S.	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7873-03	ACTIVE	PERMIT	A4370	18,000	Continuous	0	NA	433 PSNS	No	Yes	No
Marel Seattle Inc.	2001 W. GARFIELD STREET, BLDG. A1	SEATTLE	98119	METAL FINISHING - CFR 433	WEST POINT	7821-03	ACTIVE	PERMIT	A45901	500	Intermittent	0	NA	433 PSNS	No	Yes	No
Marine Vacuum Service Inc.	1516 S. GRAHAM STREET	SEATTLE	98108	CENTRALIZED WASTE TREATMENT-CFR 437	WEST POINT	7676-07	ACTIVE	PERMIT	A4297	38,400	Continuous	0	NA	437D(B&C) PSES	No	Yes	No
Marine Vacuum Service Inc.	1516 S. GRAHAM STREET	SEATTLE	98108	CENTRALIZED WASTE TREATMENT-CFR 437	WEST POINT	7676-07	ACTIVE	PERMIT	A4297A	144,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
Marine Vacuum Service Inc.	1516 S. GRAHAM STREET	SEATTLE	98108	CENTRALIZED WASTE TREATMENT-CFR 437	WEST POINT	7676-07	ACTIVE	PERMIT	A4297B	144,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
Mastercraft Metal Finishing Inc.	1175 HARRISON STREET	SEATTLE	98109	ELECTROPLATING - CFR 413	WEST POINT	7233-04	ACTIVE	PERMIT	A4199	1,000	Intermittent	0	NA	413 LT 10000	No	Yes	No
National Products Inc.	1025 S. ELMGROVE STREET	SEATTLE	98108	METAL FINISHING - CFR 433	WEST POINT	7834-03	ACTIVE	PERMIT	A45991	4,900	Continuous	0	NA	433 PSNS	No	Yes	No
Pacific Iron and Metal Inc.	2230 4TH AVENUE S.	SEATTLE	98134	METALS RECYCLING	WEST POINT	7577-05	ACTIVE	PERMIT	A4318	60,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Rabanco Recycling Co.	2733 3RD AVENUE S.	SEATTLE	98134	SOLID WASTE - TRANSFER FAC	WEST POINT	7595-06	ACTIVE	PERMIT	A43406	254,400	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Rainier Commons LLC - Old Rainier Brewery Site	3100 AIRPORT WAY S.	SEATTLE	98134	GENERAL TYPE	WEST POINT	7927-01	ACTIVE	PERMIT	IW1056A	100,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Rainier Commons LLC - Old Rainier Brewery Site	3100 AIRPORT WAY S.	SEATTLE	98134	GENERAL TYPE	WEST POINT	7927-01	ACTIVE	PERMIT	IW1056B	35,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Seattle Barrel Co.	4716 AIRPORT WAY S.	SEATTLE	98108	BARREL CLEANING	WEST POINT	7113-04	ACTIVE	PERMIT	A4089	12,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
Seattle, City of - SDOT - Elliott Bay Central Seawall Replacement Project	ALASKAN WAY (VIRGINIA TO COLUMBIA)	SEATTLE	98101	CONSTRUCTION DEWATERING	WEST POINT	7912-02	ACTIVE	PERMIT	IW1239A	612,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
Seattle, City of - SDOT - Elliott Bay Central Seawall Replacement Project	ALASKAN WAY (VIRGINIA TO COLUMBIA)	SEATTLE	98101	CONSTRUCTION DEWATERING	WEST POINT	7912-02	ACTIVE	PERMIT	IW1239B	144,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
Skills Inc. - Ballard Facility	4615 8TH AVENUE NW	SEATTLE	98107	METAL FINISHING - CFR 433	WEST POINT	7552-05	ACTIVE	PERMIT	A1030	9,950	Continuous	0	NA	433 PSNS	No	Yes	No
Sound Transit - N160 Northgate Link Extension - Station Construction Project	9560 FIRST AVENUE NE	SEATTLE	98115	CONSTRUCTION DEWATERING	WEST POINT	7933-01	ACTIVE	PERMIT	IW1334A	155,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Sound Transit - N160 Northgate Link Extension - Station Construction Project	9560 FIRST AVENUE NE	SEATTLE	98115	CONSTRUCTION DEWATERING	WEST POINT	7933-01	ACTIVE	PERMIT	IW1334B	360,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Sound Transit - Northgate Link Extension - Maple Leaf Portal (Phase 2)	1ST AVE NE AND NE 95TH ST	SEATTLE	98115	CONSTRUCTION DEWATERING	WEST POINT	7902-02	ACTIVE	PERMIT	IW1179B	216,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Sound Transit - Northgate Link Extension - Roosevelt Station (Phase 2)	6600 ROOSEVELT WAY NE	SEATTLE	98115	CONSTRUCTION DEWATERING	WEST POINT	7920-01	ACTIVE	PERMIT	IW1214A	626,400	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Sound Transit - Northgate Link Extension - Roosevelt Station (Phase 2)	6600 ROOSEVELT WAY NE	SEATTLE	98115	CONSTRUCTION DEWATERING	WEST POINT	7920-01	ACTIVE	PERMIT	IW1214B	1,044,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Sound Transit - Northgate Link Extension - University District Station	4300 BROOKLYN AVENUE NE	SEATTLE	98105	CONSTRUCTION DEWATERING	WEST POINT	7911-02	ACTIVE	PERMIT	IW1193A	168,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No

Part F.3.										Part F.6.					Part F.7.		Part F.8.
Company Name	Address	City	Zip	Customer Type	Treatment Plant	Permit No.	Status	Type	Locator	Process Wastewater (gpd)	Continuous / Intermittent	Non-Process Wastewater (gpd)	Continuous / Intermittent	REGULATION	Local Limits (Yes / No)	Categorical Standards (Yes / No)	Treatment Works Problems Attributable to SIU (Yes / No)
TLP Management Services LLC	1652 SW LANDER STREET	SEATTLE	98134	FUELING FACILITY	WEST POINT	7592-05	ACTIVE	PERMIT	A4326	45,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
TLP Management Services LLC	1652 SW LANDER STREET	SEATTLE	98134	FUELING FACILITY	WEST POINT	7592-05	ACTIVE	PERMIT	A43262	25,200	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Trident Seafoods Corp.	2001 W. GARFIELD STREET, PIER 91	SEATTLE	98119	FOOD PROCESSING-SEAFOOD	WEST POINT	7901-01	ACTIVE	PERMIT	A4489	90,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
University of Washington Seattle Campus	4109 FRANKLIN PLACE	SEATTLE	98195	ELECTRONIC COMPONENTS - CFR 469	WEST POINT	7923-01	ACTIVE	PERMIT	IW1275A	10,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
University of Washington Seattle Campus	4109 FRANKLIN PLACE	SEATTLE	98195	ELECTRONIC COMPONENTS - CFR 469	WEST POINT	7923-01	ACTIVE	PERMIT	IW1275B	6,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
University of Washington Seattle Campus	4109 FRANKLIN PLACE	SEATTLE	98195	ELECTRONIC COMPONENTS - CFR 469	WEST POINT	7923-01	ACTIVE	PERMIT	IW1275C	66,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
University of Washington Seattle Campus	4109 FRANKLIN PLACE	SEATTLE	98195	ELECTRONIC COMPONENTS - CFR 469	WEST POINT	7923-01	ACTIVE	PERMIT	IW1275D	6,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
University of Washington Seattle Campus	4109 FRANKLIN PLACE	SEATTLE	98195	ELECTRONIC COMPONENTS - CFR 469	WEST POINT	7923-01	ACTIVE	PERMIT	IW1275E	167,000	Continuous	110,000	Continuous	KCLL GT 5000	Yes	No	No
Vigor Shipyards Inc.	1801 16TH AVENUE SW	SEATTLE	98134	BOAT/SHIPYARD	WEST POINT	7782-07	ACTIVE	PERMIT	A41024	45,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Vigor Shipyards Inc.	1801 16TH AVENUE SW	SEATTLE	98134	BOAT/SHIPYARD	WEST POINT	7782-07	ACTIVE	PERMIT	A41027	397,500	Continuous	0	NA	KCLL GT 5000	Yes	No	No
Vigor Shipyards Inc.	1801 16TH AVENUE SW	SEATTLE	98134	BOAT/SHIPYARD	WEST POINT	7782-07	ACTIVE	PERMIT	A41028	550,390	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Vigor Shipyards Inc.	1801 16TH AVENUE SW	SEATTLE	98134	BOAT/SHIPYARD	WEST POINT	7782-07	ACTIVE	PERMIT	A41028A	550,390	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Vigor Shipyards Inc.	1801 16TH AVENUE SW	SEATTLE	98134	BOAT/SHIPYARD	WEST POINT	7782-07	ACTIVE	PERMIT	A4102A	57,000	Continuous	0	NA	KCLL GT 5000	Yes	No	No
WSDOT - SR 99 South Access Connection Project	SR 99 AND S. ROYAL BROUGHAM WAY	SEATTLE	98134	CONSTRUCTION DEWATERING	WEST POINT	7898-02	ACTIVE	PERMIT	IW1169A	200,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
WSDOT - SR 99 South Access Connection Project	SR 99 AND S. ROYAL BROUGHAM WAY	SEATTLE	98134	CONSTRUCTION DEWATERING	WEST POINT	7898-02	ACTIVE	PERMIT	IW1169B	200,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
WSDOT - SR 99 South Access Connection Project	SR 99 AND S. ROYAL BROUGHAM WAY	SEATTLE	98134	CONSTRUCTION DEWATERING	WEST POINT	7898-02	ACTIVE	PERMIT	IW1169C	73,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
WSDOT - SR 99 South Access Connection Project	SR 99 AND S. ROYAL BROUGHAM WAY	SEATTLE	98134	CONSTRUCTION DEWATERING	WEST POINT	7898-02	ACTIVE	PERMIT	IW1169D	200,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No
Waste Management National Services - 8th Avenue South Reload Facility	7400 8TH AVENUE S.	SEATTLE	98108	SOLID WASTE - TRANSFER FAC	WEST POINT	7928-02	ACTIVE	PERMIT	IW1215A	144,000	Intermittent	0	NA	KCLL GT 5000	Yes	No	No

ASKO Processing Inc.

Principle Product(s): ELECTROPLATING - CFR 413
Permit #: 7728-04 **Permit Status:** ACTIVE

Process Generating Pollutant

PRETREATMENT
METAL FINISHING
DYE PENETRANT

Alaskan Copper Works - 6th Ave.

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7238-06 **Permit Status:** ACTIVE

Process Generating Pollutant

PASSIVATION OF STAINLESS STEEL
X-RAY PROCESSING
PASSIVATION
DEGREASER

Art Brass Plating Inc.

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7722-06 **Permit Status:** ACTIVE

Process Generating Pollutant

METAL FINISHING

BNSF Railway Co. - Interbay Facility

Principle Product(s): TRANSPORTATION FACILITY
Permit #: 7872-02 **Permit Status:** ACTIVE

Process Generating Pollutant

DIESEL LOCOMOTIVE WASHDOWN AND FUELING

Boeing Commercial Airplane - North Field

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7594-06 **Permit Status:** ACTIVE

Process Generating Pollutant

A42292-MPK & MEK
METAL FINISHING
A4229C-DECANT STATION

Boeing Company - Plant 2 Facility

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7811-04 **Permit Status:** ACTIVE

Process Generating Pollutant

CONSTR. DEWATER
CAR WASH

Carsoe US Inc.

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7931-01 **Permit Status:** ACTIVE

Process Generating Pollutant

PASSIVATION

Ceradyne Inc., a 3M Company - Seattle

Principle Product(s): GLASS MANUFACTURING
Permit #: 7507-05 **Permit Status:** ACTIVE

Process Generating Pollutant

GLASS PRODUCTION

Darigold Inc. - Rainier Plant

Principle Product(s): FOOD PROCESSING-DAIRY
Permit #: 7116-06 **Permit Status:** ACTIVE

Process Generating Pollutant

REFRIGERATION
CLEANING/SANITIZING
DAIRY PROCESS

Emerald Services Inc. - Airport Way Facility

Principle Product(s): CENTRALIZED WASTE TREATMENT-CFR 437
Permit #: 7884-02 **Permit Status:** ACTIVE

Process Generating Pollutant

TRUCKED WASTE

Foss Maritime Company

Principle Product(s): BOAT/SHIPYARD
Permit #: 7703-05 **Permit Status:** ACTIVE

Process Generating Pollutant

BLASTING

GM Nameplate Inc.

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7187-07 **Permit Status:** ACTIVE

Process Generating Pollutant

PHOTO PROCESSING
METAL FINISHING PROCESSES

Glacier Northwest Inc. - Kenmore Facility

Principle Product(s): CEMENT/READYMIX
Permit #: 7740-04 **Permit Status:** ACTIVE

Process Generating Pollutant

CEMENT/LIME RUNOFF

Industrial Container Services - WA LLC

Principle Product(s): BARREL CLEANING
Permit #: 7929-01 **Permit Status:** ACTIVE

Process Generating Pollutant

DRUM CLEANING/WASTEWATER TREATMENT

Kerry Inc.

Principle Product(s): FOOD PROCESSING-OTHER
Permit #: 7854-02 **Permit Status:** ACTIVE

Process Generating Pollutant

COFFEE SYRUPS
TREATMENT

King County WTD - Georgetown Wet Weather Treatmen

Principle Product(s): CONSTRUCTION DEWATERING
Permit #: 7937-01 **Permit Status:** ACTIVE

Process Generating Pollutant

CDW

King County WTD - Georgetown Wet Weather Treatmen

Principle Product(s): CONSTRUCTION DEWATERING
Permit #: 7939-01 **Permit Status:** ACTIVE

Process Generating Pollutant

CDW

Lafarge - Seattle Plant

Principle Product(s): SOLID WASTE - TRANSFER FAC
Permit #: 7925-01 **Permit Status:** ACTIVE

Process Generating Pollutant

SEDIMENT TRANSLOAD
CONCRETE PRODUCTS

Lineage Logistics, Seattle-Michigan Facility

Principle Product(s): FOOD PROCESSING-SEAFOOD
Permit #: 7896-01 **Permit Status:** ACTIVE

Process Generating Pollutant

FISH PROCESSING

Machinists, Inc. Plant 5

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7892-03 **Permit Status:** ACTIVE

Process Generating Pollutant

ETCHING PROCESS

Magnetic and Penetrant Services Co.

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7873-03 **Permit Status:** ACTIVE

Process Generating Pollutant

PASSIVATION
METAL FINISHING
DYE PENETRANT

Marel Seattle Inc.

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7821-03 **Permit Status:** ACTIVE

Process Generating Pollutant

STAINLESS STEEL WASH & BUFF

Marine Vacuum Service Inc.

Principle Product(s): CENTRALIZED WASTE TREATMENT-CFR 437
Permit #: 7676-07 **Permit Status:** ACTIVE

Process Generating Pollutant

CENTRALIZED WASTE TREATMENT

Mastercraft Metal Finishing Inc.

Principle Product(s): ELECTROPLATING - CFR 413
Permit #: 7233-04 **Permit Status:** ACTIVE

Process Generating Pollutant

METAL FINSIHING
METAL FINISHING

National Products Inc.

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7834-03 **Permit Status:** ACTIVE

Process Generating Pollutant

PHOSPHATING LINE

Pacific Iron and Metal Inc.

Principle Product(s): METALS RECYCLING
Permit #: 7577-05 **Permit Status:** ACTIVE

Process Generating Pollutant

ST0RMWATER CONTAMINATION
STORMWATER CONTAMINATION

Rabanco Recycling Co.

Principle Product(s): SOLID WASTE - TRANSFER FAC
Permit #: 7595-06 **Permit Status:** ACTIVE

Process Generating Pollutant

CONTAMINATED STORMWATER

Rainier Commons LLC - Old Rainier Brewery Site

Principle Product(s): GENERAL TYPE
Permit #: 7927-01 **Permit Status:** ACTIVE

Process Generating Pollutant

CONTAMINATED STORMWATER

Seattle Barrel Co.

Principle Product(s): BARREL CLEANING
Permit #: 7113-04 **Permit Status:** ACTIVE

Process Generating Pollutant

DRUM CLEANING

Seattle, City of - SDOT - Elliott Bay Central Seawall Repl

Principle Product(s): CONSTRUCTION DEWATERING
Permit #: 7912-02 **Permit Status:** ACTIVE

Process Generating Pollutant

CONSTRUCTION DEWATERING

Skills Inc. - Ballard Facility

Principle Product(s): METAL FINISHING - CFR 433
Permit #: 7552-05 **Permit Status:** ACTIVE

Process Generating Pollutant

METAL FINISHING

Sound Transit - N160 Northgate Link Extension - Station

Principle Product(s): CONSTRUCTION DEWATERING
Permit #: 7933-01 **Permit Status:** ACTIVE

Process Generating Pollutant

CONSTRUCTION DEWATERING

Sound Transit - Northgate Link Extension - Maple Leaf P

Principle Product(s): CONSTRUCTION DEWATERING
Permit #: 7902-02 **Permit Status:** ACTIVE

Process Generating Pollutant

CDW

Sound Transit - Northgate Link Extension - Roosevelt Sta

Principle Product(s): CONSTRUCTION DEWATERING
Permit #: 7920-01 **Permit Status:** ACTIVE

Process Generating Pollutant

CONSTRUCTION

Sound Transit - Northgate Link Extension - University Dis

Principle Product(s): CONSTRUCTION DEWATERING
Permit #: 7911-02 **Permit Status:** ACTIVE

Process Generating Pollutant

DEWATERING
GWR AT OTHER SITE

TLP Management Services LLC

Principle Product(s): FUELING FACILITY
Permit #: 7592-05 **Permit Status:** ACTIVE

Process Generating Pollutant

FUELING PROCESS

Trident Seafoods Corp.

Principle Product(s): FOOD PROCESSING-SEAFOOD
Permit #: 7901-01 **Permit Status:** ACTIVE

Process Generating Pollutant

WASHDOWN
FOOD MANUF

University of Washington Seattle Campus

Principle Product(s): ELECTRONIC COMPONENTS - CFR 469
Permit #: 7923-01 **Permit Status:** ACTIVE

Process Generating Pollutant

COMPOST / UW HAZARDOUS WASTE COLLECTION AREAS
ACA/RES LABS/NANOFAB
UW HAZARDOUS WASTE COLLECTION AREAS
MEDICAL CENTER
SHOPS AND MAINTENANCE
GENERAL MAINTENANCE AREAS/POWER PLANT
DENTAL SCHOOL

Vigor Shipyards Inc.

Principle Product(s): BOAT/SHIPYARD
Permit #: 7782-07 **Permit Status:** ACTIVE

Process Generating Pollutant

HYDROBLASTING/STORM
GROUNDWATER REMED

BALLAST/BILGE

WSDOT - SR 99 South Access Connection Project

Principle Product(s): CONSTRUCTION DEWATERING

Permit #: 7898-02 **Permit Status:** ACTIVE

Process Generating Pollutant

CONSTRUCTION DEWATERING

Waste Management National Services - 8th Avenue South

Principle Product(s): SOLID WASTE - TRANSFER FAC

Permit #: 7928-02 **Permit Status:** ACTIVE

Process Generating Pollutant

SEDIMENT DEWATERING

F.5. Principle Product(s) and Raw Material(s)

ASKO Processing Inc.

Customer Type: ELECTROPLATING - CFR 413
Permit #: 7728-04 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CADMIUM
CHROMIUM
COLOR
COPPER
CYANIDE
FOG NONPOLAR
NICKEL
ORGANICS
PH ACID
PH CAUSTIC
POLYMERS
ZINC

Alaskan Copper Works - 6th Ave.

Customer Type: METAL FINISHING - CFR 433
Permit #: 7238-06 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CHROMIUM
COPPER
NICKEL
PH ACID
PH CAUSTIC
PH CAUSTIC
SILVER
ZINC

Art Brass Plating Inc.

Customer Type: METAL FINISHING - CFR 433
Permit #: 7722-06 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CADMIUM
COPPER
CYANIDE
NICKEL
PH ACID
ZINC

F.5. Principle Product(s) and Raw Material(s)

BNSF Railway Co. - Interbay Facility

Customer Type: TRANSPORTATION FACILITY
Permit #: 7872-02 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

FOG NONPOLAR

Boeing Commercial Airplane - North Field

Customer Type: METAL FINISHING - CFR 433
Permit #: 7594-06 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CHROMIUM
COPPER
CYANIDE
FOG NONPOLAR
LEAD
NICKEL
ORGANICS
ORGANICS
PCB (PER AROCLOR)
ZINC

Boeing Company - Plant 2 Facility

Customer Type: METAL FINISHING - CFR 433
Permit #: 7811-04 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

FOG NONPOLAR
PCB (PER AROCLOR)
PH CAUSTIC

Carsoe US Inc.

Customer Type: METAL FINISHING - CFR 433
Permit #: 7931-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CADMIUM
CHROMIUM
COPPER
FOG NONPOLAR
LEAD
NICKEL
PH ACID
ZINC

F.5. Principle Product(s) and Raw Material(s)

Ceradyne Inc., a 3M Company - Seattle

Customer Type: GLASS MANUFACTURING
Permit #: 7507-05 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CADMIUM
LEAD
PH ACID
PH CAUSTIC
ZINC

Darigold Inc. - Rainier Plant

Customer Type: FOOD PROCESSING-DAIRY
Permit #: 7116-06 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

AMMONIA
FOG FLOATABLE
HIGH STRENGTH
PH ACID
PH CAUSTIC

Emerald Services Inc. - Airport Way Facility

Customer Type: CENTRALIZED WASTE TREATMENT-CFR 437
Permit #: 7884-02 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

ARSENIC
CADMIUM
CHROMIUM
COPPER
CYANIDE
DIESEL
FOG FLOATABLE
FOG NONPOLAR
GAS
HIGH STRENGTH
LEAD
MERCURY
NICKEL
ORGANICS
PCB (PER AROCLOR)
PH CAUSTIC
ZINC

F.5. Principle Product(s) and Raw Material(s)

Foss Maritime Company

Customer Type: BOAT/SHIPYARD
Permit #: 7703-05 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

COPPER
LEAD
ZINC

GM Nameplate Inc.

Customer Type: METAL FINISHING - CFR 433
Permit #: 7187-07 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CHROMIUM
COPPER
NICKEL
PH ACID
PH CAUSTIC
SILVER
ZINC

Glacier Northwest Inc. - Kenmore Facility

Customer Type: CEMENT/READYMIX
Permit #: 7740-04 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

PH CAUSTIC
SOLIDS

Industrial Container Services - WA LLC

Customer Type: BARREL CLEANING
Permit #: 7929-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

FOG NONPOLAR
ORGANICS

Kerry Inc.

Customer Type: FOOD PROCESSING-OTHER
Permit #: 7854-02 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

HIGH STRENGTH
PH ACID
PH CAUSTIC

F.5. Principle Product(s) and Raw Material(s)

King County WTD - Georgetown Wet Weather Treatmen

Customer Type: CONSTRUCTION DEWATERING
Permit #: 7937-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

COPPER
GASOLINE (BTEX)
LEAD
ORGANICS
PH CAUSTIC
SOLIDS
ZINC

King County WTD - Georgetown Wet Weather Treatmen

Customer Type: CONSTRUCTION DEWATERING
Permit #: 7939-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

DAILY DISCHARGE VOLUME
FLOW RATE
SOLIDS

Lafarge - Seattle Plant

Customer Type: SOLID WASTE - TRANSFER FAC
Permit #: 7925-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

ARSENIC
CADMIUM
CHROMIUM
COPPER
FOG NONPOLAR
GASOLINE (BTEX)
LEAD
NICKEL
ORGANICS
PCB (PER AROCLOR)
PH CAUSTIC
SOLIDS
ZINC

Lineage Logistics, Seattle-Michigan Facility

Customer Type: FOOD PROCESSING-SEAFOOD
Permit #: 7896-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

FOG FLOATABLE

F.5. Principle Product(s) and Raw Material(s)

HIGH STRENGTH

Machinists, Inc. Plant 5

Customer Type: METAL FINISHING - CFR 433
Permit #: 7892-03 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CHROMIUM
COPPER
NICKEL
PH ACID
PH CAUSTIC
ZINC

Magnetic and Penetrant Services Co.

Customer Type: METAL FINISHING - CFR 433
Permit #: 7873-03 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CHROMIUM
COLOR
COPPER
LEAD
NICKEL
PH ACID
ZINC

Marel Seattle Inc.

Customer Type: METAL FINISHING - CFR 433
Permit #: 7821-03 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CHROMIUM
COPPER
DAILY DISCHARGE VOLUME
LEAD
NICKEL
PH ACID
PH CAUSTIC
ZINC

Marine Vacuum Service Inc.

Customer Type: CENTRALIZED WASTE TREATMENT-CFR 437
Permit #: 7676-07 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CADMIUM

CHROMIUM
COPPER
DIESEL
FOG NONPOLAR
GASOLINE (BTEX)
LEAD
ORGANICS
SULFIDES
ZINC

Mastercraft Metal Finishing Inc.

Customer Type: ELECTROPLATING - CFR 413
Permit #: 7233-04 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CHROMIUM
COPPER
CYANIDE
NICKEL
ZINC

National Products Inc.

Customer Type: METAL FINISHING - CFR 433
Permit #: 7834-03 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

COPPER
PH ACID
ZINC

Pacific Iron and Metal Inc.

Customer Type: METALS RECYCLING
Permit #: 7577-05 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

COPPER
FOG NONPOLAR
LEAD
PCB (PER AROCLOR)
ZINC

Rabanco Recycling Co.

Customer Type: SOLID WASTE - TRANSFER FAC
Permit #: 7595-06 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

COPPER

FOG NONPOLAR
LEAD
ZINC

Rainier Commons LLC - Old Rainier Brewery Site

Customer Type: GENERAL TYPE
Permit #: 7927-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

LEAD
PCB (PER AROCLOR)

Seattle Barrel Co.

Customer Type: BARREL CLEANING
Permit #: 7113-04 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

FOG NONPOLAR
ORGANICS
PH CAUSTIC

Seattle, City of - SDOT - Elliott Bay Central Seawall Repl

Customer Type: CONSTRUCTION DEWATERING
Permit #: 7912-02 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

COPPER
FOG NONPOLAR
LEAD
ORGANICS
PCB (PER AROCLOR)
SOLIDS
SULFIDES
ZINC

Skills Inc. - Ballard Facility

Customer Type: METAL FINISHING - CFR 433
Permit #: 7552-05 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

CHROMIUM
COPPER
PH ACID
ZINC

F.5. Principle Product(s) and Raw Material(s)

Sound Transit - N160 Northgate Link Extension - Station (

Customer Type: CONSTRUCTION DEWATERING
Permit #: 7933-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

PH CAUSTIC
SOLIDS

Sound Transit - Northgate Link Extension - Maple Leaf P

Customer Type: CONSTRUCTION DEWATERING
Permit #: 7902-02 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

PH ACID
PH CAUSTIC
SOLIDS

Sound Transit - Northgate Link Extension - Roosevelt Sta

Customer Type: CONSTRUCTION DEWATERING
Permit #: 7920-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

PH ACID
PH CAUSTIC
SOLIDS

Sound Transit - Northgate Link Extension - University Di

Customer Type: CONSTRUCTION DEWATERING
Permit #: 7911-02 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

ORGANICS
PH CAUSTIC
SOLIDS

TLP Management Services LLC

Customer Type: FUELING FACILITY
Permit #: 7592-05 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

FOG NONPOLAR
GASOLINE (BTEX)
LEAD

Trident Seafoods Corp.

Customer Type: FOOD PROCESSING-SEAFOOD
Permit #: 7901-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

FOG FLOATABLE
HIGH STRENGTH

University of Washington Seattle Campus

Customer Type: ELECTRONIC COMPONENTS - CFR 469
Permit #: 7923-01 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

FOG NONPOLAR
FOG NONPOLAR
MERCURY
OTHER
PH ACID
PH CAUSTIC
SILVER
SOLIDS

Vigor Shipyards Inc.

Customer Type: BOAT/SHIPYARD
Permit #: 7782-07 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

COPPER
FOG NONPOLAR
GASOLINE (BTEX)
ZINC

WSDOT - SR 99 South Access Connection Project

Customer Type: CONSTRUCTION DEWATERING
Permit #: 7898-02 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

PH CAUSTIC
SOLIDS
SULFIDES

Waste Management National Services - 8th Avenue South

Customer Type: SOLID WASTE - TRANSFER FAC
Permit #: 7928-02 **Permit Status:** ACTIVE

Raw Material(s) Solutions Containing

ARSENIC
CADMIUM
CHROMIUM
COPPER
FOG NONPOLAR
GASOLINE (BTEX)

F.5. Principle Product(s) and Raw Material(s)

LEAD
MERCURY
NICKEL
ORGANICS
PCB (PER AROCLOR)
ZINC

Company Name	Address	City	Zip Code	Customer Type	Authorization Type	Local Sewer Agency	Status	Authorization No.
Chevron Service Station - Vashon Soil and Groundwater Remediation Project	9229 E. MARGINAL WAY S.	TUKWILA	98118	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	CITY OF TUKWILA	ACTIVE	4167-02
ExxonMobil Oil Corp. - Former Mobil Site 19-748 (DA4143)	1915 2ND AVENUE	SEATTLE	98101	GROUNDWATER REMEDIATION - PETROLEUM	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4294-01
ExxonMobil Oil Corp. - Site 99-BLV	3801 STONE WAY N.	SEATTLE	98103	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4349-01
General Electric Co. - Dawson Street	2601 4TH AVE	SEATTLE	98121	GROUNDWATER REMEDIATION - PETROLEUM	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4474-01
Hadley Improvements Owner LLC - Footing Drain Contaminated Groundwater	1522 E. MADISON STREET	SEATTLE	98122	GROUNDWATER REMEDIATION - PETROLEUM	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4212-02
Highland Park Properties, LLC	4580 COLORADO AVENUE	SEATTLE	98124	GROUNDWATER REMEDIATION - PETROLEUM	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4085-04
Mercer Island, City of - Maintenance Facility UST Release	1414 10TH AVENUE	SEATTLE	98122	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4337-02
Mill Creek Crossing LLC - Prime Cleaners Remediation	734 S. LUCILE STREET	SEATTLE	98108	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4196-02
Panos Properties LLC - Mill Creek Plaza Cleanup Project - 164th Street	8100 LAKE CITY WAY NE	SEATTLE	98115	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4198-02
Panos Properties, LLC - Overlake Village Purge Water	3876 BRIDGE WAY NORTH	SEATTLE	98103	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4398-01
Penthouse Drapery Cleaners and Manufacturers Former Property Remediation Site	5235 DELRIDGE WAY SW	SEATTLE	98106	GROUNDWATER REMEDIATION - PETROLEUM	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4432-01
Phillips 66 Company - Facility No. 255353	5100 15TH AVENUE NW	SEATTLE	98107	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4143-03
Phillips 66 Company - Renton Terminal	220 S. DAWSON STREET	SEATTLE	98108	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	543-04
Pillar Properties - 11 Main Street South Footing Drains	7777 PERIMETER ROAD S.	SEATTLE	98108	GROUNDWATER REMEDIATION - PETROLEUM	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4129-04
Seattle Pacific University - Former Clean-M-Rite Site Groundwater Remediation	600 WESTLAKE AVENUE N.	SEATTLE	98107	GROUNDWATER REMEDIATION - PETROLEUM	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4262-02
Stack House Acquisition LLC - 420 Pontius Avenue N. Site	1265 REPUBLICAN STREET	SEATTLE	98109	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4247-02
Starbucks Coffee Co. - Mercer Island Groundwater Remediation	420 PONTIUS AVENUE N.	SEATTLE	98109	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4248-02
Surplus Items Inc.	5101 WEST MARGINAL WAY SW	SEATTLE	98106	GROUNDWATER REMEDIATION - OTHER	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	266-07
TOC Holdings Co.	2737 WEST COMMODORE WAY	SEATTLE	98199	GROUNDWATER REMEDIATION - PETROLEUM	MAJOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	4427-01
Valley Centre	9587 8TH AVENUE S.	SEATTLE	98108	GROUNDWATER REMEDIATION - ORGANICS	MAJOR DISCHARGE AUTHORIZATION	VALLEY VIEW SEWER DISTRICT	ACTIVE	4086-03
South Park Industrial Properties LLC	2334 FOURTH AVENUE	SEATTLE	98121	GROUNDWATER REMEDIATION - PETROLEUM	MINOR DISCHARGE AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	866-02
Univar USA Inc. - Groundwater Remediation	1313 SOUTH 96TH STREET	SEATTLE	98108	GROUNDWATER REMEDIATION - ORGANICS	MINOR DISCHARGE AUTHORIZATION	VALLEY VIEW SEWER DISTRICT	ACTIVE	11795-01
ExxonMobil Oil Corp. - Site 99-D9T	400 FAIRVIEW AVENUE N.	SEATTLE	98109	GROUNDWATER REMEDIATION - ORGANICS	LETTER OF AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	11586-01
Phillips 66 Company - Renton Terminal	4557 BROOKLYN AVENUE NE	SEATTLE	98105	GROUNDWATER REMEDIATION - PETROLEUM	LETTER OF AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	11797-01
Seattle Fire Station No. 2 - GWR	1752 RAINIER AVENUE SOUTH	SEATTLE	98144	GROUNDWATER REMEDIATION - ORGANICS	LETTER OF AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	1065-02
Stack House Acquisition LLC - 1265 Republican Street Site	3308 & 3310 3RD AVENUE W.	SEATTLE	98119	GROUNDWATER REMEDIATION - ORGANICS	LETTER OF AUTHORIZATION	SEATTLE PUBLIC UTILITIES	ACTIVE	11623-01
King County International Airport - GWR	9725 EAST MARGINAL WAY	SEATTLE	98124	GROUNDWATER REMEDIATION - METALS	VERBAL	SEATTLE PUBLIC UTILITIES	ACTIVE	50457-01
Univar USA Inc. - 4000 1st Avenue S.	4000 1ST AVENUE S.	SEATTLE	98134	GROUNDWATER REMEDIATION - ORGANICS	NO CONTROL DOCUMENT REQUIRED	SEATTLE PUBLIC UTILITIES	ACTIVE	400407-01

Attachment 4

NPDES Form 2A, Part G
(Combined Sewer Overflow System)

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates information was not required and is not available**

a. Outfall number **003 Ballard Siphon Regulator**

b. Location **Seattle** (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*39'50.096" N (Latitude) **122*22'56.400"** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☒ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Washington Ship Canal**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates information was not required and is not available**

a. Outfall number **004 East Ballard Overflow (aka 11th Avenue NW)**

b. Location

Seattle	
(city or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47*39'34.169" N	**122*22'14.787" W**
(Latitude)	(Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

21 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

6.4 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0.3 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.07 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Washington Ship Canal**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates information was not required and is not available

a. Outfall number **006 Magnolia, S. Overflow**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*37'48.663" N (Latitude) **122*23'56.476" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

30 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

10 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

.05 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.16 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Elliot Bay/Puget Sound**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevated bacteria levels after an event

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **007 Canal Street Overflow**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*39'6.683" N (Latitude) **122*21'29.208" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

g. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0 __________ million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0 __________ Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Washington Ship Canal**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): __________

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): __________

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **008 3rd Ave. W. and Ewing Street Overflow**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*39'7.503" N (Latitude) **122*21'36.187"** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

6 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

8 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

1.3 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.92 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Washington Ship Canal**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **009 Dexter Avenue Regulator**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*37'56.298" N (Latitude) **122*20'19.506" W** (Longitude)

c. Distance from shore (if applicable) **414** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0 ________ million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0 ________ Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Union**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ________

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ________

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

____

____

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **011 East Pine Street P.S. Emergency Overflow**

b. Location

Seattle	
(city or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47*36'53.732" N	**122*16'49.095" W**
(Latitude)	(Longitude)

c. Distance from shore (if applicable) **300** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☒ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

N/A hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

N/A million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

N/A Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Washington**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **012 Belvoir P.S. Emergency Overflow**

b. Location

Seattle (city or town, if applicable)	(Zip Code)
King (County)	**WA** (State)
47*39'24.111" N (Latitude)	**122*17'15.321" W** (Longitude)

c. Distance from shore (if applicable) **40** ft.

d. Depth below surface (if applicable) **10** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

2 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

2.2 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0.26 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

2.14 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: Lake Washington

b. Name of watershed/river/stream system: Cedar WRIA 8

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: WRIA 8

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **013 Martin Luther King Way Trunkline Overflow**

b. Location **Seattle** (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*31'23.827" N (Latitude) **122*15'46.619" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

N/A hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

N/A ________ million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

N/A ________ Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Washington**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ________

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ________

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

____

____

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **014 Montlake Overflow**

b. Location

Seattle	
(city or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47*38'49.597" N	**122*18'17.498" W**
(Latitude)	(Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

12 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

7.3 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

4.5 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.21 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: Lake Washington Ship Canal

b. Name of watershed/river/stream system: Cedar WRIA 8

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: WRIA 8

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **015 University Regulator**

b. Location

Seattle	
(city or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47*38'56.299" N	**122*18'40.281" W**
(Latitude)	(Longitude)

c. Distance from shore (if applicable) **1174** ft.

d. Depth below surface (if applicable) **na** ft.

e. Which of the following were monitored during the last year for this CSO?

☒ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

7 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

8.9 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

9.2 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.6 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: Ship Canal

b. Name of watershed/river/stream system: Cedar WRIA 8

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: WRIA 8

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **018 Matthews Park P.S. Emergency Overflow**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*41'50.85" (Latitude) **122*16'21.54"** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.) – Data not available

FACILITY NAME AND PERMIT NUMBER:

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c. Give the average volume per CSO event.

0 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year Data not available

0 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Washington**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **027a Denny Way Regulator**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*37'5.302" N (Latitude) **122*21'38.920" W** (Longitude)

c. Distance from shore (if applicable) **100** ft.

d. Depth below surface (if applicable) **20** ft.

e. Which of the following were monitored during the last year for this CSO?

☒ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

3 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

5.7 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

5.8 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.56 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: Elliott Bay/Puget Sound

b. Name of watershed/river/stream system: Cedar WRIA 8

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: WRIA 8

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **028 King Street Regulator**

b. Location

Seattle	
(city or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47*35'56.411" N	**122*20'14.730" W**
(Latitude)	(Longitude)

c. Distance from shore (if applicable) **150** ft.

d. Depth below surface (if applicable) **20** ft.

e. Which of the following were monitored during the last year for this CSO?

☒ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

3 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

9.3 hours (☐ actual or ☒ approx.) –

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c. Give the average volume per CSO event.

0.5 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

1.8 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Elliott Bay/Puget Sound**

b. Name of watershed/river/stream system: **Cedar (Puget Sound) WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **029 Connecticut Street Regulator (aka Kingdome)**

b. Location

Seattle	
(city or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47*35'33.114" N	**122*20'31.581" W**
(Latitude)	(Longitude)

c. Distance from shore (if applicable) **150** ft.

d. Depth below surface (if applicable) **20** ft.

e. Which of the following were monitored during the last year for this CSO?

☒ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

16 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

9.2 hours (☐ actual or ☒ approx.) –

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c. Give the average volume per CSO event.

1.5 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.44 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Elliott Bay/Puget Sound**

b. Name of watershed/river/stream system: **Puget Sound WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **030 Lander Street Regulator**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) — **WA** (State)

47*34'53.316" N (Latitude) — **122*20'33.320" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

21 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

17.9 hours (☐ actual or ☒ approx.) –

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c. Give the average volume per CSO event.

34.5 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.4 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Elliot Bay/Puget Sound**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **031 Hanford #1 Overflow**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*33'47.187" N (Latitude) **122*20'43.135" W** (Longitude)

c. Distance from shore (if applicable) **150** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

13 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

12.3 hours (☐ actual or ☒ approx.) –

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WA-002918-1

c. Give the average volume per CSO event.

5.8 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.42 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: Duwamish River – Via Diagonal Storm Drain

b. Name of watershed/river/stream system: Green WRIA 9

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: WRIA 9

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **032 Hanford #2 Regulator**

b. Location

Seattle ______ (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*34'38.004" N (Latitude) **122*20'34.009" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

19 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

20.23 hours (☐ actual or ☒ approx.) –

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c. Give the average volume per CSO event.

14.2 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.44 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River – East Waterway**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **033 Rainier Avenue Pump Station**

b. Location

Seattle (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*34'16.946" N (Latitude) **122*16'31.909" W** (Longitude)

c. Distance from shore (if applicable) **400** ft.

d. Depth below surface (if applicable) **30** ft.

e. Which of the following were monitored during the last year for this CSO?

- ☐ Rainfall
- ☐ CSO pollutant concentrations
- ☒ CSO frequency
- ☒ CSO flow volume
- ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.) –

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c. Give the average volume per CSO event.

0 ______ million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0 ______ Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Washington**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **034 E. Duwamish Pump Station**

b. Location

Seattle (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*33'47.605" N (Latitude) **122*20'53.720" W** (Longitude)

c. Distance from shore (if applicable) **50** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: Duwamish River

b. Name of watershed/river/stream system: Green WRIA 9

United State Soil Conservation Service 14-digit watershed code (if known): ________

c. Name of State Management/River Basin: WRIA 9

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ________

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **035 W. Duwamish Pump Station**

b. Location **Seattle** (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*33'46.748" N (Latitude) **122*20'42.979" W** (Longitude)

c. Distance from shore (if applicable) **50** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

1 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

2.4 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0.2 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

2.1 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ________

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ________

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **036 Chelan Avenue Regulator**

b. Location

Seattle (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*34'25.201" N (Latitude) **122*21'28.004" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

10 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

14.1 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

5.9 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.7 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River – West Waterway**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **037 Harbor Avenue Regulator**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*34'25.341" N (Latitude) **122*21'40.174" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

3 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0.5 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0.08 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.5 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River into Elliott Bay**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **038 Terminal 115 Overflow**

b. Location

Seattle (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*32'53.737" N (Latitude) **122*20'25.810" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

2 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

4 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0.2 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

2.2 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **039 Michigan Regulator (aka S. Michigan Regulator)**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*32'36.709" N (Latitude) **122*20'5.880" W** (Longitude)

c. Distance from shore (if applicable) **0** ft.

d. Depth below surface (if applicable) **0** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

13 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

11 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

12.1 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.45 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **040 8th Ave. S. Regulator (W. Marginal Way Pump Station)**

b. Location **Seattle** (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*32'1.131" N (Latitude) **122*19'21.501" W** (Longitude)

c. Distance from shore (if applicable) **120** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

1 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

5.4 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0.7 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

2.2 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **041 Brandon Street Regulator)**

b. Location

Seattle (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*33'16.781" N (Latitude) **122*20'26.996" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

6 events (☐ actual or ☒ approx.) No Data Available

b. Give the average duration per CSO event.

14.3 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

6.8 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year No Data Available

1.04 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

West Point TP, permit #WA-002918-1

Form Approved 1/14/99
OMB Number 2040-0086

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **042 W. Michigan Regulator**

b. Location

Seattle ______ (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*32'29.621" N (Latitude) **122*20' 5.978" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

6 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

10.4 hours (☐ actual or ☒ approx.)

c. Give the average volume per CSO event.

0.7 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year No Data Available

1.43 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available**

a. Outfall number **043 E. Marginal Pump Station**

b. Location

Seattle (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*32'13.373" N (Latitude) **122*19'6'.563"W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0 ______ million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year   No Data Available

0 ______ Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

______

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

West Point TP, permit #WA-002918-1

Form Approved 1/14/99
OMB Number 2040-0086

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available

a. Outfall number **044a Norfolk Outfall**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*30'42.98" N (Latitude) **122*17'50.48"W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☒ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

N/A hours (☐ actual or ☒ approx.)

c. Give the average volume per CSO event.

N/A million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year No Data Available

N/A Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Duwamish River**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. Rainfall, CSO volume and frequency measured continuously; rainfall not.**

a. Outfall number **045 Henderson Street Pump Station Emergency Overflow**

b. Location

Seattle	
(city or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47*31'23.827" N	**122*15'46.619" W**
(Latitude)	(Longitude)

c. Distance from shore (if applicable) **50** ft.

d. Depth below surface (if applicable) **12** ft.

e. Which of the following were monitored during the last year for this CSO?

☒ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year No Data Available

0 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Lake Washington**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

______

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall.

a. Outfall number **048a North Beach Pump Station (wet well)**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*42'14.424" N (Latitude) **122*23'33.229" W** (Longitude)

c. Distance from shore (if applicable) **810** ft.

d. Depth below surface (if applicable) **20** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

3 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

13 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

1.2 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year No Data Available

2.2 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **-Puget Sound**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available.**

a. Outfall number **048b North Beach P.S. (inlet structure) Emergency Overflow**

b. Location

Seattle (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*42'7.710" N (Latitude) **122*23'26.735" W** (Longitude)

c. Distance from shore (if applicable) **0** ft.

d. Depth below surface (if applicable) **0** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

1 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0.36 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0.73 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year No Data Available

2.5 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Puget Sound**

b. Name of watershed/river/stream system: **Cedar WRIA 8**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 8**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available.**

a. Outfall number **049 30th Avenue N.E. P.S. Emergency Overflow**

b. Location

Seattle (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*39'24.111" N (Latitude) **122*17'15.321" W** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year No Data Available

0 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: -Lake Washington-

b. Name of watershed/river/stream system: Cedar WRIA 8

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: WRIA 8

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available.

a. Outfall number **052 53rd Street S.W. PS Emergency Overflow**

b. Location

Seattle	
(city or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47*35'5.275" N	**122*24'9.186" W**
(Latitude)	(Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

1 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

1.4 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

0.37 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

2.1 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: -Elliott Bay/Puget Sound--

b. Name of watershed/river/stream system: Green WRIA 9

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: WRIA 9

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available.**

a. Outfall number **054 63rd Avenue S.W. PS Emergency Overflow**

b. Location

Seattle (city or town, if applicable) — (Zip Code)

King (County) — **WA** (State)

47*34'12.059" N (Latitude) — **122*24'58.682" W** (Longitude)

c. Distance from shore (if applicable) **1100** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

4 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

11.5 hours (☐ actual or ☒ approx.)

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c. Give the average volume per CSO event.

49.3 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

1.74 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **-Puget Sound---**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. **System Map.** Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. **System Diagram.** Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 **Description of Outfall. "na" indicates the parameter was not required and so is not available.**

a. Outfall number **055 S.W. Alaska Street Overflow**

b. Location

Seattle (city or town, if applicable) ____ (Zip Code)

King (County) **WA** (State)

47*33'33'.992" N (Latitude) **122*24'25.010"** (Longitude)

c. Distance from shore (if applicable) **N/A** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. **CSO Events.**

a. Give the number of CSO events in the last year.

0 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

0 hours (☐ actual or ☒ approx.)

FACILITY NAME AND PERMIT NUMBER:

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c. Give the average volume per CSO event.

0 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: -Puget Sound--

b. Name of watershed/river/stream system: Green WRIA 9

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: WRIA 9

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available.

a. Outfall number **056 Murray Avenue S.W. P.S. Emergency Overflow**

b. Location **Seattle** (city or town, if applicable) ______ (Zip Code)

King (County) **WA** (State)

47*32'24.991" N (Latitude) **122*24'.0.009" W** (Longitude)

c. Distance from shore (if applicable) **800** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

1 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

1.3 hours (☐ actual or ☒ approx.)

FACILITY NAME AND PERMIT NUMBER:

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c. Give the average volume per CSO event.

1.4 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

2.3 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: -Puget Sound---

b. Name of watershed/river/stream system: Green WRIA 9

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: WRIA 9

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

SUPPLEMENTAL APPLICATION INFORMATION

PART G. COMBINED SEWER SYSTEMS

If the treatment works has a combined sewer system, complete Part G.

G.1. System Map. Provide a map indicating the following: (may be included with Basic Application Information)

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1 or on a separate drawing, of the combined sewer collection system that includes the following information.

a. Location of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices.

e. Locations of pump stations.

CSO OUTFALLS:

Complete questions G.3 through G.6 once for each CSO discharge point.

G.3 Description of Outfall. "na" indicates the parameter was not required and so is not available.

a. Outfall number **057 Barton Street PS Emergency Overflow**

b. Location

Seattle	
(city or town, if applicable)	(Zip Code)
King	**WA**
(County)	(State)
47*31'25.991" N	**122*23.47.014" W**
(Latitude)	(Longitude)

c. Distance from shore (if applicable) **620** ft.

d. Depth below surface (if applicable) **N/A** ft.

e. Which of the following were monitored during the last year for this CSO?

☐ Rainfall ☐ CSO pollutant concentrations ☒ CSO frequency

☒ CSO flow volume ☐ Receiving water quality

f. How many storm events were monitored during the last year? **N/A**

G.4. CSO Events.

a. Give the number of CSO events in the last year.

2 events (☐ actual or ☒ approx.)

b. Give the average duration per CSO event.

1.0 hours (☐ actual or ☒ approx.)

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

c. Give the average volume per CSO event.

0.14 million gallons (☐ actual or ☒ approx.)

d. Give the minimum rainfall that caused a CSO event in the last year

0.4 Inches of rainfall

G.5. Description of Receiving Waters.

a. Name of receiving water: **Puget Sound**

b. Name of watershed/river/stream system: **Green WRIA 9**

United State Soil Conservation Service 14-digit watershed code (if known): ______

c. Name of State Management/River Basin: **WRIA 9**

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ______

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

Short term elevations of bacteria levels following events

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

Attachment 5

Supplemental Application Materials for the Georgetown Wet Weather Treatment Station (NPDES Form 2A, Part A-B)

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

BASIC APPLICATION INFORMATION

PART A. BASIC APPLICATION INFORMATION FOR ALL APPLICANTS:

All treatment works must complete questions A.1 through A.8 of this Basic Application Information Packet.

A.1. Facility Information.

Facility Name: **Georgetown Wet Weather Treatment Station**

Mailing Address: **201 S. Jackson St., MS-KSC-NR-0500, Seattle, WA 98104-3855**

Facility Address (not P.O. Box): **Intersection of 4th Ave. S and S. Michigan St.**

Location (Latitude/Longitude as decimal degrees (NAD83/WGS84)): **47.542791 / -122.334843**

Telephone Number: **(206) 477-4601**

E-mail address: **Mark.Isaacson@kingcounty.gov**

Contact Person: **Mark Isaacson**

Title: **Director, Wastewater Treatment Division**

UBI Number ______________________

A.2. Applicant Information. If the applicant is different from the above, provide the following:

Applicant Name: **King County Wastewater Treatment Division**

Mailing Address: **201 S. Jackson St., MS-KSC-NR-0700, Seattle, WA 98104-3855**

Telephone Number: **(206) 477-4550**

E-mail address: **Christie.True@kingcounty.gov**

Contact Person: **Christie True**

Title: **Director, King County Dept. of Natural Resources and Parks**

Is the applicant the owner or operator (or both) of the treatment works? ☒ owner ☒ operator

Indicate whether correspondence regarding this permit should be directed to the facility or the applicant.
☒ facility ☐ applicant

Can the facility obtain broadband internet access for WQWebDMR (http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html)?
☒ yes ☐ no

A.3. Existing Environmental Permits. Provide the permit number of any existing environmental permits that have been issued to the treatment works (include state-issued permits).

NPDES	______	PSD	______
UIC	______	Other	______
RCRA	______	Other	______

A.4. Collection System Information. Provide information on municipalities and areas served by the facility. Provide the name and population of each entity and, if known, provide information on the type of collection system (combined vs. separate) and its ownership (municipal, private, etc.).

Name	Population Served	Type of Collection System	Ownership

Total population served ______________________

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.5. Indian Country.

a. Is the treatment works located in Indian Country?

☐ Yes ☒ No

b. Does the treatment works discharge to a receiving water that is either in Indian Country or that is upstream from (and eventually flows through) Indian Country?

☐ Yes ☒ No

A.6. Flow. Indicate the design flow rate of the treatment plant (i.e., the wastewater flow rate that the plant was built to handle). Also provide the average daily flow rate and maximum daily flow rate for each of the last three years. Each year's data must be based on a 12-month time period with the 12th month of "this year" occurring no more than three months prior to this application submittal.

a. Design flow rate **70 peak, 49 max day** mgd

	Two Years Ago	Last Year	This Year
b. Annual average daily flow rate	**N/A**	**N/A**	**N/A**
c. Maximum daily flow rate	**N/A**	**N/A**	**N/A**

A.7. Collection System. Indicate the type(s) of collection system(s) used by the treatment plant. Check all that apply. Also estimate the percent contribution (by miles) of each.

☒ Separate sanitary sewer **27** %

☒ Combined storm and sanitary sewer **73** %

A.8. Discharges and Other Disposal Methods.

a. Does the treatment works discharge effluent to waters of the U.S.? ☒ Yes ☐ No

If yes, list how many of each of the following types of discharge points the treatment works uses:

i. Discharges of treated effluent **1**

ii. Discharges of untreated or partially treated effluent **0**

iii. Combined sewer overflow points **0**

iv. Constructed emergency overflows (prior to the headworks) **0**

v. Other ______ ______

b. Does the treatment works discharge effluent to basins, ponds, or other surface impoundments that do not have outlets for discharge to waters of the U.S.? ☐ Yes ☒ No

If yes, provide the following for each surface impoundment:

Location : ______
(Latitude/Longitude as decimal degrees (NAD83/WGS84))

Annual average daily volume discharge to surface impoundment(s) ______ mgd

Is discharge ☐ continuous or ☐ intermittent?

c. Does the treatment works land-apply treated wastewater? ☐ Yes ☒ No

If yes, provide the following for each land application site:

Location : ______
(Latitude/Longitude as decimal degrees (NAD83/WGS84))

Number of acres: ______

Annual average daily volume applied to site: ______ mgd

Is land application ☐ continuous or ☐ intermittent?

d. Does the treatment works discharge or transport treated or untreated wastewater to another treatment works? ☐ Yes ☒ No

If yes, describe the mean(s) by which the wastewater from the treatment works is discharged or transported to the other treatment works (e.g., tank truck, pipe).

If transport is by a party other than the applicant, provide:

Transporter Name

Mailing Address

Contact Person

Title

Telephone Number ( )

For each treatment works that receives this discharge, provide the following:

Name

Mailing Address

Contact Person

Title

Telephone Number ( )

If known, provide the NPDES permit number of the treatment works that receives this discharge

Provide the average daily flow rate from the treatment works into the receiving facility. mgd

e. Does the treatment works discharge or dispose of its wastewater in a manner not included in A.8. through A.8.d above (e.g., underground percolation, well injection): ☐ Yes ☒ No

If yes, provide the following for each disposal method:

Description of method (including location and size of site(s) if applicable):

Annual daily volume disposed by this method:

Is disposal through this method ☐ continuous or ☐ intermittent?

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. **If you answered "no" to question A.8.a,** go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

a. Outfall number ____________

b. Location

Seattle (City or town, if applicable) — 98108 (Zip Code)

King (County) — WA (State)

47.54305556 (Latitude) Provide these as decimal degrees (NAD83/WGS84) -122.33472222 (Longitude)

c. Distance from shore (if applicable) 120 ft.

d. Depth below surface (if applicable) -19 MLLW ft.

e. Average daily flow rate ____________ mgd

f. Does this outfall have either an intermittent or a periodic discharge? ☒ Yes ☐ No (go to A.9.g.)

If yes, provide the following information:

Number f times per year discharge occurs: 20/yr (avg)

Average duration of each discharge: 4 hr

Average flow per discharge: 3.35 mgd

Months in which discharge occurs: October-April

g. Is outfall equipped with a diffuser? ☒ Yes ☐ No

A.10. Description of Receiving Waters.

a. Name of receiving water Lower Duwamish Waterway

b. Name of watershed (if known) Green WRIA 9

United States Soil Conservation Service 14-digit watershed code (if known): ____________

c. Name of State Management/River Basin (if known): WRIA 9

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): ____________

d. Critical low flow of receiving stream (if applicable)
acute ____________ cfs chronic ____________ cfs

e. Total hardness of receiving stream at critical low flow (if applicable): N/A mg/l of $CaCO_3$

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

A.11. Description of Treatment

a. What level(s) of treatment are provided? Check all that apply.

☒ Primary ☐ Secondary

☐ Advanced ☒ Other. Describe: **Lamella plates and chemical enhanced sedimentation**

b. Indicate the following removal rates (as applicable):

Design BOD5 removal or Design CBOD5 removal	**N/A**	%
Design SS removal	**>85%**	%
Design P removal	**N/A**	%
Design N removal	**N/A**	%
Other ______		%

c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe:

Ultraviolet

If disinfection is by chlorination is dechlorination used for this outfall? ☐ Yes ☐ No

d. Does the treatment plant have post aeration? ☐ Yes ☒ No

A.12. Effluent Testing Information.

All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than one and one-half years apart.

Outfall number: **No effluent data available - new facility under construction**

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)		s.u.			
pH (Maximum)		s.u.			
Flow Rate					
Temperature (Winter)					
Temperature (Summer)					

* For pH please report a minimum and a maximum daily value

POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD5							
	CBOD5							
FECAL COLIFORM								
TOTAL SUSPENED SOLIDS (TSS)								

END OF PART A.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE

FACILITY NAME AND PERMIT NUMBER:

WA-002918-1

BASIC APPLICATION INFORMATION

PART B. ADDITIONAL APPLICATION INFORMATION FOR APPLICANTS WITH A DESIGN FLOW GREATER THAN OR EQUAL TO 0.1 MGD (100,000 gallons per day).

All applicants with a design flow rate ≥ 0.1 mgd must answer questions B.1 through B.6. All others go to Part C (Certification).

B.1. Inflow and Infiltration. Estimate the average number of gallons per day that flow into the treatment works from inflow and/or infiltration.

Uncertain for the specific CSO basins gpd

Briefly explain any steps underway or planned to minimize inflow and infiltration.

B.2. Topographic Map. Attach to this application a topographic map of the area extending at least one mile beyond facility property boundaries. This map must show the outline of the facility and the following information. (You may submit more than one map if one map does not show the entire area.)

a. The area surrounding the treatment plant, including all unit processes.

b. The major pipes or other structures through which wastewater enters the treatment works and the pipes or other structures through which treated wastewater is discharged from the treatment plant. Include outfalls from bypass piping, if applicable.

c. Each well where wastewater from the treatment plant is injected underground.

d. Wells, springs, other surface water bodies, and drinking water wells that are: 1) within ¼ mile of the property boundaries of the treatment works, and 2) listed in public record or otherwise known to the applicant.

e. Any areas where the sewage sludge produced by the treatment works is stored, treated, or disposed.

f. If the treatment works receives waste that is classified as hazardous under the Resource Conservation and Recovery Act (RCRA) by truck, rail, or special pipe, show on the map where the hazardous waste enters the treatment works and where it is treated, stored, and/or disposed.

B.3. Process Flow Diagram or Schematic. Provide a diagram showing the processes of the treatment plant, including all bypass piping and all backup power sources or redunancy in the system. Also provide a water balance showing all treatment units, including disinfection (e.g., chlorination and dechlorination). The water balance must show daily average flow rates at influent and discharge points and approximate daily flow rates between treatment units. Include a brief narrative description of the diagram.

B.4. Operation/Maintenance Performed by Contractor(s).

Are any operational or maintenance aspects (related to wastewater treatment and effluent quality) of the treatment works the responsibility of a contractor? ☐ Yes ☒ No

If yes, list the name, address, telephone number, and status of each contractor and describe the contractor's responsibilities (attach additional pages if necessary).

Name:

Mailing Address:

Telephone Number: ( )

Responsibilities of Contractor:

B.5. Scheduled improvements and Schedules of Implementation. Provide information on any uncompleted implementation schedule or uncompleted plans for improvements that will affect the wastewater treatment, effluent quality, or design capacity of the treatment works. If the treatment works has several different implementation schedules or is planning several improvements, submit separate responses to question B.5 for each. (If none, go to question B.6.)

a. List the outfall number (assigned in question A.9) for each outfall that is covered by this implementation schedule.

b. Indicate whether the planned improvements or implementation schedule are required by local, State, or Federal agencies.

☐ Yes ☐ No

FACILITY NAME AND PERMIT NUMBER:

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c. If the answer to B.5.b is "Yes," briefly describe, including new maximum daily inflow rate (if applicable).

d. Provide dates imposed by any compliance schedule or any actual dates of completion for the implementation steps listed below, as applicable. For improvements planned independently of local, State, or Federal agencies, indicate planned or actual completion dates, as applicable. Indicate dates as accurately as possible.

Implementation Stage	Schedule MM/DD/YYYY	Actual Completion MM/DD/YYYY
- Begin Construction	/ /	/ /
- End Construction	/ /	/ /
- Begin Discharge	/ /	/ /
- Attain Operational Level	/ /	/ /

e. Have appropriate permits/clearances concerning other Federal/State requirements been obtained? ☒ Yes ☐ No

Describe briefly: **Construction of the project is underway, and completion is estimated to occur sometime in 2022. All federal, state, and local approvals for construction have been acquired.**

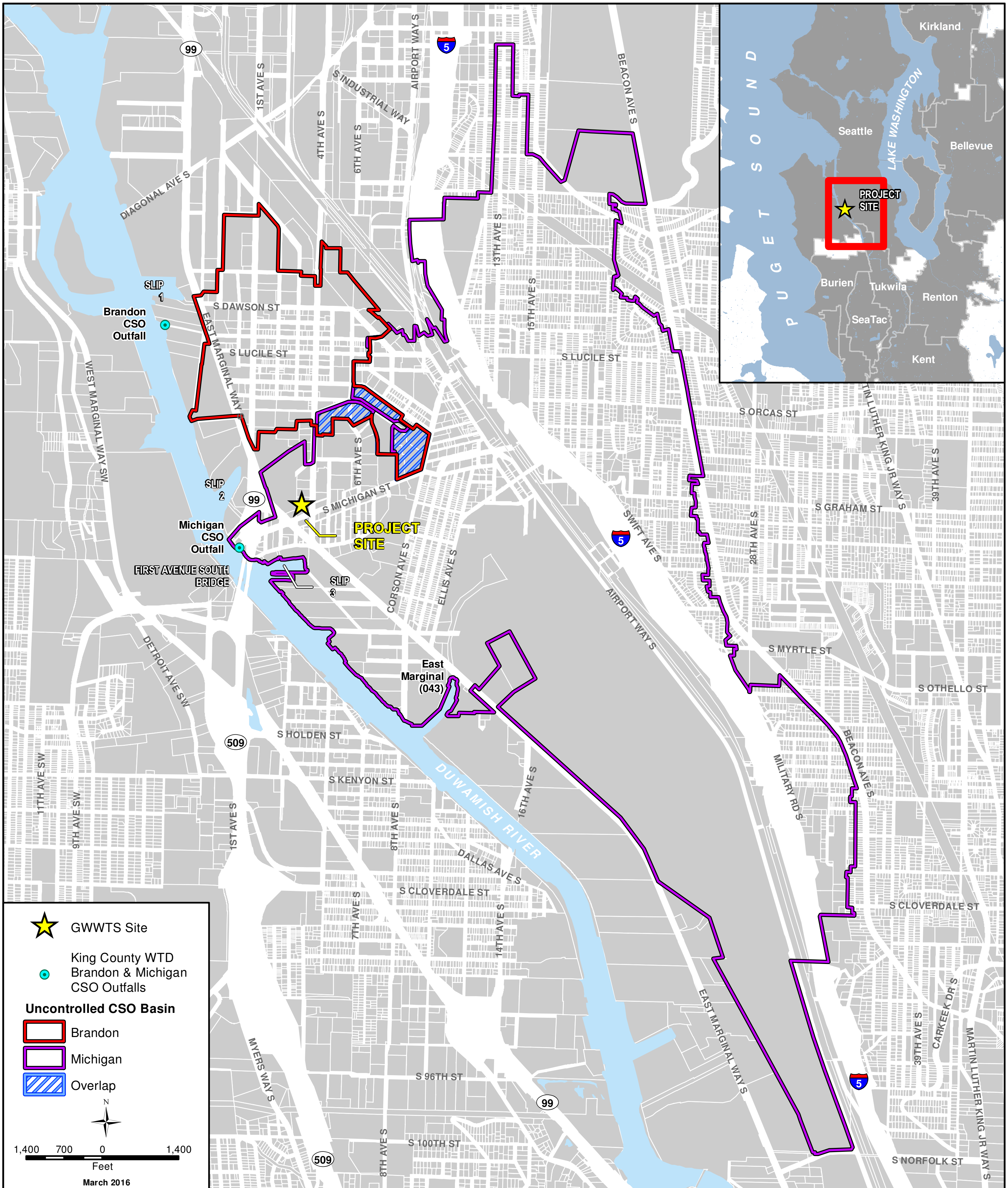
B.6. EFFLUENT TESTING DATA (GREATER THAN OR EQUAL TO 0.1 MGD ONLY).

Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods (See attachment A). In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum effluent testing data must be based on at least three pollutant scans and must be no more than four and one-half years old.

Outfall Number: **No effluent data available - new facility under construction**

POLLUTANT	MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS							
AMMONIA (as N)							
CHLORINE (TOTAL RESIDUAL, TRC)							
DISSOLVED OXYGEN							
TOTAL KJELDAHL NITROGEN (TKN)							
NITRATE PLUS NITRITE NITROGEN							
OIL and GREASE							
PHOSPHORUS (Total)							
TOTAL DISSOLVED SOLIDS (TDS)							
OTHER							

END OF PART B.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE



King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

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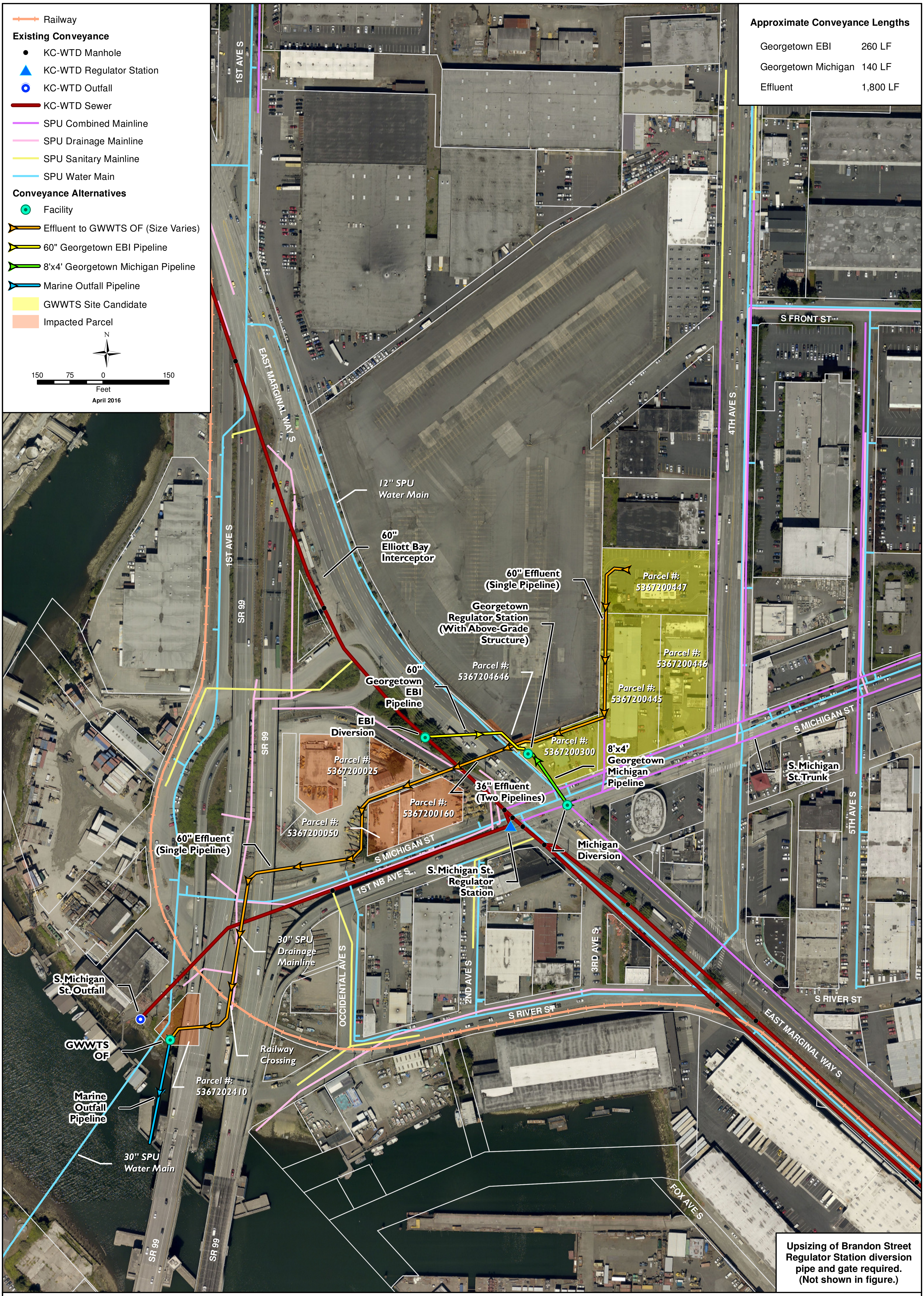
Figure 1

Site/Vicinity Map

Georgetown Wet Weather Treatment Station

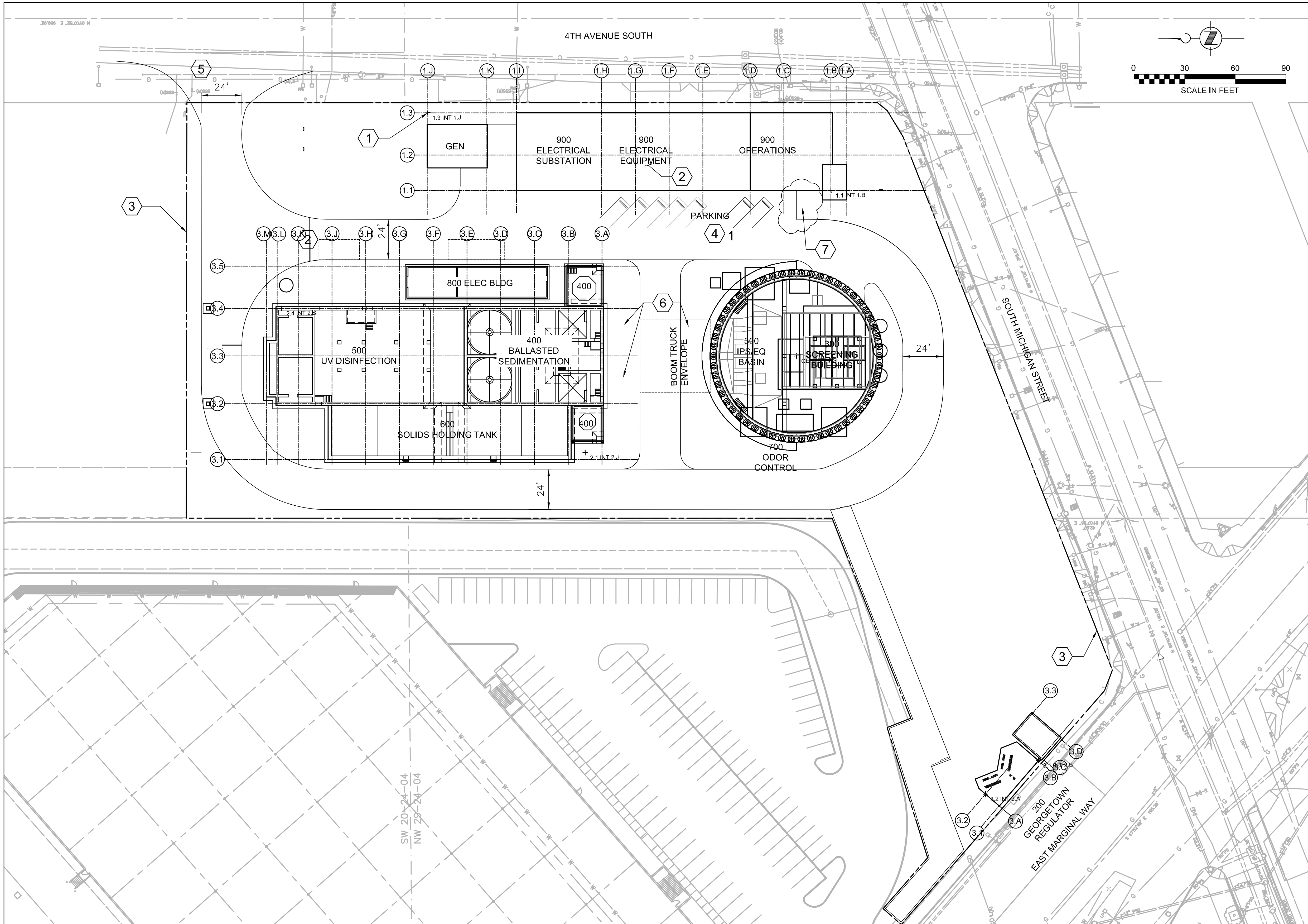


King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

Figure ES-2

Recommended System Proposal

Georgetown Wet Weather Treatment Station Facility Plan



GENERAL NOTES

1. BUILDING LOCATIONS ARE BASED ON THE BUILDING GRID SYSTEM.
2. NEW ROADWAY, PAVING, SIDEWALK, AND DRIVEWAY LOCATIONS ARE SHOWN SCREENED. SEE THE SITE ROADWAY AND PAVING DRAWINGS.
3. ALL COORDINATES ARE BASED ON PLANT COORDINATE SYSTEM. SEE NOTES ON DWG ---.
4. PARTIAL STRUCTURAL, EQUIPMENT PAD, AND MECHANICAL OUTLINES ARE SHOWN FOR REFERENCE ONLY. SEE RESPECTIVE DRAWINGS FOR ACTUAL CONSTRUCTION DETAILS.
5. LANDSCAPING FEATURES SHOWN FOR COORDINATION WITH LANDSCAPING, SEE LANDSCAPING DRAWINGS FOR LOCATION INFORMATION AND FEATURES.

KEY NOTES

1. GRID INTERSECTION POINT TYPICAL. SEE TABLE 1 ON 100-C-205. MAJOR GRID INTERSECTIONS SHOWN ON THIS DWG. SEE LOCATION PLANS A THROUGH C FOR LOCATIONS OF OTHER FEATURES.
2. SEE ELECTRICAL DRAWINGS FOR LOCATIONS OF ELECTRICAL GEAR.
3. PROPERTY LINE. SEE 100-G001.
4. PROVIDE 6 STANDARD PARKING SPACES, 8'x19' LONG, ANGLED AT 45 DEGREES AND 1 ADA COMPLIANT SPACE.
5. DRIVEWAY
6. BUS PARKING (40'x12') AND OPERATIONS VEHICLES (10'x25')
7. BIKE RACK

PARKING CALCULATIONS

OPERATIONAL BUILDING 6,300 sf - 2,500 sf WAIVED =3,800/2,000 (1 PARKING SPACE PER 2,000 sf) =2 SPACES REQUIRED.

LEGEND

2.U / 2.5 — BUILDING GRID SYSTEM COMMON TO ALL FACILITY DRAWINGS. SEE GENERAL NOTE 1.

+ 2.1 INT 2.J — CONTROL POINT. SEE SITE LOCATION COORDINATE TABLE DRAWING 100-C-205.

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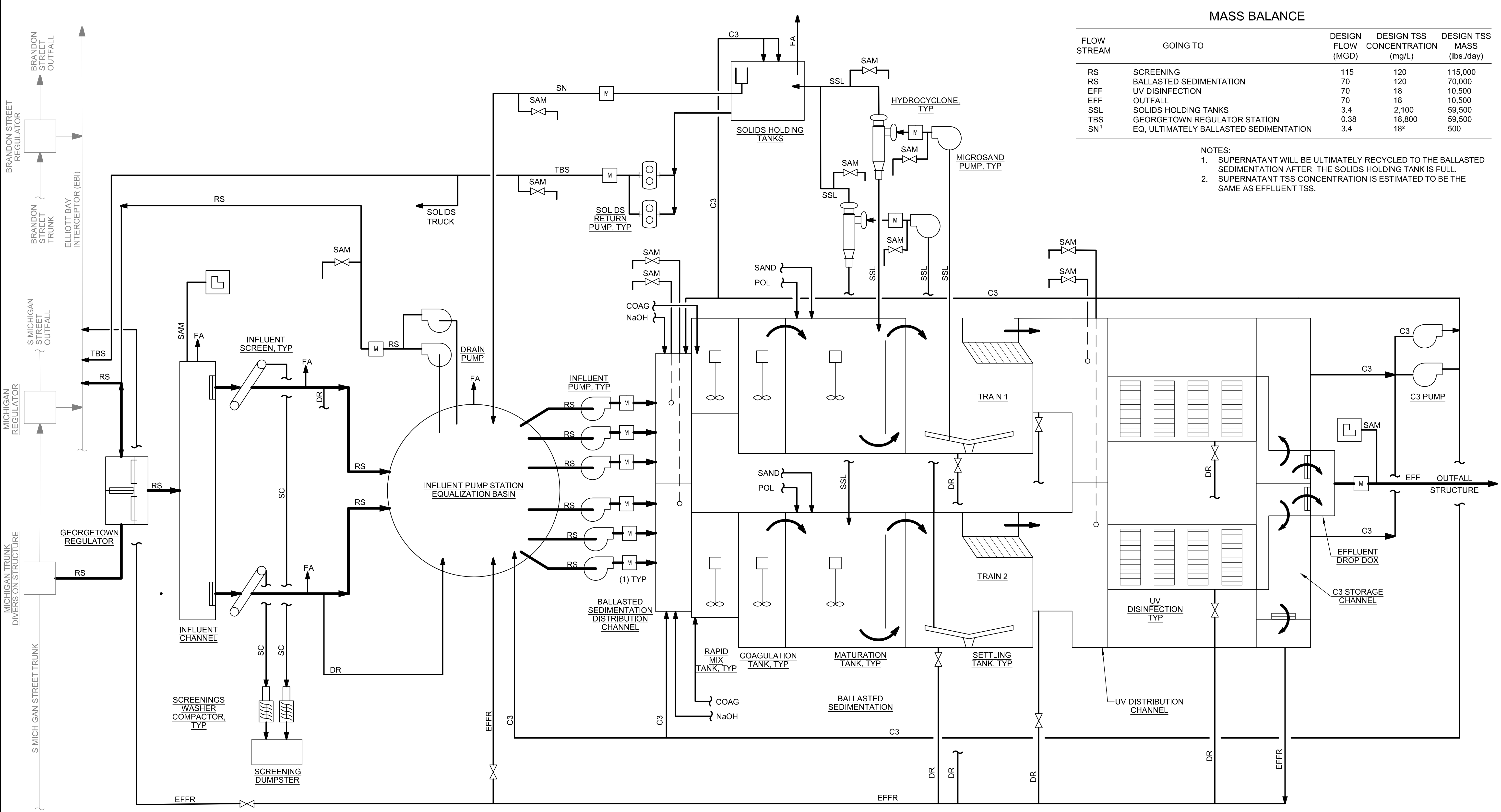
King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

Figure 5-1

Site Plan

Georgetown Wet Weather Treatment Station Facility Plan



MASS BALANCE

FLOW STREAM	GOING TO	DESIGN FLOW (MGD)	DESIGN TSS CONCENTRATION (mg/L)	DESIGN TSS MASS (lbs./day)
RS	SCREENING	115	120	115,000
RS	BALLASTED SEDIMENTATION	70	120	70,000
EFF	UV DISINFECTION	70	18	10,500
EFF	OUTFALL	70	18	10,500
SSL	SOLIDS HOLDING TANKS	3.4	2,100	59,500
TBS	GEORGETOWN REGULATOR STATION	0.38	18,800	59,500
SN[1]	EQ, ULTIMATELY BALLASTED SEDIMENTATION	3.4	18[2]	500

NOTES:
1. SUPERNATANT WILL BE ULTIMATELY RECYCLED TO THE BALLASTED SEDIMENTATION AFTER THE SOLIDS HOLDING TANK IS FULL.
2. SUPERNATANT TSS CONCENTRATION IS ESTIMATED TO BE THE SAME AS EFFLUENT TSS.

NOTES:
1. INFLUENT FLOW TO SCREENS IS CALCULATED BASED ON GATE OPENING AND WATER LEVEL AT GEORGETOWN REGULATOR.
2. ODOR CONTROL, ANCILLARY SYSTEMS, AND VALVES ARE NOT SHOWN FOR CLARITY.

King County
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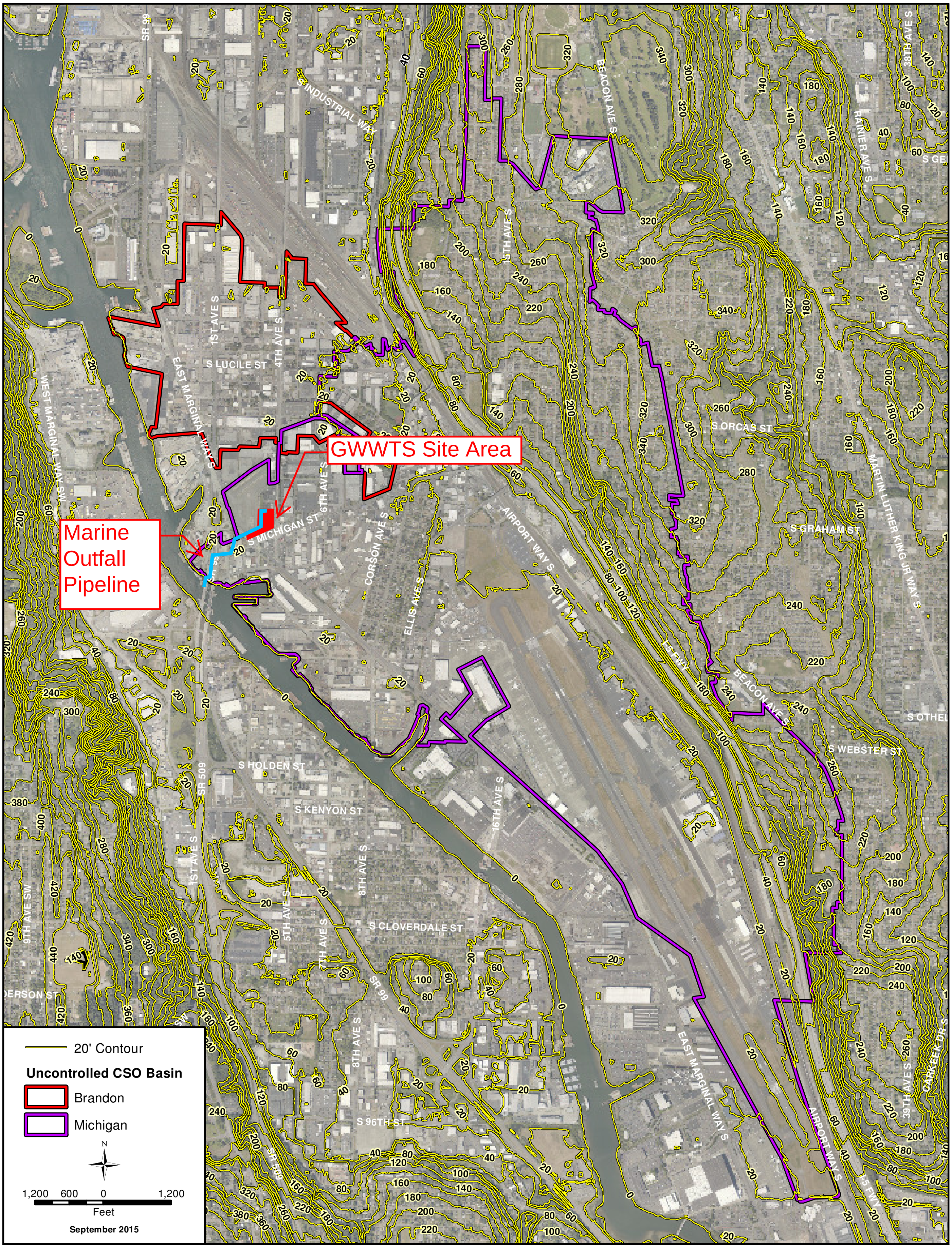
Wastewater Treatment Division

Process Flow diagram

Georgetown Wet Weather Treatment Station Facility Plan



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King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Topography

Georgetown Wet Weather Treatment Station Facility Plan

King County
Department of Natural Resources and Parks
Wastewater Treatment Division
King Street Center, KSC-NR-0500
201 South Jackson Street
Seattle, WA 98104-3855

MEMO

Date: September 17, 2015
Revised: May 2, 2016

TO: Michael Popiwny
Will Sroufe

FM: Bruce Nairn

RE: Georgetown WWTS Outfall Dilution Estimates

Cc: Betsy Cooper
File

Background. The Georgetown Wet Weather Treatment Station (GWWTS) project is intended to reduce Combined Sewer Overflows (CSOs) at King County's existing South Michigan St CSO and Brandon St CSO to the required control level of one or fewer overflows per year on a long term average. The project aims to control the Brandon Street and South Michigan Street combined sewer overflows (CSO) in compliance with Washington State standards for CSO control (RCW 90.48 and WAC 173-245-020). The Washington State Department of Ecology (Ecology) defines control as one untreated event per year on a 20-year moving average, while meeting water quality and sediment management standards criteria for treated discharges.

The project envisions constructing additional conveyance to route the existing flows to a CSO treatment process, disinfection, and a discharge to the Lower Duwamish Waterway (LDW) through a new outfall structure. High rate clarification has been selected as the treatment process, with a goal of achieving 85% average TSS removal. Following clarification, the effluent will be disinfected by UV irradiance prior to discharge.

The project team has identified a preferred location for the GWWTS on a parcel near the intersection of Michigan Street and East Marginal Way. The selected outfall location for this site is adjacent to the existing Michigan Street CSO discharge. Based on existing uses and constraints at this location, the outfall team concluded that the most feasible and beneficial location for the outfall diffuser was parallel to the northern portion of the bridge fender on the SR99/509 Bridge near river mile 2.0 (King County 2015).

The purpose of this memo is to evaluate the dilution that could be obtained from alternative diffuser configurations at this location. Initial dilution of an effluent discharged to a receiving water body depends on a number of factors. Marine outfalls usually terminate in multi-port diffuser structures, promoting rapid dilution of effluent with ambient marine waters. Upon discharge, the jet-like momentum of the effluent exiting the diffuser structure results in vigorous mixing with ambient seawater very near the diffuser ports. The effluent's buoyancy may then result in additional mixing as it rises in the water column due to a difference in density between freshwater effluent and saltwater receiving waters. The diffuser ports discharges may continue to rise and mix until it reaches the surface or it is trapped due to water column density stratification. When the receiving water column is density stratified, sufficient dilution may occur at a certain depth so that the diluted effluent (mixed with saline water) becomes denser than the overlying surface water, loses buoyancy, and is subsequently trapped below the surface. The diluted effluent then forms a plume beneath this trapping depth, which is then spread and transported laterally by currents and eddies generated by wind, tides, obstructions and bathymetric features.

The dilution modeling approach follows the Guidance in Appendix C of Ecology's *Water Quality Program Permit Writer's Manual* (Ecology, 2015). It is important to recognize that dilution modeling is conservative and assumes uniform flow conditions, and it does not account for turbulent mixing due to currents and current behavior around structures in the water which could further increase dilution.

Outfall Alignment. The outfall alignment is highly constrained by existing uses, utilities, and the navigation channel of the Lower Duwamish Waterway (LDW). The outfall team considered several potential locations adjacent to the existing SR 509 and SR 99 Duwamish River / First Ave South Bridge and concluded that an outfall located along the northern side of the southbound bridge appeared to have the best potential for effluent dilution and reducing impacts associated with construction (King County 2015). The proposed outfall/diffuser alignment is located between the bridge pier and the northern fender piles, as shown in Figure 1. It is important to recognize that the bridge piers and fenders are on piles that allow the ambient currents passage through the bridge area.

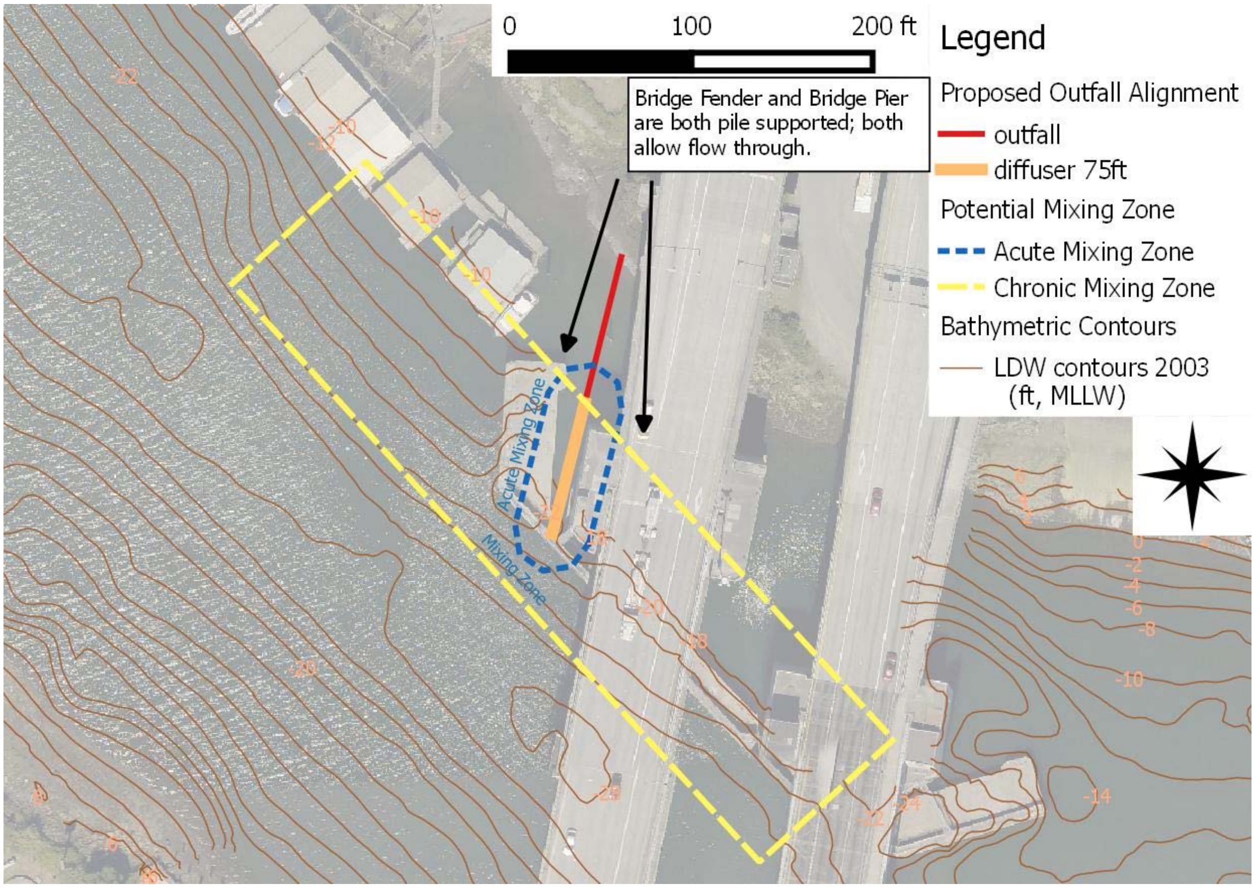

Figure 1. Proposed outfall and diffuser alignment, acute and chronic mixing zone boundaries

Mixing Zone

The areas where mixing occurs are important because water quality criteria are evaluated at the edge of the acute and chronic mixing zones. These acute and chronic mixing zones are specified by the Washington Department of Ecology in the Surface Water Quality Standards (WAC 173-201A). The LDW in the vicinity of South Michigan Street is a salt-wedge estuary, and it is anticipated that the mixing zone will be determined according to regulations for estuarine waters (WAC 173-201A-400). In estuaries, the chronic mixing zones shall:

> (i) Not extend in any horizontal direction from the discharge port(s) for a distance greater than two hundred feet plus the depth of water over the discharge port(s) as measured during mean lower low water; and
> (ii) Not occupy greater than twenty-five percent of the width of the water body as measured during mean lower low water.

Additionally, the maximum size of the acute mixing zone in estuarine waters shall not extend beyond ten percent of the distance established as the chronic mixing zone as measured independently from the discharge port(s).

For a diffuser with an average depth of 14 feet, the Ecology Permit Writer's Manual allows for a possible mixing zone distance calculated by part (i) above of 214 feet. At this location, the LDW is 400 feet wide and thus the distance calculated by part (ii) is 100 feet. This results in a rectangular mixing zone, 100 ft wide by 428 ft in length parallel to the LDW channel direction (Figure 1). Since the diffuser is aligned at 45 degrees the LDW channel and diffuser ports will discharge perpendicular to the diffuser into the offshore channel currents, then the 100-foot mixing zone width boundaries will be shifted offshore slightly from the diffuser mid-point to capture the discharge plume within the mixing zone. The acute mixing zone is 21.4 ft measured from each diffuser port (Figure 1).

Theoretical Dilution Estimates

The Lower Duwamish Waterway is characterized as a salt-wedge type estuary, with a sharp density gradient separating a lower saline layer from an upper, shallow brackish layer. This stratification limits the amount of buoyant mixing that can be achieved, and under worst-case ("critical") conditions, most of the initial mixing is a result of the momentum of the discharge. Thus, the dilution is expected to be similar to a momentum jet. The relationship for dilution from a momentum jet can be used to understand how diffuser parameters will affect dilution. Based on dimensional analysis and experimental coefficients, dilution from a momentum jet is given by:

$$DF = (Q_a + Q)/Q = \mu/Q = 0.25(z/l_Q) \qquad \text{Fischer, eqn 9.18} \qquad (1)$$

where: DF is the dilution factor,
Q is the discharge rate (or volume flux of the discharge),
Q_a is the ambient flow entrained into the discharge,
μ is the volume flux in the jet,
z is the distance downstream from the jet orifice,
l_Q is a characteristic length scale given by $Q/M^{1/2} = A^{1/2} = \sqrt{(\pi/4)}\, D$ for round jets, where Q is the volume flux, M the momentum flux, and D the port diameter.

This equation can be rewritten as:

$$\mu/Q = 0.25(z^2\, n\, W/Q)^{1/2} \qquad (2)$$

where n is the number of ports, and W the discharge velocity. While simplified and not accounting for plume overlap or ambient currents, this equation shows that dilution increases with distance, number of ports, and discharge velocity. As distance between ports is reduced, or the number of ports is increased, dilution asymptotically approaches a planar momentum jet as the discharge plumes from adjacent ports overlap. The equation for dilution from a planar momentum jet of length L can be written as:

$$\mu/Q = 0.25(4\ z\ L\ W/Q)^{1/2} \quad (3)$$

As an example, the distance along the fender pier is about 75 feet. Considering a diffuser that spanned this distance and equating the dilution for n round ports to dilution for a 75-foot planar momentum jet results in equal dilution at the acute mixing zone with n=14 ports. Thus no additional dilution would be expected with more than 14 ports.

Model Selection

The UM3 model component of VISUAL PLUMES was used for this modeling effort. This model was chosen because the GWWTS outfall conforms to the conditions specified for the suggested use of the UM3 model in Dilution Models for Effluent Discharges, 4th Edition. The simulated conditions include a buoyant plume discharging into a saline water column with a non-linear stratification profile, the predominant current at an oblique angle to the axis of the outfall, and a multiport diffuser with plume merging. The plume is not anticipated to attach to the bank as the diffuser ports are a significant distance offshore and discharge in the offshore direction. The presence of the pilings is not anticipated to directly influence the plume dilution; they will enhance turbulence and farfield mixing. The diffuser ports have been positioned to allow a clear path for the plume without interacting with the pilings. The farfield predictions were used to model dilutions at the mixing zone boundary; for this purpose the assumptions of a constant eddy diffusivity were used. This was the more conservative assumption as opposed to the assumption that the dispersion coefficient is increasing according to the 4/3 power law, the other farfield option offered by the model. The typical eddy diffusivity value was used for farfield dilution.

Model Parameters

This section presents the parameters used in the initial dilution modeling. The initial dilution of an effluent discharged to receiving water depends upon three factors: 1) effluent characteristics; 2) diffuser configuration; and 3) ambient receiving water conditions. Table 1 lists the initial dilution parameters for each initial dilution simulation.

Table 1. Initial Dilution Parameters

Category	Parameter
Ambient Water Column	Density stratification
	Current speed
	Current direction
Effluent	Flow rate
	Temperature
Diffuser	Location and depth
	Length
	Number of ports
	Port diameter
	Orientation

Ambient Water Conditions

Ambient water conditions are expressed in terms of current speeds and density profiles. The Lower Duwamish Waterway (LDW) is a salt-wedge type of estuary, characterized by a layer of relatively fresh water overlying a salty marine layer with a sharp gradient between the two layers. The thickness and salinity of the surface layer depends on the discharge rate of the Duwamish River and the tidal stage. The salinity of the lower marine layer is closely related to the marine salinity in Elliott Bay.

The current speeds in the LDW are dominated by the tidal flow, although the fresh water discharge from the Duwamish River can significantly affect the speed in the upper layer during periods of high flow.

Density Profiles

Density profiles have been measured in the channelized LDW near the area of the planned new outfall. Profiles have been recorded by King County DNRP at locator LTUM03 near the 16th Avenue Bridge (RM 3.3), about 1.3 miles upstream, and at locator LTKE03 near the Spokane St bridge (RM 0.0) about 2 miles downstream. Profiles have been collected monthly since 2005. The profiles collected at these locations show that during periods of high flow in the Duwamish River, the upper layer has low salinity and extends to 3 to 4 m in depth.

The density profiles at Spokane St Bridge (LTKE03) are used for this analysis. Little difference is expected between the density profiles collected at LTKE03 and LTUM03 based on the established circulation and mixing within the LDW. Density profiles at LTKE03 are expected to be slightly closer to those at the outfall location as the LDW channel becomes shallower upstream of the First Avenue Bridge. To verify that there is little difference between the density profiles collected at the two locations, the dilution analysis is repeated with the profiles from LTUM03 as a component of the sensitivity analysis.

Conditions which result in minimum dilution, or critical conditions, are expected to occur when the density stratification is deepest, limiting the amount of dilution due to buoyant plume rise. A simplified salinity profile for critical conditions is shown in Figure 2. The salinity profiles show a brackish layer of 0-5 psu overlying a marine water of 28 – 30 psu. The pycnocline, or transition between the two layers, occurs within 2 – 3 meters. All results presented in this memo are based on the 112 density profiles from station LTKE03.

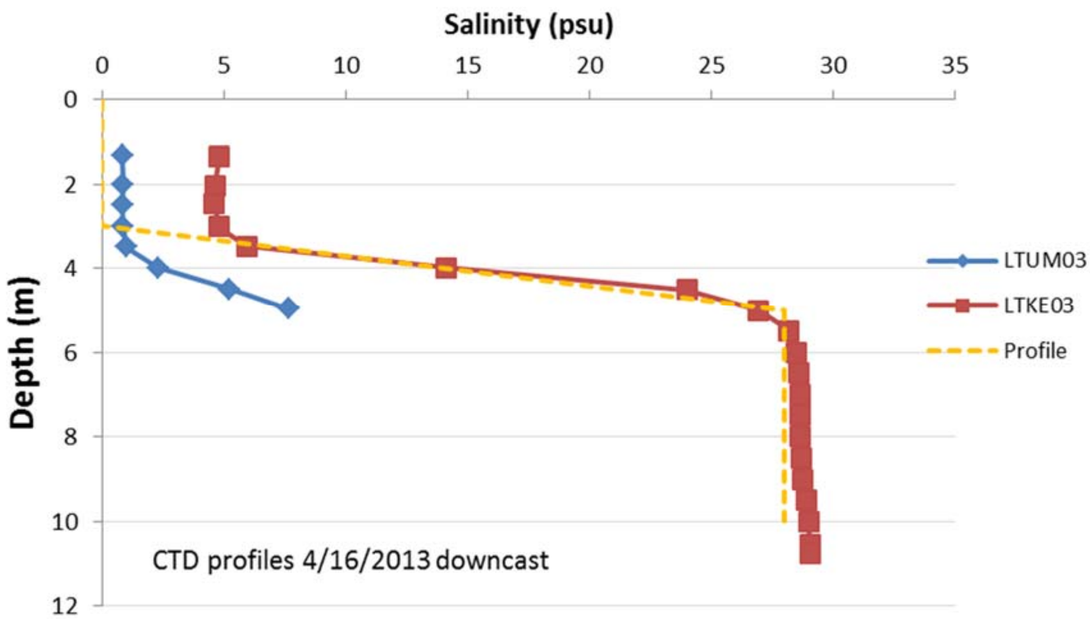

Figure 2. Simplified critical salinity profile (dashed line)

Current Speeds

EPA, the US Geological Survey (USGS), USACE, King County, Metro (now part of the King County Department of Natural Resources and Parks), the University of Washington, and other organizations have measured current velocities within the LDW as part of numerous environmental investigations (Harper-Owes 1983; King County 1999; Prych et al. 1976; Santos and Stoner 1972). The most extensive measurements within the LDW have been collected by King County. In 1996, King County deployed current velocity meters at two locations in the LDW (RM 1.1 and RM 3.5) for a 3-month period beginning in August, and recorded currents at 15-minute intervals along a vertical profile (King County 1999). The two deployment stations were selected to represent the LDW study area with respect to channel width. The LDW is widest at RM 1.1 and is at its narrowest at RM 3.5. Measured current velocities within the LDW during this study rarely exceeded 40 cm/s (1.3 ft/s).

In the winter of 2003-2004, King County conducted another study of current velocities, deploying two current velocity meters at RM 1.1 for two 4-week periods (King County 2005a). During both monitoring periods, one meter was placed near the center of the navigation channel, while the other was placed on a shallower channel side slope. The distribution of reported current speeds at mid-depth, for meters placed in the center of the channel ranged from 2.0 cm/s (10th percentile) to 27 cm/s (90th percentile). Current speeds were greater near-surface and reduced near bottom. Currents were predominantly oriented along the channel, and velocities were generally slower along the side slopes. Current patterns corresponded to the semi-diurnal tide.

Following Ecology's Permit Writer's Manual guidance and Appendix C of Ecology's Water Quality Program Permit Writer's Manual (Ecology, 2015), the 10th and 90th percentile current speeds of 2 cm/s and 27 cm/s were used for the acute dilution modeling. The 50th percentile current speed of 10 cm/s was used for the chronic dilution analysis.

Subsequent to this analysis, King County deployed two current meters at the proposed outfall location. While data from the inshore meter was not useable due to interference, the 10th and 90th percentile current speeds at the approximate termination of the diffuser were 4 cm/s and 29 cm/s. The 50th percentile current speed was 14 cm/s near-bottom (1 m above bottom) and 15 cm/s at mid-depth.

Effluent Parameters

The effluent discharged to the receiving waters is characterized by flow rate and temperature. The salinity of the effluent is assumed to be zero. The effluent temperature has a small effect on the effluent density, a characteristic value of 12^{o}C (54^{o}F) was assumed.

The design capacity and peak flow rate of the GWWTS is 70 mgd. The methodology to determine the acute and chronic design flows for intermittent CSO discharges is summarized in Section 6.1.3, Appendix C of Ecology's *Water Quality Program Permit Writer's Manual* (Ecology, 2015). When effluent discharge is intermittent, the dilution factor is to be calculated with the maximum flow rate that can occur. The dilution factor generated using the maximum flow rate may then be adjusted upward by a ratio of the maximum flow to the appropriate time-averaged flow for the criterion being assessed. For aquatic life criteria, acute dilution factors are typically assessed using the maximum one-hour average flow. Chronic dilution factors are typically assessed using the maximum 4-day average flow. However, the appropriate flow averaging period varies per pollutant as described in the water quality standards (WAC 173-201A). Ecology's guidance lists the following flows to apply in these treated CSO dilution calculations:

- **Instantaneous:** the maximum instantaneous flow rate recorded (or projected over the next permit term)
- **One-hour:** the maximum one-hour flow rate recorded (or projected over the next permit term)
- **Equivalent 24-hour flow:** for each day with effluent discharge, calculate total volume discharged. Use the highest equivalent 24-hour flow.
- **Equivalent four-day flow:** highest total 4-day discharge event volume divided by 4 days. If the CSO discharge is less than four days, use highest total event volume divided by 4 days.

The dilution factor calculated under the maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow. As the dilution calculations are independent of this flow ratio, diffuser alternatives are compared on the basis of the dilution under the maximum discharge rate. The expected acute and chronic dilution factors are then estimated for the proposed diffuser configuration by multiplying by the appropriate flow ratio.

The maximum discharge rate of GWWTS is 70 mgd. Simulation with a 32 year rainfall record indicated that 70 mgd is also the peak 1-hour flow rate, and was used for the acute water quality condition. The equivalent 24-hour flow rate was estimated at 38 mgd, and the 4-day equivalent flow was 16 mgd; and these flows represent the chronic water quality conditions for pesticides/PCBs and all other chemicals, respectively.

Subsequent to the initial analysis, an updated simulation of GWWTS operation using a 38-year rainfall time series was conducted. The equivalent flows, interpolated to a 20-year recurrence interval, were an equivalent 24-hour flow of 48.9 mgd and an equivalent 4-day flow of 13.5 mgd. These updated flow rates were applied to the predicted dilution factors for the updated diffuser configuration.

Diffuser Parameters

Location, depth, length, number of ports, port diameter and orientation (vertical and horizontal angles), and port spacing are used to characterize a diffuser in modeling. For the proposed GWWTS diffuser, the location and orientation of the existing bridge fender constrains the length, depth, and orientation of the diffuser. The diffuser is assumed to extend the length of the northern bridge fender, approximately 60 to 80 ft. The fender is orientated at a 45° angle to the direction of tidal flow. The mud line varies from 10 ft to 20 ft MLLW along the length of the fender. The horizontal discharge angle and the diffuser port depth were assumed to be fixed based on the chosen diffuser alignment. Dilution simulations were run to optimize the diffuser characteristics in terms of the number of ports, port diameter, and vertical port orientation.

Diffuser Pipe Diameter. A 48-inch internal diameter (ID) diffuser pipe was assumed. At the peak effluent flow rate of 70 mgd, the velocity in a 48-inch ID pipe is 8.6 ft/s.

Horizontal Discharge Angle. The diffuser ports are assumed to discharge perpendicular to the diffuser pipe, which results in an angle of 50° to the prevailing tidal current direction. The 50° diffuser alignment is beneficial for dilution and allows the ports on the diffuser to be oriented perpendicular to diffuser and discharge at 50 degrees to current.

Diffuser ports were only located on the channel side of the diffuser. This facilitates discharge mixing and directs the discharge away from the First Avenue Bridge structure and into the LDW channel flow under both tidal ebb and flood conditions.

Diffuser Port Depth. The mud line along the length of the fender piles varies from -10 ft to -20 ft MLLW. Since the stratification extends to at least this depth (5m or 16 ft), the port depth has a limited impact on dilution. Based on a 48” ID pipe with the invert at the sediment bed, and diffuser ports at the pipe springline, then diffuser ports would be located 2 feet above the sediment bed. This could be lowered by excavation or raised by design of bedding material, anchor block design or piling support. The combination of diffuser port elevation, vertical discharge angle, and sediment bed profile determine if the discharge plume will contact the bottom.

Vertical Discharge Angle. The sharp stratification profile limits vertical mixing from the diffuser. An upward angled diffuser port is advantageous in minimizing any concerns about plume contact and potential for scour of bottom sediments. (Note that the design will consider placement of flexible concrete mats under the diffuser to eliminate this potential.) However, the water column stratification reduces the predicted dilution as the vertical angle is increased. Preliminary results showed a horizontal discharge had the greatest dilution, and the dilution decreased as the vertical port angle was increased.

Diffuser Length and Port Spacing. Based on the outfall alignment and site characteristics, a maximum diffuser length was estimated of approximately 75 ft. Plumes from adjacent diffuser ports are not predicted to merge at the acute mixing zone when the port spacing is greater than approximately 11 ft. Minimizing the diffuser length is slightly advantageous, as it allows all diffuser ports to discharge at a deeper depth. Diffuser ports are located so that the port discharges are not directly towards an existing piling for the fender pier, and all port discharge jets are directed toward the LDW channel.

Port Discharge Velocity. Equations (2) and (3) show that the dilution is expected to increase as the square root of the discharge velocity. The discharge from GWWTS will be gravity driven, and the initial hydraulic profile included an allowance of 3 – 5 ft for the discharge head, equivalent to a maximum discharge velocity of 4 – 5 m/s (13 to 17 ft/s).

Diffuser Port Diameter. The City of Seattle requires outfalls to be equipped to prevent fish entry into the outfall. It is assumed that this diffuser will be equipped with elastomeric valves. The dilution analysis uses the calculated equivalent (round) port area for modeling – as required by the dilution models. The equivalent port area is determined by the flow rate, elastomeric check valve size and stiffness (provided by valve manufacturer).

The conceptual diffuser is illustrated in Figure 3, showing the orientation and relationship of the diffuser to the north fender pier of the SR 509/SR 99 bridge. Diffuser alternatives were created by varying the number and spacing of the diffuser ports.

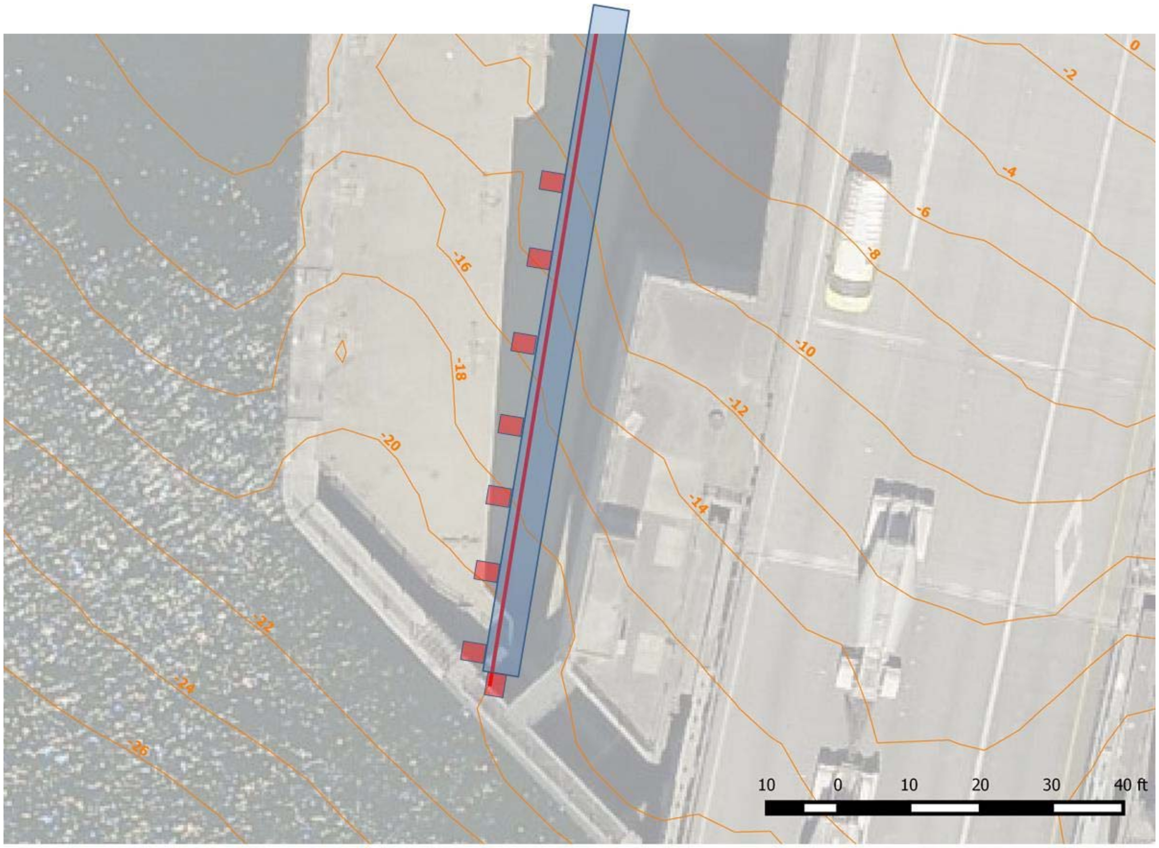

Figure 3. Conceptual diffuser with 8 ports.

Initial Dilution Simulation Results

The Visual Plumes (Version 1.0) modeling package (Frick et al., 2001) and the UM3 model was used for the dilution analysis. UM3 was run to estimate dilutions at the acute and chronic compliance distances. When the distance to the estimated chronic compliance zone exceeded the distance to the edge of the nearfield mixing region, the Brooks' intermediate-field model was run, with default parameters, to calculate additional transport and mixing due to ambient receiving water processes. The model documentation recommends the UM3 algorithm for discharges of a buoyant fluid into stratified or non-stratified marine waters.

Dilutions were simulated in two configurations, a single port representing a diffuser end port, and a diffuser with multiple diffuser ports discharging to one side. The tidal nature of the LDW implies that the discharge may be pointing up current or down current, depending on the tidal stage.

The diffuser will be located with ports at varying depths. The UM3 model, similar to other dilution models, simulates all diffuser ports at a constant depth. The initial simulation assumed an end port at a depth of -18 ft MLLW, and a shallower multiport diffuser at a depth of -14 ft MLLW.

Table 2. Predicted minimum dilution for varying number of diffuser ports at 70 mgd maximum flow

Number of Ports	Effective Port Diameter (m)	Port Spacing (ft)	Discharge Velocity (m/s)	Vertical Angle (degrees)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)
5	0.44 m (30" valve)	end port	4 m/s	0	7.3	14.2
		11	4 m/s	0	7.3	10.6
8	0.35 m (24" valve)	end port	4 m/s	0	9.0	16.9
		11	4 m/s	0	9.0	11.8
10	0.31 m (20" valve)	end port	4 m/s	0	10.0	18.5
		8	4 m/s	0	8.9	11.5
15	0.255 m (16" valve)	end port	4 m/s	0	12.1	20.8
		5	4 m/s	0	5.6	8.9
Ambient Current Speeds: 10% = 2 cm/s, 50% = 10 cm/s, 90% = 27 cm/s						

The 5- and 8- port diffusers have identical acute dilution factors predicted for the end (single)-port discharge as the multi-port diffuser, as plumes from adjacent discharge ports do not merge together before reaching the acute mixing zone. The 8-port configuration results in the greatest acute dilution factors for the multi-port diffuser section, and equivalent dilution for the end port. The closer port spacing for the 10 and 15 port diffusers results in reduced acute dilution factors compared to the 8-port diffuser, but the smaller end ports for the 10 and 15 port diffusers shows higher dilutions. The predicted minimum dilution factors for the 8 and 10 port diffusers are nearly equivalent: 9 vs. 8.9 for the $10^{th}/90^{th}$ percentile ambient currents and 11.8 vs. 11.5 for the 50^{th} percentile ambient current speeds.

Sensitivity Analysis

The sensitivity of the peak dilution rates to several of the model input parameters are examined for the multiport diffuser configuration. To simplify the analysis, dilutions are only calculated for the diffuser configuration with 8 ports. The sensitivity to the following parameters was explored:

- discharge velocity
- horizontal angle
- vertical angle
- ambient current speeds
- ambient stratification
- port depth
- port spacing

A smaller port diameter increases the discharge velocity and momentum. For the same discharge flow rate, dilution is expected to increase with a smaller port diameter (see equation 1). Varying the port diameter so the discharge velocity varied by +/- 10% confirmed this expectation (Table 3). Higher discharge velocities require additional hydraulic energy, and the increased dilution must be balanced against the increased energy required.

Table 3. Predicted minimum dilution for varying discharge port velocities or effective diameters at 70 mgd maximum flow

Diffuser	Effective Port Diameter (m)	Discharge Velocity (m/s)	Vertical Angle (degrees)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)
8 ports @ 11 ft	0.367	3.6 m/s (11.8 ft/s)	0	8.7	11.1
8 ports @ 11 ft	0.350	4.0 m/s (13.1 ft/s)	0	9.0	11.8
8 ports @ 11 ft	0.332	4.4 m/s (14.4 ft/s)	0	9.4	12.6

Ambient Current Speeds: 10% = 2 cm/s, 50% = 10 cm/s, 90% = 27 cm/s

Ambient current velocities are assumed to be aligned with the LDW channel orientation. The bridge structure and bend in the channel upstream of the SR 509/SR 99 bridge could create an average current direction that varies from the channel alignment. The assumed current direction was varied by +/- 15° in the sensitivity modeling of currents (see Figure 4). Orientation of the diffuser closer to perpendicular to the ambient current direction slightly increased the minimum predicted dilution.

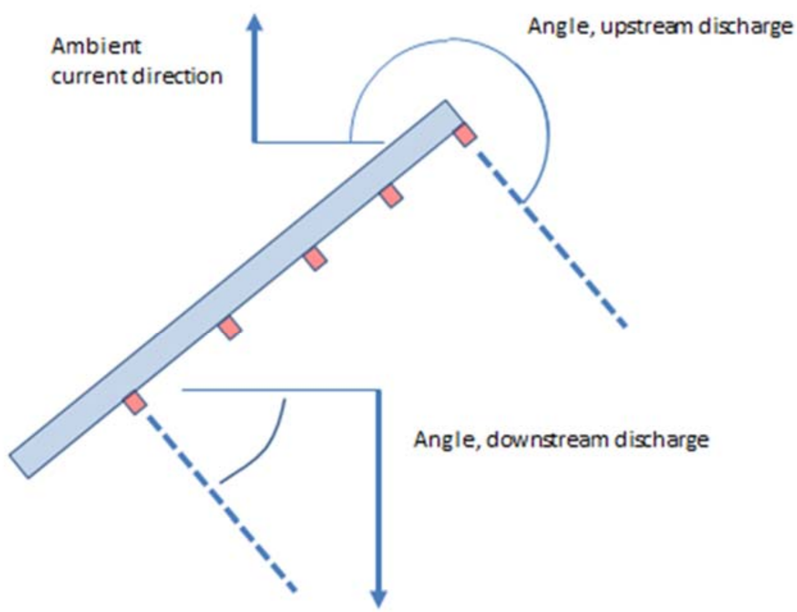

Figure 4. Definition of current direction relative to diffuser orientation

Table 4. Predicted minimum dilution for horizontal discharge angles at 70 mgd maximum flow

Diffuser	Angle to ambient flow	Discharge Velocity (m/s)	Vertical Angle (degrees)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)
8 ports, 0.35 m @ 11 ft	35 (ebb)	4.0 m/s (13.1 ft/s)	0	9.1	14.1
8 ports, 0.35 m @ 11 ft	50 (ebb)	4.0 m/s (13.1 ft/s)	0	9.0	14.3
8 ports, 0.35 m @ 11 ft	65 (ebb)	4.0 m/s (13.1 ft/s)	0	8.9	14.2
8 ports, 0.35 m @ 11 ft	215 (flood)	4.0 m/s (13.1 ft/s)	0	9.1	12.2
8 ports, 0.35 m @ 11 ft	230 (flood)	4.0 m/s (13.1 ft/s)	0	9.0	11.8
8 ports, 0.35 m @ 11 ft	245 (flood)	4.0 m/s (13.1 ft/s)	0	8.8	11.4
Ambient Current Speeds: 10% = 2 cm/s, 50% = 10 cm/s, 90% = 27 cm/s					

Diffuser ports can be orientated in an upward direction, which can enhance mixing under certain stratification conditions and reduce the risk of bottom scour. Table 5 shows that the horizontal discharge results in the greatest dilution. The assumed vertical elevation of the discharge ports is 2 feet above the sediment (ports located on diffuser spring-line) results in minimal interaction of the discharge plume with the sediment bed since the bathymetric slope is approximately 10% at the diffuser site (Figure 5). The UM3 model predicts the discharge plume expands to 6 feet in diameter approximately 10 feet from the port. With a horizontal plume trajectory, and a bathymetric drop of 1 foot, the edge of the discharge plume would touch the sediment bed at a distance of 10 feet and a plume diameter of 6 ft, roughly a 50 fold increase in area from the discharge port. At this distance the average plume velocity has slowed to about 0.5 m/s and the velocity at the edge of the plume is expected to be significantly less than the peak ambient current speeds. In addition, the buoyant plume will tend to rise slightly, further reducing the near bottom velocity. Thus it appears a horizontal discharge from ports located 2 feet above the mudline would not be expected to result in any bottom scour.

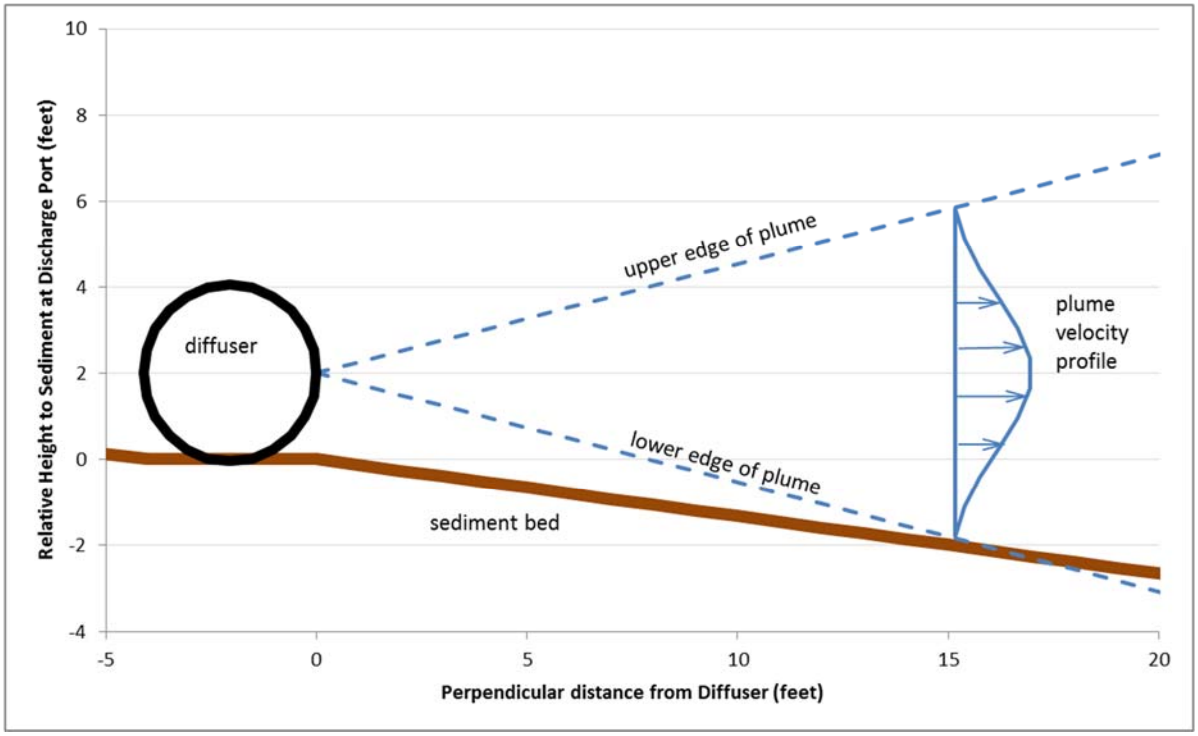

Figure 5. Schematic illustrating discharge plume spread relative to sediment bottom

Table 5. Predicted minimum dilution for varying vertical discharge angles at 70 mgd maximum flow

Number of Ports	Discharge Velocity (m/s)	Vertical Angle (degrees)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)
8 ports, 0.35 m @ 11 ft	4 m/s	0	9.0	11.8
8 ports, 0.35 m @ 11 ft	4 m/s	7.5	7.6	10.9
8 ports, 0.35 m @ 11 ft	4 m/s	15	5.9	10.3
8 ports, 0.35 m @ 11 ft	4 m/s	30	3.0	8.7
Ambient Current Speeds: 10% = 2 cm/s, 50% = 10 cm/s, 90% = 27 cm/s				

Current velocities were obtained from a current deployment in the LDW near the Brandon Street CSO, about 1 mile downstream of the outfall location. The diffuser depth is below the density stratification, which results in the ambient currents being primarily tidally driven. During periods of high flows from the Green River are carried in the brackish layer above the density stratification and appear to have minimal influence on bottom current speeds. Current speeds were varied by +/- 20% to examine sensitivity to the site specific currents. An increased 10th percentile current speed improves dilution, while increasing the 90th percentile current speed reduces dilution.

Table 6. Predicted minimum dilution for varying ambient current speeds at 70 mgd maximum flow

Diffuser	Ambient Current Speed (m/s)	Discharge Velocity (m/s)	Vertical Angle (degrees)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)
8 ports, 0.35 m @ 11 ft	0.01	4.0 m/s (13.1 ft/s)	0	8.7	
8 ports, 0.35 m @ 11 ft	0.02	4.0 m/s (13.1 ft/s)	0	9.0	
8 ports, 0.35 m @ 11 ft	0.03	4.0 m/s (13.1 ft/s)	0	9.2	
8 ports, 0.35 m @ 11 ft	0.21	4.0 m/s (13.1 ft/s)	0	9.6	
8 ports, 0.35 m @ 11 ft	0.27	4.0 m/s (13.1 ft/s)	0	9.1	
8 ports, 0.35 m @ 11 ft	0.33	4.0 m/s (13.1 ft/s)	0	8.7	
8 ports, 0.35 m @ 11 ft	0.08	4.0 m/s (13.1 ft/s)	0		12.0
8 ports, 0.35 m @ 11 ft	0.10	4.0 m/s (13.1 ft/s)	0		11.8
8 ports, 0.35 m @ 11 ft	0.12	4.0 m/s (13.1 ft/s)	0		11.6

To examine the influence of density stratification, the dilution simulations were run using the density profiles obtained upstream of the outfall location at the 16th Avenue Bridge (LTUM03). These density profiles result in very similar dilution factors as those calculated with profiles from LTKE03, downstream of the outfall. This supports using the profiles from LTKE03 as an appropriate representation of the stratification at the outfall location.

Table 7. Predicted minimum dilution for stratification from 16th Avenue Bridge (LTUM03) at 70 mgd maximum flow

			LTUM03 Density Profiles		LTKE03 Density Profiles (see Table 2)	
Number of Ports	Effective Port Diameter (m)	Port Spacing (ft)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)
5	0.44 m (30" valve)	end port	7.3	14.6	7.3	14.2
		11	7.3	10.0	7.3	10.6
8	0.35 m (24" valve)	end port	9.0	16.7	9.0	16.9
		11	9.0	11.6	9.0	11.8
10	0.31 m (20" valve)	end port	10.0	18.2	10.0	18.5
		8	8.9	11.3	8.9	11.5
15	0.255 m (16" valve)	end port	12.1	20.5	12.1	20.8
		5	8.5	10.9	5.6	8.9
All diffuser configurations discharge horizontally at 4 m/s. Ambient Current Speeds: 10% = 2 cm/s, 50% = 10 cm/s, 90% = 27 cm/s						

The actual port discharge depth will vary based on tidal elevation, as well as the exact diffuser placement. Deeper depths are expected to increase dilution, with more plume rise before being trapped by the ambient stratification. The discharge depth was varied by +/- 2 feet to look at the sensitivity to the depth. As anticipated, the results in Table 8 show increasing dilution with deeper discharge depths.

Table 8. Predicted minimum dilution for varying discharge port depths at 70 mgd maximum flow

Diffuser	Discharge Depth (ft)	Discharge Velocity (m/s)	Vertical Angle (degrees)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)
8 ports, 0.35 m @ 11 ft	12	4.0 m/s (13.1 ft/s)	0	8.7	11.1
8 ports, 0.35 m @ 11 ft	14	4.0 m/s (13.1 ft/s)	0	9.0	11.8
8 ports, 0.35 m @ 11 ft	16	4.0 m/s (13.1 ft/s)	0	9.0	12.1
Ambient Current Speeds: 10% = 2 cm/s, 50% = 10 cm/s, 90% = 27 cm/s					

The results in Table 9 illustrate the variation in dilution as the diffuser port spacing varies. Port spacings narrower than 11 ft result in a reduction in both the acute and chronic dilution values. Increasing the port spacing beyond 11 ft increases the chronic dilution, but does not alter the acute dilution as the discharges from adjacent ports have not merged by the acute mixing zone.

Table 9. Predicted minimum dilution for varying discharge port spacings at 70 mgd maximum flow

Diffuser	Port Spacing (ft)	Discharge Velocity (m/s)	Vertical Angle (degrees)	Peak Dilution (10% or 90% current speed)	Peak Dilution (50% current speed)
8 ports, 0.35 m @ 11 ft	9	4.0 m/s (13.1 ft/s)	0	8.4	10.9
8 ports, 0.35 m @ 11 ft	10	4.0 m/s (13.1 ft/s)	0	8.9	11.3
8 ports, 0.35 m @ 11 ft	11	4.0 m/s (13.1 ft/s)	0	9.0	11.8
8 ports, 0.35 m @ 11 ft	12	4.0 m/s (13.1 ft/s)	0	9.0	12.2

Ambient Current Speeds: 10% = 2 cm/s, 50% = 10 cm/s, 90% = 27 cm/s

As mentioned previously, the diffuser is expected to have elastomeric valves on each port. Representative relationships between flow rate and port area or discharge velocity were used to examine the influence of selecting different combinations of valve sizes and number of discharge ports. As anticipated, configurations with smaller effective diameters result in the highest dilution factors, although these also require more hydraulic head (Table 10). Decreasing the discharge port area results in a higher discharge velocity as well as an increased effective diameter of the elastomeric valves. This is illustrated in the differences between the 7 and 8 port configuration in Table 10.

Table 10. Predicted minimum dilution for varying elastomeric valves at 70 mgd maximum flow

Diffuser	Effective Port Diameter (m)	Discharge Velocity (m/s)	Vertical Angle (degrees)	Peak Dilution (10% or 90% current speed)	Peak Dilution (50% current speed)
7 ports @ 11 ft	0.362 (24" valve)	4.3 m/s (14.0 ft/s)	0	8.7	11.7
8 ports @ 11 ft	0.35 (24" valve)	4.0 m/s (13.1 ft/s)	0	9.0	11.8
8 ports @ 11 ft	0.324 (20" valve)	4.6 m/s (15.3 ft/s)	0	9.6	13.0
Ambient Current Speeds: 10% = 2 cm/s, 50% = 10 cm/s, 90% = 27 cm/s					

The discharge momentum has a significant influence on dilution, as expected for momentum driven mixing. Both acute and chronic dilution factors are increased by increasing discharge velocities. However, this has to be balanced against the hydraulic head available to drive the discharge. A discharge velocity of 4 m/s results in an exit loss of 2.7 ft, which is similar to estimates used for determining the effluent hydraulic profile. If additional hydraulic head was available, it could be used to increase the diffuser's dilution.

Proposed Diffuser

To optimize the dilution performance of a diffuser located along the north fender of the SR 509/SR 99 bridge, the model simulations indicate that it is advantageous to have 7 to 10 diffuser ports. Within this range of diffuser ports, dilution is expected to vary by less than 10 percent. Dilution is increased with smaller diffuser ports, but decreasing the port spacing counters this increase. The dilution results show that decreasing the port size with similar port spacing improves dilution, although this requires a greater hydraulic head. A horizontal discharge created greater dilutions than diffuser ports angled upwards.

Reducing the port diameter to utilize 8 20-inch elastomeric valves increases the minimum dilution and also allows more flexibility on the placement of diffuser ports at the end of the diffuser structure. The edge of a round momentum jet expands at an angle of approximately 14° from the centerline. Thus the discharge of adjacent ports separated by a 30° angle should not interact. As a result, the proposed diffuser configuration attempts to optimize the enhanced dilution with depth by clustering 4 ports at the terminus, each separated by a 30° angle. The remaining 4 diffuser ports are spaced along the length of the diffuser on an 11 ft spacing (Figure 6). The resulting dilution factors are summarized in Table 11.

Table 11. Predicted Dilution for Proposed Diffuser Configuration at 70 mgd maximum flow

Number of Ports	Effective Port Diameter (m)	Port Depth (ft)	Discharge Velocity (m/s)	Horizontal Angle relative to perpendicular discharge (degrees)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)
end port	0.326 m (20” valve)	- 18 ft MLLW	4.6 m/s (15.3 ft/s)	-40	9.6	22.1
end port	0.326 m (20” valve)	- 18 ft MLLW	4.6 m/s (15.3 ft/s)	-10	9.7	24.7
end port	0.326 m (20” valve)	- 18 ft MLLW	4.6 m/s (15.3 ft/s)	20	9.7	23.8
5 ports @ 11 ft spacing	0.326 m (20” valve)	- 14 ft MLLW	4.6 m/s (15.3 ft/s)	50	9.6	13.0
Ambient Current Speeds: 10% = 2 cm/s, 50% = 10 cm/s, 90% = 27 cm/s						

As discussed in the Effluent Parameters section, the dilution factor calculated under the maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow. Combining the minimum peak dilution values with predicted event discharge volumes results in:

- Acute dilution = 70/70*(Peak Q Dilution = 9.6) = 9.6
- Chronic dilution (equivalent 24-hour flow) = 70/38 * (Peak Q Dilution = 13.0) = 23.9
- Chronic dilution (equivalent 4-day flow) = 70/16 * (Peak Q Dilution = 13.0) = 56.9

The deeper port discharges create a significantly higher dilution under the 50th percentile current speeds. The chronic dilutions estimated above conservatively used the lower dilution predicted for the shallow end of the diffuser. The overall flux-averaged dilution would be higher than this estimate for chronic dilution.

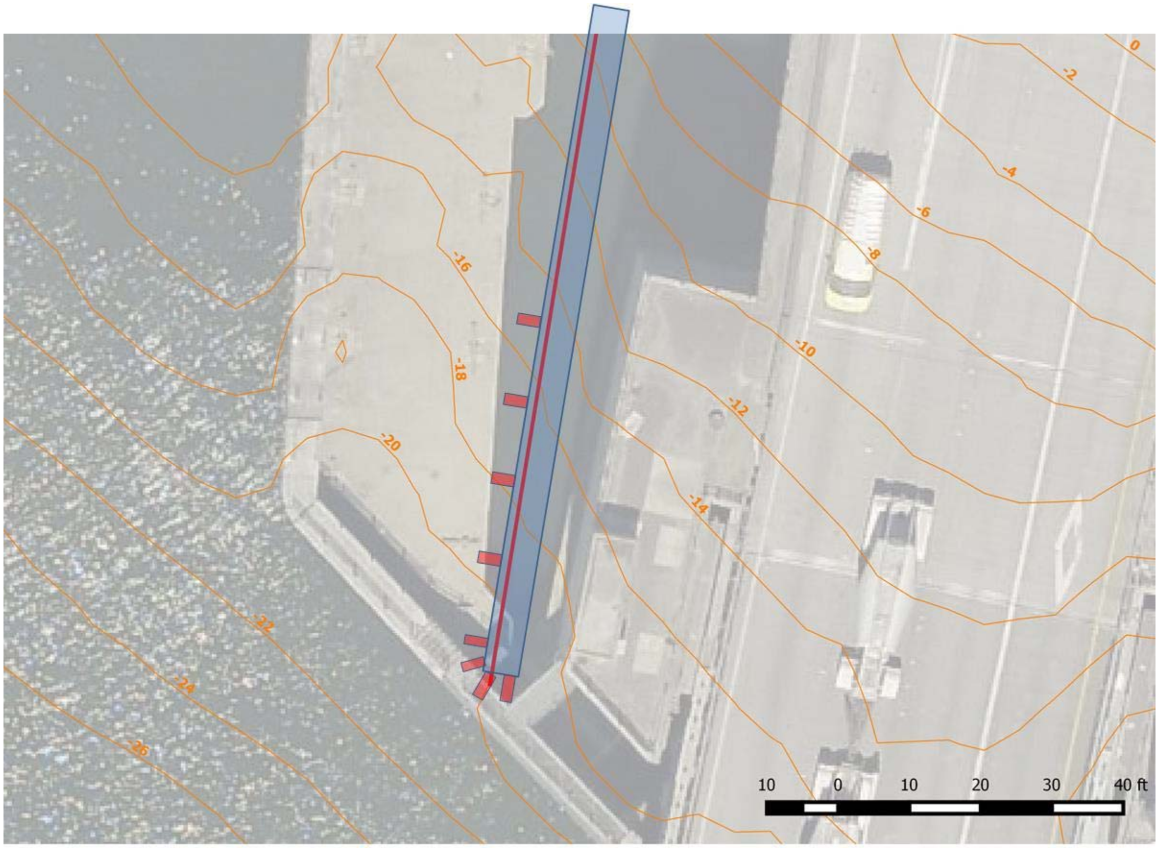

Figure 6. Proposed Diffuser configuration with end ports aligned at 0, 30, 60, and 90 degrees from the diffuser axis.

Updated Diffuser Analysis

The dilution factors for the Proposed Diffuser in the previous section are updated here to reflect additional information and further design refinements.

An Acoustic Doppler Current Profiler (ADCP) was deployed at the approximate terminus of the diffuser from February 9, 2016 to March 16, 2016. From this current record, the near-bottom 10th and 90th percentile current speeds at the approximate termination of the diffuser were 4 cm/s and 29 cm/s. The 50th percentile current speed was 14 cm/s near-bottom (1 m above bottom) and 15 cm/s at mid-depth. The dilution modeling projects the plume centerline will typically rise 2 to 3 feet above the discharge depth before reaching the acute mixing zone. The near bottom current speeds correspond to an elevation of about 1 m (3 ft) above the bottom are appropriate for the acute dilution analysis. The mid-depth 50^{th} percentile current speed is applied for the chronic analysis, where the plume is typically trapped below the pycnocline. The effect of the increased current speeds on predicted dilution is mixed. The increased 10^{th} percentile current speed (4 cm/s vs. 2 cm/s) increases the predicted minimum acute dilution slightly. The increased 50^{th} percentile current speed (15 cm/s vs 10 cm/s) reduces the chronic dilution slightly.

Port discharge elevations were updated based on the 30 percent design drawings, and are summarized in Table 12. The port elevations are substantially the same as the proposed diffuser; the inshore ports were able to be positioned slightly deeper than originally proposed. The additional depth increases the predicted dilution slightly. The revised dilution factors are summarized in Table 13.

The tidal range is significant relative to the depth of the diffuser, with mean sea level (MSL) being 6.6 ft above mean lower low water (MLLW). The chronic dilution factor is used to evaluate a 24 hour or 4 day exposure time, longer than a tidal cycle. The chronic dilution factor calculated with an average diffuser depth from MSL would be more representative of the expected dilution than a calculation based on the shallower depth to MLLW. The chronic dilution factor is calculated based on an average diffuser elevation of 78.0 ft METRO (see Table 12) at MSL, or a depth of 22.7 ft.

Table 12. Diffuser Port Depths at 30% Design

Diffuser Port	Station	Port Centerline Elevation (ft METRO)	Depth (ft, MLLW)	Depth (ft, MSL)
1	10+00	76.3	17.8	24.4
2	10+00	76.3	17.8	24.4
3	10+01	76.4	17.7	24.3
4	10+04	76.7	17.4	24.0
5	10+15	77.9	16.2	22.8
6	10+26	79.0	15.1	21.7
7	10+37	80.1	14.0	20.6
8	10+48	81.1	13.0	19.6
Average		78.0	16.1	22.7

Table 13. Predicted Dilution for Updated Diffuser Configuration at 70 mgd maximum flow

Number of Ports	Effective Port Diameter (m)	Port Depth (ft)	Discharge Velocity (m/s)	Horizontal Angle relative to perpendicular discharge (degrees)	maxQ Dilution (10% or 90% current speed)	maxQ Dilution (50% current speed)
end port	0.326 m (20" valve)	- 17.8 ft MLLW	4.6 m/s (15.3 ft/s)	-40	10.2	19.2
end port	0.326 m (20" valve)	- 17.8 ft MLLW	4.6 m/s (15.3 ft/s)	-10	10.4	23.4
end port	0.326 m (20" valve)	- 17.7 ft MLLW	4.6 m/s (15.3 ft/s)	20	10.4	21.8
5 ports @ 11 ft spacing	0.326 m (20" valve)	- 15.1 ft MLLW	4.6 m/s (15.3 ft/s)	50	10.0	12.7
8 ports @ 11 ft spacing	0.326 m (20" valve)	- 22.7 ft MSL	4.6 m/s (15.3 ft/s)	50	-	14.3
Ambient Current Speeds: 10% = 4 cm/s, 50% = 15 cm/s, 90% = 29 cm/s						

As discussed in the Effluent Parameters section, the dilution factor calculated under the maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow. To determine the acute and chronic flow rates, a 38-year simulation of GWWTS operation was analyzed. The equivalent 24-hour and 4-day flow rates were calculated from the simulated discharge flows and interpolated to a 20-year recurrence interval. This estimated an equivalent 24-hour flow of 48.9 mgd and an equivalent 4-day flow of 13.5 mgd. Combining the minimum peak dilution values with the equivalent flow rates results in:

- **Acute dilution = 70/70*(Peak Q Dilution = 10.0) = 10.0**
- **Chronic dilution (equivalent 24-hour flow) = 70/48.9 * (Peak Q Dilution = 14.3) = 20.5**

- **Chronic dilution (equivalent 4-day flow) = 70/13.5 * (Peak Q Dilution = 14.3) = 74.1**

The deeper port discharges create a significantly higher dilution under the 50th percentile current speeds. The chronic dilutions estimated above conservatively used the lower dilution predicted for the shallow end of the diffuser. The overall flux-averaged dilution would be higher than this estimate for chronic dilution.

Farfield Accumulation (Reflux)

No reduction in dilution is anticipated due to farfield accumulation. Ecology's guidance notes that in some situations tidal currents may cause effluent to accumulate in the receiving water surrounding an outfall in a tidal river or estuary. The receiving water may also contain background concentrations of pollutants from sources other than effluent.

Farfield accumulation at the GWWTS outfall is not expected for two reasons. The buoyant discharge into the salt-wedge estuary will create a vertical separation between the momentum driven mixing near the discharge and the shallower trapped wastefield. This prevents the discharged effluent from returning to the initial mixing region at the diffuser port depth. The outfall will discharge into the lower marine layer with significant horizontal momentum. The dilution simulations predict the acute dilution is achieved with typically 2 to 3 feet of vertical plume rise. The plume rises further into the water column before reaching a trapping depth, creating a vertical separation between the initial mixing region and previously discharged effluent. The effluent is not expected to be mixed down into the lower layer, which has been demonstrated with a dye study. Santos and Stoner (Santos & Stoner 1972) reference a 1966 dye study in the LDW in which dye was not detected in the bottom samples; this fact suggests that no mixing took place between the surface and bottom waters during this study. Thus effluent would not be able to accumulate in the vertical region where the majority of the dilution occurs.

The second factor making farfield accumulation unlikely is the relatively short duration of the discharges relative to a tidal cycle. Most discharge events are predicted to be less than 6 hours in duration, shorter than a tidal cycle. While multiple events may occur over several days, the travel time from the outfall to Elliott Bay was estimated at 3.5 days under low flow (300 cfs) conditions (Haushild & Stoner 1973). Under average flow conditions (1,200 cfs), this would be about one day.

The relatively short discharge durations, short travel time to Elliott Bay, vertical separation between the mixing region and the trapped plume, combined with a dye study that showed no downward mixing, suggest that the ambient condition the plume mixes with will not increase as a result of the GWWTS discharges. As a result, no reduction the in the estimated dilution factors is made for farfield accumulation (reflux). Background concentrations from other sources have been directly incorporated into the Reasonable Potential Analysis through the use of measured ambient concentrations.

Reasonable Potential Evaluation

Analysis of samples characterizing CSO effluent, combined with an assumed 85% solids removal rate in the treatment process indicate that an acute dilution of 5.4 for copper and a chronic dilution of 16.9 for ammonia would be required to demonstrate no reasonable potential to exceed water quality standards (King County 2015b). The expected minimum dilution values listed above should exceed these requirements by more than 60%. However, it is anticipated that King County will be required to characterize the effluent quality during each NPDES permit cycle to demonstrate that no reasonable potential exists to exceed water quality standards.

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Potential Density Profiles

Spokane Street Potential Density Profiles (LTKE03)

	Depth (m)			
Date	0	2	4	6
07-Feb-2006	1.515	11.179	21.012	22.066
01-Mar-2006	7.032	10.603	21.370	21.946
01-Mar-2006	5.767	10.126	19.380	21.422
27-Mar-2006	14.634	17.803	21.880	22.280
24-Apr-2006	8.187	13.101	20.694	22.116
30-May-2006	4.634	5.873	18.166	21.671
26-Jun-2006	18.802	19.639	20.474	21.346
24-Jul-2006	17.018	17.559	19.100	20.390
25-Sep-2006	16.038	19.855	21.406	21.897
23-Oct-2006	15.258	20.051	22.611	22.870
29-Nov-2006	6.870	16.627	21.966	22.340
16-Jan-2007	8.173	14.270	19.686	21.125
22-Feb-2007	2.972	5.358	18.404	21.751
19-Mar-2007	7.975	8.915	19.621	21.955
19-Mar-2007	0.083	0.781	16.512	23.923
16-Apr-2007	7.007	10.896	20.156	21.799
21-May-2007	5.848	15.002	21.025	21.766
18-Jun-2007	9.080	16.814	21.158	21.823
16-Jul-2007	16.276	19.411	20.845	21.844
20-Aug-2007	15.198	19.150	21.322	22.111
17-Sep-2007	16.998	20.254	21.483	22.280
15-Oct-2007	11.194	20.046	22.260	22.688
26-Nov-2007	13.747	19.105	22.021	22.609
17-Dec-2007	4.852	20.149	22.478	22.711
28-Jan-2008	4.522	18.977	22.453	22.768
25-Feb-2008	2.075	17.190	21.918	22.538
19-Mar-2008	5.929	16.620	22.132	22.681
21-Apr-2008	5.536	9.555	20.917	22.570
19-May-2008	2.101	2.200	20.990	22.490
16-Jun-2008	2.705	8.980	21.176	22.119
21-Jul-2008	8.193	15.878	19.547	20.780
19-Aug-2008	14.215	17.704	21.198	21.756
15-Sep-2008	14.509	18.067	22.075	22.318
20-Oct-2008	15.117	17.826	20.830	22.106
17-Nov-2008	3.298	3.329	15.978	21.685
15-Dec-2008	11.067	11.417	20.798	22.541
17-Feb-2009	8.808	10.983	22.292	22.755
16-Mar-2009	8.971	9.772	19.459	21.812

	Depth (m)			
Date	0	2	4	6
20-Apr-2009	5.297	5.760	8.158	22.505
18-May-2009	2.779	6.486	15.798	22.213
15-Jun-2009	2.290	12.902	20.774	21.596
20-Jul-2009	16.705	18.550	19.743	20.402
17-Aug-2009	17.440	18.670	21.262	22.439
21-Sep-2009	17.205	18.181	19.807	22.486
19-Oct-2009	10.352	16.640	19.972	22.547
17-Nov-2009	15.135	15.575	21.458	22.539
15-Dec-2009	11.985	15.706	22.115	22.651
19-Jan-2010	2.626	5.801	14.350	22.358
23-Feb-2010	6.627	9.054	20.271	22.594
17-Mar-2010	10.001	10.249	21.734	22.506
19-Apr-2010	8.836	9.627	17.676	21.902
18-May-2010	6.281	6.490	9.880	18.528
21-Jun-2010	7.123	7.902	17.670	20.876
20-Jul-2010	13.792	14.944	20.153	21.888
17-Aug-2010	15.276	17.540	21.334	21.921
21-Sep-2010	8.545	9.821	19.954	22.085
18-Oct-2010	5.770	12.404	20.538	22.565
15-Nov-2010	8.481	9.496	19.565	22.725
20-Dec-2010	5.409	5.818	18.642	22.631
18-Jan-2011	2.193	2.939	5.549	21.384
22-Feb-2011	7.733	8.959	13.446	21.011
21-Mar-2011	6.558	6.560	8.269	20.290
18-Apr-2011	6.542	7.087	17.847	21.611
16-May-2011	3.776	3.792	6.878	21.338
20-Jun-2011	4.252	4.543	8.474	21.297
18-Jul-2011	6.230	7.854	14.699	20.902
15-Aug-2011	13.338	14.291	17.341	21.069
19-Sep-2011	19.347	19.441	21.142	22.030
17-Oct-2011	16.849	16.889	19.762	22.165
28-Nov-2011	1.449	13.456	17.396	19.788
19-Dec-2011	10.630	13.593	22.212	22.702
23-Jan-2012	8.130	10.130	20.152	22.575
21-Feb-2012	6.960	7.038	18.405	22.457
19-Mar-2012	8.522	8.889	16.125	22.200
16-Apr-2012	5.766	6.625	21.101	22.310
21-May-2012	4.739	7.105	13.622	21.339
18-Jun-2012	5.430	6.199	20.830	21.379
16-Jul-2012	8.888	9.733	19.968	21.319
20-Aug-2012	14.682	17.278	20.226	21.418

	Depth (m)			
Date	0	2	4	6
17-Sep-2012	12.760	16.399	20.499	21.730
17-Oct-2012	15.677	16.424	19.737	21.479
26-Nov-2012	3.625	5.996	21.765	22.532
18-Dec-2012	9.904	11.424	21.218	22.132
23-Jan-2013	15.740	16.320	19.827	22.204
19-Feb-2013	7.055	7.768	21.129	22.338
18-Mar-2013	4.155	4.831	7.073	21.969
16-Apr-2013	3.883	5.497	11.138	22.127
20-May-2013	10.110	12.737	16.806	19.348
18-Jun-2013	5.248	10.622	19.092	21.633
15-Jul-2013	13.957	16.409	20.654	21.595
26-Aug-2013	18.453	18.871	21.515	22.213
16-Sep-2013	16.954	17.801	21.191	22.215
21-Oct-2013	13.743	14.975	20.678	21.479
18-Nov-2013	15.840	16.186	19.631	22.707
16-Dec-2013	17.716	17.726	21.251	22.927
21-Jan-2014	7.573	8.061	20.004	22.740
19-Mar-2014	4.797	5.366	6.887	17.424
22-Apr-2014	4.576	7.905	17.827	21.431
19-May-2014	5.461	7.353	19.749	21.471
16-Jun-2014	9.362	9.813	16.306	20.494
21-Jul-2014	9.994	16.385	20.675	21.845
22-Sep-2014	12.191	13.098	21.097	22.291
20-Oct-2014	15.111	15.481	21.265	22.403
17-Nov-2014	5.599	14.963	20.147	21.828
15-Dec-2014	6.010	6.832	17.157	22.016
20-Jan-2015	3.925	4.483	14.854	21.664
17-Feb-2015	5.472	6.707	16.315	20.109
16-Mar-2015	5.198	13.169	20.350	21.503
20-Apr-2015	10.041	11.491	16.400	21.297
18-May-2015	12.467	13.715	20.113	22.097
15-Jun-2015	14.953	15.715	20.848	22.031
21-Jul-2015	15.874	17.165	20.617	21.269

PLUMES Output

```
/ UM3.
Case 759; ambient file P:\plumes\vplumes\Georgetown\georgetown5.001.db; Diffuser table record 7:
---------------------------------

Ambient Table:
     Depth   Amb-cur   Amb-dir   Amb-sal   Amb-tem   Amb-pol     Decay   Far-spd   Far-dir
Disprsn   Density
         m       m/s       deg       psu         C     kg/kg       s-1       m/s       deg
m0.67/s2   sigma-T
       0.0      0.04      90.0     5.182       8.6       0.0       0.0      0.04      90.0
0.0003     3.942
       1.0      0.04      90.0      6.21     8.563       0.0       0.0      0.04      90.0
0.0003      4.75
       2.0      0.04      90.0     7.238     8.525       0.0       0.0      0.04      90.0
0.0003     5.558
       3.0      0.04      90.0     9.561     8.529       0.0       0.0      0.04      90.0
0.0003     7.373
       4.0      0.04      90.0     14.48     8.618       0.0       0.0      0.04      90.0
0.0003      11.2
       5.0      0.04      90.0     27.18     8.671       0.0       0.0      0.04      90.0
0.0003     21.09
       6.0      0.04      90.0     28.56     8.658       0.0       0.0      0.04      90.0
0.0003     22.16

Diffuser table:
   P-dia  P-elev V-angle H-angle   Ports Spacing SttTime EndTime Incrmnt AcuteMZ ChrncMZ P-depth
Ttl-flo Eff-sal    Temp Polutnt
     (m)    (ft)   (deg)   (deg)      ()    (ft)    (hr)    (hr)    (hr)    (ft)    (ft)    (ft)
(MGD)   (psu)     (C) (kg/kg)
   0.324     6.0     0.0    50.0     8.0    11.0     3.0   336.0     3.0    21.4   214.0    15.1
70.0     0.0    12.0   100.0

Simulation:
Froude number:      19.66; effluent density (sigma-T) -0.43777851; effluent velocity
4.65(m/s);
        Depth  Amb-cur    P-dia  Polutnt  P-speed   Dilutn   x-posn   y-posn
Step     (ft)    (m/s)      (m)  (kg/kg)    (m/s)       ()     (ft)     (ft)
   0      15.1     0.04    0.324    100.0     4.65      1.0      0.0      0.0;
 100     14.37     0.04    2.255     13.8    0.673     7.14    9.459    11.66;
 108     14.05     0.04     2.63    11.78    0.579    8.365    11.17    13.86; trap level;
 111     13.92     0.04    2.787     11.1    0.547    8.877    11.87    14.77; stream limit
reached;
 117     13.67     0.04    3.131    9.858    0.488    9.998    13.38    16.74; acute zone;
 121     13.54     0.04    3.384    9.107    0.453    10.82    14.47    18.18; merging;
 127     13.49     0.04    3.705     8.47    0.423    11.64    15.96    20.17; local maximum rise
or fall;
 141     14.02     0.04     4.41    7.412    0.377     13.3     19.7    25.21; bottom hit;
 143     14.33     0.04    4.635    7.124    0.364    13.84    21.02    27.01; trap level;
 155     14.65     0.04    5.359    6.648    0.339    14.83    23.58    30.53; local maximum rise
or fall;
Const Eddy Diffusivity.  Farfield dispersion based on wastefield width of      23.34 m
    conc  dilutn   width distnce    time
 (kg/kg)             (m)     (m)    (hrs) (kg/kg)   (s-1)   (m/s)(m0.67/s2)
 6.57622   14.99   28.21    32.7   0.145     0.0     0.0    0.04 3.00E-4
 5.91765   16.69   34.48    65.4   0.373     0.0     0.0    0.04 3.00E-4
count: 2

/ UM3.
Case 74; ambient file P:\plumes\vplumes\Georgetown\georgetown5.001.db; Diffuser table record 8: -
---------------------------------

Ambient Table:
     Depth   Amb-cur   Amb-dir   Amb-sal   Amb-tem   Amb-pol     Decay   Far-spd   Far-dir
Disprsn   Density
         m       m/s       deg       psu         C     kg/kg       s-1       m/s       deg
m0.67/s2   sigma-T
```

```
       0.0      0.15      90.0     11.01     7.688       0.0       0.0      0.15      90.0
0.0003     8.582
       1.0      0.15      90.0     11.22     7.449       0.0       0.0      0.15      90.0
0.0003     8.766
       2.0      0.15      90.0     11.43      7.21       0.0       0.0      0.15      90.0
0.0003     8.949
       3.0      0.15      90.0      12.4     7.193       0.0       0.0      0.15      90.0
0.0003     9.712
       4.0      0.15      90.0      20.7     7.475       0.0       0.0      0.15      90.0
0.0003     16.18
       5.0      0.15      90.0     26.95     7.558       0.0       0.0      0.15      90.0
0.0003     21.05
       6.0      0.15      90.0     28.46     7.595       0.0       0.0      0.15      90.0
0.0003     22.23

Diffuser table:
   P-dia  P-elev V-angle H-angle   Ports Spacing SttTime EndTime Incrmnt AcuteMZ ChrncMZ P-depth
Ttl-flo Eff-sal    Temp Polutnt
     (m)    (ft)   (deg)   (deg)      ()    (ft)    (hr)    (hr)    (hr)    (ft)    (ft)    (ft)
(MGD)   (psu)     (C) (kg/kg)
   0.324     6.0     0.0   -50.0     8.0    11.0     3.0   336.0     3.0    21.4   214.0    22.7
70.0     0.0    12.0   100.0

Simulation:
Froude number:      17.32; effluent density (sigma-T) -0.43777851; effluent velocity
4.65(m/s);
        Depth  Amb-cur    P-dia  Polutnt  P-speed   Dilutn   x-posn   y-posn
Step     (ft)    (m/s)      (m)  (kg/kg)    (m/s)       ()     (ft)     (ft)
   0      22.7     0.15    0.324    100.0     4.65      1.0      0.0      0.0;
 100     21.93     0.15    2.465     13.8    0.559    7.106    8.262   -8.597;
 115     21.11     0.15    3.299    10.46    0.413    9.368    10.74   -10.63; merging;
 146     17.78     0.15    4.463    8.176    0.351    11.98    16.12   -14.35; acute zone;
 156     15.22     0.15    5.178    7.344    0.324    13.34    18.98   -16.03; trap level;
 161     13.82     0.15    6.123    6.969    0.287    14.06     20.6   -16.89; begin overlap;
 200     12.75     0.15    7.711    6.857    0.235    14.29    22.58   -17.92;
 207     12.71     0.15     7.83    6.852    0.232     14.3    22.82   -18.04; surface;
Const Eddy Diffusivity.  Farfield dispersion based on wastefield width of      25.81 m
    conc  dilutn   width distnce    time
 (kg/kg)             (m)     (m)    (hrs) (kg/kg)   (s-1)   (m/s)(m0.67/s2)
 6.84689   14.31   27.45    32.7  0.0441     0.0     0.0    0.15 3.00E-4
 6.83842   14.33   29.55    65.4   0.105     0.0     0.0    0.15 3.00E-4
count: 2
```

Attachment 6

Flow and Wasteload Assessments – West Point Treatment Plant and Wet Weather Treatment Stations

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

West Point Treatment Plant
Flow and Wasteload Assessment 2018

The current NPDES permit for the West Point Treatment Plant (Permit No. WA002918-1), went into effect on February 1, 2015. This report addresses monitoring data collected during the current permit cycle in comparison to data collected in the previous permit cycle (2009 to mid-2013). The purpose of this document is to fulfill the West Point assessment requirement listed in Section S4.E – Wasteload Assessment (West Point WWTP). Included in the S4.E assessment requirement are the following:

1) an indication of compliance or non-compliance with the permit effluent limits;
2) a comparison between the existing and design:
    a. monthly average dry weather and wet weather flows,
    b. peak flows,
    c. cBOD, and TSS loadings (WP only),
    d. 5-year average of annual discharge events and annual discharge volume for the Alki and Carkeek wet weather treatment stations;
3) the percentage increase in these parameters since the last report;
4) the present and design population or population equivalent;
5) the projected population growth rate; and
6) the estimated date upon which the Permittee expects the wastewater treatment plant to reach design capacity, according to the most restrictive of the parameters above.

Events affecting the representative flow and loads data for West Point include the major flooding of the plant on February 9, 2017 that occurred as a result of equipment failure. During a heavy rainstorm, while the treatment plant was operating as designed at maximum influent flows of 440 MGD, an instantaneous fault in the electrical systems resulted in a shutdown of the effluent pumps. As operators worked to restart the effluent pumps, failure of level sensors resulted in overflow of the primary sedimentation tanks and flooding of below ground systems. When operators realized flooding was occurring, the influent pumps were manually shut off and the emergency bypass gate was opened to discharge inflow out the marine outfall. An estimated 200 MG of approximately 90 percent stormwater and 10 percent wastewater was discharged to Puget Sound during the 19 hours the plant was offline. In the days after partial wastewater treatment had resumed, heavy rains prompted an additional bypass on February 15 and 16 of about 58 MG over the course of 20 hours. The flooding severely damaged mechanical and electrical systems needed to provide secondary treatment and reduced the plant’s solids handling capabilities. Repair of all critical equipment needed to operate West Point took three months to complete, and the plant resumed full compliance with NPDES permit limits on May 10, 2017. During the restoration, West Point provided reduced treatment that included screening and full disinfection. The effluent did not always meet permit limits for total suspended solids (TSS), carbonaceous biochemical oxygen demand (CBOD), and residual chlorine limits during the period of reduced treatment.

Over the course of the period of restoration activities at West Point, maximum wastewater inflows during storm events had to be managed carefully to prevent additional bypasses. Considerably higher-than-normal rainfall occurred in the service area during the months of February through April, which contributed to elevated stormwater flows in the combined system. To control flows conveyed to West Point, system flows during storm events were diverted to the County’s CSO wet weather treatment stations (Elliott West, Alki, and Carkeek). System flows also were routed to King County’s Brightwater and the City of Edmonds’ treatment plants.

Additionally, untreated discharges from selected King County and SPU CSO outfalls located upstream of the Interbay Pump Station were exacerbated to some extent during the emergency bypass events, as well as periodically during storm events occurring through April when flow shedding occurred.

West Point operations also were affected in October and November 2017 as a result of the failure of the Denny Regulator marine outfall flap gate in October. The flap gate failure allowed seawater to enter the sanitary sewer during high tide conditions and adversely affected West Point solids settling and biological treatment processes resulting in plant effluent exceedances of the weekly maximum effluent limit for TSS in October and November. During this period when system flows were elevated and tides caused seawater intrusion, flow shedding was conducted by modulating Interbay pump station and diverting flows to Elliott West. A stop log was fabricated and installed in November until a replacement marine flap gate could be procured and installed in December 2017.

Table 1 below summarizes West Point's compliance with its permit effluent limits.

Table 1. Summary of Compliance with Permit Effluent Limits

Year	No. of Opportunities	No. of Exceptions	Explanation of Exceptions
2015	1062	0	Permit went into effect, February 1.
2016	1064	0	
2017	1062	Numerous	Plant suffered a catastrophic flood on February 9, 2017.
2018	1062	0	(Through December)

Table 2 below shows flow data for the calendar years 2015 through 2018. Average annual flow has been under the Design value (142 MGD), and the flow data below has been broken down by season. The "dry" season is defined as May - October, and the "wet" season is defined as January - April and November - December. Plant documents list a dry weather design flow of 110 MGD, but no wet weather design flow. Instead, Plant documents list a "wet weather (non-storm)" design flow of 133 MGD, defined as a day during the wet season on which no rain occurred on either that day or the previous day. Flow data below includes all days during the wet season, not just wet season "non-storm" days.

As noted above, the West Point flooding and recovery, Denny Regulator flap gate failure, and associated flow shedding periods affected flow data in 2017 to some degree. The actual effect of flow shedding operations on flows to West Point cannot be accurately assessed since system flows depend on many factors such as background flow in the system, rainfall intensity, and other facility operations. Therefore, it was not possible to estimate the additional quantities of diverted flows to other treatment facilities or exacerbated overflows at CSO outfalls during the period of West Point and Denny Regulator flap gate repairs. While the discrepancy in 2017 inflow volumes may be relatively small compared to flows that would have occurred without shedding, flows measured at West Point in 2017 cannot be considered representative of normal West Point operations.

Table 2. Average, Seasonal, and Peak Flows

Year	Average Annual (Jan - Dec)	Dry Season (May - Oct)	Wet Season (Nov - Apr)[1]	Peak Day [2] (Secondary)	Peak Day [2] (CSO)
2015	92.0	68.6	115.8	289.2	355.9
2016	97.9	74.3	121.7	296.3	342.0
2017	99.2	76.2	122.5	295.4	364.7
2018	91.5	68.6	114.9	270.3	298.0

[1]Wet season months during calendar year (Jan - Apr, Nov - Dec).
[2]Peak Day is the max flow day during the year; not an instantaneous max.

The average annual flows, during this current permit period, did not vary much throughout the period, and were comparable to the flows seen with the last report (summarized below). The flows, during this current period, have ranged from a minimum annual flow of 92.0 MGD in 2015; to a maximum annual flow of 99.2 MGD in 2017. The annual rainfall totals in 2015, 2016, and 2017 were significantly above average, whereas the total rainfall was slightly below average for 2018. The last assessment covered the period, starting with the 2009 year and went through April 2013. The annual flow during the previous permit period ranged from a minimum of 92.0 MGD in 2009 to a maximum of 102.2 in 2012. It should be noted that Brightwater came fully on line in late 2012, removing some population and the associated flows from the West Point service area.

Table 3 has been provided to provide a summary for the influent loading comparison. Special Condition S4.E (2.c) specifies to provide a comparison of existing and design CBOD5 loadings. However, the plant was designed for BOD5 rather than CBOD5; thus, analysis of BOD5 data is provided in Table 3.

The table summarizes influent loading for the calendar years 2015 through 2018. During the 4-year period, the monthly average influent loadings exceeded 85% of the max month design limits for BOD in ten months, and for TSS in eleven months. During this period, the max month BOD loading was 193,019 lb/day (May 2017); the 85% value of max month design is 170,850 lb/day. For TSS, the max month loading was 235,787 lb/day (February 2017); the 85% of max month design is 185,300 lb/day. Both max month design numbers were updated in the current permit. The previous permit had stated the saturation design numbers.

As noted above, the 2017 data was impacted by the flood and the flood recovery efforts, the Denny Regulator flap gate failure, and flow shedding – all of which resulted in some effects to solids conveyance or removal at West Point. In addition, it should be noted that the above average shown for the BOD loading in 2018 included an uncharacteristic monthly average in September of 224,600 lb/day that was impacted by laboratory chemical interference issues that were affecting the lab BOD results at that time.

BOD loadings, during this current permit period, have increased by 16.3% in contrast to the loadings during the period covered by the last report. The TSS loadings have increased by 5.2% in a comparison of the data from the two permit periods. The percentage change was calculated using the average of the annual loading data for each period. For the previous permit period, data was used for only the whole years so the data from the partial years, 2008 and 2013, were not included in the analysis.

Table 3. Influent BOD and TSS Loading

Year	Average BOD (lbs/day) (168,000 Avg Annual Design 201,000 Design Max Month)	Average TSS (lbs/day) (181,000 Avg Annual Design 218,000 Max Month Design)
2015	157,000	163,000
2016	141,600	167,400
2017 [a]	167,100	181,300
2018	171,700	168,400

[a] 2017 data was not considered representative of the actual loadings. Due to the flood recovery efforts, many of the influent samples were impacted by the plant recycle stream and/or unit process cleaning.

Table 4 shows forecasted residential and employment population, flows, and TSS/BOD loads in the West Point service area for 2010 through 2060. King County's Wastewater Treatment Division (WTD) recently updated the estimates of population, and wastewater flows and loads for the specific West Point Treatment Plant, Brightwater Treatment Plant, and South Treatment Plant service areas (King County 2018). The assessment is based on information from the Puget Sound Regional Council (PSRC) 2013 Land Use Forecast data (which itself is based on U.S. Census Bureau national census data from 2000 and 2010), and the U.S. Census Bureau's annual American Community Survey (ACS) data from 2016. WTD used the PSRC information to generate decadal population projections in the service sub-areas out to 2060. WTD also specifically adjusted the 2020 population estimate using the recent ACS data. Based on the projected 2010 and 2020 population, interpolation results in an estimated residential population of the West Point service area in 2018 of approximately 754,900 and a total of residential and employment population of 1,414,000. Since 2010, the Puget Sound region has experienced significant growth, outpacing the PSRC 2013 projections for the 2010 to 2020 period.

Table 4. Projections - West Point Service Area

Year	Residential Population + Employment	Percent Population Increase	Annual Flow (MGD)	BOD Loading (lbs/day)	TSS Loading (lbs/day)
2010	1,169,845	-	95	131,000	153,000
2020	1,497,461	28.0%	105	162,600	186,500
2030	1,617,008	8.0%	107	172,900	198000
2040	1,767,463	9.3%	113	186,400	211,200
2050	1,942,242	9.9%	120	201,700	227,100
2060	2,125,714	9.4%	127	217,400	243,300

WTD prepared the flow projections based on a calibrated collection system model (MIKE URBAN) with data measured at West Point from January 2004 through December 2017. Corrections are made to reflect the flow transfers from the Brightwater Treatment Plant (Brightwater) service area. The 38-year hydrograph was processed to obtain the peak day, peak week, and peak month flows expected to occur on average once every 20 years. A statistical analysis was applied to the observed 2004 to 2017 loading rates at West Point to develop peaking factors relating maximum month, maximum week, and peak day loads to the annual average load.

These peaking factors were combined with the projected annual loading rates in to estimate loading rates from 2010 through 2060. WTD is currently working with a consultant to conduct a capacity planning study with these flow and loading projections to identify the timing of necessary capacity improvements. The study is expected to be completed by mid-2019. The results of this study will be used, in conjunction with other near-term facility planning needs and long-term regional systemwide planning, to determine necessary projects to address any identified capacity needs.

ALKI Wet Weather Treatment Station
Flow and Wasteload Assessment 2018

This report reviews flows and permit compliance at the Alki Wet Weather Treatment Station (Alki) from 2013 through June 2018. It summarizes and evaluates discharge events, peak flows and annual volumes. It also summarizes and evaluates Alki's permit compliance for the current NPDES permit which went into effect in 2015. It also summarizes and evaluates permit compliance; only compliance performance starting in Feb. 1, 2015 is presented because that is the effective date of the new permit. Though data for 2017 is presented in this report, it is difficult to compare it to other years because of the unfortunate and unusual events of the West Point flooding (Feb. 2017). Thus, this report looks at flows and compliance with and without 2017 events/data.

The Alki facility currently operates under the permit for the West Point Treatment Plant (West Point), Washington State Department of Ecology NPDES permit number WA0029181-1. The current permit went into effect February 1, 2015, and expires January 31, 2020. The report was prepared to fulfill Special Condition S4.E of the permit to be submitted with the permit renewal application (by January 31, 2019).

The capacity of West Point was significantly reduced in 2017 during February, March and April while it recovered from the Feb. 9, 2017 flooding event. West Point's reduced capacity led to flow shedding upstream in the collection system during storm events, resulting in excess flows being discharged from the Alki facility. Flow shedding was implemented by limiting flow from the West Seattle Pump Station, thereby limiting flow to West Point.

The Alki facility uses a Parshall Flume to measure influent flow/volume; influent flow is then used to calculate the effluent flow/volume. In May 2016, debris was removed from the flume that undoubtedly had led to erroneously high flow measurements. Flow measurements before and after May 2016 suggest that the debris may have caused flow measurements to be 20-30% higher than actual. Such an error would have a significant impact on the average and peak flows, discharge volumes, and mass of influent and effluent TSS. At this time, we don't know when and to what extent the debris interfered with the flow measurement prior to May 2016. Thus, data presented in this report are uncorrected, i.e., data previously presented in monthly and annual reports. The debris did not interfere with the ability to send flow to, and pass flow through, the Alki treatment plant, or the number of discharge events. Also the debris did not interfere with influent and effluent TSS concentrations, effluent settleable solids, and effluent fecal coliform. Also, it's likely that the debris had little impact to the monthly TSS removal efficiency calculation since the influent and effluent flows would be equally affected by the erroneous flume measurement.

Permit Compliance:

Table 1 presents the current permit limits for the Alki facility for total suspended solids (TSS) removal, effluent settleable solids (SS), pH, fecal coliforms and total residual chlorine (TRC). Table 2 presents total discharge volume, number of discharge events and the peak day discharge flow for each year of 2013-2017 and through June 2018. Annual rainfall is also presented to provide some context for the year-to-year differences in volumes and number of events. Table 3 summarizes compliance performance of Alki for 2015 through June 2018. Table 3 only presents data back to 2015 (instead of 2013) because that's when the current NPDES permit went into effect.

Table 1. **NPDES permit conditions effective February 1, 2015.**

Effluent Limits: Outfall #046 - Alki Wet Weather Treatment Station Latitude: 47.57025˚ Longitude: -122.4225˚		
Parameter	**Average Monthly**	**Annual Average** [a]
Total Suspended Solids Removal Efficiency [b]	Report	Equal to or greater than 50% removal of influent TSS
	Monthly Geometric Mean	
Fecal Coliform Bacteria	$\leq$400/100 mL [c]	N/A
		Annual Average [a]
Settleable Solids	N/A	$\leq$0.3 mL/L/hr
	Instantaneous Minimum	**Instantaneous Maximum**
pH [d]	$\geq$6.0	$\leq$9.0
	Maximum Daily [e]	
Total Residual Chlorine	$\leq$234 ug/l	N/A
	Long-Term Average [f]	
Number of Discharge Events	$\leq$10 events/year	N/A
Discharge Volume	$\leq$46 million gallons (MG) per year	N/A
[a] Calculate annual averages as the average of all 'event' averages. Do not omit one event per year from calculation. Data must be collected and reported on a calendar year basis via WQWebDMR and in the Annual Combined Sewer Overflow (CSO) Report.		
[b] Calculate the TSS total removal efficiency on a mass balance basis as the percent of solids captured at the CSO treatment facility and then permanently removed at the West Point WWTP. The reported daily average TSS % removal efficiency at the West Point WWTP, corresponding to the event, must be used for calculating the total removal efficiency for the CSO facility. Note: While % TSS removal is reported on a monthly basis, compliance is based on the annual average as reported via WQWebDMR and in the annual CSO report as required in S11.		
[c] For the monthly geometric mean, calculate the geometric mean of all samples collected during the month; use a value of 1 for the geomean calc when fecal coliform results are 0. Do not include non-discharge days in the calculation. Ecology provides directions to calculate this value in publication No. 04-10-020, Information Manual for Treatment Plant Operators, available at: http://www.ecy.wa.gov/pubs/0410020.pdf.		
[d] Report the instantaneous maximum and minimum pH monthly. Do not average pH values.		
[e] Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge is the average measurement of the pollutant measured over a calendar day while discharging.		
[f] Long-term average will be assessed using data collected over the full permit cycle. Data must be collected and reported for the period of the permit cycle prior to permit renewal, as required in S4.E.		

Discharge Volumes, Peak Flows, and Number of Events: 2013 – 2018 (June)

Table 2 presents total discharge volume, number of discharge events and the peak discharge flow for each year of 2013-2017. Table 2 clearly shows the significant impact that the West Point flooding (Feb. 2017) had on flows and events: e.g., the annual discharge volume in 2017 was 227 MG while the next highest annual volume was 160 MG in a year with similar rainfall. Because the 2017 events were unusual, it seemed prudent to not include 2017 data when comparing Alki's long-term performance.

The 2013-2017 average discharge volume was 108 MG/Yr. If the impact of the West Point flooding is removed by excluding 2017 data, the average discharge volume is 79 MG/Yr (2013-2016). Comparing to the annual average volume for the previous four years (2009-2012) of 52.0 MG, the recent 2013-2016 average flow is an increase of 51%. Another plausible reason was a decision made in the 2012-2013 timeframe to operate Alki in a manner (i.e., operate it more often) that would best optimize the performance of the entire CSO system.

Table 2. Alki Flows and Peak Flows 2013-2018

Year	Annual Discharge Volume [a] (MG)	Peak Flow [c] (MGD)	No. of Discharge Events	No. of Discharge Days	Annual Rainfall (inches)
Permit	<u><</u>108	N/A	<u><</u>29	N/A	N/A
2013	13	86		3	22.3
2014	71	88		11	41.8
2015	160	89		9	37.7
2016	70	90 (65)[d]		10	44.7
2017	227	68		18	42.4
2018 (Jan- June)	24	60		3	18.9
Long Term Averages					
2013-2017	108	N/A	5.5	9.0	34.6
2013-2016	79	N/A	4.8	8.2	36.6
2009-2012 [b]	52	N/A	5.0	N/A	N/A

Footnotes:

[a] Total annual CSO discharge volume is reported instead of average monthly flow. Long term averages are based on annual discharge volume in million gallons (MG).

[b] Long-term 2009-2012 averages were reported in the 2013 permit renewal Flow and Wasteload report.

[c] The largest peak flows in 2013-2017 and 2013-2016 are reported as the Long-Term Averages. 2009-2012 peak flows were not available (N/A) in the 2013 permit renewal Flows and Wasteload report. Alki's maximum rated hydraulic capacity is 65 MGD at mean-low tide (per Facility Factsheet); peak flow capacity is closer to 45-50 MGD during extreme high tide.

[d] The influent Parshall flume, used for flow measurement and effluent flow calculation, was cleaned of debris in May 2016. The 90-MGD peak value in 2016 occurred before the cleaning and the 65-MGD value in parenthesis occurred after cleaning. The discharge volumes and peak flow prior to May 2016 are likely an overestimate due to the debris interference in the flume flow measurement.

The number of discharge events averaged 5.5 events/yr with 2017 data included (5-year), and 4.4/yr without 2017 data. Comparing to the average of 5.0 events/yr for the 2009-2012 period, the recent 2013-2016 average is a decrease of 14%. The data indicate that the Alki facility has met the long-term average limits of 108 MG/yr discharge volume and 29 events/year.

The design capacity of Alki is 65 million gallons per day (MGD) at mean-tide. Peak capacity can be less than 65 MGD depending on tide levels in Puget Sound, dropping to as low as 45-MGD during extreme high tides. The Alki facility had two discharge days that exceeded 65 MGD after the flume was cleaned in May 2016.

<u>Effluent Limitations Compliance Summary (2015-June 2018)</u>

This assessment describes compliance with the current permit effluent limitations for annual average total suspended solids (TSS) removal efficiency, annual average settleable solids (SS), minimum and maximum pH, daily average total residual chlorine (TRC), and monthly geomean fecal coliform concentrations set forth in the permit that went into effect February 2015.

Table 3. Alki Compliance – Annual Summary (January, 2015 through June 2018)

	Annual Event Average TSS Removal	**Annual Event Average SS**	**Fecal Coliform, Monthly Geometric Mean**	**Total Residual Chlorine, Daily Average**	**Minimum pH, Daily**	**Maximum pH, Daily**
(Permit Limit)	***(≥ 50%)***	***(≤ 0.3 ml/l/hr)***	***(≤400/ 100-mL)***	***(≤234-μg/L)***	***(≥ 6.0)***	***(≤ 9.0)***
	Average %Removal	Average SS	No. of permit deviations	No. of permit deviations	No. of permit deviations	No. of permit deviations
2015	33.7	0.10	0	0	0	0
2016	42.8	0.09	1	1	0	0
2017	24.5	0.14	0	4	1	0
2018 (Jan. - June)	- -	- -	0	0	0	0

Solids (Percent TSS Removal and Settleable Solids)
The Alki facility has met the annual average SS effluent limit of 0.3 mL/L/hr during the current permit cycle. Alki did not meet the average annual TSS removal limit in any year of this permit cycle. There are several factors that challenged Alki's ability to meet the 50% TSS removal limit. One factor is the widely varying influent pumped flows from the 63rd Ave. Pump Station. The swings in pumped flow should be lessened with the recent upgrade to the variable frequency drives (VFDs) on the 63rd Ave. pumps; the project was completed in summer 2018. Another factor impacting TSS removal efficiency is the limited solids storage available in the primary clarifiers during events. In response, King County has initiated a project to conduct a comprehensive review of the facility, including solids removal. In addition to the on-going issues of flow variability and solids storage/removal, TSS removal performance in 2017 was further exacerbated by the West Point flooding event. For example, the lower TSS removal at West Point during its recovery certainly played a role in the lower TSS removal at Alki. Also, flow shedding during West Point's recovery affected the hydraulic conditions within Alki.

Total Residual Chlorine (TRC)
Alki met the maximum daily-average effluent TRC limit of 234 µg/L on 35 of 40 discharge days of the current permit cycle. The five discharge days with effluent TRC greater than 234 µg/L occurred in 2016 and 2017. The region experienced heavy rain in two of the five violation days. Sodium bisulfite (SBS) dechlorination dose control is more challenging during a sudden high flow event or during a short discharge event. Two of the five violations were triggered during West Point flow shedding period in 2017. Along with the treatment challenges as result of pump flow variation, the dechlorination system required adjustments and fine tuning during this permit cycle.

A dechlorination system improvement project was completed by fall 2014. The project comprised of increasing the storage capacity of SBS, installing new larger capacity feed pumps with chemical feed flow meters. In addition, the project included two SBS feed control "modes": 1) an "automatic pre-dechlor chlorine residual mode" in which SBS feed is controlled by both plant flow and pre-dechlor chlorine residual and 2) a "semi-automatic" mode in which the operators can disengage the pre-dechlor chlorine residual analyzer input and manually input a pre-dechlor residual value, e.g., if pre-dechlor chlorine analyzer is providing erroneous data during treatment. Operators will be able to select between these feed control modes based on the operating circumstance.

In addition to the dechlorination improvements, King County completed a project in summer 2018 to replace the hypochlorite feed pumps. The project includes replacement of the old, oversized hypochlorite feed pumps with three smaller-capacity metering pumps with VFDs, two as duty pumps and one as a standby pump. Chemical flow meters and feed control programs were also included. The hypochlorite solution feed application point was also changed to a single point using a diffuser/spray in the Alki combined influent structure at the plant head works.

Fecal Coliform

The plant effluent met the monthly geomean fecal coliform limit of 400-cfu/100 mL in all discharge months except one during the current permit cycle. In response to the exception in 2016, the hypochlorite set point was increased. In addition, a capital project to improve the hypochlorite system was completed in summer 2018. This project included new hypochlorite feed pumps, chemical feed flow meter, hypochlorite feed diffuser and improved feed control strategy.

Instantaneous pH

The instantaneous pH minimum permit limit ($\geq$6.0) was met in 39 of 40 discharge days in the current permit cycle. Overfeeding of SBS during the start of the discharge resulted in the low effluent pH exception in 2017. The instantaneous pH maximum permit level was met in every discharge day of the current permit cycle. Recent improvements to the Alki facility, including new VFDs and pump flow control at 63rd Ave. Pump Station and adjustments to the SBS dechlorination system, as well as removal of the debris in the influent parshall flume, should improve chemical feed and pH compliance.

Basin Population and Land Use

The Alki Basin is already considered substantially built out mostly as residential property. Increased flows due to expected densification in the basin are expected to be offset by a reduction in per capita water use due to conservation efforts. No net changes in base or average flows are expected in the next 5 years.

Alki Facilities and Operations:

Prior to 1994, the Alki facility operated as a primary treatment plant under a separate permit (NPDES Permit No. WA-002901-7). The original Alki primary treatment plant was converted to a pumping station/combined sewer overflow (CSO) treatment facility; the modified facility was placed into service November 1998. The facility was included in the West Point NPDES permit, starting October 25, 1999.

Under normal conditions, sewage from the Alki region of West Seattle is conveyed to the West Point Treatment Plant. Flow in excess of the West Seattle Pump Station and Tunnel capacity is pumped to the Alki facility for treatment. This storage and treatment system provides buffer capacity against the discharge of untreated combined sewage to Puget Sound. The pumped CSO flows are chlorinated for disinfection prior to entering the bar screens and primary sedimentation tanks. Once the primary sedimentation tanks are full, treated CSO effluent is dechlorinated in a contact channel and discharged to Puget Sound via an outfall diffuser. Sludge captured in the primary sedimentation tanks is pumped to the West Seattle Tunnel for conveyance to the West Point. Once the discharge event ends, Alki's tank and channel contents are pumped to the West Seattle Tunnel.

CARKEEK PARK Wet Weather Treatment Station
Flow and Wasteload Assessment 2018

This report reviews flows and permit compliance at the Carkeek Park Wet Weather Treatment Station (Carkeek) from 2013 through June 2018. It summarizes and evaluates discharge events, peak flows and annual volumes. It also summarizes and evaluates permit compliance for the current NPDES permit which went into effect in 2015. It also summarizes and evaluates permit compliance; only compliance performance starting in Feb. 1, 2015 is presented because that is the effective date of the new permit. Though data for 2017 is presented in this report, it is difficult to compare it to other years because of the unfortunate and unusual events of the West Point flooding (Feb. 2017). Thus, this report looks at flows and compliance with and without 2017 events/data.

The Carkeek facility currently operates under the permit for the West Point Treatment Plant (West Point), Washington State Department of Ecology NPDES permit number WA002918-1. The current permit went into effect February 1, 2015, and expires January 31, 2020. The report was prepared to fulfill Special Condition S4.E of the permit to be submitted with the permit renewal application (by January 31, 2019).

The capacity of West Point was significantly reduced in 2017 during February, March and April while it recovered from the Feb. 9, 2017 flooding event. West Point's reduced capacity led to flow shedding upstream in the collection system during storm events. The reduced West Point plant capacity resulted in excess flows being discharged upstream in the collection system, including the Carkeek facility, during wet weather conditions. Flow shedding was implemented by reducing or shutting down Carkeek Pump Station, thereby limiting flows to West Point.

Permit Compliance:

Table 1 presents the current permit limits for the Carkeek facility for total suspended solids (TSS) removal, effluent settleable solids (SS), pH, fecal coliforms and total residual chlorine (TRC). Table 2 presents total discharge volume, number of discharge events and the peak day discharge flow for each year of 2013-2017 and through June 2018. Annual rainfall is also presented to provide some context for the year-to-year differences in volumes and number of events. Table 3 summarizes compliance performance of Carkeek for 2015 through June 2018. Table 3 only presents data back to 2015 (instead of 2013) because that's when the current NPDES permit went into effect.

Table 1. NPDES permit conditions effective February 1, 2015.

Effluent Limits: Outfall #046 - Carkeek Wet Weather Treatment Station Latitude: 47.71264˚ Longitude: -122.38789˚		
Parameter	**Average Monthly**	**Annual Average [a]**
Total Suspended Solids Removal Efficiency [b]	Report	Equal to or greater than 50% removal of influent TSS
	Monthly Geometric Mean	
Fecal Coliform Bacteria	≤400/100 mL [c]	N/A
		Annual Average [a]
Settleable Solids	N/A	≤0.3 mL/L/hr
	Instantaneous Minimum	**Instantaneous Maximum**
pH [d]	≥6.0	≤9.0
	Maximum Daily [e]	

Total Residual Chlorine	≤490 ug/l	N/A
	Long-Term Average [f]	
Number of Discharge Events	≤10 events/year	N/A
Discharge Volume	≤46 million gallons (MG) per year	N/A

[a] Calculate annual averages as the average of all 'event' averages. Do not omit one event per year from calculation. Data must be collected and reported on a calendar year basis via WQWebDMR and in the Annual CSO Report.
[b] Calculate the TSS total removal efficiency on a mass balance basis as the percent of solids captured at the CSO treatment facility and then permanently removed at the West Point WWTP. The reported daily average TSS % removal efficiency at the West Point WWTP, corresponding to the event, must be used for calculating the total removal efficiency for the CSO facility. Note: While % TSS removal is reported on a monthly basis, compliance is based on the annual average as reported via WQWebDMR and in the annual CSO report as required in S11.
[c] For the monthly geometric mean, calculate the geometric mean of all samples collected during the month; use a value of 1 for the geomean calc when fecal coliform results are 0. Do not include non-discharge days in the calculation. Ecology provides directions to calculate this value in publication No. 04-10-020, Information Manual for Treatment Plant Operators, available at: http://www.ecy.wa.gov/pubs/0410020.pdf.
[d] Report the instantaneous maximum and minimum pH monthly. Do not average pH values.
[e] Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge is the average measurement of the pollutant measured over a calendar day while discharging.
[f] Long-term average will be assessed using data collected over the full permit cycle. Data must be collected and reported for the period of the permit cycle prior to permit renewal, as required in S4.E.

Discharge Volumes, Peak Flows, and Number of Events: 2013 – 2018 (June)

Table 2 presents total discharge volume, number of discharge events and the peak discharge flow for each year of 2013-2017. Table 2 clearly shows the significant impact that the West Point flooding (Feb. 2017) had on flows and events: e.g., the annual discharge volume in 2017 was 79 MG while the next highest annual volume was 17.7 MG in a year with similar rainfall. Because the 2017 events were unusual, it seemed prudent to not include 2017 data when comparing Carkeek's long-term performance.

Table 2. Carkeek Flows and Peak Flows 2013-2018

Year	Annual Discharge Volume [a] (MG)	Peak Flow [c] (MGD)	No. of Discharge Events	No. of Discharge Days	Annual Rainfall (inches)
Permit	≤46	N/A	≤10	N/A	N/A
2013	1.5	23.3	2	2	19.0
2014	8.0	10.4	3	6	39.0
2015	9.9	15.0	3	7	38.1
2016	17.7	18.5	8	12	44.0
2017	79.6	26.1	10	21	43.1
2018 (Jan-June)	1.6	6.7	3	2	19.3
Long Term Averages					
2013-2017	23.3	N/A	5.2	9.6	36.6
2013-2016	9.3	N/A	4.0	6.8	35.0
2009-2012 [b]	18.6	N/A	5.8	11.0	33.5

Footnotes:
[a] Total annual CSO discharge volume is reported instead of average monthly flow. Long term averages are based on annual discharge volume in million gallons (MG).
[b] Long-term 2009-2012 averages were reported in the 2013 permit renewal Flow and Wasteload report.
[c] The largest peak flows in 2013-2017 and 2013-2016 are reported as the Long-Term Averages. 2009-2012 peak flows were not available (N/A) in the 2013 permit renewal Flows and Wasteload report.

The 2013-2017 average discharge volume was 23.3 MG/Yr. If the impact of the West Point flooding is removed by excluding 2017 data, the average discharge volume is 9.3 MG/Yr (2013-2016). It's worth noting that the average discharge volume for 2009-2012, which had a similar rainfall total as 2013-2016, was 18.6 MG/Yr. Comparing to the annual average volume for the previous four years (2009-2012) of 18.6 MG, the recent 2013-2016 average flow is a decrease of 50%.

The number of discharge events averaged 5.2 events/yr with 2017 data included (5-year), and 4.0/yr without 2017 data. Comparing to the average of 5.8 events/yr for the 2009-2012 period, the recent 2013-2016 average is a decrease of 31%. The data indicate that the Carkeek facility has met the long-term limits of 46 MG/yr discharge volume and 10 events/year.

The design capacity of Carkeek is 20 million gallons per day (MGD). During this reporting period Carkeek facility had six discharge days over two separate years that exceeded the design capacity of 20 MGD. When excluding 2017 for the reasons stated above, there was only one discharge day exceeding the design capacity occurring in 2013.

Effluent Limitations Compliance Summary (2015-June 2018)

This assessment describes compliance with the current permit effluent limitations for annual average total suspended solids (TSS) removal efficiency, annual average settleable solids (SS), minimum and maximum pH, daily average total residual chlorine (TRC), and monthly geomean fecal coliform concentrations set forth in the permit that went into effect February 2015.

Solids (Percent TSS Removal and Settleable Solids)

The Carkeek facility has met the annual average SS effluent limit of 0.3 mL/L/hr during the current current permit cycle. The plant met the average annual TSS removal efficiency limit in 2015, but exceeded the limit in the past two years. The TSS removal performance in 2017 was impacted by the West Point flood and recovery and associated flow shedding that affected hydraulic conditions within the facility. The low TSS removal efficiency also was low due to the calculation involving the solids removal performance at West Point, which was low during the flood recovery.

Total Residual Chlorine (TRC)

Carkeek met the maximum daily-average effluent TRC limit of 490 µg/L on 41 of 42 discharge days of the current permit cycle. The two discharge days with high TRC greater than the permit limit occurred in 2015 and 2016. Both incidents were caused by inadequate sodium bisulfite (SBS) feed when the SBS feed pumps failed to start automatically and in addition, the 2015 incident was also affected by SBS crystals that had clogged the feed line. The SBS feed pumps failed to start when the automatic level trigger failed. In 2016, King County replaced the faulty feed pump and to prevent SBS crystals from clogging the feed lines and pumps are flushed occasionally with C2 water.

A capital improvement project was submitted in 2017 to improve the dechlorination system. The proposed project would replace the decades old chlorine analyzers, new feed pumps and SBS storage tank along with improvement in the HVAC system in the chemical storage room. The pump station units were retrofitted with variable frequency drives (VFDs) in 2017 that also are anticipated to result in improvements with chemical dosing control.

Table 3. Carkeek Compliance – Annual Summary (January, 2015 through June 2018)

	Annual Event Average TSS Removal	Annual Event Average SS	Fecal Coliform, Monthly Geometric Mean	Total Residual Chlorine, Daily Average	Minimum pH, Daily	Maximum pH, Daily
(Permit Limit)	*(≥ 50%)*	*(≤0.3 ml/l/hr)*	*(≤400/ 100-mL)*	*(≤490-µg/L)*	*(≥6.0)*	*(≤ 9.0)*
	Average %Removal	Average SS	No. of permit deviations	No. of permit deviations	No. of permit deviations	No. of permit deviations
2015	51.3	0.10	0	1	0	0
2016	49.4	0.09	0	1	0	0
2017	28.2	0.16	1	0	0	0
2018 (Jan. - June)	- -	- -	0	0	0	0

Fecal Coliform
The plant effluent met the monthly geomean fecal coliform limit of 400 cfu/100 mL in all discharge months except one during the current permit cycle. The cause of the high fecal coliform level was initially suspected to be that the hypochlorite dosing set point was inadequate, or that the hypochlorite feed pump was gas-bound. However, in the following month during the subsequent treatment event at Carkeek, the hypochlorite feed was very low, and King County staff found that the backpressure valve on the hypochlorite feed line was clogged. A new backpressure valve was installed with bypass lines so that operators can clear any obstruction while maintaining proper hypochlorite feed.

Instantaneous pH
The instantaneous pH minimum and maximum permit level was met in every discharge day of the current permit cycle.

Basin Population and Land Use
The Carkeek Basin is already considered substantially built out. Increased flows due to expected densification in the basin are expected to be offset by a reduction in per capita water use due to conservation efforts. No net changes in base or average flows are expected in the next 5 years.

Carkeek Facilities and Operations:

The original Carkeek primary treatment plant was converted to a pumping station/combined sewer overflow (CSO) treatment facility, and the modified facility was placed into service in November of 1994, under its then existing Carkeek permit. Under normal conditions, the Carkeek pump station will convey sewage to the West Point treatment plant. Flows in excess of the pump station's capacity will enter the Carkeek plant, which provides some buffer capacity against the discharge of CSOs to Puget Sound. If the storm flow volume is greater than plant's storage capacity, the CSO flow is given primary treatment, disinfection and dechlorination before discharging into Puget Sound.

ELLIOTT WEST Wet Weather Treatment Station
Flow and Wasteload Assessment 2018

This report reviews flows and permit compliance at the Elliott West Wet Weather Treatment Station (Elliott West) from 2013 through June 2018. It summarizes and evaluates discharge events, peak flows and annual volumes. It also summarizes and evaluates permit compliance; only compliance performance starting in Feb. 1, 2015 is presented because that is the effective date of the new permit. Though data for 2017 is presented in this report, it is difficult to compare it to other years because of the unfortunate and unusual events of the West Point flooding (Feb. 2017) and failure of the marine flap-gate at the Denny Regulator (Fall 2017). Thus, this report looks at flows and compliance with and without 2017 events/data.

The Elliott West facility began operating in July 2005. The facility operates under the permit for the West Point Treatment Plant (West Point), Washington State Department of Ecology NPDES permit number WA0029181-1. The current permit went into effect February 1, 2015, and expires January 31, 2020. The report was prepared to fulfill Special Condition S4.E of the permit to be submitted with the permit renewal application (by January 31, 2019).

The capacity of West Point was significantly reduced in 2017 during February, March and April while it recovered from the Feb. 9, 2017 flooding event. West Point's reduced capacity led to flow shedding upstream in the collection system during storm events. The recovery-based flow shedding events resulted in exceptionally higher discharge volumes at Elliott West. In fact, almost 75 percent of Elliott West 2017 discharged volume occurred while West Point was recovering. The failure of the marine flap-gate in late October resulted in additional flow shedding during rain events. Flow shedding during storms was necessary to minimize the inflow of sea-water to West Point; the gate was replaced in late December 2017. The degree to which flow shedding events affected Elliott West flows can be appreciated by comparing total annual discharge volumes in 2016 and 2017 (two years with very similar annual rainfall amount): 173 million gallons (MG) and 917 MG, respectively.

Permit Compliance:

Table 1 presents the current permit limits for the Elliott West facility for total suspended solids (TSS) removal, effluent settleable solids (SS), pH, fecal coliforms and total residual chlorine (TRC). Table 2 presents total discharge volume, number of discharge events and the peak day discharge flow for each year of 2013-2017 and through June 2018. Annual rainfall is also presented to provide some context for the year-to-year differences in volumes and number of events. Table 3 summarizes compliance performance of Elliott West for 2015 through June 2018. Table 3 only presents data back to 2015 (instead of 2013) because that's when the current NPDES permit went into effect.

Discharge Volumes, Peak Flows, and Number of Events: 2013 – 2018 (June)

Table 2 presents total discharge volume, number of discharge events and the peak discharge flow for each year of 2013-2017. Table 2 clearly shows the significant impact that the West Point flooding (Feb. 2017) and the failed Denny Regulator marine flap gate (Fall 2017) had on flows and events: e.g., the annual discharge volume in 2017 was 917-MG while the next highest annual volume was 251-MG in a year with similar rainfall. Because the 2017 events were unusual, it seemed prudent to not include 2017 data when comparing Elliott West's long-term performance.

The discharge volume averaged 157 MG/Yr for 2013-2016 which was approximately 30% lower than the 2009-2012 average of 224 MG/Yr. Interestingly, the rainfall totals for the 4-year periods were nearly identical: 171.4 inches for 2013-2016 and 170.4 inches for 2009-2012. The higher total discharge volume in 2009-2012 was most likely related to the Brightwater Treatment Plant which started operations in late 2011- early 2012.

The number of discharge events in 2013-2016 averaged 10 events/Yr (ranging from 5 to 14 events/Yr) compared to an average of 11 events/Yr during 2009-2012 (i.e., 9% decrease). It can be difficult to compare the number of discharges events from year to year because of differences in rain intensity and patterns. But overall, the number of annual events in 2013-2016 tended to relate to total annual rainfall.

Table 1. NPDES permit conditions effective February 1, 2015.

Effluent Limits: Outfall #027B – Elliott West Wet Weather Treatment Station Latitude: 47.61755˚ Longitude: -122.361856˚		
Parameter	**Average Monthly**	**Annual Average [a]**
Total Suspended Solids Removal Efficiency [b]	Report	Equal to or greater than 50% removal of influent TSS
	Monthly Geometric Mean	
Fecal Coliform Bacteria	≤400/100 mL [c]	N/A
		Annual Average [a]
Settleable Solids	N/A	≤0.3 mL/L/hr
	Instantaneous Minimum	**Instantaneous Maximum**
pH [d]	≥6.0	≤9.0
	Maximum Daily [e]	
Total Residual Chlorine	≤109 ug/L	N/A

[a] Calculate annual averages as the average of all 'event' averages. Do not omit one event per year from calculation. Data must be collected and reported on a calendar year basis via WQWebDMR and in the Annual CSO Report.
[b] Calculate the TSS total removal efficiency on a mass balance basis as the percent of solids captured at the CSO treatment facility and then permanently removed at the West Point WWTP. The reported daily average TSS % removal efficiency at the West Point WWTP, corresponding to the event, must be used for calculating the total removal efficiency for the CSO facility. Note: While % TSS removal is reported on a monthly basis, compliance is based on the annual average as reported via WQWebDMR and in the annual CSO report as required in S11.
[c] For the monthly geometric mean, calculate the geometric mean of all samples collected during the month; use a value of 1 for the geomean calc when fecal coliform results are 0. Do not include non-discharge days in the calculation. Ecology provides directions to calculate this value in publication No. 04-10-020, Information Manual for Treatment Plant Operators, available at: http://www.ecy.wa.gov/pubs/0410020.pdf.
[d] Report the instantaneous maximum and minimum pH monthly. Do not average pH values.
[e] Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge is the average measurement of the pollutant measured over a calendar day while discharging.

The peak capacity of Elliott West is 250 million gallons per day (MGD) and the pumps are modulated to remain below 240 MGD on a routine basis. Operations exceeded the peak design flow during one discharge day in 2015, and additionally exceeded the operating flow objective during one additional discharge day in 2013 and two days in 2017. The occasional use of the facility's pumps above peak design and objective flow rates can reflect operations to manage and optimize the overall CSO conveyance system, as well as minor operational and measurement variability during events that can be affected by wet well depth. It should be noted, with respect to discussion of treatment performance presented below, the installed capacity of treatment components such as the hypochlorite dosing pumps, is sufficient for a 300 MGD flow rate.

Table 2. Elliott West Annual Discharge Volumes, Peak Flows and Events: 2013-2018

Year	Annual Discharge Volume [a] (MG)	Peak Flow [c] (MGD)	No. of Discharge Events	No. of Discharge Days	Annual Rainfall (inches)
2013	71	248	5	9	33.1
2014	132	172	12	16	55.3
2015	251	258	14	23	38.4
2016	173	202	9	15	38.6
2017	917	247	17	30	41.8
2018 (Jan-June)	57	225	4	6	18.2
Long Term Averages					
2013-2017	309	258	11	18.6	41.4
2013-2016	157	258	10	15.8	41.4
2009-2012 [b]	224	N/A	11	18.5	37.3

[a] Total annual CSO discharge volume is reported instead of average monthly flow. Long term averages are based on annual discharge volume in million gallons (MG).

[b] Long-term 2009-2012 averages were reported in the 2013 permit renewal Flow and Wasteload report.

[c] Peak flow is the largest instantaneous discharge flow for a day. Elliott West's Hydraulic Capacity is 240-MGD. The largest peak flows in 2013-2017 and 2013-2016 are reported as the Long-Term Averages. 2009-2012 peak flows were not available (N/A) in the 2013 permit renewal Flows and Wasteload report.

Table 3 shows that Elliott West facility operations met the 50% annual TSS removal requirement in two of the years, but was unable to meet the 0.3 ml/L/hr annual SS average in any of the years. The monthly geomean limit for fecal coliforms was achieved 14 out of 21 discharge months and the maximum daily average limit for TRC was achieved 33 out of 74 discharge days. The minimum and maximum pH limits were met 48 and 72 times, respectively, out of 74 discharge days.

Solids (Percent TSS Removal and Settleable Solids)

The facility met the ≥50% annual average TSS removal efficiency limit in 2015 and 2016, but exceeded the limit in 2017. The TSS removal performance in 2017 was impacted by the West Point flood and recovery and associated flow shedding, and the Denny Regulator marine flap and wet well drain gate failures. The TSS removal performance in 2017 was impacted by the West Point flood and recovery and associated flow shedding that affected hydraulic conditions within the facility. The low TSS removal efficiency also was low due to the calculation involving the solids removal performance at West Point, which was low during the flood recovery. TSS removal averaged 47.2% (based on mass calculation) for the entirety of January 2015 through June 2018. When 2017 data is excluded, TSS removal for this permit cycle averaged 58.1%.

Table 3. Elliott West Compliance – Annual Summary (January 2015 through June 2018)

	Annual Event Average TSS Removal	**Annual Event Average SS**	**Fecal Coliform, Monthly Geometric Mean**	**Total Residual Chlorine, Daily Average**	**Minimum pH, Daily**	**Maximum pH, Daily**
(Permit Limit)	***(≥ 50%)***	***(≤ 0.3 ml/l/hr)***	***(≤ 400/ 100-mL)***	***(≤ 109-µg/L)***	***(≥ 6.0)***	***(≤ 9.0)***
	Average %Removal	Average SS	No. of permit deviations	No. of permit deviations	No. of permit deviations	No. of permit deviations
2015	57.8%	2.6	3	14	9	0
2016	52.8%	2.2	1	11	8	0
2017	21.4%	4.0	3	14	5	2
2018 (Jan. - June)	- -	- -	0	2	4	0

Meeting the annual average effluent SS permit limit of 0.3 mL/L/hr continues to be a challenge at Elliott West. The effluent significantly exceeded the permit limit in each year of the current permit cycle. It is curious that the facility has the ability to meet the annual %TSS removal limit in some years while still discharging a very high effluent SS. King County has contracted with a consultant firm to conduct a comprehensive review of the facility, including solids removal, and assessing alternative treatment technologies. The consultants are scheduled to submit their report, with recommendations on treatment alternatives to improve overall treatment performance, in mid-2019. King County anticipates that facility improvements could be implemented within the next capital improvement program cycle by about 2027.

<u>Total Residual Chlorine (TRC)</u>
The plant met the 109-µg/L daily-average effluent TRC permit limit on 41 of 74 discharge days of the current permit cycle. There are several potential causes for the TRC permit limit exceedances. The Elliott West facility frequently experiences discharge events with intermittent flows and many events experience wide pumping fluctuations by the main pumps. This creates challenges to the hypochlorite and sodium bisulfite (SBS) chemical systems to respond quickly enough. In addition, the TRC exceedances may have been caused by inadequate SBS feed and mixing and the continuous adjustments made to the SBS feed in direct response to the minimum pH excursions.

During this current permit cycle, King County has made several changes to improve the SBS chemical feed system at Elliott West including: 1) improving the reliability and capacity of the C2 water system which is used as carrier water for SBS feed; 2) installing a two-tiered SBS diffuser upstream of the existing SBS application point within the effluent pipe to increase chemical mixing and reaction time; 3) installing a system to further dilute the SBS feed concentration to improve the chemical dispersion and mixing; and 4) modifying the SBS dosing program to allow operators to engage a "semi-auto" mode when the TRC analyzer is providing erroneous values for control. Furthermore, a comprehensive review of the facility is in progress, including a review of the chemical control systems, their control strategies, and possible alternative treatment technologies.

Fecal Coliform Bacteria

Elliott West met the monthly geomean limit for the effluent fecal coliforms for 14 of 21 discharge months of the current permit cycle. Continuous steps to improve disinfection performance at the facility match improvement efforts to the hypochlorite chemical feed system. An earlier start of the hypochlorite feed pumps when the pumped CSO flows reach the pump discharge channel has been implemented. A continuous evaluation and adjustment of the hypochlorite dosing occurs after each treatment event and adjustments to increase the hypochlorite feed has improved the disinfection outcomes. Unfortunately, higher dosing of hypochlorite increases the required SBS dose which can lower the final effluent pH below 6.0. Additionally, the County's ongoing facility improvement planning project will address the disinfection performance issues.

Instantaneous pH

Meeting the minimum instantaneous pH limit has been an ongoing challenge. Elliott West met the minimum pH limit 48 of the 74 discharge days during this current permit cycle. The maximum pH limit was exceeded twice, both days during the West Point flow shedding in response to the West Point February 2017 flood. Typically, a drop in the effluent pH below 6.0 indicates a potential overdosing of SBS or inadequate mixing. WTD staff has been fine tuning the SBS feed control program to minimize the required SBS feed. However, these actions did not prevent exceedance of the instantaneous minimum pH limit of 6.0 in subsequent discharges. Additional follow up by WTD staff included using a portable pH meter as an independent measure of pH throughout the treatment process, starting with the flows entering the wet well, pump discharge flows, pre-dechlorination and final effluent. Inflow pH tends to be around pH 7.0.

The alkalinities of the inflow and final effluent are usually in the range 18 to 32 mg/L as $CaCO_3$. These very low alkalinity values are contributing to the pH challenges at Elliott West. As stated above, WTD has installed a two-tier SBS diffuser, SBS dilution system and modifications to the SBS feed program to address the dechlorination challenges at Elliott West. Staff will continue to monitor and make adjustments as necessary.

Final Sampling Improvement and New Sampling Room Projects

WTD completed a project to improve effluent sampling at Elliot West by eliminating the potential for sea water intrusion into the effluent sample stream and reducing the potential for clogging of sample lines and online chlorine analyzers. The effluent sample intake was relocated from the Outfall Transition Structure to the effluent pipe between the Dechlorination and Transition structures (upstream of the flap gate). Relocation of the sample intake will minimize the potential for pulling seawater into the effluent sample.

The new sampling room was completed in fall of 2017 which houses new sample lines, new updated online chlorine analyzers and the mechanical means to remove grit and particulate material prior to the online chlorine analyzers. Adjustments to improve sample delivery to the online analyzers and auto-samplers continue in order to optimize their performance.

Basin Population and Land Use

The Elliott West basin is considered substantially developed. There is significant on-going re-development expected in the South Lake Union area over the next 5 years.

Elliott West Facilities and Operations:

The Elliott West facility was built as part of the Denny Way/Lake Union CSO Control Project to meet the federal and state requirements for control of City of Seattle CSOs, and King County's Dexter Avenue CSO discharges into Lake Union, and King County's Denny Way CSO discharges into Elliott Bay. Thus, Elliot West is part of the larger CSO system – which includes West Point – and is operated to best control CSOs from all locations while still achieving its permit-required performance and effluent quality.

The 6200 feet long, 14-ft 8-in diameter Mercer Street Tunnel receives CSO flows diverted from Elliott Bay Interceptor (EBI), Lake Union Tunnel, Central Trunk, City of Seattle Phase 1 & 2 pipelines, and Elliott West CSO pipelines. Elliott West is equipped with two dewatering sump pumps and six main pumps. The PLC (Programmable Logic Controller) for the treatment station is able to run in 5 different control modes:

1. **Standby mode:** Under this mode, the tunnel is empty and dry and only the dewatering pump(s) operate occasionally to empty any seepage.

2. **Storage mode:** During this mode, the combined stormwater and wastewater flows start entering the Mercer St. Storage and Treatment Tunnel and the dewatering pumps continue to run automatically based on level. The dewatering pumps remain on based on wet well level regardless of station mode until pump stop level is reached.

3. **Dewatering mode:** The lead main pump starts upon the wet well level reaching an elevation of 77 feet. If manually selected, the second main pump can also run in parallel to the lead pump. The pump discharge is recycled to West Point via the 36" pipe connection to EBI. Flows to this 36" pipe are regulated by the pump discharge channel sluice gate. When the EBI level rises above elevation 98.0, the main pump(s) shut off.

4. **Pump & Treat mode:** The pumps enter this mode when the wet well level reaches an elevation of 90.0 feet. In this mode, the pump discharge channel sluice gate is closed and the main pumps will automatically start, stop and change speeds to maintain a level set point. The flows enter into the pump discharge channel where it gets disinfected with hypochlorite before entering the 96" Elliott West effluent line that heads to the Dechlorination structure located at Myrtle Edwards Park. Chlorinated effluent is dechlorinated with sodium bisulfite at the dechlorination vault (just upstream of the Denny Regulator) before it is discharged into Elliott Bay through the Elliott West CSO outfall.

5. **Pump & Treat Extreme Event mode:** An extreme event is when a large storm occurs during a high tide, forcing the tide flap gates on CSO water conveyance to divert additional CSO water to the EBI, instead of discharging at Elliott Bay, thereby increasing the level in the EBI and at the Denny Way Regulator Station. To provide additional storage for the extra flows, the pump station goes into pump and treat mode at a lower wet well level. Any additional inflow that cannot be pumped for CSO treatment, pass through the wet well overflow into the wet well drop structure. This mode has been disengaged as an operational mode.

6. **Untreated Discharges at Denny Regulator:** When Elliott West capacity of 250 MGD is exceeded, untreated CSO discharges occur at the Denny Way CSO.

Auto-samplers collect flow-paced composite samples of the untreated CSO flows returned to West Point Treatment Plant at Elliott West, and also collect samples of the treated CSO flows discharged from the Elliott West CSO Transition Structure. The fecal grab samples are collected from a sample tap on the effluent sample line to the effluent composite sampler. For this reporting period, disinfection and dechlorination doses are residual controlled. PLC safety interlocks for the chemical control systems abort disinfection in the event of dechlorination system failure.

Henderson/MLK Wet Weather Treatment Station
Flow and Wasteload Assessment 2018

This report reviews flows and permit compliance at the Henderson/MLK Wet Weather Treatment Station (HMLK) from 2013 through June 2018. It summarizes and evaluates filling and discharge events, peak flows and annual volumes. It also summarizes and evaluates HMLK's permit compliance for the current NPDES permit which went into effect in 2015.

Data from 2017 are included in this report even given the unfortunate and unusual events of the West Point Treatment Plant (West Point) flooding (Feb. 9, 2017) and failure of the marine flap-gate at the Denny Regulator (Fall 2017). Because HMLK is located far upstream in the collection system, these events had little impact on the amount of flow sent to HMLK or the resulting discharge quality. However, these events did have an impact on HMLK's 2017 total suspended solids (TSS) removal performance because West Point's TSS removal was so low over several months following the flooding. HMLK's 2017 TSS percent removal efficiency averaged 45.5%. TSS removal for 2015, 2016 and 2018 were all greater than 50%.

The HMLK began operating in May 2005. The facility operates under the permit for West Point, Washington State Department of Ecology permit number WA-0029181-1. The current permit went into effect February 1, 2015, and expires January 31, 2020. The report was prepared to fulfill Special Condition S4.E of the permit to be submitted with the permit renewal application (by January 31, 2019).

Permit Compliance:

Table 1 presents the current permit limits for the HMLK CSO treatment facility for TSS removal, effluent settleable solids (SS), pH, coliforms and total residual chlorine (TRC). Table 2 presents HMLK's total discharge volume, number of discharge events and the peak day discharge flow for each year of 2013-2018. Annual rainfall from a local rainfall gauge is also presented to provide some context for the year-to-year differences in volumes and number of events. Table 3 summarizes compliance performance of HMLK for 2015 - 2018. Table 3 presents data back to 2015 when the current NPDES permit went into effect.

Table 1. NPDES permit conditions effective February 1, 2015

Effluent Limits: Outfall #044 – Henderson/MLK Wet Weather Treatment Station Latitude: 47.51194˚ Longitude: -122.29736˚		
Parameter	**Average Monthly**	**Annual Average** [a]
Total Suspended Solids Removal Efficiency [b]	Report	Equal to or greater than 50% removal of influent TSS
	Monthly Geometric Mean	
Fecal Coliform Bacteria	≤400/100 mL [c]	N/A
		Annual Average [a]
Settleable Solids	N/A	≤0.3 mL/L/hr
	Instantaneous Minimum	**Instantaneous Maximum**
pH [d]	≥6.0	≤9.0
	Maximum Daily [e]	
Total Residual Chlorine	≤39 ug/L	N/A

[a] Calculate annual averages as the average of all 'event' averages. Do not omit one event per year from calculation. Data must be collected and reported on a calendar year basis via WQWebDMR and in the Annual CSO Report.
[b] Calculate the TSS total removal efficiency on a mass balance basis as the percent of solids captured at the CSO treatment facility and then permanently removed at the West Point WWTP. The reported daily average TSS % removal efficiency at the West Point WWTP, corresponding to the event, must be used for calculating the total removal efficiency for the CSO facility. Note: While % TSS removal is reported on a monthly basis, compliance is based on the annual average as reported via WQWebDMR and in the annual CSO report as required in S11.
[c] For the monthly geometric mean, calculate the geometric mean of all samples collected during the month; use a value of 1 for the geomean calc when fecal coliform results are 0. Do not include non-discharge days in the calculation. Ecology provides directions to calculate this value in publication No. 04-10-020, Information Manual for Treatment Plant Operators, available at: http://www.ecy.wa.gov/pubs/0410020.pdf.
[d] Report the instantaneous maximum and minimum pH monthly. Do not average pH values.
[e] Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge is the average measurement of the pollutant measured over a calendar day while discharging.

Discharge Volumes, Peak Flows, and Number of Events: 2013 – 2018

Table 2 presents HMLK's total discharge volume, number of discharge events and the peak discharge flow for each year of 2013-2018. Compared with the other three CSO treatment facilities, HMLK operates the least often (e.g., the most discharges were 3x/year) and treats/discharges the smallest volume overall (e.g., the largest annual discharge volume was 18.6-MG in 2017).

Table 2. HMLK Annual Discharge Volumes, Peak Flows and Events: 2013-2018

Year	Annual Filling Volume [a] (MG)	Annual Discharge Volume [a] (MG)	Peak Discharge Flow [c] (MGD)	No. of Discharge Events/Days	No. of Filling + Discharge Events/Days	Annual Rainfall Henderson PS/SeaTac (inches)
2013	2.7	0	N/A	0/0	2/3	25.9
2014	10.5	0.8	7	2/2	6/8	39.0
2015	26.6	15.0	35	3/5	4/8	35.8
2016	3.3	0	N/A	0/0	4/5	42.4
2017	34.7	18.6	40	3/4	7/10	44.5
2018	8.6	3.6	22	1/2	3/4	28.7
Long Term Averages:						
2013-2018	14.4	6.3	40[c]	1.5/2.2	4.3/6.3	36.1/42.2
2013-2016	10.8	4.0	35[c]	1.25/1.75	4.0/6.0	35.8/42.8
2009-2012 [b]	12.4	6.4	41	1.0/1.25	3.0/3.75	39.2/42.6

[a] Total annual CSO discharge volume is reported instead of average monthly flow. Long term averages are based on annual discharge volume in million gallons (MG).
[b] Long-term 2009-2012 averages were reported in the 2013 permit renewal Flow and Wasteload report.
[c] Peak discharge flow is the largest instantaneous discharge flow. HMLK's Peak Capacity is 146-MGD.

Filling volumes/events and discharge volumes/events at HMLK varied significantly from year to year, even between years with similar annual rainfall totals. For example, annual rainfall totals in 2014, 2016 and 2017 were relatively similar. However, in 2016, HMLK had no discharge events and the annual inflow volume was relatively low. By contrast, HMLK had significantly higher inflow and discharge volumes in 2014 and 2017. Differences in rainfall patterns and intensity, as well as precedent weather conditions (e.g., snowfall), can explain some of the differences between these years.

New sources may also play a factor in the differences. Starting in late 2015 through 2018, several CSO control projects were completed by the Seattle Public Utilities (SPU) in the HMLK tributary area:

- **Basin 44/45: Storage Facilities** - 2.65 million gallons of storage in Seward Park (Basin 44) and 16,000 gallons of storage near Martha Washington Park (Basin 45). These storage facilities will release their flows to the KC system through Pump Station 9 in Basin 46.
- **Basin 46: Pump Station 9 Upgrade** – An upgrade of Pump Station 9 is projected to increase flows to the Henderson Pump Station from 3.2 million gallons per day (MGD) to 3.9 MGD.
- **Sub-basin 47B/ Basin 171: Conveyance Improvement** - 1,800 feet of 18-inch diameter pipe was installed to convey flows from Basins 47B and 171 to the KC Henderson Pump Station. The increased peak flow is projected to be 3.8 MGD.
- **Sub-basin 47C: Weir Raising Retrofit** – Provide additional storage in existing Storage Facility 7 by raising the existing weir within Overflow Structure 47C by 8-inches. The peak flows to the KC Henderson Trunk are projected to increase by 1.6 MGD (as a result of the increased hydraulic grade line behind the control orifice).

It's worth noting that the relative similarity in inflow volume, discharge volume and rainfall between 2015 and 2017 suggests that the West Point flooding (Feb. 2017) and the failed Denny Regulator marine flap gate (Fall 2017) had little impact on the volumes or number of events at HMLK in 2017.

Table 3 summarizes compliance performance of the HMLK facility for 2015 - 2018. The HMLK facility met the 50% annual TSS removal requirement in all of the years but 2017. The Feb. 9, 2017 flooding of West Point was the primary reason that HMLK did not meet the 50% TSS removal requirement in 2017. HMLK met the 0.3 mL/L/hr annual settleable solids average in all four years. HMLK achieved the monthly geomean limit for fecal coliforms in 5 out of 6 discharge months. HMLK achieved the maximum daily total residual chlorine (TRC) limit in 8 out of 11 discharge days. HMLK achieved the minimum and maximum daily pH limits during all 11 discharge days except for one exception to the minimum pH limit.

Solids (Percent TSS Removal and Settleable Solids)

HMLK met the ≥50% annual TSS recovery on three of the four years of the current permit cycle. In fact, TSS removal for those three years were at least 60% (59.8% actually). The poor TSS removals at West Point following the flooding event of Feb. 9, 2017 was the primary reason that HMLK did not meet the 50% TSS removal requirement in 2017. The low TSS removal efficiency calculation involves the solids removal performance at West Point, which was low during the flood recovery. HMLK met the annual average SS limit of 0.3 ml/L/hr in each of the four years.

Total Residual Chlorine

HMLK met the 39-μg/L daily average permit limit for effluent TRC on 8 of 11 discharge days of the current permit cycle. Several factors played a role in these TRC permit exceptions.

Level measurement at the inlet and outlet weirs is a key factor in TRC compliance. These measurements determine when the hypochlorite and SBS chemical dosing pumps start/stop, and how much chemical dosing occurs. Both of the inlet and outlet weirs are very long (20-ft and 38-ft, respectively) which produce small changes in depth for a sizable change in flow. For example, 10-mgd of flow should produce about 4-inches of flow over the inlet weir and about 3-inches of flow over the outlet weir. (5-mgd would produce about 3-inches and 2-inches, respectively.) Thus having reliable, responsive, and precise level measurement at the inlet and outlet weirs is a key factor. This is especially true when the inlet and outlet levels are very near the level of the weirs themselves. This was the case during the March 5, 2015 TRC exception when the SBS pumps did not operate for several hours. Thus, the inlet and outlet weirs were re-leveled in 2017 and fine-range level sensors were installed at both weirs in 2017-18 to achieve greater precision when measuring water depth over these weirs.

Table 3. HMLK Compliance – Annual Summary 2015 – 2018

	Annual Average TSS Removal	**Annual Event Average SS**	**Fecal Coliform, Monthly Geometric**	**Total Residual Chlorine, Daily Average**	**Minimum pH, Daily**	**Maximum pH, Daily**
(Permit Limit)	*(≥ 50%)*	*(≤ 0.3 mL/L/hr)*	*(≤ 400-cfu /100-mL)*	*(≤ 39-μg/L)*	*(≥ 6.0)*	*(< 9.0)*
	Average %Removal	Average SS	No. of permit deviations/chances	No. of permit deviations/chances	No. of permit deviations/chances	No. of permit deviations/chances
2015	59.8%	<0.1	1/3	1/5	0/5	0/5
2016	74.0%	N/A	0/0	0/0	0/0	0/0
2017	45.5%	<0.1	0/2	2/4	1/4	0/4
2018	86.4%	<0.1	0/1	0/2	0/2	0/2
Long Term Averages						
2015-2018	57%	<0.1	0.25/1.5	0.75/2.75	0.25/2.75	0/2.75

Proper chemical dosing at the inlet and outlet over a wide range of flows is another key factor in TRC compliance. In addition to assuring accurate, precise level measurement over the weirs, properly-sized pumps, flow-monitoring of these pumps, and TRC measurement before, as well as after, SBS dosing is also required. The existing hypochlorite and SBS dosing pumps are fairly large based on a decade of actual experience. Such large pumps made it difficult to control at the lower doses that are desirable (e.g., 3-4 mg/L Cl_2). Also these chemical pumps did not have flow meters on their discharge. In late 2017-2018, flow meters were installed on the hypochlorite and SBS chemical pumps to monitor – and provide feedback control of - their dose rates. In summer 2019, the hypochlorite and SBS pumps will be replaced with smaller capacity pumps that will better operate over a wider range of required doses, especially at lower doses.

TRC measurement after SBS addition was improved in 2015 by installing an activated carbon cartridge on the continuous city water supply that is used to wet the outlet TRC analyzer between events. The carbon dechlorinates the city water from about 500-μg/L to about 30-50 μg/L. Supplying wetting-water with a Cl_2 level near the permit limit has improved the reliability and accuracy of the TRC instrument during events. In 2019, an additional on-line TRC analyzer will be installed to measure the TRC just upstream of SBS addition. The pre-SBS TRC measurement will be used for feed-forward control of the SBS pumps.

Fecal Coliform

HMLK met the 400-cfu/100-mL monthly average permit limit for effluent fecal coliforms on 5 of 6 discharge months. The one exception was related to a decision during one event to temporarily turn off the hypochlorite disinfection pumps because of very high effluent TRC levels. All of the corrective actions related to improving hypochlorite dosing and better flow measurement should significantly improve the ability to meet the fecal coliform limit and reduce the need to intervene.

Instantaneous pH

HMLK met the daily maximum effluent pH limit on all 11 discharge days. HMLK met the daily minimum effluent pH limit on 10 of the 11 discharge days. The one exception to the minimum pH was probably related to a short-term high dose of SBS (in response to a high effluent TRC level) as well as an incorrect outlet weir level measurement that may have caused SBS to be added to the tunnel before the event. All of the corrective actions related to improving flow measurement at the inlet and out let weirs, and improving hypochlorite and SBS dosing should significantly improve the ability to maintain the effluent pH at or above the minimum limit of pH 6.0.

Basin Population and Land Use

The HMLK basin is primarily a single-family residential area, with some multi-family and commercial areas. This basin is considered to be substantially developed currently. Slight densification of the area may occur over the next 5 years due to limited redevelopment, e.g., lot subdivision. Flows to HMLK are more likely to increase – though slightly - over the next 5 years due to CSO control projects in the area.

Henderson/MLK CSO Facility Improvements Project

In 2015, a consultant study recommended improvements to address challenges with consistently meeting NPDES permit requirements for disinfection and dechlorination. In 2016, a capital project was funded to complete improvements based on the consultant's recommendations. Project tasks were separated into two phases. Phase-1 improvements, which were completed in late 2017, are intended to enhance the flow-pacing accuracy of the existing hypochlorite and SBS pumps:

- Re-level the existing inlet and outlet rectangular weirs to provide a more accurate inlet and outlet flow calculation over these very long weirs, which in turn will provide better control of chemical dosing.
- Install new fine-range bubbler sensors directly upstream of the tunnel's inlet and outlet weirs to provide greater accuracy at the small incremental level changes that occur over these very long weirs. A more accurate flow reading will provide better control of chemical dosing. The existing level sensors will be retained for redundancy and full-depth readings.
- Install flow meters on the hypochlorite and SBS chemical dosing lines to verify that the actual applied chemical dose is equal to the dose set point (e.g., lbs/MG) in the control system. The chemical flow meters will also be used in the control systems for feed control after the new chemical feed pumps and pre-dechlorination analyzer are installed.
- Improve venting of the chemical supply lines by removing and relocating pressure-relief valves at various locations on the hypochlorite supply lines.

Phase-2 improvements are based on "right-sizing" the chemical dosing pumps to better match actual flows and doses, and installing tools to improve control of the dechlorination process. Right-sizing the chemical pumps was very important given that actual flows have been far lower than the 146 MGD peak design flow. The largest inflow recorded at the facility, thus far, is only 55 MGD; current modeling suggests that peak flows will only reach about 75 MGD in the foreseeable future. Right-sizing the chemical pumps was also important because actual doses have been much lower than the dose assumed during initial design. Hypochlorite doses required to meet the 400-cfu/100-mL have usually been near 3-4

mg/L as Cl_2 while the initial design assumed 10-mg/L. Thus, the current hypochlorite pump capacity is nearly five times the demand required during most events. The new chemical pumps, while providing the lower doses with more accuracy, will still provide a sufficient dose if a 146 MGD peak flow occurs. Thus, the new equipment will maintain the HMLK facility's rated capacity of 146 MGD.
Installation of the Phase-2 improvements is scheduled for mid-2019. The second phase of work (Phase 2) includes the following tasks:

- Replace the three existing hypochlorite chemical feed pumps. The existing hypochlorite pumps are as much as five times larger than necessary based on historic operating conditions. The prior plan had been to modify the existing pumps, however, during design it was decided that new pumps will better match the range of actual and expected doses.
- Replace the two existing SBS chemical feed pumps. The two existing SBS chemical feed pumps are as much as two times larger than necessary based on historic operating conditions. The prior plan had been to modify the existing pumps, however, during design it was decided that new pumps will better match the range of actual and expected doses.
- Install a new chlorine residual analyzer before the tunnel outlet weir (referred to as pre-dechlorination analyzer). This chlorine residual signal will be used for feed-forward control of the SBS dose along with outlet flow; the SBS pumps are currently only controlled by outlet flow rate.
- Install a new strainer on the SBS pump suction lines to remove impurities, debris and chemical residues to avoid interference with the metering pumps.

As with all wet weather treatment stations, and especially this facility, opportunities to optimize operations are limited because of the relatively infrequent number of events. Challenges may be identified during one wet season, and design and implementation of major improvements may not be completed until the next wet season, with opportunities to test and monitor the improvements subsequently dependent on following storm events. Given the complexity and "normal" challenges of an intermittently-operated WWTS facility, WTD staff will continue to monitor, evaluate, and make necessary adjustments in the station's operation and maintenance. Similarly, equipment improvements will follow a design-construct-operate-monitor-adjust cycle. Additional improvements will be made as necessary.

Attachment 7

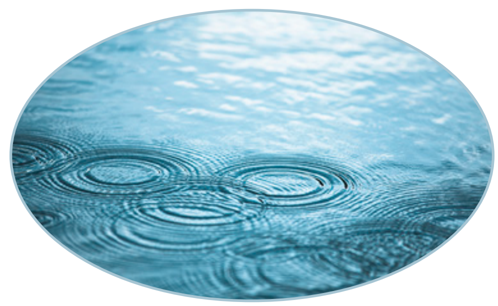
2018 Combined Sewer Overflow (CSO) Control Program Update

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

Combined Sewer Overflow Control Program

2018 CSO Control Program Update

October 2018



King County
Department of Natural Resources and Parks
Wastewater Treatment Division
Combined Sewer Overflow

2018 CSO Control Program Update

October 2018

King County

Department of
Natural Resources and Parks
Wastewater Treatment Division
Combined Sewer Overflow Program
King Street Center, KSC-NR-0512
201 South Jackson Street
Seattle, WA 98104

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Acronyms and Abbreviations

CD	consent decree
County	King County
CSO	combined sewer overflow
CSOCP	combined sewer overflow control policy
CWA	Clean Water Act
DOJ	U.S. Department of Justice
ESJ	equity and social justice
EPA	U.S. Environmental Protection Agency
Ecology	Washington State Department of Ecology
GSI	green stormwater infrastructure
K.C.C.	King County Code
LTCP	long-term control plan
Metro	Municipality of Metropolitan Seattle
MG	million gallons
MGD	million gallons per day
MLK	Martin Luther King
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCMP	Post-construction Monitoring Plan
PLC	programmable logic controller
PS	pump station
ROW	right-of-way

RS	regulator station
RWSP	Regional Wastewater Services Plan
SCADA	supervisory control and data acquisition
SMP	Sediment Management Plan
SPU	Seattle Public Utilities
TP	treatment plant
UW CIG	University of Washington Climate Impact Group
WAC	Washington Administrative Code
WQA/MS	Water Quality Assessment and Monitoring Study
WTD	King County Wastewater Treatment Division
WWS	wet weather storage
WWTS	wet weather treatment station

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Executive Summary

This 2018 Combined Sewer Overflow (CSO) Control Program Update is submitted with King County's January 2019 National Pollutant Discharge Elimination System (NPDES) permit renewal application for the West Point treatment plant (TP). This Program Update documents the status of the County's implementation of the 2012 Long-term Control Plan (LTCP), including the County's CSO control strategies and accomplishments, progress on projects underway, planning-level control volume updates for future projects, and ongoing implementation of public involvement activities for the CSO program. This Program Update additionally reports on environmental studies completed since the 2012 LTCP that inform the CSO Control Program, including the Water Quality Assessment / Monitoring Study, a Climate Change study completed with the University of Washington Climate Impact Group, and the County's ongoing water and sediment monitoring programs.

Over the last two decades, there has been a downward trend for total annual CSO volume discharged while average annual rainfall has increased. This successful trend is a direct result of implementation of the CSO Control Program by King County.

On February 9, 2017, West Point TP experienced a major equipment failure, resulting in serious flooding at the plant and bypasses of untreated stormwater and wastewater into Puget Sound. The King County Wastewater Treatment Division (WTD) has been addressing recommendations from several investigative studies from the incident. Some of the recommendations address the ability of West Point TP to continue to reliably accommodate combined stormwater and wastewater flows, including stored CSO flows, in the future.

In preparation for this Program Update, alternatives developed as part of the approved 2012 LTCP for University, Montlake, and Hanford-Lander-Kingdome-King were reevaluated with updated information. The analysis considered recent monitoring of control techniques (such as green stormwater infrastructure), updated modeling information, and opportunities for collaboration with other agencies. The purpose of re-evaluating the approved 2012 LTCP alternatives was to identify any changes in conditions that could impact the type, size, and location of the alternatives since 2012. The results of this risk-based value analysis were similar to the triple bottom line results in the approved 2012 LTCP. Based on this review of the CSO program, the WTD does not recommend any changes or amendment to the LTCP at this time.

In the approved 2012 LTCP, the programmatic cost to implement the recommended alternatives was estimated at $711M. Escalated to 2017 dollars, this programmatic cost estimate is $849M. Further refinement of alternatives over the next ten years (when the last project is in design) could significantly increase the programmatic costs. CSO programmatic costs and alternatives that also protect or improve water quality will be evaluated in the WTD Systemwide Comprehensive Plan. As WTD continues implementation of the approved 2012 LTCP alternatives, it will incorporate updated modeling information and cost estimating into project planning and development. In doing so, the CSO Control Program will continue to evaluate CSO control alternatives and opportunities for projects that further benefit water quality in relation to its work.

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Chapter 1
Introduction

This 2018 CSO Control Program Update (Program Update) provides information on the current implementation status of King County's Combined Sewer Overflow (CSO) Long-term Control Plan (LTCP). The Washington State Department of Ecology (Ecology) CSO regulation (Washington Administrative Code [WAC] 173-245) requires that King County submit CSO LTCP updates to coincide with each National Pollutant Discharge Elimination System (NPDES) permit renewal for its West Point Treatment Plant (West Point TP). The updates are intended to document progress made toward implementation of the County's CSO Control Program and identify program priorities for the next five years and beyond. The last update submitted to Ecology was the 2012 CSO Long-term Control Plan (2012 LTCP), which recommended future capital projects for CSO control that are underway today. This Program Update is being submitted to Ecology with the West Point TP Application for NPDES Permit Renewal due January 31, 2019.

The U.S. Environmental Protection Agency (EPA) and Ecology approved the County's 2012 LTCP as meeting federal requirements on March 7, 2013. This approved version became the basis for settlement of ongoing negotiations with EPA, Ecology, and the U.S. Department of Justice (DOJ) to finalize a negotiated consent decree (CD) between King County, EPA, and Ecology. The CD (Case 2:13-cv-00677-JCC) was filed in U.S. District Court on July 3, 2013. The CD commits King County to implement capital projects cited in the 2012 LTCP within the timelines specified in the CD and 2012 LTCP. In addition to providing updated information on 2012 LTCP capital projects, the 2018 Program Update confirms King County is in line with approved LTCP and CD milestones.

This chapter describes what CSOs are, the reasons for controlling CSOs, and the County's CSO control strategies and accomplishments.

1.1 What Are CSOs?

Combined sewers, which carry both wastewater and stormwater in the same pipes, exist in many U.S. and international cities with infrastructure established before 1950, including older portions of the King County sewer system. CSOs are relief points designed into combined sewers that discharge excess stormwater and wastewater into water bodies when the combined sewer system is at capacity (Figures 1-1, 1-2, 1-3). These overflows protect wastewater treatment plants from being overwhelmed with too much flow, which can reduce a plant's treatment capacity or cause damage at the plant. The overflows also reduce sewer backups into homes, businesses, and streets during periods of heavy rain.

CSO discharges are made up of approximately 10 percent wastewater and 90 percent stormwater. CSOs are a recognized source of water pollution and, as such, are regulated by EPA and Ecology. King County is proactively working to reduce the frequency of CSOs at each of its CSO locations to no more than one overflow per year on a 20-year moving average.

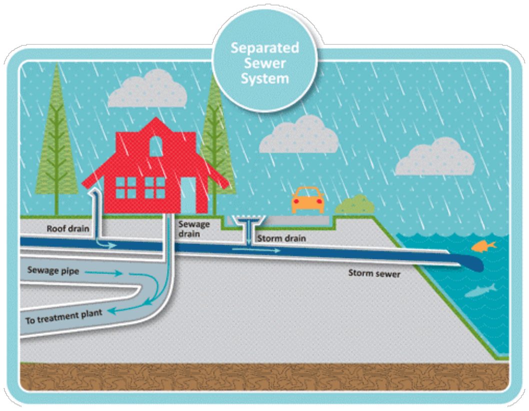

Figure 1-1 Separate Sewer System

A separate sewer system is designed to collect sewage from homes and carry it to a treatment plant. A separate storm system carries rainwater from roofs and streets to local water bodies without treatment.

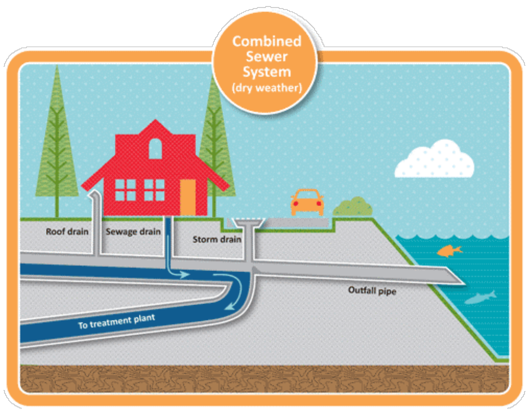

Figure 1-2 Combined Sewer System (Dry Weather)

A combined sewer system is designed to carry sewage and stormwater in the same pipes. During dry weather, all sewage is collected and treated.

Figure 1-3 Combined Sewer System (Wet Weather)

During rainy, wet weather, sewage and stormwater are largely collected and treated. However, heavy rains can overwhelm the sewer system, causing CSOs.

1.2 Why Reduce CSOs?

Regulations, agreements, policies, and public expectations require, either directly or indirectly, the reduction of CSOs to protect public health, water quality, sediment quality, and aquatic species in water bodies.

1.2.1 CSO Control Regulations

The Clean Water Act (CWA) of 1972 is the main driver for the reduction of CSOs. The goals of the CWA are to eliminate the discharge of pollutants into the nation's waterways and to achieve and maintain fishable and swimmable waters. These goals are achieved through the NPDES permit program and through federal, state, and local pollution control programs to meet specific water quality standards. Effluent limits are established to protect human health and the environment. King County holds NPDES permits for its West Point, South, Vashon, Carnation, and Brightwater treatment plants. The West Point TP NPDES permit includes operation and management of four CSO wet weather treatment stations and 39 CSOs for which King County is responsible. (There are additional CSOs within the King County service area that are managed by the City of Seattle under their own CD and LTCP.)

State and federal laws focus on reducing the number of CSO events that occur each year. Because the threat to public health from exposure to bacteria is temporary, reducing CSO events reduces that threat. These laws focus on water quality, sediment quality, and species protection in response to public concern over observed environmental impacts to rivers and lakes in their communities. The number of allowable CSO events is set by Ecology and reinforced by the County's own policies. As defined by Ecology's CSO regulation (WAC 173-245), a "controlled" CSO can overflow no more than one time each year. When the average frequency of overflows from a CSO exceeds the CSO event limit, or performance standard, the CSO is considered "uncontrolled".

1.2.2 King County Policies

In the 1970s, the Municipality of Metropolitan Seattle (Metro) and its successor, King County, began implementing CSO control projects to improve water quality in the Seattle area. Metro first developed and implemented a specific CSO control program in 1979. Since then, WTD has expanded its approach to CSO control, incorporating changes and updates based on water quality and climate research, community input, regional priorities, and evolving regulations and policy guidance.

As set forth in King County Code (K.C.C. 28.86), CSO control policies (CSOCPs) and decisions on CSO control must balance several factors, including public health and the environment, regulatory requirements, financial goals, scientific information, and public opinion, as follows:

- *CSOCP-1: King County shall plan to control its CSO discharges by the end of 2030 to meet:*

  1. The state's CSO control standard of an average of one untreated discharge per CSO outfall per year based on a twenty-year moving average, and

2. Conditions of National Pollutant Discharge Elimination System permit requirements;

3. Conditions of the Environmental Protection Agency/Washington State Department of Ecology Consent Decree.

- *CSOCP-2: King County shall continue to work with state and federal agencies to develop cost-effective regulations that protect water quality. King County shall meet the requirements of state and federal regulations and agreements.*

- *CSOCP-3: Consistent with the Environmental Protection Agency/Washington State Department of Ecology Consent Decree and the county's long-term CSO control plan as approved through Ordinance 17413, King County shall give the highest priority for control of CSO discharges that have the highest potential to impact:*

  1. Human health through contact with CSO flows or fish consumption; or

  2. Environmental health, such as in areas where sediment remediation is underway or anticipated or where there is potential to impact species listed under ESA.

- *CSOCP-4: Consistent with its legal authority, if King County constructs new projects that would separate stormwater from its combined system that result in separated stormwater discharges to waterways, the county shall coordinate with the city of Seattle in the city's municipal stormwater National Pollutant Discharge Elimination System permit (MS4) process as appropriate.*

- *CSOCP-5: King County's wastewater conveyance and treatment facilities shall not be designed to intercept, collect and treat new sources of stormwater. However, King County may evaluate benefits and impacts to the county system from accepting stormwater from the city of Seattle that is not currently in the combined system and shall consider factors including, but not limited to existing capacity, benefits and costs to ratepayers and the regional system, operational impacts, payment to county for value of the use of available capacity and for the costs of conveyance and treatment of new sources of stormwater and compliance with state and federal regulations and commitments.*

- *CSOCP-6: In accordance with King County's industrial waste rules and regulations, including K.C.C. 28.84.050.K.1 and 28.84.060, the county shall accept contaminated stormwater runoff from industrial sources and shall establish a fee to capture the cost of transporting and treating this stormwater. Specific authorization for such discharge is required.*

- *CSOCP-7: King County shall consider implementing green stormwater infrastructure projects to control CSOs when results of technical, engineering, and benefit/cost* *analyses and modeling demonstrate it is a viable and cost-effective CSO control method.*

- *CSOCP-8: King County shall consider implementing joint CSO control projects with the city of Seattle when it is cost-effective, is within county legal authorities and can be accomplished within the schedule outlined in the Environmental Protection Agency/Washington State Department of Ecology Consent Decree and the county's approved long-term CSO control plan.*

- *CSOCP-9: King County shall implement its long-range sediment management strategy to address its portion of responsibility for contaminated sediment locations associated with county CSOs and other facilities and properties. Where applicable, the county shall implement and cost share sediment remediation activities in partnership with other public and private parties, including the county's current agreement with the Lower Duwamish Waterway Group, the Department of Ecology and the Environmental Protection Agency, under the federal Comprehensive Environmental Response, Compensation and Liability Act.*

- *CSOCP-10: Consistent with the Environmental Protection Agency/Washington state Department of Ecology Consent Decree, King County shall assess CSO control projects, priorities and opportunities using the most current studies and information available, for each CSO Control Plan Amendment as required by the Department of Ecology in the National Pollutant Discharge Elimination System permit renewal process.*

- *CSOCP-11: Before completion of a National Pollutant Discharge Elimination System required CSO Control Plan Amendment, the executive shall submit a CSO program review report to the council and RWQC. The purpose of the review is to evaluate, at a minimum, changes to regulations, new technologies, existing CSO control performance, and human and environmental health priorities that may affect implementation of the CSO Control Plan. Based on its consideration of the CSO program review, RWQC may make recommendations to the council for modifying or amending the CSO program, including changing the sequencing of CSO projects. Any future updates or amendments to the county's long-term CSO control plan are subject to Environmental Protection Agency and Washington state Department of Ecology approvals.*

- *CSCOP-12: King County shall implement its CSO control projects in accordance with the Environmental Protection Agency/Washington state Department of Ecology Consent Decree and the schedule outlined in the county's approved long-term CSO control plan.*

- *CSOCP-13: King County shall prepare a water quality assessment and monitoring study, consistent with the guidance provided in Ordinance 17413 and other applicable legal requirements, to inform the next combined sewer overflow control* *program review in 2018.* (Ord. 17587 § 1, 2013: Ord. 15602 § 4, 2006: Ord. 13680 § 8, 1999)

Before each CSO LTCP update, the County reviews the plan, progress made toward CSO control, and priorities of its existing CSO Control Program against conditions that may have changed since the last update. Conditions include flow patterns, scientific developments, new or revised regulations, new technologies, and public priorities. Any significant changes in conditions may require adjustment of the LTCP and, potentially, the CD.

1.2.3 Public Perception and Preferences

The community has regularly provided input on CSO-related plans and projects since the regional wastewater system was formed in 1958. Community input is routinely sought through meetings, workshops, and interviews with environmental and community groups, tribes, agencies, and the general public. WTD public involvement activities during this Program Update have reaffirmed the following themes heard during development of previous CSO control plans, CSO Control Program reviews, and CSO control projects:

- Water quality is a priority for the residents of King County.
- WTD should continue to protect and enhance water quality.
- King County residents believe CSOs should be controlled.
- WTD should collaborate on projects with the City of Seattle when it is cost-effective to do so or when it benefits both agencies.

The community also expressed concerns about the cost of controlling CSOs and the challenge of achieving the best environmental benefit for their investment. This input led the King County Council to recommend conducting the Water Quality Assessment and Monitoring Study (WQA/MS) for the water bodies where CSOs discharge to understand current and future loadings of pollutants from other pathways in comparison to CSOs and to inform this Program Update on the sequence and timing of the remaining CSO projects. The WQA/MS is discussed further in Section 2.6.1.

The content and implementation of the LTCP Public Involvement Plan, discussed further in Chapter 4, reflect the County's Equity and Social Justice (ESJ) commitments and support the CSO Control Program's commitment to ESJ. ESJ considerations are applied throughout the CSO Control Program's long-term planning process, including planning-level reviews of populations in CSO basins and the alignment of alternatives rating criteria with the 14 Determinants of Equity identified in the ESJ Strategic Plan. During implementation of long-term CSO control projects, financial capacity assessments further present opportunities to consider the ways in which CSO control efforts impact communities across King County.

1.2.4 2013 Consent Decree

King County is one of many wastewater utilities across the nation under a CD with EPA. These utilities are typically in older, larger cities in Northern or Midwestern states, where combined sewer systems create CSO events. King County's CD, finalized on July 3, 2013 (Civil Action No. 2:13-cv-677), is a written agreement between King County, Ecology, EPA, and DOJ that outlines planned actions and provides specific milestones to achieve them in order to resolve alleged violations of the law. After completing the 2012 LTCP, King County worked with EPA and successfully demonstrated that the LTCP met federal requirements and, when fully implemented, would comply with federal and state standards to bring all CSOs under control.

Rather than risk long and costly litigation, in 2013, King County negotiated a settlement in which the 2012 LTCP Amendment formed the basis of our CD. The CD requires the County to implement CSO controls that will reduce direct discharges of all remaining uncontrolled CSOs to waters that reach Puget Sound by 2030 and describes the required projects and a schedule. The CD was modified in 2016 to reflect a joint project with Seattle Public Utilities (SPU) to control two of King County's CSOs as well as four of SPU's CSOs. This joint project, known as the Ship Canal Water Quality Project (Ship Canal Project), is discussed further in Section 3.2.2.2.

1.2.5 Reporting on WTD's CSO Control Program

WTD reports on the progress of its CSO Control Program annually and also undertakes a more comprehensive program review to coincide with the renewal of the West Point TP NPDES permit. As part of the Regional Wastewater Services Plan (RWSP) policies, enacted by the King County Council in 1999, WTD must submit a CSO Control Program update to Ecology and EPA. The history of King County CSO control planning is as follows:

- 1979 – King County's predecessor, Metro, adopted its first CSO Control Plan.
- 1985–1986 – The Plan for Combined Sewer Overflow Control and the Supplemental Plan for Combined Sewer Overflow Control were prepared, integrating the CSO Control Plan into a systemwide planning effort.
- 1987 – Ecology defined "CSO control" as "control of each CSO in such a way that an average of one untreated discharge may occur per year."
- 1988 – The 1988 Combined Sewer Overflow Control Plan was prepared to respond to the new Ecology definition of "CSO control."
- 1995 – As part of the West Point TP NPDES permit renewal, King County prepared an amendment to the 1988 Combined Sewer Overflow Control Plan, called the 1995 CSO Control Plan Update.
- 1999 – As part of the RWSP, King County prepared the 1999 Plan Amendment, listing 21 CSO control projects to bring all CSOs into control by 2030.
- 2000 – As part of the West Point TP NPDES permit renewal, King County prepared the CSO Control Plan Year 2000 Update. No changes to the CSO Control Plan were recommended.

- 2008 – Following a CSO Control Program Review conducted in 2006, and as part of the West Point TP NPDES permit renewal, King County prepared the 2008 CSO Control Plan Update. No changes to the CSO Control Plan were recommended.

- 2012 – From 2008 to 2010, WTD conducted a comprehensive evaluation of conditions, opportunities, science, treatment technology, regulations, and community input that resulted in reprioritization of project order and identified nine projects to control the remaining 14 uncontrolled CSOs in the 2012 LTCP.

- 2013 – The County entered into a CD with EPA, Ecology and EPA, which was based on the 2012 LTCP.

- 2018 – As part of the West Point TP NPDES permit renewal, King County prepared this Program Update. No changes to the LTCP are recommended at this time.

1.2.5.1 Incident at West Point Treatment Plant on February 9, 2017

On February 9, 2017, West Point TP experienced a major equipment failure, resulting in serious flooding at the plant and bypasses of untreated stormwater and wastewater into Puget Sound. This incident is described in more detail in the 2017 CSO Annual Report.

Because of the equipment failure and flooding at West Point TP, several studies were performed to investigate the causes of the incident and ensure the reliability of the entire regional system in the future. The results of these studies that most directly impact the combined sewer system and CSO Control Program, in particular, are the recommendations that address the ability of West Point TP to continue to reliably accommodate combined stormwater and wastewater flows, including stored CSO flows, in the future. These recommendations include having adequate redundancy and reliability at West Point TP to accommodate peak flows and flexibility to treat peak flows, potentially for longer periods of time or more often; addressing the maintenance, rehabilitation, and replacement of aging infrastructure; and continuing to improve WTD's ability to make risk-based asset management decisions. WTD has been addressing these issues through ongoing evaluations and capital project implementation.

1.3 What Is in this CSO Control Program Update?

The remainder of this Program Update is organized in the three following chapters:

- **Chapter 2, Effectiveness of Current CSO Control Plan**, describes King County's wastewater system, including CSO control facilities and practices, and the control status of County CSOs. It also shows how King County is meeting EPA's Nine Minimum Controls, and describes the methods and results of efforts to monitor and model CSO volume and frequency to the water bodies that receive CSOs.

- **Chapter 3, CSO Control Projects**, describes completed, in process, and planned CSO control projects, including projects that will be implemented during the next NPDES permit cycle. It also describes available CSO control strategies and how they apply to County projects.

- **Chapter 4, Public Involvement Activities Related to the CSO Control Program**, presents King County's public involvement policies and planning strategies, public notification program, and public involvement activities.

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Chapter 2

Effectiveness of Current CSO Control Plan

2.1 Combined Sewers in King County's Service Area

Today, King County's wastewater treatment system is the largest in the Puget Sound region and is managed to convey and treat wastewater from 17 cities, 16 local sewer utilities, and one Native American tribe in and adjacent to the County.

Within the King County wastewater treatment service area (Figure 2-1), the combined sewer system exists within the City of Seattle (Seattle). CSOs discharge to Puget Sound, the Duwamish Waterway, Elliott Bay, Lake Union, the ship canal, and Lake Washington. In comparison, separate sewer systems in the regional system are primarily located outside of Seattle in the other 33 jurisdictions in the service area. There are limited areas within Seattle that have separate sewer and stormwater systems.

The City of Seattle, through SPU, also manages its local sewer system within King County's combined sewer service area. Like King County, SPU has CSOs and manages them according to its own CSO LTCP, NPDES permit, and CD (Section 2.1.2).

In 2018, King County estimated the average annual volume of stormwater that is captured within its combined sewer service area. Stormwater that enters King County's combined sewer system is discharged in three ways:

1. after secondary treatment at West Point TP
2. after primary treatment standards at one of King County's WWTSs
3. as an untreated CSO.

The stormwater estimates were based on a 38-year continuous-simulation model run in 2016 (Section 2.4.1.2). King County used the model to determine an average annual dry weather flow. Any flows greater than the average annual dry weather flows were assumed to be stormwater. King County estimates that its facilities treat an average of 12.4 billion gallons of stormwater, and discharges an average of 527.6 MG of stormwater as untreated CSOs.

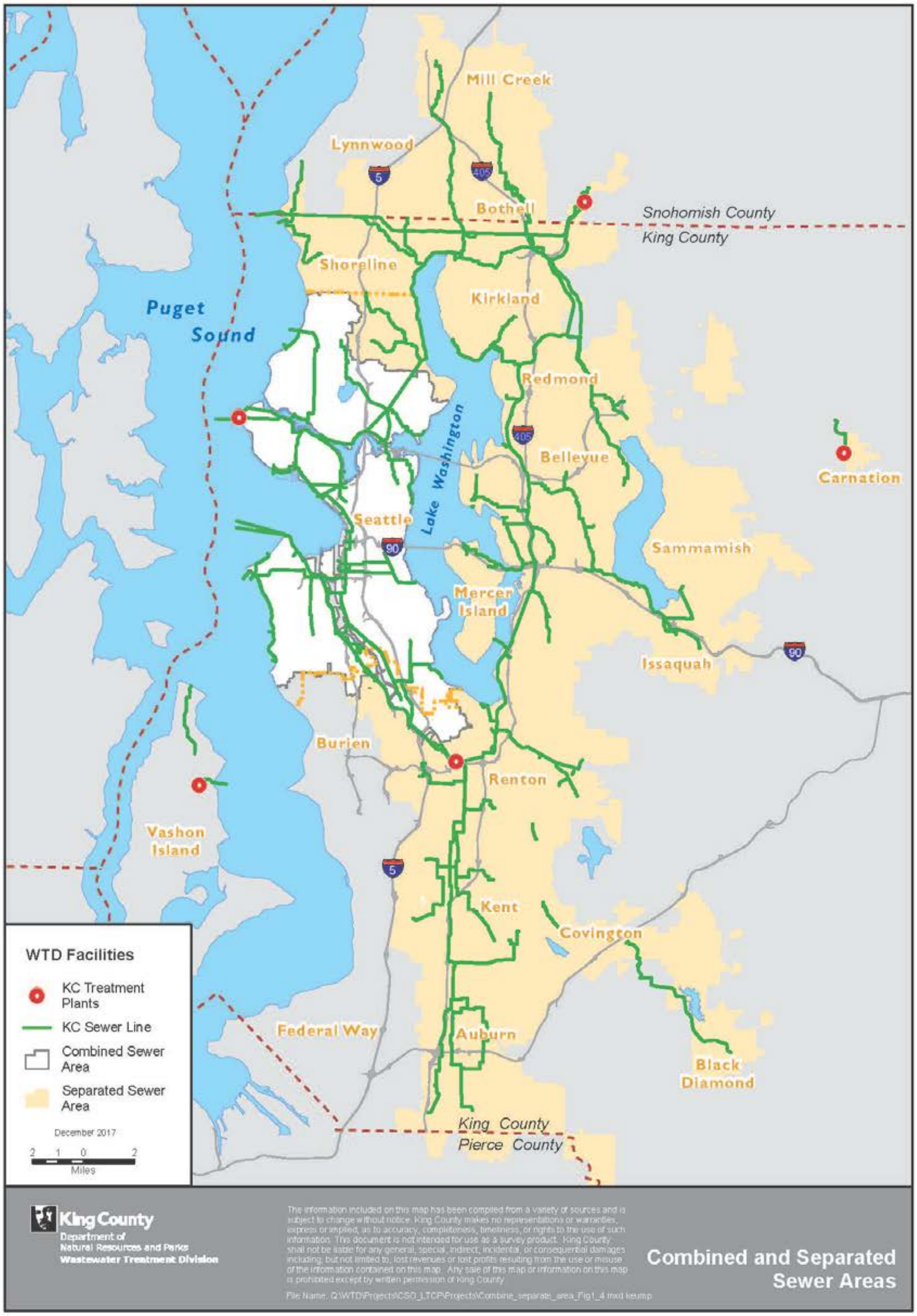


Figure 2-1 King County Wastewater Treatment Service Area

2.1.1 King County's Wastewater System

The wastewater treatment system actually begins in homes, businesses, and industries from sources such as toilets and sinks. Relatively small pipes carry wastewater from these sources to larger, local-agency-owned pipes, and then to even larger County-owned regional interceptor pipes. WTD, alone, operates and manages over 390 miles of sewer pipes. Along the way, automated regulator stations, pump stations, storage tanks, and other facilities help operators manage flows as they move toward wastewater treatment plants.

Most of King County's wastewater goes to three regional treatment plants (Brightwater Treatment Plant, South Treatment Plant [South TP], and West Point TP), where the wastewater flows through a series of treatment processes that remove solids and dissolved organics from the water and provide disinfection before being discharged to Puget Sound. The majority of the wastewater from the County's combined sewer system flows to West Point TP for treatment. In addition, the County owns and operates two local treatment plants (Carnation and Vashon) that serve smaller communities within the County's service area.

Figure 2-1 provides an overview of the County's wastewater treatment service area. Before being released to local waterways, wastewater moves through three treatment stages: primary treatment, secondary treatment, and disinfection (Figure 2-2). These stages are designed to clean the water, removing solids, dissolved organics, bacteria, and viruses. Lightning bolts in the figure indicate energy-conserving processes.

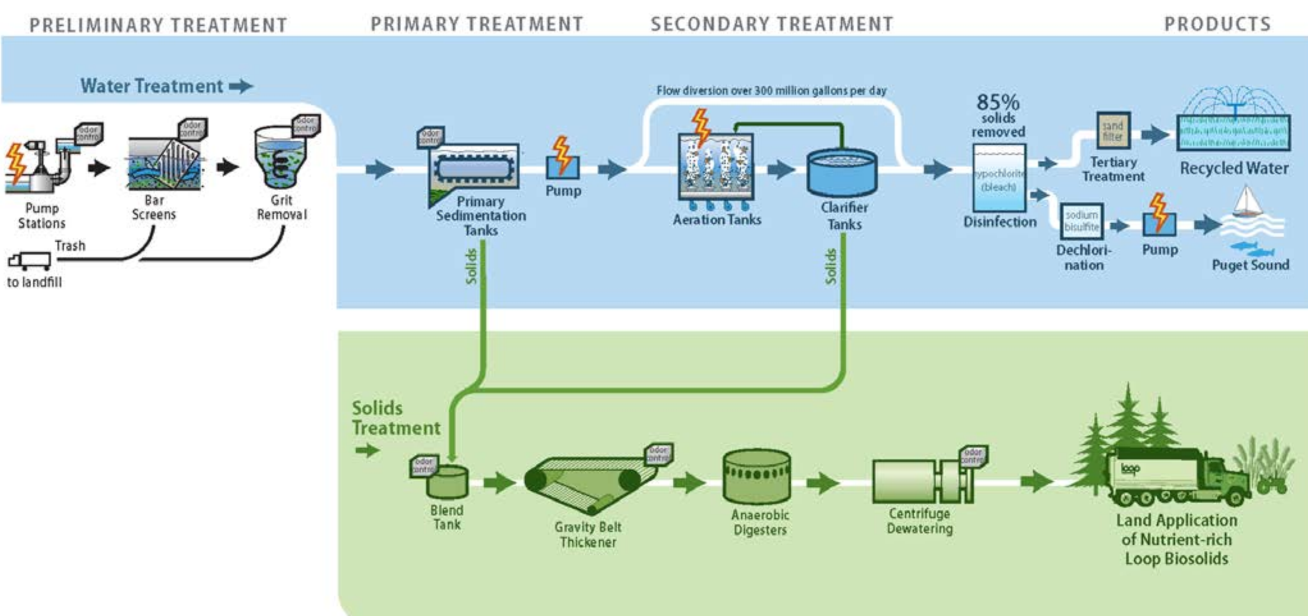


Figure 2-2 Wastewater Treatment Process

2.1.2 Relationship Between King County and City of Seattle Systems

King County operates a regional wastewater utility, providing wastewater conveyance and treatment services to local agencies who manage local conveyance systems for homes and businesses.

The City of Seattle, through SPU, is the largest local agency in WTD's service area and represents a mix of combined, partially separated (i.e., where roads connect to separate stormwater systems, but parcels connect to the combined system), and separated service areas (i.e., where stormwater flows in separate pipes from wastewater). As the regional provider, WTD treats Seattle's service areas as a combined sewer system and manages the system for peak flow during heavy rains. None of the other 33 local agencies has a combined sewer system.

Similar to King County, the City of Seattle is implementing CSO control projects under their CSO LTCP, NPDES permit, and CD. The County and SPU coordinate closely in their respective CSO control efforts and identify opportunities for cost-effective joint measures (operating and capital elements) for CSO control, as encouraged in each agency's CD.

WTD and SPU have both started new phases of planning for their respective wastewater system and wastewater and drainage system. In 2018, WTD started development of a Systemwide Comprehensive Plan to thoroughly assess the complicated demands on its wastewater system and identify a future direction for WTD that ensures the right investments are made at the right time to continue to protect water quality (Section 1.3). SPU's Drainage and Wastewater Integrated System Plan aims to improve water quality by directing future investment in Seattle's drainage and wastewater systems while providing the greatest community value through multiple benefits. WTD and SPU continue to coordinate and are working together to increase collaboration of these planning efforts to improve the results and increase the benefits realized by both agencies and the public.

2.2 CSO Control through Wastewater System Management

The policy set forth in the King County Code states:

> *King County shall construct, operate and maintain facilities to prevent raw sewage overflows and to contain overflows in the combined collection system. In the event of a raw sewage overflow, the county shall initiate a rapid and coordinated response including notification of public health agencies, the media, the public and the affected jurisdiction. Preserving public health and water quality shall be the highest priority, to be implemented by immediately initiating repairs or constructing temporary diversion systems that return flow back to the wastewater system.* (Wastewater Services Policy 8)

WTD's forecasting and demand modeling capabilities, in-field flow monitoring, and ongoing facilities inspection provide essential information to identify and address capacity and operation and maintenance (O&M) needs. The following sections describe WTD's efforts to ensure adequate capacity and to operate and maintain the system to prevent overflows.

2.2.1 Providing Adequate Capacity

Implementation of policies and projects described in the LTCP ensures that adequate wastewater capacity will be available when needed. To assess the need for new capacity, WTD conducts population and flow studies when new or updated census data become available from the Puget Sound Regional Council. In addition, WTD continually works with local component agencies to anticipate changes in flows from local agencies to the County's regional sewer system.

2.2.2 Operating and Maintaining the System

O&M programs for the combined and separate sewer systems are similar to enable efficiencies in sharing expertise and resources and to allow for quick response to unusual circumstances and emergencies. The treatment plants and the conveyance system are operated from main control centers at the treatment plants using a supervisory control and data acquisition system (SCADA). The SCADA system provides real-time flow and volume data that are constantly available, and allows WTD staff to understand and manage conditions in the sewer system.

WTD's operating strategy for its conveyance system is to send as much flow as possible to regional treatment plants while protecting treatment plant secondary biological treatment processes and meeting NPDES permit requirements.

The operating strategy is implemented with the following priority: (1) direct transfer to a regional plant; (2) inline storage, followed by transfer to a regional plant; (3) offline storage in facilities such as tunnels or tanks, followed by transfer to a regional plant; and (4) wet weather treatment and discharge. Using this priority sequence allows WTD to protect West Point TP from excess flows beyond its treatment capacity. Wet weather treatment stations (WWTSs), which handle large volumes of flow, are built to operate in conjunction with regional treatment plants. They operate only when flows cannot be managed immediately at regional plants and may be used only a few times a year to achieve the regulatory control standard (defined in Section 1.2.1).

Flows into the combined sewer system are also reduced through the use of green stormwater infrastructure (GSI), which functions to manage stormwater through groundwater infiltration and evapotranspiration before it enters the combined sewer system (Section 3.1.2). Reducing stormwater flows into the combined sewer system effectively increases the capacity of the system and can result in decreased CSO discharge events and volumes.

2.3 Implementation of EPA's Nine Minimum Controls

The EPA's Nine Minimum Controls are actions that can be taken to minimize CSO impacts while long-term capital projects are underway. When they were published, the Nine Minimum Controls packaged and codified elements, including CSO-specific elements, contained in the O&M programs of well-run wastewater management operations. Most requirements were already standard practice in the King County system. King County meets all Nine Minimum Controls and reports CSO compliance and related activities annually to Ecology and EPA through annual CSO and CD reports available at http://www.kingcounty.gov/services/environment/wastewater/cso/library/annual-reports.aspx.

Table 2-1 EPA Nine Minimum Controls

Minimum Control Name	Minimum Control Description
Control 1: Reducing CSOs through O&M	Implement proper O&M programs for the sewer system and all CSO outfalls to reduce the magnitude, frequency, and duration of CSOs.
Control 2: Storing CSOs in Collection System	Implement procedures that will maximize use of the collection system for wastewater storage to reduce the magnitude, frequency, and duration of CSOs.
Control 3: Optimizing Pretreatment Program	Review and modify, as appropriate, existing pretreatment program to minimize CSO impacts from discharges caused by nondomestic users.
Control 4: Maximizing Flow to Treatment Plant	Operate the publicly owned treatment works at maximum treatable flow during all wet weather flow conditions to reduce the magnitude, frequency, and duration of CSOs.
Control 5: Preventing Dry Weather Overflows	Dry weather overflows from CSO outfalls are prohibited.
Control 6: Controlling Solids and Floatables	Implement measures to control solid and floatable materials in CSOs.
Control 7: Preventing Pollution	Implement a pollution prevention program focused on reducing the impact of CSOs on receiving waters.
Control 8: Notifying the Public	Implement a public notification process to inform the citizens of when and where CSOs occur.
Control 9: Monitoring CSO Outfalls	Monitor CSO outfalls to characterize CSO impacts and the efficacy of CSO controls.

2.4 Monitoring and Modeling CSO Control: CSO Volume and Frequency

2.4.1 Relationship Between CSO Monitoring and Modeling

2.4.1.1 Monitoring Rainfall and CSO Flows

Monitoring rainfall and flows inside the regional system is key to assessing the frequencies and volumes of CSOs. This reliable record informs decision-making and is evaluated to determine compliance with CSO control regulations. Monitoring is carried out in the method most appropriate to the site and conditions considered, which may entail directly measuring overflows with flow meters or measuring the depth or flow level in a pipe with a known geometry and then using the data to calculate flow values.

WTD continuously monitors the frequency and volume of overflows at locations within the wastewater treatment system, such as at regulator or pump stations. Data collected from monitoring actual overflows as they occur are used to determine compliance with Ecology regulations and are included in the County’s monthly Digital Monitoring Reports to Ecology and annual reporting to Ecology and EPA.

WTD measures rainfall at 16 rain gauges maintained across the West Point TP conveyance system. Rainfall is measured in many locations because it is not even or consistent throughout Seattle. Rainfall duration and quantity are reported for each CSO event from the nearest gauge.

In addition, rainfall data, including rain gauge data from the City of Seattle and Sea-Tac Airport, are used in calibrating hydraulic models that simulate the flow in the collection system.

In addition to measuring rainfall, the County is working with SPU and the University of Washington (UW) to improve the ability to forecast storms and rainfall intensity regionally. An improved predictive capability of rainfalls allows for tailoring operations to specific storm forecasts and timing of storage use and release to reduce CSOs.

2.4.1.2 Modeling Future Facilities

WTD continues to update its continuous-simulation hydraulic model of its combined sewer system to support the sizing of facilities associated with implementation of its CSO Control Program. Continuous simulation models are based on historical long-term rainfall patterns and more realistically simulate rainfall variability than “event-based” models. In support of this Program Update, WTD completed a 38-year continuous-simulation model run in 2016. Hydraulic modeling provides the key design criteria for CSO control alternatives (i.e., the sizing of facilities required to achieve CSO control).

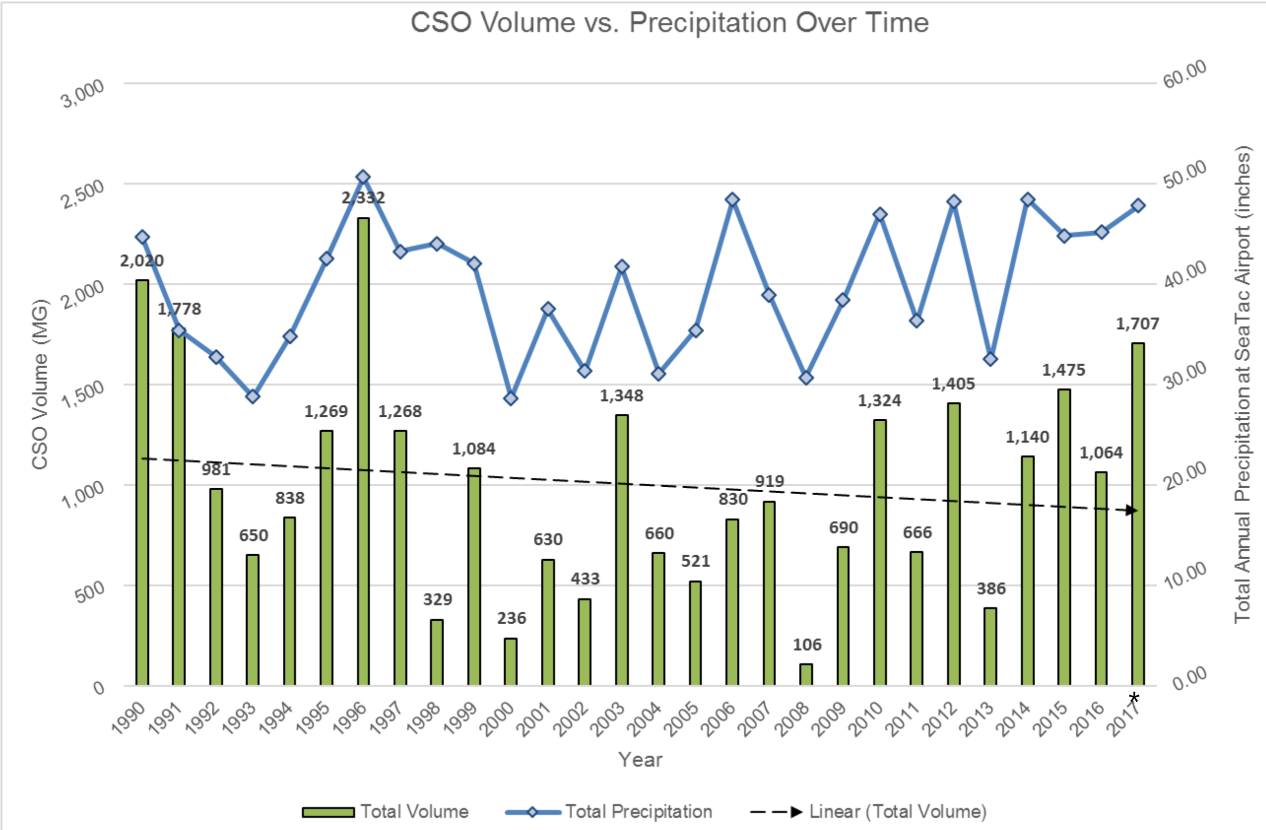
Because overflows vary with the pattern of rainfall from year to year, it is challenging to use monitored data to assess system capacity, patterns of performance, and progress in CSO control. One way to understand the patterns and trends is to take a longer-term view by using a computer model to estimate the average frequency and volume of overflows that would occur under actual rainfall patterns in the service area measured over many years. Modeled data are compared to monitoring data to calibrate the model to provide more accurate flow predictions for use in CSO Control Program planning and facility design.

WTD uses computer models to simulate stormwater and wastewater flow contributions to the combined sewer system under various conditions. These simulations, combined with field data and engineering, are used in the design and operation of CSO control facilities. Using models to retrospectively assess system performance after storms and events also informs “lessons learned” analysis and may lead to changes in operational settings to improve system management and optimize system performance. The model can also be used to assess how new or future facilities—including those operated by Seattle—will perform and interact with other parts of the regional wastewater treatment system. These assessments enable WTD to develop strategies to improve new or future facility design or operational coordination.

Modeling is also used to determine compliance with CSO control regulations if less than 20 years of actual monitoring data exist for a particular system component, such as after a new CSO control project is constructed. Models are used to predict how a CSO control facility would have performed over the 20-year period so an overflow average can be calculated and compared to Ecology’s performance standard. Section 2.5 presents more information on how WTD uses monitoring and modeling data to determine control status of its CSOs.

2.4.2 Relationship Between Measured Rainfall and CSO Volume

Figure 2-3 shows the relationship between recorded rainfall and overflow volumes over time. Rainfall amounts have fluctuated between wetter and drier years, whereas CSO volumes have trended downward because of the construction of new CSO projects. In wetter years, compliance to the one-year overflow per year (on a 20-year moving average) standard has historically been attainable with higher volumes of overflows, whereas, in drier years, compliance is easier to attain with extra capacity available in the existing sewer system.



*2017 CSO volumes were exacerbated to some extent due to the West Point TP incident described in Section 1.2.5.1.

Figure 2-3 King County CSO Volume and Precipitation Over Time

Over the last two decades, there has been a downward trend for total annual CSO volume discharged. This successful trend is a direct result of implementation of the CSO Control Program and other CSO control projects by King County.

2.5 Control Status of King County CSOs

The NPDES permit for the West Point TP, effective July 1, 2009, implemented a new interpretation of the performance standard for CSO control, which is derived from the Washington state regulatory requirements for “greatest reasonable reduction” as specified in WAC 173-245-020(22).

The performance standard of “not more than one untreated discharge event per year per outfall on average” is based on a 20-year moving average. The number of untreated discharges that occurred over each of the previous 20 years is reported for each CSO site and then averaged. This average is used to assess each CSO site’s control status with the performance standard, and is reported to Ecology annually.

King County uses a combination of monitoring and modeling data to track and report the 20-year average CSO frequency for each of the County's CSO sites. This moving average is used each year to assess CSO control status with the performance standard. As a result of monitoring system improvements, such as the upgraded SCADA system that was fully brought online in 2005, a full 20 years of measured data are not available for all CSO locations. CSO locations lacking a full 20 years of monitored data use a combination of monitored and modeled data to determine control status.

For CSOs where new control facilities have been built and, thus, lack the 20 years of measured data, modeled data of how the new facilities would have performed with the historic rainfall over those years have been substituted for the unavailable measured data. For CSOs not identified as controlled, only available measured data are reported.

Table 2-2 shows the CSO frequency 20-year average (1998–2017) as reported in the 2017 Annual CSO and Consent Decree Report and identifies the control status of each site. CSO sites that lack a full 20 years of measured data and CSO sites that use a combination of monitoring and modeled data are identified in the table. King County is addressing each of the uncontrolled CSOs identified in Table 2-2 through operational adjustments, supplemental compliance plans, and capital projects through the CSO LTCP. Descriptions of current and planned actions are described in Sections 2.5.1, 2.5.2, and 3.2.

Table 2-2 CSO Event Averages and Control Status

CSO Name	20-year Average of Events (1998–2017)	Current Control Status
11th Ave. NW	14.5	Uncontrolled
30th Ave. NE[a]	0.8	Controlled
3rd Ave. W	6.9	Uncontrolled
53rd Ave. SW PS[a]	0.3	Controlled
63rd Ave. SW[a]	1.4	Uncontrolled
8th Ave. S	0.1	Controlled
Ballard Siphon[b]	0.2	Controlled
Barton St. PS	1.6	Uncontrolled
Belvoir PS	1.5	Uncontrolled
Brandon St. RS[a]	17.6	Uncontrolled
Canal St.	0.5	Controlled
Chelan Ave. RS	5.2	Uncontrolled
Denny Way RS	10.1	Uncontrolled
Dexter Ave. RS	0.3	Controlled
E Duwamish PS	0.2	Controlled
E Marginal Way PS	0	Controlled
E Pine St.	0	Controlled

Hanford #1[a]	11.1	Uncontrolled
Hanford #2 RS	16.5	Uncontrolled
Harbor Ave. RS	1.6	Uncontrolled
Henderson St. PS[b]	0	Controlled
King St. RS	13.6	Uncontrolled
Kingdome RS	6.1	Uncontrolled
Lander St. RS	15.2	Uncontrolled
Matthews Park PS	0	Controlled
MLK Jr. Way	0	Controlled
Montlake RS[a]	7.7	Uncontrolled
Murray St. PS	0.9	Controlled
Norfolk St.	0.1	Controlled
North Beach PS Inlet Overflow[b]	0.1	Controlled
North Beach PS Wet Well Overflow	0.8	Controlled
Rainier Ave. PS	0	Controlled
S Magnolia	20.5	Uncontrolled
S Michigan St. RS	10.6	Uncontrolled
SW Alaska St.	0.3	Controlled
Terminal 115[a]	1.8	Uncontrolled
University RS	6.9	Uncontrolled
W Duwamish[a]	0.4	Controlled
W Michigan St.	4.6	Uncontrolled

[a] CSO site is missing one or more years of monitoring data used to determine CSO control status.
[b] New facility where a combination of modeling and monitoring data were used to determine CSO control status.

2.5.1 CSO Control Status Changes and Reporting

Upon identifying the changes in control status for CSOs reported as controlled in the CD, WTD notifies Ecology and EPA in accordance with the reporting and recording requirements outlined in Section S3 of the NPDES permit for West Point TP. Recently, modeling and monitoring data showed the Belvoir Pump Station Overflow (Belvoir PS Overflow) and the 63rd Avenue Southwest Pump Station Overflow (63rd Ave. SW PS Overflow) as not meeting Ecology's CSO performance standard. These two sites have historically been reported as controlled. WTD submitted notification letters to Ecology outlining actions for each of the CSOs to meet the performance standard in accordance with NPDES permit requirements and are described below.

2.5.1.1 Belvoir Pump Station

The Belvoir PS Overflow has historically been reported as controlled. However, updated modeling indicates that the CSO frequency has increased due to hydraulic and hydrologic changes. As of 2016, Belvoir does not meet the CSO control performance standard. WTD and SPU recognize that hydraulic and hydrologic changes have affected compliance at the Belvoir PS Overflow. WTD and SPU are committed to coordinating and developing mutually beneficial solutions. This includes working together to control WTD's Belvoir PS Overflow and SPU's Windermere Basins 13 and 15, which are combined sewer areas upstream of Belvoir. As a first step, WTD is working with SPU to meet the approach and schedule included in SPU's approved Windermere Basin 13 and Basin 15 Supplemental Compliance Plans, dated December 7, 2016 and April 18, 2018, respectively.

2.5.1.2 63rd Avenue Southwest Pump Station

In May 2018, monitoring data for the 63rd Avenue Southwest Pump Station (63rd Ave. SW PS) indicated that the CSO frequency increased because of hydraulic changes and no longer meets Ecology's CSO control performance standard. WTD is currently optimizing the West Seattle portion of its CSO system, which includes operating the Alki WWTS more frequently. Recent improvements have also been made to the 63rd Ave. SW PS, including changing two constant speed pumps to variable speed pumps and performing electrical and control upgrades. A comprehensive computer model of the West Seattle System will be completed by the end of 2018 and will be used to optimize operations by 2020. These upgrades and optimizations will increase operating flexibility and improve performance of the 63rd Ave. SW PS and the Alki WWTS. Operations staff will work to maintain control of the 63rd Ave. SW PS during the optimization period.

2.5.2 Supplemental Compliance Plans

Projects previously completed at four CSO sites—Denny Way Regulator Station Overflow (Denny Way RS Overflow), Harbor Avenue Regulator Station (Harbor Ave. RS), South Magnolia Wet Weather Storage (S Magnolia WWS), and Barton Street Pump Station Overflow (Barton St. PS Overflow)—have not fully achieved control to meet Ecology's CSO performance standard. The CD requires supplemental compliance plans for these projects. Supplemental compliance plans and work completed or currently underway to complete control at these four locations is described in the following sections.

Supplemental compliance plans are required for any CSO control measures identified in the CD if, at any time before the CD terminates, information becomes available that King County

- did not construct all CSO control measures in accordance with the design criteria set forth in the respective approved LTCP;
- has not achieved the performance criteria for the CSO control measures identified in the respective approved LTCP;

- is not complying with all the requirements of the respective NPDES permits pertaining to CSOs.

Supplemental compliance plans include descriptions of the remedial measure King County will take to ensure that compliance will be achieved; a schedule that is as expeditious as possible for design, construction, and implementation of the measures; a description of additional post-construction monitoring and modeling needed to assess whether King County has achieved compliance; and a schedule for performing monitoring and modeling.

WTD has four projects with active supplemental compliance plans:

- Denny Way RS Overflow
- Harbor Ave. RS Overflow
- S Magnolia WWS and Pipeline
- Barton St. PS Overflow

2.5.2.1 Denny Way Regulator Station Overflow

The Denny Way Regulator Station (Denny Way RS) was anticipated to be controlled as part of the Denny Way/Lake Union CSO Control Project completed in 2005. As part of this project, the Elliott West Wet Weather Treatment Station (Elliott West WWTS) was constructed to control the Denny Way CSOs and multiple CSOs around Lake Union. An investigation suggested that two of the inputs to the regulator station were overflowing more than intended. The investigation recommended removal of the lower Denny Way local weir and modification of the Elliott West WWTS pump ramp-up strategy to drop the lead pump start set point by 2.25 feet and improve flow into the Elliott West WWTS. The weir modifications were completed in July 2011 and pumping strategy modifications were completed on November 17, 2011. Additional work on the pumping strategy was completed in the fall of 2015. Monitoring in 2016 still showed control issues with Denny Way, and additional adjustments to pumping strategy were made in December 2016. The Denny Way RS is being monitored for two wet seasons, 2016 to 2017 and 2017 to 2018, and compliance will be assessed in 2019.

2.5.2.2 Harbor Avenue Regulator Station Overflow

The Harbor Ave. RS CSO gate diverts excess flow to the West Seattle Tunnel for storage and operates based on the water surface level of the tunnel; that is, when the tunnel gets too full, the gate closes, stopping the diversion. The design for the West Seattle Tunnel was intended to reserve half of the tunnel capacity for Harbor Ave. RS by modulating the Alki regulator sluice gate. With the current actuator, the gate opens and closes too slowly to match the high peak volumes experienced by the regulator station.

Modeling indicates that increasing the Alki gate speed will enhance the ability to improve and/or achieve control at the Harbor Ave. RS. The selected correction is to replace the existing CSO gate electric actuator to accommodate full travel (open/close) in approximately one minute. A project was initiated to install a new actuator on the CSO gate, and a supplemental compliance plan was submitted to Ecology and EPA on August 31, 2016. Following installation of the actuator, the Harbor Ave. RS will be monitored for two wet seasons and compliance will be assessed in 2021.

2.5.2.3 South Magnolia Wet Weather Storage and Pipeline

The S Magnolia WWS CSO control project was completed and became operational in December 2015. In October 2016, during a review of monitoring data, King County staff identified flow-level anomalies in the diversion structure and storage tank, indicating a potential issue. The County subsequently confirmed that a pipeline blockage in the CSO conveyance pipeline was preventing flows to the new facility's storage tank during significant storm events. A supplemental compliance plan was submitted in January 2017 (with an addendum containing the specific plan and schedule submitted in April 2018) to comply with the CD requirements for notifications. In 2018, King County continued implementing a project to replace the pipe with a new high-density polyethylene pipe using a pipe-bursting method. The S Magnolia WWS is expected to be in operation by the close of 2018 and will monitor for compliance in early 2019.

For more information, see:
http://www.kingcounty.gov/environment/wtd/Construction/Seattle/SMagnoliaCSOStorage.aspx.

2.5.2.4 Barton Street Pump Station Overflow

In 2017, post-construction monitoring and modeling indicated that the Barton Street Pump Station (Barton St. PS) was not performing at its design capacity of 33 MGD. Further investigation found that pump controls were set to a pump capacity of 30 MGD. A supplemental compliance plan was submitted in April 2018. In 2018, pump controls were reprogrammed to increase pumping capacity to 33 MGD and achieve designed pump capacity. Performance of the Barton St. PS will be monitored over the next two wet seasons, 2018 to 2019 and 2019 to 2020, and control status will be reported as part of the annual reports.

2.5.3 Planning-level Control Volume Updates

In preparation for this Program Update, WTD modelers updated volume and flow rate data from previously completed modeling results in 2010 for the remaining CSO control projects that were in the planning-level phase. The modeled volume and flow rates are used to develop the planning-level control volumes of alternatives for the remaining CSO control projects to meet the requirements in the 2013 CSO CD. These projects include University, Montlake, and a combined project to control Hanford #2, Lander St., King, and Kingdome (HLKK).

Table 2-3 Summary of CSO Control Volume and Peak Flow Rate (2010 and 2016)

CSO Basin	2010 Control Volume (MG)	2010 Peak Flow Rate (MGD)	2016 Control Volume (MG)	2016 Peak Flow rate (MGD)	Percent Change in Control Volume
University	5.23*	74.9	16.1	156.5	+208%
Montlake	7.87*	93.5	8.6	92	+9%
HLKK	103.5	151*	79.5	215.3	-11%

* Design criteria in the CD

A 32-year continuous-simulation model run of the combined sewer system was conducted in 2010 to establish project sizing and project definitions for the 2012 LTCP. The 2010 model used a 32-year rainfall record long-term average to provide a long simulation period for planning purposes. The 2010 model CSO control volumes and CSO peak flow rates were subsequently referenced in the 2013 CSO CD.

As part of WTD policy, a continuous-simulation model is run with a full 38-year data set to determine long-term averages for control volumes in planning-level analysis, and further modeling then assesses the maximum 20-year average for further control volume estimates. This policy is under review.

In 2016, WTD ran an updated 38-year continuous-simulation model run to determine current CSO control volumes and peak flow rates as part of this update. The updated modeling results are based on the 38-year rainfall record long-term average and incorporate improvements in basin calibrations. Table 2-3 compares all of the remaining uncontrolled CSO projects (except those under Supplemental Compliance Plans) and the associated volume and flow rate information referenced in the CD with the updated modeled estimates used for the 2018 Program Update. The revised volume for the University CSO basin is further discussed in Section 3.2.4.5. Revisions to the modeling for all basins will have an impact on project and program sizing and costs. Final control volumes and project sizing are completed as part of the design of any CSO project and documented in the required facility plan submitted to EPA and Ecology before the design of a CSO control project is completed. More information on the revised planning-level volume and project scope for the University CSO basin can be found in Section 3.2.4.5.

2.6 Characterizing Environmental Impacts

King County consistently considers scientific information in making wastewater management decisions, including decisions on CSO control. When required information is not available, King County initiates or participates in special studies with other agencies to develop or ascertain information. This section describes some environmental studies used to inform the CSO Control Program.

2.6.1 Water Quality Assessment/Monitoring Study

In 2012, the King County Council (Ordinance 17413) authorized a study to assess past and present water quality in local waters; review benefits from, and inform decision-making about, planned water quality improvement projects and programs; and identify water quality concerns likely to remain after completion of planned projects and programs unless other actions are taken. The WQA/MS, completed in 2017, was commissioned to inform the CSO Control Program’s work to improve water quality and ensure the County’s investments in CSO control are well planned, timed, and sequenced. The WQA/MS had a dedicated Science and Technical Review Team made up of independent technical experts in water quality, environmental science, and engineering who are not affiliated with King County. The role of the team was to ensure transparency and lend scientific credibility to the WQA/MS. The WQA/MS focused on the three water bodies where King County’s remaining uncontrolled CSOs discharge: Duwamish Estuary, Elliott Bay, and Lake Union/ship canal.

Links to the 12 reports can be found at:

https://www.kingcounty.gov/services/environment/wastewater/cso/projects/water-quality-study.aspx

The WQA/MS addressed the following four questions:

1. What are the existing and projected water quality impairments in receiving waters (water bodies) where King County CSOs discharge?

The WQA/MS identified the following impairments in study area water bodies:

- Bacteria concentrations remain above Washington state standards.
- Summer surface temperatures have been warming over time, especially in Lake Union/ship canal.
- Summer low dissolved oxygen and high salinity levels at depth in Lake Union make the area inhospitable for freshwater aquatic life.
- Multiple metals and organic chemicals in sediments do not meet state standards.

2. How do CSOs contribute to the identified impairments?

King County uncontrolled CSO discharges contribute about 85 percent of the annual loadings of fecal coliform bacteria to the three study areas. City of Seattle uncontrolled CSOs contribute about eight percent, and other pathways combined contribute about seven percent of the annual fecal coliform bacteria loading to the study areas. King County's uncontrolled CSOs contribute a number of additional contaminants to the receiving waters, but at substantially lower annual loads than contributions from other pathways.

3. How do other sources (pathways) contribute to the identified impairments?

The major pathways for contaminant loadings other than bacteria are as follows:

- Direct stormwater discharges to the receiving waters and/or flows from the upstream watersheds contribute the majority of the annual loads of nutrients, polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers, and most metals. The upstream watershed pathway, which accounts for contaminant loads flowing into the study areas from Green River and Lake Washington, represents the combined effect of all sources and pathways in the watersheds.
- Leaching from vessel-bottom antifouling paint contributes the largest known copper loads.
- Leaching from creosote-treated wood pilings contributes the largest known polycyclic aromatic hydrocarbon (PAH) loads.

4. What activities are planned through 2030 that could affect water quality in the receiving waters?

Because of data and scope limitations, the WQA/MS did not estimate changes to future contaminant loadings for all known factors that affect water quality. The following actions are likely to improve water quality in the study areas by 2030:

- *CSO control.* Implementation of King County and City of Seattle CSO control plans by 2030 are projected to reduce annual bacteria loading to the study areas by about 80 percent.

- *Copper source control.* Ecology's oversight and implementation of Washington state's limits on the copper content in antifouling vessel paint for small recreational vessels and in automobile brake pads is projected to reduce copper loading to the study areas by 50 percent.

- *Creosote-treated wood piling removal.* The planned removal of about 11,000 creosote-treated wood pilings is projected to reduce PAH loadings to Elliott Bay and the Duwamish Estuary by about one-third.

- *Contaminated sediment cleanup.* Remediation of contaminated sediment sites is projected to reduce contamination levels in the study areas. In particular, levels of PCBs, other organic chemicals, and metals in Duwamish Estuary sediments are projected to decline as the cleanup plan for the Lower Duwamish Waterway Superfund site is implemented. Less improvement is projected to occur in Lake Union/ship canal than in the other study areas.

- *Stormwater management and treatment.* Improvements in stormwater management by the City of Seattle and other jurisdictions in the study areas and upstream watersheds are projected to reduce loadings of several contaminants. Seattle is planning capital projects that include construction of stormwater treatment systems. Required (by stormwater permits) and discretionary improvements in stormwater management, including both operational and source control efforts, will likely decrease the annual loadings of all contaminants studied to some degree. The WTD Systemwide Comprehensive Plan will evaluate WTD's role in stormwater treatment.

- *Behavioral changes.* The cumulative impacts of changes in behavior by area residents can substantively affect water quality, although the degree of change and impact is not quantifiable. Examples of behaviors that can have a positive impact on water quality include preventing oil leaks through better vehicle maintenance and using nontoxic cleaning products.

WTD is identifying additional water quality projects supplemental to CSO control alternatives to evaluate them for water quality and other co-benefits. The CSO Control Program will answer the following five questions from the WQA/MS during the next phase of CSO long-term planning in conjunction with the systemwide planning effort:

- How can CSO control projects and other planned or potential corrective actions be most effective in addressing the impairments?

- How do various alternative sequences of CSO control projects integrated with other corrective actions compare in terms of cost, schedule, and effectiveness in addressing impairments?

- What other possible ways, such as coordinating projects with the City of Seattle and altering the design of planned CSO control projects, could make CSO control projects more effective and/or help reduce the costs to WTD and the region of completing all required CSO control projects by 2030?

- What regional values, priorities, and objectives should be considered when sequencing CSO control and other corrective actions?

- What is the best way to sequence CSO control projects and integrate them with other corrective actions to meet these regional values, priorities, and objectives?

2.6.2 Climate Change

Climate change impacts are predicted to have an effect on WTD's system and long-term control of CSOs. To better understand climate change impact projections for sea level rise and stormwater flows, WTD's CSO Control Program initiated a study with the University of Washington Climate Impact Group (UW CIG) to inform this Program Update. The UW CIG has worked to evaluate regional precipitation model simulations and develop projections for CSOs in Seattle.

The findings of the study show that heavy precipitation will be more intense over the next century, but that average annual rainfall will stay within historic amounts. It is uncertain how the change in heavy precipitation will impact CSOs because the hydrology and hydraulics of each CSO area varies across the city. WTD is performing long-term simulations of the hydrologic and hydraulic computer models to evaluate this new information over the next few years. The study completed by UW CIG in 2017 only used projections from two global models under two carbon scenarios. This limited modeling was done to reduce cost and decrease the time it took to perform the analysis.

There is still uncertainty in the new projections because of the limited amount of modeling performed. Additional climate modeling downscaled for local conditions is currently being performed by UW CIG, and will be used to inform climate change impacts on CSOs in the next phase of the LTCP. WTD will continue to monitor and incorporate relevant findings from this evolving science.

Because sea level rise rates are increasing, WTD has taken a precautionary approach by evaluating the range of sea level rise and not using one particular projection. By evaluating the range, the division can continue to update the timing of impacts to WTD facilities with a broader perspective. WTD has implemented several small capital projects to address sea level rise at specific facilities and has incorporated sea level rise considerations into the construction of new CSO projects or CSO-related facilities that are in tidally influenced waters. The actions include raising the elevation of critical components, installing barriers (tide gates and flaps), and siting new facilities at higher ground to protect CSO facilities from possible future intrusion and corrosion.

2.7 Ongoing Water and Sediment Monitoring Programs

In 1986, Metro began a sampling program to characterize each CSO and identify high-priority sites for early control. The program included collecting overflow quality data for five CSO sites per year and collecting sediment samples at each site. In the 1990s, sampling was expanded to assess compliance with Washington State Sediment Management Standards (SMS). The County's extensive monitoring for its 1999 CSO Water Quality Assessment of the Duwamish River and Elliott Bay found that the majority of risks to people, wildlife, and aquatic life would not be reduced by removal of CSOs because most risk-related chemicals come from sources other than CSOs.

Under the previous NPDES permit for West Point TP effective July 1, 2009, King County developed a comprehensive sediment quality summary report for all CSO discharge locations (submitted December 2009). King County's current NPDES permit requires the County to update the 2009 report by December 1, 2018. It can be found at: http://your.kingcounty.gov/dnrp/library/wastewater/cso/docs/SedQuality/0912_CompSedQualSumRptCSODischargeLoc.pdf.

King County's Post-construction Monitoring Plan (PCMP) is designed to assess, document, and report on the effectiveness of its CSO Control Program in achieving performance requirements and complying with state water and sediment quality standards. The King County PCMP was approved on September 28, 2012. As each CSO is brought into compliance, the PCMP requires demonstration that the CSO achieves performance requirements and water and sediment standards and reports those findings to Ecology within a set timeframe. The PCMP can be found at: http://your.kingcounty.gov/dnrp/library/wastewater/cso/docs/ProgramReview/2012/AppH_CSO_PostConstructionMonitoringPlan,Sept2012.pdf.

King County's current NPDES permit required the County to prepare a post-construction monitoring summary report by December 1, 2019, that demonstrates how each CSO outfall listed as "controlled", as well as those brought under control during the permit term, achieves performance requirements and complies with state water and sediment quality standards.

In October 2018, WTD submitted the King County Sediment Management Plan 2018 Update (2018 SMP Update) to Ecology. The 2018 SMP Update amended the 1999 Sediment Management Plan (1999 SMP), which evaluated remediation alternatives for seven sediment cleanup sites located near King County CSOs. The 2018 SMP Update was developed by King County's Sediment Management Program in coordination with the CSO Control Program.

The 2018 SMP Update characterizes sediment at all King County CSOs and the four CSO WWTS outfalls through sampling or modeling, provides sediment deposition models to characterize CSO solids deposition, and identifies appropriate sediment management strategies adjacent to each remaining King County outfall location. Sediment characterization results in the

2018 SMP Update are compared to Washington State SMS (WAC 173-204) except at sites that are already within the boundary of current federal or state cleanup sites. It can be found at: https://www.kingcounty.gov/services/environment/wastewater/sediment-management/plan.aspx.

Sediment quality associated with 14 CSOs and two CSO WWTS outfalls have either been previously remediated, are currently being addressed as part of an area-wide cleanup, or were addressed under the 1999 SMP and, therefore, were not further evaluated in the 2018 SMP Update (See Table 2-4).

The remaining CSOs and CSO WWTS outfalls were evaluated in the 2018 SMP Update (Table 2-4). To characterize the magnitude and extent of sediment deposition of CSO-related solids, King County developed two types of sediment deposition models and verified them with sediment quality data. The sediment characterization from sampling and modeling, along with other lines of evidence, were used to develop appropriate sediment management strategies. All of the following information was considered:

- Existing sediment cleanup actions near the CSO discharge location
- CSO control status
- Model-predicted CSO solids deposition and predicted sediment concentrations near the CSO discharge location
- Sediment concentrations near the CSO discharge location
- Nearby pathways and potential sources

Proposed sediment management strategies for each CSO and CSO WWTS outfall fall into five categories:

- Sediments are addressed as part of an existing cleanup
- No further action required
- Additional monitoring to determine if problems develop
- Further evaluate in the context of future area-wide investigation (problems exist, but are part of widespread contamination)
- Further evaluate cleanup options (preliminary evaluation in the SMP update)

Table 2-4 CSO Sediments Addressed in 2018 SMP Update, Existing Cleanups, or 1999 SMP

CSO Sediments Addressed in Existing Cleanups or the 1999 SMP	CSO Sediments Addressed in 2018 SMP Update
Hanford #1 Overflow	Carkeek Outfall
Duwamish PS Overflow	North Beach PS WW Overflow
W Duwamish Overflow	North Beach PS Inlet Overflow
Brandon St. RS Overflow	S Magnolia Overflow
Terminal 115 Overflow	53rd Ave. SW PS Overflow
S Michigan St. RS Overflow	Alki Outfall
W Michigan St. RS Overflow	63rd Ave. SW PS Overflow
E Marginal Way PS Overflow	SW Alaska St. Overflow
8th Ave. S Overflow	Murray St. PS Overflow
Norfolk St. Overflow	Barton St. PS Overflow
Henderson/MLK Outfall	Kingdome RS Overflow
Hanford #2 RS Overflow	Chelan Ave. RS Overflow
Lander St. RS Overflow	Ballard Siphon Overflow
King St. RS Overflow	11th Ave. NW Overflow
Denny Way RS Overflow	3rd Ave. W Overflow
Elliot West Outfall	Canal St. Overflow
	Dexter Ave. RS Overflow
	University RS Overflow
	Montlake RS Overflow
	Matthews Park PS Overflow
	Belvoir PS Overflow
	30th Ave. NE Overflow
	E Pine St. PS Overflow
	Rainier Ave. PS Overflow
	MLK Jr. Way Overflow
	Henderson St. PS Overflow

2.8 Relationship with WTD Systemwide Planning

The Puget Sound region is facing many complicated and expensive water quality issues. For WTD, these issues include:

- aging infrastructure,
- asset management,
- increasing population,
- secondary treatment plant capacity needs,
- increasing stress on the system from stormwater, including inflow and infiltration,
- future climate change impacts,
- increasing redundancy needs, and
- existing and potential future regulatory requirements, such as nutrient removal.

WTD initiated a planning process to update its comprehensive wastewater system plan by thoroughly assessing all the demands on the regional wastewater utility. As one of the demands on WTD, the CSO Control Program will be considered in the planning process. The planning process will use the latest data to comprehensively assess all demands on the regional wastewater system and explore plausible futures. It will also incorporate a fair and inclusive regional discussion to engage people in the region in a values-based conversation about investment priorities and associated tradeoffs, including water quality benefits relative to cost and wastewater treatment rate affordability. The discussion will include long-time participants in water quality issues as well as new, interested parties whose voices may have been unrepresented in the past. Through assessing the demands and discussing plausible futures, priorities, and tradeoffs for the utility, the planning process will result in a systemwide comprehensive plan that will be used to prioritize programs, policies, and projects to benefit regional water quality and make the best use of public funds. The outcome of the systemwide planning process will identify a path forward for WTD that:

- provides a strategic plan to guide future investments,
- allocates the right dollars to the right actions at the right time,
- ensures WTD’s core mission to protect water quality and public health,
- achieves the best water quality benefit for the investments made,
- results in an affordable wastewater utility rate into the future,
- reflects the County’s initiatives, including ESJ and strategic climate action planning, and

- guides WTD’s near-term (up to 10 years) and long-term (10 to 40 years) investments in regional water quality.

In addition, the systemwide planning process may result in recommended changes to the CSO Control Program and projects, as currently conceived.

In 2018, WTD developed the planning and regional engagement approach for the systemwide planning process; briefed elected officials, Ecology, and EPA; and engaged consultant services to assist in the planning and engagement process. The planning process will formally get underway in 2019 and is expected to be completed by the end of 2022.

The next phase of CSO long-term planning (Section 3.2.5) will have strategic linkages to the systemwide comprehensive planning process and identify opportunities for the respective processes to inform each other.

Chapter 3

CSO Control Projects

3.1 Approaches for Consideration in CSO Control Projects

King County's combined sewer system is designed to convey both wastewater and stormwater for treatment, with CSOs occurring at constructed relief points (outfalls) during heavy rainfall when capacity is exceeded in the regional system. A variety of CSO control approaches is being used by other CSO communities throughout the country to reduce the frequency and volume of CSO events. However, not all of these approaches work for King County's system as well as they do for another CSO community and vice versa because of the uniqueness of the overall system requirements, geographic elements, and design and engineering.

This section describes the CSO control approaches considered as part of this Program Update. The approaches considered fall into three broad categories:

1) Preventing stormwater from entering the combined sewer system (i.e., stormwater/sanitary sewer separation and GSI).

2) Managing excess stormwater after it has entered the combined sewer system (e.g., storage or treatment).

3) Optimizing existing facilities to operate more effectively and efficiently with a range of flows, which effectively increases storage and treatment capacity without building new infrastructure.

Since the first metropolitan sewer plan in 1958, WTD has considered and incorporated each of the following control approaches when developing alternatives for CSO control.

3.1.1 Separation

Stormwater runoff that is generated during a rainfall event can enter the combined sewer system from a variety of sources, including private property and a public right-of-way (ROW) such as a road surface. Approaches that prevent some or all of this stormwater from entering the combined sewer system are referred to as "separation approaches," as described below.

3.1.1.1 Full Separation

Full separation approaches prevent all stormwater runoff generated on private property and public ROW areas from entering the combined sewer system. In essence, full separation approaches convert areas served by a single system of combined sewers into areas served by two separate sewer systems—one dedicated to conveying sanitary sewage and one dedicated to conveying stormwater. A new and separate sanitary sewer system must be built to convey sanitary sewage from homes and businesses to existing wastewater treatment plants. Any stormwater flow separation from a combined sewer system to a separate storm sewer system would result in the regulatory transfer of that flow from CSO regulations to the NPDES stormwater permit system and its water quality compliance requirements.

WTD has modified this approach to separation by using the existing combined sewer pipe to convey stormwater and constructing a new separate sanitary sewer system. However, this separation approach only works if the existing combined sewer system has adequate capacity and is in good condition to be converted to stormwater conveyance.

Full separation is most feasible in areas where there are relatively few privately owned parcels requiring new sewer service and is often difficult to implement in large and densely populated urban areas. The cost and complexity of constructing a new sanitary sewer system in the public ROW and on private property present significant challenges for a full separation approach because of the construction impacts, including opening up many roadways.

3.1.1.2 Partial Separation

While full separation relies on complete removal of stormwater from the combined sewer system, partial separation disconnects a portion of stormwater to lower peak flows during rainfall events, thereby reducing the frequency and volume of CSOs. To limit the complexity and cost associated with work on private property, partial separation approaches typically only target stormwater runoff from the public ROW (i.e., streets, sidewalks, and parking strips). This Program Update evaluated opportunities for partial separation in areas where cost-effectiveness and feasibility of construction were likely to be favorable. These included the following areas:

- An area where a separate storm sewer system already exists, but the separated stormwater currently discharges back into the combined sewer system at some downstream point.
- An area where stormwater currently flowing into a combined sewer system could be re-routed (by constructing minimal below-grade piping improvements and/or through overland flow) into an existing stormwater system with sufficient capacity to handle the increased stormwater flow.

3.1.1.3 Opportunistic Separation

Opportunistic separation can occur in instances where large sections of the combined sewer system can be re-routed to an existing stormwater outfall. Evaluation for this Program Update considered only impervious ROW areas and did not evaluate existing downstream separated storm sewer infrastructure for feasibility to receive the additional runoff. Separating areas that are close to and directly connected to existing overflow locations results in the greatest benefit (i.e., achieves the largest reduction in CSO control volume). Separating areas that are farther from overflow locations and/or separating areas that flow into existing stormwater or CSO detention facilities results in the least benefit.

3.1.1.4 2017 Full Separation Analysis

As part of the alternatives analysis process informing this Program Update, WTD reviewed opportunities to address the remaining uncontrolled CSOs through separation. Table 3-1 reflects the planning-level cost estimate to achieve CSO control through separation.

Table 3-1 Planning Level Cost Estimate of CSO Control through Separation

CSO	Cost estimate (2017$)
University	$2.6 B
Montlake	$813 M
Kingdome/King	$830 M
Hanford/Lander	$1.1 B (plus113M*)

* 113 million dollars is the estimated cost of a 2-MG storage tank.

CSO control through separation was found to be cost-prohibitive. The extent of road reconstruction is extensive and highly disruptive. In the Hanford/Lander basins, there were insufficient areas for separation to achieve control, and an additional storage facility would still be necessary to reach the control volume.

These cost estimates were developed as part of the preparation for this Program Update, and contributed to the alternatives analysis process that confirmed the projects identified in King County's CD continue to reflect the future course of CSO control. The following sections present updated information on current and future projects to control the remaining CSOs.

3.1.2 Green Stormwater Infrastructure

GSI is a stormwater management approach that has proven to be effective in Seattle and other urban areas. In addition to removing stormwater from the combined sewer system, GSI has other social and environmental benefits such as adding additional green space in urban areas. Rather than relying on existing or new pipes and mechanical systems to convey and treat separated stormwater, GSI approaches manage stormwater runoff through a combination of natural and/or low-impact designs (e.g., bioretention, street trees, rain gardens, green roofs, cisterns, permeable pavement) that provide stormwater retention/detention and treatment.

GSI designs that retain stormwater rely on groundwater infiltration, deep well injection, onsite reuse, and/or evaporation for stormwater management. Stormwater can also be detained (i.e., temporarily stored) and slowly released back into the combined sewer system.

In partnership with SPU, WTD has administered the RainWise Program since 2010. This program provides rebates to homeowners living in specific combined sewer areas for installing rain gardens and cisterns on their property. RainWise helps to slow, detain, or retain stormwater, which reduces both the volume and timing of combined sewer flows and reduces sources of pollution into the combined system.

There are a number of GSI facilities throughout the City of Seattle, including King County's completed Barton GSI Project, which controls CSOs in West Seattle's Westwood and Sunrise Heights neighborhoods. This Program Update evaluates GSI as a CSO control approach to be used alone or in combination with separation, storage, or treatment to reduce flows from entering the system, thereby reducing the size of the downstream gray facilities.

Since 2012, the County has continued to evaluate the feasibility of GSI in basins with CSOs that do not meet the CSO performance standard and has also continued to design and construct GSI projects. A summary of the results is listed in Table 3-2. Based on the geotechnical analyses completed, the County plans GSI projects in the following three basins: Ballard/11th Ave. NW, Montlake, and University. The University GSI project is further described in Section 3.2.2.3.

In 2017, WTD determined that the GSI for W Michigan St., though originally determined to be feasible, was not suitable or cost-effective in conjunction with the storage project. Therefore, further design of GSI in this area was halted.

In addition to GSI capital projects, the County will continue the SPU and WTD RainWise Program in the W Michigan St., 8th Ave., University, and Montlake uncontrolled basins. The County has met the stormwater volume control targets in the 11th Ave. and Barton basins.

GSI projects completed by other agencies, organizations, and individuals affect WTD's system. SPU has completed GSI projects in its Delridge Basin (King County Chelan Basin) and Ballard Basin (King County Ballard Basin). WTD is still assessing the downstream impacts of these projects on its system. WTD will work with SPU to expand GSI in these areas if further downstream benefits to WTD are realized.

The Harbor Basin was evaluated for GSI and found to be feasible; however, the cost benefit of implementing GSI was very low because of the simple fix to the CSO gate identified as part of the supplemental compliance plan (Section 2.5.2.2). If further control is needed for the Harbor CSO, GSI will be evaluated and RainWise Program eligibility will be updated.

Table 3-2 Summary of GSI Feasibility and Project Status by Basin

Uncontrolled Basin*	Feasibility of GSI	WTD-led Project Status (Planning, Design, Construction)	RainWise Program Status
Ballard/11th Ave.	Feasible	In long-term planning	Completed
Barton	Feasible	Completed	Completed
Chelan	Feasible	None planned	Eligible
Harbor	Feasible	None planned	Not eligible
Hanford	Not feasible	Not applicable	Not eligible
King	Not feasible	Not applicable	Not eligible
Kingdome	Not feasible	Not applicable	Not eligible
Lander	Not feasible	Not applicable	Not eligible
Montlake	Feasible	In long-term planning	Eligible
S Magnolia	Feasible	In design	Not eligible
University	Feasible	In design	Eligible
W Michigan	Feasible	Eliminated in project-level alternative analysis	Eligible

* Uncontrolled in 2012

3.1.3 Storage

Once stormwater has entered the combined sewer system, storage can be used at or near designed CSO relief points to reduce the size and frequency of CSOs. When the pipes that carry combined sewage to treatment are full, excess flow is temporarily stored and then returned to the combined sewer system following the peak flow event caused by rainfall. There are two basic ways to store excess flow: inline storage (where storage occurs within the pipes that also convey combined sewage) and offline storage (where storage occurs in tanks or tunnels that are constructed adjacent to the combined sewer system). King County currently manages its wastewater collection system to optimize and maximize inline storage before CSO events. Therefore, this Program Update evaluates offline storage for future CSO control in either buried concrete tanks, large-diameter pipes, or tunnels.

3.1.4 CSO Treatment

Dedicated WWTSs are intermittently operated treatment facilities that treat large volumes of combined stormwater to a quality standard that meets or exceeds regulatory requirements for solids and disinfection, and then discharges the treated water to nearby waterways under a NPDES permit.

WWTSs are commonly located near existing outfalls to reduce the cost and complexity of conveying large volumes of flow to the treatment station. They are often a preferred means of CSO control when the volume of excess combined sewage is too large for a storage option or a combination of storage and GSI. King County operates several dedicated WWTSs, including Alki, Henderson/MLK Jr. Way, Elliott West, and Carkeek. A fifth WWTS (Georgetown) is currently being constructed to control CSOs from the Brandon and S Michigan St. CSO basins.

This Program Update evaluates new WWTSs as a CSO control approach in currently uncontrolled areas of the combined sewer system where flow volumes exceed feasible storage and storage/GSI options. In addition, WTD has initiated a pilot project on a new treatment technology that could potentially be used to enhance treatment at existing WWTSs (see Section 3.2.3).

3.1.5 Conveyance

Installing a new pipe or upsizing an existing pipe may eliminate conveyance capacity limitations where flow is restricted from transferring excess flow to the existing downstream conveyance system. Building new conveyance may be limited by physical constraints, such as downstream elevations. Where feasible, increasing conveyance capacity maximizes the use of existing facilities and typically results in fewer O&M needs. However, potential impacts on downstream system elements must also be considered at an early stage of analysis and may require building new or larger downstream facilities. When increasing conveyance, WTD must consider the impacts to West Point TP and any downstream WWTS to ensure all flows can be managed and treated adequately.

3.1.6 Optimization

WTD continually evaluates its conveyance system to optimize overall system performance. System optimization includes managing the operation of the combined sewer system to maximize existing capacity and minimize overflows. System modifications typically include minor adjustments in the system to better use the existing capacity, such as raising an overflow weir, adjusting gate operational set points, incorporating or adjusting real-time system control points, increasing peak flow from pump station operation, and implementing a maintenance program to optimize system performance. A system with real-time control provides the capacity to adjust the operation of facilities (e.g., gates and weirs) in response to field measurements (flows and levels) to reduce overflows.

Flows through WTD's regional wastewater conveyance and treatment system are monitored by a SCADA system and controlled by local programmable logic controllers (PLCs). Experienced operators have the option of remote control by means of the SCADA system. The local PLCs monitor levels and flows, adjusting gate positions and pump motor speeds to suit the conditions. Many of the controls are governed by determined set points that have been established over the years by hydraulic analysis and modeling to maximize conveyance to West Point TP and storage in pipes and offline storage facilities while minimizing CSOs. The automatic control of the regulator stations reduces CSOs by directing flow to maximize storage during a storm and then later conveying the flows to West Point TP for treatment when the storm subsides.

3.2 Implementation of CSO Control Projects

The approved 2012 LTCP recommended nine alternatives to control overflows from 14 CSO locations. Figure 3-1 summarizes the status of each of these alternatives as of October 2018. Since completion of the approved 2012 LTCP, six of the nine alternatives are in design, under construction, or have been completed, and three alternatives are upcoming. The projects already initiated to control six CSOs are in different phases, ranging from project-level planning to design and construction. The sequence of project implementation closely follows priorities expressed by the community: controlling CSOs in the ship canal and Duwamish Waterway first, evaluating GSI to divert stormwater from the combined system, and expanding collaboration with the City of Seattle. The projects currently underway to control six CSOs are discussed in more detail below and in Table 3-3.

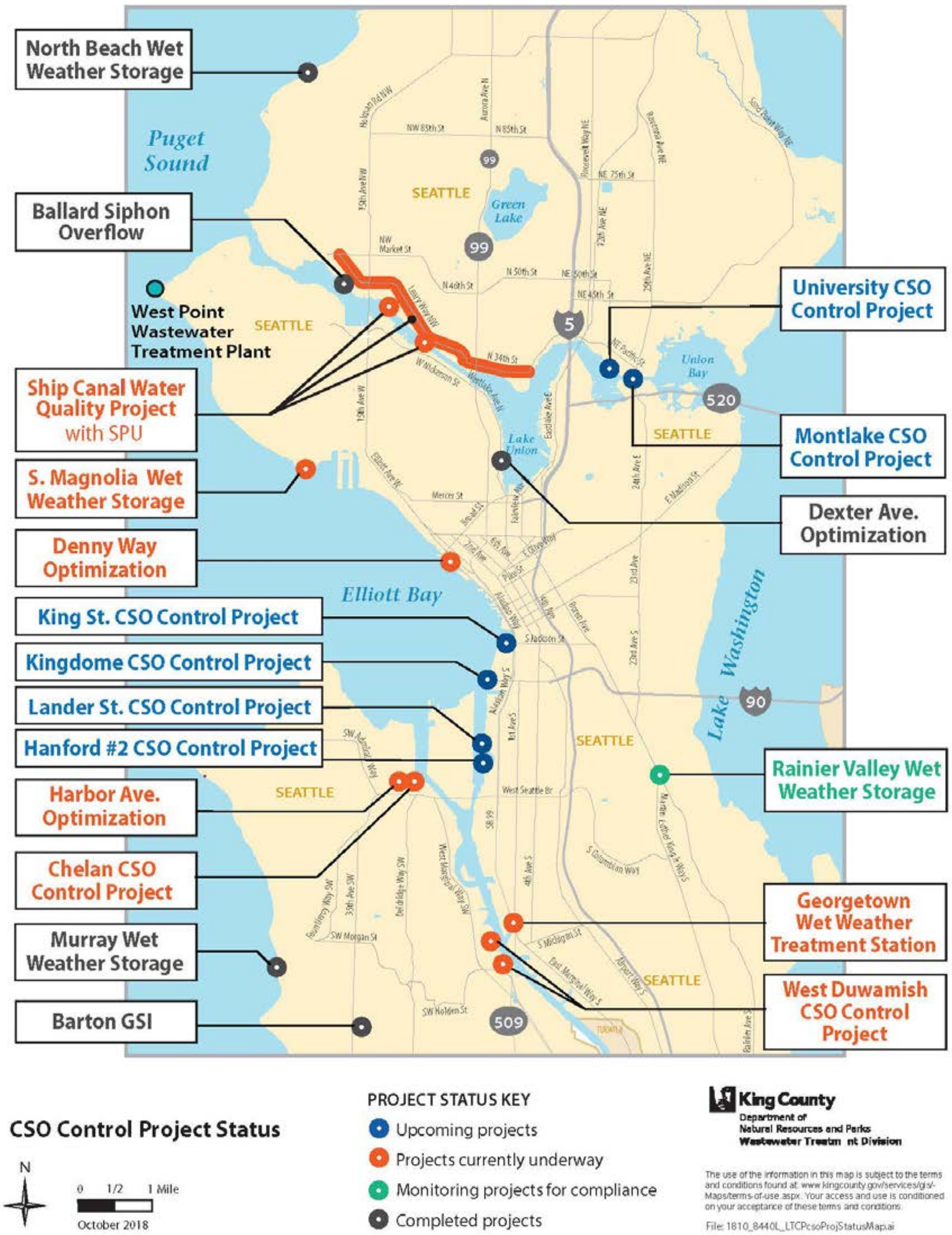


Figure 3-1 Map of CSO Project Status

Table 3-3 Projects in Progress Since 2012

Project (CSOs)	Project Phase*	Affects Lower Duwamish Waterway	GSI Planned	Collaboration with Seattle
Rainier Valley WWS (Hanford #1)	Construction Completed	✓		
Georgetown WWTS (Brandon St./S Michigan)	Construction	✓		
Ship Canal Project (3rd Ave. W)	Design			✓
Ship Canal Project (11th Ave. NW)	Design		✓	✓
W Michigan/ Terminal 115	Complete Facility Plan	✓	✓	
Chelan Ave.	Complete Facility Plan	✓		

* Project phase as of spring 2018

This Program Update describes the status of the following projects for the following CSO sites (in parentheses) that are in the design and project-level planning phases, in implementation, or have been completed since the approval of the 2012 LTCP:

- Ballard Siphon Replacement (Ballard CSO)
- Barton Roadside Garden Project (Barton PS CSO)
- Murray Ave. WWS (Murray Ave. PS CSO)
- North Beach WWS (North Beach PS CSOs)
- Rainier Valley WWS (Hanford #1 and Bayview N. CSOs)
- Georgetown WWTS (Brandon St. and S Michigan CSOs)
- Ship Canal Project (3rd Ave. W and 11th Ave. NW CSOs)
- University GSI
- Chelan Ave. (Chelan Ave RS CSO)
- West Duwamish (W Michigan St. and Terminal 115 CSOs)

Further, this Program Update evaluates the following alternatives from the approved 2012 LTCP, which have not yet started design: University storage, Montlake storage, Hanford #2, Lander St., Kingdome, and King St. CSO treatment (Section 3.2.4).

3.2.1 Completed CSO Control and Associated Projects

The following CSO projects have been completed since 2012 and now meet Ecology's CSO performance standards: the Ballard siphon (Ballard Siphon Replacement Project), Barton St. PS (Barton Roadside Rain Garden Project), Murray Ave. PS (Murray Ave. WWS), and North Beach PS and North Beach Inlet Overflow (North Beach WWS). Hanford #1 Overflow (part of the Rainier Valley WWS) construction was completed in 2018, and the facility is currently undergoing monitoring for compliance. Construction of the South Magnolia Overflow Project (S Magnolia WWS) was completed in 2015; however, the project did not meet performance standards because of a pipe failure post-construction in 2016 and is currently under a supplemental compliance plan. The following subsections give more background and detail on each of these projects.

3.2.1.1 Ballard Siphon Replacement Project

Inspections of the existing Ballard siphon revealed possible structural defects in the 100-year-old wood-stave pipe. The chosen alternative was to construct a new siphon with sufficient capacity to control the Ballard CSO. The Ballard siphon carries flow from Seattle's north end near Carkeek Park and the area in Ballard, sending it under the ship canal to an interceptor and on to West Point TP. The Ballard Siphon Replacement Project constructed a new 85-inch siphon pipe under Salmon Bay between Ballard and Interbay to accommodate growth in north Seattle and to reduce combined overflows into Salmon Bay. The project was completed in 2013 and has met CSO control performance standards since 2014.

3.2.1.2 Barton Roadside Rain Garden

The Barton Roadside Rain Garden Project included construction of 91 roadside rain gardens, a type of GSI, on 15 blocks in the Sunrise Heights and Westwood neighborhoods in West Seattle. Located in the planter strip between the curb and sidewalk, these roadside rain gardens divert stormwater runoff away from the combined sewer system. The project was completed in 2016. In 2017, modeling indicated that the pump station was not reaching the design pump capacity of 33 MGD. Further investigation into the control system confirmed that the controls for the pumps were set to a pump rate of 30 MGD. WTD has since changed the controls to achieve the design pump capacity of 33 MGD and will continue to monitor the overflow as described in the Barton St. PS Overflow Supplemental Compliance Plan (Section 2.5.2.4).

3.2.1.3 Murray Ave. Wet Weather Storage

The Murray Ave. WWS Project, which is one of the Puget Sound Beach Projects, included construction of a million-gallon underground storage tank across the street from Lowman Beach Park in West Seattle. The tank reduces overflows into Puget Sound when the Murray Ave. PS exceeds maximum capacity. The project was completed in 2016 and met CSO control performance standards in 2017.

3.2.1.4 North Beach Wet Weather Storage

The North Beach WWS Project, which is one of the Puget Sound Beach Projects, included an underground storage pipe in the ROW in the North Beach neighborhood. This facility can store up to 380,000 gallons of untreated water when the North Beach PS reaches maximum capacity.

The project was completed in 2015 and has met CSO control performance standards since 2016.

3.2.1.5 Rainier Valley Wet Weather Storage

The approved 2012 LTCP recommended preferred alternative was a 0.34-MG offline storage tank near the Hanford #1 Overflow and related facilities to modify the overflow. The final project consists of a new storage tank with related pipes that keeps stormwater and untreated sewage out of the Duwamish Waterway. This project was completed in mid-2018 and is still undergoing operational testing. In 2020, WTD will report if the project is meeting compliance standards.

3.2.2 CSO Control Projects Currently Underway

Projects are underway to control the following CSOs: 3rd Ave. W and 11th Ave. NW (as part of the joint Ship Canal Project with the City of Seattle), S Michigan and Brandon (Georgetown WWTS), and University GSI.

3.2.2.1 Georgetown Wet Weather Treatment Station

The approved 2012 LTCP recommended preferred alternative was a high-rate clarification WWTS near the South Michigan Street Regulator Station (S Michigan St. RS) and new conveyance from the Brandon St. RS to the WWTS. Through design and siting refinements that reduced overall conveyance and minimized the size of the site, the final WWTS project ultimately is located between the Brandon St. and S Michigan St. regulator stations, with related pipes and a new outfall structure to the Duwamish Waterway. After it is completed, the WWTS will treat up to 70 MGD of combined wastewater and stormwater. Construction on this project began in 2017 and construction completion is anticipated by December 31, 2022 in accordance with the CD.

3.2.2.2 Ship Canal Water Quality Project

The approved 2012 LTCP recommended alternatives for 3rd Ave. W and 11th Ave. NW were, respectively, a 7.23-MG storage tank in cooperation with Seattle to control both WTD and SPU CSOs and a 0.6-mile pipe to increase conveyance capacity to the Ballard Siphon, along with GSI in the Ballard, Phinney, and Crown Hill neighborhoods. In 2012, WTD and SPU began evaluating a joint project option to address multiple WTD and SPU CSOs with one project. For WTD’s 3rd Ave. W Overflow and 11th Ave. NW Overflow, the decision was made to initiate a joint project with SPU; King County Council approved the joint project in 2016. Because of the change of design criteria for this project, a modification to the CD was approved in 2016.

The Ship Canal Project is being delivered under multiple construction contracts because of its complexity. Most of these are currently in the design phase, though the initial Ballard Early Works contract (including site preparation and replacement of a pier that will be used for barging construction spoils) began construction in 2018. A significant CD milestone will be achieved with construction of the tunnel itself, expected to begin in 2019. The project will provide 29 MG of offline storage in a deep storage tunnel constructed between the Ballard and Wallingford areas on the north side of the ship canal. Bringing WTD’s CSOs into control will require approximately 9.77 MG of the tunnel's capacity. SPU is the lead agency for design and construction of the project and will own, operate, and maintain the tunnel and its related structures, with joint agency review and cost participation. WTD will continue to report the control status of its two CSOs (3rd Ave. W Overflow and 11th Ave. NW Overflow) in accordance with the West Point TP NPDES permit and CD requirements.

3.2.2.3 University Green Stormwater Infrastructure

The approved 2012 LTCP recommended alternative for University was a storage tank and GSI. To reduce the necessary size of the gray infrastructure, King County is implementing a University GSI project in advance of developing the University CSO storage tank design further. This University GSI project is planned to construct GSI that will manage stormwater from 240 acres in the basin. Further updated information about the storage tank is provided in Section 3.2.4.5.

The University GSI project, which is currently in the planning phase, will install green infrastructure facilities in north Seattle neighborhoods contributing to the University CSO basin. The project will complete early action projects in 2019, with construction of the full project planned for 2021 to 2023. King County will submit a report to EPA quantifying the co-benefits of the project along with a Green for Gray Partial Substitution proposal by December 31, 2022.

3.2.3 CSO Treatment Technology Pilot Program

King County is investigating options to improve the quality of discharge from its Elliot West WWTS. The County's goals are to meet or exceed requirements of its CD with Ecology and EPA and reduce CSO Control Program capital costs. Ovivo, a manufacturer of wastewater treatment systems, has introduced a new physical chemical treatment process to accommodate higher-volume CSO flows and has conducted its own performance testing of the technology. Based on the positive results of Ovivo's performance testing, King County is interested in completing a pilot test of the technology at a CSO location in King County (Seattle). The goals of the pilot testing include the following:

- Determine the ability of the technology to meet or exceed NPDES requirements given the CSO influent characteristics in King County.
- Develop criteria to guide the design and operational aspects of the treatment in a CSO environment for full-scale application of the technology.
- Review the treatment results and compare them to the manufacturer's recommended design and operational criteria and other observations and recommendations.

If the pilot yields promising results, the CSO Control Program will look to apply the technology at Elliott West WWTS and potentially other CSO WWTSs in future planning efforts.

3.2.4 Remaining Consent Decree Projects

Alternatives developed as part of the approved 2012 LTCP for University, Montlake, and HLKK were reevaluated with updated information in preparation for this Program Update. The analysis considered recent monitoring of control techniques (such as GSI), updated modeling information, and opportunities for collaboration with other agencies. The purpose of re-evaluating the approved 2012 LTCP alternatives was to identify any changes in conditions that could impact the type, size, and location of the alternatives since 2012.

Additional alternatives, identified through workshops, and the approved 2012 LTCP alternatives were run through high-level screening for feasibility to identify preliminary alternatives. Screening factors were technical complexity, constructability, and O&M complexity. Following high-level screening, a process of rating and ranking alternatives was used to incorporate performance, cost, and risk factors and identify the best value alternative for each basin and planning area.

The results of this risk-based value analysis were similar to the triple bottom line results in the approved 2012 LTCP. One key difference between the approved 2012 LTCP and the value analysis for the 2018 Program Update alternatives is the inclusion of consolidated alternatives that address multiple basins in a single approach. Table 3-4 summarizes the results of the risk-based value analysis for each basin and planning area and identifies the approved alternative from the existing 2012 LTCP for comparative purposes. At this time, WTD is continuing with implementation of the approved 2012 LTCP alternatives.

In the approved 2012 LTCP, the programmatic cost to implement the recommended alternatives was estimated at $711M. Escalated to 2017 dollars, this programmatic cost estimate is $849M. Further refinement of alternatives over the next ten years (when the last project is in design) could significantly increase the programmatic costs. CSO programmatic costs and alternatives that also protect or improve water quality will be evaluated in the WTD Systemwide Comprehensive Plan.

Sections 3.2.4.1 through 3.2.4.5 present updated descriptions of the approved 2012 LTCP alternatives.

Table 3-4 Alternatives Comparison: 2018 Best Value and 2012 LTCP

Basin	CSO Alternative Name	2018 Best Value Alternative Result*	Approved LTCP Alternative
SODO (Hanford #2, Lander St., Kingdome, and King St.)	HLK WWTS & King St. Storage Tank	HLKK WWTS	HLKK WWTS
	HLKK WWTS		
	HLKK Tunnel to Georgetown WWTS		
	HLKK Tunnel to South TP		
	SODO Full Separation		
Combined – Chelan Ave./SODO	HLKK WWTS & Chelan Ave. Storage Tank	CHLKK WWTS	N/A – Not evaluated as part of approved LTCP
	CHLKK WWTS		
Montlake	Montlake Storage Tank	Montlake Storage Tank & GSI & Separation	Montlake Storage Tank & GSI
	Montlake Storage Tank & GSI & Separation		
	Montlake Storage Tunnel		
	Montlake WWTS		
	Montlake WWTS & GSI & Separation		
	Montlake Full Separation		
University	University Storage Tank	University Storage Tank	University Storage Tank & GSI
	University Storage Tank & GSI		
	University Storage Tunnel		
	University WWTS		
	University WWTS & GSI		
	University Full Separation		
Combined - Montlake/University	Consolidated Tunnel for University & Montlake	Consolidated Tunnel for University & Montlake	N/A – Not evaluated as part of approved LTCP
	Consolidated Tunnel for University & Montlake & GSI & Separation		

* Best Value Alternative is a result of a rating and ranking process incorporating performance, cost, and risk factors.

3.2.4.1 Chelan Ave. Storage Tank

The Chelan Ave. Storage Tank alternative consists of an approximately 4.0-MG storage tank to control the WTD Chelan Ave. RS Overflow. During a storm, flow would be conveyed from the new diversion structure to the storage tank via the influent gravity pipe. After a storm, drain pumps would transfer stored combined sewage to the force main discharge maintenance hole via the drain force main when instrumentation in the West Duwamish Interceptor indicated there was downstream capacity available. Because of the potential to site the Hanford #2, Lander Street, Kingdome, and King Street Wet Weather Treatment Station (HLKK WWTS) near the Chelan RS, there is a potential to combine this latter project with HLKK WWTS. A facility plan identifying two possible scenarios is due to Ecology in December 2018.

3.2.4.2 West Michigan/T115

The West Michigan/T115 Storage Tank was previously called the South Park and Highland Park GSI Project. The 2012 LTCP recommended GSI, followed by a storage solution, if necessary. After the problem definition process was completed, the revised control volume range of 0.36 to

0.48 MG indicated that GSI alone could not solve the problem. As indicated in Table 3-2, the technical team determined that Highland Park was not an effective candidate for GSI because there was not sufficient impervious right of way connected to the combined sewer system, so the neighborhood was removed from consideration. Alternatives analysis was completed in 2017, and a storage tank was selected as the most viable solution for this project without GSI. The project is currently in the predesign phase, and a facility plan is being developed for submittal in 2020 per the CD milestone.

3.2.4.3 Hanford #2, Lander St., Kingdome, and King St. WWTS

The alternative for HLKK WWTS consists of an approximately 150-MGD WWTS with an equalization basin to treat combined flow before discharge into the Duwamish Waterway to control the Hanford #2 RS, Lander St. RS, Kingdome RS, and King St. RS overflows. Flows would be diverted from the four new diversion structures near the Hanford #2 RS, Lander St. RS, Kingdome RS, and King St. RS to a common influent gravity pipe. The influent gravity pipe would then convey the combined flows to a centralized WWTS. Because of the potential to site the HLKK WWTS near the Chelan RS, there is a potential to combine the Chelan project with HLKK WWTS.

3.2.4.4 Montlake Storage Tank, GSI, and Separation

The Montlake Storage Tank, GSI, and Separation alternative consists of an approximately 8.0-MG storage tank, GSI, and sewer separation to control the WTD Montlake RS Overflow. In addition to the storage tank, GSI and separation techniques would be integrated into the ROW, including roadway, alley, and landscape areas, to remove connected ROW impervious area and also stream flow from Interlaken Park from the combined sewer system. GSI and separation would mitigate approximately 3.0 MG by removing stormwater runoff and stream flow from the combined sewer system. Based on 2016 modeling by WTD, this 3.0-MG reduction would require effectively removing approximately 123 acres of connected ROW impervious area and stream flow from Interlaken Park from the combined sewer system. For comparison, a planning-level estimate was also developed for an 11-MG storage tank with no GSI and separation.

3.2.4.5 University Storage Tank with SPU

The University Storage Tank planning level size has changed because of a significant control volume increase. Modeling performed in 2010 for the 2012 LTCP indicated that the control volume for University CSO was 5.23 MG for a joint alternative with SPU. The current modeling indicates a 16.97-MG control volume, an approximate 200 percent increase in size from 2012. Based on an analysis by the modeling team, the increase at University was caused by three significant factors.

One factor was an improvement in basin calibrations for the lower University area resulted in a 64 percent increase. WTD installed more flow meters in the basin and calibrated the model to a higher level of detail with help from SPU.

The second factor was the lengthening the available observed rainfall record fed into the model from 32 years (1978 through 2009) to 38 years (1978 through 2015) resulted in an increase of 37 percent. Increased rainfall over the last decade has shown increases in volumes for a number of CSO sites. This is not going to improve over time. This indicates the observed rainfall in recent years is sufficient to drive the long-term average CSO values higher.

The third factor was a decision to include the impacts of anticipated I/I degradation from the separated system upstream of Matthews pump station, resulting in an increase of 107 percent. This more accurately describes future conditions for the areas of the combined sewer system that are influenced by I/I in contributing separated areas. The University CSO is heavily influenced by flows form Matthews Park Pump Station to the North Interceptor. The flows from Mathews Park PS enter the combined system downstream of University CSO through the Lake City Tunnel, thereby using up capacity in the North Interceptor before the University CSO can.

Without GSI, the University CSO Storage Tank alternative would consist of an approximately 16.1-MG storage tank to control the WTD University RS Overflow and SPU North Union Bay overflow locations. With the University GSI project described in Section 3.2.2.3, the University CSO Storage Tank alternative would consist of an approximately 8-MG storage tank. Section 3.2.2.3 describes the University GSI project, currently in design, which will submit a Green for Gray substitution proposal in 2022 in accordance with the CD timeline. The runoff volume reduction managed by University GSI will be modeled to inform the final facility design for the University CSO Storage because there is more complexity than a direct subtraction from the CSO control volume to determine the size reduction for this gray facility.

3.2.5 Advancing Planning for CSO Control

This Program Update documents progress made toward implementation of the County's CSO Control Program and identifies program priorities for the next five years and beyond. As WTD continues implementation of the approved 2012 LTCP alternatives, it will incorporate updated modeling information and cost estimating into project planning and development. In doing so, the CSO Control Program will continue to evaluate CSO control alternatives and opportunities for projects that further benefit water quality in relation to its work.

In its next phase of LTCP implementation, WTD will identify opportunities for project refinement, facility optimization, and new water quality projects. WTD will quantify the potential water quality benefits and costs of these opportunities and evaluate their merits in providing benefits that align with regional values, countywide initiatives, and planning efforts.

Concurrent with LTCP implementation, WTD has initiated a planning process to update its comprehensive wastewater system plan. The purpose of this systemwide comprehensive planning effort is to thoroughly assess all the demands on the regional wastewater utility, including CSOs, and plan a future direction that makes the right investments at the right time. Since CSO investments are among the demands considered in the systemwide planning effort, the CSO Control Program will continue its evaluation of CSO control alternatives and additional water quality improvement opportunities to inform the systemwide planning effort. WTD will continue to work with Ecology, EPA, and stakeholders as these planning processes unfold.

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Chapter 4

Public Involvement Activities Related to the CSO Control Program

Involving the community and interested parties to gain public support is critical to the success of this Program Update and WTD's CSO Control Program as a whole. Public involvement prepares the community to provide informed comments on options for controlling CSOs, siting control facilities, and environmental priorities within the Program Update. This feedback, in turn, fosters respectful, two-way communication about the CSO Control Program public involvement activities and outcomes and also helps inform decision-makers who need to hear from a range of participants before finalizing decisions.

4.1 Public Involvement Plan

The County implemented a public involvement plan to identify and understand impacted communities, use community input to inform an equitable program update, and provide all interested community members the opportunity to participate in CSO control planning.

Objectives of the Public Involvement Plan for the 2018 Program Update included the following:

- Inform interested parties and the general community about the need for the LTCP, its technical goals and constraints, and the decision process; identify and explain King County's iterative, multi-step approach to updating the LTCP.
- Provide equitable opportunities for interested community members to have a say about decisions that affect them.
- Seek timely input from the community at key milestones that can appropriately inform the technical team's work.
- Learn about social conditions, land uses, and future development plans that CSO control projects or future King County property acquisitions may impact during LTCP implementation.
- Meet community involvement expectations of the King County Executive and Council.
- Ensure public involvement activities meet NPDES public involvement requirements.
- Set the stage with the community for future projects identified in the LTCP.

Public involvement for this Program Update was built on groundwork laid during development of the approved 2012 LTCP, including the identification of interested parties, concerns, and values. This allowed for continuity with constituents and a basic understanding of possible community interests. These community values were incorporated into public involvement planning for this Program Update. These values and concerns are being truth-tested through community inquiries to ensure that they are valid, and that other values and concerns have not been missed. WTD sought through meetings, workshops, and interviews with environmental and community groups, tribes, agencies, and the general public.

To address a key WTD goal of stimulating innovation in developing and implementing new approaches and technologies to the delivery of public services, the Public Involvement Plan incorporated new approaches to public involvement for this Program Update, including the following:

- Pubic involvement staff conducted in-depth early research to learn more about the community in the University and Montlake CSO basins where GSI is feasible. Through this research, WTD learned more about how to discuss the problem of CSOs with people, what community members know about GSI, what the community's values and concerns are, and what ESJ opportunities and challenges exist.

- The use of a public involvement management software tool allowed staff to manage and record the results of outreach efforts, and to access the information so they can better communicate with the public about the plan. The tool also allowed staff to integrate information from other relevant projects that share the same communities. Use of this tool also ensured the important feedback loop was closed. Staff carefully recorded and tracked input and responses, sought key information from the project team, and provided in-depth and accurate responses to all queries.

Both the content and the implementation strategy of the LTCP Public Involvement Plan reflect the County's requirement that ESJ be considered for all projects it undertakes. For instance, the plan incorporates a County-directed inclusive project planning process to work toward achieving the vision that a more equitable and socially just workplace and community are just as important as what is accomplished in a project. Collecting the specific demographic information defined in that inclusive process informed all of WTD public involvement efforts and will provide key considerations for capital projects emerging from the LTCP.

To further promote inclusivity, translated materials were available when it was determined that more than 5 percent of the target neighborhood spoke a language other than English. WTD Community Services staff evaluated the need for translations in each project area and provided interpreters as needed for outreach activities.

In addition to language considerations, other cultural sensitivities warranted enhancements to standard outreach techniques. Examples of this include reaching out to underserved communities and identifying and establishing relationships with their trusted liaisons and community organizations to support participation. Communication, in general, avoided complete reliance on digital formats and digital communications were optimized for smart mobile phone usage, a key demographic-based consideration for ESJ communications.

4.2 Public Involvement Implementation

Specific and targeted information-sharing and outreach were conducted to inform the community at large and solicit feedback from community members and community-based organizations on the CSO Program, including:

- Website: WTD's website includes information on CSOs under the umbrella term, "Protecting our Waters." For the Program Update, the website was updated to include information about the update process, the reasons for the update, and a general discussion of the types of solutions under discussion in the 2018 Program Update (https://www.kingcounty.gov/services/environment/wastewater/cso/projects/system-plan.aspx).

- Listserv: WTD sent email newsletters using the GovDelivery platform to a listserv announcing the LTCP Update, background information, and opportunities for involvement.

- Fact Sheet: A fact sheet introduced the Program Update and provided baseline information on CSOs, including what they are and why they need to be addressed. The fact sheet also provided contact information for CSO outreach staff and encouraged people to be involved in the update planning process. In addition to being posted online, the fact sheet was distributed at LTCP-specific events and shared by WTD staff at other division events and activities.

- Community briefings: WTD staff reached out to community organizations in the planning area and offered to provide briefings on the progress of the LTCP implementation and Program Update. Some community organizations even requested return progress update visits. WTD conducted briefings for the following organizations:
  - Stewardship Partners
  - SODO Business Improvement Area
  - Salmon-Safe
  - Futurewise and Duwamish River Cleanup Coalition
  - The Nature Conservancy in Washington
  - Ravenna-Bryant Community Association
  - Montlake Community Club
  - Laurelhurst Community Club
  - Green Lake Community Council
  - Northeast District Council
  - University District Partnership

- Sustainable Ballard
- Phinney Ridge Community Council
- Seattle Yacht Club
- Cascade Bicycle Alliance
- Montlake Community Center Advisory Board
- Roosevelt Neighborhood Association
- Sierra Club
- Puget Soundkeeper Alliance

During the 2012 LTCP update process, a number of organizations were identified as having specific, environmental-based interest in CSOs and plans for how to bring the County's CSOs under control. For the 2018 Program Update, WTD reached out to these highly interested organizations to determine how they would collectively like to be involved in the 2018 Program Update. Workshops were identified as the best way to inform and engage these key environmental organizations and solicit their input on specific elements of the update process.

Environmental Workshop #1: This workshop (repeated twice on June 19 and July 31 to accommodate schedules) was held in the summer of 2017. The workshops were attended by representatives from the following organizations:

- Duwamish River Cleanup Coalition
- Futurewise
- Puget Soundkeeper Alliance
- Salmon Safe
- Seattle 2030 District
- Stewardship Partners
- The Nature Conservancy
- Washington Environmental Council

WTD staff provided information and received feedback from participants about the background of the LTCP, CSO control methods and options, the alternatives selection process, and alternative evaluation steps. Additionally, Water and Lands Resources Division staff shared information about the WQA/MS Study. Specific feedback on evaluation criteria was especially valuable.

Environmental Workshop #2: This workshop was held in July 2018. WTD staff provided updates on the LTCP and ranked alternatives, sought feedback on prioritization of potential water quality projects, and shared next steps for the Program Update and the CSO Control Program.

The workshops were attended by representatives from the following organizations:

- Duwamish River Cleanup Coalition
- Futurewise
- Puget Soundkeeper Alliance
- Salmon Safe
- Seattle 2030 District
- Stewardship Partners
- The Nature Conservancy
- Washington Environmental Council
- SPU

4.3 Public Notification Program

King County operates a CSO Notification and Posting Program as a joint project with the City of Seattle and Public Health–Seattle & King County. This program includes signs at publicly accessible CSO locations, an information phone line, websites, a brochure, and other public outreach activities. These activities provide the community with information on CSOs and their status in relation to public health, water quality, and proposed capital projects, among other factors.

A website providing real-time notification of recent and current CSO discharges went live in December 2007 (http://www.kingcounty.gov/environment/wastewater/CSOstatus.aspx). In April 2011, King County completed the process to incorporate City of Seattle near real-time overflow information on this website. The website presents overflow status for the majority of Seattle and County CSOs and provides links to and from each agency's independent website. The community has access to consolidated information to assist in making choices about the use of local waters. In late 2015, the website was upgraded to be more usable on mobile devices and now allows users to zoom in and out to get more details. This upgrade redesigned the site from a set of five pages (an overview map and four submaps) to a single-page map.

In 2017, the CSO Status Web pages had 8,774 page views (representing 7,583 unique page views, with 86 percent of users viewing and then leaving the page [bounce rate]). This represents a 6.05 percent decrease in page views from 2016, when there were 9,342 page views.

4.4 Capital Projects

King County recognizes that its construction projects can be disruptive to the community. WTD's public outreach during construction considers a project's complexity, location, and potential impacts.

WTD's project teams are committed to keeping the community and local jurisdictions apprised of the project's progress, schedule, milestones, and any unforeseen developments. WTD works directly with the community to minimize construction impacts.

The community can inform the County's decisions about the following:

- Addressing community disruptions
- Safety precautions
- Addressing private property impacts attributable to the project

WTD uses various methods to engage with the public during the design and construction phases of capital projects. Some of the public outreach activities could include:

- Community meetings with the contractor before construction
- Community briefings on project progress during construction
- Advanced written notice of major construction activities
- Project status reports
- Prompt response to all community inquiries
- 24/7 construction hotline
- Project Web pages
- News releases

4.5 General Water Quality Education

Information on the King County CSO Control Program is presented to the public in the context of the County's overall wastewater management programs through various venues, including wastewater treatment plant tours and presentations to community groups, schools, and other entities. Examples of recent education opportunities provided by WTD are shown in Table 4-1.

Table 4-1 WTD Education and Outreach Programs

Program	Description
School Field Trips	Programs conducted at WTD treatment plants and facilities that facilitate STEM education experiences for 3rd–12th graders on topics such as water systems, wastewater processes, stormwater, and the scientific process
In-Classroom Outreach Programs	Classroom presentations (1–2 hours) that provide real-world knowledge for 6th–8th graders on topics such as water systems, wastewater process, stormwater, and the students' connections to their water
Afterschool Programs	Educational activities for 1st–8th graders that support established afterschool programs run by community-based organizations
Summer Day Camps	Summer day camps for 1st–9th graders at the Brightwater Center where students explore the outdoors through hands-on activities
High School Summer Internships	Paid summer internships for six weeks of the summer where high school students build skills and learn about the variety of careers that are needed to keep our water clean
Career Opportunity Events and Career Fairs	Events for teens that increase awareness about the wide variety of jobs in wastewater through school visits, after-school events, and career fairs
Teen Development Programs	Programs that partner with social service organizations to reach at-risk teens; programs build knowledge and skills related to water systems and expose teens to careers
Educational Kits and Curriculum Resources	Resources are available to educators both online and in classroom kits that can be checked out to learn about the region's water resources, wastewater, and the environment
Treatment Plant Tours	Groups from universities, professional groups, or the general community can tour WTD's treatment facilities and learn how wastewater can be recycled into reusable water, energy, and nutrients for plants and soil
Senior Center Outreach Programs	Lectures for senior citizens that are conducted at senior centers; presentations explore the wastewater treatment process in addition to discussing the "do's" and "don'ts" of the sewer system
Adult and Professional Development Workshops	Workshops are available for adults on a variety of environmental topics; workshops for educators allow them to learn more about water systems and ways to integrate into classroom curriculum
Career Opportunity Event and Career Fairs	Events that increase awareness about the wide variety of jobs in wastewater through career exposure events and career fairs
Summer and Year-round Internships	Internships for fully enrolled college students that provide experiences in a number of environmental fields
Family Programs	A variety of community and family event programs throughout the year that combine outside exploration with hands-on activities
Community Festivals	Educational booths and activities that support community festivals
Stewardship and Volunteer Opportunities	Opportunities for local community groups, businesses, and organizations to learn more about the environment and take part in service learning projects at King County WTD facilities

The King County Wheels to Water Program provides free bus transportation for wastewater-related field trip programs for qualifying schools in King County. In 2017, WTD reached 17,578 students through these types of education programs, providing information that helps protect regional water systems, the local environment, and the health of communities.

In addition, WTD's industrial pretreatment program and the County's local hazardous waste, natural yard care, and related programs educate businesses and residents on what they can do to protect water quality.

4.6 Funding Community-led Water Quality Efforts

4.6.1 Green Grants Program 2011–2015

From 2011 to 2015, the King County Green Grants Program provided funding to nonprofit organizations, local government, schools, and tribes for projects to improve and protect air and water quality in the Duwamish watershed. In partnership with SPU and the Puget Sound Clean Air Alliance, the King County Green Grants Program awarded $561,300 over five rounds of funding. The grants promoted partnerships in the Duwamish area that prevented pollution and provided small-scale environmental and economic opportunities for creative solutions.

4.6.2 WaterWorks Grant Program 2015–2018

WTD manages the WaterWorks Grant Program, established by King County Council in 2015. The purpose of WaterWorks is to support sound investments in clean water and the community. WaterWorks provides funding to organizations for projects that benefit or improve water quality within WTD's service area and that also benefit its ratepayers. Approximately $2 million is awarded every two years for organizations implementing a variety of projects. A total of 82 projects to date have been awarded funding (Figure 4-1).

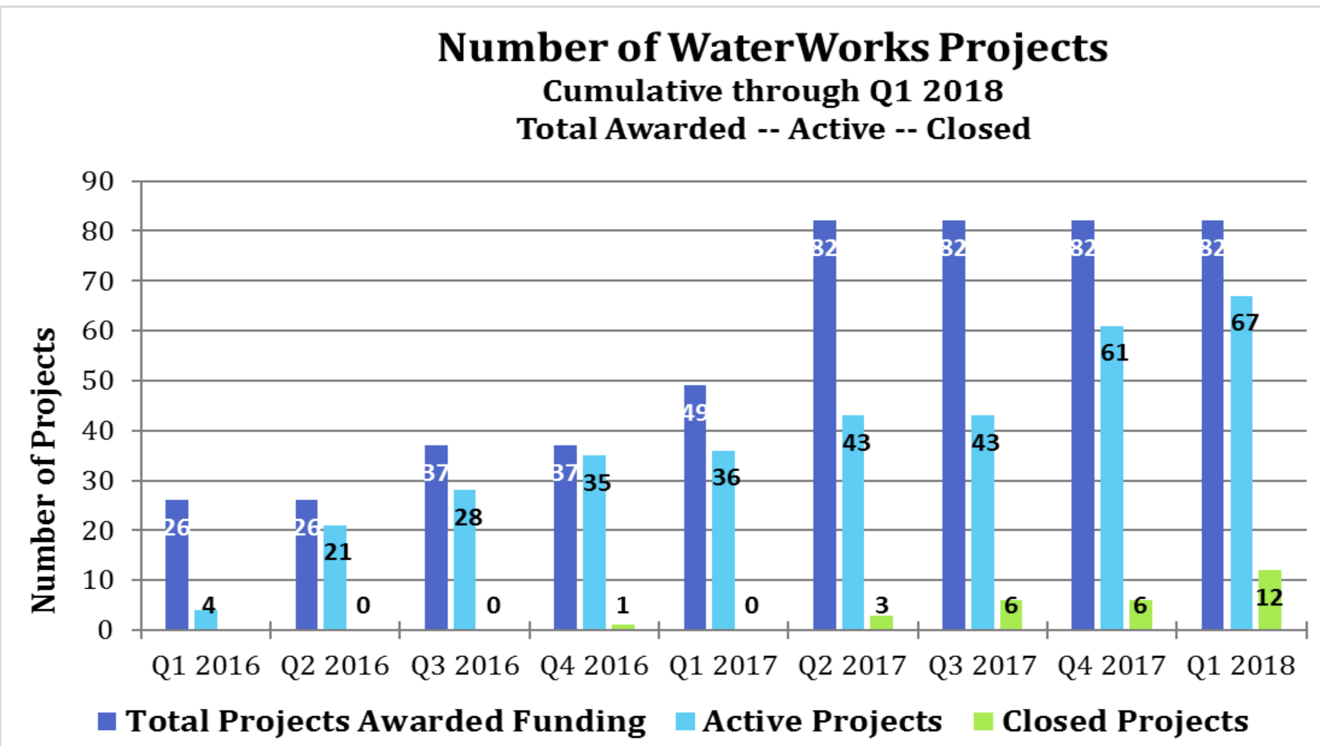

Figure 4-1 WaterWorks Grants Awarded in the Past Five Years

Attachment 8

Outfall Evaluation Reports – West Point Treatment Plant and Wet Weather Treatment Stations

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

West Point Outfall Inspection Final Report

For King County Wastewater Treatment Division

Project #1047376 | Task #0.13.02
Contract #C01100C16 – Work Order # 05

Submitted Oct. 15, 2018

Submitted by:
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Table of Contents

1. Executive Summary

On October 11, 2018, Global Diving & Salvage, Inc. (Global) conducted an ROV inspection of the West Point Treatment Plant (WPTP) Outfall in Puget Sound near Seattle, WA, inspecting the entire exposed pipe alignment including manhole/access structures and thrust block/end structure. King County Waste Water Treatment Division contracted Global to inspect and verify the condition of the outfall as part of the regular inspection and maintenance plan. This report presents the results of the inspection. The full inspection was documented in color video.

Significant findings and results, covered in more detail in this report, include:

- Diffuser section from manhole 8 offshore to the end gate is heavily covered in marine growth
- All diffusers on the north and south sides of the pipe are equally clear of debris
- Seven diffusers the south side of the pipe and four diffusers on the north side of the pipe are near bottom but do appear to have full flow
- Thrust block appears to be intact but could not be closely observed due to marine growth
- All gate hardware appears to be intact
- End gate diffuser is clear with flow consistent with the north and south outfall diffusers
- 10 to 20 feet off shore manhole 8 at station 30+00, effluent leak was observed on the north side of the pipe from the spring line up to approximately the 10 o'clock position. Effluent leaking section of joint gap appears to be 1/8 to ¼ inch wide.
- All manhole covers and hardware appeared to be in good condition. Manhole covers appeared to be held in place by only 4 securing bolts. Height off bottom of all manholes is pretty consistent at approximately 12 to 18 inches off bottom.
- The pipe was found to be covered from approximately station 29+10 inshore to station 18+75
- Pipe from station 29+10 offshore to the end gate is estimated at half buried to just less than half buried

2. Introduction

Global Diving & Salvage, Inc. (Global) was directed to perform an inspection of the entire exposed pipe alignment of the West Point Treatment Plant (WPTP) Outfall under Work Order No. 05 of King County Contract Number C01100C16, Diving, Inspection and Repair Work Order 2016. The outfall lies at 47° 39.64' N latitude, 122° 26.90' W longitude, in Puget Sound near Seattle, WA. The following final report documents the findings and observations of this inspection.

3. Inspection Schedule, Issues and Methodology

For maximum video quality, currents under 0.7 knots are preferred. The West Point Outfall Inspection was scheduled for Oct. 11th, 2018 when the maximum flood and ebb tide currents were predicted to range between 0.1 and 0.5 knots. The ROV vessel *Prudhoe Bay* was positioned approximately 100 feet north of the diffuser center. The ROV was deployed on the north side of the West Point outfall at near center of the diffuser section. The ROV then moved along the north side of the diffuser pipe offshore until the end gate was reached. Once inspection of the end gate was completed the ROV traversed inshore along the south side of the pipe while counting and observing diffuser port conditions. Once the last inshore diffuser port was reached the ROV crossed over the pipe to the north side. Diffuser ports were counted until the end gate was reached. Observations were made of the pipe and diffuser port conditions. The ROV then moved inshore along the crown of the pipe observing the condition of the pipe and noting any anomalies, discrepancies, joints, manhole covers, pipe coverage etc.

The ROV vessel *Prudhoe Bay* maintained a consistent watch circle near the ROV by following the floated section of tether from the ROV to the vessel.

It was noted that once inshore of manhole number 7, recreational boating traffic was heavy. There were ROV hazards from downrigger and fishing weights used on recreational fishing vessels. All recreational fishing vessels in the vicinity of West Point ignored the diver's flag, loud hailers and Notice to Mariners of the *Prudhoe Bay's* limited maneuverability. Derelict crab pots and crab pot lines obstructed the path of the ROV during its transit to shore during inspection.

Future consideration before ROV inspections begin need to be considered. Current direction should be north by northwest in order to inspect the pipe lay inshore of manhole 6 due to the navigation aid on the south side of the pipe near West Point. Its close proximity to the pipe of 200 feet creates a tether management and vessel maneuverability challenge which could potentially delay production of the ROV inspection. Future inspections should be conducted during an ebbing neap tide so that the tether will lay away from the navigation aid during the shallow water section of the ROV inspection.

4. Dates of Inspection, Vessel, Equipment, Crew and Methodology

4.1 Inspection Dates

The West Point Outfall inspection commenced Oct. 11th, 2018 at 1100. At 1500 the ROV was returned to deck, ending the operation.

4.2 Vessel

The inspection was conducted using the *M/V Prudhoe Bay*, Global's 63-foot, twin engine landing craft and utility vessel regularly deployed for diving, salvage and ROV work. For the duration of ROV operations, an ROV container and support generator were fitted aboard. The *Prudhoe Bay's* Gateway 5-ton, four function deck crane on a raised pedestal was utilized in launch and recovery of the ROV.

4.3 Equipment

The SAAB Seaeye Cougar-XT is a compact work-class Remotely Operated vehicle (ROV). Rated to 2,000 meters, and capable of speeds over 3.2 knots, the Cougar-XT is a versatile machine with the highest thrust-to-weight ratio in its class. With accessories like five-function manipulators and multiple camera and lighting arrays, the Cougar is a highly capable inspection platform.

Cougar-XT can accommodate the tooling for the tasks planned for this project. Features utilized during the execution of this project include:

- Dual, 5-function hydraulic manipulators for verifying scale and checking anomalies
- Wide eye camera and CCD Camera
- Variable intensity LED lighting equivalent to 600 watts

4.4 Crew

ROV Operators:

- Warren Posten, Supervisor
- Jonathan Potts, ROV Pilot/Technician
- Dave Edmisten, Deckhand/ROV Pilot

Crew:

- Ryan Dimock, Deckhand/Crane Operator
- Greg Watson, Vessel Operator

4.5 Methodology

After completing the Elliott West CSO Facility Inspection (King County Work Order C01100C16 – 06) the *Prudhoe Bay* and her crew traveled to the site of the West Point Treatment Plant Outfall at 1100. The team located the WPTP Outfall at 1145 and began the inspection, flying the ROV west to the end of the pipe, with focus on inspecting the outfall's end. The ROV was then flown east along the alignment; the diffuser ports on the south side were identified and noted as it transited toward the near shore end of the pipe. On the return pass, heading west, the diffuser ports on the north side of the pipe were located. Reaching the end of the outfall, the client representative directed the ROV pilot to fly over the top of the pipe heading east to locate and inspect the manholes. The ROV progressed toward shore inspecting the manhole covers past the pipe joint. The inspection continued until 1500, when it was halted upon agreement between the client representative and the ROV operator due to increasing current, shallow water and the risk of tether entanglement with a navigational buoy (West Point Lighted Buoy #1).

5. Video DVD/Hard Drive Reference Numbers

Inspection videos of West Point outfall were recorded continuously to DVD and hard drive using wide eye and standard definition CCD color camera. Photo images are captured as screen grabs and can be viewed in sequence using the dive log times referenced to the file time in the file name of each image.

6. Condition of Diffusers

Overall the diffusers appear to be in good condition, clear of debris and with good flow. Near the gate end of the outfall, flow appeared to be reduced. Diffuser ports were counted as they were observed on the south side from west to east; total number of diffusers was 100 each. Diffusers on the north side were counted from east to west. 101 diffusers ports were counted on the north side of the outfall. It is believed the diffuser nearest the gate on the south (Diffuser #1) could not be located due to little/no flow and obstruction from anemones and other marine growth. In general, the diffuser ports on the north side appear to be farther off the bottom than those on the south side but there did not appear to be any visual evidence of scouring. Several diffusers were observed to be close to the sea floor: Diffuser count #11, 12, 21, 34, 47, 55, 76 on south side; Diffusers #36, 83, 85, 94 on the north side.

Figure 1: Typical diffuser condition

7. Observations, Irregularities and Problems Noted

The gate end of the pipe is covered with anemones and other marine growth around the diffusers. The end gate itself has no marine growth attached. All connecting hardware was observed to be intact.
The joint near station 30+50 was located at a depth of 203 fsw; at 206 fsw there is flow coming out of the North side of the joint. Figures 8 through 11 below provide photo images of that joint. Figure 8 is of the north side of the pipe from the 10 o'clock position on the pipe down to the mud line at about 9 o'clock. The gap on the joint at this location is less than the width of the manipulator claws, estimated at ¼ to 1/8 of an inch. No effluent was observed coming out of the seam at the crown or on the south side of the pipe.

Visible marine growth was lighter at the joint end of the pipe than at the gate end. The pipe is buried from approximately station 29+10 inshore to station 18+75 with rock and gravel covering the pipe at heading 060°. The pipe from station 29+10 offshore to the end gate is partially buried but nothing exceeding the spring line of the pipe.

Ghost fishing gear was found in line with the pipe near Manhole #6. Manholes #6, 7, 8 and 9 appear to be intact. All manhole covers and hardware appeared to be in good condition. Manhole covers appeared to be held in place by only 4 securing bolts. Height off bottom of all manholes is pretty consistent at approximately 12 to 18 inches off bottom.

Figure 2: looking at the South half of the end gate. Note: a small amount of effluent exiting the diffuser port on the vertical centerline of the end gate

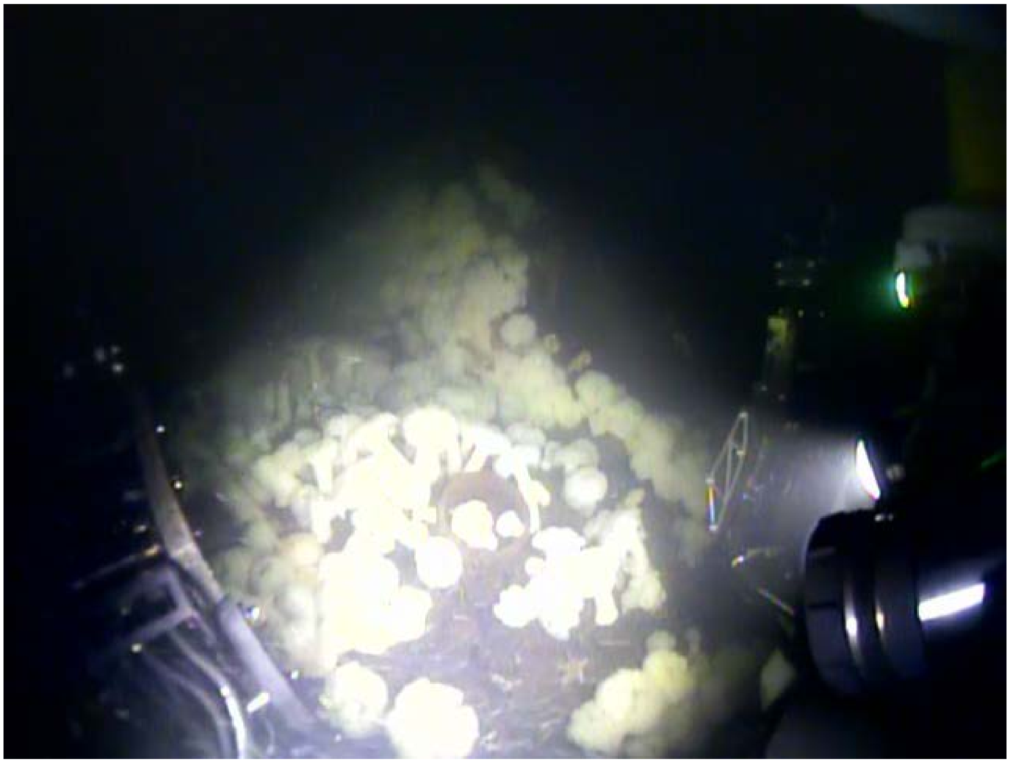

Figure 3: ROV is facing the north side of the end gate. Note the pipe in the foreground; the pipe's purpose was not determined

Figure 4: Endgate bracket, north side

Figure 5: Endgate with effluent coming from diffuser port

Figure 6: Endgate, bracket at 12 o'clock position

Figure 7: Endgate, bracket at 9 o'clock position

Figure 8: Leaking joint offshore of manhole 8 at approximately Sta 30+50

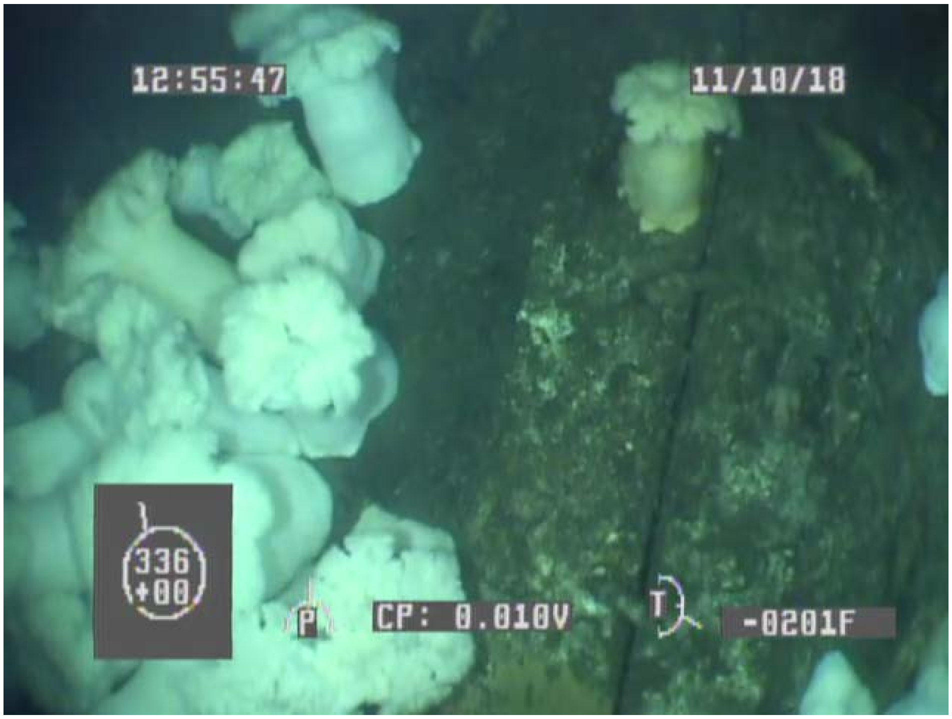

Figure 9: leaking joint offshore of manhole number 8 seen from the south side of the pipe. Note: no effluent was observed coming out of the seam from this location

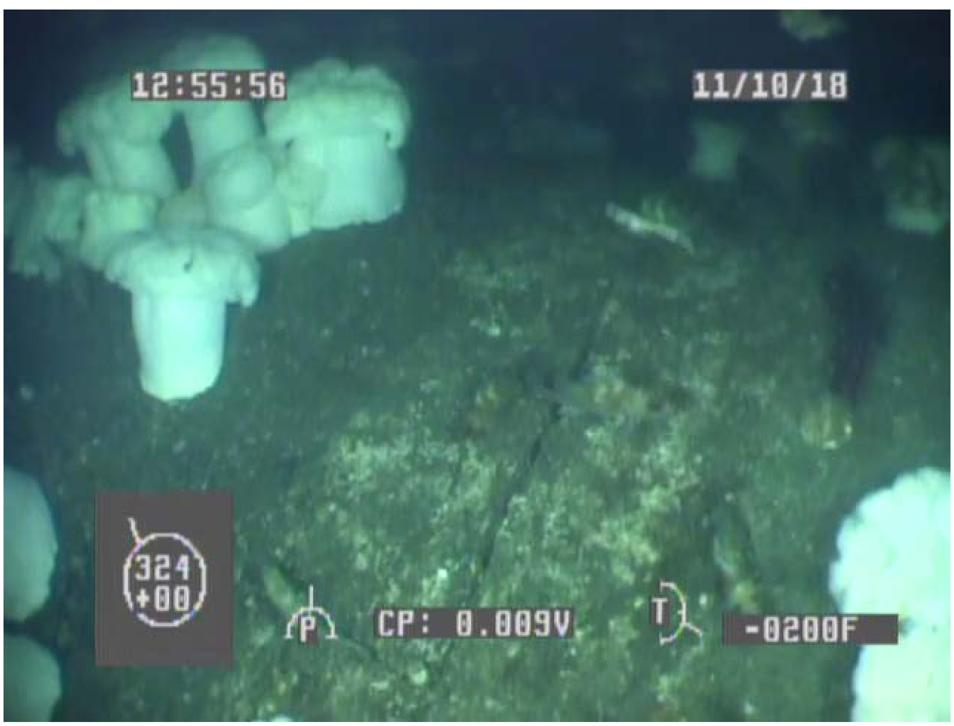

Figure 10: Leaking joint offshore of manhole number 8 at the crown.

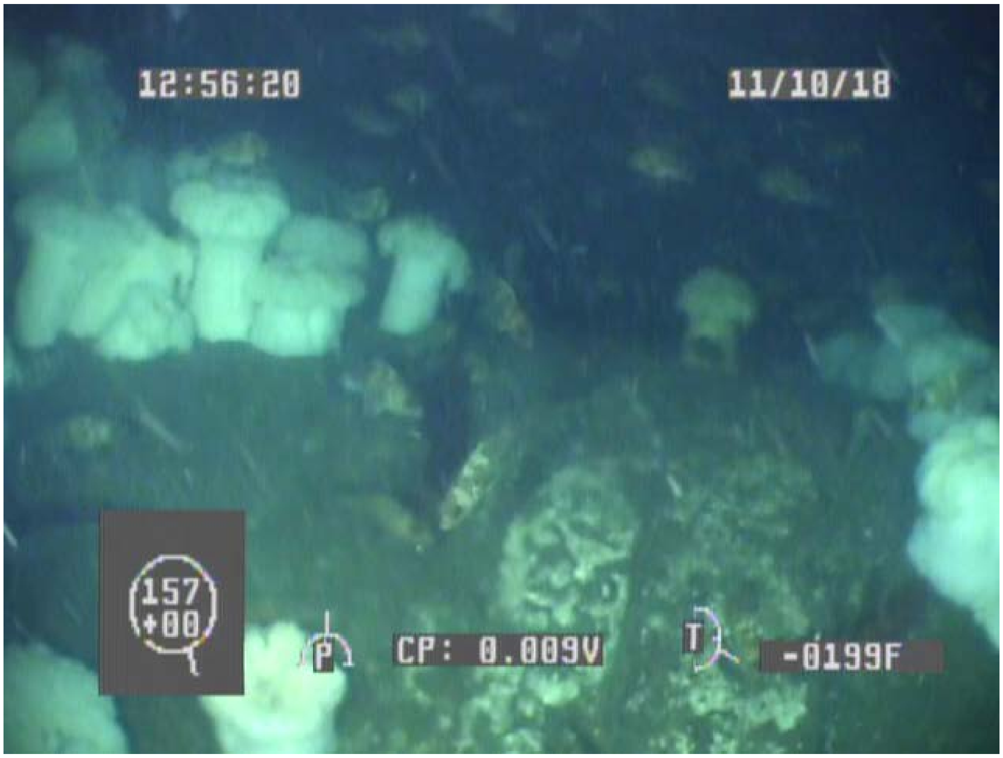

Figure 11: Leaking joint offshore of manhole number 8. This is looking at the crown and 11 o'clock position on the north side of the pipe. Effluent was observed leaking from the joint just below this image. Note the dark spot in the center of the screen just to the left of the joint is a piece of kelp, not a hole in the pipe.

Figure 12: Manhole 9, intact. The position of manhole number 9 was determined by checking that diffuser ports were still present below the manhole and verifying the approximate depth to the as built drawing.

Figure 13: Manhole 8, intact. Manholes number 8's position was determined using the same method as manhole number 9

Figure 14: Pipe between Manholes 8 and 7, the pipe entered the bottom near this location. Growth on the pipe and shore of the diffusers is sparse.

Figure 15: typical bottom type on buried pipe just inshore of the location where the pipe enters the bottom between manhole 8 and 7

Figure 16: Manhole 7, intact

Figure 17: Typical bottom, inshore of Manhole 6

8. Overall Condition Statement

The outfall pipe is generally in good condition with heavy marine growth in the deeper offshore areas and less marine growth near shore. Thrust block appears to be intact but could not be closely observed due to marine growth. The end gate is intact with hardware in place. Overall the diffusers appear to be in good condition, clear of debris and with good flow. Near the gate end of the outfall, flow appeared to be reduced. There is joint separation near station 30+50 with flow coming out of the north side of the joint. Maximum separation estimated to be ¼ to 1/8 of an inch. No effluent was observed coming out of the joint at the crown or on the south side of the pipe. The pipe is buried from approximately station 29+10 inshore to station 18+75 with rock and gravel. No observation were made of the covered pipe.

9. Recommendations

Repair of the separated joint near station 30+50 should be evaluated. The remainder of the uncovered outfall appears to be in good condition and not requiring repair or maintenance. Due to increasing current in shallow water and the risk of tether entanglement with a navigational buoy (West Point Lighted Buoy #1) the outfall was not inspected inshore of manhole number 5 (Sta 17+75). The County may want to perform diver surveys of areas of interest inshore of this location.

GLOBAL

10. Summary

In summary the ROV inspection of WPTP Outfall resulted in the following findings.

- Diffuser section from manhole 8 offshore to the end gate is heavily covered in marine growth
- All diffusers on the north and south sides of the pipe are equally clear of debris
- Seven diffusers on the south side of the pipe and four diffusers on the north side of the pipe are near bottom but appear to have full flow
- Thrust block appears to be intact but could not be closely observed due to marine growth
- All gate hardware appears to be intact
- End gate diffuser is clear with flow consistent with the north and south outfall diffusers
- 10 to 20 feet off shore manhole 8 at station 30+00, an effluent leak was observed on the north side of the pipe from the spring line up to approximately the 10 o'clock position. Effluent leaking section of joint gap appears to be 1/8 to ¼ inch wide.
- All manhole covers and hardware appeared to be in good condition. Manhole covers appeared to be held in place by only 4 securing bolts. Height off bottom of all manholes is pretty consistent at approximately 12 to 18 inches off bottom.
- The pipe was found to be covered from approximately station 29+10 inshore to station 18+75
- Pipe from station 29+10 offshore to the end gate is estimated at half buried to just less than half buried

11. Appendix

11.1 ROV Dive Log

Time:	Notes:
11.00.0	Prudhoe Bay departed Elliot West for West Point Outfall
11.45.00	Prudhoe Bay on station
12.08.00	ROV on pipe
12.13.00	Diffuser ports clear, north side of pipe
12.15.30	Pipe half buried in rock, 228'
12.17.00	ROV sliding west on north side
12.20.00	Diffuser ports 6" off bottom
12.22.00	View of pipe obstructed by sea anemones
12.24.00	end of pipe, 237'
12.25.00	Sonar contact 10 ms
12.27.00	Flap gate, 237'
12.28.00	Looking at hardware on flap gate
12.31.30	6 o'clock gate hardware intact
12.33.00	ROV moving down south side of pipe
12.38.00	Diffusers 11, 12 close to bottom, 233'

12.39.30	Diffuser 21 on bottom, 231'
12.41.00	Diffuser 34, clear on bottom, 226'
12.43.30	Diffuser 47 close to bottom, 221'
12.45.00	Diffuser 55 close to bottom, 220'
12.47.00	Diffuser 76 near bottom, 212'
12.50.00	206', #100 diffuser parts on south side
12.52.00	Continue down the south side
12.55.30	Joint near station 30 and 50, 203'
12.57.22	Flow seen coming out of north side of joint, 206'
12.59.00	Start north side of pipe moving west, starting at diffusers
13.01.00	Diffusers are higher off bottom than south side
13.04.00	#36 near bottom, 217'
13.04.45	#38 high off bottom, 217'
13.09.00	Diffuser 83 near bottom, 232'
13.10.00	Diffuser 94 close to bottom, 233'
13.11.00	At end of pipe
13.25.00	Loss of vehicle power
13.30.00	Power on, continue search for manhole
13.39.00	Manhole 9 intact, 217'
13.50.00	Manhole 8 intact, 200'
13.52.00	Continuing down pipe, light marine growth
13.53.00	Pipe buried, 194'
13.55.00	At rock covering pipe, heading 60 degrees
14.11.00	ROV continuing search for next manhole, 159'
14.16.00	Manhole 7 intact, stations 26 and 100, 154'
14.19.00	Continuing inshore
14.20.00	Pipe continuing to be covered in gravel
14.24.00	Ghost fishing gear in line with pipe - PSP
14.36.00	Manhole 6, station 21 and 73, 111'
14.40.00	Continue inshore
15.00.00	Current picking up. Marine traffic and tide picking up. Could not work around West Point lighted buoy #1, or pipe at 40' during a flood tide.
15.30.00	ROV on deck, end of ROV ops for the day

Electronically Transmitted Document

Tinnea & Associates, LLC

July 9, 2018

Darrell Myers
KING COUNTY DEPARTMENT OF NATURAL RESOURCES
WASTEWATER TREATMENT DIVISION
KSC-NR-0509
201 South Jackson Street
Seattle, Washington 98104-3855

SUBJECT: ALKI AND ETS CATHODIC PROTECTION INSPECTION WORK ORDER 12, CONTRACT E00365E15

Dear Darrell:

From May 23-30, Tinnea & Associates staff performed a cathodic protection (CP) inspection on the Alki and Effluent Transfer System (ETS) marine outfalls. The purpose of these inspections was to assess the operating conditions of the landside rectifier and underwater CP system at the ETS outfall. The conditions and performance of the Alki zinc anode bracelets and aluminum anode sleds were also assessed at this time. Tinnea & Associates were supported in this inspection by Associated Underwater Services (AUS) who provided the dive boat and remotely operated vehicle (ROV) inspection services.

BACKGROUND

The Alki outfall was constructed in 1985 and discharges effluent from the Alki Wastewater Treatment Plant into Puget Sound. The pipeline leaves the plant as a 42" diameter coated steel pipeline and splits into two 42" marine outfall pipelines off of the Alki shoreline. The outfall is protected by zinc anode bracelets dispersed across the length of the pipeline. In 2009, retrofit aluminum anode sleds were added to the end of the line at the diffusers to provide additional protection in this area which had been found to be under-protected during a previous inspection.

The ETS pipeline was constructed in 1988 to discharge effluent from the South Treatment Plant into Puget Sound near Duwamish Head. The pipeline starts as a 96" diameter prestressed concrete cylinder pipe, and splits into two 64" diameter coated steel pipelines as it transitions into the seawater. Both outfalls are protected by an on-shore impressed current CP deep well containing mixed metal oxide (MMO) anodes.

LANDSIDE RECTIFIER INSPECTION

On May 24th, Tinnea & Associates staff performed a rectifier check-out at the ETS subterranean rectifier vault. The rectifier is operating under similar conditions as documented during the 2014 inspection. Anodes had an average current output of 5.9 Amps, suggesting protection levels equivalent to previous inspections. Results of the checkout are contained in the attached data sheets (**Table 1**).

ALKI OUTFALL UNDERWATER INSPECTION

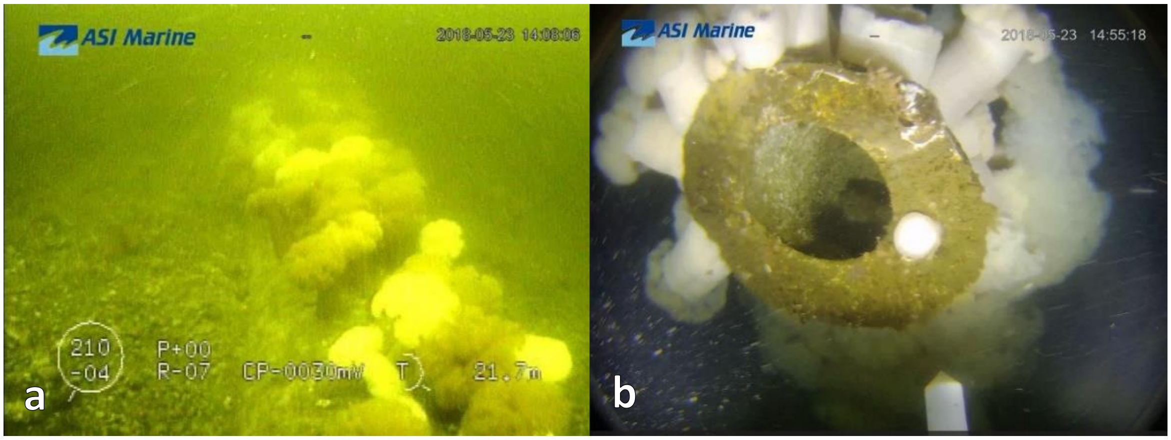

Figure 1: (a) Typical Alki pipe condition along the right of way, (b) Typical Alki diffuser condition

An initial visual inspection shows the pipe is covered in marine growth and calcareous deposits (**Figure 1a, 1b**). Some portions of the anodes were covered in marine growth as well, but this should not affect the function of the system. Inspection of the anode collars showed about 85-90% of the anode material remaining (**Figure 2**). This could indicate that the zinc has passivated and may not be providing adequate CP current.

Structure to electrolyte potentials **(Table 2)** were taken near each of the discovered anode bracelets using a silver-silver chloride (Ag-Cl) reference electrode with saturated potassium chloride fill solution. Prior to the inspection, the electrode was calibrated against a laboratory reference. The reference electrode was attached to the ROV's arm and used to spike the zinc anodes since most of the steel elements were inaccessible due to the outfall's coating. The remainder of the readings were taken on the internal diameter of the diffusers. Readings along the pipe in between the anode bracelets were not able to be recorded. All readings were taken in accordance with NACE International SP0169 and SP0176.

Figure 2: Typical anode bracelet condition

ETS OUTFALL UNDERWATER INSPECTION

An initial visual inspection shows both pipes A and B are covered in marine growth and calcareous deposits (**Figure 3a**). Visual inspection also led to the discovery of a sunken wooden boat in the right of way of pipe A (**Figure 3b**). The craft is leaning on the pipe but should not affect the CP system's functionality.

Structure to electrolyte potentials (**Table 3, 4**) were taken on the internal diameter of the diffusers, with approximately 30m in between each diffuser reading, using a silver-silver chloride (Ag-Cl) reference electrode with saturated potassium chloride fill solution. Measurements along the remainder of the pipeline were unable to be gathered. This was due to a buildup of marine growth and calcareous deposits limiting the electrical contact between the steel and the electrode. All readings were taken in accordance with NACE International SP0169 and SP0176.

In order to meet the protection criteria of NACE International Standard Practice SP0169, measured structure to electrolyte potentials must each be more negative than -0.850V relative to a copper copper-sulfate reference electrode (CSE) or the potentials must show a negative shift from the native or depolarized state of ≥0.100V at each location. Because native potentials of the outfall are unknown, and current CP cannot be interrupted, the -0.850V criteria must be used. Due to the decreased water temperature at the depth of the outfalls, this protection criteria is adjusted to account for the potential difference. All potentials fall well within the NACE SP0169 standard, indicating full protection of the both outfalls.

a

Figure 3: (a) Typical ETS pipe and diffuser condition along the right of way, (b) sunken wooden boat

RECOMMENDATIONS

At this time, Tinnea & Associates recommends:

1. Electrical contact between the probe on the ROV and the pipelines is difficult or impossible to obtain over much of the pipeline. We recommend installation of welded steel contact plates along the ETS and Alki pipelines to allow a more thorough potential map to be gathered using an ROV.

2. Reactivation of the zinc anodes on the Alki outfall bracelets by abrasion/scraping of the anode surface. This will remove the passivating oxide that likely has formed on the anode exteriors allowing the anodes to continue providing CP.

3. Periodic inspection of the system, in line with King County's existing inspection cycle, should continue to be performed to ensure both CP systems remain functioning properly. We recommend that this inspection cycle be no longer than 5 years between tests.

4. The ETS impressed current system is well beyond its designed service life and is likely nearing the end of its ability to provide protective current. Additionally, the oil-cooled rectifier is oversized for the intended purpose, making it difficult to finely tune the

system. This system should be replaced within the next 5 years to avoid an unplanned interruption of protection and unnecessarily truncated design and construction schedules.

Attached please find data sheets from the inspection. Tinnea & Associates is pleased to be of service to King County. If you have any questions, please call me at (206) 328-7872 or email me at rtinnea@tinnea.net.

Sincerely,
TINNEA & ASSOCIATES, LLC

Ryan Tinnea
Project Engineer
NACE CP Specialist #9748
RJT/ic
encl: data sheets
Ref 1515712/2018-07-09 - alki ets inspection report.docx

APPENDIX

Table 1: ETS outfall current and historical rectifier data

ETS Outfall						Current Tap Setting		Max Tap Setting	
Make:	Goodall					Course	Fine	Course	Fine
Model:	CSO-YSC 18-100 NPZ037Z235					A	3	D	5
Serial:	95C2125								
Shunt:	50mV 120A								
						Potential Reading			
	Portable Meter			Panel Meter		To Ag-AgCl Reference		CSE Equivalent	
Date (setting)	DC Volts	Shunt	DC Amps	DC Volts	DC Amps	On	Instant Off	On	Instant Off
6/23/2010 (A3)	2.7 V	2.1 mV	5.0 A	3 V	6 A*	-1.126 V	-1.035 V	-1.265 V	-1.174 V
3/3/2014 (A3)	2.5 V	1.8 mV	4.4 A	2.6 V	3 A	-1.098 V	-0.982 V	-1.237 V	-1.121 V
3/20/2014 (A2)	1.7 V	0.4 mV	1.0 A	4 V	2 A	-0.822 V	-0.798 V	-0.961 V	-0.937 V
5/24/2018 (A3)	2.6 V	2.5 mV	5.9 A			-1.059 V	-0.927 V	-1.198 V	-1.066 V
Note: Amp panel meter does not change on power off, water filling negative terminal conduit									

Table 2: Alki outfall CP potential data

Chainage	Designation	Ag-Cl Pipe	CSE Equivalent Pipe	Notes
pipe start	Bracelet 1	-0.980 V	-1.119 V	Offshore of Concrete block
	Bracelet 2	-0.990 V	-1.129 V	Heading offshore towards diffusers
	Bracelet 3	-0.980 V	-1.119 V	
	Bracelet 4	-0.990 V	-1.129 V	
	Bracelet 5	-0.990 V	-1.129 V	
	Bracelet 6	-0.960 V	-1.099 V	
	Bracelet 7	-0.990 V	-1.129 V	
	Bracelet 8	-0.990 V	-1.129 V	
	Bracelet 9	-0.990 V	-1.129 V	
	Bracelet 10	-0.980 V	-1.119 V	
	Bracelet 11	-0.990 V	-1.129 V	
	Bracelet 12	-0.990 V	-1.129 V	
	Bracelet 13	-0.960 V	-1.099 V	
	Bracelet 14	-0.990 V	-1.129 V	
	Bracelet 15	-0.990 V	-1.129 V	
	Bracelet 16	-0.980 V	-1.119 V	
	Bracelet 17	-0.970 V	-1.109 V	
	Bracelet 18	-0.970 V	-1.109 V	85% remaining - others were in better condition
	Bracelet 19	-0.970 V	-1.109 V	
pipe end	Diffuser 1	-0.970 V	-1.109 V	
	Diffuser 2	-0.970 V	-1.109 V	
	Diffuser 3	-0.970 V	-1.109 V	
	Diffuser 4	-0.960 V	-1.099 V	
	Diffuser 5	-0.960 V	-1.099 V	
	Diffuser 6	-0.950 V	-1.089 V	
	Diffuser 7 (NE)	-0.960 V	-1.099 V	
	Diffuser 8 (SW)	-0.970 V	-1.109 V	

Table 3: ETS outfall Pipe A CP potential data

Chainage	Designation	Ag-Cl Pipe	CSE Equivalent Pipe	Notes
pipe A end	diffuser 1	-0.830 V	-0.969 V	Within 30m of pipeline end - 191m deep
	diffuser 2	-0.800 V	-0.939 V	
	diffuser 3	-0.810 V	-0.949 V	
	diffuser 4	-0.810 V	-0.949 V	
	diffuser 5	-0.830 V	-0.969 V	30m from diffuser 1
	diffuser 6	-0.800 V	-0.939 V	
	diffuser 7	-0.810 V	-0.949 V	100m from diffuser 1
	diffuser 8	-0.780 V	-0.919 V	
	diffuser 9	-0.800 V	-0.939 V	
	diffuser 10	-0.800 V	-0.939 V	Last diffuser; 150m from diffuser 1; pipe buried after 60m
				Scanned approximately 500m in center of pipeline; couldn't find anything unburied. Moved closer to the diffusers, but currents made another deep dive challenging and unlikely to find the pipeline.

Table 4: ETS outfall Pipe B CP potential data

Chainage	Designation	Ag-Cl Pipe	CSE Equivalent Pipe	Notes
pipe B end	diffuser 1	-0.790 V	-0.929 V	diffusers were scattered, a representative sample was tested
	diffuser 2	-0.760 V	-0.899 V	
	diffuser 3	-0.780 V	-0.919 V	
	diffuser 4	-0.670 V	-0.809 V	
	diffuser 5	-0.800 V	-0.939 V	
	diffuser 6	-0.750 V	-0.889 V	
	diffuser 7	-0.820 V	-0.959 V	30 m from last diffuser
	diffuser 8	-0.820 V	-0.959 V	

Carkeek Outfall Inspection Final Report
For King County Wastewater Treatment Division

Project #1047376 | Task #0.13.02
Contract #C01100C16 – Work Order # 06

Submitted Oct. 15, 2018

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Table of Contents

1. Executive Summary

On October 10th, 2018, Global Diving & Salvage, Inc. (Global) conducted an ROV inspection of the Carkeek Outfall(s) near Carkeek Park, Puget Sound, WA. King County Waste Water Treatment Division contracted Global to inspect and verify the condition of the outfall as part of the regular inspection and maintenance plan. This report presents the results of that inspection. Drawings supplied with the work order indicated that 27 inch (north) and a 33 inch (south) outfall pipes run westerly offshore of the Carkeek Sewage Treatment Plant. However a search of the area failed to produce evidence of the northern 27 inch pipe. The southern 33 inch was located and the entire exposed pipe alignment including diffusers were inspected. The full inspection is documented in color video.

Significant findings and results, covered in more detail in this report, include:

- 33 inch diameter concrete pipe appears to be buried completely for the length of the outfall pipe and diffuser section
- The debris laying at a few locations along the pipe path possibly appeared to be rock guards used during the construction of the outfall pipe (figure 4)
- A single joint was found uncovered and was determined to be intact (figure 5)
- 13 diffusers at the South Carkeek outfall were located and found to be intact (figure 1 and 2)
- Of the 13 diffusers only the offshore side diffuser port was obstructed by marine growth (figure 3)
- the North Carkeek Park outfall, after a thorough search, was not located (figure 6)

2. Introduction

Global Diving & Salvage, Inc. (Global) was directed to perform an inspection of the entire exposed pipe alignment of the Carkeek Outfall under Work Order No. 06 of King County Contract Number C01100C16, Diving, Inspection and Repair Work Order 2016. The outfall lies at approximately 47° 42.56’ N latitude, 122° 22.73’ W longitude, in Puget Sound near Seattle, WA. The following final report documents the findings and observations of this inspection.

3. Inspection Schedule, Issues and Methodology

For optimal conditions, the crew selected dates within the allotted scope of work time frame based on the most favorable tides and currents at the location. For maximum video quality, currents under 0.7 knots are preferred. The Carkeek Outfall Inspection was scheduled for Oct. 10th, 2018 when the maximum flood and ebb tide currents were predicted to range between 0.1 and 0.5 knots.

4. Dates of Inspection, Vessel, Crew, Methodology and Equipment Used

4.1 Inspection Dates

The Carkeek Outfall inspection commenced Oct. 10th, 2018 at 0800. At 1515 the ROV was returned to deck, ending the operation.

4.2 Vessel

The inspection was conducted using the *M/V Prudhoe Bay*, Global's 63-foot, twin engine landing craft and utility vessel regularly deployed for diving, salvage and ROV work. For the duration of ROV operations, an ROV container and support generator were fitted aboard. The *Prudhoe Bay's* Gateway 5-ton, four function deck crane on a raised pedestal was utilized in launch and recovery of the ROV.

4.3 Equipment

The SAAB Seaeye Cougar-XT is a compact work-class Remotely Operated vehicle (ROV). Rated to 2,000 meters, and capable of speeds over 3.2 knots, the Cougar-XT is a versatile machine with the highest thrust-to-weight ratio in its class. With accessories like five-function manipulators and multiple camera and lighting arrays, the Cougar is a highly capable inspection platform.

Cougar-XT can accommodate the tooling for the tasks planned for this project. Features utilized during the execution of this project include:

- Dual, 5-function hydraulic manipulators for verifying scale and checking anomalies
- Wide eye camera and CCD Camera
- Variable intensity LED lighting equivalent to 600 watts
- Surface control system with video overlay and daylight readable display

4.4 Crew

ROV Operators:

- Warren Posten, Supervisor
- Jonathan Potts, ROV Pilot/Technician
- Dave Edmisten, Deckhand/ROV Pilot

Crew:

- Ryan Dimock, Deckhand/Crane Operator
- Greg Watson, Vessel Operator

4.5 Methodology

The crew departed from Harbor Island Marina on the *Prudhoe Bay* at 0830 hours, arriving on station at the Carkeek South Outfall at 1030. The ROV was prepared and launched at the 70 foot mark at 1100, making a 180° turn to continue the path along the outfall at 1143. The South outfall inspection was completed at 1315 and the ROV returned to deck. At 1345 the crew began searching for the North outfall pipe using coordinates from the original as-built drawings. The ROV was deployed at 1407 in the known location of the outfall, but the pipe could not be located visually with the ROV due to rock and silt. At 1455 the client representative was satisfied with the inspection; the search for the North outfall was ended and the ROV was retrieved. At 1515 the *Prudhoe Bay* began the transit back to Harbor Island Marina.

5. Video DVD/Hard Drive Reference Numbers

Inspection videos of Carkeek Park outfall were recorded continuously to DVD and hard drive using wide eye and standard definition CCD color camera. Photo images are captured as screen grabs and can be viewed in sequence using the dive log times referenced to the file time in the file name of each image.

6. Condition of Diffusers

The 13 diffusers ports are in a gooseneck configuration clustered together at the end of the outfall. Overall the south outfall diffusers appear to be in intact, above the mud line, ports clear of marine growth and debris except for the end diffuser, located at the offshore terminus of the outfall diffuser section in 190 fsw. The end diffuser port is blocked with marine growth (see figure 3).

7. Observations, Irregularities and Problems Noted

The ROV inspection began at the approximate location of station 11+50 on the shore side of the diffusers in a proximally 44 FSW. A grid search was conducted along the pipe path to find unburied pipe.

Unidentified debris approximately 12 to 16 feet long and 2 feet wide were found along the path of the pipe. The debris appeared to be made of formed steel, possibly the remains of rock guards used during construction of the outfall. A pipe joint was exposed at a location between station 19+00 and station 19+75. The ROV's manipulator arm was used to probe the bottom very near the exposed joint to determine whether or not the pipe was present underneath the sand. Upon contact with the bottom close to the joint along the crown an immediate deflection of the manipulator was observed, indicating a hard material was present.

The majority of the south outfall is buried but the diffusers are all above the mudline. Thirteen diffusers were observed, starting approximately at station 20+50 and continuing to station 21+00. All diffusers except for the diffuser on the offshore end appear to be clear of debris and marine growth. The conditions of the goosenecks and connecting flanges are unremarkable. They appear to be intact and undamaged. A moderate amount of marine growth covers the goosenecks near the diffuser nozzles. The end diffuser appeared to be completely plugged with a heavy layer of marine growth. Debris was found at several locations along the pipe path, including a crab pot and small Danforth anchor.

A note on the outfall positioning:
The as-built drawing P3, sheet 3 of 5, indicates coordinates at the end of the south Carkeek outfall. The position given in the as-built drawing, plot to the shore side of the outfall and may not represent the actual position of the end of the outfall at Carkeek Park. There are no references to datum in the as-built drawing provided. Based on the year of the drawing the datum was assumed to be NAD 27 which was then transformed to WGS 84 and entered into the navigation system. The plotted position in the navigation system indicated that the as-built position provided was along the shore at Carkeek Park; therefore an alternate method was used to determine the outfall's location. Dead reckoning from the manhole cover which could be viewed on Google Earth at Carkeek Park was used as an origin where range and bearing to the end of the outfall was plotted. This method, combined with a narrow grid pattern search starting from shore at 40 FSW and following patches of marine growth near the outfall's plotted path, proved to be successful in locating the end of the outfall.

Position of the north outfall was also determined by dead reckoning, using the manhole cover which could be viewed from Google Earth at Carkeek Park. A wider grid search was used at the plotted position. After expanding the search pattern to the north and south and moving to shallower and deeper water depth contours, the client representative on site was satisfied that we had covered the outfall location thoroughly and the search for the North Carkeek park outfall was terminated.

Figure 1 South Pipe diffuser, typical condition

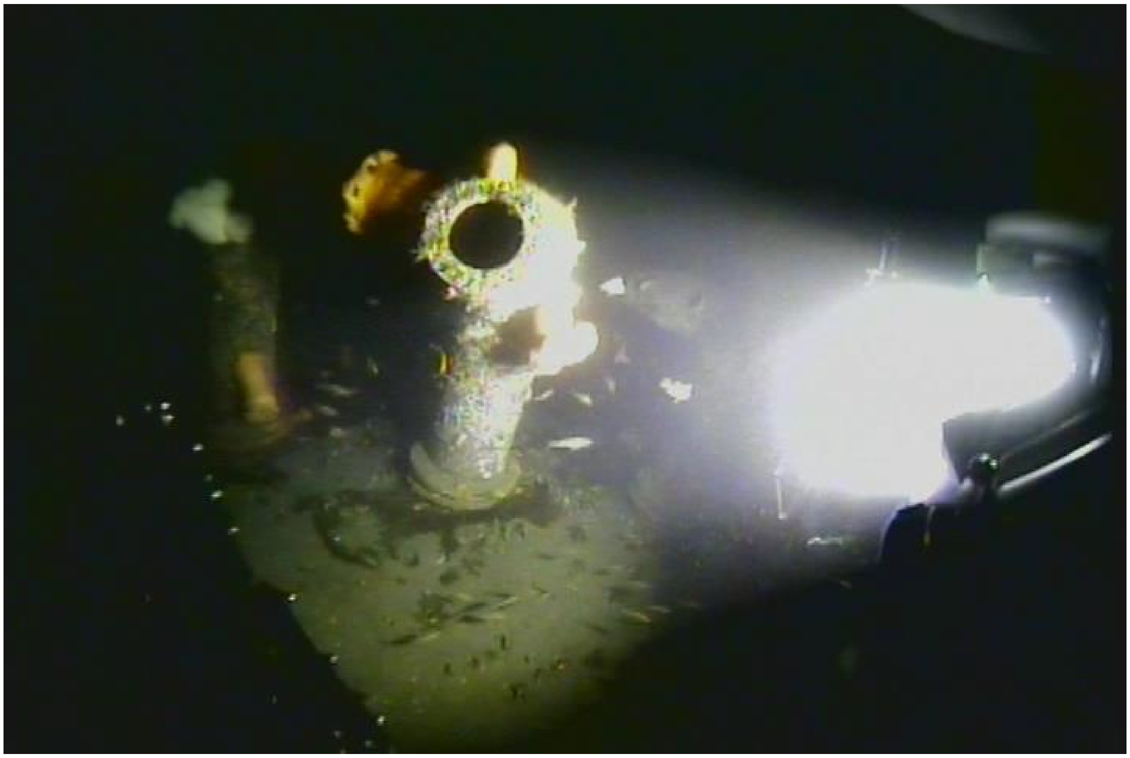

Figure 2 South Pipe diffuser, typical condition

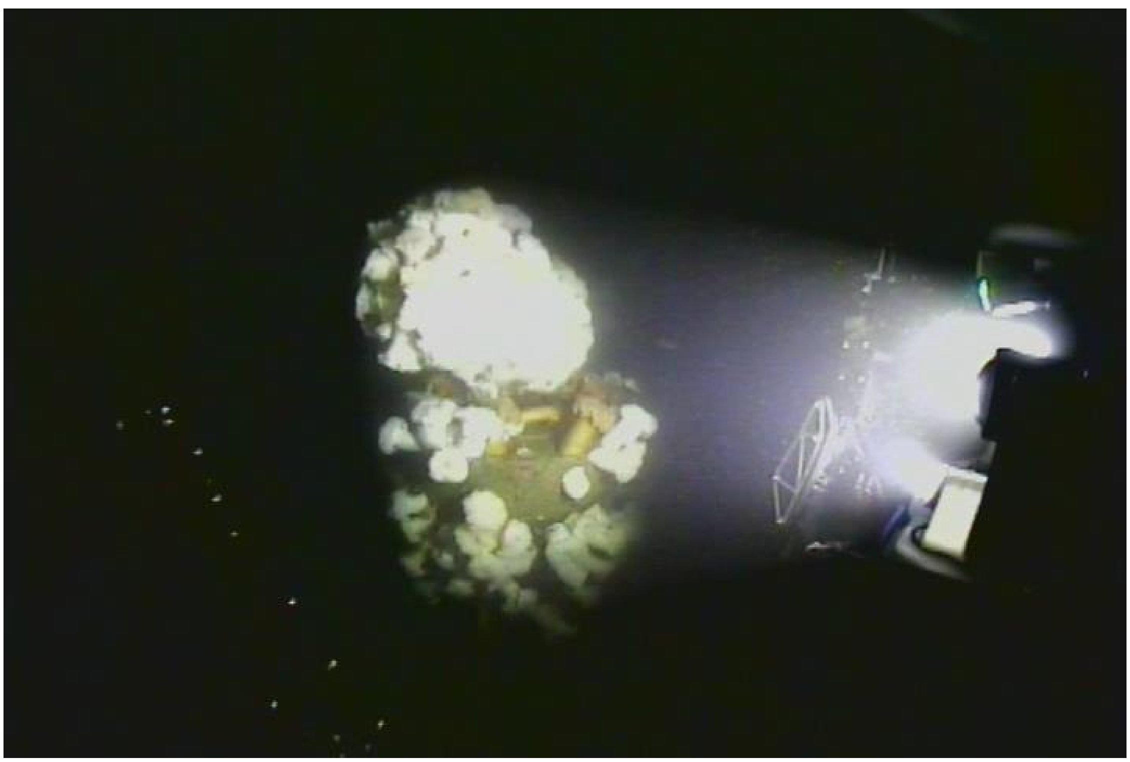

Figure 3 South Pipe, end diffuser plugged with growth

Figure 4 South Pipe, debris inshore of diffuser, possible construction rock guard

Figure 5 South Pipe, manipulator probe at joint. Note: Danforth anchor debris, lower right.

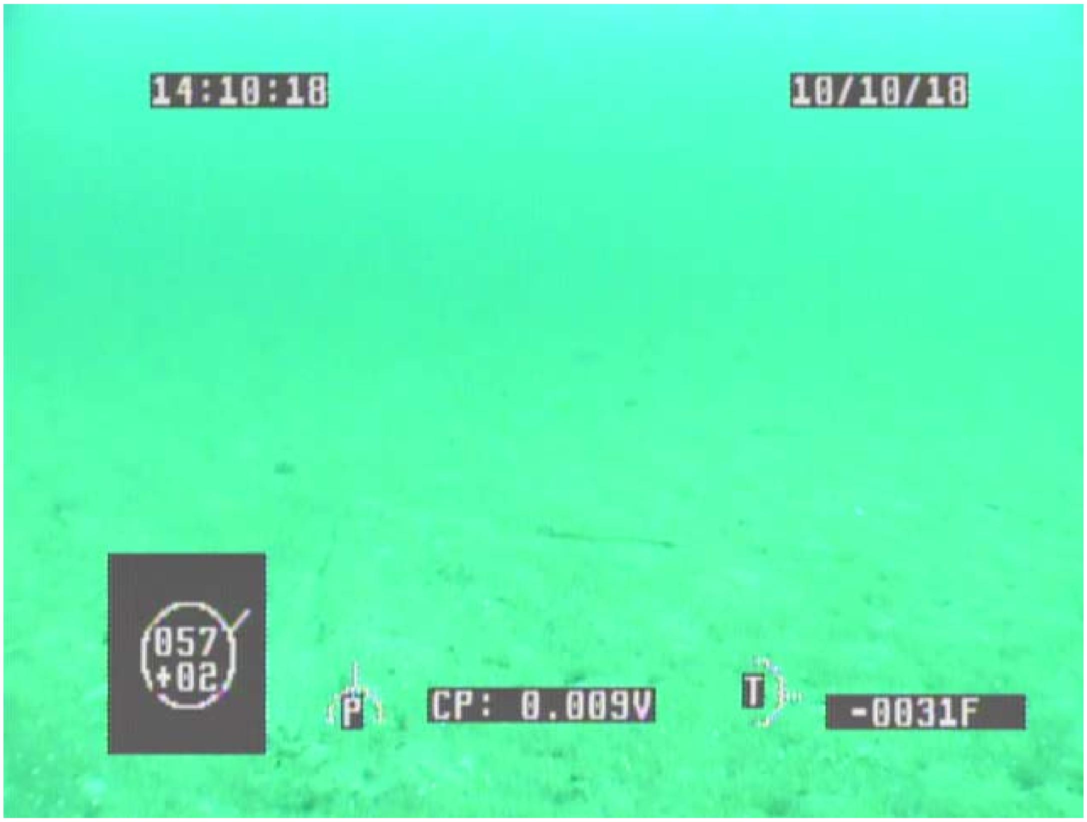

Figure 6 Area of north pipe, typical bottom

8. Overall Condition Statement

The 33 inch diameter concrete pipe appears to be buried completely for the length of the outfall and diffuser section. Diffusers are all above the mudline and appear to be in good condition with no damage observed. Marine growth appeared to be normal for this area with only heavy marine growth noted on the end outfall diffuser.

9. Observations, Conditions and Recommendations

Heavy marine growth was found on the end diffuser and the diffuser appeared to be clogged. It is recommended that further investigation using divers be undertaken to thoroughly clean the diffuser and determine the exact cause of the clogging.

10. Summary

In summary the ROV inspection of Carkeek Outfall resulted in the following findings.

- 33 inch diameter concrete pipe appears to be buried completely for the length of the outfall pipe and diffuser section.
- Debris laying at a few locations along the pipe path possibly appeared to be rock guards used during the construction of the outfall pipe (figure 4)
- A single joint was found uncovered and was determined to be intact (figure 5)
- 13 diffusers at the South Carkeek outfall were located and found to be intact (figures 1 and 2)
- Of the 13 diffusers only the offshore end diffuser was obstructed by marine growth (figure 3)
- the North Carkeek Park outfall, after a thorough search, was not located (figure 6)

11. Appendix

11.1 ROV Dive Log – South Outfall

Dive Nº:	1	Date:	11:20:52	Dive Name:	Dive-001
Project :	KCDNRPWTD Diving and Repair WO C01100C16 WO6 Carkeek So			Client:	King County
Vehicle:	Couger XT1427	Vessel:	DSV Prudhoe Bay	Location:	

Extra equipment:

Time	Activity:
11:20:52	ROV IN WATER : ROV IN WATER
11:30:47	BURIED PIPE : WATER DEPTH 44FT
11:35:18	: BURRIED PIPE NO VISIBLE GROWTH. DEPTH 44FT. FOLLOWING HEADING 230
11:55:35	: SEARCH FOR PIPE NORTH AND SOUTH AT 90 FEET. NO INDICATIONS. ROV MOVING WEST
11:58:47	DEBRIS : CRAB POT
12:03:39	BURRIED PIPE : LINE OF MARINE GROWTH. ANMEONIES, ALGAE, FISH. 145FSW
12:03:59	ANCHOR -- PIPE : 145 FSW BURRIED TO LAST 4 INCHES
12:05:21	HEAVY MARINE GROWTH : HEAVY MARINE GROWTH
12:09:05	PIPE : BURRIED. LOST VISUAL. 154FSW
12:10:07	: START OF RIP RAP 156
12:18:18	DEBRIS : 176FSW
12:20:36	DEBRIS : LINE 179FSW
12:29:49	DIFFUSER PORT : LAST DIFFUSER CLOGGED WITH MARINE GROWTH 190FSW
12:48:22	: END OF VISIBLE PIPE
12:51:09	JOINT : 1/4 EXPOSED. MEDIUM MARINE GROWTH. SILT COVERED.
12:52:26	JOINT : JOINT||JOINT
12:53:14	JOINT : LESS THAN 1/4 EXPOSED
12:53:46	JOINT : LESS THAN 1/8 EXPOSED
12:59:39	DEBRIS : DANFORTH SMALL
13:02:18	DEBRIS : DEBRIS ON TOP OF PIPE
13:02:54	PIPE : DEBRIS ON TOP OF PIPE 145FSW

13:04:04	JOINT : JOINT
13:04:41	JOINT : JOINT
13:15:59	END OF DIVE : END DIVE. MOVING TO NORTH OUTFALL

11.2 ROV Dive Log – North Outfall

Dive Nº:	1	**Date:**	13:45:11	**Dive Name:**	Dive-001
Project :	KCDNRPWTD Diving and Repair WO C01100C16 WO06 Carkeek No			**Client:**	King County
Vehicle:	Couger XT1427	**Vessel:**	DSV Prudhoe Bay	**Location:**	

Extra equipment:	
Time	**Activity:**
13:45:11	SEARCHING FOR PIPE : START SEARCH FOR NORTH PIPE
14:07:43	ROV IN WATER : ROV IN WATER
14:51:49	SEARCHING FOR PIPE : PERFORMING GRID SEARCH FOR NORTHERN OUTFALL
15:01:19	SEARCHING FOR PIPE : END SEARCH FOR PIPE
15:01:39	ROV OUT OF WATER : ROV OUT OF WATER

Elliott West CSO Inspection Final Report
For King County Wastewater Treatment Division

Project #1047376 | Task #0.13.02
Contract #C01100C16 – Work Order # 06

Submitted Oct. 15, 2018

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1. Executive Summary

On October 11, 2018, Global Diving & Salvage, Inc. (Global) conducted an ROV inspection of the Elliot West CSO (EWCSO) Facility Outfall in Elliott Bay, Seattle, WA, inspecting the entire exposed pipe structure, including the protective concrete mats covering the pipe. King County Waste Water Treatment Division contracted Global to inspect and verify the condition of the outfall as part of the regular inspection and maintenance plan. This report presents the results of the inspection. The full inspection was documented in color video.

Significant findings and results, covered in more detail in this report, include:

- end structure and hardware were observed to be intact
- outlet pipe inside the end structure is clear of debris and blockage
- cable and bracketing debris inside the end structure below the outlet pipe is not blocking the outlet pipe
- shackle rods connecting pipe joints along the pipe's length could not be observed due to the concrete mat placement over the pipe
- pipe caps, pipe joints and connecting hardware could not be observed on ROV video due to the protective concrete mats covering the pipe's length from the end structure to the shore transition into bottom (figure 16)
- 2 sets of shackle rods were observed intact: one set at each end of the mats on shore side and end structure
- steel band clamp at the shore side joint as the pipe comes out of bottom is loose (figures 12, 13 and 14)
- cathodic protection for any of the steel hardware was not seen on video
- concrete mat pipe protection appears to be intact
- concrete mat pipe protection has gaps between the sections along the pipe's length
- largest gap between concrete mats is approximately 1.5 foot along the bottom edge and closed at the crown of the pipe

2. Introduction

Global Diving & Salvage, Inc. (Global) was directed to perform an inspection of the entire exposed pipe alignment of the Elliott West CSO (EWCSO) Facility Outfall under Work Order No. 06 of King County Contract Number C01100C16, Diving, Inspection and Repair Work Order 2016. The outfall lies at 47° 37.05' N latitude, 122° 21.70' W longitude, in Elliot Bay near Seattle, WA. The following final report documents the findings and observations of this inspection.

3. Inspection Schedule, Issues and Methodology

For optimal conditions, the crew selected dates within the allotted scope of work time frame based on the most favorable tides and currents at the location. For maximum video quality, currents under 0.7

knots are preferred. The EWCSO Inspection was scheduled for Oct. 11th, 2018 when the maximum flood and ebb tide currents were predicted to range between 0.1 and 0.5 knots.

4. Dates of Inspection, Vessel, Equipment, Crew and Methodology

4.1 *Inspection Dates*

The EWCSO inspection commenced Oct. 11th, 2018 at 0800. At 1100 the ROV was returned to deck, ending the operation before transiting to the West Point Treatment Plan Outfall for inspection of that system (King County Work Order C01100C16 - 05).

4.2 *Vessel*

The inspection was conducted using the *M/V Prudhoe Bay*, Global's 63-foot, twin engine landing craft and utility vessel regularly deployed for diving, salvage and ROV work. For the duration of ROV operations, an ROV container and support generator were fitted aboard. The *Prudhoe Bay's* Gateway 5-ton, four function deck crane on a raised pedestal was utilized in launch and recovery of the ROV.

4.3 *Equipment*

The SAAB Seaeye Cougar-XT is a compact work-class Remotely Operated vehicle (ROV). Rated to 2,000 meters, and capable of speeds over 3.2 knots, the Cougar-XT is a versatile machine with the highest thrust-to-weight ratio in its class. With accessories like five-function manipulators and multiple camera and lighting arrays, the Cougar is a highly capable inspection platform.

Cougar-XT can accommodate the tooling for the tasks planned for this project. Features utilized during the execution of this project include:

- Dual, 5-function hydraulic manipulators for verifying scale and checking anomalies
- Wide eye camera and CCD Camera
- Variable intensity LED lighting equivalent to 600 watts
- Surface control system with video overlay and daylight readable display

4.4 *Crew*

ROV Operators:

- Warren Posten, Supervisor
- Jonathan Potts, ROV Pilot/Technician
- Dave Edmisten, Deckhand/ROV Pilot

Crew:

- Ryan Dimock, Deckhand/Crane Operator
- Greg Watson, Vessel Operator

4.5 *Methodology*

The *Prudhoe Bay* and her crew departed Harbor Island Marina at 0840, arriving at the outfall at 0940. The ROV was lowered at 1000, and began inspection of the north side of the structure. The covering mats and joints were inspected, completing the inspection of the north side. The ROV then started down the south side of the pipe heading offshore. Once all structures and mats were inspected, the ROV returned to surface, completing the operation.

5. Video DVD/Hard Drive Reference Numbers

Inspection videos of West Point outfall were recorded continuously to DVD and hard drive using wide eye and standard definition CCD color camera. Photo images are captured as screen grabs and can be viewed in sequence using the dive log times referenced to the file time in the file name of each image.

6. Condition of Diffusers

There are no diffusers on the EWCSO Outfall, just a single pipe outlet structure.

7. Observations, Irregularities and Problems Noted

Rock buildup along the south side of the end structure was not present as it was on the north side of the end structure (figure 7). A small amount of bottom scour around the structure on the south side was observed. The largest gap between the mats and the outfall structure was approximately 1.5 feet along bottom and tapered at the crown of the pipe. The gap shown in figure 1 is typical of the largest gaps found along the pipe's length. The concrete mats are intact with minimal gaps and were observed to cover the pipe from the outfall end structure to just before the discharge structure of the Denny Way outfall where the pipe transitions from concrete soil cover. A shackle rod between the joints appears to be sitting on top of the pile cap and there appears to be a loose clamp at the top of the pipe in 18 fsw seen in figure 12, 13 and 14. There was some sediment buildup on the pipe but it was minimal.

The outfall end structure appears to be completely intact. Where the outfall pipe is accessible inside the end structure, debris was found lying on bottom beneath the pipe exit. Debris consisted of stainless steel cable in bracketing. The debris was not obstructing the pipe exit inside the outfall structure; see figure 4, 5 and 6.

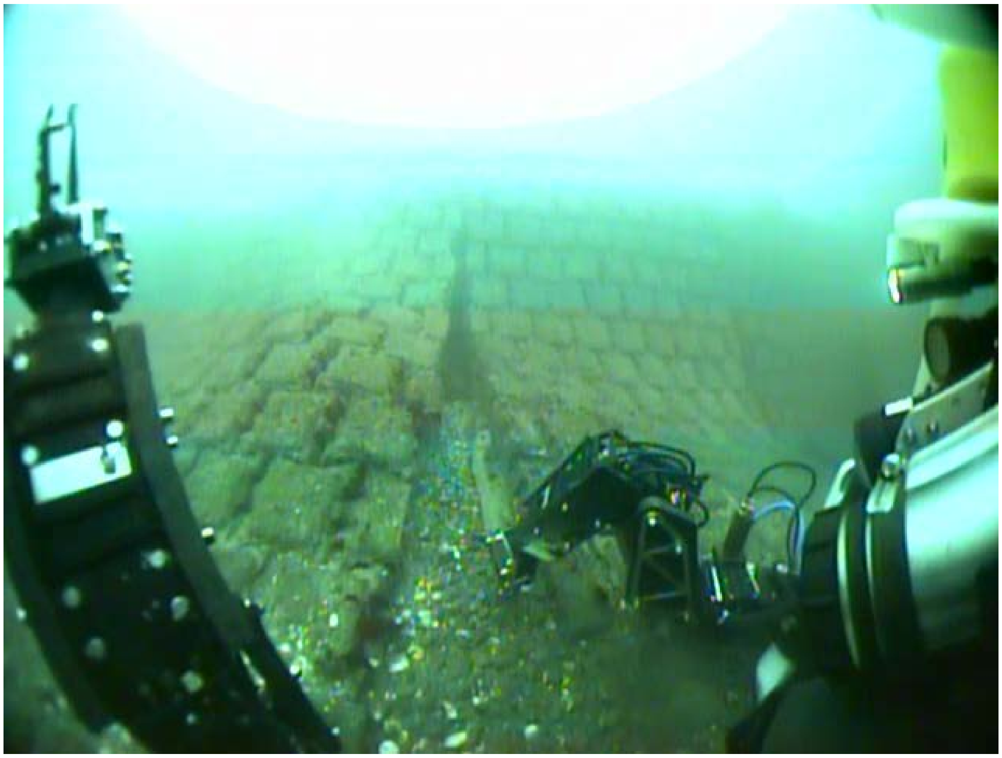

Figure 1 North side of pipe, 1.5 ft gap in concrete mats (ROV arm for scale)

Figure 2 Southwest side of pipe, outlet structure to pipe transition


Figure 3 North side, concrete mat and outfall transition

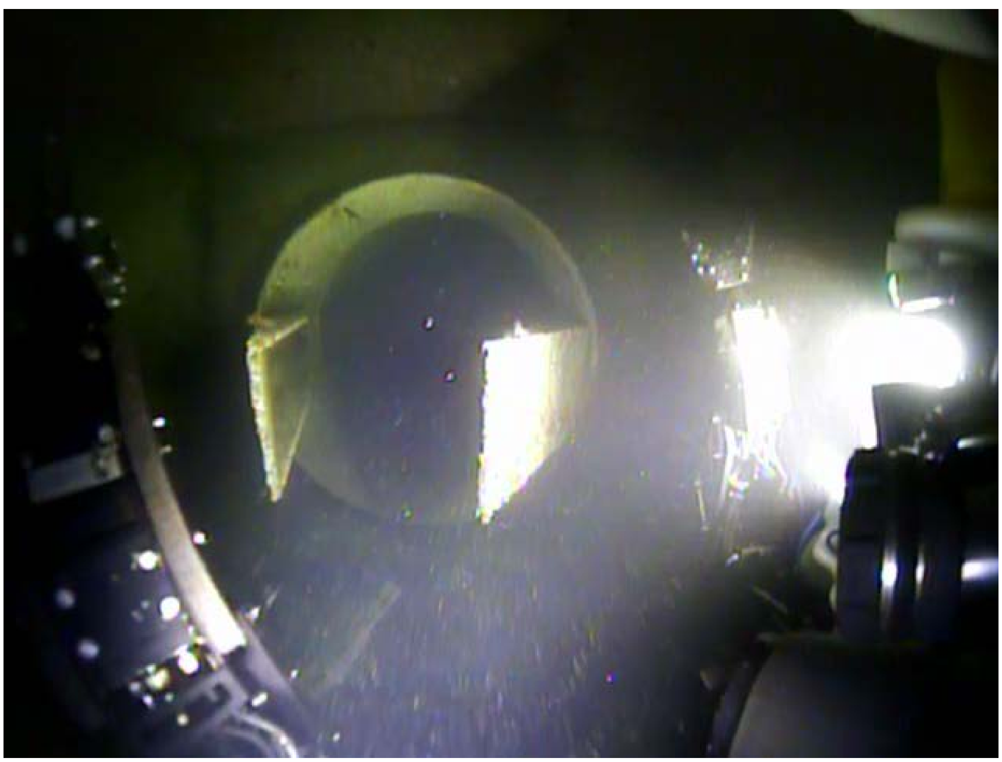
Figure 4 View from inside the outlet pipe structure

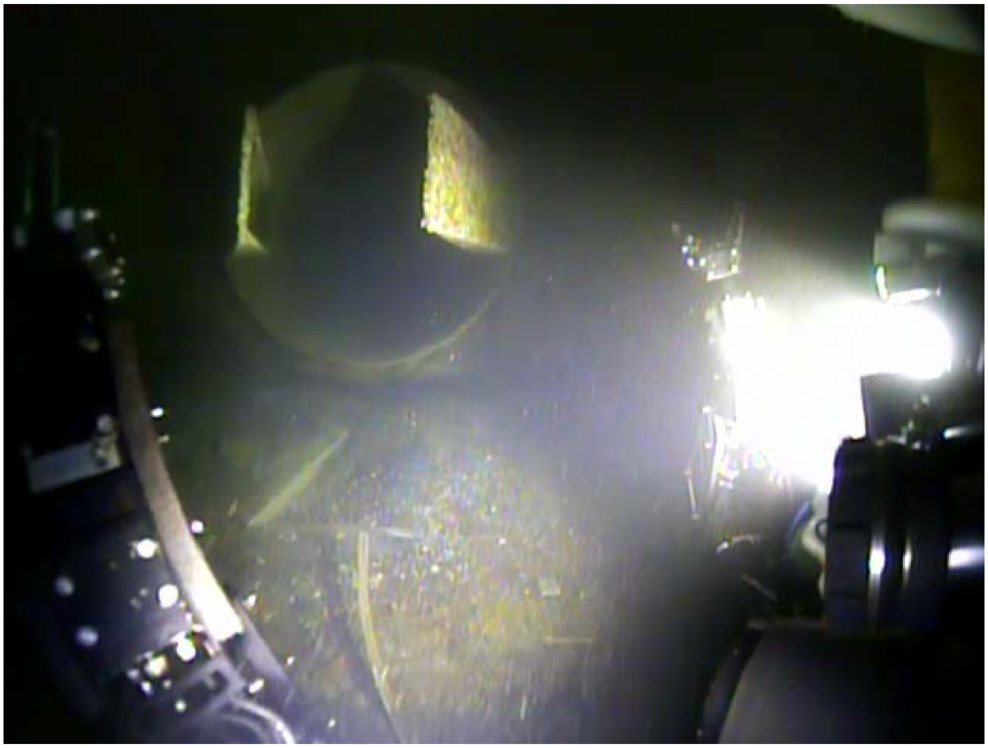
Figure 5 Debris below pipe outlet


Figure 6 Debris below pipe outlet structure

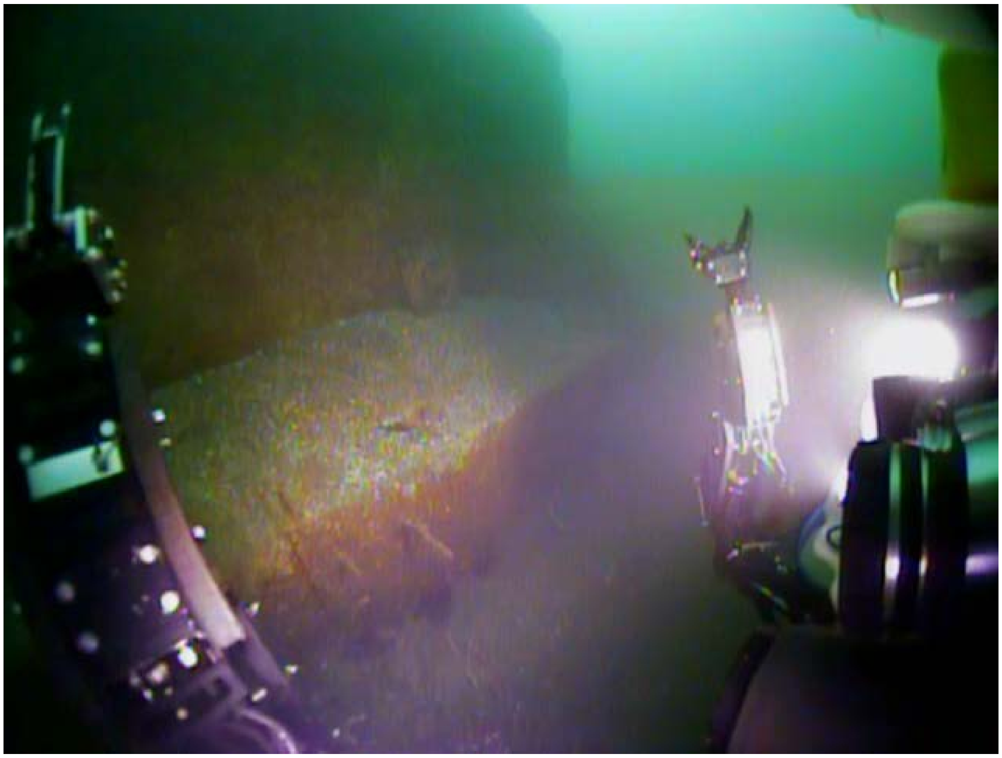

Figure 7 South side of pipe, no rock buildup

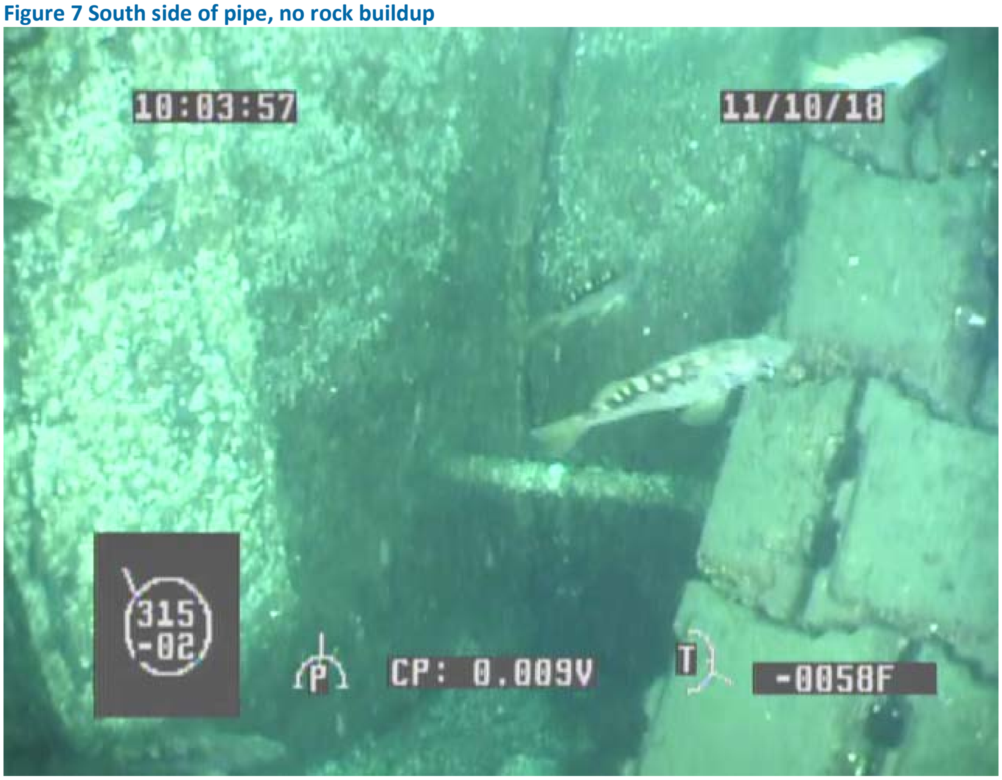

Figure 8 South side of pipe looking north, structure and mat with clamp

Figure 9 View of top of structure, typical

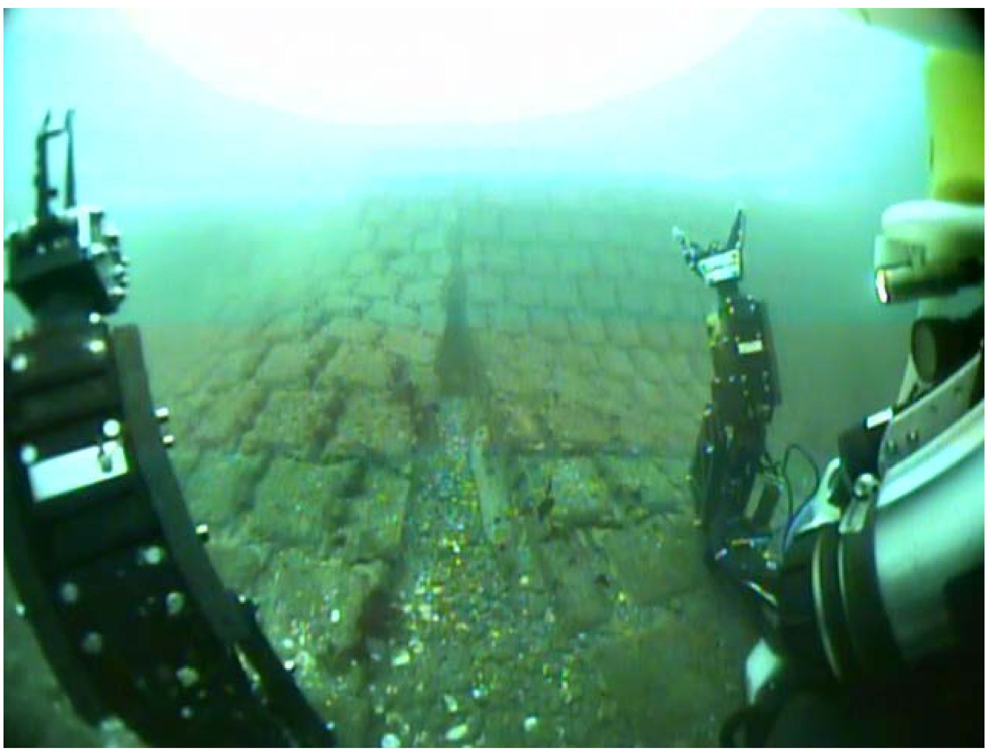

Figure 10 Gap between concrete mats

Figure 11 North side of pipe, typical condition, gap between mats

Figure 12 Loose tiebolt and band between brackets

Figure 13 Wide angle view of loose band between brackets, no concrete mats

Figure 14 Gap between pipes at band, ROV manipulator for scale

Figure 15 Outfall pipe transitions into bottom, Denny Way Outfall and Elliot West Outfall

Figure 16 Mat over crown at outlet structure, typical

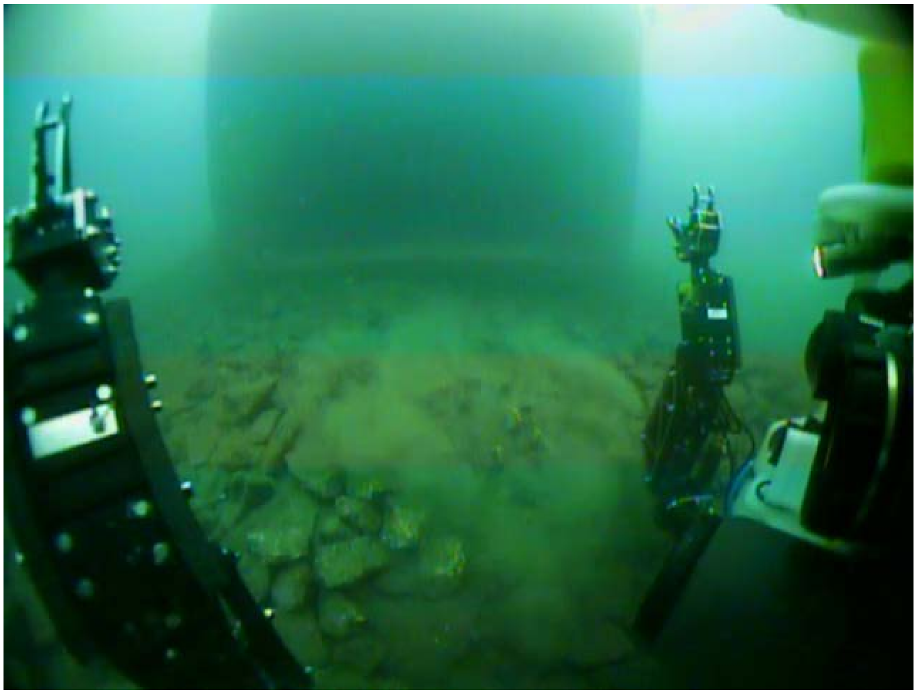
Figure 17 Outlet structure as viewed from top of rock apron

8. Overall Condition Statement

The outfall pipe is covered by concrete mats from just inshore of the outfall end structure to just before the discharge structure of the Denny Way outfall. All mats are intact and appear to be in good condition with minimal gaps. There was some sediment buildup on the pipe but it was generally light.

The outfall end structure appears to be completely intact. Where the outfall pipe is accessible inside the end structure, debris was found lying on bottom beneath the pipe exit. Debris consisted of stainless steel cable and bracketing. The debris was not obstructing the pipe exit inside the outfall structure; see Section 7 figures 4, 5 and 6.

9. Recommendations

The outfall appears to be in good condition and not requiring repair or maintenance. There was some question regarding configuration of the discharge structure and the origination of debris found inside. Further investigation may be warranted.

10. Summary

In summary the ROV inspection of EWCSO Outfall resulted in the following findings. Referenced figures can be found in Section 7.

- end structure and hardware were observed to be intact
- outlet pipe inside the end structure is clear of debris and blockage
- cable and bracketing debris inside the end structure below the outlet pipe is not blocking the outlet pipe
- shackle rods connecting pipe joints along the pipe's length could not be observed due to the concrete mat placement over the pipe
- pipe caps, pipe joints and connecting hardware could not be observed on ROV video due to the protective concrete mats covering the pipe's length from the end structure to the shore transition into bottom (figure 16)
- 2 sets of shackle rods were observed intact: one set at each end of the mats on shoreside and end structure
- steel band clamp at the shoreside joint as the pipe comes out of bottom is loose (figures 12, 13 and 14)
- cathodic protection for any of the steel hardware was not seen on video
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11. Appendix

4.6 *ROV Dive Log*

Time:	Notes:
08.00.00	Crew at Harbor Island Marina
08.40.00	Prudhoe Bay underway
09.40.00	Prudhoe Bay at Outfall
10:03:00	Bottom scour around structure, south side
10.04.36	Moving from north to south on pipe side
10.05.00	moving down north side of pipe
10.06.32	loose sand and gravel on top of structure
10.09.00	Small gap between mats, about 1.5'
10.15.00	Sand buildup on north side
10.17.00	Mat laying over debris on north side
10.19.30	Small gap in mat 71', north side, closing toward top of pipe
10.21.31	typical view on cam 1
10.24.00	view of pipe obstructed by rolling kelp
10.25.10	shackle rod between joints sitting on top of pile cap
10.31.00	loose clamp at top of pipe 18' fsw
10.33.00	End of North side
10.34.00	Looking at structure on south side of pipe, Denny Way
10.35.00	Starting south side of pipe, moving offshore
10.36.15	Beginning of mat - 8 ft from shackle rod
10.38.00	Sand buildup on north side
10.40.00	Overlapping mat on south side, 38 ft
10.41.00	Mat is tight around the pipe at 52 ft
10.48.00	At south side of pipe, moving to offshore structure
10.49.00	Mat measure, 64 bottom 52 top
10.54.00	ROV on surface, finished

Notes_NorfolkOutfall(CoS)_2018.txt

PMID# 4448 Mainsaver WO# p898096

Inspection:
September 7 2018 12:49pm. Cameron McCallum from shore. Tide +4.4 ft, Above waterline.
Removed hanging wooden debris from flap gate

Condition: Good condition. Flap gate was closed and unobstructed . No flow observed.
Removed hanging wooden debris

Asset Info:
76X76 Flap Gate. completely Exposed @ tides <4ft
N.190186.14 E. 1278580.50 or 47 30.7N x 122 17.8W
Refernce 1982 Comprehensive Outfall Agreement w/ City of Seattle Section 5,"It shall be the sole responsibility of the City to maintain repair and replace..."

Additional info:
Outfall inspection info located, I:\Outfall Inspections\Norfolk Outfall
Scanned info in Outfall Binder. Shaun O'neil added to CIFM System data map


DIV

Attachment 9

Supplemental Dilution Modeling Reports
West Point Treatment Plant and
Wet Weather Treatment Stations

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

Effluent Dilution Modeling for:
West Point Treatment Plant Outfall
Alki CSO Treatment Facility Marine Outfall
Carkeek CSO Treatment Facility Marine Outfall
Elliott West CSO Treatment Facility Marine Outfall
Henderson/MLK CSO Treatment Facility Marine Outfall

January 2019

NPDES Permit: WP- 0029181

King County Department of Natural Resources and Parks
Wastewater Treatment Division
201 South Jackson Street
Seattle, WA 98104

Effluent Dilution Modeling-West Point Wastewater Treatment Plant Marine Outfall

Prepared by: Bruce Nairn, King County WTD. January 2019

Model

Visual PLUMES

The UM3 and RSB model components of VISUAL PLUMES were used for this modeling effort. These models were chosen because the West Point Wastewater Treatment Plant (TP) outfall conforms to the conditions specified for the suggested use of both the RSB and UM models in Dilution Models for Effluent Discharges, 4th Edition . Ecology guidance recommends the RSB model for outfalls with opposing-port configurations in marine waters for prediction of the chronic dilution ratios (Ecology[1], 2011. Appendix 6, Section 1.3.7). The simulated conditions include a buoyant plume discharging into a saline water column with a non-linear stratification profile, the predominant current normal to the axis of the outfall, a multiport diffuser with plume merging. The farfield predictions were used to model dilutions at the mixing zone boundary, for this purpose the assumptions of a constant eddy diffusivity were used, this was the more conservative assumption as opposed to the assumption that the dispersion coefficient is increasing according to the 4/3 power law, the other farfield option offered by the model.

The UM3 model was run separately for the diffuser ports discharging in the direction of the current and those ports discharging in a direction opposed to the current. The predicted plume trajectories show that the discharges do not merge before the Zone of Acute Criteria Exceedance (ZACE) for the 10^{th} and 50^{th} percentile currents. Under the 90^{th} percentile currents, the plumes would merge before the ZACE, and thus this case was represented with all ports discharging in the direction of the current. The dilutions predicted for the ports discharging in the direction of the current were always more conservative than those discharging into the current. Predicted dilutions for the chronic mixing zone were obtained from the RSB model, as recommended in Washington State Department of Ecology's (Ecology) guidance. The RSB model predictions are approximately 10% more conservative than the UM model at the chronic mixing zone boundary. The depths modeled correspond to depths that have density observations, see below.

Outfall

The West Point outfall ends in a multi-port diffuser at a depth of 70m (230 ft) MLLW. The diffuser is 600 feet in length, with 200 diffuser ports varying between 4.5-

[1] Ecology, Water Quality Program Permit Writer's Manual, Publication 92-109, Revised December 2011. Olympia, WA.

inches and 5.75-inches in diameter. The ports are equally spaced on alternating sides. A port diameter of 5.2 inches corresponds to the average port area.

Modeling Conditions

Density Structure

The data set used for characterizing the density structure is King County's CTD sampling station KSSK02, located at the West Point Outfall, 47 39 38 N, 122 26 50 W. eighteen years of monthly CTD casts have been recorded, with 0.5 vertical resolution. CTD casts were extrapolated to a depth of 75m for input into the PLUMES model. The data is summarized in Table 4 and Figure 1.

Ambient Currents

The data set chosen for ambient currents was taken from an ADCP current meter study conducted in the vicinity of the West Point Outfall in February 2003. Station WP2 (see Figure 2) is located approximately 200 feet south-west of the outfall at N 245031, E 1242286 WA State Plane North at a depth of 72m. The meter collected data at 30 minute intervals for approximately 6 weeks with a 2 meter vertical resolution. A histogram was constructed and the 10th, 50th, and 90th percentile current speeds were determined. The currents at 20 m were used for the modeled depths of 30 m and shallower, the 40 m currents for depths between 30 and 50 m, and the 60m currents for depths below 50 m. The respective histograms are shown in Figure 3.

Table 1. Current Speeds at West Point Meter WP2

Station	Depth (m)	Min (cm/s)	10%	50%	90%	Max
Wp2	20	0.8	9.5	25.2	49.3	75.3
	40	0.4	8.6	27.6	47.8	70.6
	60	0.2	8.6	26.4	42.8	64.8

Ecology guidance recommends dilution at the acute mixing zone be evaluated with the 10th and 90th percentile currents. The dilution at the chronic mixing zone is to be evaluated with the 50th percentile currents.

Plant Flows

The dry weather design flow is 110 mgd. A statistical analysis was done on the daily average West Point TP flows for 2014 through June 2018. The plant flows for the critical conditions detailed below were selected from an analysis of these plant flows. It was determined that the plant is operating below 85% of the dry weather design flow

during the dry season. Critical conditions for the West Point outfall occur during the wet season, when plant flows exceed 85% of the dry weather design flow.
The acute design flow was simulated as both the maximum daily flow over the 2014-2018 period and with a peaking factor applied to the dry weather design flow.

The chronic design flow was simulated as both the maximum monthly flow over the 2014-2018 period and with the dry weather design flow.

Critical Conditions-Selected Cases-Decision Path and Ecology Guidance

Zone of Acute Criteria Exceedance (ZACE) 43 ft or 13.1 m

Ecology guidance recommends that the critical receiving water condition be first determined. Our data showed maximum density stratification (expected to cause minimum plume dilution) to occur in the vicinity of the West Point diffuser during July. Guidance also required modeling to be performed using the critical 10th percentile velocity. This is defined as both the 10th and the 90th percentile velocities derived from a cumulative frequency distribution analysis. These current conditions yielded a velocity of 8.6 - 9.5 cm/sec and 42.8 - 49.3 cm/sec as shown in table 1.

If the plant will be operating at or above 85% of the design dry weather flow (Design DWF = *110* million gallons per day [mgd]) during this time, Ecology guidance requires the use of a peaking factor applied to the dry weather design flow. The peaking factor to be used is the ratio of maximum daily plant flow to the monthly average flow. If the plant is operating below 85% of the design dry weather flow during the critical period, the maximum daily flow during the previous three years is to be used. The Acute Design Flow (ADF) was modeled both design conditions for each month.

The minimum acute dilution corresponded to the maximum flow rate. The highest daily flow in the previous three years was 365 mgd in January 2017, with a predicted minimum dilution of about 29:1 at the acute mixing zone for the January density profiles under the 90th percentile currents. Using a peaking factor, the highest ADF was 372 mgd in September, resulting in a similar dilution result of 29:1 for September density profiles and the 90th percentile currents.

Table 2. Summary of Minimum acute Dilution Ratios by Month

Month	Maximum Daily Flow	Minimum Dilution	Peaking Factor x Monthly Average Flow	Minimum Dilution
January	365	29	357	29
February	287	35	268	36
March	345	30	330	31
April	289	34	258	37
May	217	42	285	34
June	140	58	213	43
July	145	57	242	39
August	191	46	290	34
September	244	39	372	29
October	281	35	298	34
November	356	29	331	31
December	347	30	336	31

Chronic Mixing Zone: 430 ft. or 131 m

Ecology guidance specified that the modeled flow for a plant operating above 85% of its design dry weather flow should be the plant's design dry weather flow. If the plant is operating below 85% of its design dry weather flow, the maximum monthly flow observed during the previous three years is to be used. The West Point outfall discharges in a tidally influenced area with multidirectional flow conditions, for which Ecology guidance recommends the dilution factor be based upon a flux-average plume concentration at the edge of a mixing zone.

Under the observed maximum monthly flows and the 50th percentile current version of this scenario, a minimum flux-average dilution of 229:1 was found for October (maximum monthly flow of 126 mgd), This is slightly lower than the minimum dilution predicted during the summer period which had a minimum flux-average dilution of 231:1 in July (maximum monthly flow of 69 mgd) and during large winter time flows which had a minimum flux-average dilution of 245:1 in January (maximum monthly flow of 169 mgd).

Using the Design dry weather flow (110 mgd) as the design condition yielded a minimum flux-average dilution of 175:1 in July.

The minimum dilution value was selected from the observed monthly flow methodology because the minimum dilution values obtained by the design dry weather flow methodology occurred during a period that the discharge was less than 85% of the Dry

Weather Design Flow. The dilution values obtained using the observed monthly flow methodology are more conservative during other periods.

Table 3. Summary of Minimum Chronic Dilution Ratios by Month

Month	Maximum Monthly Average Flow	Minimum Dilution	Design Dry Weather Flow (MGD)	Minimum Dilution
January	169	245	110	331
February	145	278	110	332
March	151	244	110	279
April	123	237	110	253
May	93	277	110	245
June	78	249	110	200
July	69	231	110	175
August	72	258	110	222
September	72	303	110	241
October	126	229	110	245
November	133	313	110	354
December	162	262	110	372

Summary

ZACE: The dilution at the ZACE for the critical conditions detailed above yielded a dilution at the ZACE (13.1 m) of **29:1** in the plume flowing in the direction of the current.

Chronic Mixing Zone: The dilution at the chronic mixing zone (131 m) for the critical conditions described above yielded a dilution of **229:1**.

Effluent Dilution Modeling- West Point Outfall
Human Health Criteria

Models

See Effluent Dilution Modeling for West Point Outfall(Aquatic Health) for a discussion of the model used for this effort.

Ecology guidance recommends the flux-averaged dilution be used for the human health criteria, similar to the dilutions used for the aquatic criteria.

Modeling Conditions

Density Structure

A discussion of the source of data for the density structure is included in the Effluent Dilution Modeling for West Point Outfall (Aquatic Health). Ecology recommends that the density profile to use in human health-based analyses is the one that results in average mixing. This was determined as follows: (1) the dilution factors were generated for each profile, (2) the reciprocal of the dilution factors were calculated to convert them to effluent concentrations, (3) the average of the reciprocal dilution factors (average effluent concentration) were calculated, and (4) the reciprocal of the average effluent concentration was calculated and reported as the harmonic mean dilution factor.

Ambient Currents

A discussion of the source of data for the ambient currents is included in the Effluent Dilution Modeling for West Point Outfall(Aquatic Health). The critical condition for currents was taken to be the 50th percentile currents, as indicated in the Human Health Dilution Modeling Ecology Guidance.

Plant Flows

Ecology guidance is to use the annual average design flow as specified in the engineering report or permit application, for assessing carcinogen impacts, and the highest monthly average flow (or dry weather design flow) during the critical receiving water conditions for assessing non-carcinogen impacts. The design average annual flow of 142 mgd was found to be representative and so was used for the purpose of this modeling effort.

Summary

Mixing Zone

The harmonic mean dilution at the "chronic" mixing zone (430 ft., 131 meters) for the critical conditions described above yielded a dilution of **316:1**.

Table 4. West Point Density Values

Potential Density as sigma-t					
			Depth (m)		(max)
Date	0	15	35	55	75
20-Oct-1998	22.654	22.867	22.961	22.972	23.076
03-Feb-1999	21.632	22.206	22.309	22.322	22.367
10-Feb-1999	21.320	22.192	22.225	22.275	22.378
16-Mar-1999	21.601	22.112	22.246	22.272	22.295
17-Mar-1999	21.539	21.888	21.977	22.189	22.372
13-Apr-1999	21.371	21.963	22.013	22.430	22.464
21-Apr-1999	21.450	22.135	22.181	22.307	22.473
12-May-1999	21.429	22.051	22.272	22.448	22.683
09-Jun-1999	21.542	21.915	22.349	22.407	22.541
21-Jun-1999	21.311	21.968	22.157	22.234	22.441
30-Jun-1999	19.856	21.817	22.261	22.550	22.738
22-Jul-1999	20.503	21.935	22.091	22.294	22.464
04-Aug-1999	21.317	21.787	22.144	22.318	22.836
18-Aug-1999	22.074	22.143	22.180	22.257	22.520
20-Sep-1999	22.256	22.436	22.504	22.530	22.569
06-Oct-1999	22.583	22.716	22.757	22.918	22.918
27-Oct-1999	22.725	22.866	22.893	22.936	22.964
15-Nov-1999	19.877	22.831	23.053	23.131	23.167
07-Dec-1999	22.296	22.680	22.776	22.787	22.788
10-Jan-2000	21.381	22.331	22.354	22.551	22.551
10-Feb-2000	22.124	22.418	22.537	22.640	22.736
14-Feb-2000	22.284	22.365	22.492	22.575	22.594
08-Mar-2000	22.012	22.486	22.532	22.602	22.732
21-Mar-2000	22.350	22.469	22.714	22.788	22.857
05-Apr-2000	21.542	22.202	22.458	22.655	22.815
17-Apr-2000	21.688	22.232	22.320	22.717	22.859
03-May-2000	21.778	22.461	22.477	22.656	22.869
16-May-2000	21.817	22.232	22.584	22.641	22.699
22-May-2000	22.055	22.291	22.483	22.561	22.815
15-Jun-2000	22.049	22.363	22.458	22.613	22.744
28-Jun-2000	19.211	21.544	22.515	22.566	22.619
11-Jul-2000	21.873	22.151	22.191	22.204	22.567
13-Jul-2000	21.266	21.985	22.088	22.655	23.299
17-Jul-2000	21.461	21.987	22.318	22.475	22.630
31-Jul-2000	22.091	22.175	22.286	22.666	22.870
14-Aug-2000	21.642	22.222	22.628	22.764	22.764
16-Aug-2000	21.920	22.310	22.525	22.815	22.868
21-Aug-2000	22.222	22.414	22.663	22.791	22.857
06-Sep-2000	22.567	22.581	22.624	22.767	23.098
12-Sep-2000	22.306	22.560	22.759	23.051	23.097
19-Sep-2000	22.635	22.672	22.696	22.869	23.039
27-Sep-2000	22.645	22.736	22.778	23.075	23.359
18-Oct-2000	22.872	22.963	23.035	23.176	23.244
24-Oct-2000	22.737	22.891	23.010	23.094	23.163
13-Nov-2000	23.118	23.149	23.256	23.304	23.330
22-Nov-2000	23.163	23.268	23.312	23.336	23.370
28-Nov-2000	22.675	23.348	23.367	23.397	23.398
13-Dec-2000	23.150	23.407	23.444	23.451	23.475
19-Dec-2000	23.352	23.479	23.488	23.497	23.537
17-Jan-2001	23.048	23.465	23.522	23.531	23.537
14-Feb-2001	23.091	23.453	23.495	23.504	23.526
21-Feb-2001	23.325	23.429	23.480	23.485	23.488
27-Feb-2001	23.444	23.498	23.541	23.550	23.580
06-Mar-2001	23.342	23.502	23.516	23.531	23.554
20-Mar-2001	23.238	23.433	23.440	23.509	23.574
26-Mar-2001	22.692	23.346	23.432	23.528	23.636
03-Apr-2001	22.456	23.377	23.413	23.548	23.657
25-Apr-2001	22.522	23.164	23.393	23.571	23.628
22-May-2001	21.674	22.390	23.281	23.380	23.499
30-May-2001	22.894	22.973	23.014	23.072	23.132
19-Jun-2001	20.848	22.140	23.209	23.327	23.327
20-Jun-2001	21.244	21.822	22.798	22.996	23.273
26-Jun-2001	22.692	22.855	22.916	23.096	23.138
19-Jul-2001	22.221	22.644	23.022	23.222	23.222
24-Jul-2001	22.724	22.851	22.959	23.170	23.220
22-Aug-2001	22.631	22.923	22.989	23.181	23.198
23-Oct-2001	23.163	23.223	23.282	23.291	23.303
19-Nov-2001	23.027	23.164	23.276	23.408	23.474
17-Dec-2001	21.488	22.967	23.101	23.104	23.109
29-Jan-2002	21.700	22.619	22.632	22.666	22.726
20-Feb-2002	21.863	22.524	22.580	22.784	22.838
21-Mar-2002	21.837	22.354	22.606	22.651	22.833
22-Apr-2002	21.094	22.342	22.634	22.888	23.030
28-May-2002	21.913	22.466	22.684	22.822	22.917
25-Jun-2002	19.708	21.759	22.482	22.728	22.762
22-Jul-2002	20.920	21.757	22.108	22.312	22.583
27-Aug-2002	22.166	22.529	22.555	22.819	22.978
23-Sep-2002	22.152	22.815	23.004	23.038	23.089
21-Oct-2002	22.981	23.163	23.180	23.193	23.215
20-Nov-2002	23.165	23.537	23.577	23.583	23.604
16-Dec-2002	23.103	23.298	23.517	23.577	23.611
21-Jan-2003	22.686	23.139	23.188	23.236	23.291

Potential Density as sigma-t					
			Depth (m)		(max)
Date	0	15	35	55	75
24-Feb-2003	21.846	22.761	22.904	22.958	23.009
24-Mar-2003	21.795	22.706	22.811	22.815	22.854
29-Apr-2003	21.841	22.071	22.234	22.286	22.359
27-May-2003	20.868	22.275	22.417	22.588	22.615
23-Jun-2003	21.556	22.032	22.441	22.706	22.797
08-Jul-2003	21.978	22.124	22.485	22.596	22.682
28-Jul-2003	21.811	22.089	22.751	22.940	22.941
25-Aug-2003	21.935	22.435	22.785	22.962	23.014
29-Sep-2003	22.443	22.875	22.940	22.963	23.011
06-Oct-2003	22.894	23.044	23.172	23.239	23.259
27-Oct-2003	20.894	22.414	22.823	22.898	22.934
17-Nov-2003	21.667	22.933	23.010	23.066	23.090
15-Dec-2003	21.940	22.757	22.910	22.923	22.961
13-Jan-2004	22.831	22.942	23.012	23.038	23.038
20-Jan-2004	8.619	22.769	22.856	22.898	22.932
17-Feb-2004	21.033	22.636	22.698	22.828	22.867
23-Mar-2004	22.131	22.414	22.674	22.735	22.783
26-Apr-2004	21.884	22.609	22.666	22.828	22.960
25-May-2004	21.770	22.550	22.635	22.660	22.831
28-Jun-2004	20.802	22.243	22.489	22.767	23.021
27-Jul-2004	21.891	22.297	22.481	22.740	22.968
23-Aug-2004	22.197	22.492	22.577	22.634	22.634
27-Sep-2004	22.071	22.538	22.670	22.858	23.047
25-Oct-2004	22.380	22.980	23.004	23.080	23.111
15-Nov-2004	22.913	23.008	23.027	23.145	23.226
21-Dec-2004	21.886	22.898	23.005	23.071	23.113
24-Jan-2005	21.913	23.021	23.118	23.183	23.215
28-Feb-2005	22.277	22.783	22.900	22.960	22.985
30-Mar-2005	22.772	22.964	23.022	23.145	23.177
25-Apr-2005	21.722	22.435	22.850	22.869	22.947
23-May-2005	21.478	22.411	22.716	23.007	23.040
28-Jun-2005	22.123	22.351	22.441	22.524	22.682
20-Jul-2005	21.582	22.142	22.529	22.843	23.040
22-Aug-2005	22.297	22.472	22.625	22.791	22.962
26-Sep-2005	22.755	22.909	22.950	22.981	23.003
24-Oct-2005	23.017	23.187	23.196	23.360	23.423
30-Nov-2005	23.125	23.224	23.225	23.241	23.296
19-Dec-2005	23.280	23.349	23.363	23.408	23.409
08-Feb-2006	19.196	22.260	22.514	22.637	22.752
28-Feb-2006	22.262	22.345	22.483	22.561	22.598
28-Mar-2006	22.472	22.607	22.688	22.703	22.767
24-Apr-2006	20.878	22.182	22.629	22.856	22.857
31-May-2006	22.108	22.362	22.502	22.618	22.926
27-Jun-2006	21.407	21.544	22.067	22.378	22.527
25-Jul-2006	21.919	22.114	22.242	22.629	22.737
23-Aug-2006	22.220	22.410	22.481	22.730	22.872
26-Sep-2006	22.817	22.868	22.927	23.050	23.178
25-Oct-2006	23.188	23.221	23.234	23.292	23.436
27-Nov-2006	21.999	22.655	23.104	23.151	23.151
19-Dec-2006	22.131	22.823	22.893	22.980	23.008
17-Jan-2007	21.472	22.286	22.728	22.896	23.001
21-Feb-2007	22.632	22.799	22.880	22.952	23.017
20-Mar-2007	21.903	22.439	22.561	22.741	22.928
18-Apr-2007	21.877	22.213	22.537	22.765	22.852
22-May-2007	22.180	22.371	22.396	22.396	22.396
19-Jun-2007	22.162	22.336	22.529	22.646	22.781
17-Jul-2007	22.004	22.369	22.480	22.595	22.743
18-Sep-2007	22.535	22.659	22.683	22.813	22.924
16-Oct-2007	22.937	22.988	23.025	23.083	23.133
27-Nov-2007	23.013	23.212	23.251	23.307	23.371
18-Dec-2007	22.783	22.929	22.959	22.980	22.981
26-Feb-2008	22.499	22.890	23.007	23.119	23.231
18-Mar-2008	22.100	22.896	22.968	22.982	23.115
22-Apr-2008	22.599	22.980	23.120	23.218	23.359
21-May-2008	21.372	22.567	22.941	23.014	23.083
17-Jun-2008	19.579	22.074	22.706	22.942	23.211
22-Jul-2008	21.347	22.168	22.400	22.672	22.952
21-Aug-2008	22.361	22.462	22.701	22.883	23.054
16-Sep-2008	22.030	22.432	22.731	22.951	23.158
21-Oct-2008	22.970	23.121	23.160	23.175	23.202
18-Nov-2008	21.605	22.724	23.022	23.129	23.304
16-Dec-2008	22.876	23.154	23.186	23.208	23.222
21-Jan-2009	20.686	22.474	22.954	23.157	23.214
18-Feb-2009	22.842	23.069	23.094	23.222	23.290
17-Mar-2009	22.829	23.176	23.217	23.315	23.424
21-Apr-2009	19.637	22.896	23.149	23.234	23.399
19-May-2009	19.531	22.346	23.009	23.146	23.350
16-Jun-2009	20.652	22.338	22.704	22.978	23.266
21-Jul-2009	21.859	22.217	22.720	22.924	22.975
18-Aug-2009	22.371	22.613	22.738	22.808	23.098
22-Sep-2009	22.983	23.002	23.052	23.081	23.099
21-Oct-2009	22.981	23.233	23.317	23.328	23.329
14-Dec-2009	22.512	22.885	23.002	23.028	23.051
19-Jan-2010	17.552	22.643	22.985	23.006	23.007
23-Feb-2010	21.510	22.593	22.725	22.770	22.770
17-Mar-2010	22.336	22.681	22.801	22.840	22.880
19-Apr-2010	22.561	22.624	22.671	22.779	22.826
18-May-2010	20.982	22.148	22.520	22.675	22.821
21-Jun-2010	21.466	22.013	22.316	22.495	22.531

Potential Density as sigma-t

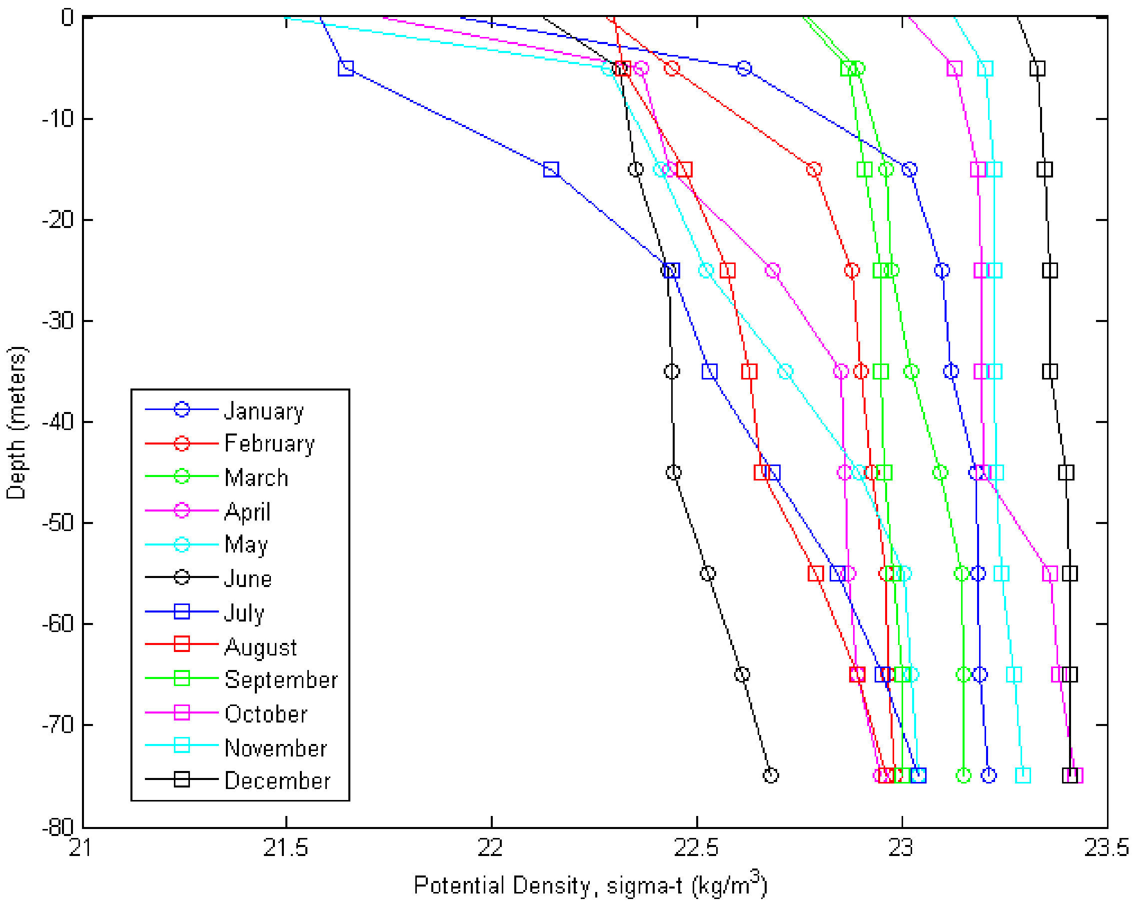
Date	0	15	Depth (m) 35	55	(max) 75
20-Jul-2010	22.072	22.235	22.369	22.390	22.408
17-Aug-2010	22.272	22.328	22.411	22.587	22.781
21-Sep-2010	21.511	22.468	22.630	23.009	23.355
18-Oct-2010	21.828	22.624	22.878	23.116	23.329
15-Nov-2010	22.924	22.929	22.982	22.982	22.983
20-Dec-2010	21.439	22.509	22.998	23.144	23.145
18-Jan-2011	20.959	22.346	22.707	22.831	22.831
22-Feb-2011	21.544	22.278	22.515	22.715	22.770
21-Mar-2011	21.664	22.405	22.523	22.590	22.725
18-Apr-2011	20.193	21.959	22.207	22.311	22.311
16-May-2011	21.429	22.083	22.339	22.444	22.678
20-Jun-2011	21.664	22.000	22.230	22.366	22.451
18-Jul-2011	21.680	22.074	22.158	22.326	22.674
15-Aug-2011	21.724	22.031	22.110	22.221	22.521
19-Sep-2011	22.297	22.408	22.571	22.835	22.935
17-Oct-2011	22.441	22.663	22.872	22.899	22.900
28-Nov-2011	22.731	23.031	23.079	23.081	23.082
19-Dec-2011	22.670	22.882	22.956	23.016	23.049
23-Jan-2012	22.557	22.873	22.968	22.968	22.998
21-Feb-2012	22.273	22.855	22.928	22.979	22.980
19-Mar-2012	21.808	22.749	22.864	23.030	23.030
17-Apr-2012	21.699	22.371	22.494	22.576	22.764
21-May-2012	20.375	21.734	22.236	22.388	22.445
18-Jun-2012	21.190	21.696	22.038	22.487	22.652
16-Jul-2012	21.037	21.749	22.112	22.458	22.827
20-Aug-2012	21.714	22.035	22.188	22.375	22.657
17-Sep-2012	22.252	22.364	22.503	22.707	22.782
17-Oct-2012	22.740	22.882	22.955	23.012	23.064
26-Nov-2012	19.375	22.455	22.853	23.087	23.141
18-Dec-2012	22.545	22.640	22.664	22.665	22.665
22-Jan-2013	22.187	22.427	22.515	22.544	22.583
19-Feb-2013	22.163	22.640	22.701	22.762	22.891
18-Mar-2013	22.186	22.709	22.779	22.834	23.002
16-Apr-2013	20.567	22.275	22.637	22.752	22.847
21-May-2013	17.625	22.026	22.600	22.896	23.007
18-Jun-2013	21.364	22.015	22.555	22.760	22.842
15-Jul-2013	21.147	22.149	22.388	22.409	22.646
26-Aug-2013	22.206	22.518	22.552	22.742	22.823
16-Sep-2013	22.498	22.528	22.702	22.914	22.978
21-Oct-2013	22.319	22.643	22.693	22.824	22.870
18-Nov-2013	22.524	23.099	23.125	23.148	23.167
16-Dec-2013	22.951	23.156	23.214	23.287	23.358
21-Jan-2014	21.787	23.115	23.212	23.275	23.286
04-Feb-2014	22.495	22.973	23.314	23.322	23.328
19-Mar-2014	20.213	22.402	22.717	23.066	23.181
22-Apr-2014	21.635	22.079	22.416	22.523	22.638
07-May-2014	20.486	22.329	22.493	22.585	22.757
19-May-2014	20.287	21.926	22.243	22.355	22.479
04-Jun-2014	21.468	21.874	22.095	22.437	22.782
16-Jun-2014	21.324	22.012	22.268	22.404	22.691
07-Jul-2014	19.789	21.878	22.287	22.413	22.453
21-Jul-2014	21.940	22.122	22.242	22.376	22.394
08-Sep-2014	22.242	22.490	22.529	22.772	22.997
22-Sep-2014	22.060	22.498	22.781	22.989	23.041
06-Oct-2014	22.594	22.723	23.003	23.113	23.134
20-Oct-2014	22.547	22.726	23.080	23.143	23.187
03-Nov-2014	21.596	22.462	22.823	22.915	22.961
17-Nov-2014	19.428	22.673	22.778	22.829	22.855
15-Dec-2014	20.334	22.409	22.492	22.552	22.628
20-Jan-2015	20.461	22.190	22.338	22.370	22.407
02-Feb-2015	20.129	22.150	22.200	22.380	22.591
17-Feb-2015	18.807	21.671	22.073	22.168	22.293
16-Mar-2015	19.622	21.913	22.160	22.258	22.258
06-Apr-2015	21.923	22.066	22.225	22.337	22.366
20-Apr-2015	21.891	21.978	22.304	22.440	22.469
04-May-2015	21.290	21.755	22.171	22.435	22.595
18-May-2015	22.140	22.267	22.416	22.567	22.622
02-Jun-2015	21.732	22.032	22.544	22.731	22.859
15-Jun-2015	22.169	22.232	22.381	22.641	22.791
06-Jul-2015	22.051	22.325	22.522	22.689	22.856
21-Jul-2015	21.993	22.280	22.407	22.520	22.801
03-Aug-2015	21.984	22.372	22.535	22.577	22.813
17-Aug-2015	22.266	22.418	22.550	22.668	22.919
08-Sep-2015	22.569	22.678	22.696	22.867	22.963
21-Sep-2015	22.603	22.773	22.828	23.015	23.024
05-Oct-2015	22.793	22.880	22.904	22.930	22.953
19-Oct-2015	22.789	22.866	22.922	22.989	23.039
02-Nov-2015	21.702	22.948	22.986	23.033	23.046
19-Nov-2015	20.604	22.655	22.856	22.911	22.968
14-Dec-2015	21.042	22.514	22.636	22.787	22.875
19-Jan-2016	22.200	22.442	22.568	22.644	22.658
01-Feb-2016	20.652	22.248	22.340	22.486	22.598
16-Feb-2016	21.081	22.111	22.129	22.190	22.247
09-Mar-2016	21.454	22.063	22.147	22.249	22.300
21-Mar-2016	20.192	21.877	21.961	22.138	22.274
06-Apr-2016	17.475	21.610	22.006	22.091	22.263
18-Apr-2016	21.454	21.715	21.767	22.094	22.109
02-May-2016	19.764	21.517	21.905	22.137	22.251
16-May-2016	21.576	21.655	21.744	22.024	22.115

Potential Density as sigma-t					
			Depth (m)		(max)
Date	0	15	35	55	75
06-Jun-2016	21.546	21.774	21.925	22.285	22.514
20-Jun-2016	21.486	21.939	22.186	22.578	22.613
05-Jul-2016	21.662	22.084	22.169	22.310	22.358
18-Jul-2016	21.584	22.121	22.278	22.622	22.836
01-Aug-2016	21.976	22.206	22.420	22.661	22.854
15-Aug-2016	21.987	22.223	22.438	22.670	22.692
06-Sep-2016	22.454	22.557	22.615	22.747	23.015
19-Sep-2016	22.479	22.704	22.748	22.755	22.775
03-Oct-2016	22.590	22.741	22.867	22.883	22.883
17-Oct-2016	22.335	22.940	22.990	23.125	23.191
07-Nov-2016	22.075	22.715	22.733	22.760	22.798
21-Nov-2016	21.406	22.411	22.510	22.565	22.589
19-Dec-2016	22.302	22.473	22.491	22.559	22.610
23-Jan-2017	22.467	22.757	22.917	22.952	23.022
08-Feb-2017	22.807	22.885	22.925	22.947	22.985
21-Feb-2017	20.416	22.522	22.761	22.880	22.910
06-Mar-2017	22.281	22.409	22.615	22.631	22.646
15-Mar-2017	22.310	22.413	22.553	22.638	22.657
20-Mar-2017	18.869	22.387	22.476	22.583	22.611
29-Mar-2017	21.039	21.991	22.173	22.384	22.495
03-Apr-2017	18.662	21.852	22.112	22.191	22.246
11-Apr-2017	21.085	21.971	22.149	22.210	22.253
17-Apr-2017	20.445	21.761	22.007	22.068	22.191
25-Apr-2017	21.108	21.974	22.146	22.214	22.250
26-Apr-2017	20.989	21.838	21.948	22.367	22.389
01-May-2017	20.962	21.713	22.035	22.054	22.055
10-May-2017	20.704	21.304	21.810	21.851	21.911
15-May-2017	21.139	21.383	21.512	21.818	22.106
24-May-2017	19.557	21.176	21.825	22.413	22.486
05-Jun-2017	17.814	21.489	21.753	21.940	22.238
06-Jun-2017	18.940	21.497	21.867	22.164	22.213
19-Jun-2017	21.236	21.585	21.747	22.366	22.673
05-Jul-2017	19.791	21.382	21.755	22.131	22.475
17-Jul-2017	20.886	21.417	21.546	22.188	22.547
07-Aug-2017	21.585	21.809	22.045	22.485	22.796
28-Aug-2017	22.087	22.124	22.218	22.480	22.790
05-Sep-2017	21.759	22.122	22.457	22.779	22.788
19-Sep-2017	22.081	22.436	22.528	22.774	22.846
03-Oct-2017	22.133	22.552	22.693	23.056	23.336
17-Oct-2017	22.590	22.888	22.948	23.025	23.088
06-Nov-2017	22.910	22.913	23.045	23.107	23.118
21-Nov-2017	22.985	23.118	23.195	23.201	23.237
18-Dec-2017	22.429	22.699	22.759	22.860	22.920
16-Jan-2018	20.425	22.611	22.634	22.927	23.070
05-Feb-2018	20.160	22.507	22.568	22.652	22.740
20-Feb-2018	18.933	22.264	22.353	22.436	22.500
07-Mar-2018	22.621	22.825	22.854	22.985	23.083
19-Mar-2018	22.323	22.430	22.509	22.758	22.919
02-Apr-2018	22.120	22.650	22.713	22.805	22.813
16-Apr-2018	20.455	22.511	22.663	22.839	23.068
07-May-2018	20.168	22.089	22.333	22.635	22.900
21-May-2018	21.251	21.811	22.376	22.503	22.507
04-Jun-2018	21.876	21.960	22.305	22.454	22.454
18-Jun-2018	21.796	22.042	22.243	22.340	22.480
09-Jul-2018	21.550	21.993	22.445	22.743	23.162
23-Jul-2018	21.856	22.068	22.588	22.734	22.860
20-Aug-2018	22.099	22.362	22.419	22.629	22.809
04-Sep-2018	22.518	22.597	22.613	22.937	23.149
17-Sep-2018	22.584	22.638	22.762	22.834	22.877
01-Oct-2018	22.712	22.783	22.879	23.033	23.111
15-Oct-2018	22.707	23.067	23.088	23.123	23.180
15-Nov-2018	22.567	22.981	23.023	23.175	23.200
26-Nov-2018	23.052	23.208	23.250	23.272	23.293
18-Jun-2013	21.364	22.015	22.555	22.760	22.842
15-Jul-2013	21.147	22.149	22.388	22.409	22.646
26-Aug-2013	22.206	22.518	22.552	22.742	22.823
16-Sep-2013	22.498	22.528	22.702	22.914	22.978
21-Oct-2013	22.319	22.643	22.693	22.824	22.870
18-Nov-2013	22.524	23.099	23.125	23.148	23.167
16-Dec-2013	22.951	23.156	23.214	23.287	23.358
21-Jan-2014	21.787	23.115	23.212	23.275	23.286
04-Feb-2014	22.495	22.973	23.314	23.322	23.328
19-Mar-2014	20.213	22.402	22.717	23.066	23.181
22-Apr-2014	21.635	22.079	22.416	22.523	22.638
07-May-2014	20.486	22.329	22.493	22.585	22.757
19-May-2014	20.287	21.926	22.243	22.355	22.479
04-Jun-2014	21.468	21.874	22.095	22.437	22.782
16-Jun-2014	21.324	22.012	22.268	22.404	22.691
07-Jul-2014	19.789	21.878	22.287	22.413	22.453
21-Jul-2014	21.940	22.122	22.242	22.376	22.394
08-Sep-2014	22.242	22.490	22.529	22.772	22.997
22-Sep-2014	22.060	22.498	22.781	22.989	23.041
06-Oct-2014	22.594	22.723	23.003	23.113	23.134
20-Oct-2014	22.547	22.726	23.080	23.143	23.187
03-Nov-2014	21.596	22.462	22.823	22.915	22.961
17-Nov-2014	19.428	22.673	22.778	22.829	22.855
15-Dec-2014	20.334	22.409	22.492	22.552	22.628
20-Jan-2015	20.461	22.190	22.338	22.370	22.407
02-Feb-2015	20.129	22.150	22.200	22.380	22.591

Potential Density as sigma-t					
			Depth (m)		(max)
Date	0	15	35	55	75
17-Feb-2015	18.807	21.671	22.073	22.168	22.293
16-Mar-2015	19.622	21.913	22.160	22.258	22.258
06-Apr-2015	21.923	22.066	22.225	22.337	22.366
20-Apr-2015	21.891	21.978	22.304	22.440	22.469
04-May-2015	21.290	21.755	22.171	22.435	22.595
18-May-2015	22.140	22.267	22.416	22.567	22.622
02-Jun-2015	21.732	22.032	22.544	22.731	22.859
15-Jun-2015	22.169	22.232	22.381	22.641	22.791
06-Jul-2015	22.051	22.325	22.522	22.689	22.856
21-Jul-2015	21.993	22.280	22.407	22.520	22.801
03-Aug-2015	21.984	22.372	22.535	22.577	22.813
17-Aug-2015	22.266	22.418	22.550	22.668	22.919
08-Sep-2015	22.569	22.678	22.696	22.867	22.963
21-Sep-2015	22.603	22.773	22.828	23.015	23.024
05-Oct-2015	22.793	22.880	22.904	22.930	22.953
19-Oct-2015	22.789	22.866	22.922	22.989	23.039
02-Nov-2015	21.702	22.948	22.986	23.033	23.046
19-Nov-2015	20.604	22.655	22.856	22.911	22.968
14-Dec-2015	21.042	22.514	22.636	22.787	22.875
19-Jan-2016	22.200	22.442	22.568	22.644	22.658
01-Feb-2016	20.652	22.248	22.340	22.486	22.598
16-Feb-2016	21.081	22.111	22.129	22.190	22.247
09-Mar-2016	21.454	22.063	22.147	22.249	22.300
21-Mar-2016	20.192	21.877	21.961	22.138	22.274
06-Apr-2016	17.475	21.610	22.006	22.091	22.263
18-Apr-2016	21.454	21.715	21.767	22.094	22.109
02-May-2016	19.764	21.517	21.905	22.137	22.251
16-May-2016	21.576	21.655	21.744	22.024	22.115
06-Jun-2016	21.546	21.774	21.925	22.285	22.514
20-Jun-2016	21.486	21.939	22.186	22.578	22.613
05-Jul-2016	21.662	22.084	22.169	22.310	22.358
18-Jul-2016	21.584	22.121	22.278	22.622	22.836
01-Aug-2016	21.976	22.206	22.420	22.661	22.854
15-Aug-2016	21.987	22.223	22.438	22.670	22.692
06-Sep-2016	22.454	22.557	22.615	22.747	23.015
19-Sep-2016	22.479	22.704	22.748	22.755	22.775
03-Oct-2016	22.590	22.741	22.867	22.883	22.883
17-Oct-2016	22.335	22.940	22.990	23.125	23.191
07-Nov-2016	22.075	22.715	22.733	22.760	22.798
21-Nov-2016	21.406	22.411	22.510	22.565	22.589
19-Dec-2016	22.302	22.473	22.491	22.559	22.610
23-Jan-2017	22.467	22.757	22.917	22.952	23.022
08-Feb-2017	22.807	22.885	22.925	22.947	22.985
21-Feb-2017	20.416	22.522	22.761	22.880	22.910
06-Mar-2017	22.281	22.409	22.615	22.631	22.646
15-Mar-2017	22.310	22.413	22.553	22.638	22.657
20-Mar-2017	18.869	22.387	22.476	22.583	22.611
29-Mar-2017	21.039	21.991	22.173	22.384	22.495
03-Apr-2017	18.662	21.852	22.112	22.191	22.246
11-Apr-2017	21.085	21.971	22.149	22.210	22.253
17-Apr-2017	20.445	21.761	22.007	22.068	22.191
25-Apr-2017	21.108	21.974	22.146	22.214	22.250
26-Apr-2017	20.989	21.838	21.948	22.367	22.389
01-May-2017	20.962	21.713	22.035	22.054	22.055
10-May-2017	20.704	21.304	21.810	21.851	21.911
15-May-2017	21.139	21.383	21.512	21.818	22.106
24-May-2017	19.557	21.176	21.825	22.413	22.486
05-Jun-2017	17.814	21.489	21.753	21.940	22.238
06-Jun-2017	18.940	21.497	21.867	22.164	22.213
19-Jun-2017	21.236	21.585	21.747	22.366	22.673
05-Jul-2017	19.791	21.382	21.755	22.131	22.475
17-Jul-2017	20.886	21.417	21.546	22.188	22.547
07-Aug-2017	21.585	21.809	22.045	22.485	22.796
28-Aug-2017	22.087	22.124	22.218	22.480	22.790
05-Sep-2017	21.759	22.122	22.457	22.779	22.788
19-Sep-2017	22.081	22.436	22.528	22.774	22.846
03-Oct-2017	22.133	22.552	22.693	23.056	23.336
17-Oct-2017	22.590	22.888	22.948	23.025	23.088
06-Nov-2017	22.910	22.913	23.045	23.107	23.118
21-Nov-2017	22.985	23.118	23.195	23.201	23.237
18-Dec-2017	22.429	22.699	22.759	22.860	22.920
16-Jan-2018	20.425	22.611	22.634	22.927	23.070
05-Feb-2018	20.160	22.507	22.568	22.652	22.740
20-Feb-2018	18.933	22.264	22.353	22.436	22.500
07-Mar-2018	22.621	22.825	22.854	22.985	23.083
19-Mar-2018	22.323	22.430	22.509	22.758	22.919
02-Apr-2018	22.120	22.650	22.713	22.805	22.813
16-Apr-2018	20.455	22.511	22.663	22.839	23.068
07-May-2018	20.168	22.089	22.333	22.635	22.900
21-May-2018	21.251	21.811	22.376	22.503	22.507
04-Jun-2018	21.876	21.960	22.305	22.454	22.454
18-Jun-2018	21.796	22.042	22.243	22.340	22.480
09-Jul-2018	21.550	21.993	22.445	22.743	23.162
23-Jul-2018	21.856	22.068	22.588	22.734	22.860
20-Aug-2018	22.099	22.362	22.419	22.629	22.809
04-Sep-2018	22.518	22.597	22.613	22.937	23.149
17-Sep-2018	22.584	22.638	22.762	22.834	22.877
01-Oct-2018	22.712	22.783	22.879	23.033	23.111
15-Oct-2018	22.707	23.067	23.088	23.123	23.180

Potential Density as sigma-t					
			Depth (m)		(max)
Date	0	15	35	55	75
15-Nov-2018	22.567	22.981	23.023	23.175	23.200
26-Nov-2018	23.052	23.208	23.250	23.272	23.293

Figure 1. Sigma-t Profile for Central Basin Station KSSK02 (only 2005 values shown)



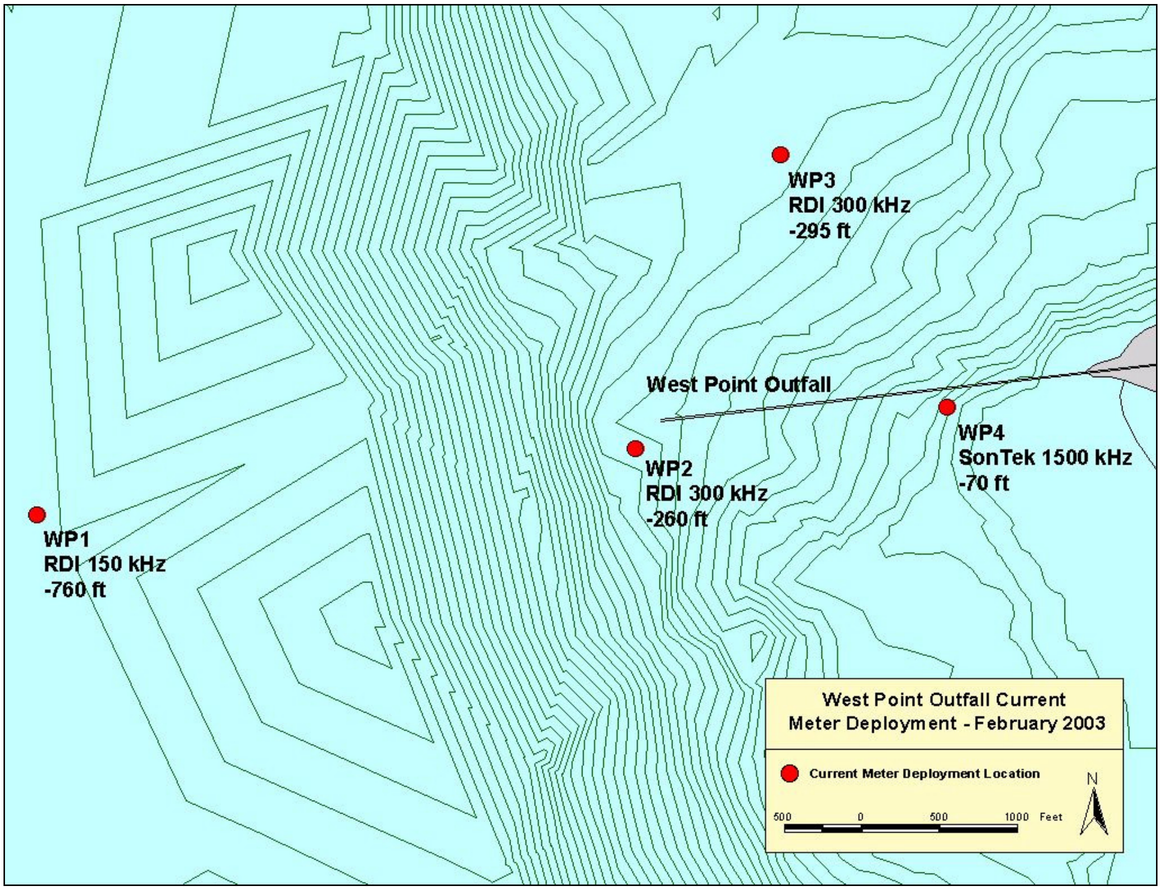


Figure 2. Location of Current Meter Station WP2

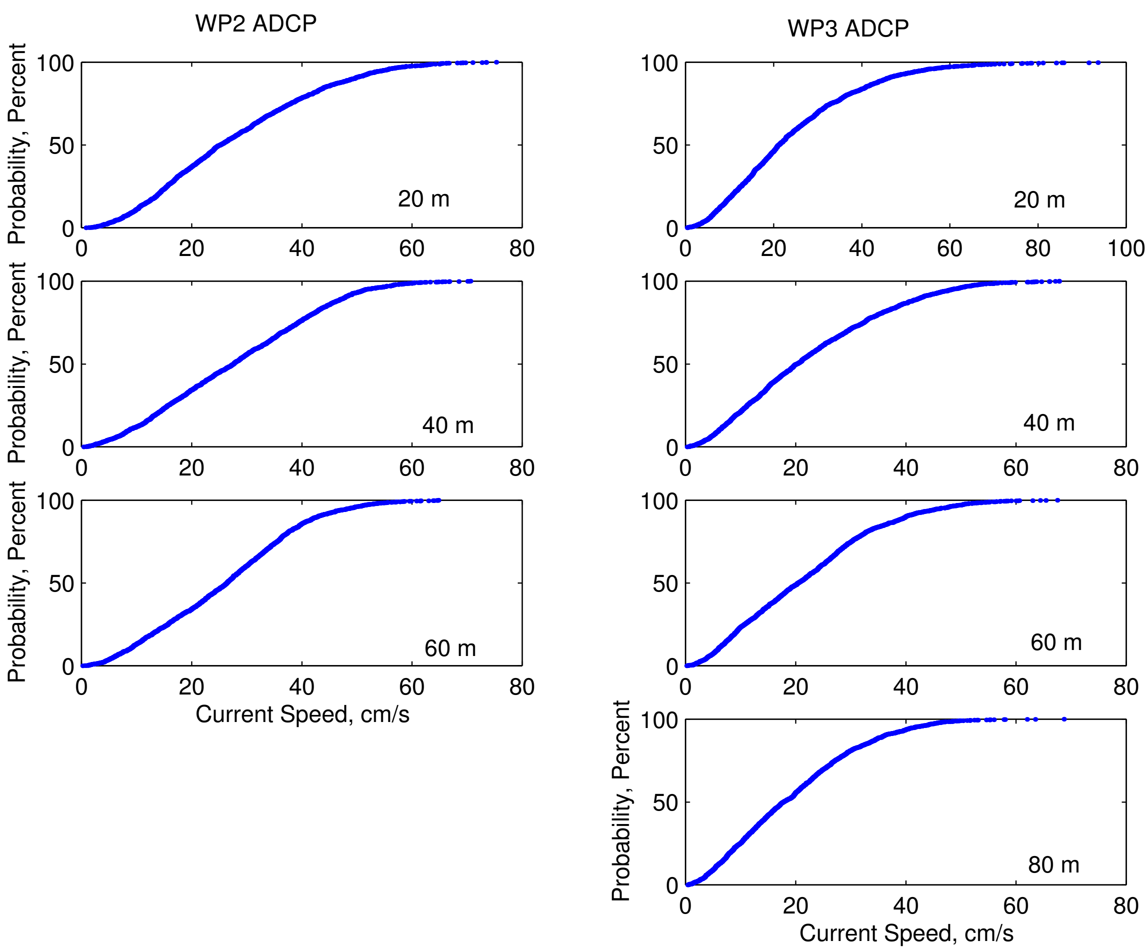


Figure 3. Histogram for Currents at 20, 40, 60 m (Station WP2, 6 week Duration)

PLUMES Output

Minimum Acute Dilution: 90 percentile current speed resulting in plumes from both sides of diffuser merging, simulated as all ports facing downstream. Discharge flow of 372 mgd for September and September density profile

/ UM3.
Case 5; ambient file m:\user\nairn\p\plumes\vplumes\WestPoint\m2018\westpoint.007.db; Diffuser table record 9: ---------------------------------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.493	90.0	30.07	12.62	0.0	0.0	-	-	0.0	22.68
5.0	0.493	90.0	30.1	12.55	0.0	0.0	-	-	0.0	22.72
15.0	0.493	90.0	30.15	12.49	0.0	0.0	-	-	0.0	22.77
25.0	0.493	90.0	30.17	12.44	0.0	0.0	-	-	0.0	22.79
35.0	0.478	90.0	30.18	12.4	0.0	0.0	-	-	0.0	22.81
45.0	0.478	90.0	30.25	12.25	0.0	0.0	-	-	0.0	22.89
55.0	0.478	90.0	30.43	11.85	0.0	0.0	-	-	0.0	23.1
65.0	0.428	90.0	30.54	11.57	0.0	0.0	-	-	0.0	23.23
75.0	0.428	90.0	30.66	11.26	0.0	0.0	-	-	0.0	23.39

Diffuser table:

P-dia	P-elev	V-angle	H-angle	Ports	Spacing	SttTime	EndTime	Incrmnt	AcuteMZ	ChrncMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(m)	(deg)	(Surv-deg)	()	(ft)	(hr)	(hr)	(hr)	(ft)	(ft)	(ft)	(MGD)	(psu)	(C)	(kg/kg)
5.2	1.0	0.0	0.0	200.0	3.0	3.0	83.0	3.0	43.0	430.0	230.0	372.0	0.0	12.0	1.0

Simulation:
Froude number: 33.9; effluent density (sigma-T) -0.43777851; effluent velocity 5.948(m/s);

Step	Depth	Amb-cur	P-dia	Polutnt	Dilutn	x-posn	y-posn
	(ft)	(cm/s)	(in)	(kg/kg)	()	(ft)	(ft)
0	230.0	42.8	5.2	1.0	1.0	0.0	0.0;
100	229.9	42.8	30.77	0.138	7.099	0.0	6.243;
110	229.9	42.8	36.12	0.113	8.649	0.0	7.776; merging;
171	225.3	42.8	158.2	0.0338	28.89	0.0	43.03; acute zone;
200	217.7	42.8	318.3	0.0191	51.29	0.0	74.79;
265	173.4	47.8	1308.4	0.00526	185.8	0.0	240.2; trap level;
274	163.1	47.8	1579.0	0.0044	222.0	0.0	294.8; stream limit reached;
286	154.9	47.8	1887.2	0.00378	258.7	0.0	380.4; bottom hit;
290	154.6	47.8	1928.5	0.00372	262.9	0.0	406.6; local maximum rise or fall;

Minimum Chronic Dilution: 50 percentile current speed simulated with RSB/NRFIELD model with opposing ports. Discharge flow of 126 mgd (5.5188 m^3/s) for October and October density profile

25 : case 3 (NRFIELD)

```
 5.5188      200   0.1321    0.0000   70.0000
 0.2640   90.0000    1.8300
      9    0.998944    0.0000   16.0000
 0.0000 1.0221328   29.5740   13.3160    0.2520   90.0000
 5.0000 1.0223831   29.8770   13.2330    0.2520   90.0000
15.0000 1.0225517   30.0530   13.0650    0.2520   90.0000
25.0000 1.0226245   30.1220   12.9650    0.2520   90.0000
35.0000 1.0226935   30.1770   12.8270    0.2760   90.0000
45.0000 1.0228384   30.2930   12.5360    0.2760   90.0000
55.0000 1.0230565   30.4760   12.1250    0.2760   90.0000
65.0000 1.0231848   30.5720   11.8300    0.2640   90.0000
75.0000 1.0233363   30.6950   11.5180    0.2640   90.0000
```

Results:

Lengthscale ratios s/lb lm/lb
.119 .108

2.59 = Froude number, u3/b, F

34.2 = Height to wastefield top, ze (m)
35.8 = Wastefield submergence below surface (m)
27.3 = Wastefield thickness, he = (m)
23.1 = Height to level of cmax, zm (m)
179.7 = Mixing region length, xi (m)

199. = Minimum dilution, Sm
229. = Flux-average dilution, Sfa =1.15 x Sm

Effluent Dilution Modeling-Alki CSO Treatment Facility Marine Outfall

Prepared by: Bruce Nairn, King County WTD. January 2019

Model

Visual PLUMES

The UM3 and NRFIELD(RSB) model components of VISUAL PLUMES were used for this modeling effort. These models were chosen because the Alki CSO Treatment Facility outfall conforms to the conditions specified for the suggested use of both the RSB and UM models in Dilution Models for Effluent Discharges, 4th Edition . The RSB model is suitable for predicting chronic dilution ratios for outfalls with opposing-port configurations in marine waters. The simulated conditions include a buoyant plume discharging into a saline water column with a non-linear stratification profile, the predominant current normal to the axis of the outfall, a multiport diffuser with plume merging. The farfield predictions were used to model dilutions at the mixing zone boundary, for this purpose the assumptions of a constant eddy diffusivity were used, this was the more conservative assumption as opposed to the assumption that the dispersion coefficient is increasing according to the 4/3 power law, the other farfield option offered by the model.

The UM3 model was run separately for the diffuser ports discharging in the direction of the current and those ports discharging in a direction opposed to the current. The predicted plume trajectories show that the discharges do not merge before the Zone of Acute Criteria Exceedance (ZACE) for the 10^{th} percentile currents. Under the 90^{th} percentile currents, the plumes would merge before the ZACE, and thus this case was represented with all ports discharging in the direction of the current. The predicted dilutions for ports discharging in the direction of the current were always more conservative than those discharging into the current. Predicted dilutions for the chronic mixing zone were obtained from the RSB model. The RSB model predictions are approximately 10% more conservative than the UM model at the chronic mixing zone boundary. The depths modeled correspond to depths that have density observations, see below.

Ecology has provided new guidance on the methodology to determine the acute and chronic design flows for intermittent CSO discharges. The new methodology is summarized in Section 6.1.3, Appendix C of Ecology's *Water Quality Program Permit Writer's Manual* (Ecology, 2015). When effluent discharge is intermittent, the dilution factor is to be calculated with the maximum flow rate that can occur. The dilution factor generated using the maximum flow rate may then be adjusted upward by a ratio of the maximum flow to the appropriate time-averaged flow for the criterion being assessed. For aquatic life criteria, acute dilution factors are typically assessed using the maximum one-hour average flow. Chronic dilution factors are typically assessed using the maximum 4-day average flow. However, the appropriate flow averaging period varies per pollutant as described in the water quality standards (WAC 173-201A). Ecology's guidance lists the following flows to apply in these treated CSO dilution calculations:

- **Instantaneous:** the maximum instantaneous flow rate recorded (or projected over the next permit term)
- **One-hour:** the maximum one-hour flow rate recorded (or projected over the next permit term)
- **Equivalent 24-hour flow:** for each day with effluent discharge, calculate total volume discharged. Use the highest equivalent 24-hour flow.
- **Equivalent four-day flow:** highest total 4-day discharge event volume divided by 4 days. If the CSO discharge is less than four days, use highest total event volume divided by 4 days.

The dilution factor calculated under the maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow.

Previously, dilution factors were estimated by modeling the discharge at acute or chronic design flow, which were defined in Ecology's permit writer's manual as:

> For critical condition scenarios at the acute boundary, the flowrate to use is the highest equivalent twenty-four hour average for the past three years during the season in which the critical condition is likely to occur. If plant influent flows are expected to increase during the life of the permit, the highest daily maximum flow must be estimated.
> For critical condition scenarios at the chronic boundary, the flowrate to use is the highest equivalent monthly average flow (total volume of all discharge events in a month divided by the total hours of discharge in that month) for the past three years during the season in which the critical condition is likely to occur. If plant influent flows are expected to increase during the life of the permit, the highest average monthly flow must be estimated. For average condition (human health-based) scenarios, the flowrate to use is the annual equivalent average flow based on data provided in the permit application or DMR analysis.

These design conditions were applied, as summarized below.

	CSO INTERMITTENT DISCHARGE METHOD
ZACE	the event with the highest equivalent twenty-four hour average (total volume of event divided by total hours of event)
MIXING ZONE (CHRONIC) & NON-CARC.	the highest equivalent monthly average over the last three years of operation (total volume of all discharge events in a month

HUMAN HEALTH	divided by the total hours of discharge in that month)
CARCINOGENIC HUMAN HEALTH	The highest equivalent annual average flow over the last three years of operation (total volume of all discharge events in a year divided by the total days of discharge in that year)

This change in methodology has a significant impact in calculating the dilution factors. Additionally, the Permit Writer's Handbook (Appendix C, Section 6.1.3) recognizes that CSO treatment plant discharges are highly intermittent and highly variable in discharge volumes, durations, and pollutant concentrations, both between storms and during a single storm event. Therefore, direct comparisons of human health receiving water criteria with pollutant concentrations is not appropriate. It concludes that deriving numeric effluent limits for human health criteria is infeasible. As a result, dilution factors are not estimated for human health design criteria.

Modeling Conditions

Outfall

The Alki outfall ends in a multi-port diffuser at a depth of 43.6m (143 ft) MLLW. The diffuser is 120 feet in length, with 8 12-inch diameter diffuser ports. The first six ports are directed to alternating sides of the oufall. The final two ports are formed from a wye at the end of the outfall. The ports discharge horizontally.

Density Structure

An extensive data set for density structure exists at King County sampling station LSKQ06. This station located at the terminus of the Alki outfall. The location is 47 34 12.98 N and 122 25 18.33 W. Fifteen years of monthly CTD casts have been recorded, with 0.5 vertical resolution. The data is summarized in Table 1 and Figure 1. The density profile was extrapolated from the depth of each CTD cast to the depth of the outfall as a constant value.

Ambient Currents

The data set chosen for ambient currents was taken from a station sampled for the siting study for the Renton outfall near Duwamish Head. The furthest west station, Station 25 from this study, see Figure 2, is located approximately 2.7 nautical miles north of the outfall, at 47 36 25 N and 122 27 50 W. Month long data sets were taken at 22 and 100 m with the current values representing an approximately 15 minute average velocity and the direction is represented by the instantaneous direction at the end of the sampling interval. A histogram was constructed from approximately 3000 observations over the period. Observations from 22 m were used to represent current speed at all modeled depths. The 10^{th} percentile current was 5.5 cm/s, the 90^{th} percentile current was

43 cm/s, and the median current speed (50th percentile) was 16 cm/s. The histogram of current speeds at 22 m is shown in Figure 3.

Plant Flows

As stated earlier, critical plant flows were determined using the intermittent discharge method. Plant flows were analyzed for the four and a half year period of January 2014 through June 2018. Discharge events between February 2017 and April 2017 were exacerbated by the West Point flooding and subsequent recovery, and are thus excluded from the analysis as they are not characteristic discharges.

- **Instantaneous:** the maximum instantaneous flow rate was assumed to equal the influent pumping capacity (63rd Street Pump Station) of 68 mgd.
- **One-hour:** the maximum one-hour flow rate was assumed to equal the instantaneous flow rate of 68 mgd.
- **Equivalent 24-hour flow:** for each day with effluent discharge, the total volume discharged was calculated. The highest equivalent 24-hour flow was 50 mgd on December 9, 2015.
- **Equivalent four-day flow:** highest total 4-day discharge event volume was 84.5 MG from December 7 – 10, 2015. Divided by 4 days, the equivalent four-day flow is 21 mgd.

The discharge events from the Alki CSO treatment plant are tabulated in Table 2.

Critical Conditions-Selected Cases-Decision Path and Ecology Guidance

Zone of Acute Criteria Exceedance (ZACE) 34 ft or 10.4 m

Ecology guidance recommends that the critical receiving water condition be determined. Using the intermittent discharge method, both the instantaneous and one hour average flows were assumed to equal the influent pumping capacity of 68 mgd. Therefore, the flow from this event was used for determining the ZACE dilution for the Alki facility. Ecology guidance also required modeling to be performed using the 10th and 90th percentile current values. These current conditions yielded velocities of 5.5 cm/sec and 43 cm/s.

Dilution was modeled with all ports discharging with the current, half the ports discharging with the current, and half the ports discharging into the current. Dilution was lower under the 90th percentile current speed conditions. At this current speed, the model predicts that at the acute mixing zone boundary the plume from the upstream ports is distinct from (does not merge) the downstream port discharge. However, the model also predicts that the plume diameter from individual ports doesn't exceed the port spacing at the acute mixing zone boundary, resulting in identical dilution predictions for all ports discharging downstream or half of the ports discharging downstream. The critical ambient density profile was determined by modeling the dilution for each available profile, although the acute dilution is relatively insensitive to the density profile. The minimum dilution of approximately 17:1 is predicted at the acute mixing zone.

Chronic Mixing Zone: 340 ft. or 104 m. at Alki

The maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow.

The maximum discharge rate of 68 MGD was used to model the dilution at the chronic mixing zone. Ecology guidance defines the 50th percentile current velocity as the critical receiving water current velocity for aquatic life chronic. The 50^{th} percentile current showed a dilution in the far field of approximately 60:1 for February receiving water conditions.

Dilution at the chronic mixing zone is determined by scaling the dilution at maximum discharge rate by the ratio of the 24-hour (50 mgd) or 4-day flow (21.5 mgd) to the maximum flow rate. This results in chronic dilution values of 82 and 190.

<u>Summary</u>

ZACE

The dilution at the ZACE for the critical conditions detailed above yielded a dilution at the ZACE (10.4 m) of **17:1** in the plume flowing in the direction of the current. This was the lower dilution of the plume pairs.

Chronic Mixing Zone

The dilution at the chronic mixing zone (104 m) for the critical conditions described above yielded a dilution of **82:1** (24-hour) and **190:1** (4-day).

Table 1. Ambient Density at Alki (Station LSKQ06)

	Potential Density as sigma-t					
			Depth (m)			
Date	0	5	15	25	35	45
21-Oct-1998	22.949	22.958	22.977	22.998	23.013	23.031
25-Jan-1999	21.387	22.116	22.254	22.355	22.451	22.532
15-Mar-1999	21.640	21.711	21.752	21.786	22.146	22.170
20-Apr-1999	22.014	22.038	22.049	22.098	22.171	22.247
22-Jun-1999	19.955	20.915	21.767	22.150	22.228	22.453
17-Aug-1999	22.103	22.172	22.226	22.273	22.334	22.368
21-Sep-1999	22.158	22.265	22.298	22.370	22.397	22.414
19-Oct-1999	22.730	22.749	22.752	22.780	22.857	22.917
17-Nov-1999	21.888	22.007	22.611	22.826	22.840	22.978
08-Dec-1999	22.633	22.639	22.646	22.670	22.712	22.756
15-Feb-2000	22.285	22.380	22.401	22.437	22.451	22.491
22-Mar-2000	22.490	22.497	22.501	22.514	22.516	22.518
18-Apr-2000	22.309	22.378	22.491	22.514	22.516	22.517
16-May-2000	22.264	22.283	22.338	22.370	22.432	22.507
11-Jul-2000	21.836	22.021	22.165	22.274	22.420	22.478
24-Jul-2000	22.038	22.137	22.241	22.301	22.398	22.522
14-Aug-2000	22.286	22.320	22.354	22.380	22.402	22.426
22-Aug-2000	22.398	22.410	22.448	22.471	22.538	22.620
12-Sep-2000	22.642	22.666	22.765	22.816	22.842	22.867
19-Sep-2000	22.572	22.665	22.732	22.848	22.860	22.892
17-Oct-2000	22.875	22.906	22.943	22.960	22.987	22.997
24-Oct-2000	23.007	23.026	23.054	23.062	23.085	23.088
22-Nov-2000	23.191	23.289	23.290	23.290	23.294	23.303
28-Nov-2000	23.207	23.316	23.322	23.325	23.327	23.328
19-Dec-2000	23.485	23.494	23.501	23.512	23.527	23.529
17-Jan-2001	23.448	23.500	23.515	23.539	23.540	23.555
14-Feb-2001	23.367	23.374	23.498	23.507	23.520	23.525
21-Feb-2001	23.425	23.432	23.434	23.436	23.443	23.446
06-Mar-2001	23.462	23.471	23.504	23.508	23.520	23.531
20-Mar-2001	23.267	23.336	23.414	23.424	23.428	23.434
03-Apr-2001	23.240	23.287	23.354	23.365	23.377	23.385
17-Apr-2001	23.257	23.261	23.278	23.294	23.303	23.312
22-May-2001	21.639	22.169	22.764	22.880	22.890	22.993
19-Jun-2001	21.745	22.222	22.435	22.677	22.782	22.833
26-Jun-2001	22.423	22.663	22.750	22.781	22.821	22.909
19-Jul-2001	22.402	22.566	22.674	22.730	22.866	22.924
24-Jul-2001	22.731	22.777	22.873	22.894	22.980	23.014
22-Aug-2001	22.838	22.842	22.883	22.942	22.984	23.028
24-Sep-2001	22.927	22.940	22.966	22.974	23.054	23.196
23-Oct-2001	23.245	23.250	23.263	23.269	23.308	23.327
19-Nov-2001	22.232	23.189	23.272	23.281	23.310	23.337
17-Dec-2001	22.913	23.014	23.014	23.014	23.014	23.014
29-Jan-2002	22.309	22.599	22.620	22.649	22.655	22.659
20-Feb-2002	22.406	22.493	22.510	22.568	22.609	22.719
18-Mar-2002	22.462	22.484	22.500	22.527	22.541	22.567
22-Apr-2002	21.522	22.051	22.387	22.446	22.611	22.749
28-May-2002	22.387	22.429	22.473	22.494	22.509	22.533
25-Jun-2002	21.867	22.046	22.129	22.182	22.356	22.418
22-Jul-2002	21.625	21.811	22.061	22.273	22.335	22.372
27-Aug-2002	22.405	22.445	22.485	22.533	22.551	22.565
23-Sep-2002	22.673	22.749	22.796	22.834	22.838	22.850
21-Oct-2002	23.041	23.133	23.157	23.160	23.162	23.167
20-Nov-2002	23.504	23.504	23.505	23.517	23.526	23.528
17-Dec-2002	23.405	23.482	23.508	23.530	23.540	23.561
21-Jan-2003	23.101	23.229	23.241	23.280	23.295	23.296
24-Feb-2003	22.773	22.849	22.861	22.866	22.873	22.911
24-Mar-2003	22.441	22.663	22.769	22.795	22.818	22.901
29-Apr-2003	21.861	22.223	22.279	22.334	22.366	22.424
27-May-2003	18.603	22.081	22.293	22.343	22.356	22.363
23-Jun-2003	10.630	21.869	22.247	22.274	22.386	22.455
28-Jul-2003	18.706	22.206	22.237	22.269	22.292	22.322
25-Aug-2003	19.823	22.377	22.484	22.529	22.545	22.569
29-Sep-2003	22.429	22.856	22.904	22.911	22.928	22.941
27-Oct-2003	17.856	21.729	22.251	22.765	22.830	22.853
17-Nov-2003	22.123	22.939	22.941	22.956	22.961	22.967
15-Dec-2003	19.426	22.909	22.911	22.915	22.927	22.929
20-Jan-2004	21.805	22.846	22.868	22.886	22.906	22.921
17-Feb-2004	22.542	22.569	22.577	22.585	22.605	22.624
23-Mar-2004	22.473	22.588	22.616	22.619	22.623	22.630
26-Apr-2004	18.386	22.552	22.597	22.631	22.733	22.827
25-May-2004	21.862	22.416	22.528	22.597	22.748	22.823
28-Jun-2004	21.994	22.076	22.198	22.356	22.411	22.446
27-Jul-2004	22.324	22.400	22.490	22.520	22.574	22.653
23-Aug-2004	22.068	22.270	22.540	22.593	22.726	22.808
27-Sep-2004	22.380	22.575	22.618	22.677	22.775	22.852
25-Oct-2004	22.902	22.931	22.948	22.965	22.967	22.971
15-Nov-2004	22.777	23.067	23.070	23.086	23.087	23.124
21-Dec-2004	22.632	22.685	22.798	22.832	22.875	22.921
25-Jan-2005	22.309	22.593	22.814	22.948	22.983	23.002
01-Mar-2005	22.843	22.856	22.872	22.895	22.938	22.967
30-Mar-2005	22.761	22.790	22.848	22.895	22.974	23.047
26-Apr-2005	22.520	22.591	22.645	22.769	22.863	22.956
24-May-2005	22.241	22.351	22.447	22.568	22.612	22.621

Potential Density as sigma-t

Date	Depth (m) 0	5	15	25	35	45
29-Jun-2005	22.297	22.378	22.400	22.429	22.451	22.477
19-Jul-2005	22.094	22.262	22.287	22.317	22.391	22.397
23-Aug-2005	22.508	22.536	22.573	22.598	22.622	22.717
26-Sep-2005	22.828	22.862	22.969	22.982	22.987	23.123
25-Oct-2005	23.179	23.184	23.189	23.219	23.354	23.423
30-Nov-2005	23.184	23.184	23.185	23.191	23.205	23.223
20-Dec-2005	23.355	23.358	23.366	23.373	23.393	23.407
08-Feb-2006	20.514	21.418	22.157	22.443	22.542	22.616
28-Feb-2006	22.314	22.334	22.372	22.399	22.425	22.441
28-Mar-2006	22.590	22.594	22.625	22.652	22.681	22.697
25-Apr-2006	21.665	21.877	22.239	22.402	22.466	22.531
31-May-2006	22.129	22.325	22.476	22.552	22.608	22.690
27-Jun-2006	21.682	21.749	21.874	22.013	22.090	22.161
25-Jul-2006	22.038	22.064	22.131	22.190	22.256	22.318
23-Aug-2006	22.405	22.405	22.455	22.467	22.478	22.490
26-Sep-2006	22.829	22.887	22.948	22.996	23.031	23.045
25-Oct-2006	23.186	23.187	23.189	23.205	23.236	23.270
27-Nov-2006	23.135	23.135	23.140	23.148	23.181	23.216
19-Dec-2006	22.474	22.497	22.585	22.742	22.844	22.960
17-Jan-2007	22.394	22.396	22.416	22.445	22.474	22.496
21-Feb-2007	22.468	22.516	22.551	22.580	22.653	22.746
20-Mar-2007	22.287	22.310	22.347	22.379	22.403	22.432
18-Apr-2007	22.301	22.319	22.351	22.396	22.435	22.442
22-May-2007	21.892	22.129	22.335	22.421	22.459	22.504
19-Jun-2007	22.368	22.402	22.448	22.483	22.547	22.622
17-Jul-2007	22.254	22.301	22.370	22.413	22.430	22.510
18-Sep-2007	22.587	22.631	22.667	22.689	22.756	22.801
16-Oct-2007	23.000	23.000	23.002	23.009	23.025	23.066
27-Nov-2007	23.226	23.226	23.228	23.237	23.252	23.259
18-Dec-2007	22.910	22.928	22.962	23.010	23.053	23.114
26-Feb-2008	22.937	22.939	22.949	22.963	22.987	23.015
18-Mar-2008	22.717	22.806	22.888	22.937	22.968	22.982
22-Apr-2008	22.933	22.941	22.978	23.011	23.035	23.050
21-May-2008	20.488	21.039	22.285	22.725	22.779	22.793
17-Jun-2008	19.671	20.877	21.952	22.472	22.716	22.749
22-Jul-2008	21.842	21.914	22.081	22.286	22.431	22.553
21-Aug-2008	22.477	22.480	22.488	22.495	22.561	22.682
16-Sep-2008	22.459	22.533	22.648	22.716	22.765	22.813
21-Oct-2008	23.118	23.120	23.126	23.131	23.135	23.139
18-Nov-2008	22.725	22.800	22.906	22.948	23.026	23.065
16-Dec-2008	23.170	23.171	23.175	23.191	23.209	23.230
21-Jan-2009	21.445	22.008	22.391	22.605	22.822	22.925
18-Feb-2009	23.008	23.035	23.050	23.060	23.068	23.081
17-Mar-2009	23.202	23.204	23.205	23.210	23.212	23.218
21-Apr-2009	21.729	22.427	22.856	22.967	22.989	23.026
19-May-2009	20.985	21.823	22.547	22.824	22.902	22.993
16-Jun-2009	21.535	21.910	22.296	22.549	22.734	22.862
21-Jul-2009	21.683	21.996	22.327	22.498	22.648	22.774
18-Aug-2009	22.647	22.682	22.715	22.736	22.755	22.774
22-Sep-2009	23.008	23.025	23.055	23.085	23.126	23.127
21-Oct-2009	23.227	23.242	23.270	23.297	23.351	23.384
14-Dec-2009	22.951	22.990	23.009	23.013	23.015	23.016
20-Jan-2010	22.760	22.865	22.931	22.951	22.974	22.993
22-Feb-2010	22.517	22.601	22.673	22.711	22.727	22.730
15-Mar-2010	22.642	22.683	22.714	22.752	22.801	22.849
20-Apr-2010	22.531	22.550	22.570	22.588	22.629	22.683
17-May-2010	22.216	22.368	22.407	22.422	22.533	22.634
22-Jun-2010	22.089	22.157	22.207	22.219	22.223	22.227
21-Jul-2010	22.222	22.223	22.223	22.223	22.223	22.223
18-Aug-2010	22.289	22.289	22.289	22.290	22.362	22.382
22-Sep-2010	22.368	22.499	22.595	22.670	22.752	22.840
19-Oct-2010	22.707	22.765	22.835	22.886	22.942	22.987
16-Nov-2010	22.918	22.920	22.923	22.929	22.949	22.965
21-Dec-2010	22.834	22.864	22.891	22.917	22.938	22.948
19-Jan-2011	21.172	21.857	22.362	22.546	22.607	22.683
23-Feb-2011	22.370	22.408	22.446	22.464	22.482	22.514
22-Mar-2011	22.142	22.261	22.431	22.529	22.651	22.766
19-Apr-2011	21.599	21.753	21.920	22.023	22.110	22.148
17-May-2011	21.398	21.505	21.840	22.015	22.077	22.086
21-Jun-2011	21.878	22.014	22.149	22.214	22.275	22.340
19-Jul-2011	22.103	22.172	22.237	22.271	22.308	22.377
16-Aug-2011	22.140	22.220	22.275	22.320	22.449	22.517
20-Sep-2011	22.373	22.419	22.490	22.531	22.576	22.659
18-Oct-2011	22.683	22.733	22.765	22.797	22.856	22.901
29-Nov-2011	23.013	23.020	23.024	23.044	23.098	23.165
20-Dec-2011	22.963	22.964	22.965	22.968	22.975	22.988
26-Jan-2012	22.974	22.988	23.025	23.067	23.157	23.282
23-Feb-2012	22.874	22.884	22.893	22.938	22.992	23.021
22-Mar-2012	22.614	22.619	22.637	22.671	22.701	22.723
17-Apr-2012	21.973	22.258	22.407	22.441	22.461	22.475
22-May-2012	21.776	21.797	21.861	21.898	21.914	21.926
19-Jun-2012	21.202	21.282	21.465	21.814	22.005	22.100
17-Jul-2012	21.419	21.569	21.786	21.944	22.026	22.038
21-Aug-2012	22.019	22.056	22.117	22.178	22.246	22.322
18-Sep-2012	22.393	22.430	22.470	22.497	22.529	22.546
18-Oct-2012	22.863	22.876	22.892	22.915	22.947	22.978
27-Nov-2012	21.781	22.005	22.319	22.599	22.802	22.872
27-Dec-2012	22.494	22.529	22.554	22.570	22.577	22.579
22-Jan-2013	22.486	22.499	22.511	22.520	22.528	22.541

Potential Density as sigma-t

Date	Depth (m) 0	5	15	25	35	45
20-Feb-2013	22.653	22.655	22.666	22.683	22.709	22.744
19-Mar-2013	22.494	22.511	22.629	22.724	22.800	22.848
15-Apr-2013	22.207	22.349	22.530	22.633	22.704	22.782
21-May-2013	19.773	21.051	21.984	22.370	22.490	22.612
17-Jun-2013	21.893	22.049	22.231	22.275	22.343	22.375
17-Jul-2013	21.345	21.558	21.911	22.035	22.201	22.326
27-Aug-2013	22.392	22.443	22.498	22.518	22.536	22.545
17-Sep-2013	22.602	22.613	22.626	22.634	22.650	22.666
22-Oct-2013	22.737	22.746	22.768	22.777	22.803	22.837
21-Nov-2013	22.428	22.742	23.102	23.120	23.155	23.232
17-Dec-2013	23.213	23.215	23.217	23.234	23.264	23.277
28-Jan-2014	22.858	23.021	23.073	23.118	23.118	23.131
06-Feb-2014	23.092	23.217	23.236	23.247	23.250	23.261
18-Mar-2014	21.346	21.654	22.432	22.600	22.706	22.709
21-Apr-2014	21.584	21.706	22.319	22.370	22.453	22.606
06-May-2014	21.022	21.586	22.232	22.283	22.481	22.571
20-May-2014	21.725	21.963	22.018	22.172	22.214	22.291
03-Jun-2014	21.634	21.752	22.034	22.091	22.239	22.354
17-Jun-2014	21.871	21.986	22.092	22.226	22.314	22.440
08-Jul-2014	20.295	21.199	21.915	22.016	22.058	22.172
22-Jul-2014	21.993	22.091	22.161	22.185	22.195	22.201
09-Sep-2014	22.393	22.414	22.449	22.468	22.494	22.566
23-Sep-2014	22.453	22.509	22.562	22.584	22.619	22.629
07-Oct-2014	22.742	22.754	22.780	22.791	22.802	22.809
21-Oct-2014	22.609	22.632	22.693	22.745	22.860	22.939
04-Nov-2014	22.215	22.242	22.680	22.820	22.832	22.837
18-Nov-2014	21.556	22.267	22.478	22.536	22.643	22.687
16-Dec-2014	20.343	21.965	22.321	22.387	22.437	22.503
21-Jan-2015	21.717	22.150	22.184	22.230	22.280	22.305
03-Feb-2015	21.932	21.964	21.992	22.001	22.043	22.072
18-Feb-2015	19.387	20.093	20.980	21.621	21.814	21.893
18-Mar-2015	21.973	21.985	21.988	22.037	22.041	22.063
07-Apr-2015	22.148	22.182	22.233	22.266	22.285	22.288
21-Apr-2015	22.072	22.119	22.219	22.255	22.319	22.337
06-May-2015	22.096	22.130	22.150	22.199	22.444	22.463
19-May-2015	22.120	22.182	22.335	22.391	22.497	22.580
03-Jun-2015	22.173	22.214	22.223	22.232	22.281	22.372
16-Jun-2015	22.216	22.235	22.242	22.303	22.411	22.460
07-Jul-2015	22.268	22.278	22.314	22.336	22.397	22.491
23-Jul-2015	22.097	22.233	22.330	22.384	22.397	22.464
04-Aug-2015	22.332	22.369	22.480	22.541	22.558	22.609
18-Aug-2015	22.435	22.468	22.527	22.647	22.701	22.811
09-Sep-2015	22.553	22.584	22.634	22.657	22.666	22.686
22-Sep-2015	22.669	22.719	22.790	22.805	22.930	22.953
06-Oct-2015	22.870	22.870	22.892	22.907	22.937	22.982
20-Oct-2015	22.155	22.930	22.975	22.999	23.002	23.020
03-Nov-2015	22.501	22.617	22.773	22.937	23.131	23.155
18-Nov-2015	22.193	22.321	22.495	22.822	22.915	22.948
15-Dec-2015	21.690	22.277	22.421	22.491	22.544	22.565
20-Jan-2016	22.285	22.316	22.349	22.357	22.402	22.471
02-Feb-2016	21.033	21.626	22.214	22.261	22.288	22.357
17-Feb-2016	21.527	21.832	22.062	22.120	22.146	22.206
08-Mar-2016	21.202	21.586	21.630	21.779	21.797	21.815
22-Mar-2016	21.629	21.677	21.703	21.720	21.830	21.872
05-Apr-2016	18.400	20.974	21.092	21.446	21.633	21.728
19-Apr-2016	21.527	21.572	21.675	21.708	21.781	21.786
03-May-2016	20.233	20.792	21.367	21.519	21.617	21.698
17-May-2016	21.496	21.527	21.613	21.645	21.766	21.800
07-Jun-2016	21.876	21.902	21.955	22.063	22.081	22.203
21-Jun-2016	21.857	21.871	21.984	22.054	22.146	22.147
06-Jul-2016	22.043	22.109	22.122	22.139	22.198	22.340
19-Jul-2016	21.761	21.928	22.083	22.089	22.188	22.203
02-Aug-2016	22.209	22.209	22.212	22.226	22.316	22.337
16-Aug-2016	22.143	22.169	22.177	22.254	22.355	22.420
07-Sep-2016	22.461	22.494	22.578	22.604	22.648	22.685
20-Sep-2016	22.730	22.742	22.765	22.789	22.801	22.949
04-Oct-2016	22.853	22.853	22.854	22.900	22.904	22.916
18-Oct-2016	22.971	22.982	23.015	23.028	23.041	23.089
08-Nov-2016	22.083	22.331	22.633	22.706	22.779	22.872
22-Nov-2016	22.662	22.671	22.703	22.708	22.716	22.753
21-Dec-2016	22.544	22.545	22.546	22.550	22.559	22.578
24-Jan-2017	22.719	22.723	22.734	22.735	22.756	22.779
07-Feb-2017	22.808	22.808	22.808	22.809	22.812	22.817
22-Feb-2017	21.998	22.175	22.239	22.340	22.566	22.705
07-Mar-2017	22.457	22.467	22.480	22.482	22.506	22.540
21-Mar-2017	20.185	21.224	22.257	22.336	22.458	22.579
04-Apr-2017	21.019	21.660	21.974	22.062	22.093	22.193
18-Apr-2017	21.799	21.807	21.813	21.877	21.983	22.030
02-May-2017	21.652	21.812	21.877	21.934	21.970	22.045
16-May-2017	20.720	21.051	21.742	21.876	21.938	22.076
07-Jun-2017	20.336	21.027	21.307	21.522	21.805	21.928
20-Jun-2017	21.605	21.624	21.683	21.704	21.718	21.757
06-Jul-2017	20.347	20.727	21.505	21.652	21.678	21.760
18-Jul-2017	21.545	21.559	21.576	21.620	21.712	21.770
08-Aug-2017	21.792	21.809	21.851	21.891	22.062	22.308
29-Aug-2017	22.024	22.041	22.077	22.184	22.221	22.244
06-Sep-2017	22.189	22.197	22.206	22.215	22.259	22.391
20-Sep-2017	22.508	22.514	22.541	22.547	22.555	22.617
02-Oct-2017	22.430	22.490	22.543	22.559	22.628	22.723

Potential Density as sigma-t						
	Depth (m)					
Date	0	5	15	25	35	45
18-Oct-2017	22.950	22.954	22.959	22.970	23.005	23.031
07-Nov-2017	22.950	22.957	22.964	22.993	23.020	23.026
21-Nov-2017	23.087	23.169	23.186	23.205	23.216	23.232
19-Dec-2017	22.722	22.723	22.728	22.745	22.769	22.769
17-Jan-2018	22.349	22.428	22.512	22.541	22.587	22.641
06-Feb-2018	22.130	22.189	22.290	22.498	22.549	22.559
21-Feb-2018	21.723	21.923	22.180	22.253	22.286	22.356
06-Mar-2018	22.822	22.827	22.838	22.838	22.850	22.859
20-Mar-2018	22.596	22.604	22.633	22.653	22.672	22.696
03-Apr-2018	22.606	22.612	22.637	22.644	22.648	22.664
17-Apr-2018	22.502	22.502	22.507	22.519	22.571	22.618
08-May-2018	21.587	21.880	22.096	22.189	22.285	22.447
22-May-2018	21.778	21.907	22.060	22.093	22.121	22.209
05-Jun-2018	21.910	21.990	22.000	22.085	22.123	22.177
19-Jun-2018	22.131	22.172	22.210	22.262	22.270	22.291
10-Jul-2018	22.141	22.166	22.194	22.219	22.252	22.264
24-Jul-2018	22.208	22.227	22.294	22.348	22.352	22.376
21-Aug-2018	22.301	22.303	22.314	22.316	22.416	22.456
05-Sep-2018	22.527	22.531	22.532	22.542	22.562	22.589
18-Sep-2018	22.699	22.716	22.793	22.819	22.833	22.854
03-Oct-2018	22.835	22.845	22.881	22.891	22.904	22.913
16-Oct-2018	23.050	23.054	23.060	23.080	23.089	23.097
14-Nov-2018	22.660	22.688	22.945	22.999	23.097	23.120
27-Nov-2018	23.162	23.175	23.210	23.226	23.229	23.236

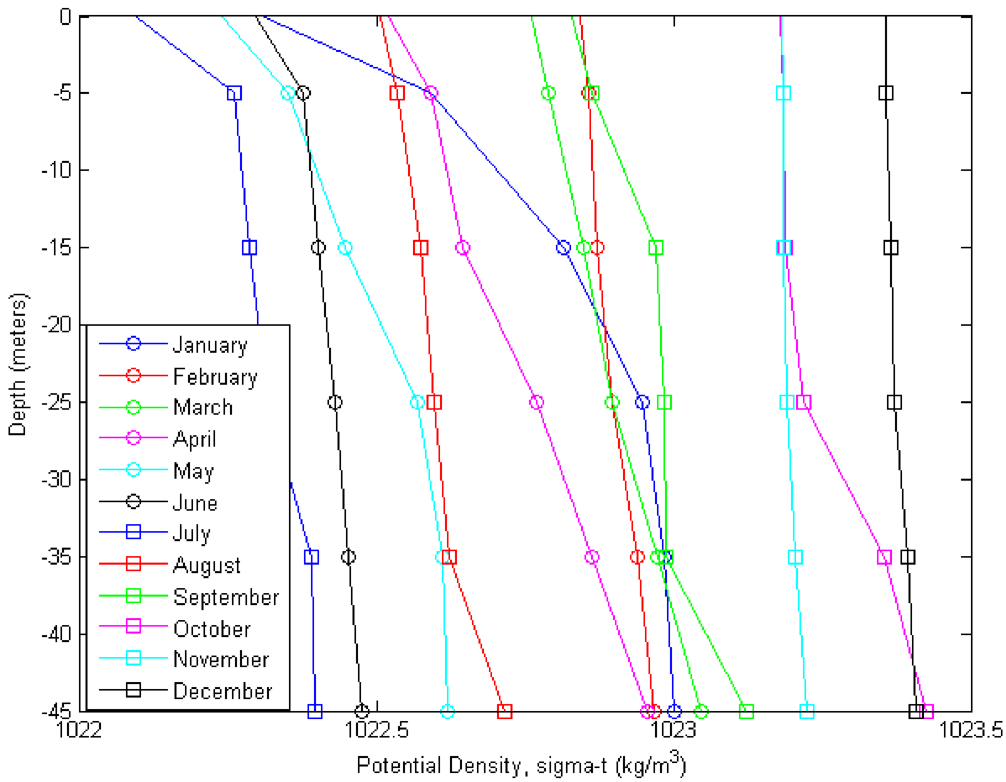
Table 2. Discharge Events from Alki CSO TP

Event Starting Date/Time	Event Ending Date/Time	Duration (hours)	Volume (million gallons)	Peak Instantaneous Flow (mgd)	24-hour average flow (mgd)
1/11/2014	1/11/2014	2.1	0.49		0.5
2/16/2014	2/17/2014	11.6	11.30		11.9
3/5/2014	3/6/2014	23.5	26.27		24.4
3/8/2014	3/10/2014	25.7	17.13		11.7
11/28/2014	11/28/2014	9.2	10.50		10.6
12/23/2014	12/24/2014	6.0	5.68		6.2
3/15/2015	3/16/2015	13.8	0.00		30.5
11/14/2015	11/15/2015	25.6	0.00		39.2
12/7/2015	12/10/2015	49.7	0.00		49.8
12/18/2015	12/18/2015	3.2	0.00		3.2
1/21/2016	1/22/2016	20.4	30.51		31.4
1/28/2016	1/28/2016	10.3	15.57		15.6
3/9/2016	3/10/2016	9.2	8.81		8.8
10/14/2016	10/14/2016	6.7	9.35		9.3
10/20/2016	10/20/2016	2.7	3.02		3.0
10/26/2016	10/27/2016	2.3	2.75		2.7
1/17/2017	1/19/2017	26.7	0.00	70.1	26.4

2/9/2017*	2/11/2017	49.5	0.00	50.1	22.2
2/15/2017*	2/16/2017	42.0	0.00	50.6	40.4
3/9/2017*	3/10/2017	3.1	0.00	18.3	1.9
3/14/2017*	3/15/2017	23.6	0.00	58.5	17.9
3/17/2017*	3/18/2017	21.5	0.00	63.4	0.0
3/29/2017*	3/29/2017	2.3	0.00	48.0	1.4
4/12/2017*	4/13/2017	7.7	0.00	57.5	4.8
11/21/2017	11/22/2017	4.3	0.00	60.2	3.2
12/19/2017	12/19/2017	6.2	0.00	63.4	7.5
12/29/2017	12/29/2017	5.2	0.00	40.0	3.7
1/11/2018	1/11/2018	1.4	0.00	32.2	0.7
1/29/2018	1/29/2018	6.3	0.00	33.5	4.6
4/14/2018	4/15/2018	7.1	0.00	60.8	14.1

* - events exacerbated by the West Point flooding and subsequent recovery

Figure 1. Sigma-t Profile for Central Basin Station KSBP01



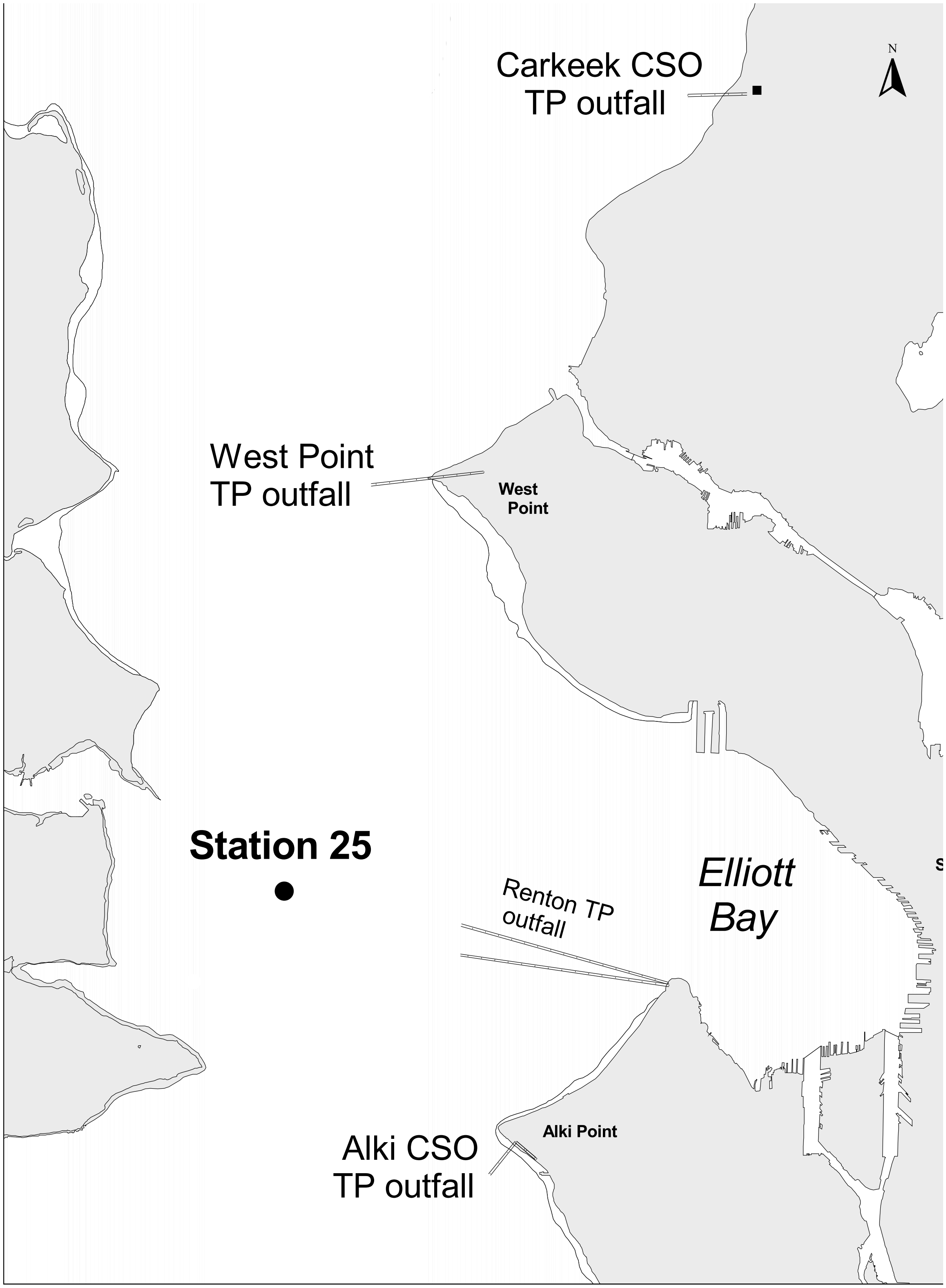


Figure 2. Location of Current Meter Station 25

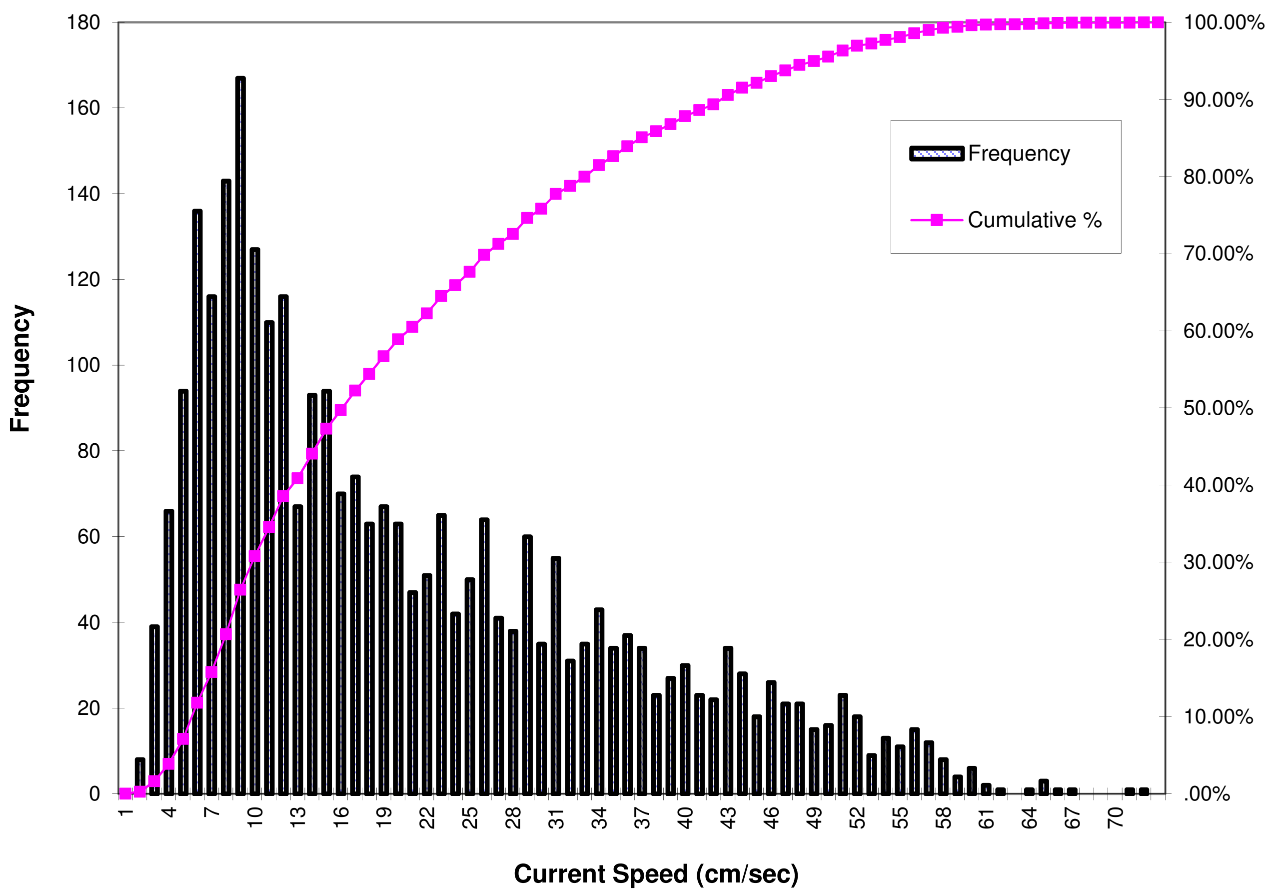


Figure 3. Histogram for Currents at 22 m (Station 25, 30 Day Duration)

PLUMES Output

Minimum Acute Dilution: 90 percentile current speed, simulated as half of the flow with downstream facing ports. Individual port plumes do not merge before Acute Mixing Zone. Discharge flow of 68 mgd.

```
/ UM3. 12/7/2018 9:07:07 AM
Case 1; ambient file
M:\user\nairn\p\plumes\vplumes\Alki\Alki2018\Alki.001.db; Diffuser
table record 1: ---------------------------------

Ambient Table:
     Depth   Amb-cur   Amb-dir   Amb-sal   Amb-tem   Amb-pol     Decay
Far-spd   Far-dir   Disprsn   Density
         m       m/s       deg       psu         C     kg/kg       s-1
m/s       deg  m0.67/s2   sigma-T
       0.0      0.43      90.0     30.43     12.51       0.0       0.0
0.05       0.0   0.00003     22.98
      15.0      0.43      90.0     30.46     12.46       0.0       0.0
0.05       0.0   0.00003     23.01
      25.0      0.43      90.0     30.48     12.44       0.0       0.0
0.05       0.0   0.00003     23.03
      35.0      0.43      90.0     30.49     12.42       0.0       0.0
0.05       0.0   0.00003     23.04
      55.0      0.43      90.0     30.51      12.4       0.0       0.0
0.05       0.0   0.00003     23.06
     100.0      0.43      90.0     30.51      12.4       0.0       0.0
0.05       0.0   0.00003     23.06

Diffuser table:
   P-dia  P-elev V-angle H-angle   Ports Spacing SttTime EndTime
Incrmnt AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (ft)   (deg)(Surv-deg)      ()    (ft)     (s)     (s)
(s)    (ft)    (ft)    (ft)   (MGD)   (psu)     (C) (kg/kg)
    12.0     6.0     0.0     0.0     4.0    40.0     3.0   856.0
3.0    34.3   343.0   142.0    34.0     0.0     7.2   100.0
   P-dia  P-elev V-angle H-angle   Ports Spacing SttTime EndTime
Incrmnt AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (ft)   (deg)(Surv-deg)      ()    (ft)     (s)     (s)
(s)    (ft)    (ft)    (ft)   (MGD)   (psu)     (C) (kg/kg)
    12.0     6.0     0.0     0.0     4.0    40.0     3.0   856.0
3.0    34.3   343.0   142.0    34.0     0.0     7.2   100.0

Simulation:
Froude number:      19.43; effluent density (sigma-T)-0.042020668;
effluent velocity     5.104(m/s);
        Depth  Amb-cur    P-dia  Polutnt   Dilutn   x-posn   y-posn
Step     (ft)    (m/s)     (in)  (kg/kg)       ()     (ft)     (ft)
   0     142.0     0.43     12.0    100.0      1.0      0.0      0.0;
 100     141.5     0.43    69.17     13.8    7.103      0.0    14.39;
 143     138.8     0.43    130.0    5.891    16.61      0.0    34.32;
acute zone;
 200     130.2     0.43    265.4    1.905    51.32      0.0    72.83;
 254     116.1     0.43    482.7    0.654    149.5      0.0    134.7;
merging;
 300     89.71     0.43   1013.7    0.263    371.7      0.0    266.2;
 315     74.42     0.43   1350.1    0.195    500.2      0.0    346.3;
chronic zone;
```

```
 323     64.28     0.43   1578.6    0.167    586.1      0.0    401.7;
surface;
Outside chronic zone
```

Minimum Chronic Dilution: 50 percentile current speed simulated with NRFIELD (RSB) mdoel. Discharge flow of 68 mgd (2.9784 m^3/s) with density profile from February 2015.

```
   202 : case 3 (NRFIELD)

   2.9784         8    0.3048    0.0000   43.6000
   0.1600   90.0000   12.2000
        6     0.999895    0.0000    7.2000
   0.0000 1.0193875   25.1970    9.4730    0.1600    0.0000
   5.0000 1.0200931   26.1450    9.7000    0.1600    0.0000
  15.0000 1.0209796   27.2880    9.7290    0.1600    0.0000
  25.0000 1.0216209   28.1110    9.7310    0.1600    0.0000
  35.0000 1.0218137   28.3540    9.7100    0.1600    0.0000
  45.0000 1.0218926   28.4540    9.7050    0.1600    0.0000
 Results:

 Lengthscale ratios       s/lb     lm/lb
                          .899      .459

   .24  = Froude number, u3/b, F

  32.4  = Height to wastefield top, ze (m)
  11.2  = Wastefield submergence below surface (m)
  28.8  = Wastefield thickness, he = (m)
  21.7  = Height to level of cmax, zm (m)
  71.6  = Mixing region length, xi (m)

    52.  = Minimum dilution, Sm
    60.  = Flux-average dilution, Sfa =1.15 x Sm
```

Effluent Dilution Modeling-Carkeek CSO Treatment Facility Marine Outfall

Prepared by: Bruce Nairn, King County WTD. January 2019

Model

Visual PLUMES

The UM3 and NRFIELD(RSB) model components of VISUAL PLUMES were used for this modeling effort. These models were chosen because the Carkeek CSO Treatment Facility outfall conforms to the conditions specified for the suggested use of both the RSB and UM models in Dilution Models for Effluent Discharges, 4th Edition . The RSB model is suitable for predicting chronic dilution ratios for outfalls with opposing-port configurations in marine waters. The simulated conditions include a buoyant plume discharging into a saline water column with a non-linear stratification profile, the predominant current normal to the axis of the outfall, a multiport diffuser with plume merging. The farfield predictions were used to model dilutions at the mixing zone boundary, for this purpose the assumptions of a constant eddy diffusivity were used, this was the more conservative assumption as opposed to the assumption that the dispersion coefficient is increasing according to the 4/3 power law, the other farfield option offered by the model.

The UM3 model was run separately for the diffuser ports discharging in the direction of the current and those ports discharging in a direction opposed to the current. The predicted plume trajectories show that the discharges do not merge before the Zone of Acute Criteria Exceedance (ZACE) for the 10th percentile currents. Under the 90th percentile currents, the plumes would merge before the ZACE, and thus this case was represented with all ports discharging in the direction of the current. The predicted dilutions for ports discharging in the direction of the current were always more conservative than those discharging into the current. Predicted dilutions for the chronic mixing zone were obtained from the RSB model. The RSB model predictions are approximately 10% more conservative than the UM model at the chronic mixing zone boundary. The depths modeled correspond to depths that have density observations, see below.

Ecology has provided new guidance (2015) on the methodology to determine the acute and chronic design flows for intermittent CSO discharges. The new methodology is summarized in Section 6.1.3, Appendix C of Ecology's *Water Quality Program Permit Writer's Manual* (Ecology, 2015). When effluent discharge is intermittent, the dilution factor is to be calculated with the maximum flow rate that can occur. The dilution factor generated using the maximum flow rate may then be adjusted upward by a ratio of the maximum flow to the appropriate time-averaged flow for the criterion being assessed. For aquatic life criteria, acute dilution factors are typically assessed using the maximum one-hour average flow. Chronic dilution factors are typically assessed using the maximum 4-day average flow. However, the appropriate flow averaging period varies per pollutant as described in the water quality standards (WAC 173-201A). Ecology's guidance lists the following flows to apply in these treated CSO dilution calculations:

- **Instantaneous:** the maximum instantaneous flow rate recorded (or projected over the next permit term)
- **One-hour:** the maximum one-hour flow rate recorded (or projected over the next permit term)
- **Equivalent 24-hour flow:** for each day with effluent discharge, calculate total volume discharged. Use the highest equivalent 24-hour flow.
- **Equivalent four-day flow:** highest total 4-day discharge event volume divided by 4 days. If the CSO discharge is less than four days, use highest total event volume divided by 4 days.

The dilution factor calculated under the maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow.

Previously, dilution factors were estimated by modeling the discharge at acute or chronic design flow, which were defined in Ecology's permit writer's manual as:

> For critical condition scenarios at the acute boundary, the flowrate to use is the highest equivalent twenty-four hour average for the past three years during the season in which the critical condition is likely to occur. If plant influent flows are expected to increase during the life of the permit, the highest daily maximum flow must be estimated.
> For critical condition scenarios at the chronic boundary, the flowrate to use is the highest equivalent monthly average flow (total volume of all discharge events in a month divided by the total hours of discharge in that month) for the past three years during the season in which the critical condition is likely to occur. If plant influent flows are expected to increase during the life of the permit, the highest average monthly flow must be estimated. For average condition (human health-based) scenarios, the flowrate to use is the annual equivalent average flow based on data provided in the permit application or DMR analysis.

These design conditions were applied, as summarized below.

	CSO INTERMITTENT DISCHARGE METHOD
ZACE	the event with the highest equivalent twenty-four hour average (total volume of event divided by total hours of event)
MIXING ZONE (CHRONIC) & NON-CARC.	the highest equivalent monthly average over the last three years of operation (total volume of all discharge events in a month

HUMAN HEALTH	divided by the total hours of discharge in that month)
CARCINOGENIC HUMAN HEALTH	The highest equivalent annual average flow over the last three years of operation (total volume of all discharge events in a year divided by the total days of discharge in that year)

This change in methodology has a significant impact in calculating the dilution factors. Additionally, the Permit Writer's Handbook (Appendix C, Section 6.1.3) recognizes that CSO treatment plant discharges are highly intermittent and highly variable in discharge volumes, durations, and pollutant concentrations, both between storms and during a single storm event. Therefore, direct comparisons of human health receiving water criteria with pollutant concentrations is not appropriate. It concludes that deriving numeric effluent limits for human health criteria is infeasible. As a result, dilution factors are not estimated for human health design criteria.

Modeling Conditions

Outfall

The Carkeek outfall ends in a multi-port diffuser at a depth of 59.5m (195 ft) MLLW. The diffuser is 50 feet in length, with 13 diffuser ports varying between 5.5-inches and 10.0-inches in diameter. The ports are equally spaced on alternating sides. A port diameter of 6.57 inches corresponds to the average port area. The ports discharge horizontally.

Density Structure

The data set used for characterizing the density structure is King County's CTD sampling station CK200P, located at the Carkeek Outfall, 47 42 45.54 N, 122 23 16.6 W. Seventeen years of monthly CTD casts have been recorded, with 0.5 vertical resolution. The data is summarized in Table 1 and Figure 1. The density profile was extrapolated from the depth of each CTD cast to the depth of the outfall as a constant value.

Ambient Currents

The data set chosen for ambient currents was taken from an ADCP current meter study conducted in the vicinity of the Carkeek Outfall in May 2001. Station 43 (see Figure 2) is located approximately 4500 feet north of the outfall at 47 43 27.47 N, 122 23 3.46 W (1258970.2 E, 268048.3 N WA State Plane North) at a depth of 91m. The meter collected data at 60 minute intervals for approximately 4 weeks with a 2 meter vertical resolution. A histogram was constructed and the 10^{th} and 90^{th} percentile current (approximately 2 cm/s and 15 cm/s) were selected as the critical condition. The ADCP collected limited data above 40m; the current speeds were applied uniformly through the water column. The 50th percentile current speed was 5 cm/s.

Plant Flows

As stated earlier, critical plant flows were determined using the intermittent discharge method. Plant flows were analyzed for the four and a half year period of January 2014 through June 2018. Discharge events between February 2017 and April 2017 were exacerbated by the West Point flooding and subsequent recovery, and are thus excluded from the analysis as they are not characteristic discharges.

- **Instantaneous:** the maximum instantaneous flow rate was 22.2 mgd during events on 1/21/2016 and 1/27/2017.
- **One-hour:** the maximum one-hour flow rate was 19.3 mgd on 1/21/2016.
- **Equivalent 24-hour flow:** for each day with effluent discharge, the total volume discharged was calculated. The highest equivalent 24-hour flow was 12.8 mgd on January 21, 2016. February – April 2017 was excluded from this analysis due to additional flow diverted to Carkeek due to West Point flooding.
- **Equivalent four-day flow:** highest total 4-day discharge event volume was 12.4 MG from January 17 – 20, 2017. Divided by 4 days, the equivalent four-day flow is 3.1 mgd. February – April 2017 was excluded from this analysis due to additional flow diverted to Carkeek due to West Point flooding.

The discharge events from the Carkeek CSO treatment plant are tabulated in Table 2.

Critical Conditions-Selected Cases-Decision Path and Ecology Guidance

Zone of Acute Criteria Exceedance (ZACE) 39.5 ft or 12.0 m

Ecology guidance recommends that the critical receiving water condition be determined. Using the intermittent discharge method, the peak instantaneous observed flow was 22.2 mgd. Therefore, the flow from this event was used for determining the ZACE dilution for the Carkeek facility. Ecology guidance also required modeling to be performed using the 10th and 90th percentile current values. These current conditions yielded velocities of 2 cm/sec and 15 cm/s.

Dilution was modeled with all ports discharging with the current, half the ports discharging with the current, and half the ports discharging into the current. The Carkeek diffuser has an end port directed offshore, so modeling the ports orientated in one direction was done with 6 ports and 6/13ths of the flow (10.25 mgd). Dilution was always lower for ports discharging with the current than into the current. Under the 10th percentile current speed conditions, the effluent plume from ports discharging into the current was never predicted to overlap with the plume from ports discharging into the current within the acute mixing zone. At this current speed, a minimum dilution of 43:1 was predicted for the ports discharging with the current.

Under the 90th percentile current speed conditions, the effluent plume from ports discharging into the current was predicted to overlap with the plume from ports discharging into the current within the acute mixing zone in approximately 7% of the density profiles. The density profiles that resulted in overlapping of the opposing discharge ports occurred during the summer months, primarily May to September. While Carkeek is unlikely to discharge at peak capacity during this summer period, it is possible and thus overlapping plumes is used as the critical condition. Since the plumes from the upstream and downstream ports merge near the acute mixing zone, modeling the discharge with all ports discharging with the current is overly conservative. The minimum dilution predicted with all ports discharging downstream was 30:1. Instead, the concentration from the upstream plume is assumed to be the ambient concentration for the downstream plume. Under these conditions, this will be a conservative approximation as much of the dilution occurs before the plumes overlap, while this assumes all entrainment into the downstream plume is from the upstream plume. The dilution equation can be written to find an equivalent dilution factor for this assumption as follows:

The dilution equation determines the plume concentration (Cp) from the ambient concentration (Ca), effluent concentration (Ce), and dilution factor (DF) as:

$$C_p = \frac{C_e}{DF} + \left(1 - \frac{1}{DF}\right) C_a$$

Using the concentration of the plume from the upstream facing ports (C_e/DF_{up}) as the ambient concentration for the downstream facing ports

$$C_p = \frac{C_e}{DF} + \left(1 - \frac{1}{DF}\right) \frac{C_e}{DF_{up}} = \frac{C_e}{DF_{eq}}$$

Rearranging, an equivalent dilution factor (DF_{eq}) can be found as:

$$DF_{eq} = \frac{DF \cdot DF_{up}}{DF + DF_{up} + 1}$$

With this assumption, a maxQ dilution factor of 35:1 was predicted at the acute mixing zone. Applying a peak one-hour flow rate of 19 mgd results in a one-hour dilution factor of 41:1.

Chronic Mixing Zone: 395 ft or 120 m at Carkeek

The maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow.

The maximum discharge rate of 22.2 MGD was used to model the dilution at the chronic mixing zone. Ecology guidance defines the 50th percentile current velocity as the critical receiving water current velocity for aquatic life chronic. The 50th percentile current (5 cm/s) showed a dilution in the far field of approximately 59:1 for September receiving water conditions.

Dilution at the chronic mixing zone is determined by scaling the dilution at maximum discharge rate by the ratio of the 24-hour (12.8 mgd) or 4-day flow (3.1 mgd) to the maximum flow rate (22.2 mgd). This results in chronic dilution values of 102 and 420.

<u>Summary</u>

ZACE

The dilution at the ZACE for the critical conditions detailed above yielded a dilution at the ZACE (10.4 m) of **35:1** (instantaneous) and **41:1** (1-hour) with merging of the discharge from the opposing ports.

Chronic Mixing Zone

The dilution at the chronic mixing zone (104 m) for the critical conditions described above yielded a dilution of **102:1** (24-hour) and **420:1** (4-day).

Table 1. Ambient Density at Carkeek (Station LSKQ06)

	Potential Density as sigma-t			
			Depth (m)	
Date	0	15	35	55
25-Jan-1999	18.646	22.240	22.456	22.460
19-Jun-2000	18.680	22.100	22.366	22.514
17-Jul-2000	21.551	22.281	22.350	22.474
21-Aug-2000	22.251	22.395	22.534	22.826
18-Sep-2000	22.483	22.659	22.813	23.066
23-Oct-2000	22.843	22.963	23.274	23.328
29-Nov-2000	23.056	23.253	23.347	23.411
20-Dec-2000	23.408	23.492	23.538	23.550
17-Jan-2001	23.361	23.493	23.526	23.540
20-Feb-2001	23.470	23.518	23.526	23.533
21-Mar-2001	23.367	23.483	23.534	23.552
16-Apr-2001	21.137	23.362	23.406	23.427
22-May-2001	22.109	22.934	23.306	23.355
18-Jun-2001	20.556	22.721	23.087	23.262
23-Jul-2001	22.634	22.725	22.833	22.886
20-Aug-2001	22.692	22.798	22.981	23.017
24-Sep-2001	22.901	23.032	23.076	23.131
23-Oct-2001	22.937	23.287	23.337	23.498
19-Nov-2001	21.499	23.088	23.306	23.438
17-Dec-2001	21.602	23.026	23.081	23.129
29-Jan-2002	21.904	22.558	22.612	22.624
20-Feb-2002	21.206	22.507	22.581	22.687
21-Mar-2002	22.458	22.505	22.541	22.688
22-Apr-2002	19.314	22.355	22.730	22.964
28-May-2002	20.609	21.868	22.589	22.748
24-Jun-2002	19.844	22.265	22.362	22.688
22-Jul-2002	20.895	22.105	22.250	22.708
27-Aug-2002	22.323	22.397	22.610	22.898
23-Sep-2002	22.667	22.792	22.858	22.944
21-Oct-2002	22.970	23.096	23.161	23.198
18-Nov-2002	23.266	23.443	23.488	23.575
17-Dec-2002	22.804	23.453	23.516	23.516
22-Jan-2003	6.279	23.255	23.294	23.327
25-Feb-2003	22.817	22.920	22.962	22.986
25-Mar-2003	19.792	22.614	22.783	22.840
28-Apr-2003	22.077	22.415	22.467	22.518
28-May-2003	21.924	22.384	22.447	22.652
24-Jun-2003	20.661	22.205	22.572	22.715
29-Jul-2003	20.708	22.280	22.522	22.550
26-Aug-2003	22.008	22.365	22.736	22.922
30-Sep-2003	22.645	22.870	23.202	23.344
29-Oct-2003	21.579	21.885	22.909	23.159
19-Nov-2003	22.702	22.927	22.941	22.946
19-Nov-2003	22.888	22.904	22.939	22.948
16-Dec-2003	22.641	22.889	23.003	23.073
21-Jan-2004	22.591	22.812	22.853	22.887
22-Mar-2004	22.117	22.543	22.600	22.620
27-Apr-2004	22.072	22.604	22.732	22.752
29-Jun-2004	21.178	22.431	22.744	22.781
28-Jul-2004	22.054	22.375	22.462	22.881
24-Aug-2004	21.807	22.516	22.666	22.899
28-Sep-2004	21.982	22.654	22.790	22.820
27-Oct-2004	23.025	23.065	23.094	23.175
16-Nov-2004	22.856	23.208	23.211	23.247
20-Dec-2004	19.922	22.818	23.032	23.124
24-Jan-2005	21.526	22.593	23.030	23.074
28-Feb-2005	22.773	22.807	22.848	22.866
28-Mar-2005	22.835	22.893	22.910	22.926
25-Apr-2005	21.772	22.652	22.862	22.875
23-May-2005	21.764	22.554	22.650	22.845
28-Jun-2005	21.900	22.332	22.517	22.810
20-Jul-2005	21.551	22.275	22.405	22.598
22-Aug-2005	22.402	22.521	22.538	22.678
26-Sep-2005	22.790	22.895	23.059	23.178
24-Oct-2005	23.129	23.268	23.377	23.454
28-Nov-2005	22.757	23.067	23.157	23.213
19-Dec-2005	23.272	23.352	23.367	23.424
07-Feb-2006	19.315	21.890	22.515	22.570
01-Mar-2006	22.108	22.260	22.334	22.475
27-Mar-2006	22.421	22.594	22.639	22.845
24-Apr-2006	21.466	22.304	22.617	22.672
30-May-2006	21.703	22.305	22.459	22.594
26-Jun-2006	21.343	21.956	22.208	22.412
24-Jul-2006	21.511	22.162	22.327	22.765
22-Aug-2006	22.093	22.281	22.462	22.633
25-Sep-2006	22.800	22.916	23.002	23.025
23-Oct-2006	23.087	23.270	23.328	23.355
29-Nov-2006	21.791	22.772	23.160	23.213
18-Dec-2006	21.624	22.436	23.019	23.200
16-Jan-2007	20.260	22.066	22.569	22.730
22-Feb-2007	22.422	22.608	22.831	22.917
19-Mar-2007	20.982	22.176	22.676	22.745
16-Apr-2007	21.607	22.230	22.431	22.706

21-May-2007	21.909	22.318	22.467	22.620
18-Jun-2007	22.183	22.344	22.392	22.621
16-Jul-2007	21.891	22.263	22.447	22.559
20-Aug-2007	21.995	22.387	22.671	22.854
17-Sep-2007	22.433	22.630	22.836	23.026
15-Oct-2007	22.642	22.886	23.073	23.131
26-Nov-2007	22.999	23.086	23.173	23.185
17-Dec-2007	22.259	22.790	23.081	23.152
28-Jan-2008	22.894	22.959	22.997	23.005
25-Feb-2008	21.982	22.880	23.062	23.088
19-Mar-2008	22.521	22.788	22.926	22.978
21-Apr-2008	22.340	22.924	23.011	23.151
19-May-2008	19.883	22.589	23.034	23.096
16-Jun-2008	19.319	22.146	22.709	22.995
21-Jul-2008	21.718	22.184	22.471	22.509
19-Aug-2008	21.837	22.027	22.616	23.009
15-Sep-2008	22.289	22.503	22.695	22.988
20-Oct-2008	22.994	23.112	23.192	23.373
17-Nov-2008	20.744	22.215	23.125	23.337
16-Dec-2008	23.194	23.210	23.234	23.261
20-Jan-2009	20.344	22.626	22.936	23.116
17-Feb-2009	23.049	23.126	23.198	23.231
16-Mar-2009	23.035	23.106	23.186	23.210
20-Apr-2009	22.021	22.940	23.127	23.422
18-May-2009	20.930	22.674	23.221	23.374
15-Jun-2009	20.606	22.356	22.899	23.100
20-Jul-2009	21.739	22.348	22.676	22.931
17-Aug-2009	22.250	22.691	22.909	23.122
21-Sep-2009	22.928	22.971	23.091	23.160
19-Oct-2009	23.167	23.232	23.279	23.330
17-Nov-2009	23.080	23.179	23.245	23.295
15-Dec-2009	22.813	22.913	22.999	23.044
19-Jan-2010	20.396	22.760	22.946	23.035
23-Feb-2010	20.424	22.491	22.696	22.760
17-Mar-2010	22.423	22.622	22.690	22.791
19-Apr-2010	20.461	22.481	22.733	22.793
18-May-2010	19.946	22.027	22.519	22.684
21-Jun-2010	20.002	22.153	22.474	22.596
20-Jul-2010	18.405	22.054	22.258	22.292
17-Aug-2010	20.696	22.299	22.520	22.775
21-Sep-2010	22.221	22.647	22.913	23.064
18-Oct-2010	22.258	22.900	23.044	23.159
15-Nov-2010	21.117	22.932	23.052	23.118
20-Dec-2010	21.660	22.572	22.948	23.015
18-Jan-2011	20.519	22.140	22.590	22.803
22-Feb-2011	21.763	21.950	22.479	22.715
21-Mar-2011	20.701	22.486	22.675	22.791
19-Apr-2011	19.332	21.598	22.295	22.343
16-May-2011	18.499	21.797	22.252	22.327
20-Jun-2011	19.564	21.839	22.143	22.408
18-Jul-2011	20.338	21.947	22.170	22.418
15-Aug-2011	21.150	22.057	22.344	22.547
19-Sep-2011	20.585	22.387	22.735	22.922
17-Oct-2011	21.875	22.657	22.977	23.063
28-Nov-2011	22.964	23.064	23.174	23.244
19-Dec-2011	22.664	22.949	23.030	23.081
23-Jan-2012	22.820	22.958	23.017	23.051
21-Feb-2012	20.118	22.589	22.772	22.849
19-Mar-2012	19.108	22.449	22.840	22.964
16-Apr-2012	20.739	22.348	22.561	22.612
21-May-2012	19.489	21.789	22.120	22.255
18-Jun-2012	20.598	21.503	22.138	22.377
16-Jul-2012	20.105	21.750	22.237	22.659
20-Aug-2012	21.829	22.049	22.268	22.571
17-Sep-2012	20.733	22.391	22.529	22.567
16-Oct-2012	21.290	22.807	22.976	23.075
26-Nov-2012	22.568	22.853	22.900	22.952
18-Dec-2012	21.732	22.494	22.648	22.660
22-Jan-2013	21.476	22.337	22.539	22.599
19-Feb-2013	21.603	22.520	22.691	22.734
18-Mar-2013	22.368	22.498	22.635	22.895
16-Apr-2013	20.143	22.171	22.703	22.889
20-May-2013	21.755	22.185	22.662	23.049
18-Jun-2013	18.962	22.049	22.424	22.715
15-Jul-2013	20.223	21.936	22.385	22.548
26-Aug-2013	22.260	22.450	22.705	22.916
16-Sep-2013	22.373	22.458	22.690	22.825
21-Oct-2013	22.546	22.670	22.818	23.007
18-Nov-2013	22.783	22.876	23.062	23.146
16-Dec-2013	23.001	23.179	23.224	23.247
21-Jan-2014	22.715	23.111	23.228	23.389
03-Feb-2014	23.239	23.242	23.252	23.337
19-Mar-2014	17.929	21.524	22.680	22.978
22-Apr-2014	21.074	22.183	22.268	22.715
07-May-2014	17.865	22.139	22.410	22.823
19-May-2014	21.002	21.850	22.143	22.455
04-Jun-2014	20.713	21.789	22.324	22.667
16-Jun-2014	21.573	21.896	22.083	22.442
07-Jul-2014	20.134	22.014	22.541	22.731
21-Jul-2014	21.618	22.150	22.192	22.239
04-Aug-2014	21.562	22.090	22.443	22.734
08-Sep-2014	20.876	22.370	22.386	22.596
22-Sep-2014	22.200	22.399	22.775	22.941

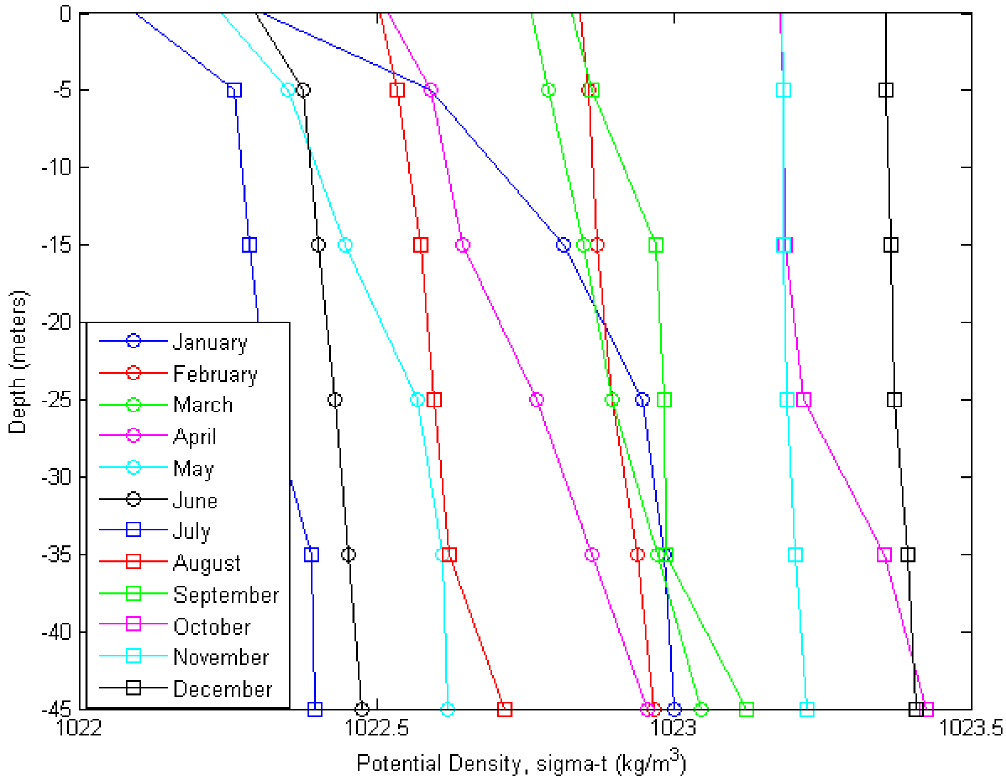
06-Oct-2014	22.660	22.724	22.794	22.850
20-Oct-2014	22.537	22.874	23.013	23.052
03-Nov-2014	19.088	22.780	22.915	22.954
17-Nov-2014	21.716	22.557	22.713	22.865
15-Dec-2014	21.141	22.238	22.572	22.729
20-Jan-2015	21.849	22.064	22.256	22.291
02-Feb-2015	20.149	22.036	22.108	22.206
17-Feb-2015	20.290	21.482	22.098	22.143
02-Mar-2015	21.612	21.832	21.913	22.005
23-Mar-2015	21.889	22.103	22.274	22.444
06-Apr-2015	21.781	22.118	22.147	22.258
20-Apr-2015	21.847	22.205	22.294	22.312
04-May-2015	21.832	22.278	22.323	22.371
18-May-2015	21.819	22.310	22.396	22.491
02-Jun-2015	21.350	22.342	22.486	22.502
15-Jun-2015	22.235	22.336	22.397	22.451
06-Jul-2015	21.913	22.326	22.388	22.640
20-Jul-2015	22.077	22.172	22.536	22.770
03-Aug-2015	22.363	22.398	22.478	22.595
17-Aug-2015	22.470	22.512	22.593	22.616
08-Sep-2015	22.294	22.620	22.682	22.921
21-Sep-2015	22.450	22.741	22.923	23.029
05-Oct-2015	22.921	22.958	22.990	23.096
19-Oct-2015	22.394	22.942	23.067	23.235
02-Nov-2015	22.697	23.019	23.195	23.230
19-Nov-2015	21.647	22.690	22.837	23.048
14-Dec-2015	22.287	22.490	22.562	22.654
19-Jan-2016	21.962	22.367	22.463	22.663
01-Feb-2016	20.441	22.140	22.241	22.495
16-Feb-2016	21.041	22.163	22.247	22.294
09-Mar-2016	20.696	21.884	21.960	21.970
21-Mar-2016	19.031	21.765	21.966	21.974
06-Apr-2016	18.305	21.343	21.864	21.897
18-Apr-2016	21.236	21.733	21.764	21.886
02-May-2016	19.641	21.420	21.885	22.140
16-May-2016	21.605	21.739	21.799	21.998
06-Jun-2016	21.674	22.026	22.075	22.126
20-Jun-2016	21.709	22.087	22.221	22.285
05-Jul-2016	21.854	22.098	22.269	22.338
18-Jul-2016	21.633	22.067	22.452	22.652
01-Aug-2016	22.062	22.168	22.291	22.456
15-Aug-2016	22.188	22.308	22.369	22.558
06-Sep-2016	22.329	22.538	22.821	23.000
19-Sep-2016	22.546	22.638	22.964	23.036
03-Oct-2016	22.657	22.683	22.790	22.843
17-Oct-2016	22.857	22.918	23.007	23.185
07-Nov-2016	22.215	22.769	22.882	22.929
21-Nov-2016	21.391	22.314	22.642	22.779
19-Dec-2016	22.046	22.342	22.350	22.355
23-Jan-2017	22.505	22.806	22.887	22.978
08-Feb-2017	21.887		22.846	22.872
21-Feb-2017	21.461	22.527	22.721	22.923
06-Mar-2017	22.065	22.517	22.586	22.624
20-Mar-2017	21.607	22.205	22.506	22.611
03-Apr-2017	19.844	21.615	22.224	22.352
17-Apr-2017	21.250	21.757	22.106	22.271
01-May-2017	21.089	21.624	22.088	22.301
15-May-2017	20.186	21.561	21.842	22.244
05-Jun-2017	17.406	21.697	21.833	22.157
19-Jun-2017	21.259	21.650	21.886	22.447
05-Jul-2017	20.499	21.669	21.946	22.091
17-Jul-2017	21.436	21.629	21.843	22.130
07-Aug-2017	21.481	21.961	22.195	22.309
28-Aug-2017	22.065	22.140	22.465	22.606
05-Sep-2017	22.144	22.269	22.502	22.599
19-Sep-2017	22.361	22.402	22.437	22.614
03-Oct-2017	22.418	22.550	22.821	23.071
17-Oct-2017	22.835	22.848	22.935	23.066
06-Nov-2017	22.787	22.942	23.115	23.211
20-Nov-2017	22.796	22.848	23.171	23.336
18-Dec-2017	22.644	22.716	22.755	22.771
16-Jan-2018	19.456	22.461	22.757	22.817
20-Feb-2018	19.791	22.137	22.367	22.617
05-Mar-2018	22.156	22.384	22.516	22.614
19-Mar-2018	22.369	22.572	22.631	22.659
02-Apr-2018	22.051	22.322	22.644	22.826
16-Apr-2018	21.131	22.522	22.677	22.892
07-May-2018	19.513	22.231	22.459	22.671
21-May-2018	21.315	22.128	22.223	22.371
04-Jun-2018	21.701	21.898	22.014	22.549
18-Jun-2018	21.999	22.226	22.500	22.703
09-Jul-2018	21.822	22.189	22.437	22.719
23-Jul-2018	22.001	22.298	22.366	22.456
20-Aug-2018	22.347	22.434	22.458	22.760
04-Sep-2018	22.532	22.624	22.678	23.036
17-Sep-2018	22.617	22.716	22.901	23.038
01-Oct-2018	22.736	22.834	23.026	23.277
15-Oct-2018	23.112	23.113	23.127	23.350
15-Nov-2018	22.246	23.107	23.257	23.330
26-Nov-2018	22.981	23.274	23.317	23.397

Table 2. Discharge Events from Carkeek CSO TP

Event Starting Date/Time	Event Ending Date/Time	Duration (hours)	Volume (million gallons)	Peak Instantaneous Flow (mgd)	24-hour average flow (mgd)
2/16/2014	2/17/2014	17.4	1.87	10.4	1.9
3/5/2014	3/6/2014	33.5	5.18	10.5	3.4
3/8/2014	3/9/2014	9.2	1.00	5.1	1.0
3/15/2015	3/16/2015	11.1	2.17	20.7	2.2
11/15/2015	11/15/2015	8.7	1.17	6.8	8.7
12/7/2015	12/10/2015	38.0	6.50	22.0	0.0
1/21/2016	1/23/2016	40.7	11.89	22.2	12.8
1/27/2016	1/28/2016	18.6	2.00	6.0	2.0
3/9/2016	3/10/2016	2.9	0.13	3.6	0.1
10/14/2016	10/14/2016	4.3	0.34	5.1	0.3
10/20/2016	10/21/2016	7.8	1.02	7.0	1.0
10/26/2016	10/27/2016	9.6	0.95	7.4	1.0
11/24/2016	11/25/2016	8.4	1.04	5.7	1.0
11/27/2016	11/27/2016	4.3	0.31	4.6	0.3
1/17/2017	1/20/2017	58.9	12.42	22.2	8.4
2/9/2017*	2/11/2017	69.2	25.62	26.1	18.6
2/15/2017*	2/17/2017	56.5	25.22	23.9	18.4
3/3/2017*	3/3/2017	5.5	0.70	7.1	0.7
3/9/2017*	3/9/2017	6.4	1.73	19.8	1.7
3/14/2017*	3/16/2017	29.5	4.58	20.3	3.3
3/17/2017*	3/19/2017	30.9	7.23	23.6	8.6
4/12/2017	4/12/2017	5.6	1.64	19.3	1.6
11/21/2017	11/22/2017	2.5	0.16	3.4	0.2
12/19/2017	12/19/2017	3.3	0.30	4.5	0.3
1/11/2018	1/11/2018	2.2	0.13	4.3	0.1
1/29/2018	1/29/2018	5.9	0.64	6.7	0.6
4/14/2018	4/15/2018	8.6	0.8	4.8	0.8

* - events exacerbated by the West Point flooding and subsequent recovery

Figure 1. Sigma-t Profile for Central Basin Station KSBP01



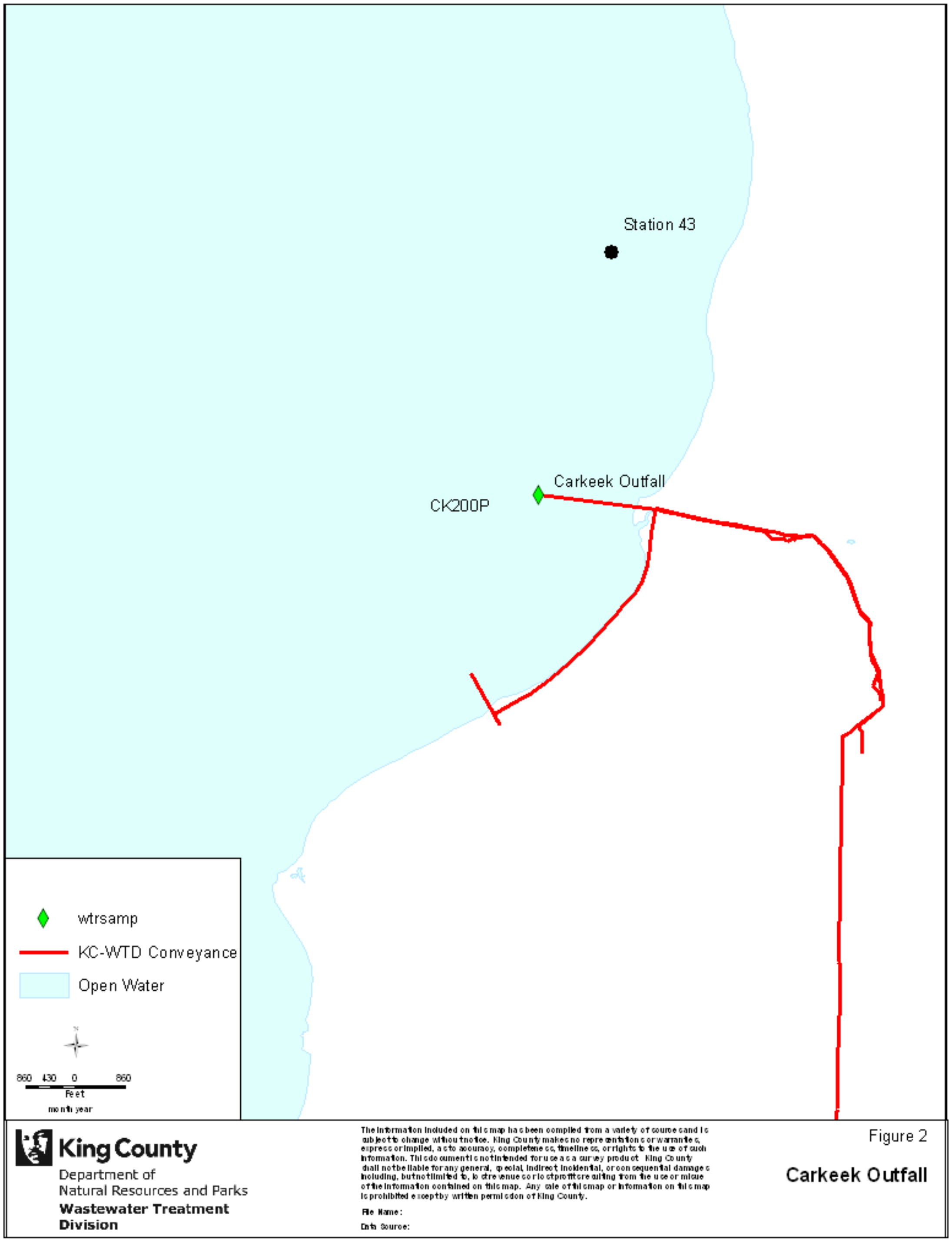


Figure 2. Location of Current Meter Station 43

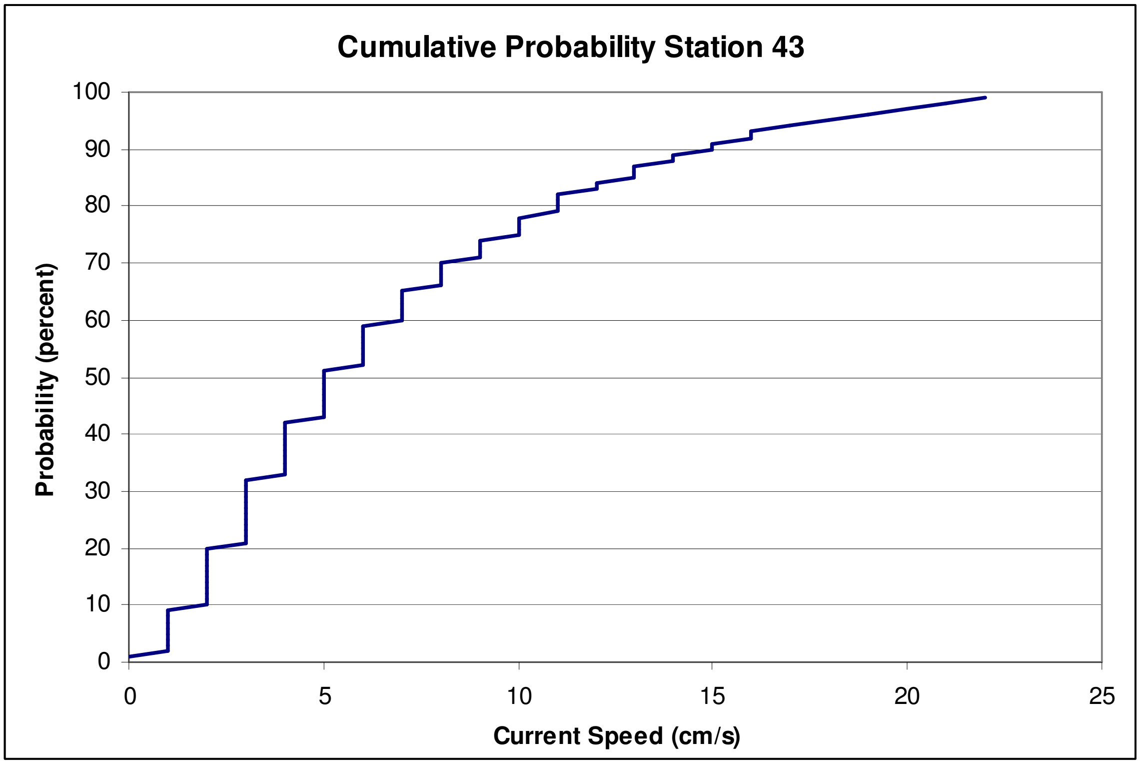


Figure 3. Histogram for Currents at all Depths, Station 43

PLUMES Output

Minimum Acute Dilution: 90 percentile current speed resulting in plumes from both sides of diffuser merging, simulated as all ports facing downstream. Discharge flow of 22.2 mgd. At the Acute mixing zone, the upstream plume is centered at a depth of 133.5 ft, with a radius of 55 ft that overlaps the downstream plume at a depth of 180 ft. Upstream dilution factor of 137 combined with downstream dilution factor of 47 creates an equivalent dilution factor of 35.

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/ UM3.
Case 236; ambient file M:\user\nairn\P\plumes\vplumes\Carkeek\Carkeek2018\Carkeek.001.db;
Diffuser table record 2: ---------------------------------
```

```
Ambient Table:
     Depth   Amb-cur   Amb-dir   Amb-sal   Amb-tem   Amb-pol     Decay   Far-spd   Far-
dir  Disprsn   Density
         m       m/s       deg       psu         C     kg/kg       s-1       m/s
deg  m0.67/s2   sigma-T
       0.0      0.15      90.0     28.07     11.74       0.0       0.0      0.15
0.0   0.00003     21.29
       5.0      0.15      90.0      28.3     11.29       0.0       0.0      0.15
0.0   0.00003     21.55
      15.0      0.15      90.0     28.42     11.05       0.0       0.0      0.15
0.0   0.00003     21.68
      25.0      0.15      90.0     28.54     10.78       0.0       0.0      0.15
0.0   0.00003     21.82
      35.0      0.15      90.0     28.64     10.63       0.0       0.0      0.15
0.0   0.00003     21.92
      45.0      0.15      90.0     28.74     10.55       0.0       0.0      0.15
0.0   0.00003     22.01
      55.0      0.15      90.0     29.27     10.25       0.0       0.0      0.15
0.0   0.00003     22.48
      65.0      0.15      90.0     29.34     10.25       0.0       0.0      0.15
0.0   0.00003     22.53

Diffuser table:
   P-dia  P-elev V-angle H-angle   Ports Spacing SttTime EndTime Incrmnt AcuteMZ ChrncMZ
P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (ft)   (deg)(Surv-deg)      ()    (ft)    (hr)    (hr)    (hr)    (ft)
(ft)    (ft)   (MGD)   (psu)     (C)  (kg/kg)
    6.57     1.0     0.0   180.0     6.0     8.0     3.0   800.0     3.0    39.5   395.0
195.0   10.25 1.00E-3     7.2   100.0

Simulation:
Froude number:      17.82; effluent density (sigma-T) -0.04123005; effluent velocity
3.422(m/s);
        Depth  Amb-cur    P-dia  Polutnt   Dilutn   x-posn   y-posn
Step     (ft)    (m/s)     (in)  (kg/kg)       ()     (ft)     (ft)
   0     195.0     0.15     6.57    100.0      1.0      0.0      0.0;
  67     194.9     0.15    25.87    26.53    3.707      0.0   -3.423; bottom hit;
 100     194.4     0.15     53.0    13.98    7.019      0.0   -7.262;
 142     192.7     0.15    84.76    9.009    10.88      0.0   -10.57; begin overlap;
 161     191.8     0.15    96.52    7.772     12.6      0.0   -11.49; merging;
 200     189.1     0.15    124.7     5.77    16.97      0.0   -12.93;
 218     187.2     0.15    143.4    4.877    20.07      0.0   -13.34; end overlap;
 300     156.5     0.15    520.7    1.236    79.14      0.0   -1.246;
 306     153.3     0.15    597.5    1.122    87.18      0.0    1.297; trap level;
 313     150.2     0.15    689.6    1.021    95.79      0.0    4.067; begin overlap;
 387     133.5     0.15   1326.1    0.713    137.1      0.0    39.81; acute zone;
 394     133.4     0.15   1334.9    0.711    137.6      0.0    43.38; local maximum rise
or fall;
Const Eddy Diffusivity.  Farfield dispersion based on wastefield width of      46.10 m
    conc  dilutn   width distnce    time
 (kg/kg)             (m)     (m)    (hrs) (kg/kg)   (s-1)   (m/s)(m0.67/s2)
 0.70982   137.8   47.01   120.0   0.198     0.0     0.0    0.15 3.00E-5
 0.71037   137.7   48.01   240.0    0.42     0.0     0.0    0.15 3.00E-5
count: 2

Downstream

/ UM3.
Case 236; ambient file M:\user\nairn\P\plumes\vplumes\Carkeek\Carkeek2018\Carkeek.001.db;
Diffuser table record 2: ---------------------------------

Ambient Table:
     Depth   Amb-cur   Amb-dir   Amb-sal   Amb-tem   Amb-pol     Decay   Far-spd   Far-
dir  Disprsn   Density
         m       m/s       deg       psu         C     kg/kg       s-1       m/s
deg  m0.67/s2   sigma-T
       0.0      0.15      90.0     28.07     11.74       0.0       0.0      0.15
0.0   0.00003     21.29
       5.0      0.15      90.0      28.3     11.29       0.0       0.0      0.15
0.0   0.00003     21.55
```

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      15.0      0.15      90.0     28.42     11.05       0.0       0.0      0.15
0.0   0.00003     21.68
      25.0      0.15      90.0     28.54     10.78       0.0       0.0      0.15
0.0   0.00003     21.82
      35.0      0.15      90.0     28.64     10.63       0.0       0.0      0.15
0.0   0.00003     21.92
      45.0      0.15      90.0     28.74     10.55       0.0       0.0      0.15
0.0   0.00003     22.01
      55.0      0.15      90.0     29.27     10.25       0.0       0.0      0.15
0.0   0.00003     22.48
      65.0      0.15      90.0     29.34     10.25       0.0       0.0      0.15
0.0   0.00003     22.53

Diffuser table:
   P-dia  P-elev V-angle H-angle   Ports Spacing SttTime EndTime Incrmnt AcuteMZ ChrncMZ
P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (ft)   (deg)(Surv-deg)      ()     (ft)    (hr)    (hr)    (hr)    (ft)
(ft)    (ft)   (MGD)   (psu)     (C)  (kg/kg)
    6.57     1.0     0.0     0.0     6.0     8.0     3.0   800.0     3.0    39.5   395.0
195.0   10.25 1.00E-3     7.2   100.0

Simulation:
Froude number:      17.82; effluent density (sigma-T) -0.04123005; effluent velocity
3.422(m/s);
        Depth  Amb-cur    P-dia  Polutnt   Dilutn   x-posn   y-posn
Step     (ft)    (m/s)     (in)  (kg/kg)       ()     (ft)     (ft)
   0     195.0     0.15     6.57    100.0      1.0      0.0      0.0;
  75     194.9     0.15    26.59    22.65     4.34      0.0    4.433; bottom hit;
 100     194.6     0.15    41.31     13.8    7.106      0.0    7.959;
 155     190.5     0.15    96.74    4.645    21.08      0.0    22.09; merging;
 196     180.0     0.15    217.4    2.062    47.44      0.0    39.84; acute zone;
 200     178.3     0.15    237.0    1.905    51.35      0.0    42.16;
 234     158.1     0.15    539.7    0.972    100.7      0.0    69.45; trap level;
 257     147.7     0.15    874.3    0.719    136.1      0.0     89.2; begin overlap;
 293     143.6     0.15   1087.6    0.636    153.7      0.0    113.5; local maximum rise
or fall;
Const Eddy Diffusivity.  Farfield dispersion based on wastefield width of      39.82 m
    conc  dilutn   width distnce    time
 (kg/kg)             (m)     (m)    (hrs) (kg/kg)   (s-1)   (m/s)(m0.67/s2)
 0.63519   154.0   40.51   120.0   0.158     0.0     0.0    0.15 3.00E-5
 0.63577   153.9   41.47   240.0    0.38     0.0     0.0    0.15 3.00E-5
count: 2
```

Minimum Chronic Dilution: 50 percentile current speed simulated with NRFIELD (RSB) mdoel. Discharge flow of 22.2 mgd (0.9724 m^3/s) with density profile from March 2014.

```
  165 : case 3 (NRFIELD)

  0.9724        13    0.1668    0.0000   59.5000
  0.0500   90.0000    2.4400
       8     0.999895    0.0000    7.2000
  0.0000 1.0179290   23.1220    8.2750    0.0500    0.0000
  5.0000 1.0194389   25.0660    8.3540    0.0500    0.0000
 15.0000 1.0215241   27.7040    8.1970    0.0500    0.0000
 25.0000 1.0225702   29.0030    7.9880    0.0500    0.0000
 35.0000 1.0226793   29.1360    7.9530    0.0500    0.0000
 45.0000 1.0229296   29.4410    7.8720    0.0500    0.0000
 55.0000 1.0229773   29.4990    7.8570    0.0500    0.0000
 65.0000 1.0231198   29.6730    7.8130    0.0500    0.0000
Results:

Lengthscale ratios       s/lb     lm/lb
                         .151      .248

  .01   = Froude number, u3/b, F

 40.8   = Height to wastefield top, ze (m)
 18.7   = Wastefield submergence below surface (m)
 30.6   = Wastefield thickness, he = (m)
 27.3   = Height to level of cmax, zm (m)
 32.4   = Mixing region length, xi (m)

   51.   = Minimum dilution, Sm
   59.   = Flux-average dilution, Sfa =1.15 x Sm
```

Effluent Dilution Modeling-Elliott West CSO Treatment Facility Marine Outfall

Prepared by: Bruce Nairn, King County WTD. January 2019

Model

Visual PLUMES

The UM3 model component of VISUAL PLUMES was used for this modeling effort. This models were chosen because the Elliott West CSO Treatment Plant outfall conforms to the conditions specified for the suggested use of the UM3 model in Dilution Models for Effluent Discharges, 4th Edition . The simulated conditions include a buoyant plume discharging into a saline water column with a non-linear stratification profile from a single port discharge. The farfield predictions were used to model dilutions at the mixing zone boundary, for this purpose the assumptions of a constant eddy diffusivity were used, this was the more conservative assumption as opposed to the assumption that the dispersion coefficient is increasing according to the 4/3 power law, the other farfield option offered by the model.

Ecology has provided new guidance (2015) on the methodology to determine the acute and chronic design flows for intermittent CSO discharges. The new methodology is summarized in Section 6.1.3, Appendix C of Ecology's *Water Quality Program Permit Writer's Manual* (Ecology, 2015). When effluent discharge is intermittent, the dilution factor is to be calculated with the maximum flow rate that can occur. The dilution factor generated using the maximum flow rate may then be adjusted upward by a ratio of the maximum flow to the appropriate time-averaged flow for the criterion being assessed. For aquatic life criteria, acute dilution factors are typically assessed using the maximum one-hour average flow. Chronic dilution factors are typically assessed using the maximum 4-day average flow. However, the appropriate flow averaging period varies per pollutant as described in the water quality standards (WAC 173-201A). Ecology's guidance lists the following flows to apply in these treated CSO dilution calculations:

- **Instantaneous:** the maximum instantaneous flow rate recorded (or projected over the next permit term)
- **One-hour:** the maximum one-hour flow rate recorded (or projected over the next permit term)
- **Equivalent 24-hour flow:** for each day with effluent discharge, calculate total volume discharged. Use the highest equivalent 24-hour flow.
- **Equivalent four-day flow:** highest total 4-day discharge event volume divided by 4 days. If the CSO discharge is less than four days, use highest total event volume divided by 4 days.

The dilution factor calculated under the maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow.

Previously, dilution factors were estimated by modeling the discharge at acute or chronic design flow, which were defined in Ecology's permit writer's manual as:

> For critical condition scenarios at the acute boundary, the flowrate to use is the highest equivalent twenty-four hour average for the past three years during the season in which the critical condition is likely to occur. If plant influent flows are expected to increase during the life of the permit, the highest daily maximum flow must be estimated.
> For critical condition scenarios at the chronic boundary, the flowrate to use is the highest equivalent monthly average flow (total volume of all discharge events in a month divided by the total hours of discharge in that month) for the past three years during the season in which the critical condition is likely to occur. If plant influent flows are expected to increase during the life of the permit, the highest average monthly flow must be estimated. For average condition (human health-based) scenarios, the flowrate to use is the annual equivalent average flow based on data provided in the permit application or DMR analysis.

These design conditions were applied, as summarized below.

	CSO INTERMITTENT DISCHARGE METHOD
ZACE	the event with the highest equivalent twenty-four hour average (total volume of event divided by total hours of event)
MIXING ZONE (CHRONIC) & NON-CARC. HUMAN HEALTH	the highest equivalent monthly average over the last three years of operation (total volume of all discharge events in a month divided by the total hours of discharge in that month)
CARCINOGENIC HUMAN HEALTH	The highest equivalent annual average flow over the last three years of operation (total volume of all discharge events in a year divided by the total days of discharge in that year)

This change in methodology has a significant impact in calculating the dilution factors. Additionally, the Permit Writer’s Handbook (Appendix C, Section 6.1.3) recognizes that CSO treatment plant discharges are highly intermittent and highly variable in discharge volumes, durations, and pollutant concentrations, both between storms and during a single storm event. Therefore, direct comparisons of human health receiving water criteria with pollutant concentrations is not appropriate. It concludes that deriving numeric effluent limits for human health criteria is infeasible. As a result, dilution factors are not estimated for human health design criteria.

Modeling Conditions

Outfall

The Elliott West outfall ends in a single-port diffuser at a depth of 60 ft MLLW. The flow is discharged horizontally through a 90-inch port, located approximately 490 ft offshore. Note that the duckbill valve has been removed from the discharge.

Density Structure

The most extensive data set that was found for density structure in the vicinity of the outfall is King County sampling station LTED04. This station is located in Elliott Bay approximately 1 nautical miles south of the outfall location and is located in generally the same water mass as the outfall. The location is 47 36 13.11 N and 122 21 23.48 W. The data is summarized in Table 1, and Figure 1. The density profile was extrapolated from the depth of each CTD cast to the depth of the outfall as a constant value.

Ambient Currents

The data set chosen for ambient currents was taken from a station sampled for the siting study for the Elliott West CSO facility. An S4 current meter was deployed at a near surface depth close to the outfall location. Data statistics from a 28-day record were summarized and the 10th and 90th percentile current was selected for the critical condition. The current speeds were 2.5 cm/s and 10cm/s, respectively. The 50th percentile current speed was 5 cm/s. The respective histogram is shown in Figure 2.

The predominant current direction is parallel to the shoreline and currents were modeled as perpendicular to the outfall axis.

Plant Flows

As stated earlier, critical plant flows were determined using the intermittent discharge method. Plant flows were analyzed for the four and a half year period of January 2014 through June 2018. Discharge events between February 2017 and April 2017 were exacerbated by the West Point flooding and subsequent recovery, and are thus excluded from the analysis as they are not characteristic discharges. Two additional events in 2017 were attributable to salt water intrusion into the collection system from a broken marine outfall gate and excluded from the analysis as they are not characteristic discharges.

- **Instantaneous:** the maximum design flow is 240 mgd, but a maximum instantaneous flow rate was 258 mgd was recorded during March 15, 2015.
- **One-hour:** the maximum one-hour flow rate was 244 mgd on November 5, 2017.

- **Equivalent 24-hour flow:** for each day with effluent discharge, the total volume discharged was calculated. The highest equivalent 24-hour flow was 59.1 mgd on January 17-18, 2017. February – April 2017 was excluded from this analysis due to additional flow diverted to Elliott West due to West Point flooding.
- **Equivalent four-day flow:** highest total 4-day discharge event volume was 82.0 MG from December 6 – 10, 2017. Divided by 4 days, the equivalent four-day flow is 20.5 mgd. February – April 2017 was excluded from this analysis due to additional flow diverted to Elliott West due to West Point flooding.

The discharge events from the Elliott West CSO treatment plant are tabulated in Table 2.

Critical Conditions-Selected Cases-Decision Path and Ecology Guidance

Zone of Acute Criteria Exceedance (ZACE) 26 ft or 7.9 m

Ecology guidance recommends that the critical receiving water condition be determined. Using the intermittent discharge method, the peak instantaneous observed flow was 258 mgd. Therefore, the flow from this event was used for determining the ZACE dilution for the Elliott West facility. Ecology guidance also required modeling to be performed using the 10^{th} and 90^{th} percentile current values. These current conditions yielded velocities of 2.5 cm/sec and 10 cm/s.

The Elliott West outfall has a single port directed offshore, so dilution was modeled with the port discharging normal to the current. Under the 10^{th} percentile current speed conditions, the dilution factor was always lower than under the 90^{th} percentile currents. At this current speed, a maxQ dilution factor of 2.5:1 was predicted at the acute mixing zone. Applying a peak one-hour flow rate of 244 mgd results in a one-hour dilution factor of 2.6:1.

Chronic Mixing Zone: 260 ft or 79 m at Elliott West

The maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow.

The maximum discharge rate of 258 MGD was used to model the dilution at the chronic mixing zone. Ecology guidance defines the 50th percentile current velocity as the critical receiving water current velocity for aquatic life chronic. The 50^{th} percentile current (5 cm/s) showed a dilution in the far field of approximately 9:1.

Dilution at the chronic mixing zone is determined by scaling the dilution at maximum discharge rate by the ratio of the 24-hour (59 mgd) or 4-day flow (20.5 mgd) to the maximum flow rate (258 mgd). This results in chronic dilution values of 39 and 113.

Summary

ZACE

The dilution at the ZACE for the critical conditions detailed above yielded a dilution at the ZACE (26 ft) of **2.5:1** (instantaneous) and **2.6:1** (1-hour) with merging of the discharge from the opposing ports.

Chronic Mixing Zone

The dilution at the chronic mixing zone (260 ft) for the critical conditions described above yielded a dilution of **39:1** (24-hour) and **113:1** (4-day).

Table 1. Ambient Density in Elliott Bay (Station LTED04)

Potential Density as sigma-t					
			Depth (m)		(max)
Date	0	5	10	15	20
21-Oct-1998	22.579	22.782	22.883	22.921	22.942
14-Dec-1998	20.979	22.552	22.748	22.793	22.821
25-Jan-1999	20.280	21.654	22.118	22.312	22.350
11-Mar-1999	18.872	20.901	21.230	21.650	21.721
15-Mar-1999	20.581	21.246	21.798	21.904	22.002
20-Apr-1999	20.965	21.821	21.999	22.018	22.054
10-May-1999	19.350	21.698	21.919	22.108	22.210
18-May-1999	19.216	21.779	22.203	22.232	22.239
15-Jun-1999	15.792	21.065	21.618	21.964	22.044
22-Jun-1999	20.402	21.392	21.782	21.996	22.039
15-Jul-1999	17.029	19.801	20.459	20.538	20.603
27-Jul-1999	19.525	20.946	21.296	21.511	21.746
17-Aug-1999	21.340	21.816	22.089	22.138	22.155
21-Sep-1999	21.276	21.709	22.274	22.396	22.423
05-Oct-1999	21.480	21.932	22.288	22.404	22.562
19-Oct-1999	22.275	22.616	22.684	22.738	22.757
17-Nov-1999	21.168	22.193	22.639	22.874	22.915
18-Nov-1999	16.643	19.603	22.120	22.866	22.974
08-Dec-1999	20.971	22.511	22.595	22.647	22.687
20-Dec-1999	13.207	18.699	21.159	22.331	22.490
19-Jan-2000	21.423	22.087	22.355	22.398	22.419
15-Feb-2000	21.411	22.003	22.186	22.432	22.463
22-Mar-2000	21.431	22.327	22.459	22.508	22.542
18-Apr-2000	20.067	22.199	22.437	22.486	22.527
16-May-2000	20.369	21.456	22.080	22.391	22.484
20-Jun-2000	20.071	21.779	22.080	22.212	22.262
24-Jul-2000	21.342	22.001	22.186	22.221	22.241
22-Aug-2000	21.875	22.254	22.381	22.431	22.463
19-Sep-2000	22.143	22.391	22.529	22.646	22.676
24-Oct-2000	22.073	22.953	22.970	22.991	23.006
28-Nov-2000	22.659	23.062	23.231	23.289	23.295
19-Dec-2000	22.917	23.348	23.453	23.464	23.468
17-Jan-2001	22.626	23.394	23.458	23.483	23.505
21-Feb-2001	21.980	23.199	23.438	23.473	23.480
20-Mar-2001	22.507	23.276	23.397	23.407	23.426
17-Apr-2001	20.907	23.073	23.226	23.323	23.356
22-May-2001	20.035	22.064	22.606	22.952	23.087
19-Jun-2001	19.132	21.910	22.377	22.613	22.770
24-Jul-2001	22.362	22.700	22.795	22.839	22.851
24-Jul-2001	22.276	22.768	22.838	22.851	22.854
22-Aug-2001	22.389	22.669	22.849	22.869	22.880
24-Sep-2001	22.201	22.800	22.922	23.005	23.018
23-Oct-2001	22.042	22.469	23.147	23.223	23.255
19-Nov-2001	21.142	22.509	23.053	23.138	23.265
17-Dec-2001	19.736	22.867	22.983	22.997	23.048
29-Jan-2002	21.204	22.525	22.577	22.595	22.603
20-Feb-2002	21.762	22.354	22.402	22.465	22.502
18-Mar-2002	21.041	22.236	22.474	22.506	22.535
22-Apr-2002	19.608	21.395	21.960	22.422	22.486
28-May-2002	20.300	21.873	22.137	22.344	22.411
25-Jun-2002	20.668	21.635	21.924	22.077	22.202
22-Jul-2002	20.707	21.489	21.756	21.958	22.137
27-Aug-2002	21.958	22.317	22.407	22.480	22.502
23-Sep-2002	22.041	22.634	22.736	22.793	22.822
21-Oct-2002	22.692	22.967	23.052	23.086	23.104
20-Nov-2002	23.216	23.364	23.405	23.439	23.486
16-Dec-2002	22.586	23.200	23.300	23.415	23.437
21-Jan-2003	18.300	23.063	23.159	23.214	23.231
24-Feb-2003	19.380	22.625	22.795	22.838	22.852
24-Mar-2003	21.113	21.113	21.113	21.113	22.747
29-Apr-2003	19.021	22.056	22.243	22.341	22.376
29-Apr-2003	19.355	22.098	22.292	22.342	22.376
27-May-2003	16.439	22.011	22.172	22.198	22.283
23-Jun-2003	19.192	21.925	22.170	22.300	22.344
08-Jul-2003	21.048	21.625	22.076	22.203	22.278
28-Jul-2003	17.546	21.744	22.099	22.187	22.349
25-Aug-2003	19.606	22.077	22.339	22.526	22.553
29-Sep-2003	22.116	22.514	22.711	22.798	22.877
06-Oct-2003	21.771	22.488	22.831	22.909	22.934
27-Oct-2003	17.408	21.019	21.784	22.460	22.698
17-Nov-2003	21.607	22.656	22.828	22.874	22.921
15-Dec-2003	17.797	22.679	22.786	22.842	22.856
13-Jan-2004	21.450	22.608	22.837	22.906	22.918
20-Jan-2004	20.251	22.690	22.800	22.819	22.838
17-Feb-2004	20.760	22.324	22.473	22.568	22.612
23-Mar-2004	20.370	22.212	22.616	22.639	22.656
26-Apr-2004	17.798	22.470	22.615	22.644	22.662
25-May-2004	20.278	22.066	22.309	22.446	22.537
28-Jun-2004	19.373	21.392	22.077	22.305	22.385
27-Jul-2004	21.591	22.093	22.214	22.394	22.467
23-Aug-2004	21.565	21.903	22.189	22.288	22.442
27-Sep-2004	21.276	21.922	22.237	22.594	22.651
25-Oct-2004	21.708	22.458	22.770	22.854	22.926

Potential Density as sigma-t

Date	0	5	Depth (m) 10	15	(max) 20
15-Nov-2004	22.280	22.689	22.919	23.034	23.050
21-Dec-2004	21.475	22.448	22.764	22.894	22.917
24-Jan-2005	20.414	22.694	22.833	22.872	22.921
28-Feb-2005	22.031	22.685	22.778	22.841	22.852
28-Mar-2005	20.865	22.327	22.843	22.907	22.926
25-Apr-2005	19.228	21.957	22.571	22.676	22.724
23-May-2005	19.533	21.438	22.316	22.370	22.491
28-Jun-2005	20.848	22.055	22.363	22.400	22.403
20-Jul-2005	20.689	21.383	21.642	22.256	22.360
22-Aug-2005	21.214	22.179	22.448	22.519	22.534
26-Sep-2005	22.213	22.489	22.735	22.870	22.932
24-Oct-2005	22.177	22.972	23.157	23.184	23.213
28-Nov-2005	22.314	22.912	23.055	23.080	23.093
19-Dec-2005	22.940	23.195	23.259	23.313	23.333
07-Feb-2006	19.727	21.173	22.190	22.423	22.470
01-Mar-2006	21.109	21.811	22.213	22.282	22.317
27-Mar-2006	21.811	22.070	22.306	22.474	22.552
24-Apr-2006	21.031	21.645	22.070	22.237	22.388
30-May-2006	20.924	21.737	22.260	22.394	22.444
26-Jun-2006	19.112	20.599	21.578	21.907	22.045
24-Jul-2006	20.551	21.410	22.014	22.206	22.292
22-Aug-2006	20.609	21.515	22.117	22.281	22.399
25-Sep-2006	22.180	22.539	22.774	22.849	22.896
23-Oct-2006	22.390	22.872	23.169	23.220	23.243
29-Nov-2006	21.840	22.316	22.688	22.884	22.953
16-Jan-2007	21.223	21.813	22.228	22.364	22.409
22-Feb-2007	20.127	21.755	22.685	22.756	22.788
19-Mar-2007	19.944	21.391	22.347	22.511	22.586
16-Apr-2007	20.550	21.442	22.061	22.270	22.325
21-May-2007	21.219	21.851	22.230	22.297	22.328
18-Jun-2007	21.667	22.045	22.299	22.376	22.432
16-Jul-2007	21.423	21.896	22.211	22.301	22.370
20-Aug-2007	21.784	22.112	22.355	22.458	22.500
17-Sep-2007	22.146	22.421	22.613	22.685	22.704
15-Oct-2007	22.189	22.636	22.938	23.018	23.048
26-Nov-2007	22.583	22.910	23.120	23.152	23.175
17-Dec-2007	21.070	22.064	22.810	22.910	22.946
28-Jan-2008	21.735	22.451	22.870	22.954	22.982
25-Feb-2008	21.672	22.421	22.875	22.943	22.975
19-Mar-2008	21.380	22.311	22.861	22.912	22.931
21-Apr-2008	20.762	22.032	22.809	22.937	22.970
19-May-2008	18.910	21.334	22.704	22.834	22.882
16-Jun-2008	19.329	20.731	21.781	22.347	22.577
21-Jul-2008	20.529	21.214	21.722	21.988	22.221
19-Aug-2008	21.163	21.870	22.313	22.436	22.486
15-Sep-2008	21.474	22.000	22.406	22.581	22.631
20-Oct-2008	22.239	22.661	22.992	23.086	23.105
17-Nov-2008	19.456	21.299	22.430	22.696	22.858
15-Dec-2008	23.062	23.089	23.109	23.115	23.121
20-Jan-2009	19.418	21.148	22.282	22.564	22.672
17-Feb-2009	21.816	22.500	22.960	23.052	23.090
16-Mar-2009	21.991	22.621	23.077	23.150	23.169
20-Apr-2009	18.755	21.319	22.888	23.060	23.099
18-May-2009	19.988	21.692	22.715	22.863	22.920
15-Jun-2009	19.928	21.287	22.180	22.384	22.456
20-Jul-2009	20.772	21.566	22.170	22.413	22.543
17-Aug-2009	21.772	22.217	22.568	22.687	22.746
21-Sep-2009	22.605	22.791	22.921	22.957	22.984
19-Oct-2009	22.989	23.094	23.151	23.158	23.166
17-Nov-2009	21.798	22.587	23.124	23.269	23.294
15-Dec-2009	21.901	22.557	22.950	22.986	22.991
19-Jan-2010	21.659	22.374	22.813	22.858	22.903
23-Feb-2010	20.771	21.770	22.444	22.639	22.703
17-Mar-2010	20.974	21.997	22.676	22.726	22.734
19-Apr-2010	20.941	21.866	22.437	22.516	22.562
18-May-2010	19.964	21.302	22.155	22.300	22.357
21-Jun-2010	18.729	20.696	21.805	22.013	22.062
20-Jul-2010	20.813	21.472	21.921	22.099	22.166
17-Aug-2010	21.460	21.983	22.287	22.376	22.427
21-Sep-2010	20.814	21.691	22.311	22.510	22.643
18-Oct-2010	20.782	21.880	22.622	22.854	22.914
15-Nov-2010	21.743	22.473	22.901	22.982	23.004
20-Dec-2010	21.042	22.017	22.624	22.718	22.779
18-Jan-2011	16.220	19.955	22.207	22.383	22.447
22-Feb-2011	19.848	21.242	22.149	22.298	22.385
21-Mar-2011	17.266	20.287	22.306	22.497	22.569
19-Apr-2011	19.276	20.877	21.825	22.055	22.155
16-May-2011	17.689	20.108	21.551	21.836	21.921
20-Jun-2011	20.105	21.282	21.951	22.085	22.107
14-Jul-2011	20.184	21.072	21.640	21.784	21.876
18-Jul-2011	21.291	21.720	22.000	22.089	22.138
15-Aug-2011	20.709	21.532	22.014	22.146	22.182
19-Sep-2011	21.856	22.135	22.338	22.448	22.487
17-Oct-2011	22.143	22.381	22.583	22.725	22.790
28-Nov-2011	22.292	22.669	22.915	22.962	22.984
14-Dec-2011	22.442	22.672	22.814	22.854	22.884
19-Dec-2011	22.306	22.652	22.852	22.899	22.931
23-Jan-2012	21.774	22.500	22.906	22.972	22.990
21-Feb-2012	20.500	21.941	22.781	22.817	22.834

Potential Density as sigma-t

Date	0	5	Depth (m) 10	15	(max) 20
19-Mar-2012	20.361	21.710	22.521	22.768	22.816
16-Apr-2012	20.821	21.782	22.383	22.468	22.491
21-May-2012	19.761	21.022	21.744	21.876	21.937
18-Jun-2012	20.428	20.998	21.363	21.501	21.652
16-Jul-2012	20.002	20.663	21.151	21.465	21.798
30-Jul-2012	19.600	20.715	21.501	21.783	22.018
20-Aug-2012	20.990	21.406	21.759	21.957	22.072
17-Sep-2012	20.846	21.764	22.312	22.394	22.430
17-Oct-2012	21.825	22.360	22.698	22.767	22.811
26-Nov-2012	21.287	22.211	22.774	22.840	22.872
12-Dec-2012	19.986	21.443	22.367	22.448	22.497
18-Dec-2012	21.599	22.110	22.468	22.619	22.625
23-Jan-2013	21.980	22.245	22.420	22.487	22.521
19-Feb-2013	21.638	22.165	22.529	22.644	22.683
18-Mar-2013	19.037	21.261	22.595	22.672	22.703
16-Apr-2013	20.994	21.953	22.469	22.568	22.637
20-May-2013	19.610	21.205	22.158	22.414	22.513
18-Jun-2013	19.585	21.011	21.913	22.144	22.230
15-Jul-2013	21.291	21.781	22.083	22.165	22.214
26-Aug-2013	21.852	22.218	22.441	22.487	22.497
16-Sep-2013	21.165	21.825	22.310	22.551	22.650
21-Oct-2013	22.382	22.531	22.650	22.718	22.750
18-Nov-2013	21.978	22.642	22.990	23.030	23.041
16-Dec-2013	22.285	22.774	23.077	23.170	23.185
21-Jan-2014	22.326	22.772	22.839	23.000	23.149
03-Feb-2014	22.507	23.086	23.200	23.216	23.247
19-Mar-2014	17.713	19.359	22.004	22.140	22.382
22-Apr-2014	21.436	22.071	22.226	22.301	22.333
07-May-2014	20.657	21.546	21.843	22.165	22.290
19-May-2014	20.322	21.592	21.915	22.025	22.067
04-Jun-2014	20.919	21.627	21.907	22.014	22.049
16-Jun-2014	20.467	21.623	21.966	22.012	22.054
07-Jul-2014	20.280	21.404	21.819	21.940	22.020
21-Jul-2014	20.696	21.721	21.939	22.029	22.089
08-Sep-2014	21.042	21.621	22.221	22.384	22.427
22-Sep-2014	21.144	21.975	22.235	22.516	22.556
06-Oct-2014	21.716	22.462	22.719	22.757	22.778
20-Oct-2014	21.765	22.306	22.511	22.751	22.842
03-Nov-2014	20.864	22.033	22.486	22.612	22.682
17-Nov-2014	21.240	22.269	22.516	22.625	22.669
15-Dec-2014	21.979	22.286	22.371	22.404	22.433
20-Jan-2015	20.055	21.652	22.001	22.046	22.137
02-Feb-2015	19.931	20.867	21.470	21.878	22.037
17-Feb-2015	18.247	20.147	20.960	21.443	21.525
02-Mar-2015	21.070	21.618	21.666	21.730	21.823
16-Mar-2015	18.940	21.773	21.965	22.020	22.067
06-Apr-2015	20.025	21.909	22.134	22.167	22.223
20-Apr-2015	20.412	21.703	21.962	22.110	22.177
04-May-2015	19.990	21.386	21.954	22.108	22.219
18-May-2015	20.366	21.691	22.163	22.191	22.297
02-Jun-2015	20.613	21.597	22.058	22.109	22.283
15-Jun-2015	21.053	21.897	22.186	22.339	22.350
06-Jul-2015	21.531	22.052	22.198	22.263	22.283
21-Jul-2015	21.712	22.085	22.285	22.345	22.371
03-Aug-2015	21.336	22.084	22.289	22.347	22.381
17-Aug-2015	21.688	22.226	22.400	22.457	22.494
08-Sep-2015	21.742	22.405	22.564	22.663	22.671
21-Sep-2015	22.078	22.369	22.519	22.632	22.686
05-Oct-2015	22.371	22.524	22.729	22.781	22.867
19-Oct-2015	22.176	22.726	22.850	22.882	22.930
02-Nov-2015	21.026	22.612	22.932	22.966	22.983
19-Nov-2015	16.620	22.130	22.577	22.673	22.754
14-Dec-2015	19.465	22.067	22.286	22.395	22.462
19-Jan-2016	21.477	22.157	22.323	22.376	22.399
01-Feb-2016	19.779	21.677	22.013	22.143	22.293
16-Feb-2016	17.384	21.541	21.901	21.971	22.043
09-Mar-2016	19.242	21.289	21.635	21.820	21.896
21-Mar-2016	18.805	20.515	21.244	21.622	21.741
06-Apr-2016	16.825	20.659	21.205	21.550	21.598
18-Apr-2016	19.944	21.386	21.617	21.723	21.757
02-May-2016	19.376	20.564	21.018	21.401	21.596
16-May-2016	21.058	21.340	21.509	21.654	21.683
06-Jun-2016	20.065	21.326	21.740	21.828	21.896
20-Jun-2016	21.040	21.592	21.770	21.931	22.035
05-Jul-2016	21.056	21.833	21.956	22.051	22.127
18-Jul-2016	21.287	21.717	21.867	22.032	22.186
01-Aug-2016	21.080	21.493	21.862	22.050	22.189
15-Aug-2016	21.268	21.847	22.186	22.321	22.357
06-Sep-2016	21.854	22.276	22.443	22.524	22.549
19-Sep-2016	22.084	22.218	22.372	22.469	22.623
03-Oct-2016	22.018	22.587	22.831	22.848	22.859
17-Oct-2016	21.363	22.404	22.852	22.875	22.916
07-Nov-2016	21.428	21.898	22.584	22.651	22.728
21-Nov-2016	21.105	21.872	22.275	22.428	22.542
19-Dec-2016	21.965	22.203	22.372	22.389	22.395
23-Jan-2017	22.295	22.532	22.719	22.773	22.794
08-Feb-2017	22.010	22.696	22.793	22.804	22.809
21-Feb-2017	21.682	22.068	22.344	22.479	22.617
06-Mar-2017	20.704	21.935	22.369	22.464	22.511

Potential Density as sigma-t

Date	0	5	Depth (m) 10	15	(max) 20
20-Mar-2017	17.454	21.719	22.184	22.336	22.405
03-Apr-2017	19.813	21.251	21.778	21.960	22.081
17-Apr-2017	18.566	21.523	21.900	21.978	22.009
01-May-2017	20.505	21.685	21.812	21.913	21.938
15-May-2017	19.719	21.133	21.453	21.586	21.751
05-Jun-2017	19.583	21.079	21.525	21.626	21.674
19-Jun-2017	19.979	21.353	21.554	21.623	21.722
05-Jul-2017	20.322	20.756	21.345	21.711	21.748
17-Jul-2017	19.848	21.054	21.404	21.693	21.726
07-Aug-2017	20.759	21.608	21.837	21.910	21.929
28-Aug-2017	21.231	21.863	22.092	22.173	22.203
05-Sep-2017	21.377	21.783	22.087	22.134	22.160
19-Sep-2017	21.675	22.226	22.302	22.411	22.437
03-Oct-2017	21.683	22.148	22.564	22.620	22.660
17-Oct-2017	22.205	22.575	22.787	22.861	22.870
06-Nov-2017	22.609	22.737	22.805	22.877	22.939
21-Nov-2017	20.871	23.048	23.109	23.136	23.150
18-Dec-2017	22.023	22.375	22.624	22.672	22.722
16-Jan-2018	19.487	21.714	22.378	22.546	22.586
05-Feb-2018	20.167	22.331	22.510	22.586	22.621
20-Feb-2018	20.109	21.258	21.817	21.957	22.195
07-Mar-2018	22.464	22.669	22.806	22.810	22.822
19-Mar-2018	22.094	22.368	22.446	22.489	22.526
02-Apr-2018	21.929	22.418	22.563	22.624	22.644
16-Apr-2018	19.001	20.599	21.866	22.546	22.609
07-May-2018	20.693	21.296	21.917	22.234	22.240
21-May-2018	20.502	21.691	22.018	22.100	22.150
04-Jun-2018	21.016	21.811	21.948	22.014	22.057
18-Jun-2018	21.575	22.036	22.212	22.238	22.266
09-Jul-2018	21.292	21.927	22.129	22.213	22.243
23-Jul-2018	20.472	21.573	22.167	22.280	22.327
20-Aug-2018	21.617	21.962	22.278	22.414	22.436
04-Sep-2018	21.568	22.348	22.582	22.611	22.647
17-Sep-2018	22.237	22.459	22.610	22.690	22.718
01-Oct-2018	22.257	22.625	22.752	22.812	22.895
15-Oct-2018	22.596	22.845	22.949	23.014	23.037
15-Nov-2018	22.242	22.599	22.913	23.022	23.067
26-Nov-2018	22.673	23.120	23.167	23.191	23.204

Table 2. Discharge Events from Elliott West CSO TP

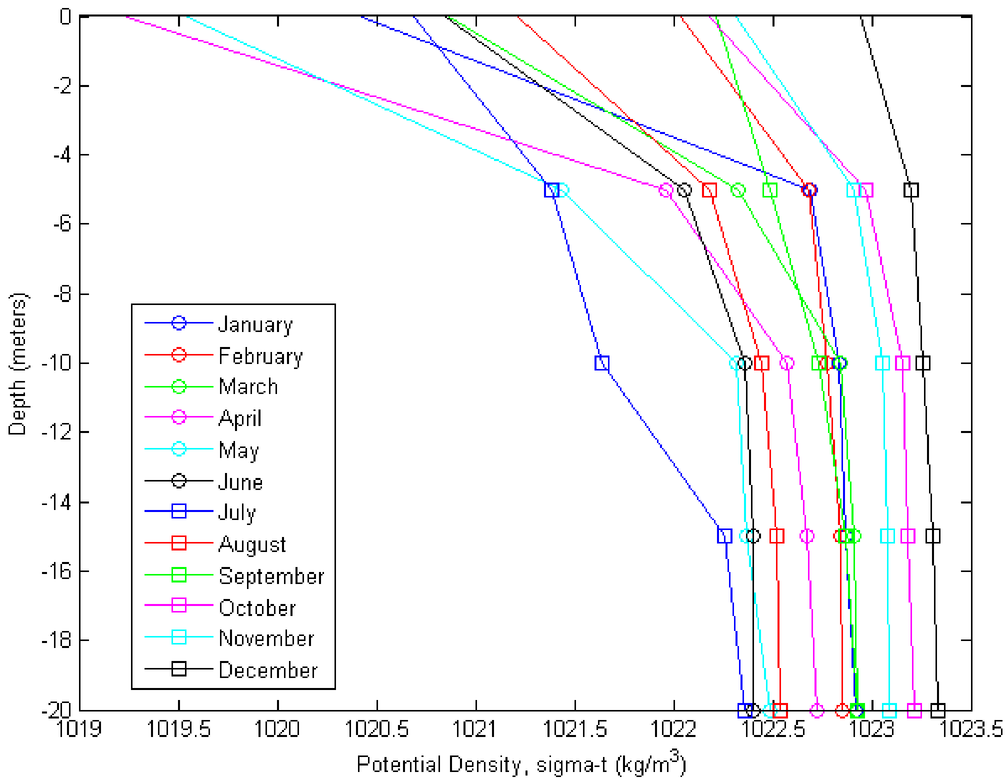
Event Starting Date/Time	Event Ending Date/Time	Duration (hours)	Volume (million gallons)	Peak Instantaneous Flow (mgd)	24-hour average flow (mgd)
1/11/2014	1/11/2014	2.4	2.42	51.0	2.4
2/16/2014	2/17/2014	5.1	14.17	167.3	14.2
2/18/2014	2/18/2014	0.7	0.45	17.9	0.5
3/5/2014	3/6/2014	20.7	28.18	127.1	28.8
3/8/2014	3/8/2014	4.1	7.14	77.5	7.1
5/3/2014	5/4/2014	2.1	5.80	121.6	5.8
7/23/2014	7/23/2014	3.2	10.29	115.9	10.3
8/13/2014	8/13/2014	6.4	19.69	175.6	19.7
10/22/2014	10/22/2014	3.8	4.73	100.0	4.7
10/31/2014	10/31/2014	2.8	6.64	119.8	6.6
11/28/2014	11/28/2014	7.4	19.88	123.0	19.9
12/23/2014	12/24/2014	5.8	12.52	118.2	12.5
1/17/2015	1/18/2015	5.8	10.48	141.8	10.5
2/6/2015	2/7/2015	12.5	14.30	123.4	16.9
2/27/2015	2/27/2015	1.9	1.16	22.3	1.2
3/15/2015	3/16/2015	11.4	46.19	258.1	46.2
8/14/2015	8/14/2015	4.4	11.32	128.7	11.3
8/29/2015	8/30/2015	2.0	10.29	174.4	10.3
10/10/2015	10/10/2015	2.0	6.33	126.6	6.3
10/31/2015	10/31/2015	1.5	3.52	89.2	3.5
11/14/2015	11/15/2015	25.5	60.80	159.6	46.9
12/6/2015	12/6/2015	3.2	1.94	16.1	1.9
12/7/2015	12/9/2015	36.2	74.30	140.3	48.1
12/10/2015	12/10/2015	4.6	7.71	179.6	7.7
12/18/2015	12/18/2015	3.6	8.99	124.5	9.0
12/21/2015	12/21/2015	1.8	1.68	41.9	1.7
1/21/2016	1/22/2016	18.7	29.18	197.7	29.2
1/27/2016	1/28/2016	9.4	9.88	149.7	9.9
2/11/2016	2/12/2016	5.2	7.14	189.5	8.0
3/9/2016	3/9/2016	4.1	6.25	74.7	6.3
10/13/2016	10/14/2016	20.4	58.15	202.3	58.2

Event Starting Date/Time	Event Ending Date/Time	Duration (hours)	Volume (million gallons)	Peak Instantaneous Flow (mgd)	24-hour average flow (mgd)
10/20/2016	10/20/2016	7.4	22.80	198.8	22.8
10/26/2016	10/27/2016	8.7	23.00	188.3	23.0
11/15/2016	11/15/2016	3.1	8.09	116.8	8.1
11/24/2016	11/25/2016	3.3	7.99	120.1	8.0
1/17/2017	1/19/2017	23.6	61.42	215.4	59.1
2/8/2017*	2/10/2017	43.3	192.48	239.6	143.2
2/15/2017*	2/16/2017	41.4	214.13	217.3	158.5
3/3/2017*	3/3/2017	11.9	22.35	116.2	22.4
3/7/2017*	3/7/2017	2.1	5.15	116.9	5.2
3/9/2017*	3/9/2017	6.3	21.91	194.5	21.9
3/13/2017*	3/15/2017	24.6	94.53	233.6	58.7
3/17/2017*	3/18/2017	23.5	91.65	229.4	91.7
3/24/2017*	3/24/2017	1.4	0.85	21.6	0.9
3/29/2017*	3/29/2017	5.8	13.85	117.1	13.9
4/12/2017*	4/12/2017	9.9	29.51	158.0	29.5
10/18/2017	10/18/2017	2.3	5.16	43.9	5.2
10/21/2017+	10/22/2017	4.0	11.73	207.6	9.5
11/3/2017+	11/5/2017	16.0	86.14	250.1	64.6
11/21/2017	11/22/2017	18.4	30.36	230.9	30.4
12/19/2017	12/19/2017	12.5	21.20	114.6	21.2
12/29/2017	12/29/2017	6.6	15.02	158.9	15.0
1/11/2018	1/11/2018	5.7	8.94	116.0	8.9
1/17/2018	1/18/2018	9.4	7.35	74.7	8.1
1/29/2018	1/29/2018	2.0	9.00	155.0	9.0
4/14/2018	4/15/2018	23.7	32.00	230.3	32.0

* - events exacerbated by the West Point flooding and subsequent recovery

\+ - events attributed to salt water intrusion into the collection system from a broken marine outfall gate

Figure 1. Sigma-t Profile for Elliott Bay Station LTED04



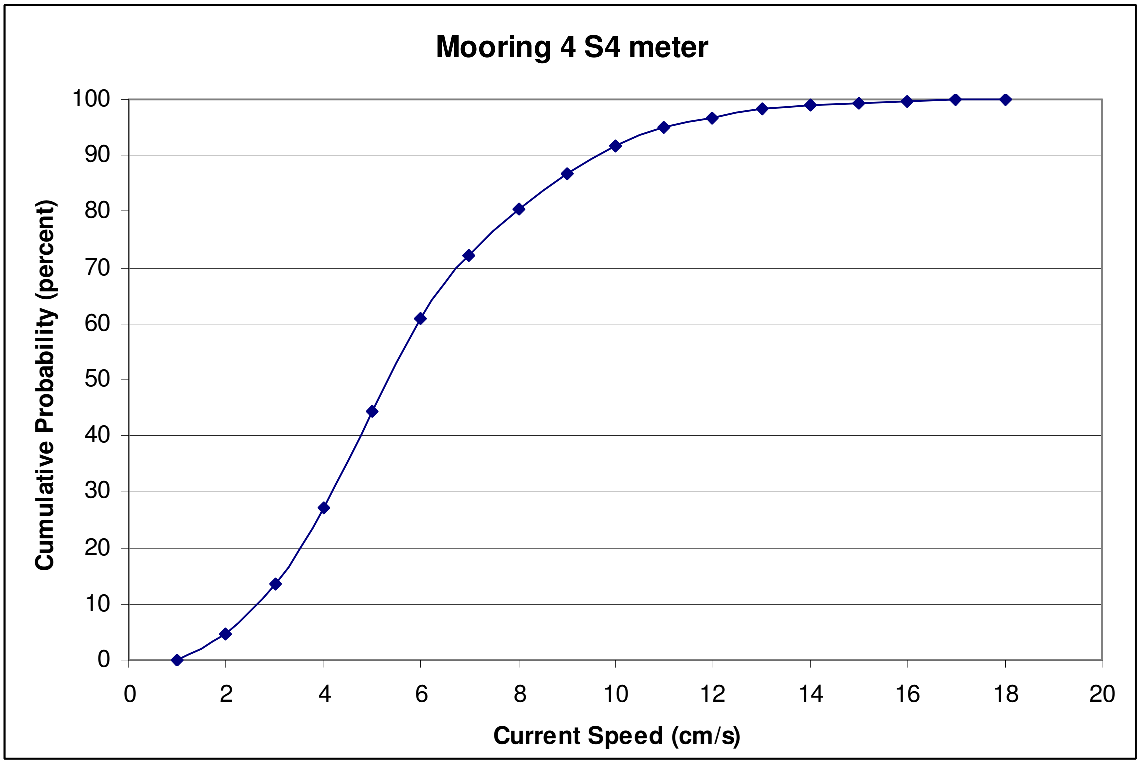


Figure 2. Histogram for near-surface currents at Station 4, 28 Day Duration

PLUMES Output

Minimum Acute Dilution: 10 percentile current speed (2.5 cm/s) perpendicular to discharge direction. Maximum observed discharge flow of 258 mgd.

```
/ UM3.
Case 191; ambient file M:\user\nairn\p\plumes\vplumes\denny\Elliott2018\Elliott.011.db;
Diffuser table record 2: ----------------------------------

Ambient Table:
     Depth   Amb-cur   Amb-dir   Amb-sal   Amb-tem   Amb-pol     Decay   Far-spd   Far-
dir   Disprsn   Density
         m       m/s       deg       psu         C     kg/kg       s-1       m/s
deg  m0.67/s2   sigma-T
       0.0     0.025      90.0     28.48     13.28       0.0       0.0      0.05
0.0    0.0003     21.33
       5.0     0.025      90.0     28.93     12.56       0.0       0.0      0.05
0.0    0.0003     21.81
      10.0     0.025      90.0     29.21     12.06       0.0       0.0      0.05
0.0    0.0003     22.12
      15.0     0.025      90.0     29.27     11.88       0.0       0.0      0.05
0.0    0.0003      22.2
      20.0     0.025      90.0     29.27     11.88       0.0       0.0      0.05
0.0    0.0003      22.2
      25.0     0.025      90.0     29.27     11.88       0.0       0.0      0.05
0.0    0.0003      22.2

Diffuser table:
   P-dia  P-elev V-angle H-angle   Ports Spacing SttTime EndTime Incrmnt AcuteMZ ChrncMZ
P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)     (m)   (deg)(Surv-deg)      ()      (m)    (hr)    (hr)    (hr)    (ft)
(ft)    (ft)   (MGD)   (psu)     (C)  (kg/kg)
    90.0     3.0     0.0   -90.0     1.0     0.0     3.0   898.0     3.0    26.0   260.0
60.0   258.0     0.0    10.0   100.0

Simulation:
Froude number:      3.883; effluent density (sigma-T) -0.23506959; effluent velocity
2.754(m/s);
        Depth  Amb-cur    P-dia  Polutnt   Dilutn   x-posn   y-posn
Step     (ft)    (m/s)     (in)  (kg/kg)       ()     (ft)     (ft)
   0      60.0    0.025     90.0    100.0      1.0      0.0      0.0;
  51     55.42    0.025    217.9    39.33    2.508   -26.01    0.182; acute zone;
 100     36.22    0.025    334.6    21.45    4.581   -51.36    0.763;
 122     14.14    0.025    414.5    14.79    6.634   -65.96    1.383; stream limit
reached;
 123     12.74    0.025    419.3     14.5    6.767   -66.69    1.422; matched energy
radial vel =  0.586m/s;
 127     6.949    0.025    439.6     13.4    7.323   -69.61    1.587; surface;
Const Eddy Diffusivity.  Farfield dispersion based on wastefield width of      11.16 m
    conc  dilutn   width distnce    time
 (kg/kg)             (m)     (m)    (hrs) (kg/kg)    (s-1)    (m/s)(m0.67/s2)
 13.1659   7.454   13.81   39.64   0.102     0.0     0.0    0.05 3.00E-4
 12.0926   8.128   16.19   59.46   0.212     0.0     0.0    0.05 3.00E-4
 11.0138   8.938   18.26   79.28   0.323     0.0     0.0    0.05 3.00E-4
count: 3
```

Minimum Chronic Dilution: 50 percentile current speed (5 cm/s) perpendicular to discharge direction. Maximum observed discharge flow of 258 mgd.

```
/ UM3.
Case 20; ambient file M:\user\nairn\p\plumes\vplumes\denny\Elliott2018\Elliott.011.db;
Diffuser table record 2: ---------------------------------

Ambient Table:
     Depth   Amb-cur   Amb-dir   Amb-sal   Amb-tem   Amb-pol     Decay   Far-spd   Far-
dir   Disprsn   Density
         m       m/s       deg       psu         C     kg/kg       s-1       m/s
deg  m0.67/s2   sigma-T
       0.0      0.05      90.0     17.01      7.77       0.0       0.0      0.05
0.0    0.0003     13.26
       5.0      0.05      90.0     24.18     8.735       0.0       0.0      0.05
0.0    0.0003     18.74
      10.0      0.05      90.0     27.42     9.228       0.0       0.0      0.05
0.0    0.0003      21.2
      15.0      0.05      90.0     28.97     9.485       0.0       0.0      0.05
0.0    0.0003     22.36
      20.0      0.05      90.0     28.97     9.485       0.0       0.0      0.05
0.0    0.0003     22.36
      25.0      0.05      90.0     28.97     9.485       0.0       0.0      0.05
0.0    0.0003     22.36

Diffuser table:
   P-dia  P-elev V-angle H-angle   Ports Spacing SttTime EndTime Incrmnt AcuteMZ ChrncMZ
P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)     (m)   (deg)(Surv-deg)      ()     (m)    (hr)    (hr)    (hr)    (ft)
(ft)    (ft)   (MGD)   (psu)     (C) (kg/kg)
    90.0     3.0     0.0   -90.0     1.0     0.0     3.0   898.0     3.0    26.0   260.0
60.0   258.0     0.0    10.0   100.0

Simulation:
Froude number:      3.869; effluent density (sigma-T) -0.23506959; effluent velocity
2.754(m/s);
        Depth  Amb-cur    P-dia  Polutnt   Dilutn   x-posn   y-posn
Step     (ft)    (m/s)     (in)  (kg/kg)       ()     (ft)     (ft)
   0     60.0     0.05     90.0    100.0      1.0      0.0      0.0;
  53    55.23     0.05    225.1    37.96    2.598   -26.21    0.385; acute zone;
 100    36.75     0.05    346.9    20.75    4.735   -50.29    1.543;
 122    13.09     0.05    469.7    13.71    7.162   -66.83    3.057; matched energy
radial vel =  0.531m/s;
 123    11.74     0.05    479.0    13.44    7.305   -67.68    3.156; trap level;
 124    10.38     0.05    489.3    13.17    7.452   -68.55     3.26; surface;
Const Eddy Diffusivity.  Farfield dispersion based on wastefield width of      12.43 m
    conc  dilutn   width distnce    time
 (kg/kg)             (m)     (m)    (hrs) (kg/kg)   (s-1)   (m/s)(m0.67/s2)
 12.9846   7.562   15.23   39.64   0.104     0.0     0.0    0.05 3.00E-4
 12.0266   8.176   17.73   59.46   0.214     0.0     0.0    0.05 3.00E-4
 11.0157   8.939   19.91   79.28   0.324     0.0     0.0    0.05 3.00E-4
count: 3
```

Effluent Dilution Modeling-Henderson/MLK CSO Treatment Facility Marine Outfall

Prepared by: Bruce Nairn, King County WTD. January 2019

Model

PDS

The PDS model of Visual Plumes was used for this modeling effort. This models was chosen because the Henderson/MLK CSO Treatment Plant outfall is a surface discharge. Note that the CORMIX model was used for the dilution predictions during Facility design.

Ecology has provided new guidance on the methodology to determine the acute and chronic design flows for intermittent CSO discharges. The new methodology is summarized in Section 6.1.3, Appendix C of Ecology's *Water Quality Program Permit Writer's Manual* (Ecology, 2015). When effluent discharge is intermittent, the dilution factor is to be calculated with the maximum flow rate that can occur. The dilution factor generated using the maximum flow rate may then be adjusted upward by a ratio of the maximum flow to the appropriate time-averaged flow for the criterion being assessed. For aquatic life criteria, acute dilution factors are typically assessed using the maximum one-hour average flow. Chronic dilution factors are typically assessed using the maximum 4-day average flow. However, the appropriate flow averaging period varies per pollutant as described in the water quality standards (WAC 173-201A). Ecology's guidance lists the following flows to apply in these treated CSO dilution calculations:

- **Instantaneous:** the maximum instantaneous flow rate recorded (or projected over the next permit term)
- **One-hour:** the maximum one-hour flow rate recorded (or projected over the next permit term)
- **Equivalent 24-hour flow:** for each day with effluent discharge, calculate total volume discharged. Use the highest equivalent 24-hour flow.
- **Equivalent four-day flow:** highest total 4-day discharge event volume divided by 4 days. If the CSO discharge is less than four days, use highest total event volume divided by 4 days.

The dilution factor calculated under the maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow.

Additionally, the Permit Writer's Handbook (Appendix C, Section 6.1.3) recognizes that CSO treatment plant discharges are highly intermittent and highly variable in discharge volumes, durations, and pollutant concentrations, both between storms and during a single storm event. Therefore, direct comparisons of human health receiving water criteria with pollutant concentrations is not appropriate. It concludes that deriving numeric effluent limits for human health criteria is infeasible. As a result, dilution factors are not estimated for human health design criteria.

Modeling Conditions

Outfall

The Henderson/MLK flow is discharged horizontally through a 84-inch pipe, located at the Norfolk outfall. The outfall approaches the Duwamish River at a 90-degree angle to the river flow and is flush with the bank. There is a discharge flap gate on the end of the pipe that was assumed to be completely open during discharge events.

Density Structure

The ambient water was assumed to be fresh with an ambient density of 999.9255 kg/m^3.

Ambient Currents

The ambient current data set is summarized in the Henderson/MLK Predesign report. The data are from current meter deployments between August 23, 1996 - September 9, 1996 and October 10, 1996 to November 18, 1996. The 10th, 50th, and 90th percentile current speeds were reported as 7.8 cm/s, 21 cm/s, and 39 cm/s, respectively.

Plant Flows

Since 2005, peak flows have been substantially lower than the design flow, with a peak flow of 56 mgd occurring during the December 3, 2007 storm. Flow simulations based on a 2016 calibration of the Henderson basin prior to City of Seattle CSO control projects indicated a maximum inflow to the Henderson/MLK CSO storage tunnel in the 55-60 mgd range. City of Seattle CSO control projects are expected to add no more than 10-15 mgd. As a result, the projected maximum inflow based on current modeling and measured flow information is 65-75 mgd. Therefore a flow of 70 mgd is used as an expected maximum instantaneous flow. This is greater than the maximum flow observed over the last 4.5 years, but is characteristic of future flow conditions.
Discharge events during February 2017 were exacerbated by the West Point flooding and subsequent recovery, and are thus excluded from the analysis as they are not characteristic discharges.

- **Instantaneous:** the maximum instantaneous flow rate was assumed to equal the design inflow rate of 70 mgd.
- **One-hour:** the maximum one-hour flow rate was assumed to equal the instantaneous flow rate of 38 mgd.
- **Equivalent 24-hour flow:** for each day with effluent discharge, the total volume discharged was calculated. The highest equivalent 24-hour flow was 6.0 mgd on December 9, 2015.
- **Equivalent four-day flow:** highest total 4-day discharge event volume was 6.0 MG on December 9, 2015. Divided by 4 days, the equivalent four-day flow is 1.5 mgd.

The discharge events from the Henderson/MLK CSO treatment plant are tabulated in Table 2.

Critical Conditions-Selected Cases-Decision Path and Ecology Guidance

While the marine water quality criteria apply for the Henderson/MLK discharge, Ecology applied the freshwater mixing zone sizing criteria to the Henderson/MLK outfall because WAC 173-201A-400(8)(a) states that riverine size criteria "may also be applied to estuaries having flow characteristics resembling rivers".

For the Henderson/MLK CSO treatment plant outfall, the chronic mixing zone is 312 feet long (downstream) and 74 feet wide. The acute mixing zone is 31.2 feet long. Both mixing zones extend from the river bottom to the top of the water surface. The dilution factors are based on dilution at the downstream distance or where the plume width reaches 25% of the river width, whichever is more conservative.

Zone of Acute Criteria Exceedance (ZACE) 31.2 ft or 9.5 m

A flow of 70 million gallons per day (MGD) was used for modeling and showed a dilution of 2.47:1 at the acute mixing zone.

Using the intermittent discharge method, the peak instantaneous flow was assumed at 70 mgd. Ecology guidance specifies modeling to be performed using the 10^{th} and 90^{th} percentile current values. These current conditions yielded velocities of 8 cm/sec and 39 cm/s.

At both the 10^{th} and 90^{th} percentile current speed conditions, the maxQ dilution factor of 2.47:1 the acute mixing zone. The peak one-hour flow rate was assumed to equal the maxQ rate of 70 mgd (38 mgd observed during 2014-2018), which results in a one-hour dilution factor of 2.5:1.

Chronic Mixing Zone: 312 ft. or 95 m. at Henderson/MLK

The maximum discharge rate is termed the maxQ dilution factor. The acute or chronic dilution factor is then calculated by multiplying this maxQ dilution factor by the ratio of the maximum flow to the appropriate acute or chronic flow.

The maximum discharge rate of 70 MGD was used to model the dilution at the chronic mixing zone. Ecology guidance defines the 50th percentile current velocity as the critical receiving water current velocity for aquatic life chronic. The 50^{th} percentile current (21 cm/s) showed a dilution in the far field of approximately 3.8:1 when the plume reached the 74 ft mixing zone width.

Dilution at the chronic mixing zone is determined by scaling the dilution at maximum discharge rate by the ratio of the 24-hour (6.0 mgd) or 4-day flow (1.5 mgd) to the maximum flow rate (70 mgd). This results in chronic dilution values of 44 and 180.

Summary

ZACE

The dilution at the ZACE for the critical conditions detailed above yielded a dilution at the ZACE (9.5 m) of **2.5:1** (instantaneous) and **2.5:1** (1-hour).

Chronic Mixing Zone

The dilution at the chronic mixing zone (312 ft by 74 ft) for the critical conditions described above yielded a dilution of **44:1** (24-hour) and **180:1** (4-day).

References

Chapter 22, Henderson/MLKing CSO Project Project No. E63020E Predesign Report for KC Dept of Water Pollution Control Division April 1, 1998

Table 1 Henderson/MLK Discharge Events

Event Starting Date/Time	Event Ending Date/Time	Duration (hours)	Volume (million gallons)	Peak instantaneous flow (mgd)	24-hour average flow (mgd)
2/27/2014	2/27/2014	5.5	0.80		0.8
3/6/2014	3/6/2014	1.2	0.11	0.8	0.1
3/16/2015	3/15/2015	7.0	5.45	34.6	5.5
11/15/2015	11/15/2015	8.7	3.53	11.7	3.5
12/9/2015	12/8/2015	19.9	6.01	19.0	6.0
1/18/2017	1/18/2017	8.2	4.08	38.1	4.1
2/9/2017*	2/9/2017	15.3	12.28	39.9	12.3
2/16/2017*	2/16/2017	6.0	2.25	35.6	2.3
4/14/2018	4/15/2018	8.9	3.60	21.7	3.6

* - events exacerbated by the West Point flooding and subsequent recovery

PDS Output

Minimum Acute Dilution: 90 percentile current speed (39 cm/s). Discharge flow of 70 mgd.

```
PDSWIN -  FLOATING WARM WATER JETS -- June 1999PAGE   1
                1 : case #

 AMBIENT CONDITIONS   : TEMP. TA=   6.5 DEG. C  ,;          VEL. =0.39 M/S
                        HEAT CONVECTION  =     2

 DISCHARGE CONDITIONS : TEMP. =  7.2  C; DEPTH = 1.22 M. ; WIDTH =  2.13 M.
                        ANGLE  90.0 DEG  ;  DISCHARGE RATE =   3.07 CU-M/S
 DISCHARGE DENSIMENTRIC FROUDE NO. =      3.04
```

X(M.)	Y(M.)	EX.TEMP (DEG. C)	TIME (SEC.)	Q/Q0 (DILU.)	QM/Q0	DEPTH(M.)	WIDTH(M.)
2.55	6.01	0.700	0.569E+01	2.00	1.00	0.73	8.45
2.65	6.24	0.685	0.591E+01	2.05	1.02	0.74	8.62
2.75	6.47	0.670	0.615E+01	2.09	1.04	0.76	8.81
2.86	6.70	0.657	0.639E+01	2.13	1.07	0.77	8.99
2.97	6.92	0.644	0.664E+01	2.17	1.09	0.78	9.17
3.09	7.15	0.633	0.689E+01	2.21	1.11	0.79	9.35
3.20	7.37	0.622	0.715E+01	2.25	1.13	0.80	9.53
3.45	7.81	0.601	0.768E+01	2.33	1.16	0.82	9.89
3.70	8.25	0.583	0.823E+01	2.40	1.20	0.84	10.25
3.97	8.68	0.567	0.881E+01	2.47	1.23	0.85	10.60
4.24	9.10	0.552	0.940E+01	2.54	1.27	0.86	10.95
4.82	9.93	0.526	0.106E+02	2.66	1.33	0.88	11.64
5.42	10.73	0.504	0.119E+02	2.78	1.39	0.89	12.32
6.06	11.51	0.484	0.133E+02	2.89	1.45	0.90	12.97
6.73	12.27	0.467	0.147E+02	3.00	1.50	0.90	13.61
8.12	13.73	0.438	0.178E+02	3.19	1.60	0.91	14.83
9.58	15.11	0.415	0.210E+02	3.38	1.69	0.91	15.99
11.11	16.43	0.394	0.243E+02	3.55	1.77	0.92	17.09
12.69	17.68	0.377	0.279E+02	3.72	1.86	0.92	18.13
15.97	20.02	0.348	0.353E+02	4.03	2.01	0.92	20.09
19.38	22.17	0.323	0.431E+02	4.33	2.17	0.92	21.90
22.90	24.15	0.302	0.513E+02	4.63	2.32	0.93	23.59
26.48	25.99	0.284	0.598E+02	4.93	2.47	0.94	25.18
30.14	27.70	0.268	0.686E+02	5.23	2.62	0.95	26.68
33.84	29.30	0.253	0.776E+02	5.53	2.77	0.96	28.13
37.58	30.79	0.240	0.868E+02	5.83	2.92	0.97	29.51
41.36	32.19	0.228	0.962E+02	6.14	3.07	0.98	30.84
45.17	33.51	0.217	0.106E+03	6.46	3.23	0.99	32.12
49.01	34.76	0.207	0.115E+03	6.78	3.39	1.01	33.37
56.74	37.05	0.188	0.135E+03	7.44	3.72	1.04	35.75
64.54	39.11	0.172	0.155E+03	8.14	4.07	1.08	38.03
72.38	40.96	0.158	0.176E+03	8.88	4.44	1.11	40.21
80.27	42.65	0.145	0.196E+03	9.65	4.82	1.15	42.31

Minimum Chronic Dilution: 50 percentile current speed (21 cm/s). Discharge flow of 70 mgd.

```
PDSWIN -  FLOATING WARM WATER JETS -- June 1999PAGE   1
                1 : case #

 AMBIENT CONDITIONS   : TEMP. TA=   6.5 DEG. C  ,;          VEL. =0.21 M/S
                        HEAT CONVECTION  =     2

 DISCHARGE CONDITIONS : TEMP. =  7.2  C; DEPTH = 1.22 M. ; WIDTH =  2.13 M.
                        ANGLE  90.0 DEG  ;  DISCHARGE RATE =   3.07 CU-M/S
 DISCHARGE DENSIMENTRIC FROUDE NO. =      3.04
```

X(M.)	Y(M.)	EX.TEMP (DEG. C)	TIME (SEC.)	Q/Q0 (DILU.)	QM/Q0	DEPTH(M.)	WIDTH(M.)
1.29	6.40	0.700	0.564E+01	2.00	1.00	0.76	8.77
1.34	6.65	0.685	0.587E+01	2.04	1.02	0.77	8.98
1.39	6.89	0.670	0.610E+01	2.09	1.04	0.79	9.19
1.44	7.14	0.657	0.633E+01	2.13	1.07	0.81	9.40
1.50	7.38	0.645	0.658E+01	2.17	1.09	0.82	9.61
1.56	7.63	0.633	0.682E+01	2.21	1.11	0.83	9.83
1.62	7.87	0.622	0.708E+01	2.25	1.13	0.85	10.04
1.75	8.36	0.601	0.760E+01	2.33	1.16	0.87	10.48
1.88	8.85	0.583	0.815E+01	2.40	1.20	0.89	10.92
2.03	9.33	0.567	0.871E+01	2.47	1.23	0.91	11.37
2.17	9.81	0.552	0.930E+01	2.54	1.27	0.92	11.81
2.49	10.77	0.526	0.105E+02	2.66	1.33	0.95	12.70
2.83	11.72	0.504	0.118E+02	2.78	1.39	0.97	13.59
3.19	12.66	0.484	0.132E+02	2.89	1.45	0.98	14.48
3.58	13.59	0.468	0.146E+02	2.99	1.50	0.99	15.36
4.40	15.43	0.440	0.177E+02	3.18	1.59	1.01	17.08
5.30	17.24	0.417	0.210E+02	3.36	1.68	1.02	18.75
6.25	19.01	0.398	0.245E+02	3.51	1.76	1.02	20.37
7.26	20.76	0.382	0.282E+02	3.66	1.83	1.02	21.94
8.33	22.47	0.369	0.321E+02	3.80	1.90	1.02	23.46
9.44	24.15	0.357	0.361E+02	3.92	1.96	1.02	24.93
11.78	27.43	0.336	0.447E+02	4.16	2.08	1.01	27.74
14.26	30.61	0.320	0.538E+02	4.38	2.19	1.00	30.39
16.87	33.68	0.306	0.634E+02	4.58	2.29	0.99	32.89
19.59	36.66	0.293	0.735E+02	4.77	2.38	0.99	35.27
22.40	39.55	0.283	0.840E+02	4.95	2.47	0.98	37.54
25.30	42.36	0.273	0.949E+02	5.12	2.56	0.97	39.72
28.27	45.08	0.264	0.106E+03	5.29	2.64	0.97	41.81
31.31	47.73	0.257	0.118E+03	5.44	2.72	0.96	43.82
37.56	52.82	0.243	0.142E+03	5.75	2.87	0.96	47.64
44.02	57.65	0.231	0.167E+03	6.03	3.02	0.95	51.22
50.64	62.26	0.221	0.193E+03	6.31	3.16	0.95	54.60
57.40	66.65	0.212	0.220E+03	6.58	3.29	0.94	57.82
64.29	70.85	0.204	0.248E+03	6.84	3.42	0.94	60.89

Attachment 10

Summary of Wet Weather Treatment Stations Effluent Priority Pollutant Data

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

Alki Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/16/2014 4:01	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
2/16/2014 4:01	Dissolved Oxygen, Field	11.5	mg/L		0.5	1	NONE
2/16/2014 4:01	Hem (oil, total)	1.8	mg/L	<RDL	1.5	5.4	EPA 1664B
2/16/2014 4:01	Sample Temperature, Field	8.4	deg C				NONE
2/16/2014 4:01	Total Phenolics	0.2	mg/L	TA	0.04	0.04	EPA 420.1
2/16/2014 23:30	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,2,4-Trichlorobenzene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,2-Diphenylhydrazine		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	2,4,6-Trichlorophenol		ug/L	<MDL	0.47	0.943	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	2,4-Dichlorophenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	2,4-Dimethylphenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	2,4-Dinitrophenol		ug/L	<MDL	0.71	1.18	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	2,4-Dinitrotoluene		ug/L	<MDL	0.12	0.472	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	2,6-Dinitrotoluene		ug/L	<MDL	0.12	0.472	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	2-Chloronaphthalene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	2-Chlorophenol		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	2-Methylphenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	2-Nitrophenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	3,3'-Dichlorobenzidine		ug/L	<MDL	0.472	0.472	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	3-Methylcholanthrene		ug/L	<MDL	0.47	1.89	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.47	1.18	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.047	0.0708	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	4-Chloro-3-Methylphenol		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	4-Nitrophenol		ug/L	<MDL,JG	0.47	1.18	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Acenaphthene		ug/L	<MDL	0.047	0.0943	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Acenaphthylene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Ammonia Nitrogen	1.02	mg/L		0.04	0.2	KEROUEL & AMINOT 1997
2/16/2014 23:30	Anthracene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Antimony, Total, ICP-MS	0.58	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
2/16/2014 23:30	Arsenic, Total, ICP-MS	2.12	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/16/2014 23:30	Barium, Total, ICP-MS	13.8	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
2/16/2014 23:30	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Benzidine		ug/L	<MDL,JG	4.72	4.72	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Benzo(a)anthracene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Benzo(a)pyrene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.19	0.354	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Benzo(g,h,i)perylene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.59	2.36	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Benzyl Butyl Phthalate		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
2/16/2014 23:30	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Bis(2-Ethylhexyl)Phthalate	0.32	ug/L	<RDL,B	0.12	0.472	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Cadmium, Total, ICP-MS	0.079	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
2/16/2014 23:30	Calcium, Total, ICP-MS	7800	ug/L		50	50	EPA 200.8*SW846 6020A
2/16/2014 23:30	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Chloroform	1.5	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Chromium, Total, ICP-MS	2.16	ug/L		0.2	1	EPA 200.8*SW846 6020A
2/16/2014 23:30	Chrysene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Copper, Total, ICP-MS	11.8	ug/L		0.4	2	EPA 200.8*SW846 6020A
2/16/2014 23:30	Di-N-Butyl Phthalate		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Di-N-Octyl Phthalate		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Dibenzo(a,e)pyrene		ug/L	<MDL	0.59	2.36	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Dibenzo(a,h)acridine		ug/L	<MDL	0.59	2.36	EPA 625/SW846 3520C*8270D

Alki Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/16/2014 23:30	Dibenzo(a,h)anthracene		ug/L	<MDL	0.19	0.354	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Dibenzo(a,h)pyrene		ug/L	<MDL	0.59	2.36	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Dibenzo(a,j)acridine		ug/L	<MDL	0.59	2.36	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Diethyl Phthalate	0.294	ug/L		0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Dimethyl Phthalate		ug/L	<MDL	0.047	0.0708	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Discharge Volume	9975000	gal				NONE
2/16/2014 23:30	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Fluoranthene		ug/L	<MDL	0.071	0.142	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Fluorene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Hardness, Calc	31.1	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
2/16/2014 23:30	Hexachlorobenzene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Hexachlorobutadiene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Hexachlorocyclopentadiene		ug/L	<MDL	0.47	1.18	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Hexachloroethane		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Isophorone		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Lead, Total, ICP-MS	5.47	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/16/2014 23:30	Magnesium, Total, ICP-MS	2810	ug/L		50	50	EPA 200.8*SW846 6020A
2/16/2014 23:30	Mercury, Total, CVAF	0.0616	ug/L		0.004	0.01	EPA 1631E
2/16/2014 23:30	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	N-Nitrosodimethylamine		ug/L	<MDL	0.47	0.708	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	N-Nitrosodiphenylamine		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Naphthalene		ug/L	<MDL	0.19	0.354	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Nickel, Total, ICP-MS	3.73	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/16/2014 23:30	Nitrite + Nitrate Nitrogen	1.37	mg/L		0.05	0.2	SM4500-NO3-F
2/16/2014 23:30	Nitrobenzene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Pentachlorophenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Perylene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Phenanthrene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Phenol		ug/L	<MDL	0.47	0.708	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Pyrene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
2/16/2014 23:30	Salinity		PSS	<MDL	2	3	SM2520-B
2/16/2014 23:30	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
2/16/2014 23:30	Silver, Total, ICP-MS	0.048	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
2/16/2014 23:30	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
2/16/2014 23:30	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Total Alkalinity	29.2	mg CaCO3/L		1	5	SM2320-B
2/16/2014 23:30	Total Dissolved Solids	94.7	mg/L		15	30	SM2540-C
2/16/2014 23:30	Total Kjeldahl Nitrogen	3.41	mg/L	SH	0.1	0.2	EPA 351.2
2/16/2014 23:30	Total Phosphorus	0.49	mg/L		0.05	0.1	SM4500-P-B,F
2/16/2014 23:30	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2014 23:30	Zinc, Total, ICP-MS	39.9	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
2/16/2014 23:51	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
2/16/2014 23:51	Dissolved Oxygen, Field	11.3	mg/L		0.5	1	NONE
2/16/2014 23:51	Hem (oil, total)	3.5	mg/L	<RDL	1.4	5.2	EPA 1664B
2/16/2014 23:51	Sample Temperature, Field	8	deg C				NONE
2/16/2014 23:51	Total Phenolics	0.24	mg/L	TA	0.04	0.04	EPA 420.1
11/28/2014 11:15	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,2,4-Trichlorobenzene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,2-Diphenylhydrazine		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	2,4,6-Trichlorophenol		ug/L	<MDL	0.47	0.943	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	2,4-Dichlorophenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	2,4-Dimethylphenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	2,4-Dinitrophenol		ug/L	<MDL	0.71	1.18	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	2,4-Dinitrotoluene		ug/L	<MDL	0.12	0.472	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	2,6-Dinitrotoluene		ug/L	<MDL	0.12	0.472	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	2-Chloronaphthalene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	2-Chlorophenol		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	2-Methylphenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	2-Nitrophenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.472	0.472	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	3-Methylcholanthrene		ug/L	<MDL	0.47	1.89	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
11/28/2014 11:15	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.47	1.18	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.047	0.0708	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	4-Chloro-3-Methylphenol		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	4-Nitrophenol		ug/L	<MDL,JG	0.47	1.18	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Acenaphthene		ug/L	<MDL	0.047	0.0943	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Acenaphthylene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Acrolein		ug/L	<MDL,H	5	10	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Acrylonitrile		ug/L	<MDL,H	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Ammonia Nitrogen	3.23	mg/L		0.1	0.5	KEROUEL & AMINOT 1997
11/28/2014 11:15	Anthracene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Antimony, Total, ICP-MS	0.47	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
11/28/2014 11:15	Arsenic, Total, ICP-MS	1.93	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 11:15	Barium, Total, ICP-MS	12.4	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
11/28/2014 11:15	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Benzidine		ug/L	<MDL,JG	7.08	21.2	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Benzo(a)anthracene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Benzo(a)pyrene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.19	0.354	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Benzo(g,h,i)perylene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.59	2.36	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Benzyl Butyl Phthalate		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 11:15	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Bis(2-Ethylhexyl)Phthalate	0.484	ug/L	B	0.12	0.472	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Cadmium, Total, ICP-MS	0.064	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
11/28/2014 11:15	Calcium, Total, ICP-MS	10100	ug/L		50	50	EPA 200.8*SW846 6020A
11/28/2014 11:15	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Chloroform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Chromium, Total, ICP-MS	1.62	ug/L		0.2	1	EPA 200.8*SW846 6020A
11/28/2014 11:15	Chrysene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Copper, Total, ICP-MS	10.8	ug/L		0.4	2	EPA 200.8*SW846 6020A
11/28/2014 11:15	Di-N-Butyl Phthalate		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Di-N-Octyl Phthalate		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.59	2.36	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Dibenzo(a,h)acridine		ug/L	<MDL	0.59	2.36	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Dibenzo(a,h)anthracene		ug/L	<MDL	0.19	0.354	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.59	2.36	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Dibenzo(a,j)acridine		ug/L	<MDL,JG	0.59	2.36	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Diethyl Phthalate	1.22	ug/L		0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Dimethyl Phthalate	0.058	ug/L	<RDL	0.047	0.0708	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Discharge Volume	9275000	gal				NONE
11/28/2014 11:15	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Fluoranthene		ug/L	<MDL	0.071	0.142	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Fluorene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Hardness, Calc	76.8	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
11/28/2014 11:15	Hexachlorobenzene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Hexachlorobutadiene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.47	1.18	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Hexachloroethane		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Isophorone		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Lead, Total, ICP-MS	4.51	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 11:15	Magnesium, Total, ICP-MS	12500	ug/L		50	50	EPA 200.8*SW846 6020A
11/28/2014 11:15	Mercury, Total, CVAF	0.0341	ug/L		0.002	0.005	EPA 1631E
11/28/2014 11:15	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	N-Nitrosodimethylamine		ug/L	<MDL	0.47	0.708	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	N-Nitrosodiphenylamine		ug/L	<MDL	0.24	0.472	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Naphthalene		ug/L	<MDL	0.19	0.354	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Nickel, Total, ICP-MS	2.47	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 11:15	Nitrite + Nitrate Nitrogen	0.724	mg/L		0.01	0.04	SM4500-NO3-F
11/28/2014 11:15	Nitrobenzene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Pentachlorophenol		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Perylene		ug/L	<MDL	0.12	0.236	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Phenanthrene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Phenol	1.46	ug/L		0.47	0.708	EPA 625/SW846 3520C*8270D

Alki Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
11/28/2014 11:15	Pyrene		ug/L	<MDL	0.071	0.118	EPA 625/SW846 3520C*8270D
11/28/2014 11:15	Salinity		PSS	<MDL	2	3	SM2520-B
11/28/2014 11:15	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
11/28/2014 11:15	Silver, Total, ICP-MS	0.054	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
11/28/2014 11:15	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
11/28/2014 11:15	Toluene	1.3	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Total Alkalinity	39.3	mg CaCO3/L	H	1	5	SM2320-B
11/28/2014 11:15	Total Dissolved Solids	393	mg/L		10	20	SM2540-C
11/28/2014 11:15	Total Kjeldahl Nitrogen	6.39	mg/L	SH	0.3	0.6	EPA 351.2
11/28/2014 11:15	Total Phosphorus	0.8	mg/L		0.025	0.05	SM4500-P-B,F
11/28/2014 11:15	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 11:15	Zinc, Total, ICP-MS	51.3	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
11/28/2014 13:10	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
11/28/2014 13:10	Dissolved Oxygen, Field	9.6	mg/L		0.5	1	NONE
11/28/2014 13:10	Hem (oil, total)	5.5	mg/L		1.5	5.3	EPA 1664B
11/28/2014 13:10	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
11/28/2014 15:46	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
11/28/2014 15:46	Hem (oil, total)	3.9	mg/L	<RDL	1.5	5.2	EPA 1664B
11/28/2014 15:46	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/15/2015 12:45	1,2,4-Trichlorobenzene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	1,2-Diphenylhydrazine		ug/L	<MDL	1.2	2.39	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2,4,6-Trichlorophenol		ug/L	<MDL	2.4	4.78	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2,4-Dichlorophenol		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2,4-Dimethylphenol		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2,4-Dinitrophenol		ug/L	<MDL	3.6	5.98	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2,4-Dinitrotoluene		ug/L	<MDL	0.6	2.39	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2,6-Dinitrotoluene		ug/L	<MDL	0.6	2.39	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2-Chloronaphthalene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2-Chlorophenol		ug/L	<MDL	1.2	2.39	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2-Methylphenol		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	2-Nitrophenol		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	3,3'-Dichlorobenzidine		ug/L	<MDL	2.39	2.39	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	3-Methylcholanthrene		ug/L	<MDL	2.4	9.57	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	4,6-Dinitro-O-Cresol		ug/L	<MDL	2.4	5.98	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.24	0.359	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	4-Chloro-3-Methylphenol		ug/L	<MDL	1.2	2.39	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	4-Nitrophenol		ug/L	<MDL	2.4	5.98	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Acenaphthene		ug/L	<MDL	0.24	0.478	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Acenaphthylene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Anthracene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Antimony, Total, ICP-MS	0.47	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
3/15/2015 12:45	Arsenic, Total, ICP-MS	2.16	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 12:45	Barium, Total, ICP-MS	14.3	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
3/15/2015 12:45	Benzidine		ug/L	<MDL,JG	35.9	108	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Benzo(a)anthracene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Benzo(a)pyrene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.96	1.79	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Benzo(g,h,i)perylene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Benzo(r,s,t)pentaphene		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Benzyl Butyl Phthalate		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 12:45	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL,JG	1.2	2.39	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Bis(2-Ethylhexyl)Phthalate	1.1	ug/L	<RDL	0.6	2.39	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Cadmium, Total, ICP-MS	0.082	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
3/15/2015 12:45	Calcium, Total, ICP-MS	6920	ug/L		50	50	EPA 200.8*SW846 6020A
3/15/2015 12:45	Chromium, Total, ICP-MS	3.15	ug/L		0.2	1	EPA 200.8*SW846 6020A
3/15/2015 12:45	Chrysene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Copper, Total, ICP-MS	16.8	ug/L		0.4	2	EPA 200.8*SW846 6020A
3/15/2015 12:45	Di-N-Butyl Phthalate		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Di-N-Octyl Phthalate		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Dibenzo(a,e)pyrene		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Dibenzo(a,h)acridine		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Dibenzo(a,h)anthracene		ug/L	<MDL	0.96	1.79	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Dibenzo(a,h)pyrene		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Dibenzo(a,j)acridine		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Diethyl Phthalate	1.2	ug/L	<RDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Dimethyl Phthalate		ug/L	<MDL	0.24	0.359	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Discharge Volume	22050000	gal				NONE
3/15/2015 12:45	Fluoranthene		ug/L	<MDL	0.36	0.718	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Fluorene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Hardness, Calc	28	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/15/2015 12:45	Hexachlorobenzene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Hexachlorobutadiene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Hexachlorocyclopentadiene		ug/L	<MDL	2.4	5.98	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Hexachloroethane		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Isophorone		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Lead, Total, ICP-MS	6.62	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 12:45	Magnesium, Total, ICP-MS	2610	ug/L		50	50	EPA 200.8*SW846 6020A
3/15/2015 12:45	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	N-Nitrosodimethylamine		ug/L	<MDL	2.4	3.59	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	N-Nitrosodiphenylamine		ug/L	<MDL	1.2	2.39	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Naphthalene		ug/L	<MDL	0.96	1.79	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Nickel, Total, ICP-MS	4.8	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 12:45	Nitrobenzene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Pentachlorophenol		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Perylene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Phenanthrene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Phenol		ug/L	<MDL	2.4	3.59	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Pyrene		ug/L	<MDL	0.36	0.598	EPA 625/SW846 3520C*8270D
3/15/2015 12:45	Salinity		PSS	<MDL	2	3	SM2520-B
3/15/2015 12:45	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
3/15/2015 12:45	Silver, Total, ICP-MS	0.097	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
3/15/2015 12:45	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/15/2015 12:45	Zinc, Total, ICP-MS	70	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
3/15/2015 15:25	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Chloroform	1.9	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/15/2015 15:25	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Hem (oil, total)	2.7	mg/L	<RDL,B	1.4	5.2	EPA 1664B
3/15/2015 15:25	Mercury, Total, CVAF	0.0567	ug/L		0.002	0.005	EPA 1631E
3/15/2015 15:25	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Toluene	1.9	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/15/2015 15:25	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:25	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 15:30	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/15/2015 15:30	Hem (oil, total)	4.5	mg/L	<RDL,B	1.5	5.2	EPA 1664B
3/15/2015 15:30	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/16/2015 8:05	Nitrite + Nitrate Nitrogen	0.846	mg/L	SH	0.02	0.08	SM4500-NO3-F
12/7/2015 14:44	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
12/7/2015 14:44	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Antimony, Total, ICP-MS	0.71	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
12/7/2015 14:44	Arsenic, Total, ICP-MS	2.19	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/7/2015 14:44	Barium, Total, ICP-MS	15	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
12/7/2015 14:44	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Benzyl Butyl Phthalate	0.086	ug/L	<RDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
12/7/2015 14:44	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Bis(2-Ethylhexyl)Phthalate	0.623	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Cadmium, Total, ICP-MS	0.089	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
12/7/2015 14:44	Calcium, Total, ICP-MS	8600	ug/L		50	50	EPA 200.8*SW846 6020A
12/7/2015 14:44	Chromium, Total, ICP-MS	2.9	ug/L		0.2	1	EPA 200.8*SW846 6020A
12/7/2015 14:44	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Copper, Total, ICP-MS	14.4	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/7/2015 14:44	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Dibenzo(a,j)acridine		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Diethyl Phthalate	1.16	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Discharge Volume	6650000	gal				NONE
12/7/2015 14:44	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Hardness, Calc	35.9	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
12/7/2015 14:44	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Lead, Total, ICP-MS	7.41	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/7/2015 14:44	Magnesium, Total, ICP-MS	3510	ug/L		50	50	EPA 200.8*SW846 6020A
12/7/2015 14:44	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Nickel, Total, ICP-MS	4.25	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/7/2015 14:44	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Perylene		ug/L	<MDL,JG	0.13	0.25	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/7/2015 14:44	Salinity		PSS	<MDL	2	3	SM2520-B
12/7/2015 14:44	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
12/7/2015 14:44	Silver, Total, ICP-MS	0.212	ug/L		0.04	0.2	EPA 200.8*SW846 6020A
12/7/2015 14:44	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
12/7/2015 14:44	Zinc, Total, ICP-MS	55.8	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
12/7/2015 16:43	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Alki Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
12/7/2015 16:43	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Chloroform	1.5	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
12/7/2015 16:43	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Hem (oil, total)	4.5	mg/L	<RDL	1.4	5.1	EPA 1664B
12/7/2015 16:43	Mercury, Total, CVAF	0.0763	ug/L		0.004	0.01	EPA 1631E
12/7/2015 16:43	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Toluene	1.4	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Total Phenolics	0.06	mg/L		0.04	0.04	EPA 420.1
12/7/2015 16:43	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/7/2015 16:43	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 9:00	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Antimony, Total, ICP-MS	0.71	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
12/8/2015 9:00	Arsenic, Total, ICP-MS	2.08	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 9:00	Barium, Total, ICP-MS	14.8	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
12/8/2015 9:00	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Benzyl Butyl Phthalate	0.092	ug/L	<RDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 9:00	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Bis(2-Ethylhexyl)Phthalate	0.37	ug/L	<RDL,B	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Cadmium, Total, ICP-MS	0.075	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
12/8/2015 9:00	Calcium, Total, ICP-MS	11800	ug/L		50	50	EPA 200.8*SW846 6020A
12/8/2015 9:00	Chromium, Total, ICP-MS	2.22	ug/L		0.2	1	EPA 200.8*SW846 6020A
12/8/2015 9:00	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Copper, Total, ICP-MS	12.6	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/8/2015 9:00	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Dibenzo(a,j)acridine		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Diethyl Phthalate	0.902	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Discharge Volume	11200000	gal				NONE

Alki Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
12/8/2015 9:00	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Hardness, Calc	46.9	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
12/8/2015 9:00	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Lead, Total, ICP-MS	5.09	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 9:00	Magnesium, Total, ICP-MS	4240	ug/L		50	50	EPA 200.8*SW846 6020A
12/8/2015 9:00	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Nickel, Total, ICP-MS	4.01	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 9:00	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Perylene		ug/L	<MDL,JG	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 9:00	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
12/8/2015 9:00	Silver, Total, ICP-MS	0.089	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
12/8/2015 9:00	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
12/8/2015 9:00	Zinc, Total, ICP-MS	74.6	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
12/8/2015 15:30	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Antimony, Total, ICP-MS	0.78	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
12/8/2015 15:30	Arsenic, Total, ICP-MS	2.29	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 15:30	Barium, Total, ICP-MS	16.4	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
12/8/2015 15:30	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 15:30	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Bis(2-Ethylhexyl)Phthalate	0.36	ug/L	<RDL,B	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Cadmium, Total, ICP-MS	0.07	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
12/8/2015 15:30	Calcium, Total, ICP-MS	13400	ug/L		50	50	EPA 200.8*SW846 6020A
12/8/2015 15:30	Chromium, Total, ICP-MS	2.35	ug/L		0.2	1	EPA 200.8*SW846 6020A
12/8/2015 15:30	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Copper, Total, ICP-MS	13.3	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/8/2015 15:30	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Dibenzo(a,j)acridine		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Diethyl Phthalate	1.41	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D

Alki Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
12/8/2015 15:30	Discharge Volume	32200000	gal				NONE
12/8/2015 15:30	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Hardness, Calc	56	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
12/8/2015 15:30	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Lead, Total, ICP-MS	4.99	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 15:30	Magnesium, Total, ICP-MS	5500	ug/L		50	50	EPA 200.8*SW846 6020A
12/8/2015 15:30	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Nickel, Total, ICP-MS	4.5	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 15:30	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Perylene		ug/L	<MDL,JG	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 15:30	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
12/8/2015 15:30	Silver, Total, ICP-MS	0.076	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
12/8/2015 15:30	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
12/8/2015 15:30	Zinc, Total, ICP-MS	42.2	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
12/10/2015 9:10	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Antimony, Total, ICP-MS	0.67	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
12/10/2015 9:10	Arsenic, Total, ICP-MS	2.01	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/10/2015 9:10	Barium, Total, ICP-MS	15.8	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
12/10/2015 9:10	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Benzyl Butyl Phthalate	0.141	ug/L		0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
12/10/2015 9:10	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Bis(2-Ethylhexyl)Phthalate	0.663	ug/L	B2	0.13	0.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Cadmium, Total, ICP-MS	0.085	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
12/10/2015 9:10	Calcium, Total, ICP-MS	13400	ug/L		50	50	EPA 200.8*SW846 6020A
12/10/2015 9:10	Chromium, Total, ICP-MS	2.25	ug/L		0.2	1	EPA 200.8*SW846 6020A
12/10/2015 9:10	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Copper, Total, ICP-MS	12.9	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/10/2015 9:10	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Dibenzo(a,j)acridine		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Diethyl Phthalate	1.1	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D

Alki Wet Weather Treatment Station							
COLLECTDATE	**PARMNAME**	**NUMVALUE**	**UNITS**	**QUALIFIER**	**MDL**	**RDL**	**METHOD**
12/10/2015 9:10	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Discharge Volume	10150000	gal				NONE
12/10/2015 9:10	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Hardness, Calc	61	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
12/10/2015 9:10	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Lead, Total, ICP-MS	5.01	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/10/2015 9:10	Magnesium, Total, ICP-MS	6690	ug/L		50	50	EPA 200.8*SW846 6020A
12/10/2015 9:10	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Nickel, Total, ICP-MS	4.44	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/10/2015 9:10	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Perylene		ug/L	<MDL,JG	0.13	0.25	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/10/2015 9:10	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
12/10/2015 9:10	Silver, Total, ICP-MS	0.075	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
12/10/2015 9:10	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
12/10/2015 9:10	Zinc, Total, ICP-MS	54.8	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
12/18/2015 2:57	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	3,3'-Dichlorobenzidine		ug/L	<MDL	0.5	0.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	4-Chloro-3-Methylphenol		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Antimony, Total, ICP-MS	0.47	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
12/18/2015 2:57	Arsenic, Total, ICP-MS	1.73	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/18/2015 2:57	Barium, Total, ICP-MS	12.2	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
12/18/2015 2:57	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Benzyl Butyl Phthalate	0.1	ug/L	<RDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
12/18/2015 2:57	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Bis(2-Ethylhexyl)Phthalate	0.629	ug/L		0.13	0.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Cadmium, Total, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
12/18/2015 2:57	Calcium, Total, ICP-MS	7310	ug/L		50	50	EPA 200.8*SW846 6020A
12/18/2015 2:57	Chromium, Total, ICP-MS	2.16	ug/L		0.2	1	EPA 200.8*SW846 6020A
12/18/2015 2:57	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Copper, Total, ICP-MS	10.4	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/18/2015 2:57	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Dibenzo(a,e)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Dibenzo(a,h)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
12/18/2015 2:57	Diethyl Phthalate	1.07	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Discharge Volume	2625000	gal				NONE
12/18/2015 2:57	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Hardness, Calc	32	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
12/18/2015 2:57	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Lead, Total, ICP-MS	5.32	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/18/2015 2:57	Magnesium, Total, ICP-MS	3330	ug/L		50	50	EPA 200.8*SW846 6020A
12/18/2015 2:57	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Nickel, Total, ICP-MS	3.07	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/18/2015 2:57	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Pentachlorophenol		ug/L	<MDL,JG	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Phenol	0.55	ug/L	<RDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/18/2015 2:57	Salinity		PSS	<MDL	2	3	SM2520-B
12/18/2015 2:57	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
12/18/2015 2:57	Silver, Total, ICP-MS	0.11	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
12/18/2015 2:57	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
12/18/2015 2:57	Zinc, Total, ICP-MS	41.6	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/21/2016 0:00	Nitrite + Nitrate Nitrogen	1.16	mg/L		0.01	0.04	SM4500-NO3-F
1/21/2016 9:57	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	1,2-Diphenylhydrazine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Antimony, Total, ICP-MS	0.59	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/21/2016 9:57	Arsenic, Total, ICP-MS	2.25	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 9:57	Barium, Total, ICP-MS	19	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/21/2016 9:57	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 9:57	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Bis(2-Ethylhexyl)Phthalate	0.37	ug/L	<RDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Cadmium, Total, ICP-MS	0.096	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/21/2016 9:57	Calcium, Total, ICP-MS	8660	ug/L		50	50	EPA 200.8*SW846 6020A
1/21/2016 9:57	Chromium, Total, ICP-MS	2.68	ug/L		0.2	1	EPA 200.8*SW846 6020A
1/21/2016 9:57	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Copper, Total, ICP-MS	13.9	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/21/2016 9:57	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/21/2016 9:57	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Dibenzo(a,j)acridine		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Diethyl Phthalate	0.981	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Discharge Volume	5950000	gal				NONE
1/21/2016 9:57	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Hardness, Calc	38.7	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/21/2016 9:57	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Lead, Total, ICP-MS	6.67	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 9:57	Magnesium, Total, ICP-MS	4160	ug/L		50	50	EPA 200.8*SW846 6020A
1/21/2016 9:57	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	N-Nitrosodiphenylamine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Nickel, Total, ICP-MS	4.08	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 9:57	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Phenol	1.21	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 9:57	Salinity		PSS	<MDL	2	3	SM2520-B
1/21/2016 9:57	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/21/2016 9:57	Silver, Total, ICP-MS	0.13	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
1/21/2016 9:57	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/21/2016 9:57	Zinc, Total, ICP-MS	53.7	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/21/2016 12:13	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Chloroform	3.42	ug/L		1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
1/21/2016 12:13	Dissolved Oxygen, Field	10.6	mg/L		0.5	1	NONE
1/21/2016 12:13	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Hem (oil, total)	3.7	mg/L	<RDL	1.4	5	EPA 1664B
1/21/2016 12:13	Mercury, Total, CVAF	0.0277	ug/L		0.002	0.005	EPA 1631E
1/21/2016 12:13	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Sample Temperature, Field	10.1	deg C				NONE
1/21/2016 12:13	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
1/21/2016 12:13	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:13	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 12:23	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	1,2-Diphenylhydrazine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/21/2016 12:23	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	3-Methylcholanthrene		ug/L	<MDL	2.5	10	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Antimony, Total, ICP-MS	0.63	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/21/2016 12:23	Arsenic, Total, ICP-MS	2.01	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 12:23	Barium, Total, ICP-MS	13.1	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/21/2016 12:23	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Benzo(a)pyrene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Benzo(b,j,k)fluoranthene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Benzo(g,h,i)perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 12:23	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Bis(2-Ethylhexyl)Phthalate	0.637	ug/L		0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Cadmium, Total, ICP-MS	0.057	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/21/2016 12:23	Calcium, Total, ICP-MS	11400	ug/L		50	50	EPA 200.8*SW846 6020A
1/21/2016 12:23	Chromium, Total, ICP-MS	1.82	ug/L		0.2	1	EPA 200.8*SW846 6020A
1/21/2016 12:23	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Copper, Total, ICP-MS	12.7	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/21/2016 12:23	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Di-N-Octyl Phthalate		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Dibenzo(a,h)acridine		ug/L	<MDL	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Dibenzo(a,h)anthracene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Dibenzo(a,j)acridine		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Diethyl Phthalate	1.16	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Discharge Volume	20300000	gal				NONE
1/21/2016 12:23	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Hardness, Calc	51.2	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/21/2016 12:23	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Lead, Total, ICP-MS	3.21	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 12:23	Magnesium, Total, ICP-MS	5520	ug/L		50	50	EPA 200.8*SW846 6020A
1/21/2016 12:23	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	N-Nitrosodiphenylamine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Nickel, Total, ICP-MS	3.67	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 12:23	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Phenol	0.881	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 12:23	Salinity		PSS	<MDL	2	3	SM2520-B
1/21/2016 12:23	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/21/2016 12:23	Silver, Total, ICP-MS	0.051	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
1/21/2016 12:23	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/21/2016 12:23	Zinc, Total, ICP-MS	36.2	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/17/2017 0:00	Nitrite + Nitrate Nitrogen	0.9	mg/L	SH	0.04	0.16	SM4500-NO3-F
1/17/2017 19:42	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/17/2017 19:42	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Antimony, Total, ICP-MS	0.53	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/17/2017 19:42	Arsenic, Total, ICP-MS	1.72	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:42	Barium, Total, ICP-MS	11.5	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:42	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:42	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Bis(2-Ethylhexyl)Phthalate	0.67	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Cadmium, Total, ICP-MS	0.068	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/17/2017 19:42	Calcium, Total, ICP-MS	8600	ug/L		50	50	EPA 200.8*SW846 6020A
1/17/2017 19:42	Chromium, Total, ICP-MS	1.68	ug/L		0.2	1	EPA 200.8*SW846 6020A
1/17/2017 19:42	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Copper, Total, ICP-MS	9.89	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/17/2017 19:42	Di-N-Butyl Phthalate	0.15	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Diethyl Phthalate	0.433	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Discharge Volume	23625000	gal				NONE
1/17/2017 19:42	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Hardness, Calc	39.7	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/17/2017 19:42	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Lead, Total, ICP-MS	3.98	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:42	Magnesium, Total, ICP-MS	4440	ug/L		50	50	EPA 200.8*SW846 6020A
1/17/2017 19:42	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Nickel, Total, ICP-MS	2.77	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:42	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Phenol	1.68	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:42	Salinity		PSS	<MDL	2	3	SM2520-B
1/17/2017 19:42	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/17/2017 19:42	Silver, Total, ICP-MS	0.063	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
1/17/2017 19:42	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/17/2017 19:42	Zinc, Total, ICP-MS	41.8	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/18/2017 0:00	Nitrite + Nitrate Nitrogen	1.5	mg/L	SH	0.04	0.16	SM4500-NO3-F

Alki Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/18/2017 8:50	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Chloroform	1.1	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
1/18/2017 8:50	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Hem (oil, total)	5	mg/L	<RDL,B	1.5	5.2	EPA 1664B
1/18/2017 8:50	Mercury, Total, CVAF	0.0314	ug/L		0.002	0.005	EPA 1631E
1/18/2017 8:50	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Total Phenolics	0.042	mg/L		0.04	0.04	EPA 420.1
1/18/2017 8:50	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 8:50	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 10:00	Discharge Rate	46.42	mgd				NONE
2/9/2017 10:00	Dissolved Oxygen, Field	10.8	mg/L		0.5	1	NONE
2/9/2017 10:00	Sample Temperature, Field	8.9	deg C				NONE
1/11/2018 13:04	Antimony, Total, ICP-MS	0.51	ug/L	<RDL	0.3	1	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Arsenic, Total, ICP-MS	1.74	ug/L		0.05	0.25	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Barium, Total, ICP-MS	11.6	ug/L		0.5	0.5	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Cadmium, Total, ICP-MS	0.061	ug/L	<RDL	0.05	0.25	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Calcium, Total, ICP-MS	7000	ug/L		50	50	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Chromium, Total, ICP-MS	2.42	ug/L		0.2	1	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Copper, Total, ICP-MS	14.9	ug/L		0.2	2	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Discharge Volume	350000	gal				NONE
1/11/2018 13:04	Dissolved Oxygen, Field	10.7	mg/L		0.5	1	KCEL SOP# 245
1/11/2018 13:04	Hardness, Calc	28.7	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/11/2018 13:04	Lead, Total, ICP-MS	5.25	ug/L		0.1	0.5	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Magnesium, Total, ICP-MS	2730	ug/L		50	50	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Nickel, Total, ICP-MS	18.8	ug/L		0.1	0.5	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Silver, Total, ICP-MS	0.058	ug/L	<RDL	0.04	0.2	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SWD846 6020A
1/11/2018 13:04	Zinc, Total, ICP-MS	54.7	ug/L		0.5	2.5	EPA 200.8*SWD846 6020A
1/11/2018 14:05	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Alki Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/11/2018 14:05	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Chloroform	3.87	ug/L		1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
1/11/2018 14:05	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Hem (oil, total)	10.2	mg/L	B	1.4	5.1	EPA 1664B
1/11/2018 14:05	Mercury, Total, CVAF	0.0299	ug/L		0.0004	0.001	EPA 1631E
1/11/2018 14:05	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
1/11/2018 14:05	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 14:05	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 0:00	Nitrite + Nitrate Nitrogen	0.785	mg/L		0.01	0.04	SM4500-NO3-F
1/29/2018 16:10	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Antimony, Total, ICP-MS	0.57	ug/L	<RDL	0.3	1	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Arsenic, Total, ICP-MS	1.89	ug/L		0.05	0.25	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Barium, Total, ICP-MS	13.2	ug/L		0.5	0.5	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Bis(2-Ethylhexyl)Phthalate	0.74	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Cadmium, Total, ICP-MS	0.057	ug/L	<RDL	0.05	0.25	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Calcium, Total, ICP-MS	7250	ug/L		50	50	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Chromium, Total, ICP-MS	2.29	ug/L		0.2	1	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Copper, Total, ICP-MS	12.2	ug/L		0.2	2	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Dibenzo(a,e)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Dibenzo(a,h)anthracene		ug/L	<MDL,JG	0.2	0.375	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Dibenzo(a,h)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Diethyl Phthalate	0.491	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Discharge Volume	3325000	gal				NONE
1/29/2018 16:10	Dissolved Oxygen, Field	10.9	mg/L		0.5	1	NONE
1/29/2018 16:10	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Hardness, Calc	33.1	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/29/2018 16:10	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D

Alki Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/29/2018 16:10	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Lead, Total, ICP-MS	4.8	ug/L		0.1	0.5	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Magnesium, Total, ICP-MS	3640	ug/L		50	50	EPA 200.8*SWD846 6020A
1/29/2018 16:10	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Nickel, Total, ICP-MS	4.08	ug/L		0.1	0.5	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 16:10	Salinity		PSS	<MDL	2	3	SM2520-B
1/29/2018 16:10	Sample Temperature, Field	10.6	deg C				NONE
1/29/2018 16:10	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Silver, Total, ICP-MS	0.17	ug/L	<RDL	0.04	0.2	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SWD846 6020A
1/29/2018 16:10	Zinc, Total, ICP-MS	41.6	ug/L		0.5	2.5	EPA 200.8*SWD846 6020A
1/29/2018 18:00	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Chloroform	2.33	ug/L		1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
1/29/2018 18:00	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Hem (oil, total)	29	mg/L	B3	1.4	5.1	EPA 1664B
1/29/2018 18:00	Mercury, Total, CVAF	0.0126	ug/L		0.0004	0.001	EPA 1631E
1/29/2018 18:00	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Total Phenolics	0.077	mg/L		0.04	0.04	EPA 420.1
1/29/2018 18:00	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 18:00	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Carkeek Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/5/2014 4:50	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Ammonia Nitrogen	1.95	mg/L		0.2	1	KEROUEL & AMINOT 1997
3/5/2014 4:50	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Antimony, Total, ICP-MS	0.63	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
3/5/2014 4:50	Arsenic, Total, ICP-MS	2.31	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Barium, Total, ICP-MS	16.8	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
3/5/2014 4:50	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Benzidine		ug/L	<MDL,JG	5	5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Bis(2-Ethylhexyl)Phthalate	31.8	ug/L	B2	0.13	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Cadmium, Total, ICP-MS	0.069	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
3/5/2014 4:50	Calcium, Total, ICP-MS	10600	ug/L		50	50	EPA 200.8*SW846 6020A
3/5/2014 4:50	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chloroform	2.48	ug/L		1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chromium, Total, ICP-MS	1.79	ug/L		0.2	1	EPA 200.8*SW846 6020A
3/5/2014 4:50	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Copper, Total, ICP-MS	12.6	ug/L		0.4	2	EPA 200.8*SW846 6020A
3/5/2014 4:50	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Diethyl Phthalate	0.353	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D

Carkeek Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/5/2014 4:50	Discharge Volume	1630800	gal				NONE
3/5/2014 4:50	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Hardness, Calc	36.4	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
3/5/2014 4:50	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Lead, Total, ICP-MS	4.77	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Magnesium, Total, ICP-MS	2420	ug/L		50	50	EPA 200.8*SW846 6020A
3/5/2014 4:50	Mercury, Total, CVAF	0.033	ug/L		0.002	0.005	EPA 1631E
3/5/2014 4:50	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Nickel, Total, ICP-MS	2.49	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Nitrite + Nitrate Nitrogen	2.3	mg/L	<RDL	1	4	SM4500-NO3-F
3/5/2014 4:50	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Salinity		PSS	<MDL	2	3	SM2520-B
3/5/2014 4:50	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
3/5/2014 4:50	Silver, Total, ICP-MS	0.044	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
3/5/2014 4:50	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/5/2014 4:50	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Total Alkalinity	37.7	mg CaCO3/L		1	5	SM2320-B
3/5/2014 4:50	Total Dissolved Solids	102	mg/L		15	30	SM2540-C
3/5/2014 4:50	Total Kjeldahl Nitrogen	4.27	mg/L	SH	0.5	1	EPA 351.2
3/5/2014 4:50	Total Phosphorus	0.783	mg/L		0.05	0.1	SM4500-P-B,F
3/5/2014 4:50	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Zinc, Total, ICP-MS	42.6	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
3/5/2014 6:01	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/5/2014 6:01	Dissolved Oxygen, Field	10.3	mg/L		0.5	1	NONE
3/5/2014 6:01	Hem (oil, total)	2.1	mg/L	<RDL	1.4	5.2	EPA 1664B
3/5/2014 6:01	Sample Temperature, Field	9.9	deg C				NONE
3/5/2014 6:01	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/5/2014 9:36	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/5/2014 9:36	Hem (oil, total)	4.9	mg/L	<RDL	1.5	5.2	EPA 1664B
3/5/2014 9:36	Sample Temperature, Field	10.7	deg C				NONE
3/5/2014 9:36	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/5/2014 9:47	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D

Carkeek Wet Weather Treatment Station							
COLLECTDATE	**PARMNAME**	**NUMVALUE**	**UNITS**	**QUALIFIER**	**MDL**	**RDL**	**METHOD**
3/5/2014 9:47	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Ammonia Nitrogen	2.58	mg/L		0.2	1	KEROUEL & AMINOT 1997
3/5/2014 9:47	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Antimony, Total, ICP-MS	0.62	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
3/5/2014 9:47	Arsenic, Total, ICP-MS	1.93	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 9:47	Barium, Total, ICP-MS	19	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
3/5/2014 9:47	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Benzidine		ug/L	<MDL,JG	5	5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 9:47	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Bis(2-Ethylhexyl)Phthalate	8.35	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Cadmium, Total, ICP-MS	0.065	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
3/5/2014 9:47	Calcium, Total, ICP-MS	13400	ug/L		50	50	EPA 200.8*SW846 6020A
3/5/2014 9:47	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Chloroform	3.87	ug/L		1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Chromium, Total, ICP-MS	1.29	ug/L		0.2	1	EPA 200.8*SW846 6020A
3/5/2014 9:47	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Copper, Total, ICP-MS	17.8	ug/L		0.4	2	EPA 200.8*SW846 6020A
3/5/2014 9:47	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Diethyl Phthalate	0.664	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Discharge Volume	1397800	gal				NONE
3/5/2014 9:47	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Hardness, Calc	46.2	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
3/5/2014 9:47	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Lead, Total, ICP-MS	2.87	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 9:47	Magnesium, Total, ICP-MS	3100	ug/L		50	50	EPA 200.8*SW846 6020A
3/5/2014 9:47	Mercury, Total, CVAF	0.0129	ug/L		0.0002	0.0005	EPA 1631E
3/5/2014 9:47	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Nickel, Total, ICP-MS	2.12	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 9:47	Nitrite + Nitrate Nitrogen	2.8	mg/L	<RDL	1	4	SM4500-NO3-F
3/5/2014 9:47	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Phenol	1.42	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
3/5/2014 9:47	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D

Carkeek Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/5/2014 9:47	Salinity		PSS	<MDL	2	3	SM2520-B
3/5/2014 9:47	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
3/5/2014 9:47	Silver, Total, ICP-MS	0.046	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
3/5/2014 9:47	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/5/2014 9:47	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Total Alkalinity	53.9	mg CaCO3/L		1	5	SM2320-B
3/5/2014 9:47	Total Dissolved Solids	144	mg/L		15	30	SM2540-C
3/5/2014 9:47	Total Kjeldahl Nitrogen	5.91	mg/L	SH	0.5	1	EPA 351.2
3/5/2014 9:47	Total Phosphorus	0.987	mg/L		0.05	0.1	SM4500-P-B,F
3/5/2014 9:47	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 9:47	Zinc, Total, ICP-MS	106	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
3/6/2014 1:43	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/6/2014 1:43	Hem (oil, total)	5.5	mg/L		1.5	5.2	EPA 1664B
3/6/2014 1:43	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/6/2014 1:54	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Ammonia Nitrogen	1.87	mg/L		0.2	1	KEROUEL & AMINOT 1997
3/6/2014 1:54	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Antimony, Total, ICP-MS	0.56	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
3/6/2014 1:54	Arsenic, Total, ICP-MS	1.77	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/6/2014 1:54	Barium, Total, ICP-MS	17.4	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
3/6/2014 1:54	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Benzidine		ug/L	<MDL,JG	5	5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Benzyl Butyl Phthalate	0.099	ug/L	<RDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
3/6/2014 1:54	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Bis(2-Ethylhexyl)Phthalate	14.4	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Cadmium, Total, ICP-MS	0.06	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
3/6/2014 1:54	Calcium, Total, ICP-MS	13400	ug/L		50	50	EPA 200.8*SW846 6020A
3/6/2014 1:54	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Carkeek Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/6/2014 1:54	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Chloroform	1.5	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Chromium, Total, ICP-MS	1.03	ug/L		0.2	1	EPA 200.8*SW846 6020A
3/6/2014 1:54	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Copper, Total, ICP-MS	9.47	ug/L		0.4	2	EPA 200.8*SW846 6020A
3/6/2014 1:54	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Diethyl Phthalate	0.547	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Discharge Volume	2168500	gal				NONE
3/6/2014 1:54	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Hardness, Calc	46.5	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
3/6/2014 1:54	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Lead, Total, ICP-MS	1.91	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/6/2014 1:54	Magnesium, Total, ICP-MS	3180	ug/L		50	50	EPA 200.8*SW846 6020A
3/6/2014 1:54	Mercury, Total, CVAF	0.0143	ug/L		0.0004	0.001	EPA 1631E
3/6/2014 1:54	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Nickel, Total, ICP-MS	1.88	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/6/2014 1:54	Nitrite + Nitrate Nitrogen	2.53	mg/L		0.5	2	SM4500-NO3-F
3/6/2014 1:54	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Phenol	0.63	ug/L	<RDL	0.5	0.75	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/6/2014 1:54	Salinity		PSS	<MDL	2	3	SM2520-B
3/6/2014 1:54	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
3/6/2014 1:54	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/6/2014 1:54	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/6/2014 1:54	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Total Alkalinity	47.5	mg CaCO3/L		1	5	SM2320-B
3/6/2014 1:54	Total Dissolved Solids	127	mg/L		15	30	SM2540-C
3/6/2014 1:54	Total Kjeldahl Nitrogen	5.77	mg/L	SH	0.5	1	EPA 351.2
3/6/2014 1:54	Total Phosphorus	0.79	mg/L		0.05	0.1	SM4500-P-B,F
3/6/2014 1:54	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/6/2014 1:54	Zinc, Total, ICP-MS	38.7	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
3/15/2015 14:12	1,2,4-Trichlorobenzene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	1,2-Diphenylhydrazine		ug/L	<MDL	1.2	2.48	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2,4,6-Trichlorophenol		ug/L	<MDL	2.5	4.95	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2,4-Dichlorophenol		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2,4-Dimethylphenol		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2,4-Dinitrophenol		ug/L	<MDL	3.7	6.19	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2,4-Dinitrotoluene		ug/L	<MDL	0.62	2.48	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2,6-Dinitrotoluene		ug/L	<MDL	0.62	2.48	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2-Chloronaphthalene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2-Chlorophenol		ug/L	<MDL	1.2	2.48	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2-Methylphenol		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	2-Nitrophenol		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	2.48	2.48	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	3-Methylcholanthrene		ug/L	<MDL	2.5	9.9	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	4,6-Dinitro-O-Cresol		ug/L	<MDL	2.5	6.19	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.25	0.371	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	4-Chloro-3-Methylphenol		ug/L	<MDL	1.2	2.48	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	4-Nitrophenol		ug/L	<MDL	2.5	6.19	EPA 625/SW846 3520C*8270D

Carkeek Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/15/2015 14:12	Acenaphthene		ug/L	<MDL	0.25	0.495	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Acenaphthylene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Anthracene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Antimony, Total, ICP-MS	0.52	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
3/15/2015 14:12	Arsenic, Total, ICP-MS	2.72	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 14:12	Barium, Total, ICP-MS	15.5	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
3/15/2015 14:12	Benzidine		ug/L	<MDL,JG	37.1	111	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Benzo(a)anthracene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Benzo(a)pyrene		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.99	1.86	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Benzo(g,h,i)perylene		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Benzo(r,s,t)pentaphene		ug/L	<MDL	3.1	12.4	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Benzyl Butyl Phthalate		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 14:12	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL,JG	1.2	2.48	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Bis(2-Ethylhexyl)Phthalate	1.5	ug/L	<RDL	0.62	2.48	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Cadmium, Total, ICP-MS	0.084	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
3/15/2015 14:12	Calcium, Total, ICP-MS	10000	ug/L		50	50	EPA 200.8*SW846 6020A
3/15/2015 14:12	Chromium, Total, ICP-MS	2.05	ug/L		0.2	1	EPA 200.8*SW846 6020A
3/15/2015 14:12	Chrysene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Copper, Total, ICP-MS	16.6	ug/L		0.4	2	EPA 200.8*SW846 6020A
3/15/2015 14:12	Di-N-Butyl Phthalate		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Di-N-Octyl Phthalate		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Dibenzo(a,e)pyrene		ug/L	<MDL	3.1	12.4	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Dibenzo(a,h)acridine		ug/L	<MDL	3.1	12.4	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Dibenzo(a,h)anthracene		ug/L	<MDL	0.99	1.86	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Dibenzo(a,h)pyrene		ug/L	<MDL	3.1	12.4	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Dibenzo(a,j)acridine		ug/L	<MDL	3.1	12.4	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Diethyl Phthalate	0.71	ug/L	<RDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Dimethyl Phthalate		ug/L	<MDL	0.25	0.371	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Discharge Volume	2170000	gal				NONE
3/15/2015 14:12	Fluoranthene		ug/L	<MDL	0.37	0.743	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Fluorene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Hardness, Calc	35.2	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
3/15/2015 14:12	Hexachlorobenzene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Hexachlorobutadiene		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Hexachlorocyclopentadiene		ug/L	<MDL,JG	2.5	6.19	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Hexachloroethane		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Isophorone		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Lead, Total, ICP-MS	4.92	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 14:12	Magnesium, Total, ICP-MS	2490	ug/L		50	50	EPA 200.8*SW846 6020A
3/15/2015 14:12	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	N-Nitrosodimethylamine		ug/L	<MDL	2.5	3.71	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	N-Nitrosodiphenylamine		ug/L	<MDL	1.2	2.48	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Naphthalene		ug/L	<MDL	0.99	1.86	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Nickel, Total, ICP-MS	2.91	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 14:12	Nitrobenzene		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Pentachlorophenol		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Perylene		ug/L	<MDL	0.62	1.24	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Phenanthrene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Phenol		ug/L	<MDL	2.5	3.71	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Pyrene		ug/L	<MDL	0.37	0.619	EPA 625/SW846 3520C*8270D
3/15/2015 14:12	Salinity		PSS	<MDL	2	3	SM2520-B
3/15/2015 14:12	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
3/15/2015 14:12	Silver, Total, ICP-MS	0.086	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
3/15/2015 14:12	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/15/2015 14:12	Zinc, Total, ICP-MS	66.5	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
3/15/2015 16:15	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Acrolein		ug/L	<MDL,JG	5	10	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Carkeek Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/15/2015 16:15	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Chloroform	3.01	ug/L		1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/15/2015 16:15	Dissolved Oxygen, Field	10.2	mg/L		0.5	1	NONE
3/15/2015 16:15	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Hem (oil, total)	7.3	mg/L	B	1.5	5.3	EPA 1664B
3/15/2015 16:15	Mercury, Total, CVAF	0.0191	ug/L		0.002	0.005	EPA 1631E
3/15/2015 16:15	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Toluene	1.4	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/15/2015 16:15	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:15	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 16:20	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/15/2015 16:20	Hem (oil, total)	10.3	mg/L	B3	1.6	5.7	EPA 1664B
3/15/2015 16:20	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/16/2015 8:31	Nitrite + Nitrate Nitrogen	1.69	mg/L	SH	0.05	0.2	SM4500-NO3-F
1/21/2016 0:00	Nitrite + Nitrate Nitrogen	2.31	mg/L		0.01	0.04	SM4500-NO3-F
1/21/2016 7:42	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	1,2-Diphenylhydrazine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Antimony, Total, ICP-MS	0.66	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/21/2016 7:42	Arsenic, Total, ICP-MS	2.51	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 7:42	Barium, Total, ICP-MS	20.2	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/21/2016 7:42	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 7:42	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Bis(2-Ethylhexyl)Phthalate	0.42	ug/L	<RDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Cadmium, Total, ICP-MS	0.091	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/21/2016 7:42	Calcium, Total, ICP-MS	10600	ug/L		50	50	EPA 200.8*SW846 6020A
1/21/2016 7:42	Chromium, Total, ICP-MS	2.08	ug/L		0.2	1	EPA 200.8*SW846 6020A
1/21/2016 7:42	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Copper, Total, ICP-MS	14.2	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/21/2016 7:42	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Dibenzo(a,j)acridine		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Diethyl Phthalate	0.376	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Discharge Volume	27305000	gal				NONE

Carkeek Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/21/2016 7:42	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Hardness, Calc	37.8	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/21/2016 7:42	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Lead, Total, ICP-MS	7.59	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 7:42	Magnesium, Total, ICP-MS	2730	ug/L		50	50	EPA 200.8*SW846 6020A
1/21/2016 7:42	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	N-Nitrosodiphenylamine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Nickel, Total, ICP-MS	2.91	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 7:42	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Phenol	1.23	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 7:42	Salinity		PSS	<MDL	2	3	SM2520-B
1/21/2016 7:42	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/21/2016 7:42	Silver, Total, ICP-MS	0.059	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
1/21/2016 7:42	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/21/2016 7:42	Zinc, Total, ICP-MS	51.7	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/21/2016 10:22	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Chloroform	2.41	ug/L		1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
1/21/2016 10:22	Dissolved Oxygen, Field	10.9	mg/L		0.5	1	NONE
1/21/2016 10:22	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Hem (oil, total)	4.1	mg/L	<RDL	1.4	5.2	EPA 1664B
1/21/2016 10:22	Mercury, Total, CVAF	0.0315	ug/L		0.002	0.005	EPA 1631E
1/21/2016 10:22	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Sample Temperature, Field	10.3	deg C				NONE
1/21/2016 10:22	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Total Phenolics	0.14	mg/L		0.04	0.04	EPA 420.1
1/21/2016 10:22	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 10:22	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 13:56	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	1,2-Diphenylhydrazine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D

Carkeek Wet Weather Treatment Station							
COLLECTDATE	**PARMNAME**	**NUMVALUE**	**UNITS**	**QUALIFIER**	**MDL**	**RDL**	**METHOD**
1/21/2016 13:56	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	3-Methylcholanthrene		ug/L	<MDL	2.5	10	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Antimony, Total, ICP-MS	0.63	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/21/2016 13:56	Arsenic, Total, ICP-MS	1.95	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 13:56	Barium, Total, ICP-MS	18.7	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/21/2016 13:56	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Benzo(a)pyrene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Benzo(b,j,k)fluoranthene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Benzo(g,h,i)perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 13:56	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Bis(2-Ethylhexyl)Phthalate	0.49	ug/L	<RDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Cadmium, Total, ICP-MS	0.065	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/21/2016 13:56	Calcium, Total, ICP-MS	12900	ug/L		50	50	EPA 200.8*SW846 6020A
1/21/2016 13:56	Chromium, Total, ICP-MS	1.32	ug/L		0.2	1	EPA 200.8*SW846 6020A
1/21/2016 13:56	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Copper, Total, ICP-MS	10.2	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/21/2016 13:56	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Di-N-Octyl Phthalate		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Dibenzo(a,h)acridine		ug/L	<MDL	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Dibenzo(a,h)anthracene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Dibenzo(a,j)acridine		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Diethyl Phthalate	0.402	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Discharge Volume	70351000	gal				NONE
1/21/2016 13:56	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Hardness, Calc	45.5	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/21/2016 13:56	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Lead, Total, ICP-MS	2.96	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 13:56	Magnesium, Total, ICP-MS	3220	ug/L		50	50	EPA 200.8*SW846 6020A
1/21/2016 13:56	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	N-Nitrosodiphenylamine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Nickel, Total, ICP-MS	2.49	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 13:56	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Phenol	0.831	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/21/2016 13:56	Salinity		PSS	<MDL	2	3	SM2520-B
1/21/2016 13:56	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/21/2016 13:56	Silver, Total, ICP-MS	0.043	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
1/21/2016 13:56	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/21/2016 13:56	Zinc, Total, ICP-MS	38.7	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/22/2016 0:00	Nitrite + Nitrate Nitrogen	2.55	mg/L	H	0.01	0.04	SM4500-NO3-F
1/22/2016 10:10	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	1,2-Diphenylhydrazine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D

Carkeek Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/22/2016 10:10	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	3-Methylcholanthrene		ug/L	<MDL	2.5	10	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Antimony, Total, ICP-MS	0.54	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/22/2016 10:10	Arsenic, Total, ICP-MS	1.48	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/22/2016 10:10	Barium, Total, ICP-MS	16.3	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/22/2016 10:10	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Benzo(a)pyrene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Benzo(b,j,k)fluoranthene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Benzo(g,h,i)perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/22/2016 10:10	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Bis(2-Ethylhexyl)Phthalate	1.33	ug/L		0.13	0.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Cadmium, Total, ICP-MS	0.092	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/22/2016 10:10	Calcium, Total, ICP-MS	14400	ug/L		50	50	EPA 200.8*SW846 6020A
1/22/2016 10:10	Chromium, Total, ICP-MS	0.79	ug/L	<RDL	0.2	1	EPA 200.8*SW846 6020A
1/22/2016 10:10	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Copper, Total, ICP-MS	10.8	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/22/2016 10:10	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Di-N-Octyl Phthalate		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Dibenzo(a,h)acridine		ug/L	<MDL	3.1	12.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Dibenzo(a,h)anthracene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Dibenzo(a,j)acridine		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Diethyl Phthalate	0.787	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Discharge Volume	669500	gal				NONE
1/22/2016 10:10	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Hardness, Calc	51.9	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/22/2016 10:10	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Lead, Total, ICP-MS	1.63	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/22/2016 10:10	Magnesium, Total, ICP-MS	3900	ug/L		50	50	EPA 200.8*SW846 6020A
1/22/2016 10:10	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	N-Nitrosodiphenylamine		ug/L	<MDL,JG	0.25	0.5	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Nickel, Total, ICP-MS	2.15	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/22/2016 10:10	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Phenol	1.61	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/22/2016 10:10	Salinity		PSS	<MDL	2	3	SM2520-B
1/22/2016 10:10	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/22/2016 10:10	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
1/22/2016 10:10	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/22/2016 10:10	Zinc, Total, ICP-MS	40.4	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/17/2017 0:00	Nitrite + Nitrate Nitrogen	1.11	mg/L	SH	0.04	0.16	SM4500-NO3-F
1/17/2017 19:39	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D

Carkeek Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/17/2017 19:39	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Antimony, Total, ICP-MS	0.48	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/17/2017 19:39	Arsenic, Total, ICP-MS	2.37	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:39	Barium, Total, ICP-MS	14.9	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:39	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:39	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Bis(2-Ethylhexyl)Phthalate	0.821	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Cadmium, Total, ICP-MS	0.089	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/17/2017 19:39	Calcium, Total, ICP-MS	10000	ug/L		50	50	EPA 200.8*SW846 6020A
1/17/2017 19:39	Chromium, Total, ICP-MS	1.81	ug/L		0.2	1	EPA 200.8*SW846 6020A
1/17/2017 19:39	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Copper, Total, ICP-MS	13	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/17/2017 19:39	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Diethyl Phthalate	0.506	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Discharge Volume	2150000	gal				NONE
1/17/2017 19:39	Dissolved Oxygen, Field	11.1	mg/L		0.5	1	NONE
1/17/2017 19:39	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Hardness, Calc	37.1	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/17/2017 19:39	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Lead, Total, ICP-MS	5.03	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:39	Magnesium, Total, ICP-MS	2940	ug/L		50	50	EPA 200.8*SW846 6020A
1/17/2017 19:39	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Nickel, Total, ICP-MS	2.43	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/17/2017 19:39	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Phenol	1.48	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/17/2017 19:39	Salinity		PSS	<MDL	2	3	SM2520-B
1/17/2017 19:39	Sample Temperature, Field	10.2	deg C				NONE
1/17/2017 19:39	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/17/2017 19:39	Silver, Total, ICP-MS	0.045	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
1/17/2017 19:39	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/17/2017 19:39	Zinc, Total, ICP-MS	50.4	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/18/2017 0:00	Nitrite + Nitrate Nitrogen	1.95	mg/L	SH	0.04	0.16	SM4500-NO3-F
1/18/2017 7:40	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Carkeek Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/18/2017 7:40	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Chloroform	8.6	ug/L		1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Cyanide, Weak & Dissociable	0.0033	mg/L	<RDL	0.002	0.01	SM4500-CN-I,E
1/18/2017 7:40	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Hem (oil, total)	4.2	mg/L	<RDL,B	1.5	5.5	EPA 1664B
1/18/2017 7:40	Mercury, Total, CVAF	0.0163	ug/L		0.002	0.005	EPA 1631E
1/18/2017 7:40	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Toluene	1.7	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Total Phenolics	0.055	mg/L		0.04	0.04	EPA 420.1
1/18/2017 7:40	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 7:40	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 13:08	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Antimony, Total, ICP-MS	0.44	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/18/2017 13:08	Arsenic, Total, ICP-MS	1.88	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 13:08	Barium, Total, ICP-MS	16.7	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/18/2017 13:08	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 13:08	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Bis(2-Ethylhexyl)Phthalate	0.917	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Cadmium, Total, ICP-MS	0.056	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/18/2017 13:08	Calcium, Total, ICP-MS	13400	ug/L		50	50	EPA 200.8*SW846 6020A
1/18/2017 13:08	Chromium, Total, ICP-MS	1.07	ug/L		0.2	1	EPA 200.8*SW846 6020A
1/18/2017 13:08	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Copper, Total, ICP-MS	10.1	ug/L		0.2	2	EPA 200.8*SW846 6020A

Carkeek Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/18/2017 13:08	Di-N-Butyl Phthalate	0.14	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Diethyl Phthalate	0.539	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Discharge Volume	2000000	gal				NONE
1/18/2017 13:08	Dissolved Oxygen, Field	11.1	mg/L		0.5	1	NONE
1/18/2017 13:08	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Hardness, Calc	50.1	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/18/2017 13:08	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Lead, Total, ICP-MS	2.28	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 13:08	Magnesium, Total, ICP-MS	4050	ug/L		50	50	EPA 200.8*SW846 6020A
1/18/2017 13:08	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Nickel, Total, ICP-MS	2.04	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 13:08	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Phenol	1.59	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 13:08	Sample Temperature, Field	10.2	deg C				NONE
1/18/2017 13:08	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/18/2017 13:08	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
1/18/2017 13:08	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/18/2017 13:08	Zinc, Total, ICP-MS	39.3	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/18/2017 14:00	Antimony, Total, ICP-MS	0.42	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/18/2017 14:00	Arsenic, Total, ICP-MS	1.75	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 14:00	Barium, Total, ICP-MS	16.2	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/18/2017 14:00	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 14:00	Cadmium, Total, ICP-MS	0.068	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/18/2017 14:00	Calcium, Total, ICP-MS	13600	ug/L		50	50	EPA 200.8*SW846 6020A
1/18/2017 14:00	Chromium, Total, ICP-MS	1.08	ug/L		0.2	1	EPA 200.8*SW846 6020A
1/18/2017 14:00	Copper, Total, ICP-MS	10.9	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/18/2017 14:00	Discharge Volume	455000	gal				NONE
1/18/2017 14:00	Hardness, Calc	51.6	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/18/2017 14:00	Lead, Total, ICP-MS	2.07	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 14:00	Magnesium, Total, ICP-MS	4260	ug/L		50	50	EPA 200.8*SW846 6020A
1/18/2017 14:00	Nickel, Total, ICP-MS	2.18	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 14:00	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/18/2017 14:00	Silver, Total, ICP-MS	0.042	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
1/18/2017 14:00	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/18/2017 14:00	Zinc, Total, ICP-MS	40	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/19/2017 0:00	Nitrite + Nitrate Nitrogen	2.47	mg/L	SH	0.05	0.2	SM4500-NO3-F
1/11/2018 12:49	Antimony, Total, ICP-MS	0.93	ug/L	<RDL	0.3	1	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Arsenic, Total, ICP-MS	2.06	ug/L		0.05	0.25	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Barium, Total, ICP-MS	12.8	ug/L		0.5	0.5	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Cadmium, Total, ICP-MS	0.24	ug/L	<RDL	0.05	0.25	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Calcium, Total, ICP-MS	8700	ug/L		50	50	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Chromium, Total, ICP-MS	1.76	ug/L		0.2	1	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Copper, Total, ICP-MS	13.2	ug/L		0.2	2	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Discharge Volume	87000	gal				NONE
1/11/2018 12:49	Dissolved Oxygen, Field	10.8	mg/L		0.5	1	KCEL SOP# 245
1/11/2018 12:49	Hardness, Calc	31.3	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/11/2018 12:49	Lead, Total, ICP-MS	3.47	ug/L		0.1	0.5	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Magnesium, Total, ICP-MS	2320	ug/L		50	50	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Nickel, Total, ICP-MS	2.57	ug/L		0.1	0.5	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Silver, Total, ICP-MS	0.049	ug/L	<RDL	0.04	0.2	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SWD846 6020A
1/11/2018 12:49	Zinc, Total, ICP-MS	52.9	ug/L		0.5	2.5	EPA 200.8*SWD846 6020A
1/11/2018 12:49	pH, Field	6.94	pH				KCEL SOP# 245
1/11/2018 13:40	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Carkeek Wet Weather Treatment Station							
COLLECTDATE	**PARMNAME**	**NUMVALUE**	**UNITS**	**QUALIFIER**	**MDL**	**RDL**	**METHOD**
1/11/2018 13:40	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Chloroform	2.69	ug/L		1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
1/11/2018 13:40	Discharge Rate	914000	mgd				NONE
1/11/2018 13:40	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Hem (oil, total)	10.3	mg/L	B	1.4	5.1	EPA 1664B
1/11/2018 13:40	Mercury, Total, CVAF	0.0155	ug/L		0.0002	0.0005	EPA 1631E
1/11/2018 13:40	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
1/11/2018 13:40	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 13:40	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 0:00	Nitrite + Nitrate Nitrogen	1.19	mg/L	H	0.01	0.04	SM4500-NO3-F
1/29/2018 15:45	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Antimony, Total, ICP-MS	0.49	ug/L	<RDL	0.3	1	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Arsenic, Total, ICP-MS	2.15	ug/L		0.05	0.25	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Barium, Total, ICP-MS	14.2	ug/L		0.5	0.5	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Bis(2-Ethylhexyl)Phthalate	0.67	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Cadmium, Total, ICP-MS	0.077	ug/L	<RDL	0.05	0.25	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Calcium, Total, ICP-MS	8610	ug/L		50	50	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Chromium, Total, ICP-MS	1.86	ug/L		0.2	1	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D

Carkeek Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/29/2018 15:45	Copper, Total, ICP-MS	15.4	ug/L		0.2	2	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Dibenzo(a,e)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Dibenzo(a,h)anthracene		ug/L	<MDL,JG	0.2	0.375	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Dibenzo(a,h)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Diethyl Phthalate	0.288	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Discharge Volume	555000	gal				NONE
1/29/2018 15:45	Dissolved Oxygen, Field	10.7	mg/L		0.5	1	NONE
1/29/2018 15:45	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Hardness, Calc	31.4	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/29/2018 15:45	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Lead, Total, ICP-MS	3.78	ug/L		0.1	0.5	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Magnesium, Total, ICP-MS	2410	ug/L		50	50	EPA 200.8*SWD846 6020A
1/29/2018 15:45	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Nickel, Total, ICP-MS	2.17	ug/L		0.1	0.5	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/29/2018 15:45	Salinity		PSS	<MDL	2	3	SM2520-B
1/29/2018 15:45	Sample Temperature, Field	10.8	deg C				NONE
1/29/2018 15:45	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Silver, Total, ICP-MS	0.06	ug/L	<RDL	0.04	0.2	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SWD846 6020A
1/29/2018 15:45	Zinc, Total, ICP-MS	161	ug/L		0.5	2.5	EPA 200.8*SWD846 6020A
1/29/2018 16:30	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Chloroform	5.86	ug/L		1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
1/29/2018 16:30	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Hem (oil, total)	9	mg/L	B	1.4	5.1	EPA 1664B
1/29/2018 16:30	Mercury, Total, CVAF	0.0189	ug/L		0.0004	0.001	EPA 1631E
1/29/2018 16:30	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
1/29/2018 16:30	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/29/2018 16:30	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Elliott West Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/5/2014 4:50	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Ammonia Nitrogen	1.79	mg/L		0.2	1	KEROUEL & AMINOT 1997
3/5/2014 4:50	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Antimony, Dissolved, ICP-MS	0.48	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
3/5/2014 4:50	Antimony, Total, ICP-MS	0.95	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
3/5/2014 4:50	Arsenic, Dissolved, ICP-MS	1.57	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Barium, Dissolved, ICP-MS	6.71	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
3/5/2014 4:50	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Benzyl Butyl Phthalate	0.192	ug/L		0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Beryllium, Dissolved, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Bis(2-Ethylhexyl)Phthalate	12.8	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Cadmium, Dissolved, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
3/5/2014 4:50	Cadmium, Total, ICP-MS	0.11	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
3/5/2014 4:50	Calcium, Total, ICP-MS	7010	ug/L		50	50	EPA 200.8*SW846 6020A
3/5/2014 4:50	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chloroform	10.5	ug/L		1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Chromium, Dissolved, ICP-MS	0.56	ug/L	<RDL	0.2	1	EPA 200.8*SW846 6020A
3/5/2014 4:50	Chromium, Total, ICP-MS	3.31	ug/L		0.2	1	EPA 200.8*SW846 6020A
3/5/2014 4:50	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Copper, Dissolved, ICP-MS	9.36	ug/L		0.4	2	EPA 200.8*SW846 6020A
3/5/2014 4:50	Copper, Total, ICP-MS	23.4	ug/L		0.4	2	EPA 200.8*SW846 6020A
3/5/2014 4:50	Di-N-Butyl Phthalate	0.23	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Di-N-Octyl Phthalate	0.087	ug/L	<RDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Discharge Volume	28200000	gal				NONE
3/5/2014 4:50	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Hardness, Calc	25.3	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
3/5/2014 4:50	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Lead, Dissolved, ICP-MS	0.53	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Lead, Total, ICP-MS	13	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Magnesium, Total, ICP-MS	1880	ug/L		50	50	EPA 200.8*SW846 6020A
3/5/2014 4:50	Mercury, Dissolved, CVAF	0.00738	ug/L		0.0002	0.0005	EPA 1631E
3/5/2014 4:50	Mercury, Total, CVAF	0.0306	ug/L		0.002	0.005	EPA 1631E

Elliott West Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/5/2014 4:50	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Nickel, Total, ICP-MS	3.27	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/5/2014 4:50	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
3/5/2014 4:50	Salinity		PSS	<MDL	2	3	SM2520-B
3/5/2014 4:50	Selenium, Dissolved, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
3/5/2014 4:50	Silver, Dissolved, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/5/2014 4:50	Silver, Total, ICP-MS	0.13	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
3/5/2014 4:50	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Thallium, Dissolved, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/5/2014 4:50	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/5/2014 4:50	Total Dissolved Solids	94.1	mg/L		15	30	SM2540-C
3/5/2014 4:50	Total Kjeldahl Nitrogen	4.44	mg/L	SH	0.5	1	EPA 351.2
3/5/2014 4:50	Total Phosphorus	0.723	mg/L		0.05	0.1	SM4500-P-B,F
3/5/2014 4:50	Total Suspended Solids	55.5	mg/L		2.5	5	SM2540-D
3/5/2014 4:50	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/5/2014 4:50	Zinc, Dissolved, ICP-MS	35.2	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
3/5/2014 5:00	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/5/2014 5:00	Dissolved Oxygen, Field	11	mg/L		0.5	1	NONE
3/5/2014 5:00	Hem (oil, total)	5.5	mg/L	B	1.5	5.2	EPA 1664B
3/5/2014 5:00	Sample Temperature, Field	10.9	deg C				NONE
3/5/2014 8:58	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/5/2014 8:58	Hem (oil, total)	2.8	mg/L	<RDL,B	1.5	5.3	EPA 1664B
3/5/2014 8:58	Sample Temperature, Field	10.1	deg C				NONE
3/5/2014 8:58	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/6/2014 2:30	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
10/31/2014 9:17	Antimony, Dissolved, ICP-MS	0.96	ug/L	<RDL,H	0.3	1	EPA 200.8*SW846 6020A
10/31/2014 9:17	Antimony, Total, ICP-MS	1.43	ug/L		0.3	1	EPA 200.8*SW846 6020A
10/31/2014 9:17	Arsenic, Dissolved, ICP-MS	1.94	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
10/31/2014 9:17	Arsenic, Total, ICP-MS	2.4	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/31/2014 9:17	Barium, Dissolved, ICP-MS	6.67	ug/L	H	0.05	0.25	EPA 200.8*SW846 6020A
10/31/2014 9:17	Barium, Total, ICP-MS	24.6	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
10/31/2014 9:17	Chromium, Dissolved, ICP-MS	0.61	ug/L	<RDL,H	0.2	1	EPA 200.8*SW846 6020A
10/31/2014 9:17	Chromium, Total, ICP-MS	4.02	ug/L		0.2	1	EPA 200.8*SW846 6020A
10/31/2014 9:17	Copper, Dissolved, ICP-MS	15.9	ug/L	H	0.4	2	EPA 200.8*SW846 6020A
10/31/2014 9:17	Copper, Total, ICP-MS	46.3	ug/L		0.4	2	EPA 200.8*SW846 6020A
10/31/2014 9:17	Hardness, Calc	25.6	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
10/31/2014 9:17	Lead, Total, ICP-MS	17	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/31/2014 9:17	Magnesium, Total, ICP-MS	1600	ug/L		50	50	EPA 200.8*SW846 6020A
10/31/2014 9:17	Mercury, Dissolved, CVAF	0.00919	ug/L		0.0002	0.0005	EPA 1631E
10/31/2014 9:17	Mercury, Total, CVAF	0.068	ug/L		0.004	0.01	EPA 1631E
10/31/2014 9:17	Nickel, Dissolved, ICP-MS	1.82	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
10/31/2014 9:17	Nickel, Total, ICP-MS	3.81	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/31/2014 9:17	Nitrite + Nitrate Nitrogen	0.338	mg/L		0.01	0.04	SM4500-NO3-F
10/31/2014 9:17	Salinity		PSS	<MDL	2	3	SM2520-B
10/31/2014 9:17	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
10/31/2014 9:17	Silver, Dissolved, ICP-MS		ug/L	<MDL,H	0.04	0.2	EPA 200.8*SW846 6020A
10/31/2014 9:17	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
10/31/2014 9:17	Total Alkalinity	24.8	mg CaCO3/L		1	5	SM2320-B
10/31/2014 9:17	Total Dissolved Solids	107	mg/L		10	20	SM2540-C
10/31/2014 9:17	Zinc, Total, ICP-MS	137	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
10/31/2014 10:00	Nitrite + Nitrate Nitrogen	0.369	mg/L	H,SH	0.01	0.04	SM4500-NO3-F
10/31/2014 10:45	Dissolved Oxygen	8.6	mg/L		0.1	0.5	SM4500-O-C
11/28/2014 10:37	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	2,4-Dichlorophenol		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	2,4-Dimethylphenol		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	2,4-Dinitrotoluene		ug/L	<MDL	0.6	2.42	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	2-Nitrophenol		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	3,3'-Dichlorobenzidine		ug/L	<MDL	2.42	2.42	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	3-Methylcholanthrene		ug/L	<MDL	2.4	9.66	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	4,6-Dinitro-O-Cresol		ug/L	<MDL	2.4	6.04	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.24	0.362	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	4-Chloro-3-Methylphenol		ug/L	<MDL	1.2	2.42	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	4-Nitrophenol		ug/L	<MDL	2.4	6.04	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Acenaphthene		ug/L	<MDL	0.24	0.483	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Acenaphthylene		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D

Elliott West Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
11/28/2014 10:37	Acrolein		ug/L	<MDL,H	5	10	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Acrylonitrile		ug/L	<MDL,H	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Ammonia Nitrogen	2.16	mg/L		0.1	0.5	KEROUEL & AMINOT 1997
11/28/2014 10:37	Anthracene		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Antimony, Dissolved, ICP-MS	0.83	ug/L	<RDL,H	0.3	1	EPA 200.8*SW846 6020A
11/28/2014 10:37	Antimony, Total, ICP-MS	1.22	ug/L		0.3	1	EPA 200.8*SW846 6020A
11/28/2014 10:37	Arsenic, Dissolved, ICP-MS	1.79	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 10:37	Arsenic, Total, ICP-MS	2.3	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 10:37	Barium, Dissolved, ICP-MS	5.55	ug/L	H	0.05	0.25	EPA 200.8*SW846 6020A
11/28/2014 10:37	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Benzidine		ug/L	<MDL	36.2	109	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Benzo(a)anthracene		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Benzo(a)pyrene		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.97	1.81	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Benzo(g,h,i)perylene		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Benzo(r,s,t)pentaphene		ug/L	<MDL	3	12.1	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Benzyl Butyl Phthalate		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Beryllium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 10:37	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Cadmium, Dissolved, ICP-MS		ug/L	<MDL,H	0.05	0.25	EPA 200.8*SW846 6020A
11/28/2014 10:37	Cadmium, Total, ICP-MS	0.2	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
11/28/2014 10:37	Calcium, Total, ICP-MS	6850	ug/L		50	50	EPA 200.8*SW846 6020A
11/28/2014 10:37	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Chloroform	3.55	ug/L		1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Chromium, Dissolved, ICP-MS	0.68	ug/L	<RDL,H	0.2	1	EPA 200.8*SW846 6020A
11/28/2014 10:37	Chromium, Total, ICP-MS	5.12	ug/L		0.2	1	EPA 200.8*SW846 6020A
11/28/2014 10:37	Chrysene		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Copper, Dissolved, ICP-MS	12.5	ug/L	H	0.4	2	EPA 200.8*SW846 6020A
11/28/2014 10:37	Copper, Total, ICP-MS	46.7	ug/L		0.4	2	EPA 200.8*SW846 6020A
11/28/2014 10:37	Di-N-Octyl Phthalate		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Diethyl Phthalate		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Dimethyl Phthalate		ug/L	<MDL	0.24	0.362	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Discharge Volume	19880000	gal				NONE
11/28/2014 10:37	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Fluoranthene		ug/L	<MDL	0.36	0.725	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Fluorene		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Hardness, Calc	24.2	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
11/28/2014 10:37	Hexachlorobenzene		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Hexachlorocyclopentadiene		ug/L	<MDL	2.4	6.04	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Hexachloroethane		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Isophorone		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Lead, Dissolved, ICP-MS	1.26	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 10:37	Lead, Total, ICP-MS	27.9	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 10:37	Mercury, Dissolved, CVAF	0.0233	ug/L		0.002	0.005	EPA 1631E
11/28/2014 10:37	Mercury, Total, CVAF	0.123	ug/L		0.002	0.005	EPA 1631E
11/28/2014 10:37	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	N-Nitrosodimethylamine		ug/L	<MDL	2.4	3.62	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	N-Nitrosodiphenylamine		ug/L	<MDL	1.2	2.42	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Nickel, Dissolved, ICP-MS	1.11	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 10:37	Nickel, Total, ICP-MS	4.75	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/28/2014 10:37	Nitrite + Nitrate Nitrogen	0.324	mg/L		0.01	0.04	SM4500-NO3-F
11/28/2014 10:37	Perylene		ug/L	<MDL	0.6	1.21	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Phenanthrene		ug/L	<MDL	0.36	0.604	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Phenol		ug/L	<MDL	2.4	3.62	EPA 625/SW846 3520C*8270D
11/28/2014 10:37	Salinity		PSS	<MDL	2	3	SM2520-B
11/28/2014 10:37	Selenium, Dissolved, ICP-MS		ug/L	<MDL,H	0.5	1	EPA 200.8*SW846 6020A
11/28/2014 10:37	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
11/28/2014 10:37	Silver, Dissolved, ICP-MS		ug/L	<MDL,H	0.04	0.2	EPA 200.8*SW846 6020A
11/28/2014 10:37	Silver, Total, ICP-MS	0.202	ug/L		0.04	0.2	EPA 200.8*SW846 6020A
11/28/2014 10:37	Thallium, Dissolved, ICP-MS	0.044	ug/L	<RDL,H	0.04	0.2	EPA 200.8*SW846 6020A
11/28/2014 10:37	Total Dissolved Solids	79.4	mg/L		10	20	SM2540-C
11/28/2014 10:37	Total Kjeldahl Nitrogen	6.83	mg/L	SH	0.3	0.6	EPA 351.2
11/28/2014 10:37	Total Suspended Solids	188	mg/L		5.2	10	SM2540-D
11/28/2014 10:37	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/28/2014 10:37	Zinc, Dissolved, ICP-MS	55.6	ug/L	H	0.5	2.5	EPA 200.8*SW846 6020A
11/28/2014 10:37	Zinc, Total, ICP-MS	162	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
11/28/2014 12:15	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E

Elliott West Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
11/28/2014 12:15	Dissolved Oxygen, Field	9.9	mg/L		0.5	1	NONE
11/28/2014 12:15	Hem (oil, total)	8.2	mg/L		1.5	5.2	EPA 1664B
11/28/2014 12:15	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
11/28/2014 14:58	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
1/17/2015 21:43	Nitrite + Nitrate Nitrogen	0.389	mg/L		0.01	0.04	SM4500-NO3-F
2/6/2015 8:49	1,2,4-Trichlorobenzene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	1,2-Diphenylhydrazine		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	2,4,6-Trichlorophenol		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	2,4-Dichlorophenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	2,4-Dimethylphenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	2,6-Dinitrotoluene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	2-Chloronaphthalene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	2-Chlorophenol		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	2-Methylphenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	2-Nitrophenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	3,3'-Dichlorobenzidine		ug/L	<MDL	2.5	2.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	3-Methylcholanthrene		ug/L	<MDL	2.5	10	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	4,6-Dinitro-O-Cresol		ug/L	<MDL	2.5	6.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.25	0.375	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	4-Chloro-3-Methylphenol		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	4-Nitrophenol		ug/L	<MDL	2.5	6.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Acenaphthene		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Anthracene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Arsenic, Dissolved, ICP-MS	2.05	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/6/2015 8:49	Arsenic, Total, ICP-MS	2.35	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/6/2015 8:49	Barium, Dissolved, ICP-MS	9.44	ug/L	H	0.05	0.25	EPA 200.8*SW846 6020A
2/6/2015 8:49	Barium, Total, ICP-MS	23.2	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
2/6/2015 8:49	Benzidine		ug/L	<MDL	37.5	113	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Benzo(a)anthracene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Benzo(b,j,k)fluoranthene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Benzo(g,h,i)perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Benzyl Butyl Phthalate		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Beryllium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.5	EPA 200.8*SW846 6020A
2/6/2015 8:49	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
2/6/2015 8:49	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Bis(2-Ethylhexyl)Phthalate	1.4	ug/L	<RDL,B2	0.63	2.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Cadmium, Dissolved, ICP-MS		ug/L	<MDL,H	0.05	0.25	EPA 200.8*SW846 6020A
2/6/2015 8:49	Cadmium, Total, ICP-MS	0.099	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
2/6/2015 8:49	Calcium, Total, ICP-MS	10200	ug/L		50	50	EPA 200.8*SW846 6020A
2/6/2015 8:49	Chromium, Dissolved, ICP-MS	0.74	ug/L	<RDL,H	0.2	1	EPA 200.8*SW846 6020A
2/6/2015 8:49	Chromium, Total, ICP-MS	3.91	ug/L		0.2	1	EPA 200.8*SW846 6020A
2/6/2015 8:49	Copper, Dissolved, ICP-MS	10.4	ug/L	H	0.4	2	EPA 200.8*SW846 6020A
2/6/2015 8:49	Di-N-Butyl Phthalate		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Di-N-Octyl Phthalate		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Dibenzo(a,h)anthracene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Dibenzo(a,j)acridine		ug/L	<MDL	3.1	12.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Diethyl Phthalate	0.8	ug/L	<RDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Dimethyl Phthalate		ug/L	<MDL	0.25	0.375	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Discharge Volume	9480000	gal				NONE
2/6/2015 8:49	Fluoranthene		ug/L	<MDL	0.38	0.75	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Fluorene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Hardness, Calc	36.5	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
2/6/2015 8:49	Hexachlorobutadiene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Hexachlorocyclopentadiene		ug/L	<MDL,JG	2.5	6.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Hexachloroethane		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Lead, Dissolved, ICP-MS	1.15	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/6/2015 8:49	Lead, Total, ICP-MS	11.9	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/6/2015 8:49	Magnesium, Total, ICP-MS	2700	ug/L		50	50	EPA 200.8*SW846 6020A
2/6/2015 8:49	N-Nitrosodimethylamine		ug/L	<MDL	2.5	3.75	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	N-Nitrosodiphenylamine		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Naphthalene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Nickel, Dissolved, ICP-MS	1.44	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/6/2015 8:49	Nitrobenzene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Pentachlorophenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Phenanthrene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Phenol		ug/L	<MDL	2.5	3.75	EPA 625/SW846 3520C*8270D
2/6/2015 8:49	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
2/6/2015 8:49	Silver, Dissolved, ICP-MS		ug/L	<MDL,H	0.04	0.2	EPA 200.8*SW846 6020A
2/6/2015 8:49	Silver, Total, ICP-MS	0.084	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
2/6/2015 8:49	Thallium, Dissolved, ICP-MS		ug/L	<MDL,H	0.04	0.2	EPA 200.8*SW846 6020A
2/6/2015 8:49	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
2/6/2015 8:49	Zinc, Dissolved, ICP-MS	56.1	ug/L	H	0.5	2.5	EPA 200.8*SW846 6020A
2/6/2015 11:10	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Elliott West Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/6/2015 11:10	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Chloroform	3.7	ug/L		1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
2/6/2015 11:10	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Hem (oil, total)	4.4	mg/L	<RDL	1.4	5.2	EPA 1664B
2/6/2015 11:10	Toluene	2.64	ug/L		1	2	EPA 624/SW846 5030C*8260C
2/6/2015 11:10	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
2/6/2015 11:10	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/7/2015 8:53	1,2-Diphenylhydrazine		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	2,4,6-Trichlorophenol		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	2,4-Dimethylphenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	2-Methylphenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	2-Nitrophenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	2.5	2.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	3-Methylcholanthrene		ug/L	<MDL	2.5	10	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	4-Chloro-3-Methylphenol		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	4-Nitrophenol		ug/L	<MDL	2.5	6.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Acenaphthene		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Acenaphthylene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Anthracene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Antimony, Dissolved, ICP-MS	0.88	ug/L	<RDL,H	0.3	1	EPA 200.8*SW846 6020A
2/7/2015 8:53	Antimony, Total, ICP-MS	0.98	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
2/7/2015 8:53	Arsenic, Total, ICP-MS	2.38	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/7/2015 8:53	Barium, Dissolved, ICP-MS	13	ug/L	H	0.05	0.25	EPA 200.8*SW846 6020A
2/7/2015 8:53	Barium, Total, ICP-MS	17.6	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
2/7/2015 8:53	Benzo(a)anthracene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Benzo(a)pyrene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Benzo(b,j,k)fluoranthene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Benzo(g,h,i)perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Benzyl Butyl Phthalate		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Bis(2-Ethylhexyl)Phthalate	1.3	ug/L	<RDL,B2	0.63	2.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Cadmium, Dissolved, ICP-MS	0.069	ug/L	<RDL,H	0.05	0.25	EPA 200.8*SW846 6020A
2/7/2015 8:53	Cadmium, Total, ICP-MS	0.084	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
2/7/2015 8:53	Calcium, Total, ICP-MS	9410	ug/L		50	50	EPA 200.8*SW846 6020A
2/7/2015 8:53	Chromium, Dissolved, ICP-MS	4.27	ug/L	H	0.2	1	EPA 200.8*SW846 6020A
2/7/2015 8:53	Chromium, Total, ICP-MS	6.26	ug/L		0.2	1	EPA 200.8*SW846 6020A
2/7/2015 8:53	Chrysene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Copper, Dissolved, ICP-MS	18	ug/L	H	0.4	2	EPA 200.8*SW846 6020A
2/7/2015 8:53	Copper, Total, ICP-MS	22.6	ug/L		0.4	2	EPA 200.8*SW846 6020A
2/7/2015 8:53	Di-N-Butyl Phthalate		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Di-N-Octyl Phthalate		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Dibenzo(a,h)acridine		ug/L	<MDL	3.1	12.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Dibenzo(a,h)anthracene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Diethyl Phthalate		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Dimethyl Phthalate		ug/L	<MDL	0.25	0.375	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Discharge Volume	4820000	gal				NONE
2/7/2015 8:53	Fluoranthene		ug/L	<MDL	0.38	0.75	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Fluorene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Hardness, Calc	32.2	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
2/7/2015 8:53	Hexachlorobenzene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Hexachlorobutadiene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Hexachlorocyclopentadiene		ug/L	<MDL,JG	2.5	6.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Lead, Total, ICP-MS	7.94	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/7/2015 8:53	Magnesium, Total, ICP-MS	2120	ug/L		50	50	EPA 200.8*SW846 6020A
2/7/2015 8:53	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	N-Nitrosodimethylamine		ug/L	<MDL	2.5	3.75	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	N-Nitrosodiphenylamine		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Nickel, Dissolved, ICP-MS	2.96	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/7/2015 8:53	Nickel, Total, ICP-MS	3.92	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/7/2015 8:53	Nitrobenzene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Pentachlorophenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/7/2015 8:53	Perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Phenanthrene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Phenol	2.6	ug/L	<RDL	2.5	3.75	EPA 625/SW846 3520C*8270D
2/7/2015 8:53	Salinity		PSS	<MDL	2	3	SM2520-B
2/7/2015 8:53	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
2/7/2015 8:53	Silver, Dissolved, ICP-MS		ug/L	<MDL,H	0.04	0.2	EPA 200.8*SW846 6020A
2/7/2015 8:53	Zinc, Dissolved, ICP-MS	83.3	ug/L	H	0.5	2.5	EPA 200.8*SW846 6020A
2/7/2015 8:53	Zinc, Total, ICP-MS	87.1	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
2/27/2015 6:10	Antimony, Total, ICP-MS	1.09	ug/L		0.3	1	EPA 200.8*SW846 6020A
2/27/2015 6:10	Arsenic, Total, ICP-MS	2.48	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/27/2015 6:10	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
2/27/2015 6:10	Cadmium, Total, ICP-MS	0.098	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
2/27/2015 6:10	Calcium, Total, ICP-MS	27100	ug/L		50	50	EPA 200.8*SW846 6020A
2/27/2015 6:10	Copper, Total, ICP-MS	25.3	ug/L		0.4	2	EPA 200.8*SW846 6020A
2/27/2015 6:10	Discharge Volume	1160000	gal				NONE
2/27/2015 6:10	Hardness, Calc	90.9	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
2/27/2015 6:10	Lead, Total, ICP-MS	8.75	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/27/2015 6:10	Magnesium, Total, ICP-MS	5630	ug/L		50	50	EPA 200.8*SW846 6020A
2/27/2015 6:10	Nickel, Total, ICP-MS	4.74	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/27/2015 6:10	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
2/27/2015 6:10	Silver, Total, ICP-MS	0.067	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
2/27/2015 6:10	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
2/27/2015 6:10	Total Suspended Solids	64.3	mg/L		2.5	5	SM2540-D
2/27/2015 6:10	Zinc, Total, ICP-MS	108	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
3/15/2015 11:37	1,2,4-Trichlorobenzene		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	2,4,6-Trichlorophenol		ug/L	<MDL	2.4	4.81	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	2,4-Dichlorophenol		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	2,4-Dimethylphenol		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	2,4-Dinitrophenol		ug/L	<MDL	3.6	6.01	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	2,4-Dinitrotoluene		ug/L	<MDL	0.6	2.4	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	2,6-Dinitrotoluene		ug/L	<MDL	0.6	2.4	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	3-Methylcholanthrene		ug/L	<MDL	2.4	9.62	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	4,6-Dinitro-O-Cresol		ug/L	<MDL	2.4	6.01	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.24	0.361	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	4-Chloro-3-Methylphenol		ug/L	<MDL	1.2	2.4	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Acenaphthene		ug/L	<MDL	0.24	0.481	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Acenaphthylene		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Anthracene		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Antimony, Dissolved, ICP-MS	0.69	ug/L	<RDL,H	0.3	1	EPA 200.8*SW846 6020A
3/15/2015 11:37	Antimony, Total, ICP-MS	1.21	ug/L		0.3	1	EPA 200.8*SW846 6020A
3/15/2015 11:37	Benzo(a)anthracene		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Benzo(a)pyrene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.96	1.8	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Benzo(g,h,i)perylene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Benzo(r,s,t)pentaphene		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Benzyl Butyl Phthalate		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Beryllium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 11:37	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL,JG	1.2	2.4	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Bis(2-Ethylhexyl)Phthalate	3.08	ug/L		0.6	2.4	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Cadmium, Dissolved, ICP-MS		ug/L	<MDL,H	0.05	0.25	EPA 200.8*SW846 6020A
3/15/2015 11:37	Calcium, Total, ICP-MS	7140	ug/L		50	50	EPA 200.8*SW846 6020A
3/15/2015 11:37	Copper, Dissolved, ICP-MS	10.6	ug/L	H	0.4	2	EPA 200.8*SW846 6020A
3/15/2015 11:37	Copper, Total, ICP-MS	47	ug/L		0.4	2	EPA 200.8*SW846 6020A
3/15/2015 11:37	Di-N-Butyl Phthalate		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Di-N-Octyl Phthalate		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Dibenzo(a,e)pyrene		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Dibenzo(a,h)acridine		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Dibenzo(a,h)pyrene		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Dibenzo(a,j)acridine		ug/L	<MDL	3	12	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Diethyl Phthalate	0.62	ug/L	<RDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Dimethyl Phthalate		ug/L	<MDL	0.24	0.361	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Discharge Volume	20000000	gal				NONE
3/15/2015 11:37	Fluoranthene		ug/L	<MDL	0.36	0.721	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Fluorene		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Hardness, Calc	24.8	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
3/15/2015 11:37	Hexachlorobenzene		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Hexachlorocyclopentadiene		ug/L	<MDL	2.4	6.01	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Lead, Dissolved, ICP-MS	1.2	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
3/15/2015 11:37	Nitrobenzene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Pentachlorophenol		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Perylene		ug/L	<MDL	0.6	1.2	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Phenol		ug/L	<MDL	2.4	3.61	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Pyrene		ug/L	<MDL	0.36	0.601	EPA 625/SW846 3520C*8270D
3/15/2015 11:37	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A

Elliott West Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/15/2015 11:37	Silver, Dissolved, ICP-MS		ug/L	<MDL,H	0.04	0.2	EPA 200.8*SW846 6020A
3/15/2015 11:37	Thallium, Dissolved, ICP-MS		ug/L	<MDL,H	0.04	0.2	EPA 200.8*SW846 6020A
3/15/2015 14:50	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Chloroform	5.63	ug/L		1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Dissolved Oxygen, Field	12.3	mg/L		0.5	1	NONE
3/15/2015 14:50	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Hem (oil, total)	7.8	mg/L	B3	1.4	5.2	EPA 1664B
3/15/2015 14:50	Mercury, Total, CVAF	0.0272	ug/L		0.002	0.005	EPA 1631E
3/15/2015 14:50	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/15/2015 14:50	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:50	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/15/2015 14:55	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/15/2015 14:55	Hem (oil, total)	8.9	mg/L	B3	1.5	5.3	EPA 1664B
3/15/2015 14:55	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/16/2015 7:50	Nitrite + Nitrate Nitrogen	0.402	mg/L	SH	0.02	0.08	SM4500-NO3-F
8/14/2015 0:00	Nitrite + Nitrate Nitrogen	1.03	mg/L	H	0.01	0.04	SM4500-NO3-F
8/29/2015 23:21	Discharge Volume	10185000	gal				NONE
10/10/2015 12:16	Antimony, Dissolved, ICP-MS	1.5	ug/L		0.3	1	EPA 200.8*SW846 6020A
10/10/2015 12:16	Antimony, Total, ICP-MS	2.45	ug/L		0.3	1	EPA 200.8*SW846 6020A
10/10/2015 12:16	Arsenic, Dissolved, ICP-MS	1.86	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/10/2015 12:16	Arsenic, Total, ICP-MS	3.48	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/10/2015 12:16	Barium, Dissolved, ICP-MS	30	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
10/10/2015 12:16	Barium, Total, ICP-MS	72.6	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
10/10/2015 12:16	Cadmium, Dissolved, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
10/10/2015 12:16	Cadmium, Total, ICP-MS	0.23	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
10/10/2015 12:16	Chromium, Dissolved, ICP-MS	0.52	ug/L	<RDL	0.2	1	EPA 200.8*SW846 6020A
10/10/2015 12:16	Copper, Total, ICP-MS	68.6	ug/L		0.2	2	EPA 200.8*SW846 6020A
10/10/2015 12:16	Discharge Volume	6300000	gal				NONE
10/10/2015 12:16	Hardness, Calc	222	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
10/10/2015 12:16	Lead, Dissolved, ICP-MS	0.13	ug/L	<RDL	0.1	0.5	EPA 200.8*SW846 6020A
10/10/2015 12:16	Lead, Total, ICP-MS	24.5	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/10/2015 12:16	Magnesium, Total, ICP-MS	30300	ug/L		50	50	EPA 200.8*SW846 6020A
10/10/2015 12:16	Nickel, Dissolved, ICP-MS	1.57	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/10/2015 12:16	Nickel, Total, ICP-MS	6.16	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/10/2015 12:16	Selenium, Dissolved, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
10/10/2015 12:16	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
10/10/2015 12:16	Silver, Dissolved, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
10/10/2015 12:16	Silver, Total, ICP-MS	0.315	ug/L		0.04	0.2	EPA 200.8*SW846 6020A
10/10/2015 12:16	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
10/10/2015 12:16	Zinc, Total, ICP-MS	159	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
10/10/2015 12:45	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Chloroform	7.52	ug/L		1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Elliott West Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
10/10/2015 12:45	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
10/10/2015 12:45	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Hem (oil, total)	8.2	mg/L		1.4	5.2	EPA 1664B
10/10/2015 12:45	Mercury, Total, CVAF	0.0589	ug/L		0.002	0.005	EPA 1631E
10/10/2015 12:45	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
10/10/2015 12:45	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/10/2015 12:45	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/30/2015 0:00	Nitrite + Nitrate Nitrogen	0.437	mg/L	H,SH,J	0.01	0.04	SM4500-NO3-F
10/31/2015 2:38	1,2,4-Trichlorobenzene		ug/L	<MDL	1.5	2.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	2,4-Dinitrotoluene		ug/L	<MDL	2.5	10	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	2,6-Dinitrotoluene		ug/L	<MDL	2.5	10	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	2-Chloronaphthalene		ug/L	<MDL	1.5	2.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	2-Chlorophenol		ug/L	<MDL	5	10	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	2-Nitrophenol		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	10	10	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	3-Methylcholanthrene		ug/L	<MDL	10	40	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	4,6-Dinitro-O-Cresol		ug/L	<MDL	10	25	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	4-Bromophenyl Phenyl Ether		ug/L	<MDL	1	1.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Anthracene		ug/L	<MDL	1.5	2.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Antimony, Dissolved, ICP-MS	2.64	ug/L		0.3	1	EPA 200.8*SW846 6020A
10/31/2015 2:38	Antimony, Total, ICP-MS	3.9	ug/L		0.3	1	EPA 200.8*SW846 6020A
10/31/2015 2:38	Arsenic, Dissolved, ICP-MS	4.41	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/31/2015 2:38	Arsenic, Total, ICP-MS	6.22	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/31/2015 2:38	Barium, Dissolved, ICP-MS	14.3	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
10/31/2015 2:38	Barium, Total, ICP-MS	120	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
10/31/2015 2:38	Benzidine		ug/L	<MDL,JG	150	450	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Benzo(a)pyrene		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Benzo(b,j,k)fluoranthene		ug/L	<MDL	4	7.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Benzo(g,h,i)perylene		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	13	50	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	5	10	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Bis(2-Ethylhexyl)Phthalate	10.9	ug/L		2.5	10	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Cadmium, Dissolved, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
10/31/2015 2:38	Cadmium, Total, ICP-MS	0.707	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
10/31/2015 2:38	Calcium, Total, ICP-MS	16700	ug/L		50	50	EPA 200.8*SW846 6020A
10/31/2015 2:38	Chromium, Total, ICP-MS	15.5	ug/L		0.2	1	EPA 200.8*SW846 6020A
10/31/2015 2:38	Chrysene		ug/L	<MDL	1.5	2.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Di-N-Octyl Phthalate		ug/L	<MDL	1.5	2.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	13	50	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Dibenzo(a,h)acridine		ug/L	<MDL	13	50	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Dibenzo(a,h)anthracene		ug/L	<MDL	4	7.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	13	50	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Diethyl Phthalate		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Dimethyl Phthalate		ug/L	<MDL	1	1.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Discharge Volume	3518900	gal				NONE
10/31/2015 2:38	Fluorene		ug/L	<MDL	1.5	2.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Hardness, Calc	61.3	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
10/31/2015 2:38	Hexachlorobenzene		ug/L	<MDL	1.5	2.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Hexachlorocyclopentadiene		ug/L	<MDL,JG	10	25	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Hexachloroethane		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Isophorone		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Lead, Dissolved, ICP-MS	0.695	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/31/2015 2:38	Lead, Total, ICP-MS	76.9	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/31/2015 2:38	N-Nitrosodiphenylamine		ug/L	<MDL	5	10	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Naphthalene		ug/L	<MDL	4	7.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Nickel, Dissolved, ICP-MS	2.65	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/31/2015 2:38	Nickel, Total, ICP-MS	14.1	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
10/31/2015 2:38	Nitrobenzene		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Pentachlorophenol		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Perylene		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Phenanthrene		ug/L	<MDL	1.5	2.5	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Phenol		ug/L	<MDL	10	15	EPA 625/SW846 3520C*8270D
10/31/2015 2:38	Selenium, Total, ICP-MS	0.66	ug/L	<RDL	0.5	1	EPA 200.8*SW846 6020A
10/31/2015 2:38	Silver, Dissolved, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
10/31/2015 2:38	Silver, Total, ICP-MS	0.846	ug/L		0.04	0.2	EPA 200.8*SW846 6020A
10/31/2015 2:38	Thallium, Dissolved, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
10/31/2015 2:38	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
10/31/2015 2:38	Total Suspended Solids	605	mg/L		23	45	SM2540-D
10/31/2015 3:23	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Elliott West Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
10/31/2015 3:23	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Chloroform	5.72	ug/L		1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
10/31/2015 3:23	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Hem (oil, total)	11.6	mg/L	B3	1.5	5.2	EPA 1664B
10/31/2015 3:23	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/31/2015 3:23	Toluene	10.7	ug/L		1	2	EPA 624/SW846 5030C*8260C
11/14/2015 3:05	Copper, Dissolved, ICP-MS	11.1	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
11/14/2015 3:05	Copper, Total, ICP-MS	32.9	ug/L		0.2	2	EPA 200.8*SW846 6020A
11/14/2015 3:05	Discharge Volume	12618000	gal				NONE
11/14/2015 3:05	Total Suspended Solids	85	mg/L		5	10	SM2540-D
11/14/2015 9:46	Copper, Dissolved, ICP-MS	13.4	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
11/14/2015 9:46	Copper, Total, ICP-MS	19	ug/L		0.2	2	EPA 200.8*SW846 6020A
11/14/2015 9:46	Discharge Volume	48000000	gal				NONE
12/6/2015 4:32	Copper, Dissolved, ICP-MS	8.03	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
12/6/2015 4:32	Copper, Total, ICP-MS	22.1	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/6/2015 4:32	Discharge Volume	1925400	gal				NONE
12/6/2015 4:32	Total Suspended Solids	32.9	mg/L		3.3	6.6	SM2540-D
12/7/2015 12:21	Copper, Dissolved, ICP-MS	10.4	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
12/7/2015 12:21	Discharge Volume	15066000	gal				NONE
12/7/2015 12:21	Total Suspended Solids	91.9	mg/L		5.1	10	SM2540-D
12/8/2015 5:05	Copper, Dissolved, ICP-MS	15.4	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
12/8/2015 5:05	Copper, Total, ICP-MS	25.4	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/8/2015 5:05	Discharge Volume	51703000	gal				NONE
12/8/2015 5:05	Total Suspended Solids	64.7	mg/L		5.1	10	SM2540-D
12/10/2015 13:12	Copper, Dissolved, ICP-MS	10.2	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
12/10/2015 13:12	Discharge Volume	7671300	gal				NONE
12/18/2015 0:57	Copper, Total, ICP-MS	43.6	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/18/2015 0:57	Discharge Volume	8961800	gal				NONE
12/18/2015 0:57	Total Suspended Solids	97.4	mg/L		6.6	13	SM2540-D
12/21/2015 14:58	Copper, Dissolved, ICP-MS	10.2	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
12/21/2015 14:58	Copper, Total, ICP-MS	34.8	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/21/2016 8:18	2,4,6-Trichlorophenol		ug/L	<MDL	2.5	5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	2,4-Dichlorophenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	2,4-Dimethylphenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	2,4-Dinitrophenol		ug/L	<MDL	3.8	6.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	2,6-Dinitrotoluene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	2-Chloronaphthalene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	2-Chlorophenol		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	2-Methylphenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	2-Nitrophenol		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.25	0.375	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	4-Chloro-3-Methylphenol		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	4-Nitrophenol		ug/L	<MDL,JG	2.5	6.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Acenaphthene		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Acenaphthylene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Antimony, Dissolved, ICP-MS	0.54	ug/L	<RDL,H	0.3	1	EPA 200.8*SW846 6020A
1/21/2016 8:18	Antimony, Total, ICP-MS	0.89	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/21/2016 8:18	Arsenic, Dissolved, ICP-MS	1.52	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 8:18	Arsenic, Total, ICP-MS	2.41	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 8:18	Barium, Dissolved, ICP-MS	6.26	ug/L	H	0.5	0.5	EPA 200.8*SW846 6020A
1/21/2016 8:18	Benzidine		ug/L	<MDL,JG	37.5	113	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Benzo(g,h,i)perylene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Benzyl Butyl Phthalate		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Beryllium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 8:18	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 8:18	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	1.3	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Bis(2-Ethylhexyl)Phthalate	1.3	ug/L	<RDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Cadmium, Dissolved, ICP-MS		ug/L	<MDL,H	0.05	0.25	EPA 200.8*SW846 6020A
1/21/2016 8:18	Cadmium, Total, ICP-MS	0.13	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
1/21/2016 8:18	Calcium, Total, ICP-MS	6780	ug/L		50	50	EPA 200.8*SW846 6020A
1/21/2016 8:18	Chromium, Dissolved, ICP-MS	0.88	ug/L	<RDL,H	0.2	1	EPA 200.8*SW846 6020A
1/21/2016 8:18	Chromium, Total, ICP-MS	3.36	ug/L		0.2	1	EPA 200.8*SW846 6020A

Elliott West Wet Weather Treatment Station							
COLLECTDATE	**PARMNAME**	**NUMVALUE**	**UNITS**	**QUALIFIER**	**MDL**	**RDL**	**METHOD**
1/21/2016 8:18	Chrysene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Copper, Dissolved, ICP-MS	9.86	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
1/21/2016 8:18	Copper, Total, ICP-MS	29.3	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/21/2016 8:18	Di-N-Octyl Phthalate		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Dibenzo(a,h)acridine		ug/L	<MDL	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	3.1	12.5	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Hexachlorobutadiene		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Hexachlorocyclopentadiene		ug/L	<MDL,JG	2.5	6.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Hexachloroethane		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Isophorone		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Lead, Dissolved, ICP-MS	0.3	ug/L	<RDL,H	0.1	0.5	EPA 200.8*SW846 6020A
1/21/2016 8:18	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.63	1.25	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	N-Nitrosodimethylamine		ug/L	<MDL	2.5	3.75	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Naphthalene		ug/L	<MDL	1	1.88	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Phenanthrene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Phenol		ug/L	<MDL	2.5	3.75	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Pyrene		ug/L	<MDL	0.38	0.625	EPA 625/SW846 3520C*8270D
1/21/2016 8:18	Salinity		PSS	<MDL	2	3	SM2520-B
1/21/2016 8:18	Selenium, Dissolved, ICP-MS		ug/L	<MDL,H	0.5	1	EPA 200.8*SW846 6020A
1/21/2016 8:18	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/21/2016 8:18	Zinc, Dissolved, ICP-MS	31.6	ug/L	H	0.5	2.5	EPA 200.8*SW846 6020A
1/21/2016 8:18	Zinc, Total, ICP-MS	99.3	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/21/2016 11:20	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Dissolved Oxygen, Field	12.6	mg/L		0.5	1	NONE
1/21/2016 11:20	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Hem (oil, total)	6.5	mg/L		1.4	5.1	EPA 1664B
1/21/2016 11:20	Mercury, Total, CVAF	0.104	ug/L		0.002	0.005	EPA 1631E
1/21/2016 11:20	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Sample Temperature, Field	10.4	deg C				NONE
1/21/2016 11:20	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Total Phenolics	0.17	mg/L		0.04	0.04	EPA 420.1
1/21/2016 11:20	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/21/2016 11:20	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/9/2016 20:36	Antimony, Dissolved, ICP-MS	0.59	ug/L	<RDL,H	0.3	1	EPA 200.8*SW846 6020A
3/9/2016 20:36	Antimony, Total, ICP-MS	0.92	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
3/9/2016 20:36	Arsenic, Total, ICP-MS	1.76	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/9/2016 20:36	Barium, Dissolved, ICP-MS	7.11	ug/L	H	0.5	0.5	EPA 200.8*SW846 6020A
3/9/2016 20:36	Barium, Total, ICP-MS	16.5	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
3/9/2016 20:36	Beryllium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.5	EPA 200.8*SW846 6020A
3/9/2016 20:36	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
3/9/2016 20:36	Cadmium, Total, ICP-MS	0.11	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
3/9/2016 20:36	Copper, Dissolved, ICP-MS	13.7	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
3/9/2016 20:36	Copper, Total, ICP-MS	26	ug/L		0.2	2	EPA 200.8*SW846 6020A
3/9/2016 20:36	Discharge Volume	2000000	gal				NONE
3/9/2016 20:36	Hardness, Calc	21.6	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
3/9/2016 20:36	Iron, Total, ICP-MS	1090	ug/L		10	50	EPA 200.8*SW846 6020A
3/9/2016 20:36	Lead, Dissolved, ICP-MS	0.516	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
3/9/2016 20:36	Magnesium, Total, ICP-MS	1510	ug/L		50	50	EPA 200.8*SW846 6020A
3/9/2016 20:36	Nickel, Dissolved, ICP-MS	0.741	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
3/9/2016 20:36	Nickel, Total, ICP-MS	2.26	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/9/2016 20:36	Selenium, Dissolved, ICP-MS		ug/L	<MDL,H	0.5	1	EPA 200.8*SW846 6020A
3/9/2016 20:36	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
3/9/2016 20:36	Silver, Dissolved, ICP-MS		ug/L	<MDL,H	0.04	0.2	EPA 200.8*SW846 6020A
3/9/2016 20:36	Silver, Total, ICP-MS	0.076	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
3/9/2016 20:36	Thallium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.2	EPA 200.8*SW846 6020A
3/9/2016 20:36	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A

Elliott West Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/9/2016 20:36	Zinc, Dissolved, ICP-MS	49.2	ug/L	H	0.5	2.5	EPA 200.8*SW846 6020A
10/13/2016 19:40	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Chloroform	1.7	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Hem (oil, total)	3.5	mg/L	<RDL	1.5	5.2	EPA 1664B
10/13/2016 19:40	Mercury, Total, CVAF	0.0573	ug/L		0.001	0.0025	EPA 1631E
10/13/2016 19:40	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Toluene	8.77	ug/L		1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Total Phenolics		mg/L	<MDL	0.042	0.042	EPA 420.1
10/13/2016 19:40	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 19:40	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
10/13/2016 21:20	Copper, Dissolved, ICP-MS	13.3	ug/L		0.2	2	EPA 200.8*SW846 6020A
10/13/2016 21:20	Copper, Total, ICP-MS	44.5	ug/L		0.2	2	EPA 200.8*SW846 6020A
10/13/2016 21:20	Total Suspended Solids	126	mg/L		3.6	7.1	SM2540-D
10/14/2016 11:55	Copper, Dissolved, ICP-MS	13	ug/L		0.2	2	EPA 200.8*SW846 6020A
10/14/2016 11:55	Copper, Total, ICP-MS	18.2	ug/L		0.2	2	EPA 200.8*SW846 6020A
10/14/2016 11:55	Discharge Volume	11350000	gal				NONE
10/20/2016 0:00	Cyanide, Weak & Dissociable		mg/L	<MDL,SH	0.005	0.01	SM4500-CN-I,E
10/20/2016 5:11	Copper, Dissolved, ICP-MS	8.13	ug/L		0.2	2	EPA 200.8*SW846 6020A
10/20/2016 9:17	Copper, Total, ICP-MS	28.9	ug/L		0.2	2	EPA 200.8*SW846 6020A
10/20/2016 9:17	Discharge Volume	7844500	gal				NONE
10/20/2016 9:17	Total Suspended Solids	72.7	mg/L		3.3	6.7	SM2540-D
10/20/2016 9:54	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
10/26/2016 11:15	Copper, Dissolved, ICP-MS	2.51	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
10/26/2016 11:15	Copper, Total, ICP-MS	33.9	ug/L		0.2	2	EPA 200.8*SW846 6020A
10/26/2016 11:15	Discharge Volume	22954000	gal				NONE
10/26/2016 11:15	Total Suspended Solids	46	mg/L		5	10	SM2540-D
11/15/2016 4:57	Copper, Dissolved, ICP-MS	4.69	ug/L		0.2	2	EPA 200.8*SW846 6020A
11/15/2016 4:57	Discharge Volume	8064000	gal				NONE
11/15/2016 4:57	Total Suspended Solids	147	mg/L		4.6	9.09	SM2540-D
11/24/2016 18:44	Copper, Dissolved, ICP-MS	10.8	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
11/24/2016 18:44	Copper, Total, ICP-MS	42.8	ug/L		0.2	2	EPA 200.8*SW846 6020A
11/24/2016 18:44	Discharge Volume	8051900	gal				NONE
11/24/2016 18:44	Total Suspended Solids	108	mg/L		1	2	SM2540-D
2/8/2017 22:52	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Antimony, Dissolved, ICP-MS	0.74	ug/L	<RDL,H	0.3	1	EPA 200.8*SW846 6020A
2/8/2017 22:52	Antimony, Total, ICP-MS	1.58	ug/L		0.3	1	EPA 200.8*SW846 6020A
2/8/2017 22:52	Arsenic, Dissolved, ICP-MS	1.76	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/8/2017 22:52	Arsenic, Total, ICP-MS	2.68	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/8/2017 22:52	Barium, Dissolved, ICP-MS	7.69	ug/L	H	0.5	0.5	EPA 200.8*SW846 6020A
2/8/2017 22:52	Barium, Total, ICP-MS	37.3	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
2/8/2017 22:52	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Bis(2-Ethylhexyl)Phthalate	1.19	ug/L		0.13	0.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Cadmium, Dissolved, ICP-MS		ug/L	<MDL,H	0.05	0.25	EPA 200.8*SW846 6020A
2/8/2017 22:52	Cadmium, Total, ICP-MS	0.2	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
2/8/2017 22:52	Calcium, Total, ICP-MS	9670	ug/L		50	50	EPA 200.8*SW846 6020A
2/8/2017 22:52	Copper, Total, ICP-MS	50	ug/L		0.2	2	EPA 200.8*SW846 6020A

Elliott West Wet Weather Treatment Station							
COLLECTDATE	**PARMNAME**	**NUMVALUE**	**UNITS**	**QUALIFIER**	**MDL**	**RDL**	**METHOD**
2/8/2017 22:52	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Dibenzo(a,h)anthracene		ug/L	<MDL,JG	0.2	0.375	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Diethyl Phthalate	0.324	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Discharge Volume	40208000	gal				NONE
2/8/2017 22:52	Fluoranthene	0.1	ug/L	<RDL	0.075	0.15	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Hardness, Calc	35.9	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
2/8/2017 22:52	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Lead, Dissolved, ICP-MS	0.733	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/8/2017 22:52	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Nickel, Dissolved, ICP-MS	0.944	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/8/2017 22:52	Nickel, Total, ICP-MS	5.15	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/8/2017 22:52	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/8/2017 22:52	Salinity		PSS	<MDL	2	3	SM2520-B
2/8/2017 22:52	Selenium, Dissolved, ICP-MS		ug/L	<MDL,H	0.5	1	EPA 200.8*SW846 6020A
2/8/2017 22:52	Thallium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.2	EPA 200.8*SW846 6020A
2/8/2017 22:52	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
2/8/2017 22:52	Total Suspended Solids	123	mg/L		4.6	9.09	SM2540-D
2/8/2017 22:52	Zinc, Dissolved, ICP-MS	44.3	ug/L	H	0.5	2.5	EPA 200.8*SW846 6020A
2/8/2017 22:52	Zinc, Total, ICP-MS	157	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
2/8/2017 23:55	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Chloroform	5.21	ug/L		1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
2/8/2017 23:55	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Hem (oil, total)	13.6	mg/L		1.5	5.5	EPA 1664B
2/8/2017 23:55	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Toluene	2.34	ug/L		1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/8/2017 23:55	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 9:23	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Antimony, Total, ICP-MS	0.87	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
2/9/2017 9:23	Arsenic, Dissolved, ICP-MS	1.55	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 9:23	Arsenic, Total, ICP-MS	2.11	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 9:23	Barium, Dissolved, ICP-MS	10.2	ug/L	H	0.5	0.5	EPA 200.8*SW846 6020A
2/9/2017 9:23	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Benzyl Butyl Phthalate	0.134	ug/L		0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Beryllium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 9:23	Cadmium, Total, ICP-MS	0.1	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
2/9/2017 9:23	Calcium, Total, ICP-MS	11400	ug/L		50	50	EPA 200.8*SW846 6020A
2/9/2017 9:23	Chromium, Dissolved, ICP-MS	0.72	ug/L	<RDL,H	0.2	1	EPA 200.8*SW846 6020A
2/9/2017 9:23	Chromium, Total, ICP-MS	2.9	ug/L		0.2	1	EPA 200.8*SW846 6020A

Elliott West Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/9/2017 9:23	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Dibenzo(a,h)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Nickel, Dissolved, ICP-MS	1.14	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 9:23	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 9:23	Salinity		PSS	<MDL	2	3	SM2520-B
2/9/2017 9:23	Selenium, Dissolved, ICP-MS		ug/L	<MDL,H	0.5	1	EPA 200.8*SW846 6020A
2/9/2017 9:23	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
2/9/2017 9:23	Zinc, Total, ICP-MS	65.2	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Antimony, Dissolved, ICP-MS	0.7	ug/L	<RDL,H	0.3	1	EPA 200.8*SW846 6020A
2/10/2017 8:02	Antimony, Total, ICP-MS	0.91	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
2/10/2017 8:02	Arsenic, Dissolved, ICP-MS	2.03	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Arsenic, Total, ICP-MS	2.5	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Barium, Dissolved, ICP-MS	20	ug/L	H	0.5	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Barium, Total, ICP-MS	36.3	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Beryllium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Cadmium, Dissolved, ICP-MS		ug/L	<MDL,H	0.05	0.25	EPA 200.8*SW846 6020A
2/10/2017 8:02	Cadmium, Total, ICP-MS	0.089	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
2/10/2017 8:02	Calcium, Total, ICP-MS	32900	ug/L		50	50	EPA 200.8*SW846 6020A
2/10/2017 8:02	Chromium, Total, ICP-MS	2.83	ug/L		0.2	1	EPA 200.8*SW846 6020A
2/10/2017 8:02	Copper, Dissolved, ICP-MS	8.4	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
2/10/2017 8:02	Copper, Total, ICP-MS	17.8	ug/L		0.2	2	EPA 200.8*SW846 6020A
2/10/2017 8:02	Lead, Dissolved, ICP-MS	0.16	ug/L	<RDL,H	0.1	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Lead, Total, ICP-MS	2.83	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Magnesium, Total, ICP-MS	25500	ug/L		50	50	EPA 200.8*SW846 6020A
2/10/2017 8:02	Nickel, Dissolved, ICP-MS	1.97	ug/L	H	0.1	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Nickel, Total, ICP-MS	3.6	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Selenium, Dissolved, ICP-MS		ug/L	<MDL,H	0.5	1	EPA 200.8*SW846 6020A
2/10/2017 8:02	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
2/10/2017 8:02	Thallium, Dissolved, ICP-MS		ug/L	<MDL,H	0.1	0.2	EPA 200.8*SW846 6020A
2/10/2017 8:02	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
2/10/2017 8:02	Total Suspended Solids	36.8	mg/L		1	2	SM2540-D
2/10/2017 8:02	Zinc, Dissolved, ICP-MS	18.8	ug/L	H	0.5	2.5	EPA 200.8*SW846 6020A
2/10/2017 8:02	Zinc, Total, ICP-MS	46.9	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
2/15/2017 1:20	Copper, Dissolved, ICP-MS	14.5	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
2/15/2017 1:20	Copper, Total, ICP-MS	32.4	ug/L		0.2	2	EPA 200.8*SW846 6020A
2/15/2017 1:20	Discharge Volume	45956000	gal				NONE
2/15/2017 1:20	Total Suspended Solids	59.6	mg/L		2	4	SM2540-D
2/15/2017 8:37	Copper, Dissolved, ICP-MS	19.8	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
2/15/2017 8:37	Copper, Total, ICP-MS	38.3	ug/L		0.2	2	EPA 200.8*SW846 6020A
2/15/2017 8:37	Discharge Volume	29423000	gal				NONE
2/15/2017 8:37	Total Suspended Solids	83.6	mg/L		1	2	SM2540-D
2/15/2017 8:50	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
2/15/2017 14:46	Discharge Volume	116190000	gal				NONE
2/15/2017 14:46	Total Suspended Solids	90.4	mg/L		0.5	1	SM2540-D
3/3/2017 18:01	Copper, Dissolved, ICP-MS	27.5	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
3/3/2017 18:01	Copper, Total, ICP-MS	57.3	ug/L		0.2	2	EPA 200.8*SW846 6020A
3/3/2017 18:01	Discharge Volume	14318000	gal				NONE
3/3/2017 18:01	Total Suspended Solids	251	mg/L		6.3	12.5	SM2540-D
3/7/2017 14:41	Copper, Total, ICP-MS	77.7	ug/L		0.2	2	EPA 200.8*SW846 6020A
3/7/2017 14:41	Discharge Volume	4830000	gal				NONE
3/7/2017 14:41	Total Suspended Solids	502	mg/L		10	20	SM2540-D
3/9/2017 17:29	Copper, Dissolved, ICP-MS	14.6	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
3/13/2017 16:22	Copper, Total, ICP-MS	31.5	ug/L		0.2	2	EPA 200.8*SW846 6020A
3/13/2017 16:22	Discharge Volume	28750000	gal				NONE
3/13/2017 16:22	Total Suspended Solids	122	mg/L		3.6	7.14	SM2540-D
3/14/2017 12:49	Copper, Dissolved, ICP-MS	15	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
3/14/2017 12:49	Copper, Total, ICP-MS	24.5	ug/L		0.2	2	EPA 200.8*SW846 6020A
3/15/2017 12:37	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
3/15/2017 13:47	Copper, Total, ICP-MS	33.7	ug/L		0.2	2	EPA 200.8*SW846 6020A
3/15/2017 13:47	Discharge Volume	5750000	gal				NONE
3/15/2017 13:47	Total Suspended Solids	80.7	mg/L		3.3	6.67	SM2540-D
3/17/2017 19:06	Copper, Dissolved, ICP-MS	4.95	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
3/17/2017 19:06	Copper, Total, ICP-MS	32.7	ug/L		0.2	2	EPA 200.8*SW846 6020A
3/17/2017 19:06	Discharge Volume	80644000	gal				NONE
3/29/2017 9:07	Copper, Dissolved, ICP-MS	14.4	ug/L	H	0.2	2	EPA 200.8*SW846 6020A
3/29/2017 9:07	Copper, Total, ICP-MS	27.6	ug/L		0.2	2	EPA 200.8*SW846 6020A
3/29/2017 9:07	Discharge Volume	12500000	gal				NONE

Elliott West Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
4/12/2017 6:00	Copper, Total, ICP-MS	29.2	ug/L		0.2	2	EPA 200.8*SW846 6020A
4/12/2017 6:00	Discharge Volume	29463000	gal				NONE
4/12/2017 6:00	Total Suspended Solids	101	mg/L		5	10	SM2540-D
10/18/2017 23:27	Discharge Volume	5250000	gal				NONE
10/21/2017 19:12	Copper, Dissolved, ICP-MS	2.7	ug/L	<RDL,H	2	20	EPA 200.8 (MOD)
10/21/2017 19:12	Copper, Total, ICP-MS	33.3	ug/L		2	20	EPA 200.8*SWD846 6020A
10/21/2017 19:12	Discharge Volume	10500000	gal				NONE
11/3/2017 16:38	Discharge Volume	32250000	gal				NONE
11/3/2017 16:38	Total Suspended Solids	48.3	mg/L		1.4	2.86	SM2540-D
11/4/2017 17:09	Copper, Dissolved, ICP-MS	4.4	ug/L	<RDL,H	2	20	EPA 200.8 (MOD)
11/4/2017 17:09	Copper, Total, ICP-MS	10	ug/L	<RDL	2	20	EPA 200.8*SWD846 6020A
11/4/2017 17:09	Discharge Volume	62250000	gal				NONE
11/4/2017 17:09	Total Suspended Solids	18.2	mg/L		1	2	SM2540-D
11/21/2017 13:29	Copper, Dissolved, ICP-MS	13.9	ug/L	H	0.2	2	EPA 200.8 (MOD)
11/21/2017 13:29	Copper, Total, ICP-MS	42.8	ug/L		2	20	EPA 200.8*SWD846 6020A
11/21/2017 13:29	Total Suspended Solids	123	mg/L		3.3	6.67	SM2540-D
11/21/2017 13:49	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
12/19/2017 7:19	Calcium, Total, ICP	11000	ug/L		50	250	EPA 200.7*SW846 6010C
12/19/2017 7:19	Copper, Dissolved, ICP-MS	14	ug/L	H	0.2	2	EPA 200.8 (MOD)
12/19/2017 7:19	Calcium, Total, ICP	9970	ug/L		50	250	EPA 200.7*SW846 6010C
12/19/2017 7:19	Conductivity	269	umhos/cm		1	5	SM2510-B
12/19/2017 7:19	Copper, Dissolved, ICP-MS	14	ug/L	H	0.2	2	EPA 200.8 (MOD)
12/19/2017 7:19	Copper, Total, ICP	43.5	ug/L		4	20	EPA 200.7*SW846 6010C
12/19/2017 7:19	Dissolved Organic Carbon	11.5	mg/L		2.5	5	SM5310-B
12/19/2017 7:19	Magnesium, Total, ICP	2430	ug/L		30	150	EPA 200.7*SW846 6010C
12/19/2017 7:19	Copper, Total, ICP-MS	44.5	ug/L		0.2	2	EPA 200.8*SWD846 6020A
12/19/2017 7:19	Discharge Volume	20000000	gal				NONE
12/19/2017 7:19	Total Suspended Solids	118	mg/L		5	10	SM2540-D
12/29/2017 11:06	Copper, Dissolved, ICP-MS	12	ug/L	H	0.2	2	EPA 200.8 (MOD)
12/29/2017 11:06	Total Suspended Solids	132	mg/L		4	8	SM2540-D
1/11/2018 12:54	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Cyanide, Weak & Dissociable	0.0038	mg/L	<RDL	0.002	0.01	SM4500-CN-I,E
1/11/2018 12:54	Discharge Rate	109318000	mgd				NONE
1/11/2018 12:54	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Hem (oil, total)	14.4	mg/L	B	1.4	5.1	EPA 1664B
1/11/2018 12:54	Mercury, Total, CVAF	0.0192	ug/L		0.0002	0.0005	EPA 1631E
1/11/2018 12:54	Sample Temperature, Field	11	deg C				KCEL SOP# 245
1/11/2018 12:54	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Toluene	1.5	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
1/11/2018 12:54	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/11/2018 12:54	pH, Field	6.32	pH				KCEL SOP# 245
1/18/2018 2:40	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Antimony, Dissolved, ICP-MS	0.88	ug/L	<RDL	0.3	1	EPA 200.8 (MOD)
1/18/2018 2:40	Arsenic, Total, ICP-MS	2.69	ug/L		0.05	0.25	EPA 200.8*SWD846 6020A
1/18/2018 2:40	Barium, Dissolved, ICP-MS	19.9	ug/L		0.5	0.5	EPA 200.8 (MOD)
1/18/2018 2:40	Barium, Total, ICP-MS	40.7	ug/L		0.5	0.5	EPA 200.8*SWD846 6020A
1/18/2018 2:40	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D

Elliott West Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
1/18/2018 2:40	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Beryllium, Dissolved, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8 (MOD)
1/18/2018 2:40	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SWD846 6020A
1/18/2018 2:40	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Bis(2-Ethylhexyl)Phthalate	1.15	ug/L	JG	0.13	0.5	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Cadmium, Dissolved, ICP-MS	0.13	ug/L	<RDL	0.05	0.25	EPA 200.8 (MOD)
1/18/2018 2:40	Calcium, Total, ICP-MS	12200	ug/L		50	50	EPA 200.8*SWD846 6020A
1/18/2018 2:40	Chromium, Dissolved, ICP-MS	0.69	ug/L	<RDL	0.2	1	EPA 200.8 (MOD)
1/18/2018 2:40	Chromium, Total, ICP-MS	6.52	ug/L		0.2	1	EPA 200.8*SWD846 6020A
1/18/2018 2:40	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Copper, Dissolved, ICP-MS	16.9	ug/L		0.2	2	EPA 200.8 (MOD)
1/18/2018 2:40	Copper, Total, ICP-MS	51.6	ug/L		0.2	2	EPA 200.8*SWD846 6020A
1/18/2018 2:40	Di-N-Butyl Phthalate	0.288	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Diethyl Phthalate	1.54	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Dimethyl Phthalate	0.0893	ug/L		0.05	0.075	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Discharge Volume	7250000	gal				NONE
1/18/2018 2:40	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Hardness, Calc	46.2	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/18/2018 2:40	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Lead, Dissolved, ICP-MS	2.22	ug/L		0.1	0.5	EPA 200.8 (MOD)
1/18/2018 2:40	Lead, Total, ICP-MS	19.8	ug/L		0.1	0.5	EPA 200.8*SWD846 6020A
1/18/2018 2:40	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Nickel, Dissolved, ICP-MS	1.7	ug/L		0.1	0.5	EPA 200.8 (MOD)
1/18/2018 2:40	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2018 2:40	Salinity		PSS	<MDL	2	3	SM2520-B
1/18/2018 2:40	Selenium, Dissolved, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8 (MOD)
1/18/2018 2:40	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SWD846 6020A
1/18/2018 2:40	Silver, Dissolved, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8 (MOD)
1/18/2018 2:40	Silver, Total, ICP-MS	0.2	ug/L	<RDL	0.04	0.2	EPA 200.8*SWD846 6020A
1/18/2018 2:40	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SWD846 6020A
1/18/2018 2:40	Total Suspended Solids	129	mg/L		1.1	2.22	SM2540-D
1/18/2018 2:40	Zinc, Dissolved, ICP-MS	123	ug/L		0.5	2.5	EPA 200.8 (MOD)
1/18/2018 2:40	Zinc, Total, ICP-MS	163	ug/L		0.5	2.5	EPA 200.8*SWD846 6020A
1/18/2018 10:04	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	Chloroform	39.7	ug/L		1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	Chloromethane	1.1	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2018 10:04	Hem (oil, total)	5.7	mg/L	B	1.4	5.1	EPA 1664B
1/18/2018 10:04	Mercury, Total, CVAF	0.00908	ug/L		0.0002	0.0005	EPA 1631E
1/18/2018 10:04	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/29/2018 15:18	Copper, Dissolved, ICP-MS	27.5	ug/L	H	0.2	2	EPA 200.8 (MOD)
1/29/2018 15:18	Copper, Total, ICP-MS	56.6	ug/L		0.2	2	EPA 200.8*SWD846 6020A
1/29/2018 15:18	Discharge Volume	9250000	gal				NONE
1/29/2018 15:18	Total Suspended Solids	159	mg/L		1.7	3.33	SM2540-D

Henderson/MLK Wet Weather Treatment Station							
COLLECTDATE	**PARMNAME**	**NUMVALUE**	**UNITS**	**QUALIFIER**	**MDL**	**RDL**	**METHOD**
2/17/2014 3:02	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	3,3'-Dichlorobenzidine		ug/L	<MDL	0.5	0.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Ammonia Nitrogen	0.73	mg/L		0.01	0.05	KEROUEL & AMINOT 1997
2/17/2014 3:02	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Antimony, Total, ICP-MS	0.69	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
2/17/2014 3:02	Arsenic, Total, ICP-MS	2.08	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/17/2014 3:02	Barium, Total, ICP-MS	51.8	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
2/17/2014 3:02	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Benzidine		ug/L	<MDL,JG	5	5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
2/17/2014 3:02	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Bis(2-Ethylhexyl)Phthalate	0.4	ug/L	<RDL,B	0.13	0.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Cadmium, Total, ICP-MS	0.12	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
2/17/2014 3:02	Calcium, Total, ICP-MS	10800	ug/L		50	50	EPA 200.8*SW846 6020A
2/17/2014 3:02	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Chloroform	3.58	ug/L		1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Chromium, Total, ICP-MS	3.34	ug/L		0.2	1	EPA 200.8*SW846 6020A
2/17/2014 3:02	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Copper, Total, ICP-MS	19.5	ug/L		0.4	2	EPA 200.8*SW846 6020A
2/17/2014 3:02	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Dibenzo(a,e)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Dibenzo(a,h)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Diethyl Phthalate	0.23	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Dimethyl Phthalate	0.114	ug/L		0.05	0.075	EPA 625/SW846 3520C*8270D

Henderson/MLK Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/17/2014 3:02	Discharge Volume	800000	gal				NONE
2/17/2014 3:02	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Hardness, Calc	36.2	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
2/17/2014 3:02	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Lead, Total, ICP-MS	7.12	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/17/2014 3:02	Magnesium, Total, ICP-MS	2260	ug/L		50	50	EPA 200.8*SW846 6020A
2/17/2014 3:02	Mercury, Total, CVAF	0.0353	ug/L		0.002	0.005	EPA 1631E
2/17/2014 3:02	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Nickel, Total, ICP-MS	4.47	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/17/2014 3:02	Nitrite + Nitrate Nitrogen	1.5	mg/L		0.05	0.2	SM4500-NO3-F
2/17/2014 3:02	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Phenol	7.09	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/17/2014 3:02	Salinity		PSS	<MDL	2	3	SM2520-B
2/17/2014 3:02	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
2/17/2014 3:02	Silver, Total, ICP-MS	0.045	ug/L	<RDL	0.04	0.2	EPA 200.8*SW846 6020A
2/17/2014 3:02	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
2/17/2014 3:02	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Total Alkalinity		mg CaCO3/L	<MDL	1	5	SM2320-B
2/17/2014 3:02	Total Dissolved Solids	201	mg/L		15	30	SM2540-C
2/17/2014 3:02	Total Kjeldahl Nitrogen	3.31	mg/L	SH	0.1	0.2	EPA 351.2
2/17/2014 3:02	Total Phosphorus	0.546	mg/L		0.05	0.1	SM4500-P-B,F
2/17/2014 3:02	Total Suspended Solids	54.2	mg/L		4.2	8.3	SM2540-D
2/17/2014 3:02	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/17/2014 3:02	Volatile Suspended Solids	19.2	mg/L		4.2	8.3	EPA 160.4
2/17/2014 3:02	Zinc, Total, ICP-MS	67.7	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
2/17/2014 3:15	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
2/17/2014 3:15	Hem (oil, total)	3.5	mg/L	<RDL	1.4	5.2	EPA 1664B
2/17/2014 3:15	Salinity		PSS	<MDL	2	3	SM2520-B
2/17/2014 3:15	Total Phenolics	0.21	mg/L	TA	0.04	0.04	EPA 420.1
3/6/2014 12:45	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
3/6/2014 12:45	Hem (oil, total)	2.4	mg/L	<RDL,B	1.5	5.2	EPA 1664B
3/6/2014 12:45	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/16/2015 0:25	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Chloroform	4.37	ug/L		1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Cyanide, Weak & Dissociable	0.0139	mg/L		0.005	0.01	SM4500-CN-I,E
3/16/2015 0:25	Dissolved Oxygen, Field	8.9	mg/L		0.5	1	NONE

Henderson/MLK Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
3/16/2015 0:25	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Hem (oil, total)	3.3	mg/L	<RDL,B	1.4	5.1	EPA 1664B
3/16/2015 0:25	Mercury, Total, CVAF	0.0322	ug/L		0.002	0.005	EPA 1631E
3/16/2015 0:25	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/16/2015 0:25	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:25	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
3/16/2015 0:30	Cyanide, Weak & Dissociable	0.0076	mg/L	<RDL	0.005	0.01	SM4500-CN-I,E
3/16/2015 0:30	Hem (oil, total)	3.9	mg/L	<RDL,B	1.5	5.2	EPA 1664B
3/16/2015 0:30	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
3/16/2015 1:00	Antimony, Total, ICP-MS	0.57	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
3/16/2015 1:00	Arsenic, Total, ICP-MS	1.85	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/16/2015 1:00	Barium, Total, ICP-MS	15.5	ug/L		0.05	0.25	EPA 200.8*SW846 6020A
3/16/2015 1:00	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
3/16/2015 1:00	Cadmium, Total, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
3/16/2015 1:00	Calcium, Total, ICP-MS	10100	ug/L		50	50	EPA 200.8*SW846 6020A
3/16/2015 1:00	Chromium, Total, ICP-MS	2.16	ug/L		0.2	1	EPA 200.8*SW846 6020A
3/16/2015 1:00	Copper, Total, ICP-MS	11.1	ug/L		0.4	2	EPA 200.8*SW846 6020A
3/16/2015 1:00	Discharge Volume	5450000	gal				NONE
3/16/2015 1:00	Hardness, Calc	35.2	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
3/16/2015 1:00	Lead, Total, ICP-MS	4.76	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/16/2015 1:00	Magnesium, Total, ICP-MS	2440	ug/L		50	50	EPA 200.8*SW846 6020A
3/16/2015 1:00	Nickel, Total, ICP-MS	3.08	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
3/16/2015 1:00	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
3/16/2015 1:00	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/16/2015 1:00	Thallium, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
3/16/2015 1:00	Zinc, Total, ICP-MS	38.9	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
11/15/2015 2:45	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2,4-Dimethylphenol		ug/L	<MDL,JG	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Antimony, Total, ICP-MS	0.81	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
11/15/2015 2:45	Arsenic, Total, ICP-MS	1.74	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/15/2015 2:45	Barium, Total, ICP-MS	13.3	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
11/15/2015 2:45	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
11/15/2015 2:45	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Bis(2-Ethylhexyl)Phthalate	0.965	ug/L	B2	0.13	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Cadmium, Total, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
11/15/2015 2:45	Calcium, Total, ICP-MS	16100	ug/L		50	50	EPA 200.8*SW846 6020A
11/15/2015 2:45	Chromium, Total, ICP-MS	1.59	ug/L		0.2	1	EPA 200.8*SW846 6020A
11/15/2015 2:45	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Copper, Total, ICP-MS	9.73	ug/L		0.2	2	EPA 200.8*SW846 6020A
11/15/2015 2:45	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Di-N-Octyl Phthalate	0.22	ug/L		0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D

Henderson/MLK Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
11/15/2015 2:45	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Diethyl Phthalate	0.25	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Discharge Volume	2930000	gal				NONE
11/15/2015 2:45	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Hardness, Calc	55.8	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
11/15/2015 2:45	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Lead, Total, ICP-MS	2.06	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/15/2015 2:45	Magnesium, Total, ICP-MS	3800	ug/L		50	50	EPA 200.8*SW846 6020A
11/15/2015 2:45	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Nickel, Total, ICP-MS	2.56	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/15/2015 2:45	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Phenol	6.9	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 2:45	Salinity		PSS	<MDL	2	3	SM2520-B
11/15/2015 2:45	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
11/15/2015 2:45	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
11/15/2015 2:45	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
11/15/2015 2:45	Zinc, Total, ICP-MS	26.5	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
11/15/2015 3:05	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Chloroform	2.28	ug/L		1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
11/15/2015 3:05	Dissolved Oxygen, Field	10.3	mg/L		0.5	1	NONE
11/15/2015 3:05	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Hem (oil, total)	4.3	mg/L	<RDL,B	1.5	5.2	EPA 1664B
11/15/2015 3:05	Mercury, Total, CVAF	0.0158	ug/L		0.0002	0.0005	EPA 1631E
11/15/2015 3:05	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Tetrachloroethylene	1.8	ug/L	<RDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
11/15/2015 3:05	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 3:05	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
11/15/2015 6:35	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	2,4-Dimethylphenol		ug/L	<MDL,JG	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D

Henderson/MLK Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
11/15/2015 6:35	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Antimony, Total, ICP-MS	0.77	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
11/15/2015 6:35	Arsenic, Total, ICP-MS	1.65	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/15/2015 6:35	Barium, Total, ICP-MS	14.3	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
11/15/2015 6:35	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
11/15/2015 6:35	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Bis(2-Ethylhexyl)Phthalate	0.915	ug/L	B2	0.13	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Cadmium, Total, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
11/15/2015 6:35	Calcium, Total, ICP-MS	14700	ug/L		50	50	EPA 200.8*SW846 6020A
11/15/2015 6:35	Chromium, Total, ICP-MS	1.48	ug/L		0.2	1	EPA 200.8*SW846 6020A
11/15/2015 6:35	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Copper, Total, ICP-MS	10.1	ug/L		0.2	2	EPA 200.8*SW846 6020A
11/15/2015 6:35	Di-N-Butyl Phthalate	0.762	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Di-N-Octyl Phthalate	0.202	ug/L		0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Diethyl Phthalate	0.263	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Discharge Volume	600000	gal				NONE
11/15/2015 6:35	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Hardness, Calc	52.2	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
11/15/2015 6:35	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Lead, Total, ICP-MS	1.82	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/15/2015 6:35	Magnesium, Total, ICP-MS	3730	ug/L		50	50	EPA 200.8*SW846 6020A
11/15/2015 6:35	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Nickel, Total, ICP-MS	2.47	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
11/15/2015 6:35	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Phenol	2.24	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
11/15/2015 6:35	Salinity		PSS	<MDL	2	3	SM2520-B
11/15/2015 6:35	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
11/15/2015 6:35	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
11/15/2015 6:35	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
11/15/2015 6:35	Zinc, Total, ICP-MS	23.3	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
12/8/2015 14:35	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
12/8/2015 14:35	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Antimony, Total, ICP-MS	0.81	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
12/8/2015 14:35	Arsenic, Total, ICP-MS	1.71	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 14:35	Barium, Total, ICP-MS	15.5	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
12/8/2015 14:35	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 14:35	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Bis(2-Ethylhexyl)Phthalate	0.537	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Cadmium, Total, ICP-MS	0.065	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
12/8/2015 14:35	Calcium, Total, ICP-MS	14700	ug/L		50	50	EPA 200.8*SW846 6020A
12/8/2015 14:35	Chromium, Total, ICP-MS	2.09	ug/L		0.2	1	EPA 200.8*SW846 6020A
12/8/2015 14:35	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Copper, Total, ICP-MS	11.8	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/8/2015 14:35	Di-N-Butyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Dibenzo(a,j)acridine		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Diethyl Phthalate	0.376	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Discharge Volume	1400000	gal				NONE
12/8/2015 14:35	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Hardness, Calc	50.9	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
12/8/2015 14:35	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Lead, Total, ICP-MS	2.51	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 14:35	Magnesium, Total, ICP-MS	3450	ug/L		50	50	EPA 200.8*SW846 6020A
12/8/2015 14:35	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Nickel, Total, ICP-MS	3.25	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 14:35	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Perylene		ug/L	<MDL,JG	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 14:35	Salinity		PSS	<MDL	2	3	SM2520-B
12/8/2015 14:35	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
12/8/2015 14:35	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
12/8/2015 14:35	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
12/8/2015 14:35	Zinc, Total, ICP-MS	33.6	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
12/8/2015 16:25	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

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COLLECTDATE	**PARMNAME**	**NUMVALUE**	**UNITS**	**QUALIFIER**	**MDL**	**RDL**	**METHOD**
12/8/2015 16:25	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Chloroform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Cyanide, Weak & Dissociable		mg/L	<MDL	0.005	0.01	SM4500-CN-I,E
12/8/2015 16:25	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Hem (oil, total)	2.8	mg/L	<RDL	1.5	5.2	EPA 1664B
12/8/2015 16:25	Mercury, Total, CVAF	0.0197	ug/L		0.0002	0.0005	EPA 1631E
12/8/2015 16:25	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
12/8/2015 16:25	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 16:25	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
12/8/2015 18:45	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	4-Nitrophenol		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Antimony, Total, ICP-MS	0.81	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
12/8/2015 18:45	Arsenic, Total, ICP-MS	1.7	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 18:45	Barium, Total, ICP-MS	15.8	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
12/8/2015 18:45	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 18:45	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Bis(2-Ethylhexyl)Phthalate	0.519	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Cadmium, Total, ICP-MS	0.066	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
12/8/2015 18:45	Calcium, Total, ICP-MS	15600	ug/L		50	50	EPA 200.8*SW846 6020A
12/8/2015 18:45	Chromium, Total, ICP-MS	1.95	ug/L		0.2	1	EPA 200.8*SW846 6020A
12/8/2015 18:45	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Copper, Total, ICP-MS	8.9	ug/L		0.2	2	EPA 200.8*SW846 6020A
12/8/2015 18:45	Di-N-Butyl Phthalate	0.18	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D

Henderson/MLK Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
12/8/2015 18:45	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Dibenzo(a,j)acridine		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Diethyl Phthalate	0.23	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Discharge Volume	7100000	gal				NONE
12/8/2015 18:45	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Hardness, Calc	54.4	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
12/8/2015 18:45	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Hexachlorocyclopentadiene		ug/L	<MDL,JG	0.5	1.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Lead, Total, ICP-MS	2.25	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 18:45	Magnesium, Total, ICP-MS	3750	ug/L		50	50	EPA 200.8*SW846 6020A
12/8/2015 18:45	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Nickel, Total, ICP-MS	3.14	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
12/8/2015 18:45	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Perylene		ug/L	<MDL,JG	0.13	0.25	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
12/8/2015 18:45	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
12/8/2015 18:45	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
12/8/2015 18:45	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
12/8/2015 18:45	Zinc, Total, ICP-MS	26.9	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/18/2017 7:00	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Antimony, Total, ICP-MS	0.51	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
1/18/2017 7:00	Arsenic, Total, ICP-MS	1.55	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 7:00	Barium, Total, ICP-MS	17.4	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
1/18/2017 7:00	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 7:00	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Bis(2-Ethylhexyl)Phthalate	1.1	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Cadmium, Total, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
1/18/2017 7:00	Calcium, Total, ICP-MS	12300	ug/L		50	50	EPA 200.8*SW846 6020A
1/18/2017 7:00	Chromium, Total, ICP-MS	2.13	ug/L		0.2	1	EPA 200.8*SW846 6020A
1/18/2017 7:00	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Copper, Total, ICP-MS	14.9	ug/L		0.2	2	EPA 200.8*SW846 6020A
1/18/2017 7:00	Di-N-Butyl Phthalate	0.407	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D

Henderson/MLK Wet Weather Treatment Station							
COLLECTDATE	**PARMNAME**	**NUMVALUE**	**UNITS**	**QUALIFIER**	**MDL**	**RDL**	**METHOD**
1/18/2017 7:00	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Diethyl Phthalate	0.23	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Discharge Volume	4080000	gal				NONE
1/18/2017 7:00	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Hardness, Calc	44.4	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
1/18/2017 7:00	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Lead, Total, ICP-MS	2.61	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 7:00	Magnesium, Total, ICP-MS	3320	ug/L		50	50	EPA 200.8*SW846 6020A
1/18/2017 7:00	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Nickel, Total, ICP-MS	3.68	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
1/18/2017 7:00	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Phenol	4.77	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
1/18/2017 7:00	Salinity		PSS	<MDL	2	3	SM2520-B
1/18/2017 7:00	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
1/18/2017 7:00	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
1/18/2017 7:00	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
1/18/2017 7:00	Zinc, Total, ICP-MS	25.7	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
1/18/2017 9:45	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Chloroform	17.1	ug/L		1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Cyanide, Weak & Dissociable	0.0024	mg/L	<RDL	0.002	0.01	SM4500-CN-I,E
1/18/2017 9:45	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Hem (oil, total)	2.1	mg/L	<RDL,B	1.5	5.2	EPA 1664B
1/18/2017 9:45	Mercury, Total, CVAF	0.0124	ug/L		0.002	0.005	EPA 1631E
1/18/2017 9:45	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Total Phenolics	0.04	mg/L		0.04	0.038	EPA 420.1
1/18/2017 9:45	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
1/18/2017 9:45	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 6:30	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D

Henderson/MLK Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/9/2017 6:30	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	3,3'-Dichlorobenzidine		ug/L	<MDL	0.5	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Antimony, Total, ICP-MS	0.69	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
2/9/2017 6:30	Arsenic, Total, ICP-MS	1.67	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 6:30	Barium, Total, ICP-MS	15.7	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
2/9/2017 6:30	Benzidine		ug/L	<MDL	7.5	22.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 6:30	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Bis(2-Ethylhexyl)Phthalate	0.21	ug/L	<RDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Cadmium, Total, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
2/9/2017 6:30	Calcium, Total, ICP-MS	13500	ug/L		50	50	EPA 200.8*SW846 6020A
2/9/2017 6:30	Chromium, Total, ICP-MS	1.84	ug/L		0.2	1	EPA 200.8*SW846 6020A
2/9/2017 6:30	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Copper, Total, ICP-MS	11	ug/L		0.2	2	EPA 200.8*SW846 6020A
2/9/2017 6:30	Di-N-Butyl Phthalate	0.21	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Dibenzo(a,e)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Dibenzo(a,h)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Diethyl Phthalate		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Discharge Volume	6950000	gal				NONE
2/9/2017 6:30	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Hardness, Calc	47.6	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
2/9/2017 6:30	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Lead, Total, ICP-MS	2.92	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 6:30	Magnesium, Total, ICP-MS	3390	ug/L		50	50	EPA 200.8*SW846 6020A
2/9/2017 6:30	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Nickel, Total, ICP-MS	2.91	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 6:30	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 6:30	Salinity		PSS	<MDL	2	3	SM2520-B
2/9/2017 6:30	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
2/9/2017 6:30	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
2/9/2017 6:30	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
2/9/2017 6:30	Zinc, Total, ICP-MS	27.5	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
2/9/2017 7:00	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C

Henderson/MLK Wet Weather Treatment Station							
COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/9/2017 7:00	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Chloroform	56.6	ug/L		1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
2/9/2017 7:00	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Hem (oil, total)	2.9	mg/L	<RDL	1.5	5.3	EPA 1664B
2/9/2017 7:00	Mercury, Total, CVAF	0.0193	ug/L		0.002	0.005	EPA 1631E
2/9/2017 7:00	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Total Phenolics		mg/L	<MDL	0.042	0.042	EPA 420.1
2/9/2017 7:00	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 7:00	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/9/2017 10:53	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	3,3'-Dichlorobenzidine		ug/L	<MDL	0.5	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Antimony, Total, ICP-MS	0.79	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
2/9/2017 10:53	Arsenic, Total, ICP-MS	2.09	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 10:53	Barium, Total, ICP-MS	20.8	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
2/9/2017 10:53	Benzidine		ug/L	<MDL	7.5	22.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 10:53	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Bis(2-Ethylhexyl)Phthalate	0.32	ug/L	<RDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Cadmium, Total, ICP-MS	0.063	ug/L	<RDL	0.05	0.25	EPA 200.8*SW846 6020A
2/9/2017 10:53	Calcium, Total, ICP-MS	13400	ug/L		50	50	EPA 200.8*SW846 6020A
2/9/2017 10:53	Chromium, Total, ICP-MS	3.11	ug/L		0.2	1	EPA 200.8*SW846 6020A
2/9/2017 10:53	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Copper, Total, ICP-MS	11.9	ug/L		0.2	2	EPA 200.8*SW846 6020A
2/9/2017 10:53	Di-N-Butyl Phthalate	0.16	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Dibenzo(a,e)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/9/2017 10:53	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Dibenzo(a,h)pyrene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Diethyl Phthalate	0.22	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Discharge Volume	6300000	gal				NONE
2/9/2017 10:53	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Hardness, Calc	47.3	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
2/9/2017 10:53	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Lead, Total, ICP-MS	5.33	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 10:53	Magnesium, Total, ICP-MS	3370	ug/L		50	50	EPA 200.8*SW846 6020A
2/9/2017 10:53	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Nickel, Total, ICP-MS	4.02	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/9/2017 10:53	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Phenol		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/9/2017 10:53	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
2/9/2017 10:53	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
2/9/2017 10:53	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
2/9/2017 10:53	Zinc, Total, ICP-MS	36.1	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
2/16/2017 4:18	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Antimony, Total, ICP-MS	0.73	ug/L	<RDL	0.3	1	EPA 200.8*SW846 6020A
2/16/2017 4:18	Arsenic, Total, ICP-MS	1.59	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/16/2017 4:18	Barium, Total, ICP-MS	14.9	ug/L		0.5	0.5	EPA 200.8*SW846 6020A
2/16/2017 4:18	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Benzo(r,s,t)pentaphene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8*SW846 6020A
2/16/2017 4:18	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Bis(2-Ethylhexyl)Phthalate	0.867	ug/L		0.13	0.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Cadmium, Total, ICP-MS		ug/L	<MDL	0.05	0.25	EPA 200.8*SW846 6020A
2/16/2017 4:18	Calcium, Total, ICP-MS	13400	ug/L		50	50	EPA 200.8*SW846 6020A
2/16/2017 4:18	Chromium, Total, ICP-MS	2.08	ug/L		0.2	1	EPA 200.8*SW846 6020A
2/16/2017 4:18	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Copper, Total, ICP-MS	24.2	ug/L		0.2	2	EPA 200.8*SW846 6020A
2/16/2017 4:18	Di-N-Butyl Phthalate	0.23	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Di-N-Octyl Phthalate	0.12	ug/L	<RDL	0.075	0.125	EPA 625/SW846 3520C*8270D

Henderson/MLK Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
2/16/2017 4:18	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Dibenzo(a,h)anthracene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Diethyl Phthalate	0.279	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Discharge Volume	2400000	gal				NONE
2/16/2017 4:18	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Hardness, Calc	47.3	mg CaCO3/L		0.331	0.331	EPA 200.8/SW846 6020A*SM2340B
2/16/2017 4:18	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Lead, Total, ICP-MS	3.81	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/16/2017 4:18	Magnesium, Total, ICP-MS	3380	ug/L		50	50	EPA 200.8*SW846 6020A
2/16/2017 4:18	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Nickel, Total, ICP-MS	3.04	ug/L		0.1	0.5	EPA 200.8*SW846 6020A
2/16/2017 4:18	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Phenol	0.52	ug/L	<RDL	0.5	0.75	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
2/16/2017 4:18	Salinity		PSS	<MDL	2	3	SM2520-B
2/16/2017 4:18	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8*SW846 6020A
2/16/2017 4:18	Silver, Total, ICP-MS		ug/L	<MDL	0.04	0.2	EPA 200.8*SW846 6020A
2/16/2017 4:18	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8*SW846 6020A
2/16/2017 4:18	Zinc, Total, ICP-MS	54.1	ug/L		0.5	2.5	EPA 200.8*SW846 6020A
2/16/2017 8:00	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Acrolein		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Acrylonitrile		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Benzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Bromoform		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Bromomethane		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Chlorobenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Chloroethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Chloroform	41.6	ug/L		1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Chloromethane		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Cyanide, Weak & Dissociable	0.004	mg/L	<RDL	0.002	0.01	SM4500-CN-I,E
2/16/2017 8:00	Ethylbenzene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Hem (oil, total)	2.3	mg/L	<RDL,B	1.5	5.4	EPA 1664B
2/16/2017 8:00	Mercury, Total, CVAF	0.0151	ug/L		0.002	0.005	EPA 1631E
2/16/2017 8:00	Methylene Chloride		ug/L	<MDL	5	10	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Toluene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
2/16/2017 8:00	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
2/16/2017 8:00	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624/SW846 5030C*8260C
4/14/2018 21:30	1,2,4-Trichlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	1,2-Diphenylhydrazine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	2,4,6-Trichlorophenol		ug/L	<MDL	0.5	1	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	2,4-Dichlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	2,4-Dimethylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	2,4-Dinitrophenol		ug/L	<MDL	0.75	1.25	EPA 625/SW846 3520C*8270D

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COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
4/14/2018 21:30	2,4-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	2,6-Dinitrotoluene		ug/L	<MDL	0.13	0.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	2-Chloronaphthalene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	2-Chlorophenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	2-Methylphenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	2-Nitrophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	3,3'-Dichlorobenzidine		ug/L	<MDL,JG	0.5	0.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	3-Methylcholanthrene		ug/L	<MDL	0.5	2	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	4,6-Dinitro-O-Cresol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	4-Bromophenyl Phenyl Ether		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	4-Chloro-3-Methylphenol		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	4-Chlorophenyl Phenyl Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	4-Nitrophenol		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Acenaphthene		ug/L	<MDL	0.05	0.1	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Acenaphthylene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Antimony, Total, ICP-MS	0.74	ug/L	<RDL	0.3	1	EPA 200.8 (MOD)
4/14/2018 21:30	Arsenic, Total, ICP-MS	2.03	ug/L		0.05	0.25	EPA 200.8 (MOD)
4/14/2018 21:30	Barium, Total, ICP-MS	19	ug/L		0.5	0.5	EPA 200.8 (MOD)
4/14/2018 21:30	Benzidine		ug/L	<MDL,JG	7.5	22.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Benzo(a)anthracene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Benzo(a)pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Benzo(b,j,k)fluoranthene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Benzo(g,h,i)perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Benzo(r,s,t)pentaphene		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Benzyl Butyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Beryllium, Total, ICP-MS		ug/L	<MDL	0.1	0.5	EPA 200.8 (MOD)
4/14/2018 21:30	Bis(2-Chloroethoxy)Methane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Bis(2-Chloroethyl)Ether		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Bis(2-Chloroisopropyl)Ether		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Bis(2-Ethylhexyl)Phthalate	0.522	ug/L	B	0.13	0.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Cadmium, Total, ICP-MS	0.082	ug/L	<RDL	0.05	0.25	EPA 200.8 (MOD)
4/14/2018 21:30	Calcium, Total, ICP-MS	13600	ug/L		50	50	EPA 200.8 (MOD)
4/14/2018 21:30	Chromium, Total, ICP-MS	3.22	ug/L		0.2	1	EPA 200.8 (MOD)
4/14/2018 21:30	Chrysene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Copper, Total, ICP-MS	14.6	ug/L		0.2	2	EPA 200.8 (MOD)
4/14/2018 21:30	Di-N-Butyl Phthalate	0.257	ug/L		0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Di-N-Octyl Phthalate		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Dibenzo(a,e)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Dibenzo(a,h)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Dibenzo(a,h)anthracene		ug/L	<MDL,JG	0.2	0.375	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Dibenzo(a,h)pyrene		ug/L	<MDL,JG	0.63	2.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Dibenzo(a,j)acridine		ug/L	<MDL	0.63	2.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Diethyl Phthalate	0.25	ug/L	<RDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Dimethyl Phthalate		ug/L	<MDL	0.05	0.075	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Discharge Volume	3600000	gal				NONE
4/14/2018 21:30	Fluoranthene		ug/L	<MDL	0.075	0.15	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Fluorene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Hardness, Calc	47	mg CaCO3/L		0.331	0.331	EPA 200.8 (MOD)*SM2340B
4/14/2018 21:30	Hexachlorobenzene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Hexachlorobutadiene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Hexachlorocyclopentadiene		ug/L	<MDL	0.5	1.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Hexachloroethane		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Indeno(1,2,3-Cd)Pyrene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Isophorone		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Lead, Total, ICP-MS	4.71	ug/L		0.1	0.5	EPA 200.8 (MOD)
4/14/2018 21:30	Magnesium, Total, ICP-MS	3190	ug/L		50	50	EPA 200.8 (MOD)
4/14/2018 21:30	N-Nitrosodi-N-Propylamine		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	N-Nitrosodimethylamine		ug/L	<MDL	0.5	0.75	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	N-Nitrosodiphenylamine		ug/L	<MDL	0.25	0.5	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Naphthalene		ug/L	<MDL	0.2	0.375	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Nickel, Total, ICP-MS	4.41	ug/L		0.1	0.5	EPA 200.8 (MOD)
4/14/2018 21:30	Nitrobenzene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Pentachlorophenol		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Perylene		ug/L	<MDL	0.13	0.25	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Phenanthrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Phenol	1.71	ug/L		0.5	0.75	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Pyrene		ug/L	<MDL	0.075	0.125	EPA 625/SW846 3520C*8270D
4/14/2018 21:30	Salinity		PSS	<MDL	2	3	SM2520-B
4/14/2018 21:30	Sample Temperature, Field	0.5	deg C				NONE
4/14/2018 21:30	Selenium, Total, ICP-MS		ug/L	<MDL	0.5	1	EPA 200.8 (MOD)
4/14/2018 21:30	Silver, Total, ICP-MS	0.041	ug/L	<RDL	0.04	0.2	EPA 200.8 (MOD)
4/14/2018 21:30	Thallium, Total, ICP-MS		ug/L	<MDL	0.1	0.2	EPA 200.8 (MOD)
4/14/2018 21:30	Zinc, Total, ICP-MS	41.2	ug/L		0.5	2.5	EPA 200.8 (MOD)
4/14/2018 21:43	1,1,1-Trichloroethane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	1,1,2,2-Tetrachloroethane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	1,1,2-Trichloroethane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C

Henderson/MLK Wet Weather Treatment Station

COLLECTDATE	PARMNAME	NUMVALUE	UNITS	QUALIFIER	MDL	RDL	METHOD
4/14/2018 21:43	1,1,2-Trichloroethylene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	1,1-Dichloroethane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	1,1-Dichloroethylene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	1,2-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	1,2-Dichloroethane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	1,2-Dichloropropane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	1,3-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	1,4-Dichlorobenzene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	2-Chloroethylvinyl ether		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Acrolein		ug/L	<MDL	5	10	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Acrylonitrile		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Benzene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Bromodichloromethane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Bromoform		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Bromomethane		ug/L	<MDL	5	10	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Carbon Tetrachloride		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Chlorobenzene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Chlorodibromomethane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Chloroethane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Chloroform	21.8	ug/L		1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Chloromethane		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Cis-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Cyanide, Weak & Dissociable		mg/L	<MDL	0.002	0.01	SM4500-CN-I,E
4/14/2018 21:43	Ethylbenzene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Hem (oil, total)	4	mg/L	<RDL	1.4	5.2	EPA 1664B
4/14/2018 21:43	Mercury, Total, CVAF	0.0263	ug/L		0.0004	0.001	EPA 1631E
4/14/2018 21:43	Methylene Chloride		ug/L	<MDL	5	10	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Tetrachloroethylene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Toluene	1.4	ug/L	<RDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Total Phenolics		mg/L	<MDL	0.04	0.04	EPA 420.1
4/14/2018 21:43	Trans-1,2-Dichloroethylene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Trans-1,3-Dichloropropene		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C
4/14/2018 21:43	Vinyl Chloride		ug/L	<MDL	1	2	EPA 624.1/SW846 5030C*8260C

SAMPLE RECEIPT FORM / CHEMICAL ANALYSIS FORM

FILE #: PR154559

CLIENT: King County
322 W. Ewing St.
Seattle, WA 98119
USA

Phone: (206) 477-7114
Email: fritz.grothkopp@kingcounty.gov

RECEIVED BY: J. Wiebe
CONDITION: okay, 9.0°C

DATE/TIME: December 30, 2015 (11:15 a.m.)

# of Containers	Sample Type	Sample (Client Codes)	Lab Codes	Test Requested
		Project ID: 421185-400		
2	Water	L62493-1 Date Sampled: 11/15/15	PR154559	209PCB
2	Water	L62493-4 Date Sampled: 11/15/15	PR154560	209PCB

STORAGE: Stored at 4°C.

ANALYTES: HRGC/HRMS analysis for polychlorinated polychlorinated biphenyls (209 congeners).

SPECIAL INSTRUCTIONS: none

METHODOLOGY

Reference Method: PCB: SOP LAB02; EPA Method 1668C

Data summarized in Data Report Attached

Report sent to: Fritz Grothkopp   Date: January 27, 2016

Comments: Results relate only to items tested.

Case Narrative – PCBs

Sample Preparation - Water
The samples were extracted in one batch commencing on January 4, 2016. The batch consisted of two samples, a blank and a spike (LCS). The duplicate for this batch was from other samples submitted by the client. Approximately 1 L of water was spiked with 5 ng each of 27 carbon-13 labelled PCB surrogates and extracted with 3 x 100 mL dichloromethane. The extract was collected in a 500 mL boiling flask and concentrated to 1 mL by rotary evaporator. The sample was reconstituted in 5 mL of hexane and placed in a vial containing 10 mL of concentrated H_2SO_4 . Clean-up standard (PCB028L, 111L and 178L, 5 ng) was added at this time. It was vigorously shaken and left overnight to allow the layers to separate. The extract was then cleaned up in an acid silica gel column. If color persisted on the column it was repeated. The eluate from the silica gel column was concentrated by rotary evaporator to 2 mL and further reduced to 50 µL was by a gentle stream of nitrogen. Recovery standard (5 ng) was added and the final volume made up to 100 µL.

Instrument Calibration
All samples were analysed on a Thermo Instruments DFS high resolution mass spectrometer coupled with a Thermo Trace gas chromatograph. The column used was a 60 m HT8 (SGE), 0.15 µm, 0.25 mm i.d.

An initial six point calibration (CS-LO, CS-1 to CS-5) consisting of the first and last eluting congener in for each homolog plus the twelve toxic PCBs was run on July 14, 2015, covering the range of 0.2 ng/mL to 2000 ng/mL. A single point calibration standard (PCCS-209) was analyzed on December 17^{th} and added to the calibration file. Surrogate and recovery standards are kept at a constant 100 ng/mL.

1. All LOC/Toxic CBs are calibrated as per EPA 1668c §10.4.

   - Internal standards were quantified relative to the Recovery Standards as follows:
     - use PCB-009L as per method for PCB001L, PCB003L,PCB004L and PCB015L. Also use for PCB019L
     - use PCB-052L as per method for PCB037L, PCB054L, PCB081L, PCB077L and PCB028L.
     - use PCB-101L as per method for PCB104L and PCB111L. Also use for and PCB155L.
     - use PCB-138L as per method for PCB167L, PCB156L, PCB157L and PCB169L. Also use for PCB123L, PCB118L, PCB114L, PCB105L, PCB126L, PCB188L, PCB178L and PCB202L.
     - use PCB-194L as per method for PCB189L, PCB205L, PCB206L, PCB208L and PCB209L.

2. All other CBs are calibrated by internal standard as per EPA 1668c §10.5:
   - All other CBs are calibrated against the average response for all internal standards in a given LOC.
   - Concentrations for natives and internal standards are as follows:
     - MoCB, DiCB and TriCB @ 25 ng/mL
     - TeCB, PeCB, HxCB and HpCB @ 50 ng/mL
     - OcCB, NoCB @ 75 ng/mL
     - All internal standards @ 100 ng/mL

Calibration Verification
The calibration was verified at the beginning and end of the run or every 12 hours with a single-point 209 congener standard (CS209, 25-75 ng/mL). The criteria used to evaluate data is from 1668C:

- 75-125% for LOC and dl-PCBs. All other PCBs require correct ion ratios
- 50-145% for labelled compounds.

The CalVers were acceptable for use. Two CalVers had failing criteria (low recovery for labeled PCB), however as the affected data was only being quantified for MoCB, the data was accepted. The failing CalVers are as follows:

- FS01111610 – Low ^{13}C-PCB105 and ^{13}C-PCB126.
- FS01121620 – Low ^{13}C-PCB019, ^{13}C-PCB188 and ^{13}C-PCB202.

The HRMS analyst got mixed up in her counting such that the continuing CalVer January 10th (FS01101622) was at 13h 06 minutes. All data was acceptable and no further action was taken.

Mass Resolution

The high resolution mass spectrometer was operated at a resolution of >10,000. This resolution was checked each day documented in hardcopy.

Results

There is a narrow window of 30 seconds between PCB003 (last eluting MoCB) and PCB010 (first eluting DiCB). We usually split the two groups somewhere in the middle. However, after injecting the first sample, which was okay, many of the remaining samples had PCB003 clipped. Therefore these samples were reinjected and quantified for MonoCBs only.

All data was quantified using Thermo TargetQuan software. All data <5x blank levels are flagged with a B. Non-detectable results are represented with a value of zero (0) and flagged with U (U J if the detection level is less than the EQL).

Any congener data that failed to meet acceptable ion ratios was flagged with an “N” provided its EMPC was greater than the reporting limit. The EMPC calculation results when all criteria for peak identification are met with the exception of ratio criteria. If the ratio is correct, the calculated value is listed in the EMPC column. When the ratio is incorrect, the smallest area is used to calculate a theoretical summed area. If the QuanMass is the smallest area then the calculation is QMA + QMA*ratio. If the Reference Mass is the smallest area then the calculation is RMA + RMA/ratio.

EQLs were calculated assuming a final volume of 100 μL. For a 1 L sample and CS-Lo of 0.2 ng/mL, the EQL calculates to 20 pg/L.

The Reporting Limits were set at 2.5x S/N. All data below the EQL but above the RL was flagged with a J.

Standard Recoveries

Criteria used to evaluate data is from 1668C (5-145% for MoCB-TriCB standards and 10-145% for TeCB-DeCB). All samples gave acceptable recoveries for internal standards and clean-up standards.

QC Samples

Blanks

One method blank was carried through the extraction and clean-up procedure. All sample data <5x blank levels are flagged with a B. If the sample concentration is >5x blank levels, it is flagged with a B1.

Spikes

One litre of lab water was spiked with 1 ng each of 72 PCB congeners and carried through the extraction and clean-up procedures. Recoveries of toxic PCBs and window defining PCBs were within the acceptable range of 60-135%. All other PCBs were also within this range.

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David Hope P.Chem., CEO

DATA REPORT

Client:	King County	Date Collected:	11/15/2015
Client ID:	L62493-1	Date Extracted:	1/4/2016
Project ID:	421185-400	Date Analysed:	1/10/2016 1/12/2016
PRL ID:	PR154559	HRMS File:	FS011016A06 FS01121609
		Work Group No.:	PRL011

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
2-MoCB	PCB-001	2051-60-7	0	0.67	U J	20
3-MoCB	PCB-002	2051-61-8	2.29	0.98	N J	20
4-MoCB	PCB-003	2051-62-9	0	1.10	U J	20
2,6-DiCB	PCB-010	33146-45-1	0	5.56	U J	20
2,2'-DiCB	PCB-004	13029-08-8	0	6.32	U J	20
2,5-DiCB	PCB-009	34883-39-1	0	5.39	U J	20
2,4-DiCB	PCB-007	33284-50-3	0	5.84	U J	20
2,3'-DiCB	PCB-006	25569-80-6	0	5.54	U J	20
2,3/2,4'-DiCB	PCB-005/008		0	5.35	U J	20
3,5-DiCB	PCB-014	34883-41-5	0	5.12	U J	20
3,3'-DiCB	PCB-011	2050-67-1	57.5	4.74	B	20
3,4/3,4'-DiCB	PCB-012/013		0	5.59	U J	20
4,4'-DiCB	PCB-015	2050-68-2	0	6.14	U J	20
2,2',6-TrCB	PCB-019	38444-73-4	0	3.22	U J	20
2,4,6-TrCB	PCB-030	35693-92-6	0	2.17	U J	20
2,2',5-TrCB	PCB-018	37680-65-2	12.6	2.25	J	20
2,2',4-TrCB	PCB-017	37680-66-3	7.4	3.01	J	20
2,3,6-TrCB	PCB-024	55702-45-9	0	2.44	U J	20
2,3',6-TrCB	PCB-027	38444-76-7	0	1.39	U J	20
2,4',6-TrCB	PCB-032	38444-77-8	0	3.55	U J	20
2,2',3-TrCB	PCB-016	38444-78-9	3.73	1.25	J	20
2,3,5-TrCB	PCB-023	55720-44-0	0	1.07	U J	20
2,3',5'-TrCB	PCB-034	37680-68-5	0	1.49	U J	20
2,4,5-TrCB	PCB-029	15862-07-4	0	0.89	U J	20
2,3',5-TrCB	PCB-026	38444-81-4	6.12	0.83	J	20
2,3',4-TrCB	PCB-025	55712-37-3	4.76	1.02	N J	20
2,4',5-TrCB	PCB-031	16606-02-3	22.8	0.85		20
2,4,4'-TrCB	PCB-028	7012-37-5	21.9	1.25	B	20
2,3,4-TrCB	PCB-021	55702-46-0	0	1.65	U J	20
	PCB-020/033		8.44	1.32	N J	20
2,3,4'-TrCB	PCB-022	38444-85-8	8.28	1.63	J	20
3,3',5-TrCB	PCB-036	38444-87-0	0	1.14	U J	20
3,4',5-TrCB	PCB-039	38444-88-1	0	1.25	U J	20
3,4,5-TrCB	PCB-038	53555-66-1	0	1.52	U J	20
3,3',4-TrCB	PCB-035	37680-69-6	0	1.43	U J	20
3,4,4'-TrCB	PCB-037	38444-90-5	0	1.69	U J	20
2,2',6,6'-TeCB	PCB-054	15968-05-5	0	1.32	U J	20
2,2',4,6-TeCB	PCB-050	62796-65-0	0	2.19	U J	20
2,2',5,6'-TeCB	PCB-053	41464-41-9	0	2.35	U J	20
2,2',4,6'-TeCB	PCB-051	68194-04-7	45.6	2.27		20
2,2',3,6-TeCB	PCB-045	70362-45-7	0	2.38	U J	20
2,2',3,6'-TeCB	PCB-046	41464-47-5	0	2.74	U J	20
	PCB-052/069		51.5	2.01	B	20
2,3',5',6-TeCB	PCB-073	74338-23-1	0	1.69	U J	20
	PCB-043/049		17.1	2.48	J	20
	PCB-065/075		0	1.80	U J	20
	PCB-047/048		82.7	2.08		20
2,3,4,6-TeCB	PCB-062	54230-22-7	0	2.10	U J	20
2,2',3,5'-TeCB	PCB-044	41464-39-5	28.2	2.79		20
2,3,3',6-TeCB	PCB-059	74472-33-6	0	1.75	U J	20
2,2',3,4'-TeCB	PCB-042	36559-22-5	0	2.49	U J	20
	PCB-064/072		8.33	1.67	N J	20

DATA REPORT

Client:	King County	Date Collected:	11/15/2015
Client ID:	L62493-1	Date Extracted:	1/4/2016
Project ID:	421185-400	Date Analysed:	1/10/2016 1/12/2016
PRL ID:	PR154559	HRMS File:	FS011016A06 FS01121609
		Work Group No.:	PRL011

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
2,3',4',6-TeCB	PCB-071	41464-46-4	0	1.65	U J	20
2,2',3,4-TeCB	PCB-041	52663-59-9	0	2.52	U J	20
2,3',4,5'-TeCB	PCB-068	73575-52-7	17.3	1.63	N J	20
	PCB-040/057		0	2.11	U J	20
2,3',4,5-TeCB	PCB-067	73575-53-8	0	1.74	U J	20
2,3,4',5-TeCB	PCB-063	74472-34-7	0	1.89	U J	20
2,3,3',5'-TeCB	PCB-058	41464-49-7	0	1.36	U J	20
2,3,4,5-TeCB	PCB-061	33284-53-6	0	2.17	U J	20
2,4,4',5-TeCB	PCB-074	32690-93-0	8.34	1.60	N J	20
2,3',4',5-TeCB	PCB-070	32598-11-1	63	1.95		20
2,3,3',4-TeCB	PCB-055	74338-24-2	0	1.80	U J	20
3,3',5,5'-TeCB	PCB-080	33284-52-5	0	1.80	U J	20
2,3',4,4'-TeCB	PCB-066	32598-10-0	21.7	1.59		20
2,3',4',5'-TeCB	PCB-076	70362-48-0	0	1.69	U J	20
2,3,4,4'-TeCB	PCB-060	33025-41-1	0	2.05	U J	20
2,3,3',4'-TeCB	PCB-056	41464-43-1	7.79	1.59	J	20
3,3',4,5'-TeCB	PCB-079	41464-48-6	0	1.54	U J	20
3,3',4,5-TeCB	PCB-078	70362-49-1	0	1.58	U J	20
3,4,4',5-TeCB	PCB-081	70362-50-4	0	2.44	U J	20
3,3',4,4'-TeCB	PCB-077	32598-13-3	0	2.17	U J	20
2,2',4,6,6'-PeCB	PCB-104	56558-16-8	0	2.88	U J	20
2,2',3,6,6'-PeCB	PCB-096	73575-54-9	0	3.33	U J	20
2,2',4,5',6-PeCB	PCB-103	60145-21-3	0	3.94	U J	20
2,2',4,4',6-PeCB	PCB-100	39485-83-1	0	4.30	U J	20
2,2',3,5,6'-PeCB	PCB-094	73575-55-0	0	5.12	U J	20
	PCB-093/098/102		0	5.05	U J	20
2,2',3,5',6-PeCB	PCB-095	38379-99-6	39.2	4.10		20
2,2',3,4,6-PeCB	PCB-088	55215-17-3	0	4.54	U J	20
	PCB-091/121		0	3.94	U J	20
2,2',3,3',6-PeCB	PCB-084	52663-60-2	0	4.87	U J	20
2,2',3,5,5'-PeCB	PCB-092	52663-61-3	0	4.53	U J	20
2,2',3,4,6'-PeCB	PCB-089	73575-57-2	0	5.12	U J	20
2,2',3,4',5-PeCB	PCB-090	68194-07-0	0	4.55	U J	20
2,2',4,5,5'-PeCB	PCB-101	37680-73-2	66.8	3.46		20
2,3,3',5',6-PeCB	PCB-113	68194-10-5	0	3.43	U J	20
2,2',4,4',5-PeCB	PCB-099	38380-01-7	16.5	4.07	J	20
	PCB-112/119		0	3.19	U J	20
	PCB-083/109		0	4.34	U J	20
	PCB-086/097/117		0	4.62	U J	20
	PCB-116/125		11.5	3.43	J	20
	PCB-087/115		0	4.16	U J	20
2,3,3',5,5'-PeCB	PCB-111	39635-32-0	0	3.45	U J	20
2,2',3,4,4'-PeCB	PCB-085	65510-45-4	0	4.85	U J	20
2,3',4,5,5'-PeCB	PCB-120	68194-12-7	0	3.44	U J	20
2,3,3',4',6-PeCB	PCB-110	38380-03-9	67.4	3.46		20
2,2',3,3',4-PeCB	PCB-082	52663-62-4	0	5.46	U J	20
2,3',4',5,5'-PeCB	PCB-124	70424-70-3	0	1.04	U J	20
	PCB-107/108		0	1.48	U J	20
2,3',4,4',5'-PeCB	PCB-123	65510-44-3	0	1.32	U J	20
2,3,3',4,5-PeCB	PCB-106	70424-69-0	0	1.42	U J	20
2,3',4,4',5-PeCB	PCB-118	31508-00-6	94.1	1.31		20
2,3,4,4',5-PeCB	PCB-114	74472-37-0	0	1.25	U J	20

DATA REPORT

Client:	King County	Date Collected:	11/15/2015
Client ID:	L62493-1	Date Extracted:	1/4/2016
Project ID:	421185-400	Date Analysed:	1/10/2016 1/12/2016
PRL ID:	PR154559	HRMS File:	FS011016A0€ FS01121609
		Work Group No.:	PRL011

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
2,3,3',4',5'-PeCB	PCB-122	76842-07-4	0	1.60	U J	20
	PCB-105/127		41.2	1.71		20
3,3',4,4',5-PeCB	PCB-126	57465-28-8	0	1.63	U J	20
2,2',4,4',6,6'-HxCB	PCB-155	33979-03-2	0	2.27	U J	20
2,2',3,4',6,6'-HxCB	PCB-150	68194-08-1	0	2.23	U J	20
2,2',3,5,6,6'-HxCB	PCB-152	68194-09-2	0	2.06	U J	20
2,2',3,4,6,6'-HxCB	PCB-145	74472-40-5	0	2.28	U J	20
	PCB-136/148		0	2.44	U J	20
2,2',4,4',5,6'-HxCB	PCB-154	60145-22-4	0	2.38	U J	20
2,2',3,5,5',6-HxCB	PCB-151	52663-63-5	0	3.27	U J	20
2,2',3,3',5,6'-HxCB	PCB-135	52744-13-5	0	3.33	U J	20
2,2',3,4,5',6-HxCB	PCB-144	68194-14-9	0	3.31	U J	20
2,2',3,4',5,6-HxCB	PCB-147	68194-13-8	0	2.36	U J	20
	PCB-139/149		62.3	2.96	N	20
2,2',3,4,4',6'-HxCB	PCB-140	59291-64-4	0	0.78	U J	20
2,2',3,4,5,6'-HxCB	PCB-143	68194-15-0	0	0.95	U J	20
2,2',3,3',5,6-HxCB	PCB-134	52704-70-8	0	1.18	U J	20
2,2',3,4,5,6-HxCB	PCB-142	41411-61-4	0	1.10	U J	20
2,2',3,3',4,6-HxCB	PCB-131	61798-70-7	0	1.22	U J	20
2,2',3,3',5,5'-HxCB	PCB-133	35694-04-3	0	0.78	U J	20
2,3,3',5,5',6-HxCB	PCB-165	74472-46-1	0	0.83	U J	20
2,2',3,4',5,5'-HxCB	PCB-146	51908-16-8	3.03	0.80	N J	20
	PCB-132/161		21.7	0.81		20
2,2',4,4',5,5'-HxCB	PCB-153	35065-27-1	130	0.90		20
2,3',4,4',5',6-HxCB	PCB-168	59291-65-5	0	0.63	U J	20
2,2',3,4,5,5'-HxCB	PCB-141	52712-04-6	19.6	0.91	J	20
2,2',3,4,4',5-HxCB	PCB-137	35694-06-5	0	1.02	U J	20
2,2',3,3',4,5'-HxCB	PCB-130	52663-66-8	0	1.06	U J	20
	PCB-163/164		22.8	0.78		20
2,2',3,4,4',5'-HxCB	PCB-138	35065-28-2	92.6	0.83		20
2,3,3',4,5,6-HxCB	PCB-160	41411-62-5	0	1.07	U J	20
2,3,3',4,4',6-HxCB	PCB-158	74472-42-7	0	0.74	U J	20
2,2',3,3',4,5-HxCB	PCB-129	55215-18-4	0	1.25	U J	20
2,3,4,4',5,6-HxCB	PCB-166	41411-63-6	0	0.72	U J	20
2,3,3',4,5,5'-HxCB	PCB-159	39635-35-3	0	0.62	U J	20
2,2',3,3',4,4'-HxCB	PCB-128	38380-07-3	0	1.11	U J	20
2,3,3',4',5,5'-HxCB	PCB-162	39635-34-2	10.8	0.60	N J	20
2,3',4,4',5,5'-HxCB	PCB-167	52663-72-6	0.91	0.81	N J	20
2,3,3',4,4',5-HxCB	PCB-156	38380-08-4	5.11	0.66	N J	20
2,3,3',4,4',5'-HxCB	PCB-157	69782-90-7	1.76	0.65	N J	20
3,3',4,4',5,5'-HxCB	PCB-169	32774-16-6	0	0.71	U J	20
2,2',3,4',5,6,6'-HpCB	PCB-188	74487-85-7	0	0.82	U J	20
2,2',3,4,4',6,6'-HpCB	PCB-184	74472-48-3	3.01	0.50	J	20
2,2',3,3',5,6,6'-HpCB	PCB-179	52663-64-6	8.35	0.49	J	20
2,2',3,3',4,6,6'-HpCB	PCB-176	52663-65-7	0	0.51	U J	20
2,2',3,4,5,6,6'-HpCB	PCB-186	74472-49-4	0	0.55	U J	20
2,2',3,3',5,5',6-HpCB	PCB-178	52663-67-9	0.89	0.72	N J	20
2,2',3,3',4,5',6-HpCB	PCB-175	40186-70-7	0	0.69	U J	20
	PCB-182/187		14.5	0.69	J	20
2,2',3,4,4',5',6-HpCB	PCB-183	52663-69-1	4.97	0.64	N J	20
2,2',3,4,5,5',6-HpCB	PCB-185	52712-05-7	0	0.70	U J	20
2,2',3,3',4,5,6'-HpCB	PCB-174	38411-25-5	3.27	0.70	N J	20

DATA REPORT

Client:	King County	Date Collected:	11/15/2015
Client ID:	L62493-1	Date Extracted:	1/4/2016
Project ID:	421185-400	Date Analysed:	1/10/2016 1/12/2016
PRL ID:	PR154559	HRMS File:	FS011016A0(FS01121609
		Work Group No.:	PRL011

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
2,2',3,4,4',5,6-HpCB	PCB-181	74472-47-2	0	0.75	U J	20
2,2',3,3',4,5',6'-HpCB	PCB-177	52663-70-4	0	0.68	U J	20
2,2',3,3',4,4',6-HpCB	PCB-171	52663-71-5	2.53	0.69	N J	20
2,2',3,3',4,5,6-HpCB	PCB-173	68194-16-1	0	0.81	U J	20
2,2',3,3',4,5,5'-HpCB	PCB-172	52663-74-8	0	0.68	U J	20
2,3,3',4,5,5',6-HpCB	PCB-192	74472-51-8	0	0.60	U J	20
2,2',3,4,4',5,5'-HpCB	PCB-180	35065-29-3	65.8	0.78		20
2,3,3',4',5,5',6-HpCB	PCB-193	69782-91-8	0	0.41	U J	20
2,3,3',4,4',5',6-HpCB	PCB-191	74472-50-7	0	0.51	U J	20
2,2',3,3',4,4',5-HpCB	PCB-170	35065-30-6	20.4	0.69		20
2,3,3',4,4',5,6-HpCB	PCB-190	41411-64-7	1.17	0.45	N J	20
2,3,3',4,4',5,5'-HpCB	PCB-189	39635-31-9	3.42	0.28	N J	20
2,2',3,3',5,5',6,6'-OcCB	PCB-202	2136-99-4	0	0.43	U J	20
2,2',3,3',4,5',6,6'-OcCB	PCB-201	40186-71-8	0	0.22	U J	20
2,2',3,4,4',5,6,6'-OcCB	PCB-204	74472-52-9	0	0.21	U J	20
2,2',3,3',4,4',6,6'-OcCB	PCB-197	33091-17-7	0	0.23	U J	20
2,2',3,3',4,5,6,6'-OcCB	PCB-200	52663-73-7	0.27	0.22	N J	20
2,2',3,3',4,5,5',6-OcCB	PCB-198	68194-17-2	0	0.32	U J	20
2,2',3,3',4,5,5',6'-OcCB	PCB-199	52663-75-9	11.2	0.25	J	20
2,2',3,3',4,4',5,6'-OcCB	PCB-196	42740-50-1	0	0.29	U J	20
2,2',3,4,4',5,5',6-OcCB	PCB-203	52663-76-0	1.18	0.25	N J	20
2,2',3,3',4,4',5,6-OcCB	PCB-195	52663-78-2	1.47	0.19	N J	20
2,2',3,3',4,4',5,5'-OcCB	PCB-194	35694-08-7	6.63	0.17	N J	20
2,3,3',4,4',5,5',6-OcCB	PCB-205	74472-53-0	0	0.13	U J	20
2,2',3,3',4,5,5',6,6'-NoCB	PCB-208	52663-77-1	6.68	1.36	N J	20
2,2',3,3',4,4',5,6,6'-NoCB	PCB-207	52663-79-3	0	1.19	U J	20
2,2',3,3',4,4',5,5',6-NoCB	PCB-206	40186-72-9	17.9	1.73	J	20
2,2',3,3',4,4',5,5',6,6'-DeCB	PCB-209	2051-24-3	14.5	0.14	J	20

Homologs	# of Congeners	Conc.	SDL	Flag	EQL
Monochlorobiphenyls	3	0	0.67	U J	20
Dichlorobiphenyls	12	57.5	4.74	B	20
Trichlorobiphenyls	24	82.8	0.83		20
Tetrachlorobiphenyls	42	318	1.32		20
Pentachlorobiphenyls	46	337	1.04		20
Hexachlorobiphenyls	42	287	0.60		20
Heptachlorobiphenyls	24	112	0.28		20
Octachlorobiphenyls	12	11.2	0.13	J	20
Nonachlorobiphenyls	3	17.9	1.19	J	20
Decachlorobiphenyl	1	14.5	0.14	J	20
Total PCB		1240	0.13		20

SAMPLE RECEIPT FORM / CHEMICAL ANALYSIS FORM

FILE #: PR171245

CLIENT: King County
322 W. Ewing St.
Seattle, WA 98119
USA

Phone: (206) 477-7114
Email: fritz.grothkopp@kingcounty.gov

RECEIVED BY: J. Wiebe
CONDITION: okay, 7.6°C

DATE/TIME: April 6, 2017 (11:00 a.m.)

# of Containers	Sample Type	Sample (Client Codes)	Lab Codes	Test Requested
		Project ID: 421185-400 MLK/Henderson CSO Dish.		
2	Water	L67002-1 Date Sampled: 02-09-17	PR171245	209PCB
2	Water	L67002-4 Date Sampled: 02-09-17	PR171246	209PCB

STORAGE: Stored at 4°C.

ANALYTES: HRGC/HRMS analysis for polychlorinated polychlorinated biphenyls (209 congeners).

SPECIAL INSTRUCTIONS: none

METHODOLOGY

Reference Method: PCB: SOP LAB02; EPA Method 1668C

Data summarized in Data Report Attached

Report sent to: Fritz Grothkopp Date: May 17, 2017

Comments: Results relate only to items tested.

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Pacific Rim Laboratories Inc. #103, 19575 - 55A Avenue, Surrey, BC V3S 8P8 Tel: 604-532-8711 Fax: 604-532-8712

Pacific Rim Laboratories Inc.

COMPANY: KingCo ENV. Lab.
322 West Ewing St
Seattle WA 98119

CONTACT: F. Grothkopp

PHONE: 206-477-7114

Date: 4-5-17

EMAIL: fritz.grothkopp@kingcounty.gov

SAMPLE ID	PRL ID	DATE SAMPLED	SAMPLE MATRIX	NUMBER OF CONTAINERS	DIOXIN/FURAN	PCB - dioxin-like (12)	PCB - 209 congener	PAH	NDMA	TBT	Nonylphenol		Date Requested	COMMENTS bottles
~~L66912-1~~		~~1-18-17~~	~~WATER~~				~~✓~~							
L67002-1	PR17 1245	2-9-17	↓	2			✓							
-4	1246	2-9-17	↓	2			✓							

Sampler's Signature	Relinquished by: Frederick Grothkopp	Company KCEL	Date 4-5-17	Time 1200	Received by:
Comments: 421185-400. MLK/Henderson CSO Disch.	Method of Shipment fedex	Waybill No.:	Rec'd for PRL: PN	Date 06APR17	Time 11am
	Shipment Condition good	Temp.: 9.0°C	Cooler Opened By: JW		

Case Narrative – PCBs

Sample Preparation - Water
The samples were extracted in one batches commencing on April 13, 2017. The batch consisted of two samples, a duplicate, a blank and a spike (LCS). Approximately 1 L of water was spiked with 5 ng each of 27 carbon-13 labelled PCB surrogates and extracted with 3 x 100 mL dichloromethane. The extract was collected in a 500 mL boiling flask and concentrated to 1 mL by rotary evaporator. The sample was reconstituted in 5 mL of hexane and placed in a vial containing 10 mL of concentrated H_2SO_4 . Clean-up standard (PCB028L, 111L and 178L, 5 ng) was added at this time. It was vigorously shaken and left overnight to allow the layers to separate. The extract was then cleaned up in an acid silica gel column. If color persisted on the column it was repeated. The eluate from the silica gel column was concentrated by rotary evaporator to 2 mL and further reduced to 50 µL was by a gentle stream of nitrogen. Recovery standard (5 ng) was added and the final volume made up to 100 µL.

Instrument Calibration
All samples were analysed on a Thermo Instruments DFS high resolution mass spectrometer coupled with a Thermo Trace gas chromatograph. The column used was a 60 m HT8 (SGE), 0.15 µm, 0.25 mm i.d.

An initial six point calibration (CS-LO, CS-1 to CS-5) consisting of the first and last eluting congener in for each homolog plus the twelve toxic PCBs was run on March 3rd and again on March 13th, 2017, covering the range of 0.2 ng/mL to 2000 ng/mL. A single point calibration standard (PCCS-209) was analyzed on March 3rd (cali FS030317), 14th (cali FS031317b) and 20th (cali FS031317c) and added to the calibration file. Surrogate and recovery standards are kept at a constant 100 ng/mL.

1. All LOC/Toxic CBs are calibrated as per EPA 1668c §10.4.

   - Internal standards were quantified relative to the Recovery Standards as follows:
     - use PCB-009L as per method for PCB001L, PCB003L,PCB004L and PCB015L. Also use for PCB019L
     - use PCB-052L as per method for PCB037L, PCB054L, PCB081L, PCB077L and PCB028L.
     - use PCB-101L as per method for PCB104L and PCB111L. Also use for and PCB155L.
     - use PCB-138L as per method for PCB167L, PCB156L, PCB157L and PCB169L. Also use for PCB123L, PCB118L, PCB114L, PCB105L, PCB126L, PCB188L, PCB178L and PCB202L.
     - use PCB-194L as per method for PCB189L, PCB205L, PCB206L, PCB208L and PCB209L.

2. All other CBs are calibrated by internal standard as per EPA 1668c §10.5:
   - All other CBs are calibrated against the average response for all internal standards in a given LOC.
   - Concentrations for natives and internal standards are as follows:
     - MoCB, DiCB and TriCB @ 25 ng/mL
     - TeCB, PeCB, HxCB and HpCB @ 50 ng/mL
     - OcCB, NoCB @ 75 ng/mL
     - All internal standards @ 100 ng/mL

Calibration Verification
The calibration was verified at the beginning and end of the run or every 12 hours with a single-point 209 congener standard (CS209, 25-75 ng/mL). The criteria used to evaluate data is from 1668C:
- 75-125% for LOC and dl-PCBs. All other PCBs require correct ion ratios
- 50-145% for labelled compounds.

The CalVers were acceptable for use.

Mass Resolution
The high resolution mass spectrometer was operated at a resolution of >10,000. This resolution was checked each day documented in hardcopy.

Results
All data was quantified using Thermo TargetQuan software. All data <5x blank levels are flagged with a B. Non-detectable results are represented with a value of zero (0) and flagged with U (U J if the detection level is less than the EQL).

Any congener data that failed to meet acceptable ion ratios was flagged with an “N” provided its EMPC was greater than the reporting limit. The EMPC calculation results when all criteria for peak identification are met with the exception of ratio criteria. If the ratio is correct, the calculated value is listed in the EMPC column. When the ratio is incorrect, the smallest area is used to calculate a theoretical summed area. If the QuanMass is the smallest area then the calculation is QMA + QMA*ratio. If the Reference Mass is the smallest area then the calculation is RMA + RMA/ratio.

EQLs were calculated assuming a final volume of 100 µL. For a 1 L sample and CS-Lo of 0.2 ng/mL, the EQL calculates to 20 pg/L.

The Reporting Limits were set at 2.5x S/N. All data below the EQL but above the RL was flagged with a J.

Standard Recoveries

Criteria used to evaluate data is from 1668C (5-145% for MoCB-TriCB standards and 10-145% for TeCB-DeCB). All samples gave acceptable recoveries for internal standards and clean-up standards.

QC Samples

Blanks

One method blank was carried through the extraction and clean-up procedure. All sample data <5x blank levels are flagged with a B. If the sample concentration is >5x blank levels, it is flagged with a B1.

Spikes

One litre of lab water was spiked with 1 ng each of 72 PCB congeners and carried through the extraction and clean-up procedures. Recoveries of toxic PCBs and window defining PCBs were within the acceptable range of 60-135%. All other PCBs were also within this range except:

- PCB-074 155.3%

Duplicates

One sample (PR171245) were analysed in duplicate. The criteria used to evaluate duplicates is an RPD of <50% (difference / mean) when analytes are detected in both samples at values >10 pg/L. The duplicate was acceptable using this criteria.

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David Hope P.Chem., CEO

DATA REPORT

Client:	King County	**Date Collected:**	2-9-2017
Client ID:	L67002-1	**Date Extracted:**	4-13-2017
Project ID:	421185-400	**Date Analysed:**	4-20-2017
PRL ID:	PR171245	**HRMS File:**	DF04201706
		Work Group No.:	PRL027

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
2-MoCB	PCB-001	2051-60-7	0	2.76	U J	20
3-MoCB	PCB-002	2051-61-8	0	2.45	U J	20
4-MoCB	PCB-003	2051-62-9	0	2.75	U J	20
2,6-DiCB	PCB-010	33146-45-1	0	3.26	U J	20
2,2'-DiCB	PCB-004	13029-08-8	0	8.06	U J	20
2,5-DiCB	PCB-009	34883-39-1	0	3.62	U J	20
2,4-DiCB	PCB-007	33284-50-3	0	3.4	U J	20
2,3'-DiCB	PCB-006	25569-80-6	0	3.43	U J	20
2,3/2,4'-DiCB	PCB-005/008		0	3.59	U J	20
3,5-DiCB	PCB-014	34883-41-5	0	3.72	U J	20
3,3'-DiCB	PCB-011	2050-67-1	86.8	3.81	B	20
3,4/3,4'-DiCB	PCB-012/013		0	4	U J	20
4,4'-DiCB	PCB-015	2050-68-2	0	2.61	U J	20
2,2',6-TrCB	PCB-019	38444-73-4	0	0.56	U J	20
2,4,6-TrCB	PCB-030	35693-92-6	0	0.27	U J	20
2,2',5-TrCB	PCB-018	37680-65-2	0	0.46	U J	20
2,2',4-TrCB	PCB-017	37680-66-3	0	0.39	U J	20
2,3,6-TrCB	PCB-024	55702-45-9	0	0.32	U J	20
2,3',6-TrCB	PCB-027	38444-76-7	0	0.27	U J	20
2,4',6-TrCB	PCB-032	38444-77-8	0	0.35	U J	20
2,2',3-TrCB	PCB-016	38444-78-9	2.96	0.28	N J	20
2,3,5-TrCB	PCB-023	55720-44-0	0	0.21	U J	20
2,3',5'-TrCB	PCB-034	37680-68-5	0	0.2	U J	20
2,4,5-TrCB	PCB-029	15862-07-4	0	0.24	U J	20
2,3',5-TrCB	PCB-026	38444-81-4	0	0.22	U J	20
2,3',4-TrCB	PCB-025	55712-37-3	0	0.25	U J	20
2,4',5-TrCB	PCB-031	16606-02-3	9.05	0.23	J	20
2,4,4'-TrCB	PCB-028	7012-37-5	11.7	0.24	J	20
2,3,4-TrCB	PCB-021	55702-46-0	0	0.3	U J	20
	PCB-020/033		6.54	0.22	J	20
2,3,4'-TrCB	PCB-022	38444-85-8	0	0.25	U J	20
3,3',5-TrCB	PCB-036	38444-87-0	0	0.26	U J	20
3,4',5-TrCB	PCB-039	38444-88-1	0	0.27	U J	20
3,4,5-TrCB	PCB-038	53555-66-1	0	0.29	U J	20
3,3',4-TrCB	PCB-035	37680-69-6	0	0.3	U J	20
3,4,4'-TrCB	PCB-037	38444-90-5	0	0.32	U J	20
2,2',6,6'-TeCB	PCB-054	15968-05-5	0	0.47	U J	20
2,2',4,6-TeCB	PCB-050	62796-65-0	0	0.48	U J	20
2,2',5,6'-TeCB	PCB-053	41464-41-9	0	0.53	U J	20
2,2',4,6'-TeCB	PCB-051	68194-04-7	0	0.54	U J	20
2,2',3,6-TeCB	PCB-045	70362-45-7	0	0.57	U J	20
2,2',3,6'-TeCB	PCB-046	41464-47-5	0	0.72	U J	20
	PCB-052/069		37.1	0.56		20
2,3',5',6-TeCB	PCB-073	74338-23-1	0	0.5	U J	20
	PCB-043/049		13.7	0.66	N J	20
2,3,5,6-TeCB	PCB-065	33284-54-7	0	0.5	U J	20
	PCB-075/047/048		18.4	0.6	J	20
2,3,4,6-TeCB	PCB-062	54230-22-7	0	0.68	U J	20
2,2',3,5'-TeCB	PCB-044	41464-39-5	11.5	0.57	J	20
2,3,3',6-TeCB	PCB-059	74472-33-6	0	0.65	U J	20
2,2',3,4'-TeCB	PCB-042	36559-22-5	0	0.95	U J	20
2,3,4',6-TeCB	PCB-064	52663-58-8	0	0.45	U J	20

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PRL ID:	PR171245	**HRMS File:**	DF04201706
		Work Group No.:	PRL027

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
	PCB-072/071		0	0.48	U J	20
2,2',3,4-TeCB	PCB-041	52663-59-9	0	1.25	U J	20
2,3',4,5'-TeCB	PCB-068	73575-52-7	14.1	0.62	J	20
2,2',3,3'-TeCB	PCB-040	38444-93-8	0	0.97	U J	20
2,3,3',5-TeCB	PCB-057	70424-67-8	0	0.59	U J	20
2,3',4,5-TeCB	PCB-067	73575-53-8	0	0.6	U J	20
	PCB-063/058		0	0.68	U J	20
2,3,4,5-TeCB	PCB-061	33284-53-6	0	0.6	U J	20
2,4,4',5-TeCB	PCB-074	32690-93-0	0	0.78	U J	20
2,3',4',5-TeCB	PCB-070	32598-11-1	39.6	0.56		20
2,3,3',4-TeCB	PCB-055	74338-24-2	0	0.76	U J	20
	PCB-080/066		23.5	0.64		20
2,3',4',5'-TeCB	PCB-076	70362-48-0	0	0.63	U J	20
2,3,4,4'-TeCB	PCB-060	33025-41-1	0	0.55	U J	20
2,3,3',4'-TeCB	PCB-056	41464-43-1	0	0.79	U J	20
3,3',4,5'-TeCB	PCB-079	41464-48-6	0	0.68	U J	20
3,3',4,5-TeCB	PCB-078	70362-49-1	0	0.78	U J	20
3,4,4',5-TeCB	PCB-081	70362-50-4	0	0.53	U J	20
3,3',4,4'-TeCB	PCB-077	32598-13-3	0	0.52	U J	20
2,2',4,6,6'-PeCB	PCB-104	56558-16-8	0	2.71	U J	20
2,2',3,6,6'-PeCB	PCB-096	73575-54-9	0	2.15	U J	20
2,2',4,5',6-PeCB	PCB-103	60145-21-3	0	3.03	U J	20
2,2',4,4',6-PeCB	PCB-100	39485-83-1	0	3.3	U J	20
2,2',3,5,6'-PeCB	PCB-094	73575-55-0	0	3.85	U J	20
	PCB-102/093		0	4.12	U J	20
	PCB-098/095		56	4.01		20
2,2',3,4,6-PeCB	PCB-088	55215-17-3	0	3.42	U J	20
2,2',3,4',6-PeCB	PCB-091	68194-05-8	0	4.66	U J	20
2,3',4,5',6-PeCB	PBC-121	56558-18-0	0	3.45	U J	20
	PCB-084/092		0	3.63	U J	20
2,2',3,4,6'-PeCB	PCB-089	73575-57-2	0	4.15	U J	20
2,2',3,4',5-PeCB	PCB-090	68194-07-0	0	4.53	U J	20
2,2',4,5,5'-PeCB	PCB-101	37680-73-2	89.4	3.32		20
2,3,3',5',6-PeCB	PCB-113	68194-10-5	0	3.23	U J	20
2,2',4,4',5-PeCB	PCB-099	38380-01-7	45.7	4.37		20
2,3',4,4',6-PeCB	PCB-119	56558-17-9	0	2.89	U J	20
2,3,3',5,6-PeCB	PCB-112	74472-36-9	0	4.28	U J	20
2,2',3,3',5-PeCB	PCB-083	60145-20-2	0	3.94	U J	20
2,3,3',4,6-PeCB	PCB-109	74472-35-8	0	5.49	U J	20
2,2',3,4,5-PeCB	PCB-086	55312-69-1	0	4.3	U J	20
	PCB-097/117		25.8	4.3		20
	PCB-116/125		0	3.6	U J	20
	PCB-087/115		55.4	4.2	N	20
	PCB-111/085		0	4.68	U J	20
2,3,3',4',6-PeCB	PCB-110	38380-03-9	133	3.96		20
2,3',4,5,5'-PeCB	PCB-120	68194-12-7	0	3.67	U J	20
2,2',3,3',4-PeCB	PCB-082	52663-62-4	0	5.63	U J	20
2,3',4',5,5'-PeCB	PCB-124	70424-70-3	0	1.18	U J	20
	PCB-107/108		0	2.82	U J	20
2,3',4,4',5'-PeCB	PCB-123	65510-44-3	0	3.02	U J	20
2,3,3',4,5-PeCB	PCB-106	70424-69-0	0	2.78	U J	20
2,3',4,4',5-PeCB	PCB-118	31508-00-6	92.5	2.78		20

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PRL ID:	PR171245	**HRMS File:**	DF04201706
		Work Group No.:	PRL027

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
2,3,4,4',5-PeCB	PCB-114	74472-37-0	0	3.26	U J	20
2,3,3',4',5'-PeCB	PCB-122	76842-07-4	0	2.89	U J	20
2,3,3',4,4'-PeCB	PCB-105	32598-14-4	47.1	2.69		20
3,3',4,5,5'-PeCB	PCB-127	39635-33-1	0	2.7	U J	20
3,3',4,4',5-PeCB	PCB-126	57465-28-8	0	1.81	U J	20
2,2',4,4',6,6'-HxCB	PCB-155	33979-03-2	0	0.64	U J	20
2,2',3,4',6,6'-HxCB	PCB-150	68194-08-1	0	0.26	U J	20
2,2',3,5,6,6'-HxCB	PCB-152	68194-09-2	0	0.24	U J	20
2,2',3,4,6,6'-HxCB	PCB-145	74472-40-5	0	0.29	U J	20
2,2',3,3',6,6'-HxCB	PCB-136	38411-22-2	0	0.25	U J	20
2,2',3,4',5,6'-HxCB	PCB-148	74472-41-6	0	0.4	U J	20
2,2',4,4',5,6'-HxCB	PCB-154	60145-22-4	0	0.35	U J	20
2,2',3,5,5',6-HxCB	PCB-151	52663-63-5	8.8	0.4	J	20
2,2',3,3',5,6'-HxCB	PCB-135	52744-13-5	0	0.4	U J	20
2,2',3,4,5',6-HxCB	PCB-144	68194-14-9	0	0.4	U J	20
2,2',3,4',5,6-HxCB	PCB-147	68194-13-8	0	0.36	U J	20
2,2',3,4,4',6-HxCB	PCB-149	56030-56-9	69.5	0.44		20
2,2',3,4',5',6-HxCB	PCB-139	38380-04-0	0	0.36	U J	20
2,2',3,4,4',6'-HxCB	PCB-140	59291-64-4	0	0.25	U J	20
2,2',3,4,5,6'-HxCB	PCB-143	68194-15-0	0	0.25	U J	20
2,2',3,3',5,6-HxCB	PCB-134	52704-70-8	0	0.34	U J	20
2,2',3,4,5,6-HxCB	PCB-142	41411-61-4	0	0.27	U J	20
2,2',3,3',4,6-HxCB	PCB-131	61798-70-7	0	0.3	U J	20
2,2',3,3',5,5'-HxCB	PCB-133	35694-04-3	0	0.3	U J	20
2,3,3',5,5',6-HxCB	PCB-165	74472-46-1	0	0.34	U J	20
2,2',3,3',4,6'-HxCB	PCB-132	38380-05-1	20.6	0.19		20
2,2',3,4',5,5'-HxCB	PCB-146	51908-16-8	0	0.24	U J	20
2,3,3',4,5',6-HxCB	PCB-161	74472-43-8	0	0.23	U J	20
2,2',4,4',5,5'-HxCB	PCB-153	35065-27-1	117	0.28		20
2,3',4,4',5',6-HxCB	PCB-168	59291-65-5	0	0.19	U J	20
2,2',3,4,5,5'-HxCB	PCB-141	52712-04-6	0	0.27	U J	20
2,2',3,4,4',5-HxCB	PCB-137	35694-06-5	0	0.3	U J	20
2,2',3,3',4,5'-HxCB	PCB-130	52663-66-8	0	0.31	U J	20
	PCB-163/164		16.2	0.22	J	20
2,2',3,4,4',5'-HxCB	PCB-138	35065-28-2	143	0.39		20
2,3,3',4,5,6-HxCB	PCB-160	41411-62-5	0	0.2	U J	20
2,3,3',4,4',6-HxCB	PCB-158	74472-42-7	0	0.21	U J	20
2,2',3,3',4,5-HxCB	PCB-129	55215-18-4	0	0.36	U J	20
2,3,4,4',5,6-HxCB	PCB-166	41411-63-6	0	0.23	U J	20
	PCB-159/128		15.6	0.28	J	20
2,3,3',4',5,5'-HxCB	PCB-162	39635-34-2	1.04	0.25	N J	20
2,3',4,4',5,5'-HxCB	PCB-167	52663-72-6	0	0.23	U J	20
2,3,3',4,4',5-HxCB	PCB-156	38380-08-4	16.4	0.22	J	20
2,3,3',4,4',5'-HxCB	PCB-157	69782-90-7	0	0.21	U J	20
3,3',4,4',5,5'-HxCB	PCB-169	32774-16-6	0	0.22	U J	20
2,2',3,4',5,6,6'-HpCB	PCB-188	74487-85-7	0	0.44	U J	20
2,2',3,4,4',6,6'-HpCB	PCB-184	74472-48-3	0	0.21	U J	20
2,2',3,3',5,6,6'-HpCB	PCB-179	52663-64-6	0.71	0.21	N J	20
2,2',3,3',4,6,6'-HpCB	PCB-176	52663-65-7	0	0.21	U J	20
2,2',3,4,5,6,6'-HpCB	PCB-186	74472-49-4	0	0.24	U J	20
2,2',3,3',5,5',6-HpCB	PCB-178	52663-67-9	0	0.32	U J	20
2,2',3,3',4,5',6-HpCB	PCB-175	40186-70-7	0	0.31	U J	20

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PRL ID:	PR171245	**HRMS File:**	DF04201706
		Work Group No.:	PRL027

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
	PCB-182/187		27	0.32		20
2,2',3,4,4',5',6-HpCB	PCB-183	52663-69-1	0	0.3	U J	20
2,2',3,4,5,5',6-HpCB	PCB-185	52712-05-7	0	0.34	U J	20
2,2',3,3',4,5,6'-HpCB	PCB-174	38411-25-5	19.4	0.33	N J	20
2,2',3,4,4',5,6-HpCB	PCB-181	74472-47-2	0	0.37	U J	20
2,2',3,3',4,5',6'-HpCB	PCB-177	52663-70-4	11.9	0.34	J	20
2,2',3,3',4,4',6-HpCB	PCB-171	52663-71-5	0	0.34	U J	20
2,2',3,3',4,5,6-HpCB	PCB-173	68194-16-1	0	0.41	U J	20
2,2',3,3',4,5,5'-HpCB	PCB-172	52663-74-8	0	0.38	U J	20
2,3,3',4,5,5',6-HpCB	PCB-192	74472-51-8	0	0.33	U J	20
	PCB-180/193		52.7	0.35		20
2,3,3',4,4',5',6-HpCB	PCB-191	74472-50-7	0	0.33	U J	20
2,2',3,3',4,4',5-HpCB	PCB-170	35065-30-6	24	0.49		20
2,3,3',4,4',5,6-HpCB	PCB-190	41411-64-7	1.94	0.35	N J	20
2,3,3',4,4',5,5'-HpCB	PCB-189	39635-31-9	0	0.19	U J	20
2,2',3,3',5,5',6,6'-OcCB	PCB-202	2136-99-4	5.31	0.17	N J	20
2,2',3,3',4,5',6,6'-OcCB	PCB-201	40186-71-8	0	0.11	U J	20
2,2',3,4,4',5,6,6'-OcCB	PCB-204	74472-52-9	0	0.12	U J	20
2,2',3,3',4,4',6,6'-OcCB	PCB-197	33091-17-7	0	0.13	U J	20
2,2',3,3',4,5,6,6'-OcCB	PCB-200	52663-73-7	0	0.12	U J	20
	PCB-198/199		10.9	0.21	J	20
2,2',3,3',4,4',5,6'-OcCB	PCB-196	42740-50-1	3.7	0.3	N J	20
2,2',3,4,4',5,5',6-OcCB	PCB-203	52663-76-0	6.54	0.22	N J	20
2,2',3,3',4,4',5,6-OcCB	PCB-195	52663-78-2	0	0.22	U J	20
2,2',3,3',4,4',5,5'-OcCB	PCB-194	35694-08-7	13	0.24	N J	20
2,3,3',4,4',5,5',6-OcCB	PCB-205	74472-53-0	0	0.12	U J	20
2,2',3,3',4,5,5',6,6'-NoCB	PCB-208	52663-77-1	0	4.38	U J	20
2,2',3,3',4,4',5,6,6'-NoCB	PCB-207	52663-79-3	0	4.05	U J	20
2,2',3,3',4,4',5,5',6-NoCB	PCB-206	40186-72-9	0	5.05	U J	20
2,2',3,3',4,4',5,5',6,6'-DeCB	PCB-209	2051-24-3	0	0.68		20

Homologs	# of Congeners	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
Monochlorobiphenyls	3	0	2.45	U J	20
Dichlorobiphenyls	12	86.8	2.61	B	20
Trichlorobiphenyls	24	27.3	0.2		20
Tetrachlorobiphenyls	42	144	0.45		20
Pentachlorobiphenyls	46	490	1.18		20
Hexachlorobiphenyls	42	407	0.19		20
Heptachlorobiphenyls	24	116	0.19		20
Octachlorobiphenyls	12	10.9	0.11	J	20
Nonachlorobiphenyls	3	0	4.05	U J	20
Decachlorobiphenyl	1	26.6	0.68		20
Total PCB		1310	0.11		20

PACIFIC RIM
LABORATORIES INC

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Pacific Rim Laboratories Inc. #103, 19575 - 55A Avenue, Surrey, BC V3S 8P8 Tel: 604-532-8711 Fax: 604-532-8712

COMPANY: King County Environmental Lab
322 W Ewing Street
Seattle, WA 98119

CONTACT: F. Grothkopp

PHONE: 206-477-7114

Date:

EMAIL: fritz.grothkopp@kingcounty.gov

SAMPLE ID	PRL ID	DATE SAMPLED	SAMPLE MATRIX	NUMBER OF CONTAINERS	DIOXIN/FURAN	PCB - dioxin-like (12)	PCB - 209 congener	PAH	NDMA	TBT	Nonylphenol	PBDE	OCP	COMMENTS
L67399-1	[illegible]2182570	14-Apr-18	Water	2			x							

Sampler's Signature	Relinquished by: [signature]	Company: KCEL	Date: 9-12-18	Time: 1200	Received by:
Comments: MLK Henderson CSO	Method of Shipment	Waybill No.	Rec'd for PRL: CH	Date: 13Sep18	Time: 2:45
421185-400	Shipment Condition	Temp: 7.6°C	Cooler Opened By:		

12.5°C

SAMPLE RECEIPT FORM / CHEMICAL ANALYSIS FORM

FILE #: PR182570

CLIENT: King County
322 W. Ewing St.
Seattle, WA 98119
USA

Phone: (206) 477-7114
Email: fritz.grothkopp@kingcounty.gov

RECEIVED BY: C. Hsieh
CONDITION: okay, 12.5°C

DATE/TIME: September 13, 2018 (2:45 p.m.)

# of Containers	Sample Type	Sample (Client Codes)	Lab Codes	Test Requested
		Project ID: 421185-400 MLK/Henderson CSO		
2	Water	L67399-1 Date Sampled: 14-04-18	PR182570	209PCB

STORAGE: Stored at 4°C.

ANALYTES: HRGC/HRMS analysis for polychlorinated polychlorinated biphenyls (209 congeners).

SPECIAL INSTRUCTIONS: none

METHODOLOGY

Reference Method: PCB: SOP LAB02; EPA Method 1668C

Data summarized in Data Report Attached

Report sent to: Fritz Grothkopp Date: October 5, 2018

Comments: Results relate only to items tested.

Case Narrative – PCBs

Sample Preparation - Water
The sample was extracted in duplicate commencing on September 18, 2018. Included in the batch were a blank and a spike (LCS). Approximately 1 L of water was spiked with 5 ng each of 27 carbon-13 labelled PCB surrogates and extracted with 3 x 100 mL dichloromethane. The extract was collected in a 500 mL boiling flask and concentrated to 1 mL by rotary evaporator. The sample was reconstituted in 5 mL of hexane and placed in a vial containing 10 mL of concentrated H_2SO_4 . Clean-up standard (PCB028L, 111L and 178L, 5 ng) was added at this time. It was vigorously shaken and left overnight to allow the layers to separate. The extract was then cleaned up in an acid silica gel column. If color persisted on the column it was repeated. The eluate from the silica gel column was concentrated by rotary evaporator to 2 mL and further reduced to 50 µL was by a gentle stream of nitrogen. Recovery standard (5 ng) was added and the final volume made up to 100 µL.

Instrument Calibration
All samples were analysed on a Thermo Instruments DFS high resolution mass spectrometer coupled with a Thermo Trace 1310 gas chromatograph. The column used was a 60 m HT8 (SGE), 0.15 µm, 0.25 mm i.d.

An initial six point calibration (CS-LO, CS-1 to CS-4) consisting of the first and last eluting congener in for each homolog plus the twelve toxic PCBs was run on July 13, 2018, covering the range of 0.2 ng/mL to 400 ng/mL. CD-5 was not used as the instrument was too sensitive and many of the peaks were flat topping. A single point calibration standard (PCCS-209) was analyzed on September 26, 2018 (cali FS09261803) and added to the calibration file. Surrogate and recovery standards are kept at a constant 100 ng/mL.

1. All LOC/Toxic CBs are calibrated as per EPA 1668c §10.4.

   - Internal standards were quantified relative to the Recovery Standards as follows:
     - use PCB-009L as per method for PCB001L, PCB003L,PCB004L and PCB015L. Also use for PCB019L
     - use PCB-052L as per method for PCB037L, PCB054L, PCB081L, PCB077L and PCB028L.
     - use PCB-101L as per method for PCB104L and PCB111L. Also use for and PCB155L.
     - use PCB-138L as per method for PCB167L, PCB156L, PCB157L and PCB169L. Also use for PCB123L, PCB118L, PCB114L, PCB105L, PCB126L, PCB188L, PCB178L and PCB202L.
     - use PCB-194L as per method for PCB189L, PCB205L, PCB206L, PCB208L and PCB209L.

2. All other CBs are calibrated by internal standard as per EPA 1668c §10.5:
   - All other CBs are calibrated against the average response for all internal standards in a given LOC.
   - Concentrations for natives and internal standards are as follows:
     - MoCB, DiCB and TriCB @ 25 ng/mL
     - TeCB, PeCB, HxCB and HpCB @ 50 ng/mL
     - OcCB, NoCB @ 75 ng/mL
     - All internal standards @ 100 ng/mL

Calibration Verification
The calibration was verified at the beginning and end of the run or every 12 hours with a single-point 209 congener standard (CS209, 25-75 ng/mL). The criteria used to evaluate data is from 1668C:
- 75-125% for LOC and dl-PCBs. All other PCBs require correct ion ratios
- 50-145% for labelled compounds.

The opening CalVer (FS01261803) is low for ^{13}C-PCB202 (38%). All other CalVers were acceptable for use.

Mass Resolution
The high resolution mass spectrometer was operated at a resolution of >10,000. This resolution was checked each day documented in hardcopy.

Results
All data was quantified using Thermo TargetQuan software. All data <5x blank levels are flagged with a B. Non-detectable results are represented with a value of zero (0) and flagged with U (U J if the detection level is less than the EQL).

Any congener data that failed to meet acceptable ion ratios was flagged with an “N” provided its EMPC was greater than the reporting limit. The EMPC calculation results when all criteria for peak identification are met with the exception of ratio criteria. If the ratio is correct, the calculated value is listed in the EMPC column. When the ratio is incorrect, the smallest area is used to calculate a theoretical summed area. If the QuanMass is the smallest area then the calculation is QMA + QMA*ratio. If the Reference Mass is the smallest area then the calculation is RMA + RMA/ratio.

EQLs were calculated assuming a final volume of 100 µL. For a 1 L sample and CS-Lo of 0.2 ng/mL, the EQL calculates to 20 pg/L.

The Reporting Limits were set at 2.5x S/N. All data below the EQL but above the RL was flagged with a J.

Standard Recoveries
Criteria used to evaluate data is from 1668C (5-145% for MoCB-TriCB standards and 10-145% for TeCB-DeCB). All samples gave acceptable recoveries for internal standards and clean-up standards.

QC Samples

Blanks
One method blank was carried through the extraction and clean-up procedure with each batch. All sample data <5x blank levels are flagged with a B. If the sample concentration is >5x blank levels, it is flagged with a B1. The blank was clean so no flags were used

Spikes
One litre of lab water was spiked with 1 ng each of 72 PCB congeners and carried through the extraction and clean-up procedures. Recoveries of toxic PCBs and window defining PCBs were within the acceptable range of 60-135%. All other PCBs were also within this range.

Duplicate
The sample was analyzed in duplicates. The criteria used to evaluate duplicates is an RPD of <50% (difference / mean) when analytes are detected in both samples at values >10 pg/L. The sample met this criteria.

David Hope P.Chem., CEO

DATA REPORT

Client:	King County	**Date Collected:**	4/14/2018
Client ID:	**L67399-1**	**Date Extracted:**	9/18/2018
Project ID:	421185-400	**Date Analysed:**	9/27/2018
PRL ID:	PR182570	**HRMS File:**	FS09271805
		Work Group No.:	PRL052

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
2-MoCB	PCB-001	2051-60-7	0	0.38	U J	19.8
3-MoCB	PCB-002	2051-61-8	0	0.36	U J	19.8
4-MoCB	PCB-003	2051-62-9	0	0.37	U J	19.8
2,6-DiCB	PCB-010	33146-45-1	0	2.92	U J	19.8
2,2'-DiCB	PCB-004	13029-08-8	0	4.44	U J	19.8
2,5-DiCB	PCB-009	34883-39-1	0	2.75	U J	19.8
2,4-DiCB	PCB-007	33284-50-3	0	3.18	U J	19.8
2,3'-DiCB	PCB-006	25569-80-6	0	2.94	U J	19.8
2,3/2,4'-DiCB	PCB-005/008		0	3.03	U J	19.8
3,5-DiCB	PCB-014	34883-41-5	0	3.01	U J	19.8
3,3'-DiCB	PCB-011	2050-67-1	61.8	3.06		19.8
3,4/3,4'-DiCB	PCB-012/013		0	3.3	U J	19.8
4,4'-DiCB	PCB-015	2050-68-2	0	3.09	U J	19.8
2,2',6-TrCB	PCB-019	38444-73-4	0	3.76	U J	19.8
2,4,6-TrCB	PCB-030	35693-92-6	0	3.05	U J	19.8
2,2',5-TrCB	PCB-018	37680-65-2	24.2	5.03		19.8
2,2',4-TrCB	PCB-017	37680-66-3	0	4.36	U J	19.8
2,3,6-TrCB	PCB-024	55702-45-9	0	3.61	U J	19.8
2,3',6-TrCB	PCB-027	38444-76-7	0	3.26	U J	19.8
2,4',6-TrCB	PCB-032	38444-77-8	0	2.94	U J	19.8
2,2',3-TrCB	PCB-016	38444-78-9	0	5.7	U J	19.8
2,3,5-TrCB	PCB-023	55720-44-0	0	1.59	U J	19.8
2,3',5'-TrCB	PCB-034	37680-68-5	0	1.31	U J	19.8
2,4,5-TrCB	PCB-029	15862-07-4	0	1.44	U J	19.8
2,3',5-TrCB	PCB-026	38444-81-4	0	1.31	U J	19.8
2,3',4-TrCB	PCB-025	55712-37-3	0	1.63	U J	19.8
2,4',5-TrCB	PCB-031	16606-02-3	0	1.35	U J	19.8
2,4,4'-TrCB	PCB-028	7012-37-5	21.3	1.22		19.8
2,3,4-TrCB	PCB-021	55702-46-0	0	1.65	U J	19.8
	PCB-020/033		0	1.33	U J	19.8
2,3,4'-TrCB	PCB-022	38444-85-8	0	1.48	U J	19.8
3,3',5-TrCB	PCB-036	38444-87-0	0	1.31	U J	19.8
3,4',5-TrCB	PCB-039	38444-88-1	0	1.31	U J	19.8
3,4,5-TrCB	PCB-038	53555-66-1	0	1.61	U J	19.8
3,3',4-TrCB	PCB-035	37680-69-6	0	1.51	U J	19.8
3,4,4'-TrCB	PCB-037	38444-90-5	0	3.1	U J	19.8
2,2',6,6'-TeCB	PCB-054	15968-05-5	0	3.63	U J	19.8
2,2',4,6-TeCB	PCB-050	62796-65-0	0	3.48	U J	19.8
2,2',5,6'-TeCB	PCB-053	41464-41-9	0	3.68	U J	19.8
2,2',4,6'-TeCB	PCB-051	68194-04-7	0	3.67	U J	19.8
2,2',3,6-TeCB	PCB-045	70362-45-7	0	4	U J	19.8
2,2',3,6'-TeCB	PCB-046	41464-47-5	0	4.4	U J	19.8
	PCB-052/069		55	3.27		19.8
2,3',5',6-TeCB	PCB-073	74338-23-1	0	2.94	U J	19.8
	PCB-043/049		29	3.9		19.8
	PCB-065/075		0	3.23	U J	19.8
	PCB-047/048		11.1	2.99	N J	19.8
2,3,4,6-TeCB	PCB-062	54230-22-7	0	3.23	U J	19.8
2,2',3,5'-TeCB	PCB-044	41464-39-5	56.9	4.82		19.8
2,3,3',6-TeCB	PCB-059	74472-33-6	0	2.89	U J	19.8
2,2',3,4'-TeCB	PCB-042	36559-22-5	0	4.34	U J	19.8
2,3',5,5'-TeCB	PCB-072	41464-42-0	0	3.25	U J	19.8

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PRL ID:	PR182570	**HRMS File:**	FS09271805
		Work Group No.:	PRL052

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
	PCB-064/071		9.91	2.51	N J	19.8
2,2',3,4-TeCB	PCB-041	52663-59-9	0	6.16	U J	19.8
2,3',4,5'-TeCB	PCB-068	73575-52-7	0	2.84	U J	19.8
2,2',3,3'-TeCB	PCB-040	38444-93-8	0	4.83	U J	19.8
2,3,3',5-TeCB	PCB-057	70424-67-8	0	2.71	U J	19.8
2,3',4,5-TeCB	PCB-067	73575-53-8	0	2.85	U J	19.8
	PCB-058/063		0	2.64	U J	19.8
2,3,4,5-TeCB	PCB-061	33284-53-6	0	3.53	U J	19.8
2,4,4',5-TeCB	PCB-074	32690-93-0	18.5	2.9	J	19.8
2,3',4',5-TeCB	PCB-070	32598-11-1	62.3	2.98		19.8
2,3,3',4-TeCB	PCB-055	74338-24-2	0	2.85	U J	19.8
	PCB-066/080		28.3	2.59	N	19.8
2,3',4',5'-TeCB	PCB-076	70362-48-0	0	3.02	U J	19.8
2,3,4,4'-TeCB	PCB-060	33025-41-1	23.8	2.6		19.8
2,3,3',4'-TeCB	PCB-056	41464-43-1	0	2.84	U J	19.8
3,3',4,5'-TeCB	PCB-079	41464-48-6	0	2.68	U J	19.8
3,3',4,5-TeCB	PCB-078	70362-49-1	0	3.02	U J	19.8
3,4,4',5-TeCB	PCB-081	70362-50-4	0	3.46	U J	19.8
3,3',4,4'-TeCB	PCB-077	32598-13-3	0	3.4	U J	19.8
2,2',4,6,6'-PeCB	PCB-104	56558-16-8	0	0.91	U J	19.8
2,2',3,6,6'-PeCB	PCB-096	73575-54-9	0	1.62	U J	19.8
2,2',4,5',6-PeCB	PCB-103	60145-21-3	0	1.91	U J	19.8
2,2',4,4',6-PeCB	PCB-100	39485-83-1	0	2.13	U J	19.8
2,2',3,5,6'-PeCB	PCB-094	73575-55-0	0	2.53	U J	19.8
	PCB-093/095/098/102		174	2.28		19.8
2,2',3,4,6-PeCB	PCB-088	55215-17-3	0	2.42	U J	19.8
2,2',3,4',6-PeCB	PCB-091	68194-05-8	0	2.21	U J	19.8
2,3',4,5',6-PeCB	PCB-121	56558-18-0	0	1.6	U J	19.8
	PCB-084/092		26.5	2.36	N	19.8
2,2',3,4,6'-PeCB	PCB-089	73575-57-2	0	2.35	U J	19.8
2,2',3,4',5-PeCB	PCB-090	68194-07-0	0	2.46	U J	19.8
2,2',4,5,5'-PeCB	PCB-101	37680-73-2	199	1.86		19.8
2,3,3',5',6-PeCB	PCB-113	68194-10-5	0	1.75	U J	19.8
2,2',4,4',5-PeCB	PCB-099	38380-01-7	95.8	2.03		19.8
	PCB-112/119		0	1.6	U J	19.8
2,2',3,3',5-PeCB	PCB-083	60145-20-2	0	2.83	U J	19.8
2,3,3',4,6-PeCB	PCB-109	74472-35-8	0	1.91	U J	19.8
	PCB-086/097/117		66.8	2.14		19.8
	PCB-116/125		0	1.97	U J	19.8
	PCB-087/115		0	2.02	U J	19.8
2,3,3',5,5'-PeCB	PCB-111	39635-32-0	0	1.65	U J	19.8
2,2',3,4,4'-PeCB	PCB-085	65510-45-4	0	2.21	U J	19.8
	PCB-110/120		221	1.6		19.8
2,2',3,3',4-PeCB	PCB-082	52663-62-4	36.4	2.46	N	19.8
2,3',4',5,5'-PeCB	PCB-124	70424-70-3	3.57	0.57	N J	19.8
	PCB-107/108		0	0.87	U J	19.8
2,3',4,4',5'-PeCB	PCB-123	65510-44-3	0	0.97	U J	19.8
2,3,3',4,5-PeCB	PCB-106	70424-69-0	0	0.86	U J	19.8
2,3',4,4',5-PeCB	PCB-118	31508-00-6	139	0.92		19.8
2,3,4,4',5-PeCB	PCB-114	74472-37-0	0	1.06	U J	19.8
2,3,3',4',5'-PeCB	PCB-122	76842-07-4	0	0.93	U J	19.8
2,3,3',4,4'-PeCB	PCB-105	32598-14-4	56.3	1.22		19.8

DATA REPORT

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Project ID:	421185-400	**Date Analysed:**	9/27/2018
PRL ID:	PR182570	**HRMS File:**	FS09271805
		Work Group No.:	PRL052

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
3,3',4,5,5'-PeCB	PCB-127	39635-33-1	0	1.1	U J	19.8
3,3',4,4',5-PeCB	PCB-126	57465-28-8	0	1.07	U J	19.8
2,2',4,4',6,6'-HxCB	PCB-155	33979-03-2	0	0.32	U J	19.8
2,2',3,4',6,6'-HxCB	PCB-150	68194-08-1	0	0.37	U J	19.8
2,2',3,5,6,6'-HxCB	PCB-152	68194-09-2	0	0.36	U J	19.8
2,2',3,4,6,6'-HxCB	PCB-145	74472-40-5	0	0.39	U J	19.8
2,2',3,3',6,6'-HxCB	PCB-136	38411-22-2	10.3	0.36	N J	19.8
2,2',3,4',5,6'-HxCB	PCB-148	74472-41-6	0	0.47	U J	19.8
2,2',4,4',5,6'-HxCB	PCB-154	60145-22-4	0	0.41	U J	19.8
2,2',3,5,5',6-HxCB	PCB-151	52663-63-5	0	0.51	U J	19.8
2,2',3,3',5,6'-HxCB	PCB-135	52744-13-5	0	0.55	U J	19.8
2,2',3,4,5',6-HxCB	PCB-144	68194-14-9	0	0.47	U J	19.8
2,2',3,4',5,6-HxCB	PCB-147	68194-13-8	0	0.58	U J	19.8
	PCB-139/149		180	0.51		19.8
2,2',3,4,4',6'-HxCB	PCB-140	59291-64-4	0	0.2	U J	19.8
2,2',3,4,5,6'-HxCB	PCB-143	68194-15-0	0	0.26	U J	19.8
2,2',3,3',5,6-HxCB	PCB-134	52704-70-8	0	0.36	U J	19.8
2,2',3,4,5,6-HxCB	PCB-142	41411-61-4	0	0.32	U J	19.8
2,2',3,3',5,5'-HxCB	PCB-133	35694-04-3	0	0.31	U J	19.8
2,2',3,3',4,6-HxCB	PCB-131	61798-70-7	0	0.27	U J	19.8
2,3,3',5,5',6-HxCB	PCB-165	74472-46-1	0	0.22	U J	19.8
	PCB-132/146		57	0.26		19.8
2,3,3',4,5',6-HxCB	PCB-161	74472-43-8	0	0.2	U J	19.8
2,2',4,4',5,5'-HxCB	PCB-153	35065-27-1	108	0.22		19.8
2,3',4,4',5',6-HxCB	PCB-168	59291-65-5	0	0.21	U J	19.8
2,2',3,4,5,5'-HxCB	PCB-141	52712-04-6	0	0.25	U J	19.8
2,2',3,4,4',5-HxCB	PCB-137	35694-06-5	0	0.3	U J	19.8
2,2',3,3',4,5'-HxCB	PCB-130	52663-66-8	0	0.31	U J	19.8
	PCB-163/164		33.8	0.2	N	19.8
2,2',3,4,4',5'-HxCB	PCB-138	35065-28-2	93.7	0.27		19.8
2,3,3',4,5,6-HxCB	PCB-160	41411-62-5	0	0.25	U J	19.8
2,3,3',4,4',6-HxCB	PCB-158	74472-42-7	7.4	0.19	N J	19.8
2,2',3,3',4,5-HxCB	PCB-129	55215-18-4	0	0.31	U J	19.8
2,3,4,4',5,6-HxCB	PCB-166	41411-63-6	0	0.22	U J	19.8
2,3,3',4,5,5'-HxCB	PCB-159	39635-35-3	0	0.21	U J	19.8
2,2',3,3',4,4'-HxCB	PCB-128	38380-07-3	0	0.3	U J	19.8
2,3,3',4',5,5'-HxCB	PCB-162	39635-34-2	0	0.22	U J	19.8
2,3',4,4',5,5'-HxCB	PCB-167	52663-72-6	1.2	0.24	N J	19.8
2,3,3',4,4',5-HxCB	PCB-156	38380-08-4	8.83	0.23	N J	19.8
2,3,3',4,4',5'-HxCB	PCB-157	69782-90-7	0	0.25	U J	19.8
3,3',4,4',5,5'-HxCB	PCB-169	32774-16-6	0	0.28	U J	19.8
2,2',3,4',5,6,6'-HpCB	PCB-188	74487-85-7	0	0.21	U J	19.8
2,2',3,4,4',6,6'-HpCB	PCB-184	74472-48-3	0	0.19	U J	19.8
2,2',3,3',5,6,6'-HpCB	PCB-179	52663-64-6	0	0.19	U J	19.8
2,2',3,3',4,6,6'-HpCB	PCB-176	52663-65-7	0	0.19	U J	19.8
2,2',3,4,5,6,6'-HpCB	PCB-186	74472-49-4	0	0.2	U J	19.8
2,2',3,3',5,5',6-HpCB	PCB-178	52663-67-9	0	0.27	U J	19.8
2,2',3,3',4,5',6-HpCB	PCB-175	40186-70-7	0	0.27	U J	19.8
	PCB-182/187		55.9	0.25		19.8
2,2',3,4,4',5',6-HpCB	PCB-183	52663-69-1	0	0.25	U J	19.8
2,2',3,4,5,5',6-HpCB	PCB-185	52712-05-7	0	0.3	U J	19.8
2,2',3,3',4,5,6'-HpCB	PCB-174	38411-25-5	24.5	0.29	N	19.8

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Client:	King County	**Date Collected:**	4/14/2018
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PRL ID:	PR182570	**HRMS File:**	FS09271805
		Work Group No.:	PRL052

IUPAC Name	PCB #	CAS #	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
2,2',3,4,4',5,6-HpCB	PCB-181	74472-47-2	0	0.31	U J	19.8
2,2',3,3',4,5',6'-HpCB	PCB-177	52663-70-4	0	0.3	U J	19.8
2,2',3,3',4,4',6-HpCB	PCB-171	52663-71-5	0	0.29	U J	19.8
2,2',3,3',4,5,6-HpCB	PCB-173	68194-16-1	0	0.35	U J	19.8
2,2',3,3',4,5,5'-HpCB	PCB-172	52663-74-8	0	0.31	U J	19.8
2,3,3',4,5,5',6-HpCB	PCB-192	74472-51-8	0	0.24	U J	19.8
2,2',3,4,4',5,5'-HpCB	PCB-180	35065-29-3	97.8	0.34		19.8
2,3,3',4',5,5',6-HpCB	PCB-193	69782-91-8	0	0.2	U J	19.8
2,3,3',4,4',5',6-HpCB	PCB-191	74472-50-7	0	0.22	U J	19.8
2,2',3,3',4,4',5-HpCB	PCB-170	35065-30-6	0	0.33	U J	19.8
2,3,3',4,4',5,6-HpCB	PCB-190	41411-64-7	0	0.23	U J	19.8
2,3,3',4,4',5,5'-HpCB	PCB-189	39635-31-9	0	0.16	U J	19.8
2,2',3,3',5,5',6,6'-OcCB	PCB-202	2136-99-4	0	0.23	U J	19.8
2,2',3,3',4,5',6,6'-OcCB	PCB-201	40186-71-8	0	0.26	U J	19.8
2,2',3,4,4',5,6,6'-OcCB	PCB-204	74472-52-9	0	0.25	U J	19.8
2,2',3,3',4,4',6,6'-OcCB	PCB-197	33091-17-7	0	0.28	U J	19.8
2,2',3,3',4,5,6,6'-OcCB	PCB-200	52663-73-7	0	0.27	U J	19.8
2,2',3,3',4,5,5',6-OcCB	PCB-198	68194-17-2	0	0.38	U J	19.8
2,2',3,3',4,5,5',6'-OcCB	PCB-199	52663-75-9	0	0.44	U J	19.8
2,2',3,3',4,4',5,6'-OcCB	PCB-196	42740-50-1	0	0.37	U J	19.8
2,2',3,4,4',5,5',6-OcCB	PCB-203	52663-76-0	0	0.37	U J	19.8
2,2',3,3',4,4',5,6-OcCB	PCB-195	52663-78-2	0	0.26	U J	19.8
2,2',3,3',4,4',5,5'-OcCB	PCB-194	35694-08-7	0	0.25	U J	19.8
2,3,3',4,4',5,5',6-OcCB	PCB-205	74472-53-0	0	0.28	U J	19.8
2,2',3,3',4,5,5',6,6'-NoCB	PCB-208	52663-77-1	0	2.33	U J	19.8
2,2',3,3',4,4',5,6,6'-NoCB	PCB-207	52663-79-3	0	2.5	U J	19.8
2,2',3,3',4,4',5,5',6-NoCB	PCB-206	40186-72-9	0	3.98	U J	19.8
2,2',3,3',4,4',5,5',6,6'-DeCB	PCB-209	2051-24-3	0	0.21	U J	19.8

Homologs	# of Congeners	Conc. pg/L	SDL pg/L	Flag	EQL pg/L
Monochlorobiphenyls	3	0	0.36	U J	19.8
Dichlorobiphenyls	12	61.8	2.75		19.8
Trichlorobiphenyls	24	45.5	1.22		19.8
Tetrachlorobiphenyls	42	246	2.51		19.8
Pentachlorobiphenyls	46	952	0.57		19.8
Hexachlorobiphenyls	42	439	0.19		19.8
Heptachlorobiphenyls	24	154	0.16		19.8
Octachlorobiphenyls	12	0	0.23	U J	19.8
Nonachlorobiphenyls	3	0	2.33	U J	19.8
Decachlorobiphenyl	1	0	0.21	U J	19.8
Total PCB		1900	0.16		19.8

Attachment 11

Elliott West Wet Weather Treatment Station - Cyanide Assessment

West Point Treatment Plant and CSO System
Application for Renewal of the NPDES Permit (WA002918-1)
(January 2019)

Elliott West Wet Weather Treatment Station – Cyanide Assessment

January 2019

King County

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Alternate Formats Available

Elliott West Wet Weather Treatment Station – Cyanide Assessment

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King County
Department of
Natural Resources and Parks
Water and Land Resources Division

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EXECUTIVE SUMMARY

The West Point Wastewater Treatment Plant (West Point) National Pollutant Discharge Elimination System permit regulates discharges from wet weather treatment stations within combined sewer basins. One such combined sewer drainage basin encompasses the South Lake Union area and flows to the Elliott West Wet Weather Treatment Station (Elliott West). Treatment includes screening to remove coarse debris, some solids removal through settling, disinfection with chlorine, and finally dechlorination prior to discharge to Puget Sound.

The King County Wastewater Treatment Division (WTD) conducts periodic monitoring of Elliott West effluent and cyanide has been intermittently detected. Cyanide is a highly reactive molecule and is challenging to analyze due to the variety of known chemical and methodological interferences potentially influencing the analytical results. Its complex chemical behavior, especially when combined with the many reactants present in combined sewer flows consisting of stormwater and sewage called for a more detailed investigation to better understand the factors contributing to detections of cyanide at Elliott West. This report describes the methods, results, and conclusions for the Elliott West cyanide assessment study.

Six influent samples were collected from the Elliott West wet well between February 3, 2016 to November 15, 2016. Each sample was split into a series of subsamples that received different chlorination and/or sample preservation treatments prior to cyanide analysis. The treatments were designed to represent the range of historic residual chlorine levels previously measured in Elliott West effluent, as well as the sample preservation methods designated for cyanide analysis. Both chlorine, the chemicals used for dechlorination, and the chemicals used for sample preservation have the potential to influence analytical results for cyanide.

Cyanide was intermittently detected by the permit-approved weak acid and dissociable cyanide method (KCEL SOP 321) in 12 of the 66 different subsamples analyzed for this study. The highest frequency of detection was found in subsamples dosed at the 40 mg/L chlorination level. These data suggest that very high chlorination levels are linked to detection of weak acid and dissociable cyanide in Elliott West effluent. Unfortunately, the overall frequency of detection was low, which limits more rigorous statistical analysis of the cyanide chemical-oxidation relationships. Interferences appeared to be common with cyanide meter measurements frequently reporting negative values. Cyanide was not detected in unchlorinated and preserved study samples, indicating that interferences observed by others in the literature associated with sample preservation and handling procedures were not evident in this study.

During the current permit cycle of January 2015 through June 2018, cyanide has only been detected in effluent twice during 21 wet weather discharge days at Elliott West at a maximum value of 0.0062 mg/L. Thus, cyanide in Elliott West effluent has been infrequent and at levels that are relatively low for an intermittent discharge compared to applicable cyanide water quality standards for Puget Sound. Because cyanide is rarely detected in Elliott West effluent, further investigations into whether detections of cyanide are a product of high chlorination of complex cyanides, or methodological artifacts are not recommended. Continued monitoring of weak acid dissociable cyanide during discharge events appears to be sufficient to evaluate Elliott West effluent.

1.0 INTRODUCTION

The West Point Wastewater Treatment Plant (West Point) National Pollutant Discharge Elimination System (NPDES) permit (WA002918-1) regulates discharges from wet weather treatment stations within the combined sewer basins. One such combined sewer drainage basin encompasses the South Lake Union area of the West Point service area. Drainage from this combined basin flows to the Elliott West Wet Weather Treatment Station (Elliott West) which then discharges to Puget Sound. The Elliott West facility provides treatment (solids removal and disinfection) for wet weather combined sewer overflow (CSO) events.

The King County Wastewater Treatment Division (WTD) conducts periodic monitoring of the Elliott West effluent. Free (ionic) cyanides are highly toxic to the marine environment and intermittent detection of cyanide in Elliott West treated effluent was of concern to WTD, particularly due to the relatively small permitted mixing zone at this location. However, due to the chemical complexity of cyanide and potential interferences from the presence of reactants in effluent and the prescribed sample preservation and handling procedures, there was interest in further evaluating the detection of cyanide in Elliott West effluent. This study conducted additional testing and analysis to evaluate the possible causes of cyanide detections in Elliot West effluent. This report describes these methods, results, and conclusions.

1.1 Cyanide Background

Cyanide is not an independent chemical compound; it is a chemical group comprised of carbon and nitrogen bonded to other atoms or chemical groups. Cyanide has a triple bond between the carbon and the nitrogen and is commonly written as "CN". The cyanide group can bond with, as well as disassociate from, many other chemical groups or molecules; these cyanide complexes can be synthetic or natural chemicals and many are powerful toxicants. Free cyanide is the ionic form of cyanide, when it is dissociated from any associated chemical groups. Cyanides are commonly produced by many industries including metal plating and gold mining (ATSDR 2006) and may also be produced by common naturally occurring bacteria such as *Pseudomonas* spp. (Askeland and Morrison 1983, Faramarzi and Brandl 2006).

Because cyanide and cyanide compounds are a potential source of toxicity, detection of any measurable amount of cyanide at a wet weather treatment facility would be of concern to the WTD, permit regulators, and the public. The Washington State water quality criteria for cyanide applicable to Elliott West discharges in Puget Sound are 0.0091 mg/L as an acute 1-hr average value, and 0.0028 mg/L as a chronic 4-day average value (WAC 173-201A-240). Both are based on the forms of cyanide detected by the weak acid dissociable method. Although cyanide has been detected at several of the County's wet weather treatment facilities, its frequency of detection (FOD) is low, and detected concentrations have been just above the method detection limit (MDL) of 0.005 mg/L. For instance, during the past four years of the current permit cycle, weak acid dissociable cyanide was detected in one of seven discharge days sampled at the Carkeek Park facility (0.0033 mg/L), and three of nine days at the Henderson/MLK facility (0.0024 – 0.0139 mg/), and was not detected at the Alki facility.

The cyanide measured and detected in effluent discharged from King County wet weather facilities is considered the weak acid dissociable form and is analyzed using the King County Environmental Lab (KCEL) standard operating procedure #321v7 which based on Standard Method SM4500, CN-I,E. The CN group does not exist by itself and can complex with a variety of other chemical groups or atoms. These complexes can result in a variety of cyanide compounds, some with stronger bonds than others. The weak acid dissociable analysis (SOP #321v7) subjects sample to a weak acid (approximately pH 4.5) which breaks apart the weaker cyanide complexes. These simple and weak cyanide complexes are recovered, while the complexes with strong bonds remain complexed. The weak acid dissociated cyanide is converted to hydrogen cyanide (HCN) by the acid. The HCN is a gas that can be absorbed in a scrubbing solution of sodium hydroxide and analyzed colorimetrically through the addition of a pyridine-barbituric acid.

KCEL SOP #321v7 and related standard methods for cyanide require preservation to a pH of greater than 12 using sodium hydroxide (NaOH) within 15 minutes (min.) of sample collection. Many wastewater facilities, mostly in California, have documented formation of total cyanide through this required sample preservation process before analysis (Khoury et al 2008). The total cyanide analytical method is similar to the weak acid dissociable cyanide method described above except that it uses a stronger acid, with a pH of 2, to break apart all weak and strong cyanide complexes. If NaOH were used to preserve samples for the weak acid dissociable cyanide method used for King County wet weather treatment facilities, the potential high bias would be even greater than observed for California wastewaters. This is because the weak acid cyanide method intentionally leaves some strongly bound cyanide in the sample solution since it is presumed to not be bioavailable; having complexed cyanide remaining creates more opportunities for bias compared to strong acids which liberate 100% of the cyanide from complex molecules. Figure 1 explains the different forms of cyanide and which method detects which form.

	acid addition to pH ~4.5		acid addition to pH 2	
	↓		↓	
Raw influent, free CN	→	*weak acid dissociable cyanides*	→	*total CN*
↑		↑		↑
Hach® meter		this study SOP #321v7		Not analyzed

Figure 1. Cyanide forms with analytical and measurement methods

Other studies, also in California, have documented formation of cyanide through the interaction of glycine and chlorine during chlorination of wastewater effluents (Pandit et al. 2006). Glycine is the smallest of the 20 different amino acids which make up proteins (molecular formula $C_2H_5NO_2$) and is likely present in sewage. Other studies have demonstrated unpredictable interferences and cyanide production from the use of NaOH as a sample preservative (Guidice et al 2010), as well as cyanide formation over time in preserved samples, particularly within the first 48 hours after sample collection (Pandit et al., 2006). A variety of other chemicals can influence cyanide analysis results including sulfide, sulfite, thiosulfate (used in the lab as a dechlorination agent to prepare samples for analysis), nitrate, and nitrite, all of which are typically present in wet weather effluents. To date, most work examining cyanide false positives or negatives, preservation, and analytical interferences has been conducted in California on wastewater treatment plant effluents. The degree to which these complexities, false negatives and positives, and interferences influence cyanide results for combined sewage and stormwater effluents in the Pacific Northwest are unknown.

This study presents results of an assessment conducted to better understand if detection of cyanide in Elliott West effluent is due to: (1) cyanide in the influent, (2) generation of cyanide through differing levels of chlorination, (3) the dechlorination process, or (4) from sampling, preservation and/or analytical processes. The effect of sample holding time was not specifically addressed in this study as the County has not developed the means to analyze cyanide from Elliott West effluent within the prescribed 15-minute time period following sample collection.

1.2 Scope of Work

To understand the possible influences on cyanide concentrations measured by the weak dissociable method used by KCEL for Elliott West effluents in the past, a bench scale study was undertaken. This study used a matrix of treatment conditions to try to illustrate under what conditions, if any, weak acid dissociable cyanide might be detected under various chlorination and dechlorination regimes.

This study focused on the Elliott West facility. Influent samples representative of waters which could be discharged to Puget Sound were collected during the winter of 2016 (n= 4) and then again in fall 2016 (n= 2) once influent water levels in the treatment facility wet-well rose to the point where discharges were possible. A total of six samples were collected. The wet-well is a large vault (approximately 20 x 60 x 100 ft.) where flows from multiple combined sewer conveyance and storage pipes join before being pumped into the disinfection portion of the facility. The influent was collected in a 2.5 gallon high density polyethylene carboy and returned to the KCEL where it was subsampled and split into multiple containers. Each influent subsample container received a different treatment prior to cyanide analysis by the weak acid dissociable method KCEL (SOP #321v7). These treatments involved dosing subsamples to prescribed residual chlorine levels and then de-chlorination by various methods. One subsample was also analyzed for total and dissolved metals, nitrate-nitrite, and total suspended solids (TSS) to evaluate whether cyanide detections are related to these parameters. The treatment regime is described in Section 2.2 below.

2.0 METHODS

This project treated influent samples from Elliott West to a variety of bench scale treatment regimens to mimic how actual discharge samples may have been treated in past events when weak acid dissociable cyanide was detected. No actual effluents were tested for this laboratory based study.

2.1 Sampling and Analytical Approach

Influent intended to be representative of water which may, after treatment, subsequently overflow was collected from the Elliott West wet-well during higher water conditions (>86 ft Metro datum[1]). However, during wet weather conditions the wet-well is a hazardous environment and cannot be entered. Therefore, influent was collected from the tap of the small dewatering pump used to remove residual water and base flows from the bottom of the wet-well during dry weather into the Elliott Bay Interceptor pipe and eventually to the West Point treatment plant. The wet-well is assumed to be well mixed during higher flow conditions and despite the dewatering pump's location near the bottom of the wet-well, influent collected off the dewatering pump is assumed to be comparable to influent treated and discharged to Elliott Bay by the larger pumps used during actual discharge events.

Six influent water samples were collected from the dewatering pump tap in a 2.5 gal. HDPE carboy on the following days in 2016: February 3 and 12, October 13, 20, and 26, and November 15. The influent samples were iced and then immediately returned to KCEL without field preservation. They were then split and processed into 500 mL subsamples treated to mimic different possible chlorination and dechlorination processes. The carboy was agitated while subsamples were siphoned off. Each subsample jar was filled to the base of the neck to try to ensure consistent dosing of chlorine and dechlorination agents across bottles and sampling events. The purpose was to begin to elucidate which process(es) might influence cyanide detection.

The chlorine levels were chosen to mimic the actual chlorine residuals measured at Elliott West over 51 different discharge events from 2011 to 2015. The doses of chlorine necessary to achieve these chlorine residuals were variable and difficult to predict as they are dependent on influent specific conditions such as solids content and organic matter (both total and dissolved). The WTD aims to have a minimum of 2 to 3 mg/L chlorine residuals just prior to dechlorination to ensure adequate disinfection. One subsample was dosed with increasing levels of chlorine to bracket the historic range of residual chlorination detected at Elliott West. For ease of use, storage and health and safety reasons, household strength bleach (active ingredient sodium hypochlorite) was used instead of the more concentrated form of chlorine used at Elliott West. The active ingredients are identical.

[1] Seattle Metro datum is the National Geodetic Vertical Datum of 1929 plus 100ft. For comparison, 94.08ft Metro datum is mean lower low water.

The bench scale dosing of influent allowed for testing of a series of possible historic combinations of residual chlorine levels and dechlorination conditions which may have contributed to cyanide formation or interference with the analytical method. This strategy allowed for examination of a wider variety of variables concurrently vs. testing an effluent sample which only represents the chlorination-dechlorination conditions for a particular discharge event.

Because some of the samples were not preserved according to the EPA method specifications, a Hach® portable cyanide meter was used as a supplementary measurement of free cyanide in the samples by SOP #321v7. The Hach® meter was intended to ensure that significant cyanide concentrations in unpreserved influents had not been lost between subsample processing and laboratory analysis by SOP #321v7. One influent subsample was analyzed for nitrate-nitrite, total and dissolved metals and TSS. All analyses were conducted by KCEL.

2.2 Sample Dosing and Preservation

This matrix shown in Table 1 mimicked the range of chlorination and dechlorination treatments used at Elliott West and the type of sample preservation used by KCEL prior to cyanide analysis. This range of low, medium, and high chlorination levels (5, 12, 40 mg/L total chlorine) served as a starting point to understand if chlorination, the degree of chlorination, or the dechlorination process is potentially responsible for the creation of free or weak acid dissociable cyanide from more complex cyanides (e.g., iron cyanide complexes).

Both the hypochlorite and the sodium bisulfite (SBS) (used to dechlorinate Elliott West effluent) are too concentrated to accurately dose small 500 mL sampling bottles. Therefore, the standard 8.25% hypochlorite and the SBS were diluted 1 to 5 by volume with laboratory deionized water to prepare a stock solution before administering their respective doses to subsample bottles with an eye dropper as described below.

Before the chlorination dosing matrix (Table 1) was executed, one influent subsample bottle (bottle 0) was dosed with hypochlorite at an estimated 5 mg/L total chlorine level and tested for total chlorine with a calibrated portable chlorine meter. This initial subsample's dose was then adjusted to 5 mg/L total chlorine by adding additional chlorine as required. Additional drops of the hypochlorite stock solution were added to subsample bottle 0 and tested with the calibrated chlorine meter to confirm the necessary 12 and 40 mg/L total chlorine residual in the final sample. The subsequent doses used for subsample bottles 1 through 11 were based on the actual chlorine doses required to meet 5, 12, and 40 mg/L residual chlorine. The doses required adjustments on a sample specific basis due to the consumption of chlorine by organic matter within the influent. For example, only 18 drops of dilute hypochlorite solution were required to achieve 40 mg/L residual chlorine in the February 12, 2016 sample, while 50 drops were required to achieve the same 40 mg/L residual chlorine in the February 3, 2106 sample.

The residual chlorine dosing levels were chosen based on the historical range of residual chlorine levels in Elliott West effluent. The mean residual chlorine in effluent prior to dechlorination for over 50 discharge events since 2012 is 13.5 mg/L (minimum 4 to maximum 47.5 mg/L). The specific dose of hypochlorite (in drops) and measured residual chlorine levels in subsample 0 was recorded in the laboratory notes.

Since 2012, chlorine contact time at Elliott West as effluent has travelled from the point of chlorination through the discharge channel to the outfall has ranged from 12 to 115 min. (average 37 min.) To stimulate these turbulent conditions and time in the laboratory, subsamples were shaken every 10 min. over a 40 min. chlorine contact period to ensure sufficient mixing and a representative chlorine contact time. After 40 min., subsamples 1 through 8 (Table 1) were dechlorinated with SBS. Prior to analysis, KCEL uses sodium thiosulfate to dechlorinate cyanide samples when residual chlorine is still present according to KI-Starch test strips. Unfortunately, sodium thiosulfate is itself suspected to cause interference with cyanide analysis. Therefore, three additional subsamples (Table 1, subsamples 9 through 11) were dosed at the high, medium, and low residual chlorine levels (5, 12, 40 mg/l), but they were dechlorinated only using sodium thiosulfate. Dechlorination with sodium thiosulfate proceeded according to KCEL SOP #321v7 which specifies one drop of sodium thiosulfate be added, then KI-starch test strips were used to test for remaining residual chlorine. If the sample was not sufficiently dechlorinated, an additional drop of sodium thiosulfate was added and the subsample tested again.

Table 1. Elliott West wet weather influent sample splitting and processing regime

Treatment Bottle Number	Target CL- total residual chlorine in 500mL subsampling bottle (mg/L)	*Estimated* Drops 1:5 dilute hypochlorite added to 500mL[a]	Contact time in min.	Drops 1:5 diluted SBS[b]	Sodium thiosulfate used for dechlorination[c]	NaOH preservative added
0	Test bottle to confirm hypochlorite dosing regime					
1	0	n/a	n/a	n/a	No	No
2	5	3.2	40	1	No	No
3	12	7.6	40	2	No	No
4	40	25.4	40	5	No	No
5	0	n/a	n/a	n/a	No	Yes
6	5	3.2	40	1	No	Yes
7	12	7.6	40	2	No	Yes
8	40	25.4	40	5	No	Yes
9	5	3.2	40	None	Yes	Yes
10	12	7.6	40	None	Yes	Yes
11	40	25.4	40	None	Yes	Yes
12	Subsample for TSS analysis					
13	Subsample for Nitrate-Nitrite analysis					

14	Subsample for Dissolved metals, see Table 3

[a] Estimated dose, actual dose adjusted using a calibrated handheld Hach® chlorine meter to achieve target chlorine residual concentration.

[b] SBS is used by WTD to dechlorinate effluent prior to discharge. SBS used to remove residual chlorine by adding a drop of stock solution at a time until the KI-starch test strips demonstrate no residual chlorine remains.

[b] Sodium thiosulfate is used by KCEL to dechlorinate cyanide samples delivered with residual chlorine. For purposes of bench testing, subsamples of the three chlorine dose levels were dechlorinated with sodium thiosulfate until the KI-starch test strip revealed no residual chlorine.

Following the sample dechlorination process, subsamples 1 to 4 were unpreserved while subsamples 5 to 11 were preserved with NaOH to a pH 12 that was checked using a pH meter. Unless preserved to a pH of >12, cyanide analysis is to be conducted "immediately" per EPA Method 335.4 (EPA 1993) which has been interpreted to be within 15 min. of collection for analysis when using KCEL SOP #321v7 as well. The basis for the 15 min. holding time is unclear in the literature as volatilization appears to be the dominant removal pathway for cyanide from waters with a pH less than 8 (Australian Dept. of Health and Aging, 2010). However, because the preservation process itself is implicated in cyanide generation/formation, some of the influent subsamples were not preserved. To mitigate possible volatilization and cyanide loss from unpreserved samples, all samples were agitated before opening the subsample bottle for analysis. Additionally, all samples were analyzed as one batch as soon as possible after collection. Due to the unique handing of these subsamples, they were flagged with an "SH" flag in the KCEL Laboratory Information System (LIMS) to notify potential future data users of their unusual provenance.

Free cyanide levels were measured in subsamples 1 through 4 using a portable cyanide meter following dechlorination and prior to preservation to address concerns about the possible loss of cyanide in unpreserved samples and provide an additional line of evidence about the origin and fate of cyanide in all samples. Additional subsamples were collected for TSS and nitrate-nitrite analysis as these parameters may influence cyanide detection and help describe the sample specific conditions where cyanide is typically found. The analytical methods for all parameters are described below.

2.3 Analytical Procedures

The following sections describe the evaluation of cyanide at Elliott West utilizing both the King County SOP #321v7 which is based on Standard Method for examination of water and wastewater SM4500-CN-I,E and a calibrated handheld Hach meter, model DR2800. Additional subsamples were analyzed for nitrate/nitrite, metals, and TSS.

2.3.1 Conventional Parameters

Weak acid dissociable cyanide was analyzed by KCEL SOP #321v7. Free cyanide was measured with a Hach® model DR2800 cyanide meter (Figure 1), calibrated to the manufacturer's specifications. KCEL had not previously used cyanide meters; therefore, no SOP was available for this instrument at the time of this study. The MDLs and reporting detection limits (RDL) achieved in this study are presented in Table 2, below. MDLs for some subsamples were elevated due to matrix or other interferences.

Table 2. Conventional Parameters Methods with MDLs and RDLs (mg/L)

Analyte	Method	Minimum MDL	Maximum MDL	RDL	Acute/Chronic Water Quality Criteria
Weak acid dissociable cyanide	SM4500-CN, I,E	0.002	0.005	0.01	0.0091/ 0.0028
Free cyanide	Hach® Meter	0.001	NA	NA	NA
Total suspended solids	SM2540-D	5	5	2 to 10	NA
Nitrate-Nitrite (NO23)	SM4500-NO3, F	0.01	0.1	0.04 to 0.4	NA

MDL = Method detection limit
RDL = Reporting Detection Limit

2.3.2 Metals

All samples were acid digested per KCEL SOP #609 prior to analysis by inductively coupled plasma mass spectrometry (ICP-MS) according to KCEL SOP #624 which is based on EPA Method 200.8. The MDL and RDL are presented in below in Table 3. In most cases, the MDLs were adequate to detect metals in all samples, however MDLs for beryllium, selenium and thallium were too high to detect these metals in any sample.

Table 3. MDL/RDLs for ICPMS Total Metals in µg/L

Analyte	MDL	Maximum MDL	RDL
Aluminum	2	2	10
Antimony	0.3	0.3	1
Arsenic	0.1	0.1	0.5
Barium	0.5	0.5	0.5
Beryllium	0.1	0.1	0.5
Cadmium	0.05	0.05	0.25
Calcium	50	50	50
Chromium	0.2	0.2	1
Cobalt	0.05	0.05	0.25
Copper	0.2	0.2	2
Iron	10	10	50
Lead	0.1	0.1	0.5
Magnesium	50	50	50
Manganese	0.1	0.5	0.5
Molybdenum	0.1	0.5	0.5
Nickel	0.1	0.5	0.5

Analyte	MDL	Maximum MDL	RDL
Potassium	100	500	500
Selenium	0.5	1	1
Silver	0.04	0.04	0.2
Sodium	100	100	100
Thallium	0.1	0.2	0.2
Tin	0.5	0.5	1.5
Titanium	0.5	0.5	2.5
Vanadium	0.075	0.075	0.375
Zinc	0.5	0.5	2.5

Method blanks and laboratory duplicates were run at a minimum of one per analytical batch of twenty. Due to the experimental nature of this investigation KCEL did not complete QA reports for these samples to formally document blank, duplicate, laboratory control samples, and spike blank results. However, these are considered to be within the SAP and method specifications since no laboratory flags, other than "SH" sample handling, were applied to the metals and conventional parameter results. As previously discussed, sample handling flags were applied to the cyanide analysis because they were not preserved within 15 min. of collection as required by SOP #321v7 and SM4500, CN-I,E. The SAP specified that dissolved metals would be analyzed. This analysis was not conducted, but does not materially affect the study conclusions.

3.0 RESULTS AND DISCUSSION

Free cyanide and weak acid dissociable cyanide were never detected in either preserved or unpreserved subsamples that had not been dosed with chlorine. Detections of weak acid dissociable cyanide occurred in both preserved and unpreserved samples indicating generally similar presence and concentrations. The highest frequency of detection was found in the subsamples dosed at the 40 mg/L residual chlorine level. It was detected three times in the subsamples at the lowest, 5 mg/L residual level and once in the 12 mg/L level. A total of ten 40 mg/L residual chlorine subsamples had detected weak acid and dissociable cyanide (10 of 33 total subsamples at this chlorination level). Table 4 shows the detected cyanide concentrations by residual chlorine level.

There are insufficient numbers of paired detections among the Hach® meter free cyanide and weak acid dissociable methods, making comparisons difficult to evaluate. Additionally, note that in many cases the Hach® meter reported slightly negative cyanide concentrations. The cause of the negative Hach® meter values is uncertain, but appeared to likely be a systematic low-bias in the meter voltage output relative to the calibration standards range. Readings in the chlorinated samples may have also been a result of high ionic strength interferences. Other than the low biased meter values, results indicate that free cyanide occurred in four chlorinated samples, with three of the detections all at the highest 40 mg/L residual chlorine level and one detection at the 12 mg/L level.

Table 4. Cyanide results for all subsamples by analytical method, detected concentrations shown in bold. Data represents results from the 6 sampling events.

Treatment number[a]	Residual Chlorine Level mg/L	Sample ID 2/3/16	Cyanide mg/L		Sample ID 2/12/16	Cyanide mg/L		Sample ID 10/13/16	Cyanide mg/L		Sample ID 10/20/16	Cyanide mg/L		Sample ID 10/26/16	Cyanide mg/L		Sample ID 11/15/16	Cyanide mg/L	
			Hach® Meter	SOP 321v7		Hach ®Mete r	SOP 321v7		Hach® Meter	SOP 321v7		Hach® Meter	SOP 321v7		Hach® Meter	SOP 321v7		Hach® Meter	SOP 321v7
1	0	L64660-1	-0.001	0.005U	L64837-1	-0.007	0.005U	L66411-2	0.000	0.005U	L66458-1	0.000	0.005U	L66509-1	-0.004	0.005U	L66646-1	-0.017	0.002U
2	5	L64660-2	-0.004	**0.0056**	L64837-2	-0.004	0.005U	L66411-3	**0.001**	0.005U	L66458-2	**0.001**	0.005U	L66509-2	-0.017	0.005U	L66646-2	-0.002	0.002U
3	12	L64660-3	-0.002	0.005U	L64837-3	-0.01	0.005U	L66411-4	-0.001	0.005U	L66458-3	0.000	0.005U	L66509-3	-0.002	0.005U	L66646-3	0.000	**0.0023**
4	40	L64660-4	-0.005	0.005U	L64837-4	0.000	0.005U	L66411-5	0.000	**0.0054**	L66458-4	**0.004**	**0.0113**	L66509-4	**0.041**	0.005U	L66646-4	**0.003**	**0.0038**
5	0	L64660-5	NT	0.005U	L64837-5	NT	0.005U	L66411-6	NA	0.005U	L66458-5	NA	0.005U	L66509-5	NT	0.005U	L66646-5	NA	0.002U
6	5	L64660-6	NT	0.005U	L64837-6	NT	0.005U	L66411-7	NA	0.005U	L66458-6	NA	0.005U	L66509-6	NT	0.005U	L66646-6	NA	0.002U
7	12	L64660-7	NT	0.005U	L64837-7	NT	0.005U	L66411-8	NA	0.005U	L66458-7	NA	0.005U	L66509-7	NT	0.005U	L66646-7	NA	0.002U
8	40	L64660-8	NT	0.005U	L64837-8	NT	0.005U	L66411-9	NA	0.005U	L66458-8	NA	**0.0112**	L66509-8	NT	0.005U	L66646-8	NA	**0.0058**
9	5	L64660-9	NT	0.005U	L64837-9	NT	0.005U	L66411-10	NA	0.005U	L66458-9	NA	0.005U	L66509-9	NT	0.005U	L66646-9	NA	0.002U
10	12	L64660-10	NT	0.005U	L64837-10	NT	0.005U	L66411-11	NA	0.005U	L66458-10	NA	0.005U	L66509-10	NT	0.005U	L66646-10	NA	0.002U
11	40	L64660-11	NT	0.005U	L64837-11	NT	0.005U	L66411-12	NA	0.005U	L66458-11	NA	**0.0088**	L66509-11	NT	0.005U	L66646-11	NA	**0.007**

[a] See Table 1, column 1 for subsample treatment numbers
*All results are available electronically on request.

While cyanide was more frequently detected in subsamples treated at the higher chlorination level, the relationship (Figure 2) was not statistically significant. However, it is biologically and chemically plausible that the strong oxidation of complex cyanides by the higher level of residual chlorine is creating free and weak acid dissociable cyanides - which are then detected by both the Hach® meter and laboratory method respectively. The lack of detectable free cyanide is not unexpected given the high solids content of influent, as well as the many potentially active ligands for cyanide to complex with.

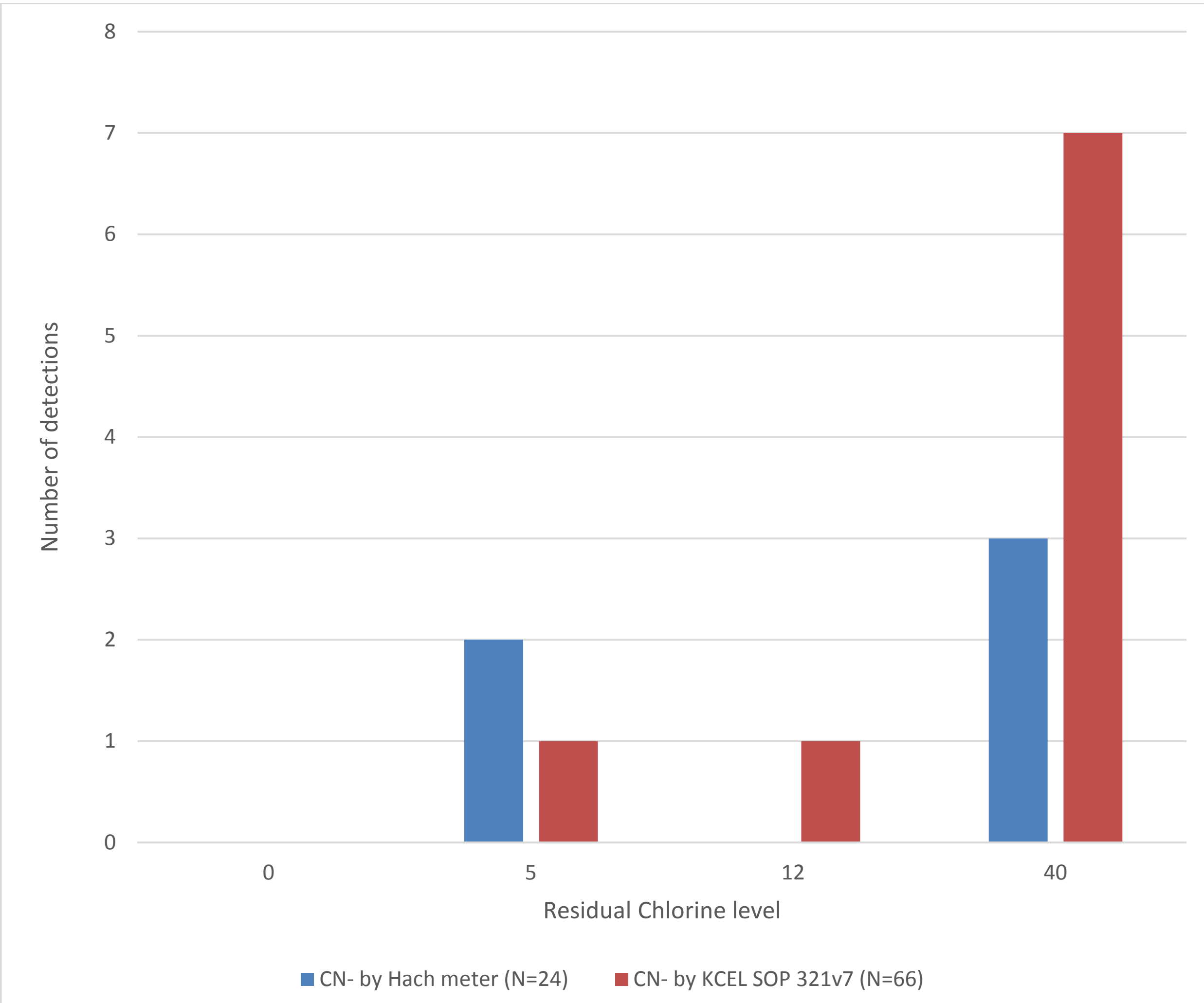

Figure 2. Frequency of cyanide detections by residual chlorination level

To explore the concept that complex cyanides are disassociating under the strong oxidizing 40 mg/L residual chlorine conditions, cyanide detections were plotted against data for detected metals. No relationships were apparent for the detected metals which are most commonly associated with cyanide, e.g. zinc and iron. In Figure 3 below, the Hach® meter cyanide results are plotted against the iron detections as an example.

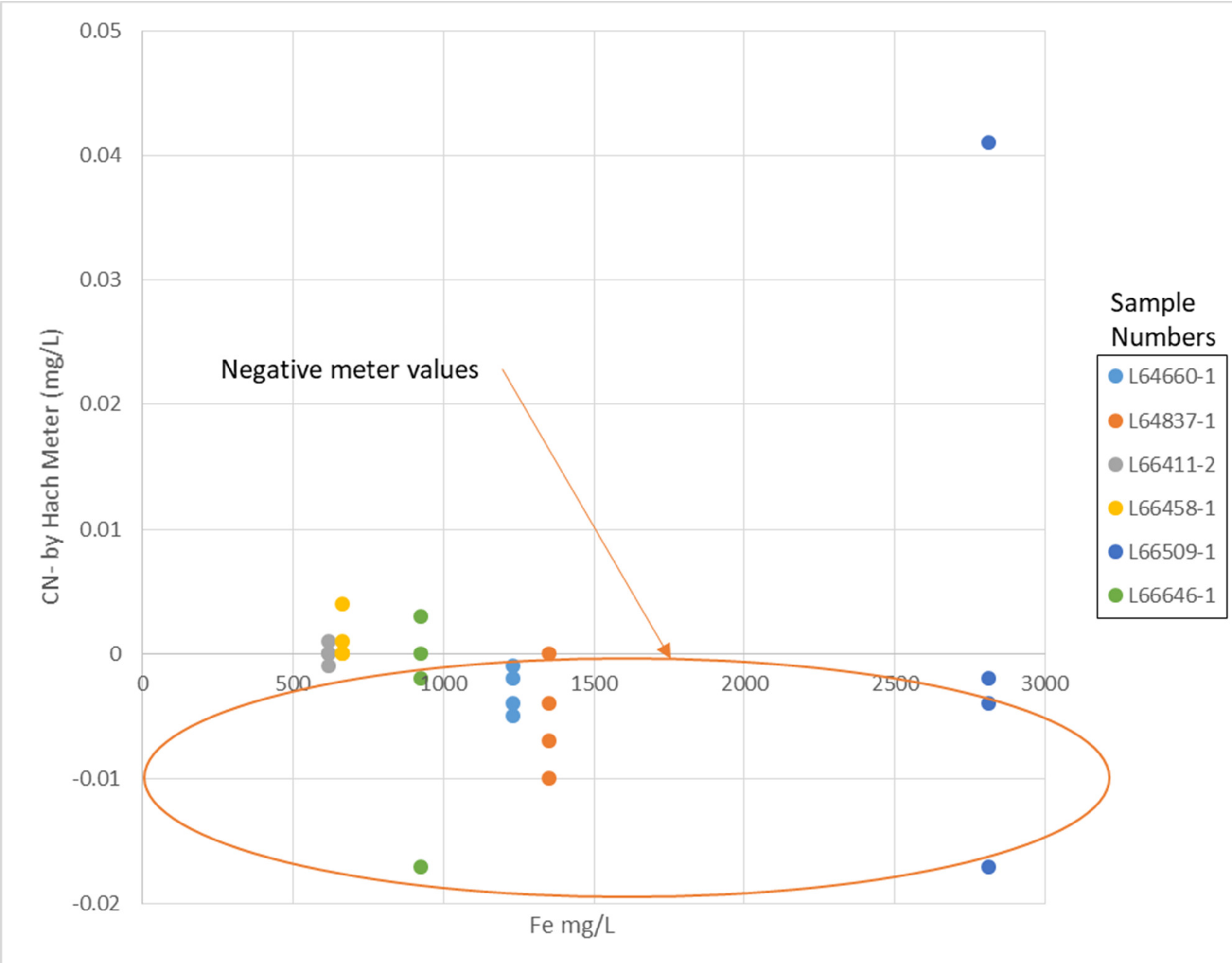

Figure 3. Free cyanide by Hach® meter compared to detected iron concentrations.

Figure 3 illustrates the absence of a substantive relationship between iron and free cyanide by the Hach® meter method. The results of weak acid and dissociable cyanide by SOP #321v7 compared to iron and other metals (metals results available by request) are also unremarkable. Figure 4 below presents the SOP #312v7 weak acid and dissociable cyanide results to similarly illustrate the lack of any simple meaningful relationships with iron concentrations.

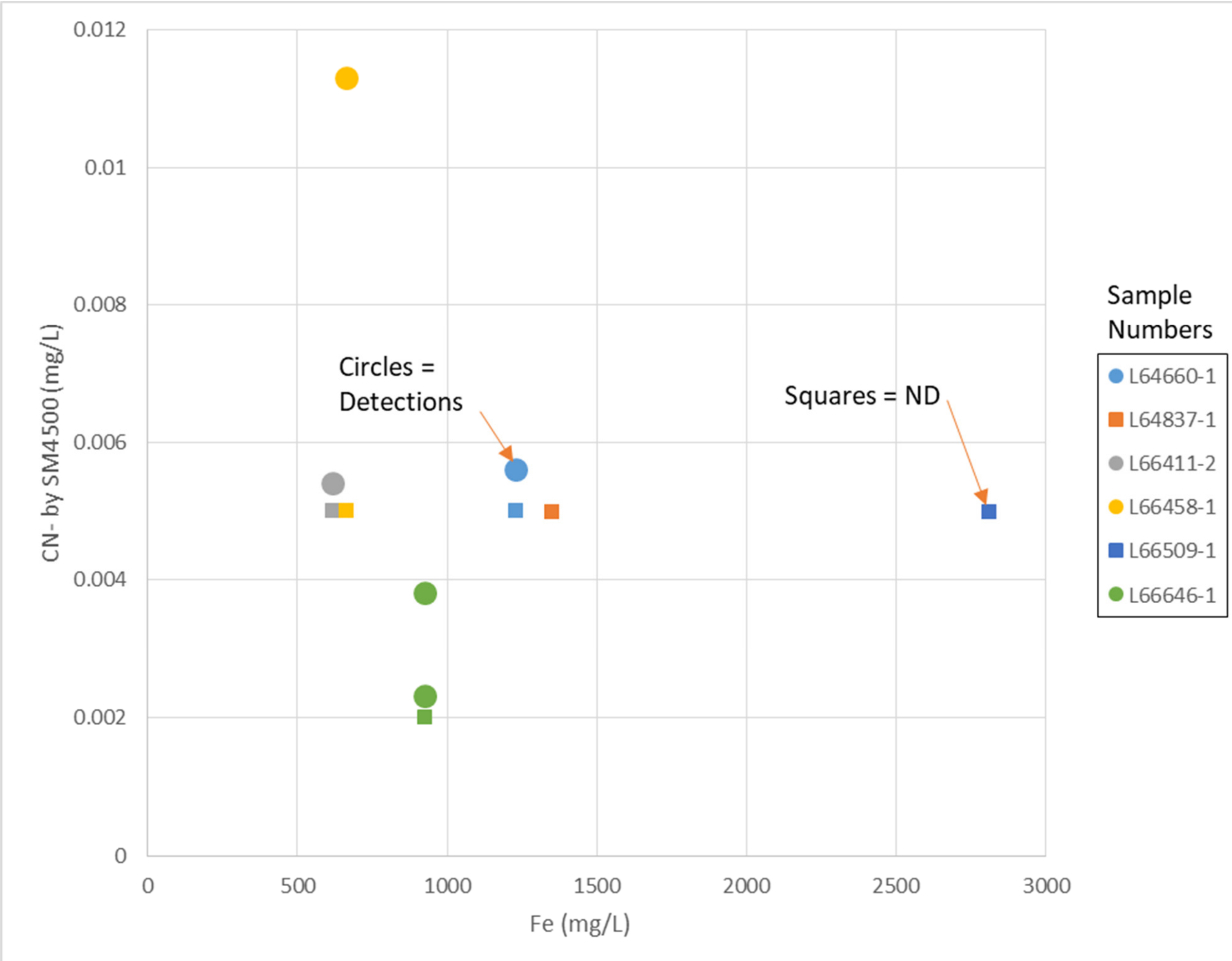

Figure 4. Weak acid and dissociable cyanide by SOP #321v7 compared to detected iron concentrations

The pattern of results in Figures 3 and 4 are similar to results observed for the other metals analyzed, which suggests that cyanide-metal complexes are not present at a concentration to be a predictable source of cyanide despite their association with heavy oxidizing conditions (i.e. 40 mg/L residual chlorine in Figure 2). While other investigations (Faramarzi and Brandl 2006, Pandit 2006, Khoury et al. 2008, and Guidice et al. 2010) have implicated use of NaOH as a preservatives for “false positives” in waters, there is no evidence that was the case in this study.

4.0 CONCLUSIONS

Cyanide continues to be detected at Elliott West at low concentrations (<0.0062 mg/L). This study provides some evidence to suggest that higher levels of chlorination may be oxidizing complex cyanides into free or weak acid dissociable forms. Detection of free and/or weak acid dissociable cyanide was not otherwise associated with the concentration of detected total metals, nitrate-nitrite or TSS. Possible preservation method interferences observed in the literature were not apparent; however, the known holding time interferences were not evaluated and cannot be ruled out as a potential issue.

Variable TSS concentrations and prior chlorination equipment and controls have previously been associated with higher chlorination levels at Elliott West during CSO discharge events. Current operational practices avoid the highest chlorination residual levels evaluated in this bench study, i.e. 40 mg/L residual chlorine. New chlorine dosing pumps and improved chemical application controls were implemented in 2011 that substantially reduced the amount of sodium hypochlorite and subsequent SBS application rates during discharge events. The current total hypochlorite dose is typically less than about 20 mg/L, most of which is consumed while allowing for adequate residuals for disinfection (~3 mg/L). Therefore, both the total chlorine dosing levels and residual chlorine levels practiced now are at the lower range of the concentrations evaluated in this study. King County WTD is currently evaluating additional solids removal technologies which will also likely reduce the need to higher chlorine doses as solids levels fluctuate during and after storms events. Efforts to stabilize the chlorination rate to the minimum necessary to achieve disinfection (target residual chlorine concentration prior to dichlorination is 2-3 mg/L) will likely avoid the destruction of complex cyanides and formation of weak acid dissociable cyanide.

King County is currently working with multiple engineering teams to address solids capture and removal performance limitations at Elliott West. This includes evaluation of existing and new technologies to improve treatment performance. The preliminary planning and engineering evaluations conducted to date, and information gained, are described below:

1. Modeling to evaluate the potential to improve Elliot West's suspended solids removal was completed in 2018. This analysis indicated there were no opportunities to modify the wet well to enhance solids removal or reduce solids re-suspension, which are key drivers associated with not meeting effluent limitations for settleable solids and TSS removal (Carollo Engineers 2018). The modeling results indicate a need to evaluate additional treatment technologies to improve solids removal performance.
2. An evaluation and recommendation to install permanent sampling and flow metering instruments necessary to accurately monitor the solids load entering Elliott West was completed in 2018.

3. The current effluent screens are challenging to operate because they clog quickly. An improved screening system has been identified and could be retrofitted at Elliott West. However, the new screening system would need to be compatible with any changes in treatment technologies used.
4. Installation of additional CSO treatment technologies for solids removal such as chemical coagulation, flocculation, and sedimentation is feasible. However, installation of this type of technology would require additional land area outside the existing Elliott West footprint where land and space adjacent to the station are limited.
5. WTD is currently working with the Ovivo Corporation to pilot test a membrane technology. It uses less footprint and provides a higher level of solids removal than existing treatment technologies. The Ovivo technology has not been used in CSO treatment applications; therefore, WTD is conducting pilot testing to confirm the manufacturer's recommendations for CSO treatment.

A recommendation for a specific solids treatment technology is anticipated to be made by mid-2019. Selection of a solids treatment technology will then drive the decision to select appropriate screening systems. The selected upgrades will move into the design phase in the next two years once the WTD has sufficient information to make decisions, with completion anticipated to occur by 2027.

In the interim, low level detection of cyanide does not appear to be attributable to any known source. The Science section recommends continued cyanide monitoring in wet weather discharges, but direct actions to reduce these concentrations are unwarranted. Efforts to limit over-chlorination of discharges beyond levels necessary for disinfection are prudent.

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