

Annual Construction Stormwater Monitoring Report

Seattle-Tacoma International Airport

For the Period July 1, 2015 through June 30, 2016

September 30, 2016

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Section 1: Construction Stormwater Annual Report

The Port of Seattle (Port) National Pollutant Discharge Elimination System (NPDES) permit is broken down into three sections: Part 1: Industrial Wastewater, Part 2: Industrial Stormwater and Part 3: Construction Stormwater. NPDES Permit Part 1 Special Condition S2.F requires an annual summary of construction stormwater monitoring results. The twelve month period is defined as July 1 through June 30. This report provides a summary of the number of projects, active outfalls, number of construction stormwater events and permit compliance results during this period.

1.1 Background

The Port operates and maintains the Seattle-Tacoma International Airport (STIA). STIA routinely undergoes facility upgrades to improve outdated infrastructure and to increase facility and operational capacity to accommodate the increased number of passengers and meet other needs of the airline industry. Many of these upgrades involve ground disturbing activities requiring construction stormwater runoff monitoring in accordance with Part 3 Special Condition S1. The monitoring results summarized in this report document permit compliance.

Section 2: Construction Stormwater Monitoring Requirements

The Port develops and submits a site-specific construction stormwater monitoring plan prior to construction activities for any project that disturbs one (1) or more acres. The monitoring plan provides a brief project description, identifies construction stormwater outfalls, stormwater treatment processes (if applicable), reporting requirements and non-compliance notification contacts and procedures. Monitoring continues until a site stabilization notification is submitted to Ecology.

Construction stormwater monitoring is defined under Part 3, Special Condition 3S2 is broken into three categories:

- Non-Chemically Treated Discharge Monitoring
- Continuous Chemical Treatment Monitoring
- Batch Treatment Monitoring.

Port personnel work with project and construction management teams to identify the appropriate form of treatment for each site and how the site will be monitored to meet permit requirements. Each category of treatment has specific monitoring frequencies and effluent limitations. Table 1 provides a summary of active construction projects in the reporting period and the form of treatment used at each.

A construction outfall grid was developed in order to determine the location of potential construction stormwater discharges so that they would be identified in the Airport's NPDES permit. These locations discharge into the six (6) receiving waters surrounding STIA. These grids or boxes reflect the associated authorized outfalls referenced in Part III, Special Condition 3S1.A Table III . The *NPDES Construction Monitoring Outfall Areas Map* (Appendix A) provides a reference for outfall locations.

The Port has the potential to utilize 62 construction outfalls identified in the NPDES permit. Each outfall can have a non-chemical construction stormwater discharge, batch-treated chemical stormwater discharge and/or a continuous flow chemical treated stormwater discharge. Appendix A *NPDES Construction Monitoring Outfall Areas Map* shows all of the potential construction stormwater outfalls at STIA.

The Port and Ecology track each outfall under three (3) possible operating conditions:

- Non-operational
- Inactive
- Active.

A *non-operational* outfall has never been activated as a construction stormwater outfall during the current permit cycle. An *inactive* outfall has previously been active but during a particular month(s) there was no construction activity discharging to that outfall. An *active* outfall receives stormwater from a construction site with ground disturbing activity. The Port provides an outfall summary to Ecology along with the monthly Discharge Monitoring Report (DMR) submittal to track operating outfall status. The DMRs summarize the monitoring results from all active outfalls.

The Port may also discharge construction stormwater to the Industrial Waste Treatment Plant (IWTP). All stormwater sent to the IWTP is treated and discharged per NPDES permit Part I, Special Conditions S1.A Table 1-1 & S2.A.1 Table S2-1.

Table 1. Project Summary and Treatment Type Utilized

Project	July	August	September	October	November	December	January	February	March	April	May	June
Logistics Site	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem
Sound Transit 200 th Extension S440 Project	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem	Non-Chem
16C/34C Reconstruction Project	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem	Non-Chem Chem
Logistics Expansion Project	Inactive	Inactive	Inactive	Inactive	Inactive	Inactive	Inactive	Inactive	Inactive	Inactive	Non-Chem Chem	Non-Chem Chem

Non-Chem: Non-Chemically Treated Discharge

Chem: Flow Through Chitosan Enhanced Sand Filtration

2.1 Non-Chemically Treated Discharge Monitoring

Non-chemically treated discharge monitoring is triggered when conventional erosion and sediment control BMPs are utilized to meet water quality standards.

A non-chemically treated discharge monitoring event is triggered when the airport receives 0.5 inches or greater of rain in a 24-hour period. The 24-hour period is defined as being from 8:00am to 8:00am to ensure safety of field samplers and if necessary allows for Best Management Practice (BMP) adjustments or repairs to be completed that working day. The Port NPDES permit requires non-chemical treatment discharges be monitored upstream and downstream of the outfall. The upstream monitoring location is approximately five (5) feet upstream of the discharge and the downstream monitoring location is determined by Ecology's RivPlum Model and is no greater than 100 feet downstream or at the nearest accessible point. Table 2 summarizes the Non-chemically treated discharge monitoring parameters and effluent limitations.

Table 2. Non-Chemically Treated Monitoring Parameters & Effluent Limits

Monitoring Parameter	Effluent Limit
Turbidity ^(a)	5 NTU or 10% increase above background
pH	6.5 to 8.5 ^(b)
Total Petroleum Hydrocarbons	5 mg/L ^(c)
Flow	Report

Footnotes:

- (a) Background turbidity 50 NTU or less then the turbidity in the receiving water shall not exceed 5 NTU above background. Background turbidity is greater than 50 NTU cannot have 10% increase in turbidity.
- (b) With human caused variation must be within .2 units.
- (c) TPH shall only be measured and sampled if visible sheen is observed.

2.2 Continuous Chemically Treated Discharge Monitoring

Continuous or batch chemical treatment is used to treat runoff in those cases where site specific conditions may limit the ability of traditional erosion and sediment control BMPs to meet water quality standards in the receiving water. Ecology defines chemical treatment methods and requirements in BMP C250, *Western Washington Stormwater Management Manual, Volume II*.

A continuous chemical treatment was utilized for the 16C/34C Reconstruction project. The Port's NPDES permit specifies monitoring parameters and frequencies in addition to Ecology's General Use Level Designation requirements.

2.3 Batch Chemically Treated Discharge Monitoring

Batch treatment is also utilized when traditional BMPs may not be adequate. The chemical treatment methods and requirements are also defined in BMP C250, *Western Washington Stormwater Management Manual, Volume II*.

The Port did not perform any batch treatment during this reporting period. The Port's NPDES permit specifies monitoring parameters and frequencies. If the Port uses batch treatment for future construction stormwater projects it will be identified in the site-specific monitoring plan and reported to Ecology on the monthly DMR.

Section 3: Construction Stormwater Monitoring Results Summary

This section summarizes the construction stormwater monitoring events and results. All data summarized in this section has been reported to Ecology on monthly DMRs and is included in Appendix B.

3.1 Non-Chemically Treated Discharge Monitoring Summary

The Port monitored twenty-six (26) 0.5-inch of rain within 24-hour storm events during this period. All of the monitoring results were reported in the monthly DMRs. During this period there were up to five (5) active construction stormwater outfalls. The Port discharged into Des Moines Creek, Northwest Ponds, and Lake Reba. Table 3 provides a monthly summary of the number of 0.5-inch/24-hour stormwater events.

Table 3. Summary 0.5-Inch within 24-Hour Monitoring Events

Month (July 2015 – June 2016)	Number 0.5-Inch Stormwater Events
July	0
August	2
September	0
October	2
November	5
December	5
January	6
February	3
March	2
April	0
May	0
June	1

Appendix B provides the instream monitoring data results submitted on the DMR. Please note that Appendix B reflects the maximum and minimum data results if there were multiple 0.5 inch/24-hour storm events during the month.

The following is a description of the non-chemically treated discharge monitoring events with results exceeding permit effluent limits. All non-compliance occurrences described below were reported to Ecology on the DMR and/or a 5-day non-compliance notification per Part 3, Special Condition S2.E. Any effluent limit exceedances are noted in Appendix B *NPDES Construction Stormwater Annual Data Summary, Non-Chemically Treated Discharge*.

Majority of the exceedances are associated with non-Airport influences. The non-chemical construction monitoring occurs in the receiving water which results in many

outside sources comingling with construction discharges in the receiving water. The Port performs site inspections to ensure BMPs are working effectively and unanticipated discharges are not occurring from the project site.

3.1.1 Turbidity

The Port identified three (3) occurrences which there was a 5 NTU or greater difference between upstream and downstream values. None of these exceedances were associated with Airport construction activities. The following table describes each event.

Table 4. Turbidity Limit Exceedance Notifications

Date	Outfall	NTUs above background	Explanation
12/18/15	D10	5.3	Not related to Airport construction activities. No evidence turbid water leaving project site was present. All BMPs were installed and functioning properly.
12/18/15	L29	9.4	The outfall discharge was less than the upstream turbidity value. As a result, the elevated turbidity is not associated with construction activity.
12/22/15	L29	11.5	The portion of the project discharging to the L29 outfall was stabilized discharge was less than the upstream turbidity value. The Port does not believe the construction site contributed to the elevated turbidity levels.

3.1.2 pH

There were four (4) pH exceedances during this period. None of the exceedances were associated with Port activity. Every exceedance was below the 6.5 S.U. effluent limit and occurred in the East Branch of Des Moines Creek. The upstream pH value associated with each exceedance was also below 6.5 S.U. in all samples except for one instance. The table below describes each exceedance and the numeric value. The depressed pH of the creek in these instances is related to basin-wide effects of low pH rainwater on the receiving water.

Table 5. pH Limit Exceedance Notifications

Date	Outfall	pH	Explanation
01/28/16	D10	6.48	Not related to Airport construction activity. The depressed pH of the creek in these instances is related to basin-wide effects of low pH rainwater on the receiving waters
	D13	6.42	
03/10/16	D10	6.24	Not related to Airport construction activity. The depressed pH of the creek in these instances is related to basin-wide effects of low pH rainwater on the receiving waters.
	D13	6.44	

3.1.3 Total Petroleum Hydrocarbons

The Port did not visually identify a sheen during any of the monitoring events.

3.1.4 Flow

The Port monitored flow during all of the monitoring events.

3.2 Continuous Chemical Treatment Monitoring Summary

There was one CESF continuous flow system active during this reporting period. The CESF system discharges to Northwest Ponds via the D5C – Northwest Ponds #5 Chemical Outfall and was activated on May 4, 2015. Table 6 describes the number of days processed and the total volume discharged.

Table 6. Continuous Chemical Treatment Monitoring Summary		
Month	Operating Days	Volume Discharged
July	0	0
August	1	35,674
September	0	0
October	6	407,676
November	27	9,541,925
December	18	11,298,455
January	6	2,524,318
February	3	671,932
March	4	562,901
April	0	0
May	0	0
June	2	338,814
Annual	67	25,381,695

Appendix C identifies the continuous flow data results submitted on the DMR. Please note that Appendix C *NPDES Construction Stormwater Annual Data Summary Chemically Treated Discharge* reflects the maximum and minimum data results of the CESF treated stormwater during the month.

The following is a description of the continuous CESF monitoring parameters and results.

3.2.1 Turbidity

There were nine operating days in which the treatment facility exceeded the 5 NTU maximum daily average. On the first day of treatment, the turbidity set point was inadvertently set to 10 NTUs and the maximum daily turbidity average discharged was 7.1 NTUs.

The remaining eight exceedances were associated with three significant storm events on 10/31/16, 11/1-11/5/16 and 11/13-11/15/16. For all events the chitosan treatment system encountered chemistry treatment interference with organics and tannins along with pump failures, a treatment system failure, and pipe breaks. The interference was associated with the vast volumes of compost soil amendment and bonded fiber matrix applied to the 16C 34C Runway Rehabilitation Project. After each event the project team evaluated deficiencies and completed facility improvements. Noncompliance notifications were submitted for each incident.

3.2.2 pH

The Port CESF effluent was between 6.5 and 8.5 during all discharges.

3.2.3 Total Petroleum Hydrocarbons

The Port did not identify a visible sheen during any of treatment operations. During five (5) operating days, the treatment system collected less than four visual samples due to short operating periods. On 8/31/15 operations, the operator stated visual samples were collected however the samples were not noted on operator logs.

3.2.4 Flow

The Port monitored flow during all of the monitoring events. The maximum daily flow and total monthly discharge volume was submitted to Ecology on the DMR.

The Port discharged 25,381,695 gallons of continuous CESF treated construction stormwater during this reporting period. All of the monitoring results were submitted to Ecology on the monthly DMR.

3.3 Batch Chemical Treatment Monitoring Summary

The Port did not perform any batch treatment during this reporting period. The Port's NPDES permit specifies monitoring parameters and frequencies. If the Port uses batch treatment for future construction stormwater projects it will be identified in the site-specific monitoring plan and reported to Ecology on the monthly DMR.

Appendix A

NPDES Construction Monitoring Outfall Areas Map

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Appendix B

NPDES Construction Stormwater Annual Data Summary Non-Chemically Treated Discharge

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NPDES Permit WA-0024651; Seattle-Tacoma International Airport, Part 3 Construction Stormwater Data Summary
Non-Chemically Treated Discharge: July 2015 - June 2016

Parameter	Month	Outfalls			
		D10	D13	L29	D5
Flow (mgd)	Jul, 2015	ND	ND	ND	ND
	Aug, 2015	2.15	0.86	ND	5.16
	Sep, 2015	ND	ND	ND	ND
	Oct, 2015	1.94	0.52	ND	3.87
	Nov, 2015	4.73	0.56	1.94	6.45
	Dec, 2015	1.51	0.22	0.95	4.73
	Jan, 2016	1.18	1.18	0.09	1.18
	Feb, 2016	0.645	0.172	0.43	1.29
	Mar, 2016	0.645	0.129	0.516	1.075
	Apr, 2016	ND	ND	ND	ND
	May, 2016	ND	ND	ND	ND
	Jun, 2016	0.645	0.129	0.129	2.365
Oil and Grease - Total Petroleum Hydrocarbon (mg/L)	Jul, 2015	ND	ND	ND	ND
	Aug, 2015	No Sheen	No Sheen	ND	No Sheen
	Sep, 2015	ND	ND	ND	ND
	Oct, 2015	No Sheen	No Sheen	ND	No Sheen
	Nov, 2015	No Sheen	No Sheen	No Sheen	No Sheen
	Dec, 2015	No Sheen	No Sheen	No Sheen	No Sheen
	Jan, 2016	No Sheen	No Sheen	No Sheen	No Sheen
	Feb, 2016	No Sheen	No Sheen	No Sheen	No Sheen
	Mar, 2016	No Sheen	No Sheen	No Sheen	No Sheen
	Apr, 2016	ND	ND	ND	ND
	May, 2016	ND	ND	ND	ND
	Jun, 2016	No Sheen	No Sheen	No Sheen	No Sheen
pH (s.u.) - [min \ max]	Jul, 2015	ND	ND	ND	ND
	Aug, 2015	7.21 \ 7.61	7.23 \ 7.58	ND	7.07 \ 7.28
	Sep, 2015	ND	ND	ND	ND
	Oct, 2015	7.04 \ 7.54	7.02 \ 7.53	ND	6.74 \ 7.32
	Nov, 2015	6.91 \ 7.53	6.92 \ 7.55	6.83 \ 7.44	6.67 \ 7.55
	Dec, 2015	7.04 \ 7.67	7.01 \ 7.65	6.86 \ 7.42	6.84 \ 7.36
	Jan, 2016	6.48(c) \ 7.07	6.42(c) \ 6.93	6.87 \ 7.35	6.61 \ 6.98
	Feb, 2016	6.82 \ 6.90	6.84 \ 6.92	7.00 \ 7.09	6.69 \ 6.98
	Mar, 2016	6.24(c) \ 7.57	6.44(c) \ 7.57	6.53 \ 7.31	6.8 \ 7.42
	Apr, 2016	ND	ND	ND	ND
	May, 2016	ND	ND	ND	ND
	Jun, 2016	7.49 \ 7.49	7.51 \ 7.51	7.74 \ 7.74	7.14 \ 7.14
Turbidity Background <=50 NTU (NTU)	Jul, 2015	ND	ND	ND	ND
	Aug, 2015	3.1	0.2	ND	7.2
	Sep, 2015	ND	ND	ND	ND
	Oct, 2015	4.1	0	ND	1.1
	Nov, 2015	5	0.3	3.5	4.7
	Dec, 2015	5.3 (a)	0.5	11.5 (b)	0
	Jan, 2016	1.21	0.5	3.07	1.73
	Feb, 2016	4.9	0.8	4.9	0.8
	Mar, 2016	2.9	0	4.2	1.1
	Apr, 2016	ND	ND	ND	ND
	May, 2016	ND	ND	ND	ND
	Jun, 2016	1.2	0	0	0
Turbidity Background >50 NTU (%)	Jul, 2015	ND	ND	ND	ND
	Aug, 2015	NA	NA	ND	NA
	Sep, 2015	ND	ND	ND	ND
	Oct, 2015	NA	NA	ND	NA
	Nov, 2015	NA	NA	NA	NA
	Dec, 2015	NA	NA	NA	NA
	Jan, 2016	NA	NA	NA	NA
	Feb, 2016	NA	NA	NA	NA
	Mar, 2016	NA	NA	NA	NA
	Apr, 2016	ND	ND	ND	ND
	May, 2016	ND	ND	ND	ND
	Jun, 2016	NA	NA	NA	ND

Notes:

a) The turbidity effluent limit was exceeded during the 12/18/15 storm event. Site inspections did not identify turbidity source. A non-compliance notification was submitted on 12/21/15.

b) The turbidity effluent limit was exceeded during the 12/18/15 and 12/22/15 storm events. Site inspections did not identify turbidity source. A non-compliance notification was submitted on 12/23/15.

c) The pH value was below 6.5 effluent limit. The depressed pH of the creek in these instances is related to basin-wide effects of low pH rainwater on the receiving waters.

mgd = million gallons per day

mg/l = milligrams per liter

s.u. = standard units

ntu = nephelometric turbidity units

ND = No Discharge

NA = Not Applicable

N/A = Not Analyzed

IA = Inactive

NPDES Permit WA-0024651; Seattle-Tacoma International Airport, Part 3 Construction Stormwater Data Summary

Chemically Treated Discharge: July 2015 - June 2016

Parameter	Month	Outfall D5C	
Maximum Daily Flow	Jul, 2015	ND	mg/l = milligrams per liter
	Aug, 2015	35,674	s.u. = standard units
	Sep, 2015	ND	NTU = nephelometric turbidity units
	Oct, 2015	251,649	
	Nov, 2015	1,885,935	ND = No Discharge
	Dec, 2015	2,527,938	NA = Not Applicable
	Jan, 2016	1,038,501	N/A = Not Analyzed
	Feb, 2016	357,878	IA = Inactive
	Mar, 2016	184,667	
	Apr, 2016	ND	
	May, 2016	ND	
	Jun, 2016	388,814	
Oil and Grease - Total Petroleum Hydrocarbon (mg/l)	Jul, 2015	ND	
	Aug, 2015	N/A (a)	
	Sep, 2015	ND	
	Oct, 2015	No Sheen (b)	
	Nov, 2015	No Sheen (c)	
	Dec, 2015	No Sheen	
	Jan, 2016	No Sheen	
	Feb, 2016	No Sheen	
	Mar, 2016	No Sheen	
	Apr, 2016	ND	
	May, 2016	ND	
	Jun, 2016	No Sheen	
pH (s.u.) - [min \ max]	Jul, 2015	ND	
	Aug, 2015	6.6 \ 8.2	
	Sep, 2015	ND	
	Oct, 2015	6.7 \ 8.5	
	Nov, 2015	6.5 \ 8.5	
	Dec, 2015	6.5 \ 8	
	Jan, 2016	6.5 \ 7.7	
	Feb, 2016	6.7 \ 7.6	
	Mar, 2016	6.61 \ 7.3	
	Apr, 2016	ND	
	May, 2016	ND	
	Jun, 2016	6.56 \ 7.22	
Turbidity (NTU)	Jul, 2015	ND	
	Aug, 2015	7.1 (d)	
	Sep, 2015	ND	
	Oct, 2015	18.1 (e)	
	Nov, 2015	37.3 (f)	
	Dec, 2015	3.3	
	Jan, 2016	3.3	
	Feb, 2016	3.3	
	Mar, 2016	2.71	
	Apr, 2016	ND	
	May, 2016	ND	
	Jun, 2016	181	

Notes:

- (a) The operator did not record the visual TPH sample.
- (b) Due to truncated operations on 10/8 & 10/21, less than 4 visual sheen samples were collected.
- (c) Due to truncated operations on 11/3, 11/26, and 11/27, less than 4 visual sheen samples were collected.
- (d) The treatment system turbidity set point erroneously set at 10 NTU
- (e) During the 10/31/15 storm event, the turbidity set point elevated due to chemistry issues and increased the treatment systems discharge output volumes.
- (f) During the 11/1- 11/5, 11/13-11/15 storm events, the turbidity set point elevated due to chemistry issues and increased the treatment systems discharge output volumes.