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Annual Construction Stormwater Monitoring Report

Seattle-Tacoma International Airport

For the Period July 1, 2018 through June 30, 2019

**September 28, 2019**

Prepared by

Aviation Environmental Programs

Port of Seattle

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****Section1T**** 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 STIA routinely undergoes facility upgrades to improve outdated infrastructure and to increase facility and operational capacity to accommodate the increased number of passengers and meet other needs of the airline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* (Figure 1) 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. Figure 1 *NPDES Construction Monitoring Outfall Areas Map* shows all of the potential construction stormwater outfalls at STIA.

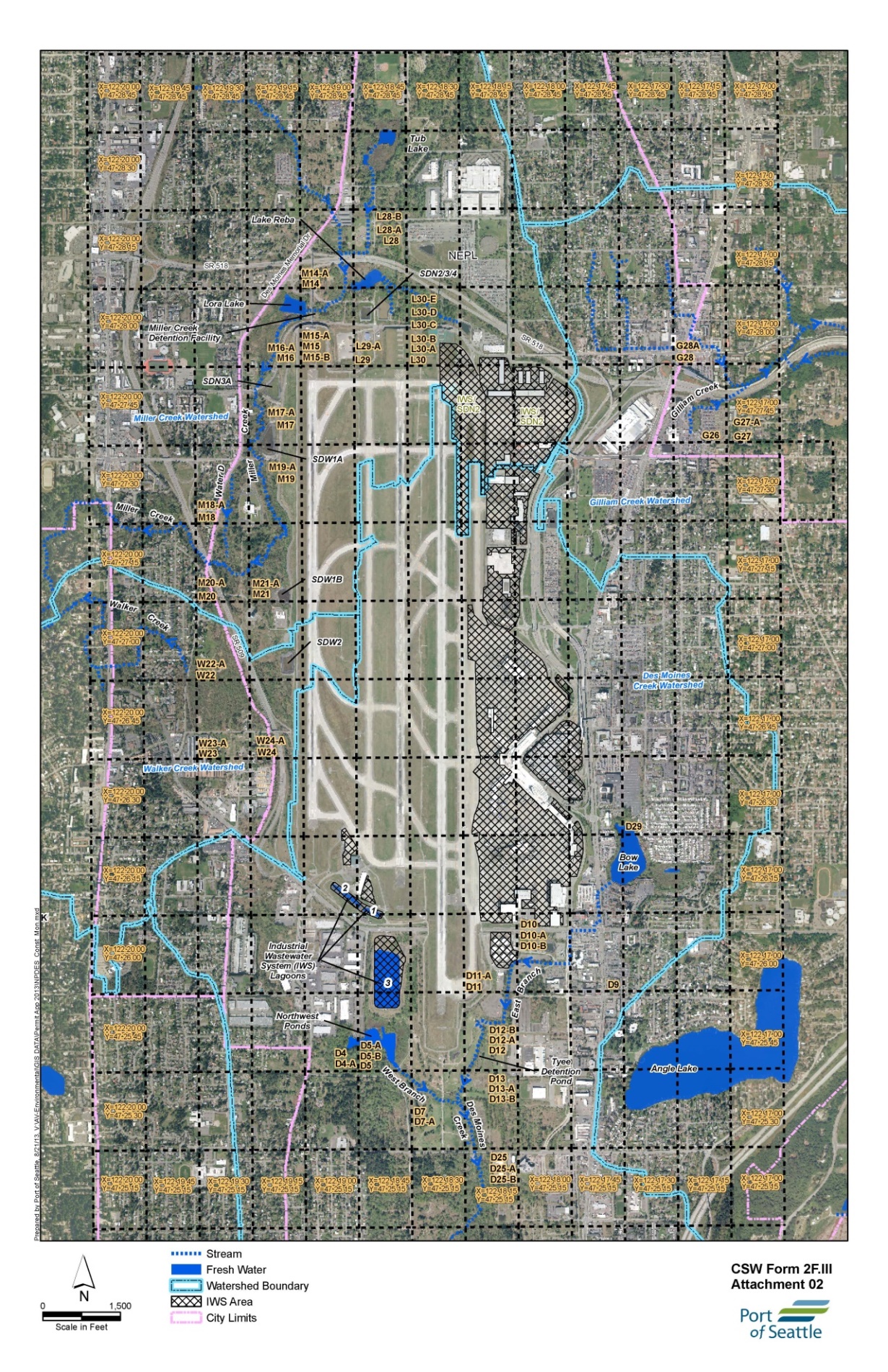
The Port and Ecology track each outfall under three (3) possible operating conditions:

* + - 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.

Figure 1. Construction Stormwater Outfall Map

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|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 |
| International Arrivals Facility | 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 |
| North Satellite Renovation 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 |
| Tyee Conversion to Pollinator Habitat | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Inactive | Inactive | Inactive |
| Concourse D Hardstand Holdroom | Non-Chem  Chem | Non-Chem  Chem | Non-Chem  Chem | Inactive | Inactive | Inactive | Inactive | Inactive | Inactive | Inactive | Inactive | Inactive |
| 2018 Taxiway Improvement | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Non-Chem | Inactive | Inactive | Inactive |
| Non-Chem: Non-Chemically Treated Discharge  Chem: Flow Through Electrocoagulation | | | | |  |  |  |  |  |  |  |
|  |  | | |  |  |  |  |  |  |  |  |

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** |
| TurbidityP(a) | 5 NTU or 10% increase above background |
| pH | 6.5 to 8.5P(b) |
| Total Petroleum Hydrocarbons | 5 mg/LP(c) |
| Flow | Report |

Footnotes:

1. 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.
2. With human caused variation must be within .2 units.
3. 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*. The Port’s NPDES permit specifies monitoring parameters and frequencies in addition to Ecology’s General Use Level Designation requirements.

The International Arrivals Facility Project utilized an Electrocoagulation Treatment system which discharged to the D10C - Des Moines Creek #10C outfall beginning in October 2017. The Port’s NPDES permit specifies monitoring parameters and frequencies.

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 seventeen (17) 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 four (4) active construction stormwater outfalls. The Port discharged into Des Moines Creek, Northwest Ponds, Miller Creek 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 2018 – June 2019)** | **Number 0.5-Inch Stormwater Events** |
| July | 0 |
| August | 0 |
| September | 0 |
| October | 3 |
| November | 3 |
| December | 3 |
| January | 2 |
| February | 2 |
| March | 1 |
| April | 2 |
| May | 0 |
| June | 1 |

Table 4 *Non-Chemically Treated Discharge Data Results* provides the instream monitoring data results submitted on the DMR. Please note that Table 4 reflects the maximum and minimum data results if there were multiple 0.5 inch/24-hour storm events during the month.

The non-chemical construction monitoring occurs in the receiving water which results in many outside sources comingling with construction discharges in the receiving water.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table 4. Non-Chemically Treated Discharge: July 2018 - June 2019** | | | |  |  |  |
|  |  | **Outfalls** | | | |  |
| **Parameter** | **Month** | **D10** | **D13** | **D5** | **L29** |  |
| **Flow (mgd)** | Jul-18 | ND | ND | ND | ND |  |
| Aug-18 | ND | ND | ND | ND |  |
| Sep-18 | ND | ND | ND | ND |  |
| Oct-18 | 1.161 | 0.516 | 3.01 | 0.129 |  |
| Nov-18 | 2.365 | 0.129 | 6.45 | 1.29 |  |
| Dec-18 | 1.505 | 0.344 | 3.87 | 0.946 |  |
| Jan-19 | 2.15 | 0.645 | 7.74 | 0.903 |  |
| Feb-19 | 1.505 | 0.215 | 6.45 | 0.516 |  |
| Mar-19 | 1.075 | 0.086 | 1.935 | 0.43 |  |
| Apr-19 | 1.505 | 0.086 | 2.365 | 0.645 |  |
| May-19 | ND | ND | IA | ND |  |
| Jun-19 | 0.344 | 0.172 | IA | ND |  |
| **Oil and Grease Total Petroleum Hydrocarbon (mg/L)** | Jul-18 | ND | ND | ND | ND |  |
| Aug-18 | ND | ND | ND | ND |  |
| Sep-18 | ND | ND | ND | ND |  |
| Oct-18 | No Sheen | No Sheen | No Sheen | No Sheen |  |
| Nov-18 | No Sheen | No Sheen | No Sheen | No Sheen |  |
| Dec-18 | No Sheen | No Sheen | No Sheen | No Sheen |  |
| Jan-19 | No Sheen | No Sheen | No Sheen | No Sheen |  |
| Feb-19 | No Sheen | No Sheen | No Sheen | No Sheen |  |
| Mar-19 | No Sheen | No Sheen | No Sheen | No Sheen |  |
| Apr-19 | No Sheen | No Sheen | No Sheen | No Sheen |  |
| May-19 | ND | ND | IA | ND |  |
| Jun-19 | No Sheen | No Sheen | IA | No Sheen |  |
| **pH [min \ max] (s.u.)** | Jul-18 | ND | ND | ND | ND |  |
| Aug-18 | ND | ND | ND | ND |  |
| Sep-18 | ND | ND | ND | ND |  |
| Oct-18 | 6.86\ 7.23 | 6.83\ 7.22 | 6.6\ 6.91 | 6.57\ 6.90 |  |
| Nov-18 | 6.58\ 6.67 | 6.61\ 6.70 | 6.42\ 6.62 | 6.58\ 6.76 |  |
| Dec-18 | 6.61\ 7.07 | 6.63\ 6.96 | 6.36\ 6.83 | 6.46\ 6.82 |  |
| Jan-19 | 6.67\ 6.91 | 6.68\ 6.90 | 6.39\ 6.68 | 6.65\ 6.80 |  |
| Feb-19 | 7.19\ 7.39 | 7.28\ 7.28 | 7.13\ 7.13 | 7.00\ 7.00 |  |
| Mar-19 | 7.33\ 7.33 | 7.25\ 7.25 | 6.85\ 6.85 | 7.00\ 7.00 |  |
| Apr-19 | 7.33\ 7.50 | 7.32\ 7.49 | 7.03\ 7.13 | 7.19\ 7.26 |  |
| May-19 | ND | ND | IA | ND |  |
| Jun-19 | 7.55\ 7.55 | 7.59\ 7.59 | IA | ND |  |
| **Turbidity Background  <=50 NTU** | Jul-18 | ND | ND | ND | ND |  |
| Aug-18 | ND | ND | ND | ND |  |
| Sep-18 | ND | ND | ND | ND |  |
| Oct-18 | 2.2 | 1.2 | 0 | 0.9 |  |
| Nov-18 | 4.9 | 0 | 1.2 | 4.4 |  |
| Dec-18 | 1 | 0.2 | 0 | 0.6 |  |
| Jan-19 | 0 | 0 | 0 | 0.5 |  |
| Feb-19 | 3.4 | 0 | 0 | 0 |  |
| Mar-19 | 5 | 0 | 2 | 0 |  |
| Apr-19 | 4.1 | 0.6 | 0 | 0.6 |  |
| May-19 | ND | ND | IA | ND |  |
| Jun-19 | 6.4 | 0 | IA | ND |  |
| **Turbidity Background >50 NTU (%)** | Jul-18 | ND | ND | ND | ND |  |
| Aug-18 | ND | ND | ND | ND |  |
| Sep-18 | ND | ND | ND | ND |  |
| Oct-18 | NA | NA | NA | NA |  |
| Nov-18 | NA | NA | NA | NA |  |
| Dec-18 | NA | NA | NA | NA |  |
| Jan-19 | NA | NA | NA | NA |  |
| Feb-19 | NA | NA | NA | NA |  |
| Mar-19 | NA | NA | NA | NA |  |
| Apr-19 | NA | NA | NA | NA |  |
| May-19 | ND | ND | IA | ND |  |
| Jun-19 | NA | NA | IA | ND |  |
| **Notes:** |  |  |  |  |  |  |
| mgd = million gallons per day |  | s.u. = standard units | |  | ND = No Discharge | |
| mg/l = milligrams per liter |  | ntu = nephelometric turbidity units | | | NA = Not Applicable | |
|  |  |  |  |  | IA = Inactive |  |

The Port performs site inspections to ensure BMPs are working effectively and unanticipated discharges are not occurring from the project site.

During this monitoring period there were monitoring results that exceeded permit limitations. All 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.

During February 2019 the region experienced heavy snowfall event that limited access to some of the construction monitoring sites and the samples were unable to be collected. Each of these instances was reported to Ecology in notification and on DMR submittal.

**3.1.1 Turbidity**

There was one occurrence on 6/20/19 in which there was a 5 NTU or greater difference between upstream and downstream value. The difference between the upsteam and downstream turbidity measurement was 6.4 NTUs. The upstream value was 2.0 NTUs and the downstream value was 8.4 NTUs. Site inspections did not identify any direct turbidity discharges from construction activity. The primary construction activity discharging to the D10 outfall is collected and treated by an electrocoagulation treatment system however the project runoff did not generate enough volume to treat and discharge on June 20th. The Port does not believe the elevated turbidity is associated with construction activity.

**3.1.2 pH**

There were four (4) pH exceedances during this period. In each exceedance the upstream pH value was below the 6.5 S.U. effluent limit and the Port does not believe the exceedances were associated with Port activity. 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 Summary** | | | |
| **Date** | **Outfall** | **pH** | **Explanation** |
| 11/23/18 | D5 | 6.34 | The project discharging to the D5 outfall did not have any low pH generating activity occurring. The primary project activities were joint seal and concrete panel replacement. There was no evidence the depressed pH was associated with construction activity. |
| 12/18/19 | D5  L29 | 6.36  6.45 | The project discharging to the D5 outfall did not have any low pH generating activity occurring. The primary activities were joint seal replacement and replacement of taxiway concrete panels.  In the L29 drainage area there was only construction laydown occurring. Site inspections did not identify any activities that would reduce pH. Due to region wide depressed pH values and lack of pH sources, the Port believes the depressed pH value was related to basin-wide effects of low pH rainwater on the receiving water. |
| 1/3/19 | D5 | 6.39 | The project discharging to the D5 outfall was stabilized and during construction the primary activities were joint seal replacement and replacement of taxiway concrete panels. The stormwater runoff from this drainage basin is from runways and taxiways and flows through compost filter strips before entering the conveyance and detention system and discharging to Northwest Ponds. The Port believes the depressed pH value was related to basin-wide effects of low pH rainwater on the receiving water.. |

**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**

The International Arrivals Facility project operated an electrocoagulation (EC) continuous flow system during this reporting period. The treatment system discharges to Des Moines Creek via the D10-C – Des Moines Creek #10 Chemical Outfall. The system began operation in October 2017 and below is a summary of discharges.

**Table 6. Continuous Chemically Treated Discharge Data Results**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Month**  **(2018-2019)** | **Gallons Treated (MGD)** | **Operating**  **Days** | **Turbidity (NTUs)** | **pH (s.u.)**  **min/max** |
| July | 0 | 0 | -- | -- |
| August | 0.88 | 7 | 2.3 | 7.45/7.99 |
| September | 0 | 0 | -- | -- |
| October | 0 | 0 | -- | -- |
| November | 0 | 0 | -- | -- |
| December | 0.0014 | 2 | 2.36 | 7.8/8.03 |
| January | 0.79 | 3 | 1.08 | 7.47/7.6 |
| February | 0.15 | 2 | 0.53 | 7.42/8.09 |
| March | 0.015 | 1 | 0.72 | 7.5/7.5 |
| April | 0.0108 | 1 | 0.64 | 7.39/7.39 |
| May | 0 | 0 | -- | -- |
| June | 0 | 0 | -- | -- |

**3.2.1 Turbidity**

All construction discharges were below 5 NTUs maximum daily average. There were no exceedances during this reporting period.

**3.2.2 pH**

All EC continuous flow system discharges were within 6.5 to 8.5 pH range.

**3.2.3 Total Petroleum Hydrocarbons**

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

**3.2.4 Flow**

The Port monitored flow during all of the monitoring events.

**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.