Post-Construction Surface Sediment Monitoring Report—Year 5

Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2, Seattle/Tukwila, Washington

Prepared for:

The Boeing Company

Seattle, Washington

Project No. 0131320440

October 2020

As required by Section 15.2 of the Boeing Plant 2, Seattle/Tukwila, Washington, RCRA Administrative Order on Consent, (USEPA ID No. WAD 00925 6819, RCRA Docket No. 1092-01-22-3008(h)), this Certification Statement and Signature accompanies submittal of the following report:

Report: Post-Construction Surface Sediment Monitoring Report – Year 5
Duwamish Sediment Other Area and Southwest Bank

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 submitted 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.

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Table of contents

1.0 Introduction 1
2.0 Sampling Design and Methods 1
2.1 Design 1
2.2 Sample Collection 2
2.3 Analytical Laboratory 2
3.0 Results 2
3.1 Sample Collection 2
3.2 Sample Physical Characteristics 3
3.3 Sediment Chemistry 3
3.3.1 Sediment Management Standards Analytes 4
3.3.2 Dioxins/Furans 5
3.3.3 Grain Size 5
4.0 Data Quality Review 5
4.1 PCB Analyses 5
4.2 Metals Analyses 5
4.3 Semivolatile Organic Analyses 5
4.4 Semivolatile Organic Selective Ion Monitoring Analyses 5
4.5 Dioxin/Furan Analyses 5
4.6 General Chemistry Analyses 5
4.7 Grain-Size Analysis 6
5.0 Summary 6
5.1 Grain Size 6
5.2 Chemistry 6
6.0 References 7

List of figures

Figure 1 Post-Construction Surface Monitoring Sampling Locations
Figure 2 Post-Construction Surface Monitoring Sampling Results 2015, 2016, 2018, and 2020

List of tables

Table 1 Post-Construction Surface Sample Locations and Average Silt Thickness—Year 5
Table 2 Sediment Management Standards Chemicals of Concern Analytical Results
Table 3 Dioxins and Furans Analytical Results
Table 4 Grain-Size Analysis Results
Table 5 Frequency of Detection of Chemical Analytes

List of appendices

Appendix A Qualitative Sample Characteristics Forms and Photographs
Appendix B Chain-of-Custody Forms
Appendix C Data Validation Report

List of abbreviations and acronyms

µg/kg	microgram(s) per kilogram
cm	centimeter(s)
DSOA	Duwamish Sediment Other Area
HPAH	high-molecular-weight polycyclic aromatic hydrocarbon
LCS	laboratory-control sample(s)
LPAH	low-molecular-weight polycyclic aromatic hydrocarbon
m^2	square meter
mg/kg	milligram(s) per kilogram
MLLW	mean lower low water
MS	matrix spike
MSD	matrix-spike duplicate
OC	organic carbon
PCB	polychlorinated biphenyl
PAH	polycyclic aromatic hydrocarbon
QAPP	quality assurance project plan
RRM	regional reference material
SIM	semivolatile organic selective ion monitoring
SMS	Sediment Management Standards
SQS	Sediment Quality Standards
SRM	standard reference material
TOC	total organic carbon
vs	versus
WAC	Washington Administrative Code

1.0 Introduction

This report documents the results of Year 5 sediment quality monitoring conducted five years after construction of the Duwamish Sediment Other Area (DSOA) and Southwest Bank Corrective Measure and Habitat Project (completed in March 2015). As described in the *Post-Construction Surface Sediment Monitoring Work Plan* (Work Plan; AMEC et al., 2014), post-construction monitoring was to be conducted upon completion of all dredging, shoreline construction, and final backfilling to grade (Year 0) and during Years 1, 3, 5, 7, and 10 post-construction. This report presents the results of the sampling conducted in June 2020 (Year 5). The analytical results from the Year 5 monitoring are also compared to the previous year's analytical results.

2.0 Sampling Design and Methods

The sampling design and methods are presented below.

2.1 Design

The sampling design was a judgmental sampling design (i.e., sample locations were selected based on best professional judgment). The project area included the in-water dredging areas (including Slip 4), the North and South Shoreline Areas below approximately +4 feet mean lower low water (MLLW), and the North and South Shoreline Areas above approximately +4 feet MLLW (Figure 1). The North and South Shoreline Areas above approximately +5 feet MLLW were planted with marsh vegetation as part of restoration/creation of shoreline habitat within the DSOA and Southwest Bank area.

The 36 sampling locations (plus 4 duplicate stations) were selected to provide good spatial coverage of the post-construction surface and to include sampling points near stormwater outfalls (Figure 1). Sampling locations were stratified into five distinct groups based on the elevation of the post-construction surface.

- Shoreline area samples at approximately 7 feet MLLW;
- Shoreline area samples at approximately 4 feet MLLW;
- In-water work area sample locations above -5 feet MLLW and below +4 feet MLLW;
- In-water dredging area sample locations below -5 feet MLLW; and
- Stormwater outfall locations.

The elevations of the proposed sampling points were estimated using the design drawings for the designed final finish grade.

Elevation ranges for the stratified sampling groups were selected based on the potential mechanisms and potential sources of off-site contaminants. Potential mechanisms of recontamination include releases, subsequent transport, and redeposition of contaminants from either upstream or downstream sources within the Duwamish Waterway. Transport of material from off-site sources in the waterway is stratified by water depth:

- Releases from upstream sources can potentially move downstream within the surface freshwater lens, and
- Releases within the tidally-driven salt wedge can result in either upstream or downstream transport of contaminants.

The mechanisms influencing the sediment transport processes and the sources of potential contamination differ above and below the halocline (defined as the transition between the fresh, low-salinity surface layers and the higher-salinity salt wedge). A majority of the water flow above the halocline in the Duwamish Waterway adjacent to Plant 2 is governed by surface freshwater flow, and sediment transport is predominantly downstream. The area below the halocline is predominately exposed to tidally-driven flows that can result in either downstream or upstream water movement. Therefore, for monitoring purposes, the project area was divided into two strata, one above and one below the halocline.

The depth (or elevation) of the halocline depends primarily on the tidal height, tidal cycle, and river discharge rate. The elevation of the halocline in the vicinity of Plant 2 is estimated to be at approximately -5 feet MLLW, based on information collected by King County at the South Park Bridge between February 2006 and October 2011 (King County, 2011). As such, the project area was divided into two subareas or strata (above -5 feet MLLW and below -5 feet MLLW; Figure 1) for monitoring purposes.

To meet the monitoring requirements of the Natural Resource Trustees, additional monitoring stations were established in the upper intertidal area within the North and South Shoreline Habitat Areas at an elevation of approximately +7 feet MLLW (Figure 1).

Finally, additional sampling stations were established adjacent to stormwater outfalls in the Duwamish Waterway and in Slip 4.

2.2 Sample Collection

Sediment sample collection of the top 10 centimeter(s) (cm) of sediment followed the procedures specified in the Work Plan (AMEC et al., 2014) using either a 0.2-square-meter (m^2) stainless-steel van Veen grab sampler or by hand using hand cores or spoons. Measurements of fine-grained depositional material thickness if present was made at each of the sampling locations.

2.3 Analytical Laboratory

The analytical methods for sediment samples followed the requirements of the Work Plan (Amec et al. 2014) and the *Construction and Post-Construction Sediment Monitoring Quality Assurance Project Plan* (QAPP; AMEC et al., 2013). All samples were analyzed for the Sediment Management Standards (SMS; Washington Administrative Code 173-204) analytes, which include metals, polycyclic aromatic hydrocarbons (PAHs; low-molecular-weight PAHs [LPAHs] and high-molecular-weight PAHs [HPAHs]), chlorinated benzenes, phthalate esters, miscellaneous non-ionizable organic compounds, ionizable organic compounds, polychlorinated biphenyls (PCBs), and total organic carbon (TOC). Selected samples were also analyzed for dioxin/furans and grain size. Grain-size samples were collected and analyzed as described in the Work Plan.

3.0 Results

3.1 Sample Collection

Sample collection followed the Work Plan (AMEC et al., 2014) with the following exception; sediment samples were not collected at sample locations SD-PCM001, SD-PCM021, and SD-PCM033 because the locations were covered by the coarse gravel used to stabilize the outer shoreline at the North Site in 2016 (see Figure 1 for approximate location of gravel placement).

Samples in the areas at +4 feet MLLW and below, as shown on Figure 1, were collected using a 0.2-m^2 stainless-steel, powered grab sampler with the exception of SD-PCM02020 which was collected by hand corer. Measurements were made of any silt accumulation at three locations (center, left, and right side) on the exposed surface of the grab. Samples above +4 feet MLLW (SD-PCM03120, SD-PCM03220,

SD-PCM03420, SD-PCM03520, and SD-PCM03620) were collected by hand corer and silt layer thickness was measured at the center of the hand core.

At sampling locations SD-PCM031 and SD-PCM032, coir matting was present approximately 3 cm under a wet layer of soft silt. The intact strands of the coir mat were cut with a knife when encountered and removed from the sample.

The Year 5 samples were collected at 33 locations; in addition, field duplicate samples were collected at four of the sample locations. A list of samples and coordinates of sampling locations are presented in Table 1, and approximate sampling locations are shown on Figure 1. Samples that were collected for only SMS analysis were placed directly into a single 1-liter clear glass bottle; these samples were homogenized at the analytical laboratory. Samples collected for analysis of SMS analytes and dioxin/furans or grain-size analysis were homogenized in the field before being placed into the sample containers. Sediment from SD-PCM001 was to be analyzed for dioxins/furans; however, the sample was not collected due to the presence of gravel placed for shoreline protection as described above. Sample SD-PCM03120 was analyzed for dioxins/furans as a replacement for sample SD-PCM00120.

3.2 Sample Physical Characteristics

The qualitative sample characteristics forms and photographs of the samples are provided in Appendix A.

There were 27 samples collected below elevation +4 feet MLLW, including six outfall samples. Silt was observed on the surface in all 27 of the samples (apparently recently deposited material) as described below and in Table 1:

- Eight samples had 1-cm or less thick layer of silt present on the surface of the sample,
- 15 samples had an 1- to 5-cm-thick layer of silt present on the surface of the sample, and
- Four samples had accumulations of silt that were greater than 5-cm-thick with a maximum of 16.7-cm-thick layer present on the surface of the sample.

Five samples were collected along the shoreline area at approximately +4 feet MLLW. All five of the samples had a measurable silt layer which ranged from 0.4 to 10.0 cm.

Five samples were collected along the shoreline at an elevation of approximately +7 feet MLLW. All of the samples had a measurable silt layer that ranged from 0.5- to 5.0-cm thick.

At 34 of the 37 sample locations, layers of fine to coarse sand were found below any overlying silt layer. This material likely represents the original backfill material. Locations SD-PCM01020, SD-PCM02020, and SD-PCM02920 did not appear to contain any underlying sand in the sample although this may have been due to the grab not penetrating sufficiently to collect the underlying sand material.

3.3 Sediment Chemistry

The chain-of-custody forms for the samples that were analyzed are provided in Appendix B. The results of the SMS analyses for the Year 0, Year 1, Year 3, and the current Year 5 sampling events are presented in Table 2, dioxin/furan analyses for all events are presented in Table 3, and grain-size analyses for all events are presented in Table 4. The frequency of detection of the analytes for all sampling events are presented in Table 5.

One of the sample locations (SD-PCM001) that had been sampled for dioxins in Year 0 (2015) and in Year 1 (2016) could not be sampled during Year 5 because of the coarse gravel placed for shoreline stabilization. An additional dioxin sample was collected at SD-PCM031 to meet the requirement for sampling six locations as described in the Work Plan; however, the sample was not collected in an amber

glass bottle as specified in the QAPP (Amec et al., 2013). The sample for the dioxin/furan analysis was collected in a 1-liter clear glass bottle rather than an amber bottle.

3.3.1 Sediment Management Standards Analytes

3.3.1.1 Metals

Metals were analyzed in 37 samples. All of the detected metals concentrations were well below the Washington State Management Standards Sediment Quality Standards (SQS; WAC 173-204-320; Table 2). Arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc were detected in all the samples.

3.3.1.2 PAHs

PAHs were analyzed in 37 samples, and all detected concentrations were well below the SQS (Table 2). PAHs were detected in 32 of the 37 samples. The most frequently detected PAHs were pyrene, benzofluoranthenes, fluoranthene, chrysene, and phenanthrene, (29 of 37, 29 of 37, 28 of 37, 22 of 37, and 20 of 37, respectively). Fluorene, acenaphthylene, acenaphthene, naphthalene, and 2-methylnaphthalene were detected in four or fewer of the samples (Table 5).

3.3.1.3 Chlorinated Benzenes

Chlorinated benzenes were analyzed in 37 samples, and all detected concentrations were well below the SQS (Table 5).

3.3.1.4 Phthalate Esters

Phthalates were analyzed in 37 samples, and all detected concentrations were below the SQS (Table 2). Butyl benzyl phthalate, bis[2-ethylhexyl] phthalate, and dimethyl phthalate were detected in 15, 11, and 10 of the 37 samples, respectively (Table 5).

3.3.1.5 Miscellaneous Non-Ionizable Organic Compounds

Of the miscellaneous non-ionizable organic compounds, dibenzofuran and N-nitrosdiphenylamine were the only detected compounds and were detected in four and one of the 37 samples, respectively (Table 5). The detected concentrations were below the SQS (Table 2 and Table 5).

3.3.1.6 Ionizable Organic Compounds

Ionizable organic compounds were analyzed in 37 samples, and all detected concentrations were below the SQS (Table 2). Phenol and 2-methylphenol were the most detected of the ionizable organic compounds (Table 5). Benzyl alcohol was detected in four samples, and benzoic acid was detected in three samples. The reporting limit for 2,4-dimethylphenol in a single sample (SD-PCM02020) was elevated above the corresponding SQS criterion.

3.3.1.7 Polychlorinated Biphenyls

Thirty-seven samples were analyzed for PCBs (Table 2). Aroclor 1248, 1254, and 1260 were the only Aroclors detected (29 of 37, 33 of 37, and 33 of 37, respectively) in the samples. There were detectable concentrations of PCBs in 34 of the 37 samples analyzed. Total PCB concentrations ranged from non-detect to 188.5 microgram(s) per kilogram (µg/kg). There were two samples that had total PCBs concentrations greater than the SQS dry-weight criterion of 130 µg/kg (SD-PCM01020 [188.5 µg/kg] and SD-PCM03020 [136.1 µg/kg]). No samples exceeded the SQS carbon normalized concentration of 12 milligram(s) per kilogram organic carbon (mg/kg-OC).

3.3.1.8 Total Organic Carbon

TOC in the 37 samples that were analyzed ranged from 0.05 to 4.9 percent (Table 2 and Table 5) with an average of about 0.9 percent.

3.3.2 Dioxins/Furans

Six samples were analyzed for dioxins/furans (Table 3). Several of the dioxin/furan congeners were detected (Table 5). The toxicity equivalences using one-half of the estimated detection limit ranged from 0.37 to 40.5.

3.3.3 Grain Size

Six samples were analyzed for grain size (Table 4). Total fines in the samples ranged from 3.7 to 54.0 percent with an average of about 19.2 percent.

4.0 Data Quality Review

The chain-of-custody forms are provided in Appendix B. Results of the Stage 2B data validation on metals, PCBs, semivolatile organics, conventionals, grain size, and the Stage 4 data validation on dioxins/furans are reported in Appendix C. Sample chain-of-custody and sample log-in documentation were reviewed, and all requested analyses were performed. A summary of the data validation for each analysis is presented below.

4.1 PCB Analyses

The majority of the calibration data demonstrated acceptable instrument performance. The blank, surrogate, laboratory-control samples (LCS), regional reference material (RRM), and matrix spike/matrix-spike duplicate (MS/MSD) results demonstrated acceptable accuracy and precision. Results were qualified as estimated due to dual-column variability. The PCB data were acceptable for use as qualified.

4.2 Metals Analyses

With minor exceptions, calibration data demonstrated acceptable instrument performance. The method blank, LCS, and MS results demonstrated acceptable laboratory accuracy. Results were estimated based on lab and field duplicate variability. The metals data were acceptable for use as qualified.

4.3 Semivolatile Organic Analyses

Some results were qualified as estimated or had raised reporting limits due to low calibration responses. Except for data replaced by results from another analysis, semivolatile organic data are acceptable for use as qualified.

4.4 Semivolatile Organic Selective Ion Monitoring Analyses

With minor exceptions, calibration data demonstrated acceptable instrument performance. Semivolatile organic selective ion monitoring (SIM) data are acceptable for use as qualified.

4.5 Dioxin/Furan Analyses

Documentation was found to be clear and complete. The calibration data and system performance checks demonstrated acceptable instrument performance. The quality control results indicated acceptable accuracy. Some results were estimated based on lab duplicate variability and blank contamination and resulted in elevated reporting limits. No dioxin sample jar (amber bottle) was collected for sample SD-PCM03120; therefore, the analysis was performed on sample material not stored in an amber jar. Because the sample had not been stored in the dark, dioxin results for this sample are qualified as estimated.

The dioxin/furan data were acceptable for use as qualified.

4.6 General Chemistry Analyses

The calibration data indicated acceptable performance. The method blank, LCS, standard reference material (SRM), MS recoveries, and laboratory triplicate results demonstrated acceptable laboratory

accuracy. Data were qualified as estimated based on field duplicate variability. The general chemistry results were acceptable for use as qualified.

4.7 Grain-Size Analysis

Results were qualified as estimated based on laboratory triplicate results. The grain-size data were acceptable for use as qualified.

5.0 Summary

Three sample locations that were sampled in Year 0 and Year 1 were not sampling during the Year 5 monitoring event. The three locations (SD-PCM001, SD-PCM021, and SD-PCM033) were along the shoreline on the river side of the North Site habitat project. Large gravel was placed in July 2016 within the intertidal to address problems with slope stability along the shoreline. The coarse material covered up the finer-grained materials.

5.1 Grain Size

The average fines in the Year 0 samples was approximately 1.3 percent. The average fines in the Year 1 samples had increased to 6 percent, to 8 percent in Year 3, and to 19.2 percent in Year 5. The increase in the percent fines was greatest at SD-PCM002 (5.4 percent [Year 3] and 54 percent [Year 5]). There was an increase in percent fines between Year 3 and Year 5 at four sample locations and a decrease at the remaining two sample locations. The grain-size data suggests that there is a general accumulation of finer-grained sediment to the project site but that the finer-grained material is associated with the surface silt layer and is mobile.

5.2 Chemistry

The results of the Year 5 sampling (Table 2) demonstrate that a majority of the surface sediments remain well below the SQS criteria; however, the sample collected at SD-PCM010 (within Slip 4, Figure 2), and SD-PCM030 (at Outfall Z at the south end of the DSOA, Figure 2) had measured concentrations of total PCBs that were above the SQS dry-weight criterion (188.5 µg/kg dry weight and 136.1 µg/kg dry weight, respectively, vs 130 µg/kg). However, the carbon-normalized PCB results at SD-PCM010 and SD-PCM030 (8 mg/kg-OC and 5.3 mg/kg-OC, respectively) were below the organic carbon-normalized SQS criterion of 12 mg/kg-OC (Table 2). In addition, the sample collected at SD-PCM010 had the highest calculated toxicity equivalences for dioxins and furans of 40.5 (using one-half of the estimated detection limit).

The number of sample locations with detected levels of PCB Aroclors increased with 34 of 37 samples having detected levels of total PCBs. The four samples with the highest total PCB concentrations (75 to 188.5 µg/kg) were samples that had silt layer thickness at least 10 cm; therefore, since only the top 10 cm was analyzed, these concentrations are representative of recently deposited material on the site, not the backfill that was placed. These concentrations of PCBs are consistent with PCB concentrations measured by Boeing as part of the *Additional Duwamish Sediment Other Area Backfill Sampling* (see Wood, 2020).

Other analytes that were above the SQS criteria in previous years were either undetected or were well below the appropriate criterion in Year 5 (Figure 2). The sample for SD-PCM020 had an elevated reporting limit for 2,4-dimethylphenol that was slightly higher than the SQS criteria.

6.0 References

AMEC Environment & Infrastructure, Inc.; Dalton, Olmsted & Fuglevand, Inc.; and Floyd|Snider, Inc. (AMEC et al.). 2013. Construction and Post-Construction Sediment Monitoring Quality Assurance Project Plan, Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project, Boeing Plant 2, Seattle/Tukwila, Washington. Prepared for The Boeing Company, Seattle, Washington.

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Figures

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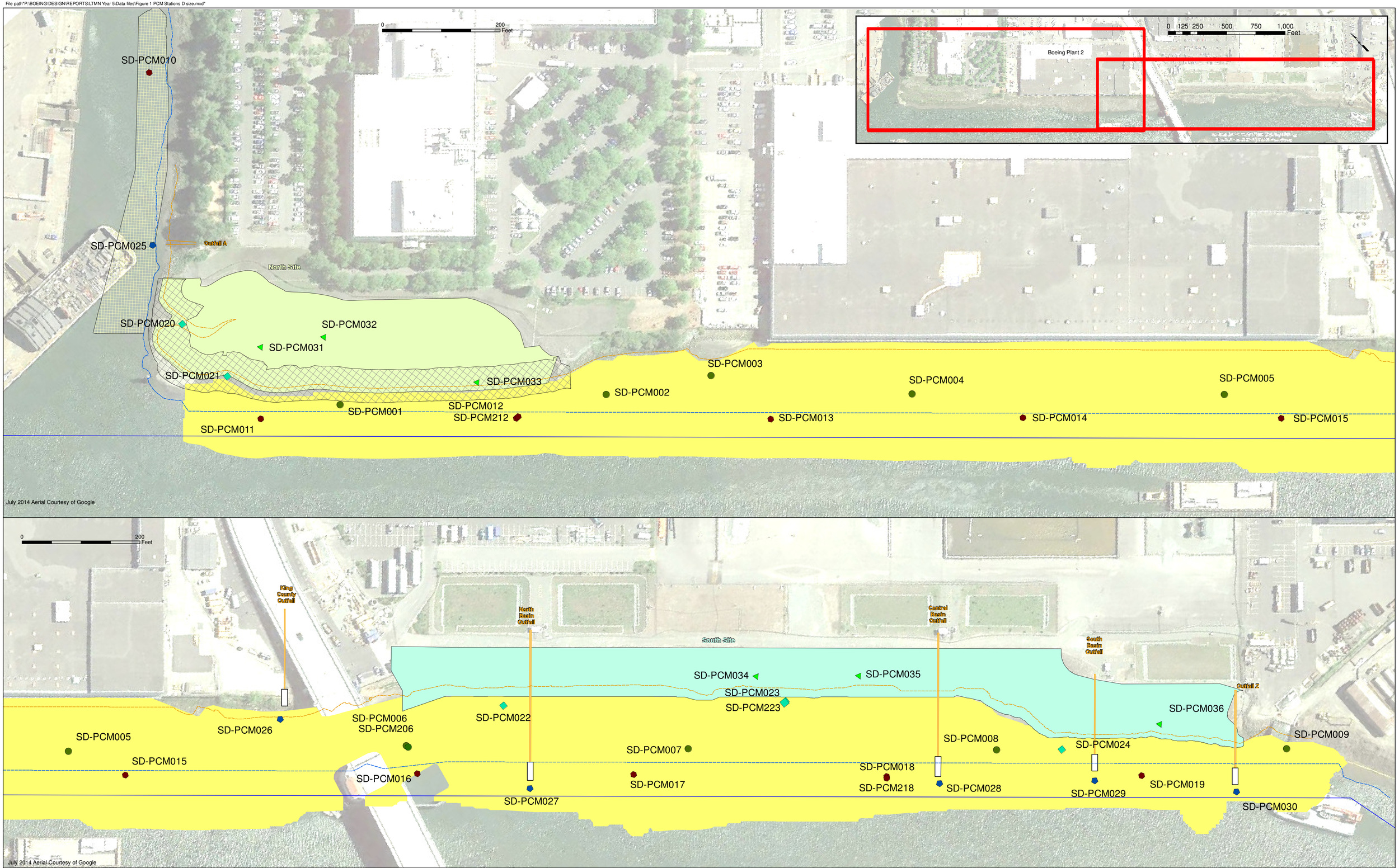

Legend

- Shoreline Area Samples (at approximately +7 ft MLLW)
- Shoreline Area Samples (at approximately +4 ft MLLW)
- Sampling Locations (above -5 ft MLLW and below + 4 ft MLLW)
- Sampling Location (below -5 ft MLLW)
- Outfall Sample Locations
- North Shoreline Area
- South Shoreline Area
- Slip 4 Approximate Dredge Area
- DSOA Limits of Dredging
- Gravel Placement 2016 (approximate)
- -5 ft MLLW Contour (post-construction)
- +4 ft MLLW Contour (post-construction)

BOEING

POST-CONSTRUCTION SURFACE MONITORING
SAMPLING LOCATIONS
Duwamish Sediment Other Area and Southwest
Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

By: RHG	Date: 9/11/2020	Project No. 0131320440
		Figure 1

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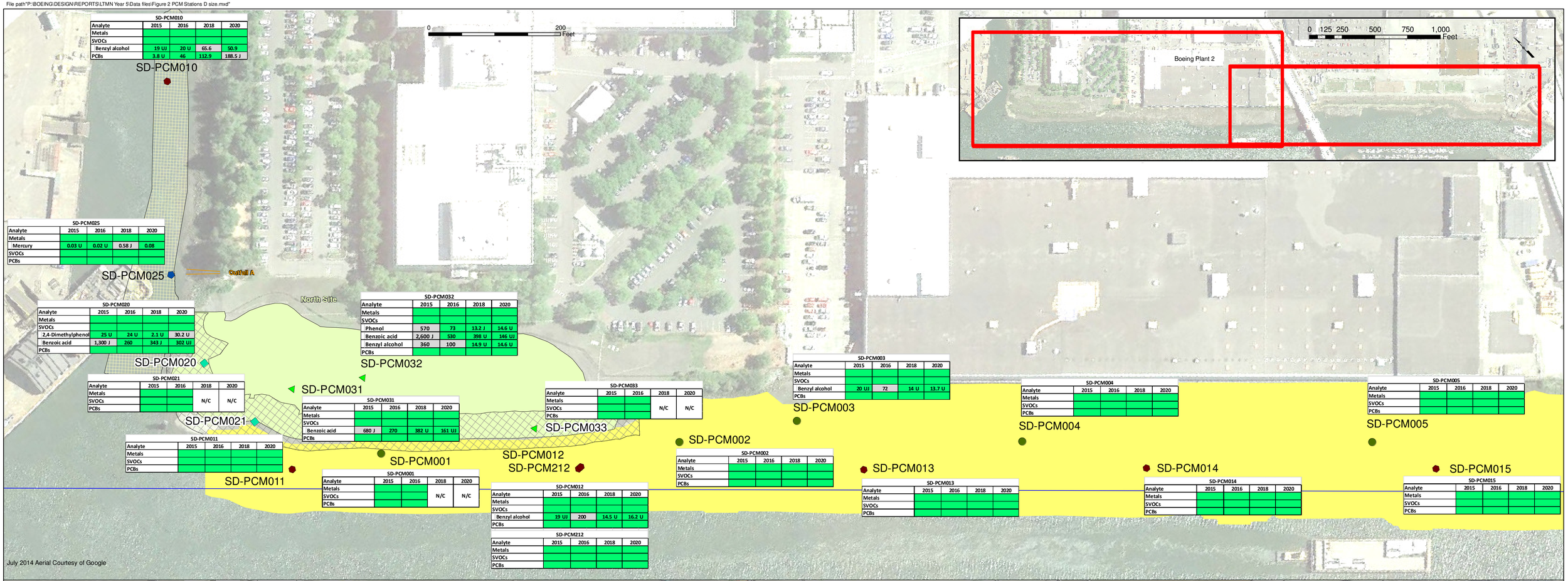


SD-PCM010	2015	2016	2018	2020
Metals				
SVOCs				
Benzyl alcohol	19 UJ	20 U	65.6	50.9
PCBs	3.8 U	46	112.9	188.5 J

SD-PCM025	2015	2016	2018	2020
Metals				
Mercury	0.03 U	0.02 U	0.58 J	0.08
SVOCs				
PCBs				

SD-PCM020	2015	2016	2018	2020
Metals				
SVOCs				
2,4-Dimethylphenol	25 U	24 U	2.1 U	30.2 U
Benzoic acid	1,300 J	260	343 J	302 UJ
PCBs				

SD-PCM032	2015	2016	2018	2020
Metals				
SVOCs				
Phenol	570	73	13.2 J	14.6 U
Benzoic acid	2,600 J	530	398 U	146 UJ
Benzyl alcohol	360	100	14.9 U	14.6 U
PCBs				

SD-PCM021	2015	2016	2018	2020
Metals			N/C	N/C
SVOCs				
PCBs				

SD-PCM031	2015	2016	2018	2020
Metals				
SVOCs				
Benzoic acid	680 J	270	382 U	161 UJ
PCBs				

SD-PCM033	2015	2016	2018	2020
Metals			N/C	N/C
SVOCs				
PCBs				

SD-PCM003	2015	2016	2018	2020
Metals				
SVOCs				
Benzyl alcohol	20 UJ	72	14 U	13.7 U
PCBs				

SD-PCM004	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM005	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM011	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM001	2015	2016	2018	2020
Metals			N/C	N/C
SVOCs				
PCBs				

SD-PCM012	2015	2016	2018	2020
Metals				
SVOCs				
Benzyl alcohol	19 UJ	200	14.5 U	16.2 U
PCBs				

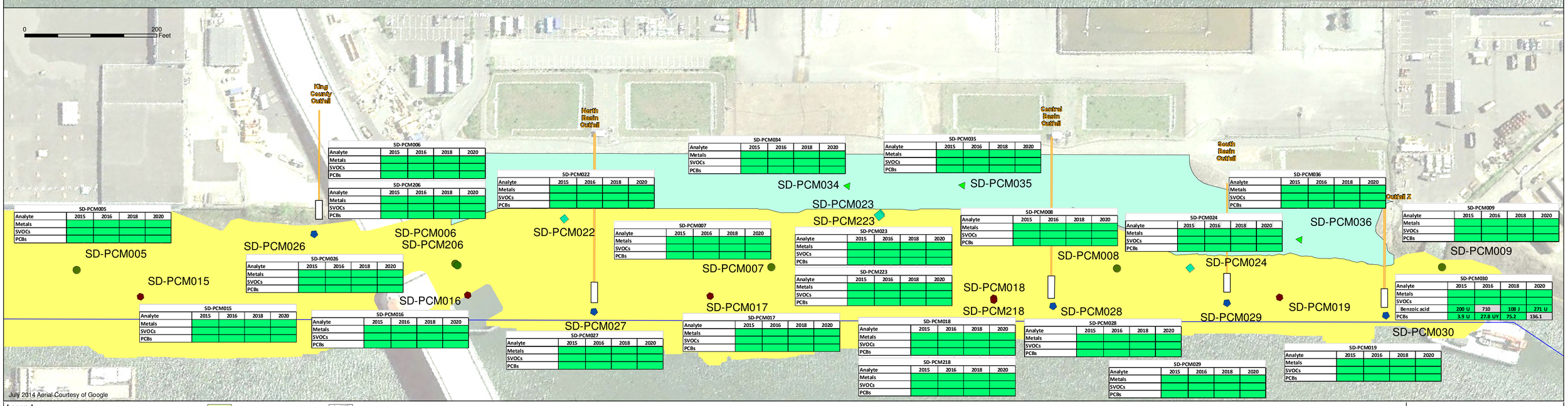
SD-PCM212	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM002	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM013	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM014	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM015	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				



SD-PCM005	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM006	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM206	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM022	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM034	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM035	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM036	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM009	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM026	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM007	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM023	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM223	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM008	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM024	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM030	2015	2016	2018	2020
Metals				
SVOCs				
Benzoic acid	200 U	710	108 J	271 U
PCBs	3.9 U	27.8 UY	75.2	136.1

SD-PCM015	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM016	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM027	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM017	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM018	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM218	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM028	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM029	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

SD-PCM019	2015	2016	2018	2020
Metals				
SVOCs				
PCBs				

Legend

- Shoreline Area Samples (at approximately +7 ft MLLW)
- Shoreline Area Samples (at approximately +4 ft MLLW)
- Sampling Locations (above -5 ft MLLW and below + 4 ft MLLW)
- Sampling Location (below -5 ft MLLW)
- Outfall Sample Locations
- North Shoreline Area
- South Shoreline Area
- Slip 4 Approximate Dredge Area
- DSOA Limits of Dredging
- Gravel Placement 2016 (approximate)

SMS COC Groups

SD-PCM003	2015	2016	2018	2020
Metals				
SVOCs				
Benzyl alcohol	20 UJ	72	14 U	13.7 U
PCBs				

Sampling Location

Gray Cell - SMS Analyte That Exceeds SMS Criteria

Notes:
Sediment concentrations for Sediment Management Standards (SMS) chemicals of concern (COC) are compared to the SMS dry weight equivalent sediment criteria (Sediment Quality Standard [SQS] and Cleanup Screening Level [CSL] criteria). If all of the SMS COCs within a group are below the SQS then the cell is colored green. If one or more analytes exceed the SQS (or CSL) then the analyte is listed with the results from each year and the cells are color coded gray to indicate the value exceeds one or more of the SMS criterion.

POST-CONSTRUCTION SURFACE MONITORING SAMPLING RESULTS 2015, 2016, 2018, AND 2020
Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

BOEING

By: RHG | Date: 9/11/2020 | Project No. 0131320440

Figure 2

Tables

TABLE 1

POST-CONSTRUCTION SURFACE SAMPLE LOCATIONS AND AVERAGE SILT THICKNESS, YEAR 5

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Location	Sample ID	Date Sampled	WA State Plane, North Zone, NAD 83, Survey Feet		Average Silt Thickness (cm)
			Easting	Northing	
In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW					
SD-PCM001	no sample	6/25/2020	1273107	198114	NC - Large gravel
SD-PCM002	SD-PCM00220	6/25/2020	1273449	197833	7.3
SD-PCM003	SD-PCM00320	6/25/2020	1273607	197734	0.3
SD-PCM004	SD-PCM00420	6/25/2020	1273836	197465	0.1
SD-PCM005	SD-PCM00520	6/25/2020	1274223	197126	2.0
SD-PCM006	SD-PCM00620	6/24/2020	1274660	196750	1.0
SD-PCM206[1]	SD-PCM20620	6/24/2020	1274657	196746	2.3
SD-PCM007	SD-PCM00720	6/24/2020	1275011	196421	1.5
SD-PCM008	SD-PCM00820	6/24/2020	1275404	196076	0.8
SD-PCM009	SD-PCM00920	6/24/2020	1275769	195739	4.0
In-water Dredging Area Samples Below -5 feet MLLW					
SD-PCM010	SD-PCM01020	6/25/2020	1273235	198751	14.3
SD-PCM011	SD-PCM01120	6/25/2020	1272986	198193	5.0
SD-PCM012	SD-PCM01220	6/25/2020	1273313	197898	4.7
SD-PCM212[1]	SD-PCM21220	6/25/2020	1273311	197897	1.5
SD-PCM013	SD-PCM01320	6/25/2020	1273630	197612	1.0
SD-PCM014	SD-PCM01420	6/25/2020	1273951	197322	3.0
SD-PCM015	SD-PCM01520	6/25/2020	1274275	197035	3.0
SD-PCM016	SD-PCM01620	6/24/2020	1274639	196702	1.5
SD-PCM017	SD-PCM01720	6/24/2020	1274920	196452	1.3
SD-PCM018	SD-PCM01820	6/24/2020	1275234	196157	0.5
SD-PCM218[1]	SD-PCM21820	6/24/2020	1275225	196165	0.2
SD-PCM019	SD-PCM01920	6/24/2020	1275551	195872	1.3
Shoreline Area Samples at Approximately +4 feet MLLW					
SD-PCM020	SD-PCM02020	6/25/2020	1272992	198398	10.0
SD-PCM021	no sample	6/24/2020	1272992	198281	NC - Large gravel
SD-PCM022	SD-PCM02220	6/24/2020	1274832	196690	1.7
SD-PCM023	SD-PCM02320	6/24/2020	1275190	196370	0.4
SD-PCM223[1]	SD-PCM22320	6/24/2020	1275192	196372	2.0
SD-PCM024	SD-PCM02420	6/24/2020	1275491	196003	1.5
Outfall Samples					
SD-PCM025	SD-PCM02520	6/25/2020	1273056	198533	5.0
SD-PCM026	SD-PCM02620	6/25/2020	1274539	196926	0.2
SD-PCM027	SD-PCM02720	6/24/2020	1274767	196556	1.8
SD-PCM028	SD-PCM02820	6/24/2020	1275293	196098	2.0
SD-PCM029	SD-PCM02920	6/24/2020	1275492	195919	12.0
SD-PCM030	SD-PCM03020	6/24/2020	1275652	195751	16.7

TABLE 1

POST-CONSTRUCTION SURFACE SAMPLE LOCATIONS AND AVERAGE SILT THICKNESS, YEAR 5

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Location	Sample ID	Date Sampled	WA State Plane, North Zone, NAD 83, Survey Feet		Average Silt Thickness (cm)
			Easting	Northing	
Shoreline Area Samples at Approximately +7 feet MLLW					
SD-PCM031	SD-PCM03120	6/25/2020	1273066	198282	3.0
SD-PCM032	SD-PCM03220	6/25/2020	1273168	198225	0.5
SD-PCM033	no sample	6/24/2020	1273300	197989	NC - Large gravel
SD-PCM034	SD-PCM03420	6/24/2020	1275182	196437	2.0
SD-PCM035	SD-PCM03520	6/24/2020	1275313	196322	5.0
SD-PCM036	SD-PCM03620	6/24/2020	1275636	195919	0.5

Note(s)
1. Field duplicate.

Abbreviation(s)
cm = centimeter(s)
MLLW = mean lower low water
NAD = North American Datum
WA State Plane = Washington State Plane Coordinates

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW																																										
	Location	SD-PCM001												SD-PCM002												SD-PCM003												SD-PCM004											
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/11/2015			3/9/2016			N/C			N/C			3/10/2015			3/9/2016			3/19/2018			6/25/2020			3/11/2015			3/9/2016			3/19/2018			6/25/2020			3/11/2015			3/9/2016			3/19/2018			6/25/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33									0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM00115			SD-PCM00116									SD-PCM00215			SD-PCM00216			SD-PCM00218			SD-PCM00220			SD-PCM00315			SD-PCM00316			SD-PCM00318			SD-PCM00320			SD-PCM00415			SD-PCM000416			SD-PCM00418			SD-PCM00420		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Conventionals																																												
Total Organic Carbon (percent)	—	0.061			0.471		J							0.068			0.466		J	0.21		J	1.47			0.076			2.71		J	0.28		J	0.09			0.087			1.48		J	2.03		J	0.54		
Metals (mg/kg)																																												
Arsenic	57	2			3.9									2.3			2.8			3.56	D		8.97			2.2			8.9			3.08	D		2.42			2.4			6.2			6.07	D		3.24		
Cadmium	5.1	0.3			0.2	U								0.3			0.2	U		0.04	DJ		0.13	J		0.2			0.4	U		0.09	DJ		0.03	J		0.2			0.3	U		0.13	DJ		0.04	J	
Chromium	260	18.9			12.8									16.2			21.2			16.3	BD	J	20.2		J	18.3			25.8			19.9	BD	J	14.7		J	18.1			15.4			24.1	BD	J	14.7		J
Copper	390	16.2			13.9									15.6			13.9			16.2	BD		33.7			13.7			36.5			23.4	BD		12.9			16			18.7			28.3	BD		19.5		
Lead	450	2			3									2	U		3			2.6	BD		13.1			2	U		11			2.48	BD		2.37			2	U		5			7.43	BD		3.17		
Mercury	0.41	0.02	U		0.03	U								0.02	U		0.03			0.002	U		0.101			0.02	U		0.08			0.003	J	J	0.012	J		0.03			0.04			0.073		J	0.045		
Silver	6.1	0.3	U		0.4	U								0.3	U		0.3	U		0.05	DJ		0.14	J		0.3	U		0.5	U		0.13	DJ		0.04	J		0.3	U		0.4	U		0.13	DJ		0.06	J	
Zinc	410	31			29									31			30			34.4	BD		68.6			28			71			29.9	BD		31.3			30			39			52.5	BD		34.5		
Non-ionizable Organic Compounds																																												
Aromatic Hydrocarbons (µg/kg)																																												
Total LPAHs	5,200	20	U		20	U								20	U		19	U		6.6	J		59.6	J		20	U		44.7	J		6.7	J		13.7	U		20	U		24.8	J		30.1	J		15.5	U	
Naphthalene	2,100	20	U		20	U								20	U		19	U		5	U		10	J		20	U		6.9	J		4.9	U		13.7	U		20	U		5.8	J		5.2	U		15.5	U	
Acenaphthylene	1,300	20	U		20	U								20	U		19	U		4.6	U		24.1	U		20	U		20	U		4.5	U		13.7	U		20	U		19	U		4.7	U		15.5	U	
Acenaphthene	500	20	U		20	U								20	U		19	U		4.9	U		24.1	U		20	U		20	U		4.8	U		13.7	U		20	U		19	U		5.1	U		15.5	U	
Fluorene	540	20	U		20	U								20	U		19	U		4.7	U		24.1	U		20	U		20	U		4.7	U		13.7	U		20	U		19	U		4.9	U		15.5	U	
Phenanthrene	1,500	20	U		20	U								20	U		19	U		6.6	J		35.9			20	U		30			6.7	J		13.7	U		20	U		19			24.1			15.5	U	
Anthracene	960	20	U		20	U								20	U		19	U		5.7	U		13.7	J		20	U		7.8	J		5.6	U		13.7	U		20	U		19	U		6	J		15.5	U	
2-Methylnaphthalene	670	20	U		20	U								20	U		19	U		5.4	U		7.3	J		20	U		7.8	J		5.3	U		13.7	U		20	U		7.7	J		5.6	U		15.5	U	
Total HPAHs	12,000	40	U		40	U								40	U		51.5	J		62.5	J		557.4	J		40	U		336.1			69.9	J		27.4	U		40	U		200.7	J		225.3	J		39.3	J	
Fluoranthene	1,700	20	U		20	U								20	U		8.7	J		10.5	J		106			20	U		60			13.6	J		13.7	U		20	U		45			42.7			10.6	J	
Pyrene	2,600	20	U		20	U								20	U		11	J		13.2	J		92.9			20	U		57			14.6	J		13.7	U		20	U		34			44.4			10.4	J	
Benz[a]anthracene	1,300	20	U		20	U								20	U		19	U		5	U		43.6			20	U		24			6.9	J		13.7	U		20	U		19	U		18.2	J		5.8	J	
Chrysene	1,400	20	U		20	U								20	U		11	J		12.8	J		67.6			20	U		50			15.5	J		13.7	U		20	U		30			32.3			15.5	U	
Total benzofluoranthenes	3,200	40	U		40	U								40	U		14	J		18.3	J		111			40	U		69			19.3	J		27.4	U		40	U		44			47.4			12.5	J	
Benzo[a]pyrene	1,600	20	U		20	U								20	U		6.8	J		6.2	U		48.3			20	U		24			6.1	U		13.7	U		20	U		14	J		23.5			15.5	U	
Indeno[1,2,3-c,d]pyrene	600	20	U		20	U								20	U		19	U		5.7	U		31.3			20	U		20		J	5.6	U		13.7	U		20	U		12	J	J	16.8	J		15.5	U	
Dibenzo[a,h]anthracene	230	5	U		5	U								4.9	U		4.8	U		5.9	U		12.5	J		5	U		6.1		J	5.8	U		13.7	U		5	U		4.7	J	J	6.1	U		15.5	U	
Benzo[g,h,i]perylene	670	20	U		20	U								20	U		19	U		7.7	J		44.2			20	U		26		J	5.5	U		13.7	U		20	U		17	J	J	5.8	U		15.5	U	
Chlorinated Benzenes (µg/kg)																																												
1,2-Dichlorobenzene	35	5	U		5	U								4.9	U		4.8	U		0.7	U		6	U		5	U		4.9	U		0.7	U		3.4	U	UJ	5	U		4.8	U		0.7	U		3.9	U	UJ
1,4-Dichlorobenzene	110	5	U		5	U								4.9	U		4.8	U		0.6	U		1.2	J		5	U		4.9	U		0.6	U		3.4	U	UJ	5	U		4.8	U		0.6	U		3.9	U	UJ
1,2,4-Trichlorobenzene	31	5	U		5	U								4.9	U		4.8	U		2.6	U	UJ	6	U		5	U		4.9	U		2.5	U	UJ	3.4	U		5	U		4.8	U		2.7	U	UJ	3.9	U	
Hexachlorobenzene	22	5	U		5	U								4.9	U		4.8	U		0.7	U		1.3	J		5	U		4.9	U		0.7	U		3.4	U		5	U		4.8	U		0.7	U		3.9	U	
Phthalate Esters (µg/kg)																																												
Dimethyl phthalate	71	5	U		5	U								4.9	U		4.8	U		1	U		5.2	J		5	U		4.9	U		0.9	U		3.4	U		5	U		4.8	U		1	U		3.9	U	
Diethyl phthalate	200	20	U		20	U								20	U		19	U		19.4	B	U	24.1	U		20	U		20	U		11.3	B J	UJ	13.7	U		23		J	24			8.2	B J	UJ	6.3	J	UJ
Di-n-butyl phthalate	1,400	20	U		20	U								20	U		19	U		5.1	U		24.1	U		20	U		20	U		5	U		13.7	U		20	U		19	U		5.3	U		15.5	U	
Butyl benzyl phthalate	63	5	U		5	U								4.9	U		4.8	U		0.7	U		7.9			5	U		8.6			0.6	U		3.4	U		5	U		4.2	J		6.1	Q	J	3.9	U	
Bis[2-ethylhexyl] phthalate	1,300	50	U		50	U								49	U		48	U		27.6	U		70			50	U		120			43.4	J	J	34.2	U		50	U		75			70.2		J	38.8	U	
Di-n-octyl phthalate	6,200	20	U		20	U								20	U		19	U		8.4	U		24.1	U		20	U		20	U		8.2	U		13.7	U		20	U		19	U		8.6	U		15.5	U	

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Area		In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW																																										
Location		SD-PCM001												SD-PCM002												SD-PCM003												SD-PCM004								
Monitoring Year		Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
Collection Date		3/11/2015			3/9/2016			N/C			N/C			3/10/2015			3/9/2016			3/19/2018			6/25/2020			3/11/2015			3/9/2016			3/19/2018			6/25/2020			3/11/2015			3/9/2016			3/19/2018			6/25/2020		
Sample Depth (ft)		0 - 0.33			0 - 0.33									0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
Sample ID		SD-PCM00115			SD-PCM00116									SD-PCM00215			SD-PCM00216			SD-PCM00218			SD-PCM00220			SD-PCM00315			SD-PCM00316			SD-PCM00318			SD-PCM00320			SD-PCM00415			SD-PCM000416			SD-PCM00418			SD-PCM00420		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Non-ionizable Organic Compounds (cont.)																																												
Miscellaneous (µg/kg)																																												
Dibenzofuran	540	20	U		20	U								20	U		19	U		4.4	U		5.8	J		20	U		20	U		4.3	U		13.7	U		20	U		19	U		4.6	U		15.5	U	
Hexachlorobutadiene	11	5	U		5	U								4.9	U		4.8	U		0.7	U	UJ	6	U		5	U		4.9	U		0.7	U	UJ	3.4	U		5	U		4.8	U		0.7	U	UJ	3.9	U	
N-nitrosodiphenylamine	28	5	U		5	U								4.9	U		4.8	U		1.3	U		1.8	J		5	U		4.9	U		1.2	U		3.4	U		5	U		4.8	U		1.3	U		3.9	U	
Ionizable Organic Compounds (µg/kg)																																												
Phenol	420	20	U	UJ	20	U								20	U		19	U		7.9	U		12	J		20	U	UJ	16	J		7.7	U		13.7	U		20	U	UJ	19	U		15.8	J		15.5	U	
2-Methylphenol	63	5	U	UJ	5	U								4.9	U		4.8	U	UJ	1.2	J		2.4	J		5	U	UJ	2.6	J		1	U		3.4	U	UJ	5	U	UJ	4.8	U		1.1	U		0.9	J	J
4-Methylphenol	670	20	U	UJ	20	U								20	U		19	U		14.1	U		24.1	U		20	U	UJ	24			13.8	U		13.7	U		20	U	UJ	19	U		14.5	U		15.5	U	
2,4-Dimethylphenol	29	25	U	UJ	25	U								25	U		24	U		2.1	U		24.1	U		25	U	UJ	24	U		2	U		13.7	U		25	U	UJ	24	U		2.1	U		15.5	U	
Pentachlorophenol	360	20	U	UJ	20	U								20	U		19	U	UJ	30	U	UJ	121	U	UJ	20	U	UJ	20	U		29.4	U	UJ	68.4	U		20	U	UJ	19	U		31	U	UJ	77.5	U	
Benzyl alcohol	57	20	U	UJ	20	U								20	U		19	U		14.3	U		19.7	J		20	U	UJ	**72**			14	U		13.7	U		20	U	UJ	46			40			15.5	U	
Benzoic acid	650	200	U	UJ	200	U								200	U		190	U		103	J	J	241	U	UJ	200	U	UJ	180	J		376	U	UJ	137	U		200	U	UJ	110	J		70.2	J	J	155	U	
PCBs (µg/kg)																																												
Aroclor 1016	NE	3.9	U		3.7	U								3.9	U		3.9	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.9	U		3.9	U		1.5	U		3.9	U	
Aroclor 1221	NE	3.9	U		3.7	U								3.9	U		3.9	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.9	U		3.9	U		1.5	U		3.9	U	
Aroclor 1232	NE	3.9	U		3.7	U								3.9	U		3.9	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.9	U		3.9	U		1.5	U		3.9	U	
Aroclor 1242	NE	3.9	U		3.7	U								3.9	U		3.9	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.9	U		3.9	U		1.5	U		3.9	U	
Aroclor 1248	NE	3.9	U		3.7	U								3.9	U		3.9	U		2.6	J		17.7			3.9	U		11			2.2	J		1.7	J		3.9	U		7			6.6			2.9	J	
Aroclor 1254	NE	3.9	U		4.6									3.9	U		6.6	P	J	3.6	J		24.9			3.9	U		17			3	P1J	J	2.5	J		3.9	U		12			7.7			3.2	J	
Aroclor 1260	NE	3.9	U		2.2	J								3.9	U		2.3	J		2.5	J		26.2	P1	J	3.9	U		16			2.8	J		1.7	J		3.9	U		7.9			6.9			4.6		
Total PCBs (µg/kg Dry-Weight)	130	3.9	U		6.8	J	J [5]							3.9	U		8.9	J	J [5]	8.7	J	J [5]	68.8		J [5]	3.9	U		44			8	J	J [5]	5.9	J	J [5]	3.9	U		26.9			21.2			10.7	J	J [5]
Total PCBs (mg/kg OC) [4]	12	—			—									—			—			—			4.7		J [6]	—			1.6		J [6]	—			—			—			1.8		J [6]	1.0		J [6]	2.0		J [6]

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW																																										
	Location	SD-PCM005												SD-PCM006												SD-PCM206												SD-PCM007								
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/10/2015			3/10/2016			3/19/2018			6/25/2020			3/10/2015			3/10/2016			3/20/2018			6/24/2020			3/10/2015			3/10/2016			3/20/2018			6/24/2020			2/24/2015			3/10/2016			3/20/2018			6/24/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM00515			SD-PCM00516			SD-PCM00518			SD-PCM00518			SD-PCM00615			SD-PCM00616			SD-PCM00618			SD-PCM006			SD-PCM20615			SD-PCM20616			SD-PCM20618			SD-PCM20620			SD-PCM00715			SD-PCM00716			SD-PCM00718			SD-PCM00720		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Conventionals																																												
Total Organic Carbon (percent)	—	0.083			0.157		J	0.47		J	0.25			0.08			0.083		J	0.15		J	0.45		J	0.048			0.094		J	0.16		J	0.94		J	0.079			0.161		J	0.12		J	0.26		
Metals (mg/kg)																																												
Arsenic	57	2			2.7			3.8	D		2.97			2			2.7			3.39	D	J	3.94			1.9			3			3.4	D	J	4.49			1.8			2.4			2.34	D	J	3.56		
Cadmium	5.1	0.2			0.2	U		0.05	DJ		0.04	J		0.2			0.2	U		0.04	DJ		0.05	J		0.2	U		0.2	U		0.04	DJ		0.07	J		0.2			0.2	U		0.05	DJ		0.12	U	
Chromium	260	19.4			21.9		J	20.1	BD	J	12.3		J	16.2		J	19.7		J	15.9	BD		18.3			20.7			18.7		J	17.5	BD		17.1			20.9			14.4		J	16.3	BD		13.2		
Copper	390	13.8			15.6			21.1	BD		13.5			13.9			14.9			15.7	D		15.7		J	13			17.3			15.8	D		17.6		J	13.3			12.2			12.8	D		13.1		J
Lead	450	2	U		2			4.25	BD		2.63			2	U		2			2.18	DJ		3.7			2	U		3			3.08	D		4.19			2	U		3			1.63	DJ		2.81		
Mercury	0.41	0.02	U		0.02	U		0.04		J	0.017	J		0.02	U		0.02	U		0.006	J	J	0.017	J		0.02	U		0.02	U		0.006	J	J	0.015	J		0.03	U		0.02	U		0.033		J	0.019	J	
Silver	6.1	0.3	U		0.4	U		0.06	DJ		0.04	J	U	0.3	U		0.3	U		0.06	DJ		0.05	J	U	0.3	U		0.3	U		0.06	DJ		0.05	J	U	0.3	U		0.3	U		0.04	DJ		0.05	J	
Zinc	410	29			32			35.9	BD		31			27			32			43.3	D		34.6			26			36			40.8	D		39.1			30			29			35.1	D		31.9		
Non-ionizable Organic Compounds																																												
Aromatic Hydrocarbons (µg/kg)																																												
Total LPAHs	5,200	19	U		19	U		14.1	J		14.8	U		19	U		20	U		5.8	U		15.4	U		19	U		19	U		5.9	U		15.9	U		19	U		19	U		5.6	U		14.9	U	
Naphthalene	2,100	19	U		19	U		5.2	U		14.8	U		19	U		20	U		5.1	U		15.4	U		19	U		19	U		5.2	U		15.9	U		19	U		19	U		4.9	U		14.9	U	
Acenaphthylene	1,300	19	U		19	U		4.7	U		14.8	U		19	U		20	U		4.7	U		15.4	U		19	U		19	U		4.7	U		15.9	U		19	U		19	U		4.5	U		14.9	U	
Acenaphthene	500	19	U		19	U		5.1	U		14.8	U		19	U		20	U		5	U		15.4	U		19	U		19	U		5.1	U		15.9	U		19	U		19	U		4.8	U		14.9	U	
Fluorene	540	19	U		19	U		4.9	U		14.8	U		19	U		20	U		4.8	U		15.4	U		19	U		19	U		4.9	U		15.9	U		19	U		19	U		4.7	U		14.9	U	
Phenanthrene	1,500	19	U		19	U		14.1	J		14.8	U		19	U		20	U		4.6	U		15.4	U		19	U		19	U		4.6	U		15.9	U		19	U		19	U		4.4	U		14.9	U	
Anthracene	960	19	U		19	U		5.9	U		14.8	U		19	U		20	U		5.8	U		15.4	U		19	U		19	U		5.9	U		15.9	U		19	U		19	U		5.6	U		14.9	U	
2-Methylnaphthalene	670	19	U		19	U		5.6	U		14.8	U		19	U		20	U		5.5	U		15.4	U		19	U		19	U		5.6	U		15.9	U		19	U		19	U		5.3	U		14.9	U	
Total HPAHs	12,000	60	J		12.3	J		191	J		27.3	J		38	U		39	U		5.1	J		28.1	J		39	U		39	U		13.5	J		37.1	J		2.5	J		22	J		9.6	U		23.1	J	
Fluoranthene	1,700	19	U		5.7	J		34.6			14.8	U		19	U		20	U		5.1	J	J	7.8	J		19	U		19	U		6.6	J		10.1	J		19	U		11	J		4.3	U		5	J	
Pyrene	2,600	19	U		6.6	J		32			7.7	J		19	U		20	U		5.4	U		7.9	J		19	U		19	U		6.9	J		10.4	J		19	U		19	U		5.2	U		4.5	J	
Benz[a]anthracene	1,300	19	U		19	U		14.8	J		4.3	J		19	U		20	U		5.1	U		15.4	U		19	U		19	U		5.1	U		15.9	U		19	U		19	U		4.9	U		14.9	U	
Chrysene	1,400	19	U		19	U		25.2			6.2	J		19	U		20	U		5.1	U		15.4	U		19	U		19	U		5.2	U		15.9	U		19	U		19	U		4.9	U		4.6	J	
Total benzofluoranthenes	3,200	10	J		38	U		36.3	J		9.1	J		38	U		39	U		10	U		12.4	J		39	U		39	U		10.1	U		16.6	J		37	U		11	J		9.6	U		9	J	
Benzo[a]pyrene	1,600	19	U		19	U		14	J		14.8	U		19	U		20	U		6.3	U		15.4	U		19	U		19	U		6.4	U		15.9	U		19	U		19	U		6.1	U		14.9	U	
Indeno[1,2,3-c,d]pyrene	600	6.5	J		19	U		14.1	J		14.8	U		19	U		20	U		5.9	U		15.4	U		19	U		19	U		5.9	U		15.9	U		19	U		19	U		5.6	U		14.9	U	
Dibenzo[a,h]anthracene	230	4.3	J		4.8	U		6.1	U		14.8	U		4.8	U		4.9	U		6	U		15.4	U		4.8	U		4.8	U		6.1	U		15.9	U		2.5	J		4.8	U		5.8	U		14.9	U	
Benzo[g,h,i]perylene	670	39			19	U		20			14.8	U		19	U		20	U		5.7	U		15.4	U		19	U		19	U		5.8	U		15.9	U		19	U		19	U		5.5	U		14.9	U	
Chlorinated Benzenes (µg/kg)																																												
1,2-Dichlorobenzene	35	2.8	J		2.8	J		0.7	U		3.7	U	UJ	4.8	U		4.9	U		0.7	U		3.9	U	UJ	4.8	U		4.8	U		0.7	U		4	U	UJ	4.6	U		4.8	U		0.7	U		3.7	U	
1,4-Dichlorobenzene	110	2.5	J		4.8	U		0.6	U		3.7	U	UJ	4.8	U		4.9	U		0.6	U		3.9	U		4.8	U		4.8	U		0.6	U		4	U		4.6	U		4.8	U		0.6	U		3.7	U	
1,2,4-Trichlorobenzene	31	2.6	J		4.8	U		2.7	U	UJ	3.7	U		4.8	U		4.9	U		2.6	U		3.9	U		4.8	U		4.8	U		2.6	U		4	U		4.6	U		4.8	U		2.5	U		3.7	U	
Hexachlorobenzene	22	3.5	J		3.1	J		0.7	U		3.7	U		4.8	U		4.9	U		0.7	U		3.9	U		4.8	U		4.8	U		0.7	U		4	U		4.6	U		4.8	U		0.7	U		3.7	U	
Phthalate Esters (µg/kg)																																												
Dimethyl phthalate	71	4.7	U		3	J		1	U		3.7	U		4.8	U		4.9	U		1	U		3.9	U		4.8	U		4.8	U		1	U		4	U		4.6	U		4.8	U		0.9	U		3.7	U	
Diethyl phthalate	200	19	U		19	U		8.6	B J	UJ	14.8	U		19	U		20	U		15.6	B J	UJ	8.6	J	UJ	19	U		19	U		12.2	B J	UJ	6.5	J	UJ	19	U		19	U		14.5	B J	UJ	6.6	J	UJ
Di-n-butyl phthalate	1,400	19	U		19	U		5.3	U		14.8	U		19	U		20	U		5.2	U		15.4	U		19	U		19	U		5.2	U		15.9	U		19	U		19	U		5	U		14.9	U	
Butyl benzyl phthalate	63	2.9	J	J	5			3	J	J	3.7	U		4.8	U		4.9	U		0.7	U		3.9	U		4.8	U		4.8	U		0.7	U		1.6	J		5.3	Q	J	4.8	U		0.6	U		3.7	U	
Bis[2-ethylhexyl] phthalate	1,300	47	U		48	U		76.8		J	37.1	U		48	U		49	U		28.2	U		38.6	U		48	U		48	U		28.5	U		39.8	U		46	U		48	U		27.1	U		37.3	U	
Di-n-octyl phthalate	6,200	19	U		19	U		8.6	U		14.8	U		19	U		20	U		8.5	U		15.4	U		19	U		19	U		8.6	U		15.9	U		19	U		19	U		8.2	U		14.9	U	

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW																																												
	Location	SD-PCM005												SD-PCM006												SD-PCM206												SD-PCM007										
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/10/2015			3/10/2016			3/19/2018			6/25/2020			3/10/2015			3/10/2016			3/20/2018			6/24/2020			3/10/2015			3/10/2016			3/20/2018			6/24/2020			2/24/2015			3/10/2016			3/20/2018			6/24/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM00515			SD-PCM00516			SD-PCM00518			SD-PCM00518			SD-PCM00615			SD-PCM00616			SD-PCM00618			SD-PCM006			SD-PCM20615			SD-PCM20616			SD-PCM20618			SD-PCM20620			SD-PCM00715			SD-PCM00716			SD-PCM00718			SD-PCM00720		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Non-ionizable Organic Compounds (cont.)																																														
Miscellaneous (µg/kg)																																														
Dibenzofuran	540	19	U		19	U		4.6	U		14.8	U		19	U		20	U		4.5	U		15.4	U		19	U		19	U		4.6	U		15.9	U		19	U		19	U		4.3	U		14.9	U	
Hexachlorobutadiene	11	2.4	J		4.8	U		0.7	U	UJ	3.7	U		4.8	U		4.9	U		0.7	U		3.9	U		4.8	U		4.8	U		0.7	U		4	U		4.6	U		4.8	U		0.7	U		3.7	U	
N-nitrosodiphenylamine	28	4.7	U		4.8	U		1.3	U		3.7	U		4.8	U		4.9	U		1.3	U		3.9	U		4.8	U		4.8	U		1.3	U		4	U		4.6	U		4.8	U		1.2	U		3.7	U	
Ionizable Organic Compounds (µg/kg)																																														
Phenol	420	10	J		19	U		16.3	J		14.8	U		19	U	UJ	20	U		8.5	J		15.4	U		19	U		19	U		8.1	U		38.8			19	U		19	U		7.8	U		8.5	J	
2-Methylphenol	63	4.7	U		4.8	U		1.1	U		3.7	U	UJ	4.8	U	UJ	4.9	U		1.1	U		3.9	U		4.8	U		4.8	U		1.1	U		0.9	J		4.6	U		4.8	U		1	U		1	J	
4-Methylphenol	670	19	U		19	U		14.6	U		14.8	U		19	U	UJ	20	U		14.4	U		15.4	U		19	U		19	U		14.5	U		15.9	U		19	U		19	U		13.8	U		13.7	J	
2,4-Dimethylphenol	29	23	U		24	U		2.1	U		14.8	U		24	U		24	U		2.1	U		15.4	U		24	U		24	U		2.1	U		15.9	U		23	U		24	U		2	U		14.9	U	
Pentachlorophenol	360	19	U	UJ	19	U		31	U	UJ	74.1	U		19	U	UJ	20	U		30.6	U		77.2	U		19	U		19	U		30.9	U		79.6	U		19	U		19	U		29.5	U		74.6	U	
Benzyl alcohol	57	19	U		19	U		14.8	U		14.8	U		19	U	UJ	20	U		14.6	U		15.4	U		19	U		19	U		14.7	U		15.9	U		19	U		19	U	UJ	14	U		14.9	U	
Benzoic acid	650	190	U		190	U		396	U	UJ	148	U		190	U	UJ	200	U		62	J		154	U		190	U		190	U		396	U	UJ	159	U		190	U		190	U		376	U	UJ	149	U	
PCBs (µg/kg)																																														
Aroclor 1016	NE	3.8	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		4	U		3.9	U		1.5	U		4	U	
Aroclor 1221	NE	3.8	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		4	U		3.9	U		1.5	U		4	U	
Aroclor 1232	NE	3.8	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		4	U		3.9	U		1.5	U		4	U	
Aroclor 1242	NE	3.8	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		4	U		3.9	U		1.5	U		4	U	
Aroclor 1248	NE	3.8	U		3.8	U		3.9			6.2			3.8	U		3.9	U		1.5	U		3.1	J		3.8	U		3.9	U		1.5	U		4.2			4	U		3.9	U		1.5	U		2.4	J	
Aroclor 1254	NE	3.8	U		3.8	U		6.7			18.9			3.8	U		3.9	J		1.6	J		3.7	J		3.8	U		3.9	U		3.3	J		5.6			4	U		4.5			1.5	U		4		
Aroclor 1260	NE	3.8	U		3.8	U		4.9			14.1			3.8	U		3.1	J		1.2	J		3.1	J		3.8	U		3.9	U		2.4	J		4.1			4	U		2.7	J		0.6	U		3.4	J	
Total PCBs (µg/kg Dry-Weight)	130	3.8	U		3.8	U		15.5			39.2			3.8	U		7	J	J [5]	2.8	J	J [5]	9.9	J	J [5]	3.8	U		3.9	U		5.7	J	J [5]	13.9			4	U		7.2	J	J [5]	1.5	U		9.8	J	J [5]
Total PCBs (mg/kg OC) [4]	12	—			—			—			—			—			—			—			—			—			—			—			1.5		J [6]	—			—			—			—		

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW																																												
	Location	SD-PCM008												SD-PCM009												In-water Dredging Area Samples Below -5 feet MLLW																				
																										SD-PCM010												SD-PCM011								
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	2/24/2015			3/10/2016			3/20/2018			6/24/2020			2/25/2015			3/11/2016			3/20/2018			6/24/2020			3/11/2015			3/9/2016			3/19/2018			6/25/2020			3/10/2015			3/9/2016			3/19/2018			6/25/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM00815			SD-PCM00816			SD-PCM00818			SD-PCM00820			SP-PCM00915			SD-PCM00916			SD-PCM00918			SD-PCM00920			SD-PCM01015			SD-PCM01016			SD-PCM01018			SD-PCM01020			SD-PCM01115			SD-PCM01116			SD-PCM01118			SD-PCM01120		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Conventionals																																														
Total Organic Carbon (percent)	—	0.04			0.059		J	0.12		J	0.39			0.051			0.334		J	2.2		J	2.8			0.097			1.95		J	2.75		J	2.35			0.165			0.59		J	0.71		J	0.66		
Metals (mg/kg)																																														
Arsenic	57	1.2			2.6			2.5	D	J	4.31			1.6			2.9			12.7	D	J	9.89			1.9			5.7			13.7	D		12.6			3			2.6			4.26	D		6.22		
Cadmium	5.1	0.2	U		0.2	U		0.03	DJ		0.05	J		0.2	U		0.2	U		0.19	DJ		0.13	J		0.2			0.3	U		0.29	D		0.28			0.2			0.2	U		0.06	DJ		0.06	J	
Chromium	260	17.9			24.5		J	15	BD		15.2			15.9			19.1		J	26.5	BD		25.5			16.6			23.2			30.3	BD	J	20.1		J	17.2			15.7			16.9	BD	J	16.6		J
Copper	390	12.4			15.7			12	D		17.3		J	11.5			14.4		J	41.2	D		35.4		J	17.9			26.7			58.1	BD		45.6			13.4			14			20.8	BD		21.6		
Lead	450	2	U		2			2.14	DJ		4.24			2	U		4			14.1	D		9.2			2	U		7			22.2	BD		17.9			2	U		3			4.07	BD		8.23		
Mercury	0.41	0.03	U		0.02	U		0.012	J	J	0.018	J		0.02	U		0.02	U		0.125		J	0.1			0.02	U		0.08			0.207		J	0.099			0.02	U		0.02	U		0.056		J	0.048		
Silver	6.1	0.3	U		0.3	U		0.04	DJ		0.05	J		0.3	U		0.4	U		0.18	DJ		0.15	J	U	0.3	U		0.4	U		0.29	DJ		0.23	J	J	0.3	U		0.3	U		0.05	DJ		0.08	J	U
Zinc	410	28			32			33.9	D		34.6			25			33			105	D		73			29			50			115	BD		89.5			26			32			39.4	BD		44.7		
Non-ionizable Organic Compounds																																														
Aromatic Hydrocarbons (µg/kg)																																														
Total LPAHs	5,200	20	U		19	U		5.9	U		7.5	J		18	U		5.7	J		68.6	J		23.7	J		19	U		42	J		145.6	J		354.7			19	U		19.4	J		11	J		60.7	J	
Naphthalene	2,100	20	U		19	U		5.2	U		16.1	U		18	U		19	U	UJ	6.6	J		25.8	U		19	U		20	U		12.6	J		30.3	U		19	U		18	U		5.1	U		17.4	U	
Acenaphthylene	1,300	20	U		19	U		4.7	U		16.1	U		18	U		19	U	UJ	4.8	U		25.8	U		19	U		20	U		8.8	J		30.3	U		19	U		18	U		4.6	U		17.4	U	
Acenaphthene	500	20	U		19	U		5.1	U		16.1	U		18	U		19	U	UJ	5.1	U		25.8	U		19	U		20	U		6.9	J		64.6			19	U		18	U		5	U		17.4	U	
Fluorene	540	20	U		19	U		4.9	U		16.1	U		18	U		19	U	UJ	5	U		25.8	U		19	U		20	U		12.9	J		61.5			19	U		18	U		4.8	U		17.4	U	
Phenanthrene	1,500	20	U		19	U		4.7	U		7.5	J		18	U		5.7	J	J	50.4			23.7	J		19	U		28			67.4			185			19	U		13	J		11	J		49.5		
Anthracene	960	20	U		19	U		5.9	U		16.1	U		18	U		19	U	UJ	11.6	J		25.8	U		19	U		14	J		37			43.6			19	U		6.4	J		5.8	U		11.2	J	
2-Methylnaphthalene	670	20	U		19	U		5.6	U		16.1	U		18	U		19	U	UJ	7.4	J		25.8	U		19	U		20	U		11.1	J		30.3	U		19	U		18	U		5.5	U		17.4	U	
Total HPAHs	12,000	39	U		38	U		36.5	J		62.5	J		37	U		107.6	J		599.3	J		238.2	J		38	U		345.6	J		1048	J		1225	J		38	U		77.1	J		134.5	J		551.7	J	
Fluoranthene	1,700	20	U		19	U		9.8	J	J	13	J		18	U		46		J	116	Q	J	42.2			19	U		81			191	Q	J	265			19	U		15	J		26.5			118		
Pyrene	2,600	20	U		19	U		8.4	J		12.5	J		18	U		42		J	96.2			40.6			19	U		69			188			229			19	U		14	J		21.2			112		
Benz[a]anthracene	1,300	20	U		19	U		5.1	U		6.1	J		18	U		19	U	UJ	39.5			16.6	J		19	U		26			90.1			102			19	U		5.5	J		11.8	J		44.5		
Chrysene	1,400	20	U		19	U		5.9	J		9.9	J		18	U		7.6	J	J	68.5			28.5			19	U		43			133			159			19	U		11	J		18.3	J		68.7		
Total benzofluoranthenes	3,200	39	U		38	U		12.4	J		15.4	J		37	U		12	J	J	137			52			38	U		62			259			218			38	U		16	J		31.4	J		99.2		
Benzo[a]pyrene	1,600	20	U		19	U		6.4	U		5.6	J		18	U		19	U	UJ	49.3			23.1	J		19	U		22			92.6			91.8			19	U		9.2	J		13.3	J		42.3		
Indeno[1,2,3-c,d]pyrene	600	20	U		19	U		6	U		16.1	U		18	U		19	U	UJ	36.2			17.1	J		19	U		16	J	J	38.7			62.8			19	U		6.4	J	J	5.8	U		25.8		
Dibenzo[a,h]anthracene	230	4.9	U		4.7	U		6.1	U		16.1	U		4.6	U		4.7	U	UJ	12.7	J		25.8	U		4.8	U		4.6	J	J	13.6	J		18.6	J		4.8	U		4.6	U		6	U		10.6	J	
Benzo[g,h,i]perylene	670	20	U		19	U		5.8	U		16.1	U		18	U		19	U	UJ	43.9			18.1	J		19	U		22		J	41.6			78.8			19	U		18	U		12	J		30.6		
Chlorinated Benzenes (µg/kg)																																														
1,2-Dichlorobenzene	35	4.9	U		4.7	U		0.7	U		4	U	UJ	4.6	U		4.7	U	UJ	0.7	U		6.5	U	UJ	4.8	U		5	U		0.7	U		7.6	U	UJ	4.8	U		4.6	U		0.7	U		4.4	U	UJ
1,4-Dichlorobenzene	110	4.9	U		4.7	U		0.6	U		4	U		4.6	U		4.7	U	UJ	0.6	U		2.2	J		4.8	U		5	U		0.6	U		7.6	U	UJ	4.8	U		4.6	U		0.6	U		4.4	U	UJ
1,2,4-Trichlorobenzene	31	4.9	U		4.7	U		2.7	U		4	U		4.6	U		4.7	U	UJ	2.7	U		6.5	U		4.8	U		5	U		2.6	U		7.6	U		4.8	U		4.6	U		2.6	U	UJ	4.4	U	
Hexachlorobenzene	22	4.9	U		4.7	U		0.7	U		4	U		4.6	U		4.7	U	UJ	0.7	U		6.5	U		4.8	U		5	U		0.7	U		7.6	U		4.8	U		4.6	U		0.7	U		4.4	U	
Phthalate Esters (µg/kg)																																														
Dimethyl phthalate	71	4.9	U		4.7	U		1	U		4	U		4.6	U		4.7	U	UJ	1	U		6.5	U		4.8	U		5	U		1	U		5.8	J		4.8	U		4.6	U		1	U		0.9	J	
Diethyl phthalate	200	20	U		19	U		6.3	B J	UJ	6.1	J	UJ	20	B	U	19	U	UJ	10.4	B J	UJ	9.9	J	UJ	19	U		20	U		19.6	Q B	UJ	30.3	U		19	U		18	U		12.1	B J	UJ	17.4	U	
Di-n-butyl phthalate	1,400	20	U		19	U		5.3	U		16.1	U		18	U		19	U	UJ	5.7	J		25.8	U		19	U		20	U		5.9	J		30.3	U		19	U		18	U		5.2	U		17.4	U	
Butyl benzyl phthalate	63	4.9	U		4.7	U		0.7	U		4	U		4.6	U		4.7	U	UJ	16.8	Q	J	6.5	U		4.8	U		5.5			18.2	Q	J	18			4.8	U		4.6	U		0.7	U		14.4		
Bis[2-ethylhexyl] phthalate	1,300	49	U		47	U		28.6	U		29.8	J		46	U		32	J	J	99.8			61.7	J		48	U		85			279			210			48	U		46	U		32.4	J	J	37.4	J	
Di-n-octyl phthalate	6,200	20	U		19	U		8.7	U		16.1	U		18	U		19	U	UJ	8.7	U		25.8	U		19	U		13	J		8.5	U		30.3	U		19	U		18	U		8.5	U		17.4	U	

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW																								In-water Dredging Area Samples Below -5 feet MLLW																	
	Location	SD-PCM008												SD-PCM009												SD-PCM010												SD-PCM011											
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	2/24/2015			3/10/2016			3/20/2018			6/24/2020			2/25/2015			3/11/2016			3/20/2018			6/24/2020			3/11/2015			3/9/2016			3/19/2018			6/25/2020			3/10/2015			3/9/2016			3/19/2018			6/25/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM00815			SD-PCM00816			SD-PCM00818			SD-PCM00820			SP-PCM00915			SD-PCM00916			SD-PCM00918			SD-PCM00920			SD-PCM01015			SD-PCM01016			SD-PCM01018			SD-PCM01020			SD-PCM01115			SD-PCM01116			SD-PCM01118			SD-PCM01120		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Non-ionizable Organic Compounds (cont.)																																																	
Miscellaneous (µg/kg)																																																	
Dibenzofuran	540	20	U		19	U		4.6	U		16.1	U		18	U		19	U	UJ	4.6	U		25.8	U		19	U		6	J		4.5	U		56.4			19	U		18	U		4.5	U		17.4	U	
Hexachlorobutadiene	11	4.9	U		4.7	U		0.7	U		4	U		4.6	U		4.7	U	UJ	0.7	U		6.5	U		4.8	U		5	U		0.7	U		7.6	U		4.8	U		4.6	U		0.7	U	UJ	4.4	U	
N-nitrosodiphenylamine	28	4.9	U		4.7	U		1.3	U		4	U		4.6	U		4.7	U	UJ	1.3	U		6.5	U		4.8	U		5	U		1.3	U		7.6	U		4.8	U		4.6	U		1.3	U		4.4	U	
Ionizable Organic Compounds (µg/kg)																																																	
Phenol	420	20	U	UJ	19	U		8.2	U		26.3			18	U		19	U	J	26.7			25.8	U		19	U	UJ	20	U		17.7	J		16.7	J		19	U	UJ	18	U		16.5	J		11.6	J	
2-Methylphenol	63	4.9	U	UJ	4.7	U		1.1	U		1.3	J		4.6	U		4.7	U	UJ	1.1	U		2.8	J		4.8	U	UJ	5	U	UJ	1.1	U		3.8	J	J	4.8	U	UJ	4.6	U	UJ	1.1	U		1.6	J	J
4-Methylphenol	670	20	U	UJ	19	U		14.6	U		17.3			18	U		19	U	UJ	14.7	U		25.8	U		19	U	UJ	20	U		14.4	U		30.3	U		19	U	UJ	18	U		14.3	U		17.4	U	
2,4-Dimethylphenol	29	24	U	UJ	24	U		2.2	U		16.1	U		23	U		24	U	UJ	2.2	U		25.8	U		24	U	UJ	25	U		2.1	U		3.9	J		24	U	UJ	23	U		2.1	U		17.4	U	
Pentachlorophenol	360	20	U	UJ	19	U		31.1	U		80.5	U		18	U		19	U	UJ	31.3	U		129	U		19	U	UJ	20	U	UJ	30.7	U		152	U		19	U	UJ	18	U	UJ	30.4	U	UJ	87.2	U	
Benzyl alcohol	57	20	U	UJ	19	U		14.8	U		16.1	U		18	U		19	U	UJ	38			50.8			19	U	UJ	20	U		**65.6**			50.9			19	U	UJ	18	U		14.5	U		17.4	U	
Benzoic acid	650	200	U	UJ	190	U		398	U	UJ	161	U		180	U		190	Q	J	295		J	258	U		190	U	UJ	85	J		171	J	J	303	U		190	U	UJ	180	U		388	U	UJ	174	U	
PCBs (µg/kg)																																																	
Aroclor 1016	NE	3.9	U		3.8	U		1.6	U		4	U		3.9	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.6	U		4	U		3.8	U		3.8	U		1.5	U		4	U	
Aroclor 1221	NE	3.9	U		3.8	U		1.6	U		4	U		3.9	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.6	U		4	U		3.8	U		3.8	U		1.5	U		4	U	
Aroclor 1232	NE	3.9	U		3.8	U		1.6	U		4	U		3.9	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.6	U		4	U		3.8	U		3.8	U		1.5	U		4	U	
Aroclor 1242	NE	3.9	U		3.8	U		1.6	U		4	U		3.9	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.6	U		4	U		3.8	U		3.8	U		1.5	U		4	U	
Aroclor 1248	NE	3.9	U		3.8	U		1.6	U		4.9			3.9	U		3.8	U		14.5			13.8			3.8	U		14			27.2			42.3			3.8	U		4.7			5.8			15.5		
Aroclor 1254	NE	3.9	U		3.8	U		2	J		6.5			3.9	U		4.6			21.5			16.6			3.8	U		21			44.5			55			3.8	U		12			9.9			22.3		
Aroclor 1260	NE	3.9	U		3.8	U		0.6	U		4.1			3.9	U		2.7	J		15.5			15			3.8	U		11			41.2			91.2	P1	J	3.8	U		4.8			6.9			21.3		
Total PCBs (µg/kg Dry-Weight)	130	3.9	U		3.8	U		2	J	J [5]	15.5			3.9	U		7.3	J	J [5]	51.5			45.4			3.8	U		46			112.9			**188.5**		J [5]	3.8	U		21.5			22.6			59.1		
Total PCBs (mg/kg OC) [4]	12	—			—			—			—			—			—			2.3		J [6]	1.6			—			2.4		J [6]	4.1		J [6]	8.0		J [6]	—			3.6		J [6]	3.2		J [6]	9.0		

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	In-water Dredging Area Samples Below -5 feet MLLW																																												
	Location	SD-PCM012												SD-PCM212												SD-PCM013												SD-PCM014								
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/11/2015			3/9/2016			3/19/2018			6/25/2020			3/11/2015			3/9/2016			3/19/2018			6/25/2020			3/10/2015			3/9/2016			3/19/2018			6/25/2020			3/10/2015			3/9/2016			3/19/2018			6/25/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM01215			SD-PCM01216			SD-PCM01218			SD-PCM01220			SD-PCM21215			SD-PCM21216			SD-PCM21218			SD-PCM21220			SD-PCM01315			SD-PCM01316			SD-PCM01318			SD-PCM01320			SD-PCM01415			SD-PCM01416			SD-PCM01418			SD-PCM01420		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Conventionals																																														
Total Organic Carbon (percent)	—	0.095			1.82		J	0.14		J	0.46		J	0.065			2.15		J	1.42		J	0.22		J	0.065			0.077		J	0.18		J	0.21			0.065			1.78		J	0.15		J	0.65		
Metals (mg/kg)																																														
Arsenic	57	2.3		J	6.2		J	3.52	D	J	4.77		J	1.6			3.9		J	4.99	D	J	3.01		J	2.2			2.2			3.26	D		2.85			2.2			4.4			2.86	D		5.57		
Cadmium	5.1	0.2	U		0.3	U		0.07	DJ		0.05	J		0.2	U		0.2	U		0.11	DJ		0.04	J		0.2			0.2	U		0.05	DJ		0.05	J		0.2			0.3	U		0.05	DJ		0.06	J	
Chromium	260	14.2			20.7			13.9	BD	J	15		J	16.2			18.9			17.8	BD	J	11.5		J	28.2			19.6			17.4	BD	J	12.6		J	18.8			17.7			18.5	BD	J	14.7		J
Copper	390	13.1			27.6		J	15.9	BD	J	19.3		J	12.7			20.7		J	35.7	BD	J	12.6		J	14.3			13.6			18.8	BD		16.6			15.5			23.2			14.6	BD		20.6		
Lead	450	2	U		10		J	2.26	BDJ	J	6.72			2	U		6		J	9.47	BD	J	3.44			2	U		2	U		2.39	BD		3.1			2	U		7			2.32	BD		6.55		
Mercury	0.41	0.02	U		0.07			0.023		Po	0.044			0.02	U		0.04			0.097		J	0.016	J		0.02	U		0.02	U		0.002	U		0.012	J		0.05			0.05			0.063		J	0.042		
Silver	6.1	0.3	U		0.5	U		0.06	DJ		0.07	J		0.3	U		0.4	U		0.15	DJ		0.06	J		0.3	U		0.3	U		0.05	DJ		0.06	J		0.3	U		0.4	U		0.2	DJ		0.16	J	J
Zinc	410	27			59		J	40.7	BD	J	42.2		J	25			42		J	56.7	BD	J	27.1		J	30			27			31.2	BD		27.6			34			47			26.6	BD		44.5		
Non-ionizable Organic Compounds																																														
Aromatic Hydrocarbons (µg/kg)																																														
Total LPAHs	5,200	19	U		62	J		5.8	U		29	J		20	U		33.8	J		39	J		7	J		19	U		20	U		5.5	U		7.1	J		19	U		25.9	J		5.8	U		15.9	J	
Naphthalene	2,100	19	U		18	J		5.1	U		16.2	U		20	U		20	U		6.2	J		15.4	U		19	U		20	U		4.9	U		13.5	U		19	U		20	U		5.1	U		16.9	U	
Acenaphthylene	1,300	19	U		19	U		4.6	U		16.2	U		20	U		20	U		4.7	U		15.4	U		19	U		20	U		4.4	U		13.5	U		19	U		20	U		4.6	U		16.9	U	
Acenaphthene	500	19	U		19	U		5	U		16.2	U		20	U		20	U		5.1	U		15.4	U		19	U		20	U		4.7	U		13.5	U		19	U		20	U		5	U		16.9	U	
Fluorene	540	19	U		19	U		4.8	U		16.2	U		20	U		20	U		4.9	U		15.4	U		19	U		20	U		4.6	U		13.5	U		19	U		20	U		4.8	U		16.9	U	
Phenanthrene	1,500	19	U		31			4.5	U		22.8			20	U		25			22.4			7	J		19	U		20	U		4.3	U		7.1	J		19	U		19	J		4.6	U		15.9	J	
Anthracene	960	19	U		13	J		5.8	U		6.2	J		20	U		8.8	J		10.4	J		15.4	U		19	U		20	U		5.5	U		13.5	U		19	U		6.9	J		5.8	U		16.9	U	
2-Methylnaphthalene	670	19	U		19	U		5.5	U		16.2	U		20	U		20	U		5.6	U		15.4	U		19	U		20	U		5.2	U		13.5	U		19	U		20	U		5.5	U		16.9	U	
Total HPAHs	12,000	38	U		386.4			10.5	J		276.1	J		40	U		295.7			371.7	J		114.5	J		38	U		40	U		9.4	U		62.6	J		37	U		256.6	J		34.4	J		195.4	J	
Fluoranthene	1,700	19	U		74			5.1	J	J	51.4			20	U		70			65.9	Q	J	14.4	J		19	U		20	U		4.2	U		12.5	J		19	U		50			7.2	J		34		
Pyrene	2,600	19	U		64			5.4	U	UJ	44.5			20	U		65			64.9		J	15.3	J		19	U		20	U		5.1	U		11.4	J		19	U		41			5.5	J		31.2		
Benz[a]anthracene	1,300	19	U		30			5	U		24.1			20	U		20			30.6			11.1	J		19	U		20	U		4.8	U		6	J		19	U		22			5	U		15.7	J	
Chrysene	1,400	19	U		54			5.4	J	J	35.5			20	U		37			47.9		J	20.7			19	U		20	U		4.8	U		9.6	J		19	U		30			8.3	J		26		
Total benzofluoranthenes	3,200	38	U		75			9.9	U		55			40	U		53			91			25	J		38	U		40	U		9.4	U		16	J		37	U		51			13.4	J		42.9		
Benzo[a]pyrene	1,600	19	U		29			6.3	U		26			20	U		24			33.8			11.8	J		19	U		20	U		6	U		7.1	J		19	U		24			6.3	U		17.6		
Indeno[1,2,3-c,d]pyrene	600	19	U		22		J	5.8	U		14.8	J		20	U		20	U		18.3	J		6.8	J		19	U		20	U		5.5	U		13.5	U		19	U		13	J	J	5.8	U		12.2	J	
Dibenzo[a,h]anthracene	230	4.8	U		9.4		J	6	U		6.4	J		5	U		6.7		J	6.1	U		15.4	U		4.8	U		5	U		5.7	U		13.5	U		4.7	U		4.6	J	J	6	U		16.9	U	
Benzo[g,h,i]perylene	670	19	U		29		J	5.6	U		18.4			20	U		20		J	19.3	J		9.4	J		19	U		20	U		5.4	U		13.5	U		19	U		21		J	5.7	U		15.8	J	
Chlorinated Benzenes (µg/kg)																																														
1,2-Dichlorobenzene	35	4.8	U		4.7	U		0.7	U		4.1	U		5	U		4.9	U		0.7	U		3.8	U		4.8	U		5	U		0.7	U		3.4	U	UJ	4.7	U		4.9	U		0.7	U		4.2	U	UJ
1,4-Dichlorobenzene	110	4.8	U		4.7	U		0.6	U		4.1	U		5	U		4.9	U		0.6	U		3.8	U		4.8	U		5	U		0.6	U		3.4	U	UJ	4.7	U		4.9	U		0.6	U		4.2	U	UJ
1,2,4-Trichlorobenzene	31	4.8	U		4.7	U		2.6	U		4.1	U		5	U		4.9	U		2.7	U		3.8	U		4.8	U		5	U		2.5	U		3.4	U		4.7	U		4.9	U		2.6	U	UJ	4.2	U	
Hexachlorobenzene	22	4.8	U		4.7	U		0.7	U		4.1	U		5	U		4.9	U		0.7	U		3.8	U		4.8	U		5	U		0.6	U		3.4	U		4.7	U		4.9	U		0.7	U		4.2	U	
Phthalate Esters (µg/kg)																																														
Dimethyl phthalate	71	4.8	U		4.7	U		1	U		0.9	J		5	U		4.9	U		1.6	J		3.8	U		4.8	U		5	U		0.9	U		3.4	U		4.7	U		2.4	J		1	U		1	J	
Diethyl phthalate	200	19	U		19	U		9.7	B J	UJ	16.2	U		20	U		20	U		10.1	B J	UJ	15.4	U		19	U		20	U		10.3	B J	UJ	13.5	U		19	U		22			5.9	B J	UJ	16.9	U	
Di-n-butyl phthalate	1,400	19	U		19	U		5.2	U		16.2	U		20	U		20	U		5.3	U		15.4	U		19	U		20	U		4.9	U		13.5	U		19	U		20	U		5.2	U		16.9	U	
Butyl benzyl phthalate	63	4.8	U		4.2	J		3.5	J	J	2.3	J		5	U		3.4	J		6.8	Q	J	0.6	J		4.8	U		5	U		0.6	U		1.3	J		4.7	U		3.2	J		3.2	J	J	5		
Bis[2-ethylhexyl] phthalate	1,300	48	U		74			27.9	U		40.5	U		50	U		41	J		41.6	J		38.5	U		48	U		50	U		26.6	U		33.8	U		47	U		49			28.1	U		25.2	J	
Di-n-octyl phthalate	6,200	19	U		19	U		8.5	U		16.2	U		20	U		20	U		8.7	U		15.4	U		19	U		20	U		8.1	U		13.5	U		19	U		20	U		8.5	U		16.9	U	

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Area		**In-water Dredging Area Samples Below -5 feet MLLW**																																													
Location		**SD-PCM012**												**SD-PCM212**												**SD-PCM013**												**SD-PCM014**										
Monitoring Year		**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**			**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**			**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**			**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**		
Collection Date		**3/11/2015**			**3/9/2016**			**3/19/2018**			**6/25/2020**			**3/11/2015**			**3/9/2016**			**3/19/2018**			**6/25/2020**			**3/10/2015**			**3/9/2016**			**3/19/2018**			**6/25/2020**			**3/10/2015**			**3/9/2016**			**3/19/2018**			**6/25/2020**		
Sample Depth (ft)		**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**		
Sample ID		**SD-PCM01215**			**SD-PCM01216**			**SD-PCM01218**			**SD-PCM01220**			**SD-PCM21215**			**SD-PCM21216**			**SD-PCM21218**			**SD-PCM21220**			**SD-PCM01315**			**SD-PCM01316**			**SD-PCM01318**			**SD-PCM01320**			**SD-PCM01415**			**SD-PCM01416**			**SD-PCM01418**			**SD-PCM01420**		
Analyte	**SMS SQS Criteria** [3]	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**
Non-ionizable Organic Compounds (cont.)																																															
Miscellaneous (µg/kg)																																															
Dibenzofuran	540	19	U		19	U		4.5	U		16.2	U		20	U		20	U		4.6	U		15.4	U		19	U		20	U		4.3	U		13.5	U		19	U		20	U		4.5	U		16.9	U	
Hexachlorobutadiene	11	4.8	U		4.7	U		0.7	U		4.1	U		5	U		4.9	U		0.7	U		3.8	U		4.8	U		5	U		0.7	U		3.4	U		4.7	U		4.9	U		0.7	U	UJ	4.2	U	
N-nitrosodiphenylamine	28	4.8	U		4.7	U		1.3	U		4.1	U		5	U		4.9	U		1.3	U		3.8	U		4.8	U		5	U		1.2	U		3.4	U		4.7	U		4.9	U		1.3	U		4.2	U	
Ionizable Organic Compounds (µg/kg)																																															
Phenol	420	19	U	UJ	43			8	U		7.6	J		20	U	UJ	9.8	J		8.7	J		24.9			10	J		20	U		7.6	U		13.5	U		19	U		9.8	J		8	U		12.3	J	
2-Methylphenol	63	4.8	U	UJ	4.7	U	UJ	1.1	U		4.1	U		5	U	UJ	4.9	U	UJ	1.1	U		3.8	U		4.8	U		5	U		1	U		1.2	J	J	4.7	U		4.9	U		1.1	U		1	J	J
4-Methylphenol	670	19	U	UJ	19	U		14.3	U		16.2	U		20	U	UJ	20	U		14.6	U		15.4	U		19	U		20	U		13.6	U		13.5	U		19	U		20	U		14.3	U		16.9	U	
2,4-Dimethylphenol	29	24	U	UJ	24	U		2.1	U		16.2	U		25	U	UJ	24	U		2.2	U		15.4	U		24	U		25	U		2	U		13.5	U		23	U		25	U		2.1	U		16.9	U	
Pentachlorophenol	360	19	U	UJ	19	U	UJ	30.4	U		81	U	UJ	20	U	UJ	20	U	UJ	31.1	U		77	U	UJ	19	U		20	U		28.9	U		67.6	U		19	U		20	U		30.5	U	UJ	84.5	U	
Benzyl alcohol	57	19	U	UJ	**200**		J	14.5	U		16.2	U		20	U	UJ	12	J	J	21.2			15.4	U		19	U		20	U		13.8	U		13.5	U		19	U		32			14.5	U		16.9	U	
Benzoic acid	650	190	U	UJ	390			388	U	UJ	162	U	UJ	200	U	UJ	200	U		67.4	J	J	154	U	UJ	190	U		200	U		370	U	UJ	135	U		190	U		72	J		390	U	UJ	169	U	
PCBs (µg/kg)																																															
Aroclor 1016	NE	3.8	U		3.9	U		1.5	U		4	U		3.9	U		3.8	U		1.5	U		3.9	U		3.8	U		3.9	U		1.5	U		3.9	U		3.7	U		3.9	U		1.5	U		4	U	
Aroclor 1221	NE	3.8	U		3.9	U		1.5	U		4	U		3.9	U		3.8	U		1.5	U		3.9	U		3.8	U		3.9	U		1.5	U		3.9	U		3.7	U		3.9	U		1.5	U		4	U	
Aroclor 1232	NE	3.8	U		3.9	U		1.5	U		4	U		3.9	U		3.8	U		1.5	U		3.9	U		3.8	U		3.9	U		1.5	U		3.9	U		3.7	U		3.9	U		1.5	U		4	U	
Aroclor 1242	NE	3.8	U		3.9	U		1.5	U		4	U		3.9	U		3.8	U		1.5	U		3.9	U		3.8	U		3.9	U		1.5	U		3.9	U		3.7	U		3.9	U		1.5	U		4	U	
Aroclor 1248	NE	3.8	U		20		J	2.9	J	J	9.5			3.9	U		11		J	11.6		J	4.2			3.8	U		3.9	U		1.5	U		3.4	J		3.7	U		12			2.5	J		11.4		
Aroclor 1254	NE	3.8	U		34		J	3.9	J	J	13.3			3.9	U		20		J	17.8		J	5.9			3.8	U		3.9	U		2.2	J		4.5			3.7	U		21			3.6	J		17.3		
Aroclor 1260	NE	3.8	U		18			2.9	J	J	10.2			3.9	U		10			19.6		J	3.9			3.8	U		3.9	U		1.4	J		2.8	J		3.7	U		17			2.1	J		14		
Total PCBs (µg/kg Dry-Weight)	130	3.8	U		72		J [5]	9.7	J	J [5]	33			3.9	U		41		J [5]	49		J [5]	14			3.8	U		3.9	U		3.6	J	J [5]	10.7	J	J [5]	3.7	U		50			8.2	J	J [5]	42.7		
Total PCBs (mg/kg OC) [4]	12	—			4.0		J [6]	—			—			—			1.9		J [6]	3.5		J [6]	—			—			—			—			—			—			2.8		J [6]	—			6.6		

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	In-water Dredging Area Samples Below -5 feet MLLW																																										
	Location	SD-PCM015												SD-PCM016												SD-PCM017												SD-PCM018											
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/11/2015			3/10/2016			3/19/2018			6/25/2020			3/10/2015			3/10/2016			3/19/2018			6/24/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM01515			SD-PCM01516			SD-PCM01518			SD-PCM01520			SD-PCM01615			SD-PCM01616			SD-PCM01618			SD-PCM01620			SD-PCM01715			SD-PCM01716			SD-PCM01718			SD-PCM01720			SD-PCM01815			SD-PCM01816			SD-PCM01818			SD-PCM01820		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Conventionals																																												
Total Organic Carbon (perc	—	0.071			0.047		J	0.09		J	0.16			0.076		J	0.193		J	0.48		J	0.57			0.079		J	0.046		J	0.09		J	0.19			0.059		J	0.038		J	0.56		J	0.2		J
Metals (mg/kg)																																												
Arsenic	57	1.9			2.6			2.68	D		3.31			2.1			3			3.7	D		4.3			2			2.2			2.48	D	J	2.75			5.7		J	2.7		J	5.94	D	J	2.93		
Cadmium	5.1	0.2	U		0.2	U		0.06	DJ		0.12	U		0.2	U		0.2	U		0.02	DJ		0.05	J		0.2	U		0.2	U		0.04	DJ		0.04	J		0.2	U		0.2	U		0.1	DJ		0.05	J	
Chromium	260	17		J	20.8		J	18	BD	J	13.4		J	13.2		J	23.9		J	17.7	BD	J	15.5			17.1		J	19.6		J	19.2	BD		12.2		J	23.9		J	17.2		J	23.4	BD	J	21		J
Copper	390	12.6			15.4			13.4	BD		13.5			13.2			14.4			17.7	BD		19		J	12.2			11.5		J	18.3	D		13.9			12.6			17		J	23.9	D	J	16		J
Lead	450	2	U		2	U		1.67	BDJ		3.28			2	U		3			2.74	BD		3.33			2	U		2	U		1.71	DJ		2.17			2	U		2			7.35	D		3.68		
Mercury	0.41	0.02	U		0.02	U		0.002	U		0.012	J		0.02	U		0.03			0.029		J	0.023	J		0.02	U		0.02	U		0.03		J	0.007	J		0.03	U		0.02	U		0.057		J	0.036		
Silver	6.1	0.3	U		0.3	U		0.05	DJ		0.04	J	U	0.3	U		0.4	U		0.05	DJ		0.07	J	U	0.3	U		0.3	U		0.06	DJ		0.06	J	U	0.3	U		0.3	U		0.08	DJ		0.06	J	
Zinc	410	30			30			23.9	BD		30.6			25			34			32.6	BD		36.7			26		J	23			38.7	D		25.9			29			34			63.4	D	J	32.1		
Non-ionizable Organic Compounds																																												
Aromatic Hydrocarbons (µg/kg)																																												
Total LPAHs	5,200	19	U		19	U		5.5	U		14.7	U		19	U		19	U		5.6	U		5.2	J		19	U		20	U		4.8	J		13.3	U		20	U		20	U		29.8	J		15.5	U	
Naphthalene	2,100	19	U		19	U		4.9	U		14.7	U		19	U		19	U		5	U		15.5	U		19	U		20	U		5	U		13.3	U		20	U		20	U		5.2	U		15.5	U	
Acenaphthylene	1,300	19	U		19	U		4.4	U		14.7	U		19	U		19	U		4.5	U		15.5	U		19	U		20	U		4.6	U		13.3	U		20	U		20	U		4.7	U		15.5	U	
Acenaphthene	500	19	U		19	U		4.8	U		14.7	U		19	U		19	U		4.9	U		15.5	U		19	U		20	U		4.9	U		13.3	U		20	U		20	U		5.1	U		15.5	U	
Fluorene	540	19	U		19	U		4.6	U		14.7	U		19	U		19	U		4.7	U		15.5	U		19	U		20	U		4.8	U		13.3	U		20	U		20	U		4.9	U		15.5	U	
Phenanthrene	1,500	19	U		19	U		4.4	U		14.7	U		19	U		19	U		4.4	U		5.2	J		19	U		20	U		4.8	J		13.3	U		20	U		20	U		21.7			15.5	U	
Anthracene	960	19	U		19	U		5.5	U		14.7	U		19	U		19	U		5.6	U		15.5	U		19	U		20	U		5.7	U		13.3	U		20	U		20	U		8.1	J		15.5	U	
2-Methylnaphthalene	670	19	U		19	U		5.3	U		14.7	U		19	U		19	U		5.4	U		15.5	U		19	U		20	U		5.4	U		13.3	U		20	U		20	U		5.6	U		15.5	U	
Total HPAHs	12,000	38	U		37	U		9.5	U		12.1	J		43	J		28.8	J		31.2	J		57.9	J		2.9	J		40	U		5	J		12.2	J		39	U		39	U		370.5	J		46.5	J	
Fluoranthene	1,700	19	U		19	U		4.2	U		14.7	U		4.8	J		7.4	J		7.6	J	J	11.8	J		19	U		20	U		5	J		13.3	U		20	U		20	U		66.4			9	J	
Pyrene	2,600	19	U		19	U		5.2	U		14.7	U		6.8	J		7.4	J		7.3	J		12.4	J		19	U		20	U		5.3	U		13.3	U		20	U		20	U		60.5			8.7	J	
Benz[a]anthracene	1,300	19	U		19	U		4.8	U		14.7	U		19	U		19	U		4.9	U		6.6	J		19	U		20	U		5	U		13.3	U		20	U		20	U		31.1			4.9	J	
Chrysene	1,400	19	U		19	U		4.9	U		4.4	J		19	U		19	U		5.1	J		9.8	J		19	U		20	U		5	U		13.3	U		20	U		20	U		44.2			6.4	J	
Total benzofluoranthenes	3,200	38	U		37	U		9.5	U		7.7	J		39	U		14	J		11.2	J		17.3	J		38	U		40	U		9.8	U		26.5	U		39	U		39	U	UJ	88.3			12.9	J	
Benzo[a]pyrene	1,600	19	U		19	U		6	U		14.7	U		19	U		19	U		6.1	U		15.5	U		19	U		20	U		6.2	U		13.3	U		20	U		20	U	UJ	30.7			15.5	U	
Indeno[1,2,3-c,d]pyrene	600	19	U		19	U		5.6	U		14.7	U		19	U		19	U		5.7	U		15.5	U		19	U		20	U		5.7	U		13.3	U		20	U		20	U	UJ	19.1	J		15.5	U	
Dibenzo[a,h]anthracene	230	4.8	U		4.6	U		5.7	U		14.7	U		4.6	J		4.6	U		5.8	U		15.5	U		2.9	J		4.9	U		5.9	U		13.3	U		4.9	U		4.9	U		7.2	J		15.5	U	
Benzo[g,h,i]perylene	670	19	U		19	U		5.4	U		14.7	U		27			19	U		5.5	U		15.5	U		19	U		20	U		5.6	U		12.2	J		20	U		20	U	UJ	23			4.6	J	
Chlorinated Benzenes (µg/kg)																																												
1,2-Dichlorobenzene	35	4.8	U		4.6	U		0.7	U		3.7	U	UJ	2.8	J		4.6	U		0.7	U		3.9	U	UJ	4.8	U		4.9	U		0.7	U		3.3	U	UJ	4.9	U		4.9	U		0.7	U		3.9	U	
1,4-Dichlorobenzene	110	4.8	U		4.6	U		0.6	U		3.7	U	UJ	2.8	J		4.6	U		0.6	U		3.9	U		4.8	U		4.9	U	UJ	0.6	U		3.3	U	UJ	4.9	U		4.9	U	UJ	0.6	U		3.9	U	
1,2,4-Trichlorobenzene	31	4.8	U		4.6	U		2.5	U		3.7	U		2.7	J		4.6	U		2.5	U		3.9	U		4.8	U		4.9	U		2.6	U		3.3	U		4.9	U		4.9	U		2.7	U		3.9	U	
Hexachlorobenzene	22	4.8	U		4.6	U		0.7	U		3.7	U		3.2	J		4.6	U		0.7	U		3.9	U		4.8	U		4.9	U		0.7	U		3.3	U		4.9	U		4.9	U		0.7	U		3.9	U	
Phthalate Esters (µg/kg)																																												
Dimethyl phthalate	71	4.8	U		4.6	U		0.9	U		3.7	U		2.7	J		4.6	U		0.9	U		3.9	U		4.8	U		4.9	U		1	U		3.3	U		4.9	U		4.9	U		1	U		3.9	U	
Diethyl phthalate	200	19	U		19	U		7.3	B J	UJ	14.7	U		19	U		19	U		21.6	Q B	UJ	6.7	J	UJ	19	U		20	U		20.7	Q B	UJ	3.8	J	UJ	20	U		20	U		12.8	B J	UJ	7.4	J	UJ
Di-n-butyl phthalate	1,400	19	U		19	U		5	U		14.7	U		19	U		19	U		5	U		15.5	U		19	U		20	U		5.1	U		13.3	U		20	U		20	U		5.3	U		15.5	U	
Butyl benzyl phthalate	63	4.8	U		4.6	U		0.6	U		3.7	U		3.6	J	J	4.6	U		2.1	J	J	3.9	U		2.8	QJ	J	4.9	U		0.7	U		3.3	U		4.9	U		4.9	U		9.2	Q	J	3.9	U	
Bis[2-ethylhexyl] phthalate	1,300	48	U		46	U		26.9	U		36.7	U		48	U		46	U		27.3	U		38.6	U		48	U		49	U		27.6	U		33.2	U		49	U		49	U		57.5			38.8	U	
Di-n-octyl phthalate	6,200	19	U		19	U		8.1	U		14.7	U		19	U		19	U		8.3	U		15.5	U		19	U		20	U		8.4	U		13.3	U		20	U		20	U		8.6	U		15.5	U	

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	In-water Dredging Area Samples Below -5 feet MLLW																																												
	Location	SD-PCM015												SD-PCM016												SD-PCM017												SD-PCM018										
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/11/2015			3/10/2016			3/19/2018			6/25/2020			3/10/2015			3/10/2016			3/19/2018			6/24/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM01515			SD-PCM01516			SD-PCM01518			SD-PCM01520			SD-PCM01615			SD-PCM01616			SD-PCM01618			SD-PCM01620			SD-PCM01715			SD-PCM01716			SD-PCM01718			SD-PCM01720			SD-PCM01815			SD-PCM01816			SD-PCM01818			SD-PCM01820		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Non-ionizable Organic Compounds (cont.)																																														
Miscellaneous (µg/kg)																																														
Dibenzofuran	540	19	U		19	U		4.3	U		14.7	U		19	U		19	U		4.4	U		15.5	U		19	U		20	U		4.4	U		13.3	U		20	U		20	U		4.6	U		15.5	U	
Hexachlorobutadiene	11	4.8	U		4.6	U		0.7	U		3.7	U		2.5	J		4.6	U		0.7	U		3.9	U		4.8	U		4.9	U		0.7	U		3.3	U		4.9	U		4.9	U		0.7	U		3.9	U	
N-nitrosodiphenylamine	28	4.8	U		4.6	U		1.2	U		3.7	U		4.8	U		4.6	U		1.2	U		3.9	U		4.8	U		4.9	U		1.3	U		3.3	U		4.9	U		4.9	U		1.3	U		3.9	U	
Ionizable Organic Compounds (µg/kg)																																														
Phenol	420	10	J		19	U		7.7	U		12.8	J		9.7	J		19	U		7.8	U	UJ	15.5	U		19	U		20	U		7.9	U		13.3	U		20	U	UJ	20	U		12.5	J		15.5	U	
2-Methylphenol	63	4.8	U		4.6	U		1	U		3.7	U	UJ	4.8	U		4.6	U		1	U		3.9	U		4.8	U		4.9	U		1.1	U		3.3	U	UJ	4.9	U	UJ	4.9	U		1.1	U		3.9	U	
4-Methylphenol	670	19	U		19	U		13.7	U		14.7	U		19	U		19	U		13.9	U	UJ	15.5	U		19	U		20	U		14.1	U		13.3	U		20	U	UJ	20	U		14.5	U		15.5	U	
2,4-Dimethylphenol	29	24	U		23	U		2	U		14.7	U		24	U		23	U		2.1	U		15.5	U		24	U		25	U		2.1	U		13.3	U		25	U	UJ	25	U		2.1	U		15.5	U	
Pentachlorophenol	360	19	U		19	U		29.2	U		73.4	U		19	U		19	U		29.6	U	UJ	77.3	U		19	U		20	U	UJ	30	U		66.3	U		20	U	UJ	20	U	UJ	31	U		77.6	U	
Benzyl alcohol	57	19	U		19	U		13.9	U		14.7	U		19	U		19	U		14.1	U	UJ	15.5	U		19	U		20	U		14.3	U		13.3	U		20	U	UJ	20	U		15.2	J		15.5	U	
Benzoic acid	650	190	U		190	U		372	U	UJ	147	U		190	U		190	U		378	U	UJ	155	U		62	JQ	J	200	U		384	U	UJ	192		J	200	U	UJ	200	U		396	U	UJ	155	U	
PCBs (µg/kg)																																														
Aroclor 1016	NE	3.8	U		4	U		1.5	U		4	U		3.9	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.9	U		3.9	U		1.5	U		4	U	
Aroclor 1221	NE	3.8	U		4	U		1.5	U		4	U		3.9	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.9	U		3.9	U		1.5	U		4	U	
Aroclor 1232	NE	3.8	U		4	U		1.5	U		4	U		3.9	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.9	U		3.9	U		1.5	U		4	U	
Aroclor 1242	NE	3.8	U		4	U		1.5	U		4	U		3.9	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.9	U		3.9	U		1.5	U		4	U	
Aroclor 1248	NE	3.8	U		10	Y	UY	1.5	U		2.3	J		3.9	U		4.1			2.9	J		4.9			3.9	U		3.9	U		1.5	U		1.6	J		3.9	U		3.9	U		10.9			5		
Aroclor 1254	NE	3.8	U		4	U		1.5	U		3.5	J		3.9	U		6			4.4			7.7			3.9	U		3.9	U		1.7	J		2.9	J		3.9	U		3.9	U		14.4			6.4		
Aroclor 1260	NE	3.8	U		4	U		0.6	U		2.9	J		3.9	U		3.2	J		2.9	J		6.6			3.9	U		3.9	U		1.2	J		1.7	J		3.9	U		3.9	U		12			4.6		
Total PCBs (µg/kg Dry-Weight)	130	3.8	U		10	Y	UY	1.5	U		8.7	J	J [5]	3.9	U		13.3	J	J [5]	10.2	J	J [5]	19.2			3.9	U		3.9	U		2.9	J	J [5]	6.2	J	J [5]	3.9	U		3.9	U		37.3			16		
Total PCBs (mg/kg OC) [4]	12	—			—			—			—			—			—			—			3.4			—			—			—			—			—			—			6.7		J [6]	—		

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	In-water Dredging Area Samples Below -5 feet MLLW																								Shoreline Area Samples at Approximately +4 feet MLLW																							
	Location	SD-PCM218												SD-PCM019												SD-PCM020												SD-PCM021											
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	2/24/2015			3/11/2016			#N/A			6/24/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020			3/11/2015			3/9/2016			3/20/2018			6/25/2020			3/11/2015			3/9/2016			N/C			N/C		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33								
	Sample ID	SD-PCM21815			SD-PCM21816			SD-PCM21818			SD-PCM21820			SD-PCM01915			SD-PCM01916			SD-PCM01918			SD-PCM01920			SD-PCM02015			SD-PCM02016			SD-PCM02018			SD-PCM02020			SD-PCM02115			SD-PCM02116								
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Conventionals																																																	
Total Organic Carbon (percent)	—	0.187			0.068		J	0.05		J	0.05		J	0.034			0.054		J	0.34		J	0.2			2.07			3.39		J	3.96		J	4.94			0.118			0.309		J						
Metals (mg/kg)																																																	
Arsenic	57	3.1			1.8		J	2.63	D	J	2.56			1.5			2			3	D	J	3.81			4.8			9.1			14	D	J	11.1			2.5			1.9								
Cadmium	5.1	0.2	U		0.2	U		0.05	DJ		0.05	J		0.2	U		0.2	U		0.06	DJ		0.05	J		0.5			0.5	U		0.29	DJ		0.25			0.2			0.2	U							
Chromium	260	18.2			15.3		J	15.8	BD	J	13.4		J	34.5			12.1		J	15.9	BD		19.2			29.1			26			26.4	BD		22.7		J	17.7			20.1								
Copper	390	13.5			12.1		J	14.5	D	J	15.3		J	14			12.8		J	17.8	D		15.8		J	36.8			36.9			49.5	D		43.8			15.9			14.2								
Lead	450	2			2	U		1.99	DJ		1.53	J		2	U		2	U		2.09	DJ		3.1			8			9			18.7	D		15.5			2	U		2	U							
Mercury	0.41	0.03	U		0.02	U		0.027		J	0.012	J		0.02	U		0.02	U		0.036		J	0.025			0.04			0.08			0.135		J	0.081			0.02	U		0.02	U							
Silver	6.1	0.3	U		0.3	U		0.05	DJ		0.04	J		0.3	U		0.3	U		0.04	DJ		0.06	J		0.5	U		0.7	U		0.18	DJ		0.18	J		0.4	U		0.3	U							
Zinc	410	32			28			38.5	D	J	28			28			23			36.5	D		34.8			64			73			133	D		95.1			32			30								
Non-ionizable Organic Compounds																																																	
Aromatic Hydrocarbons (µg/kg)																																																	
Total LPAHs	5,200	11	J		20	U		5.9	U		12.6	U		20	U		20	U		5.8	U		5	J		57	J		45.3	J		124.5	J		39.3	J		20	U		19	U							
Naphthalene	2,100	20	U		20	U		5.2	U		12.6	U		20	U		20	U		5.2	U		13.4	U		20	U		7.7	J		8.1	J		30.2	U		20	U		19	U							
Acenaphthylene	1,300	20	U		20	U		4.7	U		12.6	U		20	U		20	U		4.7	U		13.4	U		20	U		19	U		6.5	J		30.2	U		20	U		19	U							
Acenaphthene	500	20	U		20	U		5.1	U		12.6	U		20	U		20	U		5	U		13.4	U		20	U		19	U		5.2	J		30.2	U		20	U		19	U							
Fluorene	540	20	U		20	U		4.9	U		12.6	U		20	U		20	U		4.9	U		13.4	U		20	U		5.8	J		11.5	J		30.2	U		20	U		19	U							
Phenanthrene	1,500	11	J		20	U		4.6	U		12.6	U		20	U		20	U		4.6	U		5	J		43			26			71.2			28.3	J		20	U		19	U							
Anthracene	960	20	U		20	U		5.9	U		12.6	U		20	U		20	U		5.8	U		13.4	U		14	J		5.8	J		22			11	J		20	U		19	U							
2-Methylnaphthalene	670	20	U		20	U		5.6	U		12.6	U		20	U		20	U		5.6	U		13.4	U		20	U		19	U		6.1	J		30.2	U		20	U		19	U							
Total HPAHs	12,000	80	J		39	U		10.1	U		25.2	U		40	U		40	U		33.9	J		62.8	J		240	J		226.5	J		833.6	J		445.1	J		40	U		38	U							
Fluoranthene	1,700	17	J		20	U		4.5	U		12.6	U		20	U		20	U		10.7	J		10.2	J		49			44			194	Q	J	87.4			20	U		19	U							
Pyrene	2,600	16	J		20	U		5.5	U		12.6	U		20	U		20	U		9.6	J		10.3	J		44			38			153			72.3			20	U		19	U							
Benz[a]anthracene	1,300	7.8	J		20	U		5.1	U		12.6	U		20	U		20	U		5.1	U		5.4	J		19	J		15	J		62.4			34.4			20	U		19	U							
Chrysene	1,400	12	J		20	U		5.2	U		12.6	U		20	U		20	U		5.1	U		7.2	J		35			35			109			60.7			20	U		19	U							
Total benzofluoranthenes	3,200	20	J		39	U		10.1	U		25.2	U		40	U		40	U		13.6	J		15.8	J		51			46			189			93.2			40	U		38	U							
Benzo[a]pyrene	1,600	6.9	J		20	U		6.4	U		12.6	U		20	U		20	U		6.4	U		5.2	J		11	J		15	J		56.8			38			20	U		19	U							
Indeno[1,2,3-c,d]pyrene	600	20	U		20	U		5.9	U		12.6	U		20	U		20	U		5.9	U		4.5	J		14	J		14	J	J	28.5			24.7	J		20	U		19	U							
Dibenzo[a,h]anthracene	230	4.9	U		4.9	U		6.1	U		12.6	U		5	U		4.9	U		6	U		13.4	U		5.2			5.5		J	8.6	J		30.2	U		5	U		4.8	U							
Benzo[g,h,i]perylene	670	20	U		20	U		5.8	U		12.6	U		20	U		20	U		5.7	U		4.2	J		12	J		14	J	J	32.3			34.4			20	U		19	U							
Chlorinated Benzenes (µg/kg)																																																	
1,2-Dichlorobenzene	35	4.9	U		4.9	U		0.7	U		3.1	U		5	U		4.9	U		0.7	U		3.3	U		4.9	U		4.8	U		0.7	U		7.5	U		5	U		4.8	U							
1,4-Dichlorobenzene	110	4.9	U		4.9	U	UJ	0.6	U		3.1	U		5	U		4.9	U	UJ	0.6	U		3.3	U		4.9	U		4.8	U		0.6	U		7.5	U		5	U		4.8	U							
1,2,4-Trichlorobenzene	31	4.9	U		4.9	U		2.6	U		3.1	U		5	U		4.9	U		2.6	U		3.3	U		4.9	U		4.8	U		2.6	U		7.5	U		5	U		4.8	U							
Hexachlorobenzene	22	4.9	U		4.9	U		0.7	U		3.1	U		5	U		4.9	U		0.7	U		3.3	U		4.9	U		4.8	U		0.7	U		7.5	U		5	U		4.8	U							
Phthalate Esters (µg/kg)																																																	
Dimethyl phthalate	71	4.9	U		4.9	U		1	U		3.1	U		5	U		4.9	U		1	U		3.3	U		4.9	U		4.8	U		9.8			3.1	J		5	U		4.8	U							
Diethyl phthalate	200	20	U		20	U		70.6	Q B	J	5.3	J	UJ	20	U		20	U		84.3	Q B	J	4.4	J	UJ	20	U		19	U		115	Q B	J	8.5	J	UJ	20	U		19	U							
Di-n-butyl phthalate	1,400	20	U		20	U		5.2	U		12.6	U		20	U		20	U		5.2	U		13.4	U		20	U		19	U		5.2	U		30.2	U		20	U		19	U							
Butyl benzyl phthalate	63	4.9	U		4.9	U		0.7	U		3.1	U		3.8	QJ	J	4.9	U		3.7	J	J	1	J		59			12			48.9	Q	J	14.4			5	U		4.8	U							
Bis[2-ethylhexyl] phthalate	1,300	33	J		49	U		28.5	U		31.5	U		50	U		49	U		28.3	U		33.4	U		110			98			230			64.3	J		50	U		48	U							
Di-n-octyl phthalate	6,200	20	U		20	U		8.6	U		12.6	U		20	U		20	U		8.6	U		13.4	U		20	U		9.6	J		26.4			30.2	U		20	U		19	U							

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Area		In-water Dredging Area Samples Below -5 feet MLLW																								Shoreline Area Samples at Approximately +4 feet MLLW																							
Location		SD-PCM218												SD-PCM019												SD-PCM020												SD-PCM021											
Monitoring Year		Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
Collection Date		2/24/2015			3/11/2016			#N/A			6/24/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020			3/11/2015			3/9/2016			3/20/2018			6/25/2020			3/11/2015			3/9/2016			N/C			N/C		
Sample Depth (ft)		0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33								
Sample ID		SD-PCM21815			SD-PCM21816			SD-PCM21818			SD-PCM21820			SD-PCM01915			SD-PCM01916			SD-PCM01918			SD-PCM01920			SD-PCM02015			SD-PCM02016			SD-PCM02018			SD-PCM02020			SD-PCM02115			SD-PCM02116								
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Non-ionizable Organic Compounds (cont.)																																																	
Miscellaneous (µg/kg)																																																	
Dibenzofuran	540	20	U		20	U		4.6	U		12.6	U		20	U		20	U		4.5	U		13.4	U		20	U		19	U		4.5	U		30.2	U		20	U		19	U							
Hexachlorobutadiene	11	4.9	U		4.9	U		0.7	U		3.1	U		5	U		4.9	U		0.7	U		3.3	U		4.9	U		4.8	U		0.7	U		7.5	U		5	U		4.8	U							
N-nitrosodiphenylamine	28	4.9	U		4.9	U		1.3	U		3.1	U		5	U		4.9	U		1.3	U		3.3	U		4.9	U		4.8	U		1.3	U		7.5	U		5	U		4.8	U							
Ionizable Organic Compounds (µg/kg)																																																	
Phenol	420	20	U		11	J		8.1	U		12.6	U		20	U		20	U		10.9	J		8.7	J		260			24			32.6			12.5	J		8.9	J		19	U							
2-Methylphenol	63	4.9	U		4.9	U		1.1	U		3.1	U		5	U		4.9	U		1.1	U		3.3	U		4.9	U		4.8	U	UJ	1.1	U		3.2	J		5	U		4.8	U	UJ						
4-Methylphenol	670	20	U		20	U		14.5	U		12.6	U		20	U		20	U		14.4	U		13.4	U		86			20			36.6			25.8	J		20	U		19	U							
2,4-Dimethylphenol	29	24	U		25	U		2.1	U		12.6	U		25	U		25	U	UJ	2.1	U		13.4	U		25	U		24	U		2.1	U		**30.2**	U		25	U		24	U							
Pentachlorophenol	360	20	U		20	U	UJ	30.9	U		62.9	U		20	U		20	U	UJ	30.7	U		66.9	U		13	J	J	19	U	UJ	30.8	U		151	U	UJ	20	U	UJ	19	U	UJ						
Benzyl alcohol	57	20	U		20	U		14.7	U		12.6	U		20	U	UJ	12	J		14.6	U		13.4	U		20	U		19	U		28.9			30.2	U		20	U		19	U							
Benzoic acid	650	130	JQ	J	200	U		396	U	UJ	126	U		200	U		200	U		392	U	UJ	134	U		**1300**		J	260			343		J	302	U	UJ	200	U		190	U							
PCBs (µg/kg)																																																	
Aroclor 1016	NE	3.9	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		3.8	U		3.9	U		1.6	U		4	U		4	U		3.8	U							
Aroclor 1221	NE	3.9	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		3.8	U		3.9	U		1.6	U		4	U		4	U		3.8	U							
Aroclor 1232	NE	3.9	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		3.8	U		3.9	U		1.6	U		4	U		4	U		3.8	U							
Aroclor 1242	NE	3.9	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		1.5	U		4	U		58	Y	UY	3.9	U		1.6	U		4	U		4	U		3.8	U							
Aroclor 1248	NE	3.9	U		3.8	U		1.5	U		4	U		3.8	U		3.9	U		3.2	J		2.7	J		3.8	U		26			49.5			54.1	P1	J	4	U		6.2								
Aroclor 1254	NE	5.2			3.8	U		1.5	U		4	U		3.8	U		3.9	U		4.4			4			30	P	J	40	P	J	30.2			24.9	P1	J	4	U		3.8	U							
Aroclor 1260	NE	3.6	J		3.8	U		0.6	U		4	U		3.8	U		3.9	U		3	J		2.8	J		27			11			20.3			23.2	P1	J	4	U		3.8	U							
Total PCBs (µg/kg Dry-Weight)	130	8.8	J	J [5]	3.8	U		1.5	U		4	U		3.8	U		3.9	U		10.6	J	J [5]	9.5	J	J [5]	57		J [5]	77	P	J [5]	100			102.2		J [5]	4	U		6.2								
Total PCBs (mg/kg OC) [4]	12	—			—			—			—			—			—			—			—			2.8		J [6]	2.3	P	J [6]	2.5		J [6]	—			—			—								

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	Shoreline Area Samples at Approximately +4 feet MLLW																																												
	Location	SD-PCM022												SD-PCM023												SD-PCM223												SD-PCM024											
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/10/2015			3/10/2016			3/19/2018			6/24/2020			2/24/2015			3/10/2016			3/19/2018			6/24/2020			2/24/2015			3/10/2016			#N/A			6/24/2020			2/24/2015			3/10/2016			3/20/2018			6/24/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM02215			SD-PCM02216			SD-PCM02218			SD-PCM02220			SD-PCM02315			SD-PCM02316			SD-PCM02318			SD-PCM02320			SD-PCM22315			SD-PCM22316			SD-PCM22318			SD-PCM22320			SD-PCM02415			SD-PCM02416			SD-PCM02418			SD-PCM02420		
Analyte	**SMS SQS Criteria** [3]	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**
Conventionals																																																	
Total Organic Carbon (percent)	—	0.052			0.117		J	0.08		J	1.03			0.034			0.09		J	0.18		J	0.34		J	0.054			0.131		J	0.2		J	0.16		J	0.037			0.044		J	0.21		J	0.13		
Metals (mg/kg)																																																	
Arsenic	57	1.7			2.5			2.08	D		4.84			1.7			2.5		J	3.14	D		3.28			1.6			2		J	3.14	D		3.25			1.9			1.9			3.53	D	J	2.11		
Cadmium	5.1	0.2			0.2	U		0.07	DJ		0.07	J		0.2	U		0.2	U		0.04	DJ		0.05	J		0.2			0.2	U		0.04	DJ		0.04	J		0.2			0.2	U		0.02	DJ		0.04	J	
Chromium	260	22.5			27.8		J	18	BD	J	20.5			22.9			16.2		J	14.5	BD	J	11.6			20.1			15.4		J	14.7	BD	J	13.4			18			17		J	18.7	BD		21		
Copper	390	14.1			15.1			15.7	BD		18.5		J	12.9			11.3			16.9	BD		13.7		J	13.9			13			14.8	BD		12.4		J	17.5			17.2			17.7	D		19		J
Lead	450	2	U		3			1.69	BDJ		5.1			2	U		2	U		2.39	BD		2.89			2	U		3			1.94	BDJ		2.57			2	U		2			1.89	DJ		2.11	J	
Mercury	0.41	0.02	U		0.02	U		0.002	U		0.023	J		0.02	U		0.02	U		0.002	U		0.009	J		0.02	U		0.03	U		0.002	U		0.013	J		0.02	U		0.02	U		0.009	J	J	0.007	J	
Silver	6.1	0.3	U		0.3	U		0.05	DJ		0.07	J		0.3	U		0.3	U		0.04	DJ		0.05	J		0.3	U		0.3	U		0.04	DJ		0.05	J		0.3	U		0.3	U		0.06	DJ		0.06	J	U
Zinc	410	26.8			33			29.6	BD		39.7			28			28			36.5	BD		32.8			30			29			33.8	BD		31			33			32			37.7	D		30		
Non-ionizable Organic Compounds																																																	
Aromatic Hydrocarbons (µg/kg)																																																	
Total LPAHs	5,200	19	U		19	U		5.8	U		89.2			20	U		19	U		5.9	U		14.4	U		27	U		8.8	J		5.8	U		13.6	U		19	U		18	U		5.7	U		13.4	U	
Naphthalene	2,100	19	U		19	U		5.1	U		18.5	U		20	U		19	U		5.2	U		14.4	U		27	U		20	U		5.1	U		13.6	U		19	U		18	U		5	U		13.4	U	
Acenaphthylene	1,300	19	U		19	U		4.7	U		18.5	U		20	U		19	U		4.7	U		14.4	U		27	U		20	U		4.6	U		13.6	U		19	U		18	U		4.6	U		13.4	U	
Acenaphthene	500	19	U		19	U		5	U		18.5	U		20	U		19	U		5.1	U		14.4	U		27	U		20	U		5	U		13.6	U		19	U		18	U		4.9	U		13.4	U	
Fluorene	540	19	U		19	U		4.9	U		18.5	U		20	U		19	U		4.9	U		14.4	U		27	U		20	U		4.8	U		13.6	U		19	U		18	U		4.7	U		13.4	U	
Phenanthrene	1,500	19	U		19	U		4.6	U		32.8			20	U		19	U		4.6	U		14.4	U		27	U		8.8	J		4.6	U		13.6	U		19	U		18	U		4.5	U		13.4	U	
Anthracene	960	19	U		19	U		5.8	U		56.4			20	U		19	U		5.9	U		14.4	U		27	U		20	U		5.8	U		13.6	U		19	U		18	U		5.7	U		13.4	U	
2-Methylnaphthalene	670	19	U		19	U		5.6	U		18.5	U		20	U		19	U		5.6	U		14.4	U		27	U		20	U		5.5	U		13.6	U		19	U		18	U		5.4	U		13.4	U	
Total HPAHs	12,000	2.8	J		38	U		10	U		1250		J	40	U		38	U		28	J		36.1	J		53	U		29.6	J		30.6	J		7.7	J		38	U		37	U		9.7	U		26.9	U	
Fluoranthene	1,700	19	U		19	U		4.4	U		39.5			20	U		19	U		9.1	J		8	J		27	U		11	J		8.4	J		13.6	U		19	U		18	U		4.3	U		13.4	U	
Pyrene	2,600	19	U		19	U		5.4	U		30.4			20	U		19	U		7.5	J		7.6	J		27	U		9.8	J		6.8	J		13.6	U		19	U		18	U		5.3	U		13.4	U	
Benz[a]anthracene	1,300	19	U		19	U		5.1	U		255		J	20	U		19	U		5.1	U		14.4	U		27	U		20	U		5	U		13.6	U		19	U		18	U		4.9	U		13.4	U	
Chrysene	1,400	19	U		19	U		5.1	U		466		J	20	U		19	U		5.2	U		14.4	U		27	U		8.8	J		5.2	J		13.6	U		19	U		18	U		5	U		13.4	U	
Total benzofluoranthenes	3,200	38	U		38	U		10	U		264			40	U		38	U		11.4	J		10.5	J		53	U		39	U		10.2	J		7.7	J		38	U		37	U		9.7	U		26.9	U	
Benzo[a]pyrene	1,600	19	U		19	U		6.4	U		88.3			20	U		19	U		6.4	U		14.4	U		27	U		20	U		6.3	U		13.6	U		19	U		18	U		6.2	U		13.4	U	
Indeno[1,2,3-c,d]pyrene	600	19	U		19	U		5.9	U		44			20	U		19	U		5.9	U		14.4	U		27	U		20	U		5.8	U		13.6	U		19	U		18	U		5.7	U		13.4	U	
Dibenzo[a,h]anthracene	230	2.8	J		4.8	U		6	U		22.3			5	U		4.8	U		6.1	U		14.4	U		6.6	U		4.9	U		6	U		13.6	U		4.8	U		4.6	U		5.9	U		13.4	U	
Benzo[g,h,i]perylene	670	19	U		19	U		5.7	U		40.5			20	U		19	U		5.8	U		10	J		27	U		20	U		5.7	U		13.6	U		19	U		18	U		5.6	U		13.4	U	
Chlorinated Benzenes (µg/kg)																																																	
1,2-Dichlorobenzene	35	4.7	U		4.8	U		0.7	U		4.6	U	UJ	5	U		4.8	U		0.7	U		3.6	U	UJ	6.6	U		4.9	U		0.7	U		3.4	U	UJ	4.8	U		4.6	U		0.7	U		3.4	U	UJ
1,4-Dichlorobenzene	110	4.7	U		4.8	U		0.6	U		4.6	U		5	U		4.8	U		0.6	U		3.6	U		6.6	U		4.9	U		0.6	U		3.4	U		4.8	U		4.6	U		0.6	U		3.4	U	
1,2,4-Trichlorobenzene	31	4.7	U		4.8	U		2.6	U	UJ	4.6	U		5	U		4.8	U		2.7	U	UJ	3.6	U		6.6	U		4.9	U		2.6	U	UJ	3.4	U		4.8	U		4.6	U		2.6	U		3.4	U	
Hexachlorobenzene	22	4.7	U		4.8	U		0.7	U		4.6	U		5	U		4.8	U		0.7	U		3.6	U		6.6	U		4.9	U		0.7	U		3.4	U		4.8	U		4.6	U		0.7	U		3.4	U	
Phthalate Esters (µg/kg)																																																	
Dimethyl phthalate	71	4.7	U		4.8	U		1	U		1.7	J		5	U		4.8	U		1	U		3.6	U		6.6	U		4.9	U		1	U		3.4	U		4.8	U		4.6	U		1	U		3.4	U	
Diethyl phthalate	200	19	U		19	U		23.3	B	U	6.2	J	UJ	20	U		19	U		9.6	B J	UJ	7.2	J	UJ	27	U		20	U		12.1	B J	UJ	4.4	J	UJ	19	U		18	U		17.5	B J	UJ	4	J	UJ
Di-n-butyl phthalate	1,400	19	U		19	U		5.2	U		18.5	U		20	U		19	U		5.3	U		14.4	U		27	U		20	U		5.2	U		13.6	U		19	U		18	U		5.1	U		13.4	U	
Butyl benzyl phthalate	63	4.7	U		4.8	U		0.7	U		12			2.5	QJ	J	4.8	U		0.7	U		1.3	J		10	Q	J	4.9	U		0.7	U		1.1	J		4.8	U		4.6	U		0.6	U		3.4	U	
Bis[2-ethylhexyl] phthalate	1,300	47	U		48	U		28.2	U		34.3	J		50	U		48	U		28.5	U		36	U		66	U		29	J		28	U		33.9	U		48	U		46	U		27.5	U		33.6	U	
Di-n-octyl phthalate	6,200	19	U		19	U		8.6	U		18.5	U		20	U		19	U		8.6	U		14.4	U		27	U		20	U		8.5	U		13.6	U		19	U		18	U		8.3	U		13.4	U	

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	**Shoreline Area Samples at Approximately +4 feet MLLW**																																												
	Location	**SD-PCM022**												**SD-PCM023**												**SD-PCM223**												**SD-PCM024**										
	Monitoring Year	**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**			**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**			**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**			**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**		
	Collection Date	**3/10/2015**			**3/10/2016**			**3/19/2018**			**6/24/2020**			**2/24/2015**			**3/10/2016**			**3/19/2018**			**6/24/2020**			**2/24/2015**			**3/10/2016**			**#N/A**			**6/24/2020**			**2/24/2015**			**3/10/2016**			**3/20/2018**			**6/24/2020**		
	Sample Depth (ft)	**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**		
	Sample ID	**SD-PCM02215**			**SD-PCM02216**			**SD-PCM02218**			**SD-PCM02220**			**SD-PCM02315**			**SD-PCM02316**			**SD-PCM02318**			**SD-PCM02320**			**SD-PCM22315**			**SD-PCM22316**			**SD-PCM22318**			**SD-PCM22320**			**SD-PCM02415**			**SD-PCM02416**			**SD-PCM02418**			**SD-PCM02420**		
Analyte	**SMS SQS Criteria** [3]	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**
Non-ionizable Organic Compounds (cont.)																																																
Miscellaneous (µg/kg)																																																
Dibenzofuran	540	19	U		19	U		4.5	U		18.5	U		20	U		19	U		4.6	U		14.4	U		27	U		20	U		4.5	U		13.6	U		19	U		18	U		4.4	U		13.4	U	
Hexachlorobutadiene	11	4.7	U		4.8	U		0.7	U	UJ	4.6	U		5	U		4.8	U		0.7	U	UJ	3.6	U		6.6	U		4.9	U		0.7	U	UJ	3.4	U		4.8	U		4.6	U		0.7	U		3.4	U	
N-nitrosodiphenylamine	28	4.7	U		4.8	U		1.3	U		4.6	U		5	U		4.8	U		1.3	U		3.6	U		6.6	U		4.9	U		1.3	U		3.4	U		4.8	U		4.6	U		1.3	U		3.4	U	
Ionizable Organic Compounds (µg/kg)																																																
Phenol	420	9.4	J		19	U		8.1	U		17.7	J		20	U		19	U	UJ	8.1	U		8	J		27	B	U	140		J	8	U		13.6	U		19	U		18	U		7.9	U		13.4	U	
2-Methylphenol	63	4.7	U		4.8	U		1.1	U		2.5	J		5	U		4.8	U		1.1	U		0.8	J		6.6	U		4.9	U		1.1	U		0.8	J		4.8	U		4.6	U		1.1	U		3.4	U	
4-Methylphenol	670	19	U		19	U		14.4	U		41.7			20	U		19	U		14.5	U		14.4	U		27	U		20	U		14.3	U		13.6	U		19	U		18	U		14	U		13.4	U	
2,4-Dimethylphenol	29	24	U		24	U		2.1	U		4.4	J		25	U		24	U		2.1	U		14.4	U		33	U		24	U		2.1	U		13.6	U		24	U		23	U		2.1	U		13.4	U	
Pentachlorophenol	360	19	U		19	U		30.7	U	UJ	92.7	U		20	U		19	U		31	U	UJ	71.9	U		27	U		20	U		30.4	U	UJ	67.9	U		19	U		18	U		29.9	U		67.2	U	
Benzyl alcohol	57	19	U		19	U		14.6	U		18.5	U		20	U		19	U		14.7	U		14.4	U		27	U		20	U	UJ	14.5	U		13.6	U		19	U		18	U	UJ	14.2	U		13.4	U	
Benzoic acid	650	190	U		190	U		392	U	UJ	311			200	U		190	U		396	U	UJ	144	U		270	U		200	U		390	U	UJ	136	U		190	U		180	U		382	U	UJ	134	U	
PCBs (µg/kg)																																																
Aroclor 1016	NE	4	U		3.8	U		1.5	U		3.9	U		3.9	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		4	U		3.9	U		4	U		1.5	U		4	U	
Aroclor 1221	NE	4	U		3.8	U		1.5	U		3.9	U		3.9	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		4	U		3.9	U		4	U		1.5	U		4	U	
Aroclor 1232	NE	4	U		3.8	U		1.5	U		3.9	U		3.9	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		4	U		3.9	U		4	U		1.5	U		4	U	
Aroclor 1242	NE	4	U		3.8	U		1.5	U		3.9	U		3.9	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		4	U		3.9	U		4	U		1.5	U		4	U	
Aroclor 1248	NE	4	U		2.1	J		1.5	U		7.8	P1	J	3.9	U		3.8	U		1.5	U		2.3	J		3.9	U		3.9	U		1.9	J		4	U		3.9	U		4	U		1.7	J		4	U	
Aroclor 1254	NE	4	U		3.6	J		1.5	U		7.8			3.9	U		3.8	U		3.3	J		3.3	J		3.9	U		4.7			2.4	J		3.1	J		3.9	U		4	U		1.9	J		4.5		
Aroclor 1260	NE	4	U		3.8	U		0.6	U		8.1			3.9	U		3.8	U		2.4	J		2.1	J		3.9	U		5.1			2.3	J		1.7	J		3.9	U		4	U		1.3	J		4	U	
Total PCBs (µg/kg Dry-Weight)	130	4	U		5.7	J	J [5]	1.5	U		24		J [5]	3.9	U		3.8	U		5.7	J	J [5]	7.7	J	J [5]	3.9	U		9.8			6.6	J	J [5]	4.8	J	J [5]	3.9	U		4	U		4.9	J	J [5]	4.5		
Total PCBs (mg/kg OC) [4]	12	—			—			—			2.3		J [6]	—			—			—			—			—			—			—			—			—			—			—			—		

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	Outfall Samples																																												
	Location	SD-PCM025												SD-PCM026												SD-PCM027												SD-PCM028											
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/11/2015			3/9/2016			3/19/2018			6/25/2020			3/10/2015			3/10/2016			3/19/2018			6/25/2020			2/25/2015			3/11/2016			3/20/2018			6/24/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM02515			SD-PCM02516			SD-PCM02518			SD-PCM02520			SD-PCM02615			SD-PCM02616			SD-PCM02618			SD-PCM02620			SD-PCM02715			SD-PCM02716			SD-PCM02718			SD-PCM02720			SD-PCM02815			SD-PCM02816			SD-PCM02818			SD-PCM02820		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Conventionals																																																
Total Organic Carbon (percent)	—	0.054			0.985		J	0.47		J	1.06			0.058			0.06		J	0.08		J	0.13			0.072			0.057		J	0.7		J	0.29			0.036			0.041		J	2.57		J	0.05		
Metals (mg/kg)																																																
Arsenic	57	1.8			2.8			3.28	D		5.54			1.7			2.1			2.01	D		2.25			1.4		J	2.1			6.09	D	J	3.11			2.1			2.1			11.9	D	J	2.56		
Cadmium	5.1	0.2	U		0.2	U		0.05	DJ		0.07	J		0.2			0.2	U		0.05	DJ		0.06	J		0.2	U		0.2	U		0.11	DJ		0.04	J		0.2	U		0.2	U		0.28	D		0.04	J	
Chromium	260	14.5			16.6			16.4	BD	J	13.4		J	19.7			17		J	21.9	BD	J	21.6		J	15.9			15		J	21	BD		13.4		J	18.4			15.2		J	27.1	BD		14.4		
Copper	390	11.7			15.8			19.8	BD		21.5			17.6			13.5			11	BD		11.6			11.1			15.7		J	26.3	D		13.7			12.3			15.1		J	49.2	D		15.2		J
Lead	450	2	U		3			2.89	BD		9.62			2	U		2	U		2.86	BD		3.33			2	U		2			6.08	D		2.5			2	U		2	U		18.8	D		2.42		
Mercury	0.41	0.03	U		0.02	U		**0.579**		J	0.075			0.04			0.02	U		0.002	U		0.009	J		0.02	U		0.02	U		0.071		J	0.021	J		0.02	U		0.02	U		0.212		J	0.007	J	
Silver	6.1	0.3	U		0.3	U		0.05	DJ		0.1	J	U	0.3	U		0.3	U		0.03	DJ		0.03	J	U	0.3	U		0.3	U		0.09	DJ		0.04	J	U	0.3	U		0.3	U		0.23	DJ		0.04	J	
Zinc	410	25			35			37.2	BD		45.2			28			28			29.7	BD		26.7			25			26			64.5	D		32.1			26			29			117	D		30.3		
Non-ionizable Organic Compounds																																																
Aromatic Hydrocarbons (µg/kg)																																																
Total LPAHs	5,200	19	U		15J			8.2	J		45.7	J		20	U		20	U		5.9	U		12.9	U		19	U		20	U		22	J		13.3	U		19	U		20	U		87.2	J		12.7	U	
Naphthalene	2,100	19	U		19	U		5.1	U		21.4	U		20	U		20	U		5.2	U		12.9	U		19	U		20	U		5.1	U		13.3	U		19	U		20	U		8.7	J		12.7	U	
Acenaphthylene	1,300	19	U		19	U		4.6	U		21.4	U		20	U		20	U		4.7	U		12.9	U		19	U		20	U		4.6	U		13.3	U		19	U		20	U		5.5	J		12.7	U	
Acenaphthene	500	19	U		19	U		5	U		21.4	U		20	U		20	U		5.1	U		12.9	U		19	U		20	U		5	U		13.3	U		19	U		20	U		5.1	U		12.7	U	
Fluorene	540	19	U		19	U		4.8	U		21.4	U		20	U		20	U		4.9	U		12.9	U		19	U		20	U		4.8	U		13.3	U		19	U		20	U		6	J		12.7	U	
Phenanthrene	1,500	19	U		15	J		8.2	J		32.6			20	U		20	U		4.7	U		12.9	U		19	U		20	U		15.5	J		13.3	U		19	U		20	U		49.3			12.7	U	
Anthracene	960	19	U		19	U		5.8	U		13.1	J		20	U		20	U		5.9	U		12.9	U		19	U		20	U		6.5	J		13.3	U		19	U		20	U		17.7	J		12.7	U	
2-Methylnaphthalene	670	19	U		19	U		5.5	U		21.4	U		20	U		20	U		5.6	U		12.9	U		19	U		20	U		5.5	U		13.3	U		19	U		20	U		8	J		12.7	U	
Total HPAHs	12,000	38	U		89.1	J		143	J		376.9			4.3	J		39	U		10.1	U		25.7	U		12	J		39	U		245.8	J		40.9	J		37	U		40	U		680.9	J		25.4	U	
Fluoranthene	1,700	19	U		24			36.7	Q	J	62.9			20	U		20	U		4.5	U		12.9	U		19	U		20	U		44.2			10.6	J		19	U		20	U		120			12.7	U	
Pyrene	2,600	19	U		21			14.7	J		57.5			20	U		20	U		5.5	U		12.9	U		19	U		20	U		40.6			9.4	J		19	U		20	U		110			12.7	U	
Benz[a]anthracene	1,300	19	U		6.6	J		19.5			35.2			20	U		20	U		5.1	U		12.9	U		19	U		20	U		18.2	J		3.6	J		19	U		20	U		54.4			12.7	U	
Chrysene	1,400	19	U		10	J		13.7	J		58.2			20	U		20	U		5.2	U		12.9	U		19	U		20	U		30.1			6.3	J		19	U		20	U		82.2			12.7	U	
Total benzofluoranthenes	3,200	38	U		20	J		29.9	J		77.9			39	U		39	U		10.1	U		25.7	U		39	U		39	U		60.8			11	J		37	U		40	U		174			25.4	U	
Benzo[a]pyrene	1,600	19	U		7.5	J		11	J		34			20	U		20	U		6.4	U		12.9	U		19	U		20	U		21			13.3	U		19	U		20	U		62.2			12.7	U	
Indeno[1,2,3-c,d]pyrene	600	19	U		19	U		8.2	J		23.3			20	U		20	U		5.9	U		12.9	U		19	U		20	U		13.4	J		13.3	U		19	U		20	U		33			12.7	U	
Dibenzo[a,h]anthracene	230	4.7	U		4.7	U		6	U		21.4	U		4.3	J		4.9	U		6.1	U		12.9	U		4.8	U		4.9	U		5.9	U		13.3	U		4.6	U		5	U		10.5	J		12.7	U	
Benzo[g,h,i]perylene	670	19	U		19	U		9.3	J		27.9			23			20	U		5.8	U		12.9	U		12	J		20	U		17.5	J		13.3	U		19	U		20	U		34.6			12.7	U	
Chlorinated Benzenes (µg/kg)																																																
1,2-Dichlorobenzene	35	4.7	U		4.7	U		0.7	U	UJ	5.3	U	UJ	3.3	J		4.9	U		0.7	U		3.2	U	UJ	4.8	U		4.9	U		0.7	U		3.3	U	UJ	4.6	U		5	U		0.7	U		3.2	U	
1,4-Dichlorobenzene	110	4.7	U		4.7	U		0.6	U	UJ	5.3	U	UJ	3.4	J		4.9	U		0.6	U		3.2	U	UJ	4.8	U		4.9	U	UJ	0.6	U		3.3	U	UJ	4.6	U		5	U	UJ	0.6	U		3.2	U	
1,2,4-Trichlorobenzene	31	4.7	U		4.7	U		2.6	U	UJ	5.3	U		3.5	J		4.9	U		2.7	U	UJ	3.2	U		4.8	U		4.9	U		2.6	U		3.3	U		4.6	U		5	U		2.7	U		3.2	U	
Hexachlorobenzene	22	4.7	U		4.7	U		0.7	U	UJ	5.3	U		3.8	J		4.9	U		0.7	U		3.2	U		4.8	U		4.9	U		0.7	U		3.3	U		4.6	U		5	U		0.7	U		3.2	U	
Phthalate Esters (µg/kg)																																																
Dimethyl phthalate	71	4.7	U		4.7	U		1	U	UJ	1.6	J		3.1	J		4.9	U		1	U		3.2	U		4.8	U		2.6	J		2.6	J		3.3	U		4.6	U		5	U		6.4			3.2	U	
Diethyl phthalate	200	19	U		19	U		19	B J	UJ	21.4	U		20	U		20	U		7.7	B J	UJ	12.9	U		76	B	U	20	U		24.9	Q B	UJ	13.3	U		19			20	U		99.6	Q B	J	3.3	J	UJ
Di-n-butyl phthalate	1,400	19	U		19	U		5.2	U		21.4	U		20	U		20	U		5.3	U		12.9	U		19	U		20	U		5.1	U		13.3	U		19	U		20	U		6	J		12.7	U	
Butyl benzyl phthalate	63	4.7	U		4.7	U		0.7	U	UJ	5.2	J		3.7	J	J	4.9	U		0.7	U		3.2	U		4.8	U		4.9	U		6.3	Q	J	3.3	U		4.6	U		5	U		21.7	Q	J	3.2	U	
Bis[2-ethylhexyl] phthalate	1,300	47	U		34	J		28.9	J		65.6			49	U		49	U		28.6	U		32.1	U		48	U		49	U		66.9			33.4	U		46	U		50	U		145			31.7	U	
Di-n-octyl phthalate	6,200	19	U		19	U		13.2	J		21.4	U		20	U		20	U		8.7	U		12.9	U		19	U		20	U		8.4	U		13.3	U		19	U		20	U		8.7	U		12.7	U	

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	Outfall Samples																																												
	Location	SD-PCM025												SD-PCM026												SD-PCM027												SD-PCM028											
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/11/2015			3/9/2016			3/19/2018			6/25/2020			3/10/2015			3/10/2016			3/19/2018			6/25/2020			2/25/2015			3/11/2016			3/20/2018			6/24/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM02515			SD-PCM02516			SD-PCM02518			SD-PCM02520			SD-PCM02615			SD-PCM02616			SD-PCM02618			SD-PCM02620			SD-PCM02715			SD-PCM02716			SD-PCM02718			SD-PCM02720			SD-PCM02815			SD-PCM02816			SD-PCM02818			SD-PCM02820		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Non-ionizable Organic Compounds (cont.)																																																	
Miscellaneous (µg/kg)																																																	
Dibenzofuran	540	19	U		19	U		4.5	U		21.4	U		20	U		20	U		4.6	U		12.9	U		19	U		20	U		4.5	U		13.3	U		19	U		20	U		6.5	J		12.7	U	
Hexachlorobutadiene	11	4.7	U		4.7	U		0.7	U	UJ	5.3	U		3	J		4.9	U		0.7	U	UJ	3.2	U		4.8	U		4.9	U		0.7	U		3.3	U		4.6	U		5	U		0.7	U		3.2	U	
N-nitrosodiphenylamine	28	4.7	U		4.7	U		1.3	U	UJ	5.3	U		4.9	U		4.9	U		1.3	U		3.2	U		4.8	U		4.9	U		1.3	U		3.3	U		4.6	U		5	U		1.3	U		3.2	U	
Ionizable Organic Compounds (µg/kg)																																																	
Phenol	420	19	U	UJ	19	U		19.6	U		21.4	U		9.8	J		18	J		8.2	U		12.9	U		19	U		9.8	J		10.6	J		13.3	U		19	U		20	U		60.6			12.7	U	
2-Methylphenol	63	4.7	U	UJ	4.7	U	UJ	1.1	U	UJ	1.8	J	J	4.9	U		4.9	U		1.1	U		3.2	U	UJ	4.8	U		4.9	U		1.1	U		3.3	U	UJ	4.6	U		5	U		1.1	U		3.2	U	
4-Methylphenol	670	19	U	UJ	19	U		19.6	U		21.4	U		20	U		20	U		14.6	U		12.9	U		19	U		20	U		14.2	U		13.3	U		19	U		20	U		14.6	U		12.7	U	
2,4-Dimethylphenol	29	23	U	UJ	23	U		2.1	U	UJ	21.4	U		25	U		25	U		2.2	U		12.9	U		24	U		25	U		2.1	U		13.3	U		23	U		25	U		2.2	U		12.7	U	
Pentachlorophenol	360	19	U	UJ	19	U	UJ	98	U		107	U		20	U		20	U		31.1	U	UJ	64.3	U		19	U		20	U	UJ	30.2	U		66.7	U		19	U		20	U	UJ	31.1	U		63.5	U	
Benzyl alcohol	57	19	U	UJ	19	U		19.6	U		21.4	U		20	U		20	U		14.8	U		12.9	U		19	U		20	U		14.4	U		13.3	U		19	U		20	U		52			12.7	U	
Benzoic acid	650	190	U	UJ	190	U		196	U		214	U		200	U		200	U		398	U	UJ	129	U		190	U		200	U		386	U	UJ	133	U		190	U		200	U		398	U	UJ	127	U	
PCBs (µg/kg)																																																	
Aroclor 1016	NE	3.7	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.8	U		3.9	U		1.5	U		3.9	U		3.8	U		3.9	U		1.6	U		4	U	
Aroclor 1221	NE	3.7	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.8	U		3.9	U		1.5	U		3.9	U		3.8	U		3.9	U		1.6	U		4	U	
Aroclor 1232	NE	3.7	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.8	U		39	Y	UY	1.5	U		3.9	U		3.8	U		3.9	U		1.6	U		4	U	
Aroclor 1242	NE	3.7	U		3.8	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		3.9	U		3.8	U		3.9	U		1.5	U		3.9	U		3.8	U		3.9	U		1.6	U		4	U	
Aroclor 1248	NE	3.7	U		3.8	U		2.6	J		14.5			3.9	U		3.9	U		1.5	U		1.8	J		3.8	U		3.9	U		9.3			2.8	J		3.8	U		3.9	U		24.6			4	U	
Aroclor 1254	NE	3.7	U		6.7			3.4	J		18.2			3.9	U		3.9	U		1.5	U		4.9			3.8	U		3.9	U		12.2			4.5			3.8	U		3.9	U		45.9			4	U	
Aroclor 1260	NE	3.7	U		2.2	J		2.4	J		19.2	P1	J	3.9	U		2.9	J		5			6			3.8	U		3.9	U		9.9			2.9	J		3.8	U		3.9	U		36.9			4	U	
Total PCBs (µg/kg Dry-Weight)	130	3.7	U		8.9	J	J [5]	8.4	J	J [5]	51.9		J [5]	3.9	U		2.9	J	J [5]	5			12.7			3.8	U		39	Y	UY	31.4			10.2	J	J [5]	3.8	U		3.9	U		107.4			4	U	
Total PCBs (mg/kg OC) [4]	12	—			0.9		J [6]	—			4.9		J [6]	—			—			—			—			—			—			4.5		J [6]	—			—			—			4.2		J [6]	—		

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	Outfall Samples																								Shoreline Area Samples at Approximately +7 feet MLLW																	
	Location	SD-PCM029												SD-PCM030												SD-PCM031									SD-PCM032								
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	2/24/2015			3/11/2016			3/20/2018			6/24/2020			2/25/2015			3/11/2016			3/20/2018			6/24/2020			3/12/2015			3/9/2016			3/20/2018			6/25/2020			3/12/2015			3/9/2016			3/20/2018			6/25/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM02915			SD-PCM02916			SD-PCM02918			SD-PCM02920			SD-PCM03015			SD-PCM03016			SD-PCM03018			SD-PCM03020			SD-PCM03115			SD-PCM03116			SD-PCM03118			SD-PCM03120			SD-PCM03215			SD-PCM03216			SD-PCM03218			SD-PCM03220		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Conventionals																																																
Total Organic Carbon (perc	—	0.049			0.073		J	1.22		J	2.26			0.168			1.07		J	2.27		J	2.58			2.65			1.47		J	4.5		J	3.27			8.7			7.27		J	2.12		J	0.96		J
Metals (mg/kg)																																																
Arsenic	57	2.4			2.5			8	D	J	7.74			1.6			7.8			13.5	D	J	15.5			2.8			3.4			3.38	D	J	3.49			15			15			3.75	D	J	3.65		
Cadmium	5.1	0.2			0.2	U		0.15	D		0.22			0.2			0.4	U		0.21	D		0.31			0.3			0.3	U		0.07	DJ		0.14			1	U		1	U		0.1	DJ		0.05	J	
Chromium	260	28			18.2		J	19.2	BD		23.5			30			29.7		J	25.6	BD		30.8			18.9			19.4			13.8	BD		13.3		J	27			30			17.7	BD		35.3		J
Copper	390	13.8			15.3		J	31	D		41		J	15.5			32.2		J	45.7	D		61.7		J	24.6			19.9			19.4	D		18.1			50			55			20	D		17.2		
Lead	450	2			2			8.9	D		17.5			2	U		8			17.1	D		24.5			4			4			3.8	D		2.92			20			20			3.57	D		3.77		
Mercury	0.41	0.02	U		0.03	U		0.085		J	0.114			0.02	U		0.06			0.193		J	0.145			0.03	U		0.03	U		0.05		J	0.017	J		0.1			0.2	U		0.053		J	0.018	J	
Silver	6.1	0.3	U		0.3	U		0.13	DJ		0.19	J		0.3	U		0.5	U		0.25	DJ		0.3	J	J	0.4	U		0.4	U		0.05	DJ		0.06	J		2	U		2	U		0.06	DJ		0.07	J	U
Zinc	410	33			29			73.4	D		84.4			26			64			110	D		122			35			34			42.5	D		39.8			138			151			45.4	D		31.1		
Non-ionizable Organic Compounds																																																
Aromatic Hydrocarbons (µg/kg)																																																
Total LPAHs	5,200	19	U		20	U		37.5	J		61.2	J		20	U		69	J		107.1	J		69	J		121	J		52.5	J		35	J		14.9	J		296			99	J		102.9	J		17.3	J	
Naphthalene	2,100	19	U		20	U		5.5	J		7.2	J		20	U		19	J		9.5	J		27.1	U		12	J		19	U		5	U		16.1	U		56			13	J		5.2	U		14.6	U	
Acenaphthylene	1,300	19	U		20	U		4.7	U		22.6	U		20	U		20	U		5.1	J		27.1	U		19	U		19	U		4.5	U		16.1	U		20	U		20	U		4.8	U		14.6	U	
Acenaphthene	500	19	U		20	U		5.1	U		22.6	U		20	U		20	U		5.8	J		27.1	U		17	J		7.5	J		6.1	J		16.1	U		20	U		20	U		17.7	J		4.4	J	
Fluorene	540	19	U		20	U		4.9	U		7.3	J		20	U		20	U		4.9	U		27.1	U		18	J		10	J		8.7	J		6.1	J		20	U		20	U		23.2			7.3	J	
Phenanthrene	1,500	19	U		20	U		23.3			33.6			20	U		39			58.5			48.9			68			35			20.2			8.8	J		130			66			49.4			5.6	J	
Anthracene	960	19	U		20	U		8.7	J		13.1	J		20	U		11	J		28.2			20.1	J		5.8	J		19	U		5.7	U		16.1	U		110			20			12.6	J		14.6	U	
2-Methylnaphthalene	670	19	U		20	U		5.6	U		22.6	U		20	U		20	U		10.8	J		27.1	U		6.7	J		19	U		5.4	U		16.1	U		20	U		20	U		5.7	U		14.6	U	
Total HPAHs	12,000	38	U		40	U		320.9	J		538.5	J		6.9	J		358.5			757.2	J		700.3	J		86	J		77.6	J		77.2	J		64	J		629			779			207.8	J		30.2	J	
Fluoranthene	1,700	19	U		20	U		59.5			106			6.9	J		67			138			118			33			28			23.1			25			140			150			88.7			17.6		
Pyrene	2,600	19	U		20	U		54.8			93.2			20	U		58			128			115			27			21			17.3	J		18.6			130			120			61.4			12.6	J	
Benz[a]anthracene	1,300	19	U		20	U		25.9			44.4			20	U		26			60			54.6			19	U		6.6	J		4.9	U		5.8	J		40			53			11.5	J		14.6	U	
Chrysene	1,400	19	U		20	U		39.1			66.6			20	U		50			95			92.7			12	J		12	J		6.7	J		5.8	J		110			120			15.5	J		14.6	U	
Total benzofluoranthenes	3,200	38	U		40	U		81.1			115			40	U		68			191			160			14	J		10	J		12.8	J		8.8	J		130			180			23.8	J		29.1	U	
Benzo[a]pyrene	1,600	19	U		20	U		28.8			43.4			20	U		28			66.2			58.9			19	U		19	U		6.2	U		16.1	U		37			51			6.9	J		14.6	U	
Indeno[1,2,3-c,d]pyrene	600	19	U		20	U		14.7	J		29.1			20	U		23			31.7			44.9			19	U		19	U		5.7	U		16.1	U		29			38		J	6	U		14.6	U	
Dibenzo[a,h]anthracene	230	4.7	U		5	U		6.1	U		13.8	J		4.9	U		6.5			11.2	J		11.2	J		4.8	U		4.7	U		5.9	U		16.1	U		13			18		J	6.1	U		14.6	U	
Benzo[g,h,i]perylene	670	19	U		20	U		17	J		27			20	U		32			36.1			45			19	U		19	U		5.5	U		16.1	U		20	U		49		J	5.8	U		14.6	U	
Chlorinated Benzenes (µg/kg)																																																
1,2-Dichlorobenzene	35	4.7	U		5	U		0.7	U		5.7	U		4.9	U		4.9	U		0.7	U		6.8	U	UJ	4.8	U		4.7	U		0.7	U		4	U		3.5	J		5	U		0.7	U		3.6	U	
1,4-Dichlorobenzene	110	4.7	U		5	U	UJ	0.6	U		5.7	U		4.9	U		4.9	U	UJ	0.6	U		6.8	U		4.8	U		4.7	U		0.6	U		4	U		5	U		5	U		0.6	U		3.6	U	
1,2,4-Trichlorobenzene	31	4.7	U		5	U		2.7	U		5.7	U		4.9	U		4.9	U		2.7	U		6.8	U		4.8	U		4.7	U		2.6	U		4	U		5	U		5	U		2.7	U		3.6	U	
Hexachlorobenzene	22	4.7	U		5	U		0.7	U		5.7	U		4.9	U		3.2	J		0.7	U		6.8	U		4.8	U		4.7	U		0.7	U		4	U		5	U		5	U		0.7	U		3.6	U	
Phthalate Esters (µg/kg)																																																
Dimethyl phthalate	71	4.7	U		5	U		3.1	J		4.9	J		4.9	U		4.9	U		14.8			6.8	U		4.8	U		4.7	U		1	U		4	U		5	U		8.7			1	U		3.6	U	
Diethyl phthalate	200	19	U		20	U		35.5	Q B	J	12.9	J	UJ	29	B	U	20	U		54.2	Q B	J	9.6	J	UJ	19	U		19	U		16.3	B J	UJ	16.1	U		20	U		20	U		22.7	Q B	UJ	14.6	U	
Di-n-butyl phthalate	1,400	19	U		20	U		5.3	U		6.1	J		20	U		20	U		10.2	J		27.1	U		19	U		19	U		5.1	U		16.1	U		20	U		20	U		5.3	U		14.6	U	
Butyl benzyl phthalate	63	4.7	U		5	U		9.4	Q	J	9.3			4.9	U		8.7			24.9	Q	J	6.8	U		4.8	U		4.7	U		24.3	Q	J	4	U		39	Q	J	39			0.7	U		3.6	U	
Bis[2-ethylhexyl] phthalate	1,300	47	U		50	U		82.6			138			29	J		170			211			121			48	U		47	U		27.5	U		40.2	U		410			260			28.7	U		36.4	U	
Di-n-octyl phthalate	6,200	19	U		20	U		8.7	U		22.6	U		20	U		20	U		8.7	U		27.1	U		19	U		19	U		8.3	U		16.1	U		40			23			8.7	U		14.6	U	

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	Outfall Samples																								Shoreline Area Samples at Approximately +7 feet MLLW																							
	Location	SD-PCM029												SD-PCM030												SD-PCM031												SD-PCM032											
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	2/24/2015			3/11/2016			3/20/2018			6/24/2020			2/25/2015			3/11/2016			3/20/2018			6/24/2020			3/12/2015			3/9/2016			3/20/2018			6/25/2020			3/12/2015			3/9/2016			3/20/2018			6/25/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM02915			SD-PCM02916			SD-PCM02918			SD-PCM02920			SD-PCM03015			SD-PCM03016			SD-PCM03018			SD-PCM03020			SD-PCM03115			SD-PCM03116			SD-PCM03118			SD-PCM03120			SD-PCM03215			SD-PCM03216			SD-PCM03218			SD-PCM03220		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Non-ionizable Organic Compounds (cont.)																																																	
Miscellaneous (µg/kg)																																																	
Dibenzofuran	540	19	U		20	U		4.6	U		6.4	J		20	U		20	U		8.2	J		27.1	U		19	U		19	U		5.1	J		16.1	U		20	U		7.9	J		10.2	J		4.8	J	
Hexachlorobutadiene	11	4.7	U		5	U		0.7	U		5.7	U		4.9	U		4.9	U		0.7	U		6.8	U		4.8	U		4.7	U		0.7	U		4	U		5	U		5	U		0.7	U		3.6	U	
N-nitrosodiphenylamine	28	4.7	U		5	U		1.3	U		5.7	U		4.9	U		4.9	U		1.3	U		6.8	U		4.8	U		4.7	U		1.2	U		4	U		5	U		5	U		1.3	U		3.6	U	
Ionizable Organic Compounds (µg/kg)																																																	
Phenol	420	19	U	UJ	20	U		192			30.2			20	U		110			69.4			28			63			25			13.4	J		16.1	U		**570**			73			13.2	J		14.6	U	
2-Methylphenol	63	4.7	U	UJ	5	U		1.1	U		2.3	J		4.9	U		5.9			2.9	J		3.5	J		12	M	N	4.7	U	UJ	1	U		1.1	J		5	U		5	U	UJ	1.1	U		1	J	
4-Methylphenol	670	19	U	UJ	20	U		14.6	U		22.4	J		20	U		20	U		14.7	U		27.1	U		98			30			14	U		16.1	U		130			20	U		15.3	J		14.6	U	
2,4-Dimethylphenol	29	24	U	UJ	25	U		2.2	U		22.6	U		25	U		25	U		2.2	U		27.1	U		24	U		24	U		2.1	U		16.1	U		25	U		25	U		2.2	U		14.6	U	
Pentachlorophenol	360	19	U	UJ	20	U	UJ	31.2	U		113	U		20	U		12	QJ	J	31.2	U		135	U		19	U	UJ	19	U	UJ	29.8	U		80.3	U	UJ	18	J	J	20	U	UJ	31.2	U		72.8	U	UJ
Benzyl alcohol	57	19	U		20	U		25.6			22.6	U		15	J		20	U		34.2			32.4			56			19	U		14.2	U		16.1	U		**360**			**100**			14.9	U		14.6	U	
Benzoic acid	650	190	U	UJ	200	U		398	U	UJ	141	J		200	U		**710**			108	J	J	271	U		**680**	Q	J	270			382	U	UJ	161	U	UJ	**2600**	Q	J	530			398	U	UJ	146	U	UJ
PCBs (µg/kg)																																																	
Aroclor 1016	NE	3.8	U		3.9	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		4	U		4	U		4	U		1.6	U		3.8	U		4	U		4	U		1.5	U		3.9	U	
Aroclor 1221	NE	3.8	U		3.9	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		4	U		4	U		4	U		1.6	U		3.8	U		4	U		4	U		1.5	U		3.9	U	
Aroclor 1232	NE	3.8	U		3.9	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		4	U		4	U		4	U		1.6	U		3.8	U		4	U		4	U		1.5	U		3.9	U	
Aroclor 1242	NE	3.8	U		3.9	U		1.5	U		4	U		3.9	U		3.9	U		1.5	U		4	U		4	U		4	U		1.6	U		3.8	U		4	U		4	U		1.5	U		3.9	U	
Aroclor 1248	NE	3.8	U		3.9	U		10.7			22.2			3.9	U		12	Y	UY	22.8			38.9			4	U		5.9	Y	UY	1.6	U		4.4			40	Y	UY	32			1.5	U		3.9	U	
Aroclor 1254	NE	3.8	U		3.9	U		13.9			28.5			3.9	U		18			28.8			50.1			9.9	Y	UY	14	Y	UY	1.6	U		6.3			68			66			1.5	U		3.9	U	
Aroclor 1260	NE	3.8	U		3.9	U		13.1			24.7			3.9	U		9.8			23.6			47.1			4	U		4	U		0.6	U		4.1			53	P	J	29			0.6	U		3.9	U	
Total PCBs (µg/kg Dry-Weight)	130	3.8	U		3.9	U		37.7			75.4			3.9	U		27.8	Y	UY	75.2			**136.1**			9.9	Y	UY	14	Y	UY	1.6	U		14.8			121	P	J [5]	127			1.5	U		3.9	U	
Total PCBs (mg/kg OC) [4]	12	—			—			3.1		J [6]	3.3			—			2.6		J [6]	3.3		J [6]	5.3			0.4		UY	1.0	Y	UJ	—			0.5			—			—			0.1	U	J [6]	0.4	U	J [6]

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	Shoreline Area Samples at Approximately +7 feet MLLW																																												
	Location	SD-PCM033												SD-PCM034												SD-PCM035												SD-PCM036											
	Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
	Collection Date	3/12/2015			3/9/2016			N/C			N/C			3/12/2015			3/9/2016			3/20/2018			6/24/2020			3/12/2015			3/9/2016			3/20/2018			6/24/2020			3/12/2015			3/9/2016			3/20/2018			6/24/2020		
	Sample Depth (ft)	0 - 0.33			0 - 0.33									0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
	Sample ID	SD-PCM03315			SD-PCM03316									SD-PCM03415			SD-PCM03416			SD-PCM03418			SD-PCM03420			SD-PCM03515			SD-PCM03516			SD-PCM03518			SD-PCM03520			SD-PCM03615			SD-PCM03616			SD-PCM03618			SD-PCM03620		
Analyte	SMS SQS Criteria [3]	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Conventionals																																																
Total Organic Carbon (percent)	—	0.47			0.283		J							1.19			2.06		J	0.81		J	0.33			1.46			2.03		J	0.81		J	0.65			0.97			1.12		J	0.76		J	1.68		
Metals (mg/kg)																																																
Arsenic	57	1.3			1.9									3.2			3.2			3.09	D	J	3.07			3.3			2.8			2.67	D	J	2.86			2.4			2.1			2.05	D	J	3.25		
Cadmium	5.1	0.3			0.2	U								0.2	U		0.2	U		0.07	DJ		0.04	J		0.2	U		0.2	U		0.05	DJ		0.04	J		0.3			0.2	U		0.05	DJ		0.1	J	
Chromium	260	26.8			21.5									20.9			17.7			19.5	BD		18.9			19.1			16.4			15.6	BD		17.6			23.2			19.4			18	BD		19.4		
Copper	390	22.9			18.2									19.3			18			19.7	D		13.8		J	20			30.9			18.5	D		14		J	22.6			24.4			20.2	D		26.4		J
Lead	450	2	U		2	U								4			3			3.3	D		2.81			3			3			2.97	D		3.35			5			3			2.46	D		3.42		
Mercury	0.41	0.02	U		0.02	U								0.03	U		0.03	U		0.043		J	0.015	J		0.02	U		0.02	U		0.043		J	0.012	J		0.02			0.02	U		0.036		J	0.018	J	
Silver	6.1	0.3	U		0.3	U								0.3	U		0.3	U		0.06	DJ		0.05	J		0.3	U		0.4	U		0.05	DJ		0.06	J		0.4	U		0.3	U		0.05	DJ		0.07	J	
Zinc	410	30			31									31			32			46.1	D		35.3			30			32			38.4	D		32.5			34			35			39	D		39.1		
Non-ionizable Organic Compounds																																																
Aromatic Hydrocarbons (µg/kg)																																																
Total LPAHs	5,200	18	U		19	U								34			17	J		16.5	J		14.7	U		54.1	J		28			16.8	J		6.9	J		13	J		8.8	J		6	J		7.3	J	
Naphthalene	2,100	18	U		19	U								20	U		19	U		5	U		14.7	U		19	U		20	U		5	U		14.4	U		19	U		20	U		5.2	U		14.2	U	
Acenaphthylene	1,300	18	U		19	U								20	U		19	U		4.5	U		14.7	U		19	U		20	U		4.5	U		14.4	U		19	U		20	U		4.7	U		14.2	U	
Acenaphthene	500	18	U		19	U								20	U		19	U		4.9	U		14.7	U		5.6	J		20	U		4.8	U		14.4	U		19	U		20	U		5.1	U		14.2	U	
Fluorene	540	18	U		19	U								20	U		19	U		4.7	U		14.7	U		7.5	J		20	U		4.7	U		14.4	U		19	U		20	U		4.9	U		14.2	U	
Phenanthrene	1,500	18	U		19	U								34			17	J		16.5	J		14.7	U		41			28			16.8	J		6.9	J		13	J		8.8	J		6	J		7.3	J	
Anthracene	960	18	U		19	U								20	U		19	U		5.6	U		14.7	U		19	U		20	U		5.6	U		14.4	U		19	U		20	U		5.9	U		14.2	U	
2-Methylnaphthalene	670	18	U		19	U								20	U		19	U		5.4	U		14.7	U		19	U		20	U		5.4	U		14.4	U		19	U		20	U		5.6	U		14.2	U	
Total HPAHs	12,000	37	U		37	U								32	J		27	J		26.7	J		26.9	J		41.5	J		34	J		14.4	J		39.7	J		25	J		80.1	J		15.2	J		24.9	J	
Fluoranthene	1,700	18	U		19	U								16	J		16	J		15.4	J		7.5	J		20			20			14.4	J		10.5	J		14	J		16	J		8.8	J		11.5	J	
Pyrene	2,600	18	U		19	U								16	J		11	J		11.3	J		5.9	J		14	J		14	J		5.2	U		7.2	J		11	J		9.8	J		6.4	J		8.6	J	
Benz[a]anthracene	1,300	18	U		19	U								20	U		19	U		4.9	U		14.7	U		19	U		20	U		4.9	U		4.1	J		19	U		6.9	J		5.1	U		14.2	U	
Chrysene	1,400	18	U		19	U								20	U		19	U		5	U		4.6	J		7.5	J		20	U		4.9	U		8.3	J		19	U		9.8	J		5.2	U		4.8	J	
Total benzofluoranthenes	3,200	37	U		37	U								40	U		38	U		9.7	U		8.9	J		37	U		39	U		9.6	U		9.6	J		37	U		15	J		10.1	U		28.4	U	
Benzo[a]pyrene	1,600	18	U		19	U								20	U		19	U		6.2	U		14.7	U		19	U		20	U		6.1	U		14.4	U		19	U		9.8	J		6.4	U		14.2	U	
Indeno[1,2,3-c,d]pyrene	600	18	U		19	U								20	U		19	U		5.7	U		14.7	U		19	U		20	U		5.7	U		14.4	U		19	U		5.9	J	J	5.9	U		14.2	U	
Dibenzo[a,h]anthracene	230	4.6	U		4.6	U								5	U		4.7	U		5.8	U		14.7	U		4.7	U		4.9	U		5.8	U		14.4	U		4.6	U		4.9	U		6.1	U		14.2	U	
Benzo[g,h,i]perylene	670	18	U		19	U								20	U		19	U		5.5	U		14.7	U		19	U		20	U		5.5	U		14.4	U		19	U		6.9	J	J	5.8	U		14.2	U	
Chlorinated Benzenes (µg/kg)																																																
1,2-Dichlorobenzene	35	4.6	U		4.6	U								5	U		4.7	U		0.7	U		3.7	U	UJ	4.7	U		4.9	U		0.7	U		3.6	U		4.6	U		4.9	U		0.7	U		3.5	U	
1,4-Dichlorobenzene	110	4.6	U		4.6	U								5	U		4.7	U		0.6	U		3.7	U		4.7	U		4.9	U		0.6	U		3.6	U		4.6	U		4.9	U		0.6	U		3.5	U	
1,2,4-Trichlorobenzene	31	4.6	U		4.6	U								5	U		4.7	U		2.5	U		3.7	U		4.7	U		4.9	U		2.5	U		3.6	U		4.6	U		4.9	U		2.7	U		3.5	U	
Hexachlorobenzene	22	4.6	U		4.6	U								5	U		4.7	U		0.7	U		3.7	U		4.7	U		4.9	U		0.7	U		3.6	U		4.6	U		4.9	U		0.7	U		3.5	U	
Phthalate Esters (µg/kg)																																																
Dimethyl phthalate	71	4.6	U		4.6	U								5	U		4.7	U		0.9	U		3.7	U		4.7	U		4.9	U		0.9	U		5			4.6	U		4.9	U		1	U		3.5	U	
Diethyl phthalate	200	18	U		19	U								20	U		19	U		8.5	B J	UJ	4.9	J	UJ	19	U		20	U		9.4	B J	UJ	4.9	J	UJ	19	U		20	U		10.6	B J	UJ	5	J	UJ
Di-n-butyl phthalate	1,400	18	U		19	U								20	U		19	U		5	U		14.7	U		19	U		20	U		341			14.4	U		19	U		20	U		5.3	U		14.2	U	
Butyl benzyl phthalate	63	4.6	U		4.6	U								5	U		4.7	U		5.9	Q	J	3.7	U		4.7	U		4.9	U		6.4	Q	J	3.6	U		4.6	U		4.9	U		3.4	J	J	3.5	U	
Bis[2-ethylhexyl] phthalate	1,300	46	U		46	U								50	U		47	U		27.3	U		36.7	U		47	U		49	U		27.2	U		36	U		46	U		49	U		28.6	U		35.5	U	
Di-n-octyl phthalate	6,200	18	U		19	U								20	U		19	U		8.3	U		14.7	U		19	U		20	U		8.2	U		14.4	U		19	U		20	U		8.7	U		14.2	U	

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS [1, 2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Area	**Shoreline Area Samples at Approximately +7 feet MLLW**																																												
	Location	**SD-PCM033**												**SD-PCM034**												**SD-PCM035**												**SD-PCM036**											
	Monitoring Year	**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**			**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**			**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**			**Year 0 (2015)**			**Year 1 (2016)**			**Year 3 (2018)**			**Year 5 (2020)**		
	Collection Date	**3/12/2015**			**3/9/2016**			**N/C**			**N/C**			**3/12/2015**			**3/9/2016**			**3/20/2018**			**6/24/2020**			**3/12/2015**			**3/9/2016**			**3/20/2018**			**6/24/2020**			**3/12/2015**			**3/9/2016**			**3/20/2018**			**6/24/2020**		
	Sample Depth (ft)	**0 - 0.33**			**0 - 0.33**									**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**			**0 - 0.33**		
	Sample ID	**SD-PCM03315**			**SD-PCM03316**									**SD-PCM03415**			**SD-PCM03416**			**SD-PCM03418**			**SD-PCM03420**			**SD-PCM03515**			**SD-PCM03516**			**SD-PCM03518**			**SD-PCM03520**			**SD-PCM03615**			**SD-PCM03616**			**SD-PCM03618**			**SD-PCM03620**		
Analyte	**SMS SQS Criteria** [3]	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**	**Value**	**Q1**	**Q2**
Non-ionizable Organic Compounds (cont.)																																																	
Miscellaneous (µg/kg)																																																	
Dibenzofuran	540	18	U		19	U								20	U		19	U		4.4	U		14.7	U		5.6	J		20	U		4.3	U		14.4	U		19	U		20	U		4.6	U		14.2	U	
Hexachlorobutadiene	11	4.6	U		4.6	U								5	U		4.7	U		0.7	U		3.7	U		4.7	U		4.9	U		0.7	U		3.6	U		4.6	U		4.9	U		0.7	U		3.5	U	
N-nitrosodiphenylamine	28	4.6	U		4.6	U								5	U		4.7	U		1.2	U		3.7	U		4.7	U		4.9	U		1.2	U		3.6	U		4.6	U		4.9	U		1.3	U		3.5	U	
Ionizable Organic Compounds (µg/kg)																																																	
Phenol	420	18	U		19	U								20	U		19	U		7.8	U		14.7	U		19	U		9.7	J		7.8	U		14.4	U		19	U		20	U		8.2	U		14.2	U	
2-Methylphenol	63	4.6	U		4.6	U								5	U		4.7	U		1	U		1	J		4.7	U		4.9	U	UJ	1	U		3.6	U		4.6	U		4.9	U	UJ	1.1	U		0.8	J	
4-Methylphenol	670	18	U		19	U								20	U		19	U		14	U		14.7	U		19			20	U		13.9	U		14.4	U		19	U		20	U		14.6	U		14.2	U	
2,4-Dimethylphenol	29	23	U		23	U								25	U		24	U		2.1	U		14.7	U		23	U		24	U		2	U		14.4	U		23	U		25	U		2.2	U		14.2	U	
Pentachlorophenol	360	18	U	UJ	19	U								20	U		19	U		29.7	U		73.5	U		19	U	UJ	20	U	UJ	29.5	U		72.1	U		19	U	UJ	20	U	UJ	31.1	U		70.9	U	
Benzyl alcohol	57	19	U		19	U								20	U		19	U		14.1	U		14.7	U		28			20	U		14.1	U		14.4	U		19	U		20	U		14.8	U		14.2	U	
Benzoic acid	650	180	U		65	J								200	U		190	U		380	U	UJ	147	U		84	JQ	J	200	U		378	U	UJ	144	U		190	U		200	U		398	U	UJ	142	U	
PCBs (µg/kg)																																																	
Aroclor 1016	NE	3.9	U		3.8	U								4	U		3.8	U		1.5	U		4	U		3.8	U		4	U		1.5	U		4	U		3.8	U		4	U		1.5	U		4	U	
Aroclor 1221	NE	3.9	U		3.8	U								4	U		3.8	U		1.5	U		4	U		3.8	U		4	U		1.5	U		4	U		3.8	U		4	U		1.5	U		4	U	
Aroclor 1232	NE	3.9	U		3.8	U								4	U		3.8	U		1.5	U		4	U		3.8	U		4	U		1.5	U		4	U		3.8	U		4	U		1.5	U		4	U	
Aroclor 1242	NE	3.9	U		3.8	U								4	U		3.8	U		1.5	U		4	U		3.8	U		4	U		1.5	U		4	U		3.8	U		4	U		1.5	U		4	U	
Aroclor 1248	NE	3.9	U		3.8	U								4	U		9.6	Y	UY	1.5	U		4	U		3.8	U		5.9	Y	UY	1.5	U		4	U		3.8	U		4	U		1.5	U		4	U	
Aroclor 1254	NE	3.9	U		3.8	U								9.9	Y	UY	9.6	Y	UY	1.5	U		14.8			9.4	Y	UY	14	Y	UY	1.5	U		3.6	J		9.5	Y	UY	9.9	Y	UY	1.5	U		4	U	
Aroclor 1260	NE	3.9	U		3.8	U								3.7	J		3.8	U		0.6	U		5.4			4.8			18			0.6	U		12.6			3.8	U		4	U		0.6	U		1.8	J	
Total PCBs (µg/kg Dry-Weight)	130	3.9	U		3.8	U								3.7	J	J [5]	9.6	Y	UY	1.5	U		20.2			4.8			18			1.5	U		16.2	J	J [5]	9.5	Y	UY	9.9	Y	UY	1.5	U		1.8	J	J [5]
Total PCBs (mg/kg OC) [4]	12.0	—			—									0.3		J [6]	0.5	Y	UJ	0.2	U	J [6]	—			0.3			0.9		J [6]	0.2	U	J [6]	2.5	J	J [6]	1.0		UY	0.9	Y	UJ	0.2	U	J [6]	0.1	J	J [6]

Note(s)

1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   J = estimated concentration when the value is less than the RL.
   Q = detected analyte with an initial or continuing calibration that does not meet established acceptance criteria.
   Y = analyte not detected at the reporting limit provided. The reporting limit is raised due to chromatographic interferences.
   P = Analyte detected on both chromatographic columns; RPD >40% with no chromatographic interference.
   B = analyte detected in associated method blank at concentration greater than 1/2 RL, or 5% analyte concentration.
   M = estimated value for analyte detected with poor spectral match.
   D = The reported value is from a dilution
2. Validation qualifiers (Q2) are defined as follows:
   J = analyte positively identified; value is approximate concentration in sample.
   N = The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
   U = material was analyzed for, but was not detected above the level of the associated value.
   UJ = material was not detected; reporting limit is estimated and may be inaccurate or imprecise.
   UY = material was not detected; raised reporting limit.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al., 2013). Values that are **BOLD** are equal to or exceed the appropriate SMS SQS criteria.
4. — = no carbon-normalized value was calculated when results for organic carbon were outside the normal carbon normalization range of 0.5 to 4.0%.
5. If 20% of total detected Aroclors are qualified as estimated, the total calculated PCB concentration will also be considered estimated and assigned a "J" qualifier.
6. If the total calculated PCB concentration is considered to be estimated and assigned a "J" qualifier, or the if the total organic carbon percentage is considered to be estimated and assigned a "J" qualifier, then the organic carbon normalized value will also be assigned a "J" qualifier.

Reference(s)

AMEC Environment & Infrastructure, Inc.; Dalton, Olmsted & Fuglevand, Inc.; and Floyd|Snider, Inc. (AMEC et al.). 2013. Construction and Post-Construction Sediment Monitoring Quality Assurance Project Plan, Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project, Boeing Plant 2, Seattle/Tukwila, Washington. Prepared for The Boeing Company, Seattle, Washington.

Abbreviation(s)

ft = feet
HPAHs = high-molecular-weight polycyclic aromatic hydrocarbons
LPAHs = low-molecular-weight polycyclic aromatic hydrocarbons
mg/kg = milligram(s) per kilogram
mg/kg OC = milligram(s) per kilogram organic carbon
MLLW = mean lower low water
NC = not collected
NE = not established
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RL = reporting limit
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = microgram(s) per kilogram
µg/kg Dry-Weight = microgram(s) per kilograms dry weight
WAC = Washington Administrative Code

TABLE 3

DIOXINS AND FURANS ANALYTICAL RESULTS [1, 2]
Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Area		In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW																																			
Location		SD-PCM001						SD-PCM031			SD-PCM031			SD-PCM004												SD-PCM008											
Monitoring Year		Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
Collection Date		3/11/2015			3/9/2016			3/20/2018			6/25/2020			3/11/2015			3/9/2016			3/19/2018			6/25/2020			2/24/2015			3/10/2016			3/20/2018			6/24/2020		
Sample Depth (ft)		0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
Sample ID		SD-PCM00115			SD-PCM00116			SD-PCM03118			SD-PCM03120			SD-PCM00415			SD-PCM00416			SD-PCM00418			SD-PCM00420			SD-PCM00815			SD-PCM00816			SD-PCM00818			SD-PCM00820		
Analyte		Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Dioxins and Furans (ng/kg)	**TEF [3]**																																				
2,3,7,8-TCDD	1	0.131	JEMPC		0.0336	U		0.06	U		0.076	U	UJ	0.134	JEMPC		0.196	JEMPC		0.055	U		0.08	U		0.0252	U		0.0339	U		0.034	U		0.08	U	
2,3,7,8-TCDF	0.1	0.0438	U		0.0711	U		0.101	U		0.567	EMPC,J	EMPC,UJ	0.0579	U		0.165	JEMPC		0.121	U		0.096	U		0.031	U		0.0439	U		0.058	U		0.116	U	
1,2,3,7,8-PeCDD	1	0.0597	JEMPC		0.0711	U		0.18	EMPC,J	EMPC,U	0.13	U	UJ	0.03	U		0.309	J		0.097	U		0.105	U		0.0329	U		0.0698	JEMPC		0.06	U		0.193	U	
1,2,3,7,8-PeCDF	0.03	0.133	JEMPC		0.0928	JEMPC		0.071	U		0.196	J,B	UJ	0.292	JEMPC		0.174	JX	UJ	0.111	U		0.093	U		0.0717	BJEMPC	J	0.0518	JEMPC		0.056	U		0.123	U	
2,3,4,7,8-PeCDF	0.3	0.0537	U		0.0612	U		0.249	EMPC,J	EMPC,U	0.296	J,B	UJ	0.158	BJEMPC	U	0.228	JEMPC		0.115	U		0.093	U		0.0349	U		0.0518	U		0.065	J		0.113	U	
1,2,3,4,7,8-HxCDD	0.1	0.0498	JEMPC		0.128	JEMPC		0.233	EMPC,J	EMPC,U	0.274	J,B	UJ	0.0579	J		0.39	J		0.223	EMPC,J	EMPC,U	0.31	EMPC,J	EMPC,U	0.031	U		0.13	JEMPC		0.061	U		0.388	J	
1,2,3,6,7,8-HxCDD	0.1	0.0557	U		0.395	BJEMPC	UJ	0.837	EMPC,J	EMPC,U	1.08	B	J	0.0699	BJEMPC	U	1.16			0.744	EMPC,J	EMPC,U	4			0.0329	U		0.179	BJEMPC	UJ	0.232	EMPC,J	EMPC,U	4.9		J
1,2,3,7,8,9-HxCDD	0.1	0.0995	JEMPC		0.347	BJ	J	0.562	EMPC,J	EMPC,U	0.678	J	J	0.0639	JEMPC		0.842	BJ		0.545	J		0.703	J		0.0388	JEMPC		0.0837	BJEMPC	J	0.159	EMPC,J	EMPC,U	0.928	J	
1,2,3,4,7,8-HxCDF	0.1	0.0896	BJ	J	0.207	J		0.424	J		0.611	J,B	UJ	0.124	BJEMPC	J	0.72	J		0.371	J		0.56	EMPC,J	EMPC,U	0.0349	U		0.0937	U		0.146	EMPC,J	EMPC,U	0.913	J	
1,2,3,6,7,8-HxCDF	0.1	0.145	BJEMPC	U	0.13	JEMPC		0.277	EMPC,J	EMPC,U	0.351	EMPC,J,B	EMPC,UJ	0.218	BJEMPC	U	0.331	JEMPC		0.255	J		0.201	J		0.0329	BJEMPC	U	0.0937	U		0.034	U		0.293	J	
1,2,3,7,8,9-HxCDF	0.1	0.117	BJ	U	0.0928	BJ	UJ	0.178	EMPC,J	EMPC,U	0.132	J	J	0.164	BJEMPC	U	0.12	BJEMPC	UJ	0.103	EMPC,J	EMPC,U	0.137	J		0.0659	BJEMPC	U	0.12	U		0.049	U		0.131	U	
2,3,4,6,7,8-HxCDF	0.1	0.0637	BJEMPC	J	0.148	JEMPC		0.426	J		0.435	EMPC,J,B	EMPC,UJ	0.108	BJ	J	0.433	J		0.277	EMPC,J	EMPC,U	0.471	EMPC,J	EMPC,U	0.0368	BJEMPC	J	0.0977	U		0.102	EMPC,J	EMPC,U	0.609	J	
1,2,3,4,6,7,8-HpCDD	0.01	1.14	B	J	8.79	B	J	17.9			23	B	J	0.865	BJ	J	30.1			20.9			314	B		0.587	BJEMPC	U	3.26	B	U	6.57			351	B	J
1,2,3,4,6,7,8-HpCDF	0.01	0.129	BJEMPC	U	2.19			3.42	EMPC,J	EMPC,U	5.05	B	J	0.246	BJEMPC	U	6.41			3.74			30.6	B		0.095	BJEMPC	J	0.483	J		1.4			35.8	B	J
1,2,3,4,7,8,9-HpCDF	0.01	0.0438	J		0.113	J		0.209	EMPC,J	EMPC,U	0.317	J	J	0.0759	J		0.487	JEMPC		0.379	EMPC,J	EMPC,U	3.08			0.031	U		0.0518	U		0.097	J		3.33		
OCDD	0.0003	8.77	B	U	86.3	B	J	130			151	B	J	5.46	B	U	268			177			3130	B		3.76	B	U	29.4	B	U	57.8			3230	B	J
OCDF	0.0003	0.392	J		8.21			9.14			10.7	B	J	0.25	J		20.4			14			275	B		0.0523	U		1.27	BJEMPC	UJ	4.95			292	B	J
Total HpCDD		3.17		J	22.6	EMPC	J	38.8			44.6		J	2.42		J	71.8			53.4			422			1.48	EMPC	U	8.76	EMPC	U	17.2			471		
Total HpCDF		0.356	EMPC	J	7.71			9.83			14.2		J	0.626	EMPC	J	19.9	EMPC		12.5			191			0.179	EMPC	J	1.46			4.82			215		
Total HxCDD		1.1	EMPC	J	5.2	EMPC	J	6.75			7.03		J	1.06	EMPC	J	11.7	EMPC		6.76			9.97			0.469	EMPC	J	2.7	EMPC	J	1.98			6.21		
Total HxCDF		0.912	EMPC	J	3.08	EMPC		6.84			6.99		J	2.07	EMPC	J	9.38	EMPC		5.59			18.4			0.39	EMPC	J	0.488	EMPC		1.85			26.1		
Total PeCDD		0.199	EMPC		1.03	EMPC	J	2			0.207		J	0.126	EMPC		2.63	EMPC		0.906			0.076			0.0329	U		0.459	EMPC	U		U		0.316		
Total PeCDF		1.19	EMPC	J	1.34	EMPC		4.72			3.21		J	2.9	EMPC	J	4.86	EMPC		2.55			0.696			0.333	EMPC	J	0.255	EMPC		0.742			1.93		
Total TCDD		0.972	EMPC		1.4	EMPC	U	0.856			0.592		J	0.436	EMPC		2.09	EMPC	J	0.112			0.303			0.565			0.926	EMPC	U	0.235			0.631		
Total TCDF		1.5	EMPC	J	0.993	EMPC		3.13			2.66		J	2.57	EMPC	J	4.69	EMPC		0.867			0.04	U		0.303	EMPC	J	0.0652	EMPC		0.482			1.12		
WHO 2005 [3] TEQ (ND = 0 including EMPC)		0.27			0.195			0.306			0.521		J	0.28			1.12			0.421			5.00			0.03			0.0048			0.119			5.76		J
WHO 2005 [3] TEQ (ND = 1/2 EDL including EMPC)		0.28			0.306			0.592			0.783		J	0.3			1.29			0.591			5.18			0.07			0.128			0.209			5.93		J

TABLE 3

DIOXINS AND FURANS ANALYTICAL RESULTS [1, 2]
Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Area		In-water Dredging Area Samples Below -5 feet MLLW																																			
Location		SD-PCM010												SD-PCM015												SD-PCM019											
Monitoring Year		Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
Collection Date		3/11/2015			3/9/2016			3/19/2018			6/25/2020			3/11/2015			3/10/2016			3/19/2018			6/25/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020		
Sample Depth (ft)		0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
Sample ID		SD-PCM01015			SD-PCM01016			SD-PCM01018			SD-PCM01020			SD-PCM01515			SD-PCM01516			SD-PCM01518			SD-PCM01520			SD-PCM01915			SD-PCM01916			SD-PCM01918			SD-PCM01920		
Analyte		Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Dioxins and Furans (ng/kg)	**TEF [3]**																																				
2,3,7,8-TCDD	1	0.164	JEMPC		0.19	JEMPC		0.337	EMPC,J	EMPC,U	0.486	EMPC,J	EMPC,U	0.0299	U		0.0277	U		0.077	EMPC,J	EMPC,U	0.083	U		0.124	JEMPC		0.0456	U		0.035	U		0.076	U	
2,3,7,8-TCDF	0.1	0.0818	J		0.234	J		0.546	J		1.02			0.0539	JEMPC		0.0257	U		0.055	U		0.15	U		0.0415	U		0.0342	U		0.084	U		0.119	U	
1,2,3,7,8-PeCDD	1	0.0439	U		0.377	J		0.934	J		1.89			0.0359	U		0.145	J		0.065	U		0.163	U		0.0592	JEMPC		0.0684	U		0.085	EMPC,J	EMPC,U	0.173	U	
1,2,3,7,8-PeCDF	0.03	0.134	J		0.254	JEMPC		0.43	X,J	J	0.766	X,J	J	0.176	J		0.0911	JEMPC		0.056	U		0.099	U		0.118	BJEMPC	J	0.101	J		0.077	J		0.099	U	
2,3,4,7,8-PeCDF	0.3	0.0658	BJEMPC	U	0.322	J		1.1			1.56	EMPC		0.0778	BJ	U	0.0396	JEMPC		0.053	U		0.099	U		0.0395	U		0.0665	U		0.102	J		0.098	U	
1,2,3,4,7,8-HxCDD	0.1	0.0658	JEMPC		0.391	JEMPC		1.4			3.23			0.0299	U		0.0574	U		0.053	U		0.153	U		0.0415	U		0.0722	U		0.115	EMPC,J	EMPC,U	0.185	U	
1,2,3,6,7,8-HxCDD	0.1	0.201	BJEMPC	U	1.34			5.52			35.9			0.0559	BJ	U	0.131	BJ	UJ	0.071	EMPC,J	EMPC,U	0.323	EMPC,J	EMPC,U	0.101	BJEMPC	U	0.0741	U		0.427	J		0.483	J	
1,2,3,7,8,9-HxCDD	0.1	0.104	JEMPC		0.841	JEMPC		2.61	EMPC		6.88			0.0379	JEMPC		0.216	BJEMPC	J	0.056	U		0.227	EMPC,J	EMPC,U	0.109	JEMPC		0.0779	U		0.267	J		0.197	U	
1,2,3,4,7,8-HxCDF	0.1	0.156	BJEMPC	J	1.58			4.17			10.6			0.136	BJEMPC	J	0.0653	JEMPC		0.039	U		0.273	J		0.0533	BJEMPC	J	0.0608	U		0.349	J		0.252	EMPC,J	EMPC,U
1,2,3,6,7,8-HxCDF	0.1	0.138	BJEMPC	U	0.52	J		1.42			2.86			0.176	BJ	U	0.0851	JEMPC		0.04	U		0.092	U		0.0987	BJEMPC	U	0.057	U		0.112	J		0.086	U	
1,2,3,7,8,9-HxCDF	0.1	0.144	BJEMPC	U	0.421	J		0.669	EMPC,J	EMPC,U	1.7	EMPC		0.144	BJ	U	0.101	BJEMPC	UJ	0.054	U		0.114	U		0.101	BJEMPC	U	0.0856	U		0.124	EMPC,J	EMPC,U	0.108	U	
2,3,4,6,7,8-HxCDF	0.1	0.0598	BJEMPC	J	0.564	J		1.78			4.98	EMPC		0.128	BJEMPC	J	0.0495	J		0.04	U		0.082	U		0.0454	U		0.0646	U		0.115	J		0.08	U	
1,2,3,4,6,7,8-HpCDD	0.01	4.69	B		39.6			179			2260	B		0.862	BJ	J	1.91	B	U	1.36	EMPC,J	EMPC,U	9.33	B		1.73	B	U	1.25	B	U	11.1			12.5	B	
1,2,3,4,6,7,8-HpCDF	0.01	0.816	JEMPC		10.1			31.5			258	B		0.228	BJ	U	0.226	JEMPC		0.269	J		1.87	B		0.193	BJ	J	0.202	JEMPC		2.34			2.33	B	
1,2,3,4,7,8,9-HpCDF	0.01	0.116	JEMPC		1.03			2.86			22.6			0.0579	JEMPC		0.0693	U		0.045	U		0.192	U		0.0336	U		0.0837	U		0.165	J		0.292	U	
OCDD	0.0003	31.8	B	J	392			1660			19300	E,B	J	6.47	B	U	16.9	B	U	10.3			101	B		9.62	B	U	9.95	B	U	103			106	B	
OCDF	0.0003	1.84	J		31.7			145			1910	B		0.571	J		0.941	BJEMPC	UJ	0.813	EMPC,J	EMPC,U	5.41	B		0.075	U		0.451	BJEMPC	UJ	6.79			6.8	B	
Total HpCDD		12.6			92.6			467			3230			2		J	4.68	EMPC	U	3.52			19.1			5.08		U	2.81		U	26.7			24.3		
Total HpCDF		2.58	EMPC		41.1	EMPC		130			1470			0.808	EMPC		0.492	EMPC	U	0.887			6.44			0.259	EMPC	J	0.66	EMPC	J	7.89			7.77		
Total HxCDD		2.55	EMPC		13.7	EMPC		48			141			0.414	EMPC	J	1.62	EMPC	J	0.414			1.27			1.9	EMPC	J	0.586	EMPC	J	3.5			0.483		
Total HxCDF		1.97	EMPC	J	16.6	EMPC		51.6			235			1.5	EMPC	J	0.507	EMPC		0.267			2.48			0.7	EMPC	J	0.267	EMPC	J	3.82			3.03		
Total PeCDD		0.448	EMPC		3.27	EMPC		7.36			8.3			0.0403	EMPC		0.407	EMPC	U	0.992			0.062	U		0.421	EMPC		0.046		U	0.38			0.073	U	
Total PeCDF		1.89	EMPC	J	6.39	EMPC		20.1			12.5			2.17	EMPC	J	0.297	EMPC		0.054			0.231			0.889	EMPC	J	0.176	EMPC		1.49			0.483		
Total TCDD		0.746	EMPC		2.57	EMPC	J	2.51			2.64			0.348	EMPC		0.698	EMPC	U	0.284			0.229			0.64	EMPC		0.522		U	0.447			0.04	U	
Total TCDF		2	EMPC	J	5.2	EMPC		14.5			25			1.87	EMPC	J	0.065			0.992			0.063	U		0.896	EMPC	J	0.0477			0.659			0.111		
WHO 2005 [3] TEQ (ND = 0 including EMPC)		0.35			1.57			5.7			39.7		J	0.12			0.15			0.006			0.17		J	0.26			0.003			0.329			0.23		J
WHO 2005 [3] TEQ (ND = 1/2 EDL including EMPC)		0.37			1.73			5.9			40.5		J	0.15			0.219			0.113			0.37			0.27			0.106			0.405			0.424		J

Note(s)

1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   B = analyte detected in an associated method blank at a concentration greater than 1/2 the RL or 5% of the analyte concentration in the sample.
   EMPC = value calculated for 2,3,7,8-substituted isomers for which the quantitation and/or confirmation ion(s) has signal to noise in excess of 2.5,But does not meet identification criteria.
   J = estimated concentration when the value is less than the RL.
2. Validation qualifiers (Q2) are defined as follows:
   J = analyte positively identified; value is approximate concentration in sample.
   U = material was analyzed for, but was not detected above the level of the associated value.
3. Source: Van den Berg et al., 2006.

Abbreviation(s)

EDL = estimated detection limit
EMPC = estimated maximum possible concentration
ft = feet
MLLW = mean lower low water
ND = non detected
ng/kg = nanogram(s) per kilogram
Q1 = laboratory qualifiers
Q2 = validation qualifiers
RL = reporting limit
TEF = toxicity equivalency factors
TEQ = toxic equivalency quotient

Reference(s)

Van den Berg, M., Birnbaum, L.S., Denison, M., De Vito, M., Farland, W., Feeley, M., Fiedler, H., Hakansson, H., Hanberg, A., Haws, L., Rose, M., Safe, S., Schrenk, D., Tohyama, C., Tritscher, A., Toumisto, J., Tysklind, M., Walker, N., and Peterson, R.E. 2006 (WHO). The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds. Toxicological Sciences, v. 93(2), p. 223-241.

TABLE 4

GRAIN-SIZE ANALYSIS RESULTS [1,2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Area	In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW																																			
Location	SD-PCM002												SD-PCM005												SD-PCM007											
Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
Collection Date	3/10/2015			3/9/2016			3/19/2018			6/25/2020			3/10/2015			3/10/2016			3/19/2018			6/25/2020			2/24/2015			3/10/2016			3/20/2018			6/24/2020		
Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
Sample ID	SD-PCM00215			SD-PCM00216			SD-PCM00218			SD-PCM00220			SD-PCM00515			SD-PCM00516			SD-PCM00518			SD-PCM00520			SD-PCM00715			SD-PCM00716			SD-PCM00718			SD-PCM00720		
Analyte	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Grain Size (%)																																				
Gravel	26.7			29.7			26.8			3.8		J	27.5			20.8			22.9			21.6		J	25.8			25.7			32.8			30.4		J
Very Coarse Sand	26.6			24.4			26.7			8.1			24.7			20.6			19.5			29.3			25.6			24.5			26.9			25.7		
Coarse Sand	26.8			24.8			23.3			9.5			27.4			27.9			24.9			29.2			25.1			22.5			22.4			22.2		
Medium Sand	14.6			13.1			13.9			7.7			16			21.1			17.3			13.3			17.7			15.7			12.5			12.3		
Fine Sand	2.5			2.2			2.7			5.2			2.6			5.1			4			2.0			3.0			3.4			2.3			2.4		
Very Fine Sand	0.4			0.6			1			11.7			0.5			1.1			1			0.9			0.3			1.9			0.7			0.8		
Coarse Silt	2.3	U		0.4			0.6		J	19.4			1.1	U		3.5	U		1		J	0.2			2.4	U		1.4			2.4	U		0.5		
Medium Silt	2.3	U		1.4			1.6			10.6			1.1	U		3.5	U		2.7			1.1			2.4	U		1.4			2.4	U		1.5		
Fine Silt	2.3	U		0.9			1.3			10.1			1.1	U		3.5	U		2.7			1.0			2.4	U		1.1			2.4	U		1.1		
Very Fine Silt	2.3	U		0.8			0.8			6.3			1.1	U		3.5	U		1.7			0.2			2.4	U		0.9			2.4	U		1.0		
8-9 Phi Clay	2.3	U		0.6			0.4			3.6			1.1	U		3.5	U		0.8			0.4			2.4	U		0.6			2.4	U		0.7		
9-10 Phi Clay	2.3	U		0.2			0.2			1.5			1.1	U		3.5	U		0.5			0.3			2.4	U		0.3			2.4	U		0.6		
> 10 Phi Clay	2.3	U		0.6			0.5			2.4			1.1	U		3.5	U		1			0.5			2.4	U		0.5			2.4	U		0.6		
Total Fines	2.3			5			5.4			54.0			1.1			3.5			10.4			3.7			2.4			6.3			2.4			6.0		

TABLE 4

GRAIN-SIZE ANALYSIS RESULTS [1,2]

Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Area	In-water Dredging Area Samples Below -5 feet MLLW																																			
Location	SD-PCM011												SD-PCM014												SD-PCM018											
Monitoring Year	Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)			Year 0 (2015)			Year 1 (2016)			Year 3 (2018)			Year 5 (2020)		
Collection Date	3/10/2015			3/9/2016			3/19/2018			6/25/2020			3/10/2015			3/9/2016			3/19/2018			6/25/2020			2/24/2015			3/11/2016			3/20/2018			6/24/2020		
Sample Depth (ft)	0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33			0 - 0.33		
Sample ID	SD-PCM01115			SD-PCM01116			SD-PCM01118			SD-PCM01120			SD-PCM01415			SD-PCM01416			SD-PCM01418			SD-PCM01420			SD-PCM01815			SD-PCM01816			SD-PCM01818			SD-PCM01818		
Analyte	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Grain Size (%)																																				
Gravel	28			27.8			31.1			14.3		J	17.6			28.4			26.2			19.2		J	22.9			28			19.4			23.5		J
Very Coarse Sand	28			29			22.5			15.7			25.2			25.1			25			15.8			23.6			29.8			23.6			23.8		
Coarse Sand	26.3			23.3			22.8			18.2			34.8			18.3			27.4			17.6			28.2			29.6			24.6			28.5		
Medium Sand	14.5			10.5			10.9			13.4			19.4			8.5			13.7			11.1			19.8			11			10.7			13.2		
Fine Sand	2.3			1.9			2.4			6.1			2.4			2.1			2.3			7.0			3.4			0.6			1.6			0.5		
Very Fine Sand	0.4			1.9			3.1			11.2			0.4			2.7			1.4			8.0			0.7			0.2			1.9			1.3		
Coarse Silt	0.5	U		1.4			1.6		J	6.1			0.2	U		4.7			1		J	6.6			1.4	U		0.9	U		5.2		J	3.3		
Medium Silt	0.5	U		1.3			2			5.3			0.2	U		3.2			1			5.4			1.4	U		0.9	U		4.1			1.5		
Fine Silt	0.5	U		1			1.4			4.2			0.2	U		2.7			0.7			4.1			1.4	U		0.9	U		3.6			1.6		
Very Fine Silt	0.5	U		0.6			0.9			2.4			0.2	U		1.7			0.5			3.1			1.4	U		0.9	U		2.3			1.1		
8-9 Phi Clay	0.5	U		0.5			0.5			1.5			0.2	U		0.9			0.3			1.3			1.4	U		0.9	U		1.2			0.7		
9-10 Phi Clay	0.5	U		0.1			0.2			0.4			0.2	U		0.5			0.1	U		0.3			1.4	U		0.9	U		0.6			0.2		
> 10 Phi Clay	0.5	U		0.7			0.7			1.1			0.2	U		1.3			0.4			0.5			1.4	U		0.9	U		1.3			0.7		
Total Fines	0.5			5.6			7.3			21.0			0.2			14.8			3.9			21.3			1.4			0.9			18.3			9.1		

Note(s)
1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
2. Validation qualifiers (Q2) are defined as follows:
   J = value is approximate concentration in sample.

Abbreviation(s)
ft = feet
MLLW = mean lower low water
Q1 = laboratory qualifiers
Q2 = validation qualifiers

TABLE 5

FREQUENCY OF DETECTION OF CHEMICAL ANALYTES
Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

		Year 0 (2015)				Year 1 (2016)				Year 3 (2018)				Year 5 (2020)			
Analyte	**SMS SQS Criteria**	**Number of Analyses**	**Number of Detections**	**Minimum Detected Value**	**Maximum Detected Value**	**Number of Analyses**	**Number of Detections**	**Minimum Detected Value**	**Maximum Detected Value**	**Number of Analyses**	**Number of Detections**	**Minimum Detected Value**	**Maximum Detected Value**	**Number of Analyses**	**Number of Detections**	**Minimum Detected Value**	**Maximum Detected Value**
Conventionals																	
Total Organic Carbon (percent)	–	40	40	0.034	8.7	40	40	0.038	7.27	37	37	0.05	4.5	37	37	0.05	4.94
Metals (mg/kg)																	
Arsenic	57	40	40	1.2	15	40	40	1.8	15	37	37	2.01	14	37	37	2.11	15.5
Cadmium	5.1	40	22	0.2	0.5	40	0	–	–	37	37	0.02	0.29	37	37	0.03	0.31
Chromium	260	40	40	13.2	34.5	40	40	12.1	30	37	37	13.8	30.3	37	37	11.5	35.3
Copper	390	40	40	11.1	50	40	40	11.3	55	37	37	11	58.1	37	37	11.6	61.7
Lead	450	40	9	2	20	40	30	2	20	37	37	1.63	22.2	37	37	1.53	24.5
Mercury	0.41	40	6	0.02	0.1	40	10	0.03	0.08	37	30	0.00285	0.579	37	37	0.0065	0.145
Silver	6.1	40	0	–	–	40	0	–	–	37	37	0.03	0.29	37	24	0.04	0.3
Zinc	410	40	40	25	138	40	40	23	151	37	37	23.9	133	37	37	25.9	122
Non-ionizable Organic Compounds																	
Aromatic Hydrocarbons (µg/kg)																	
Total LPAHs																	
Naphthalene	2100	40	2	12	56	40	6	5.8	19	37	7	5.5	12.6	37	2	7.2	10
Acenaphthylene	1300	40	0	–	–	40	0	–	–	37	4	5.1	8.8	37	0	–	–
Acenaphthene	500	40	2	5.6	17	40	1	7.5	7.5	37	5	5.2	17.7	37	2	4.4	64.6
Fluorene	540	40	2	7.5	18	40	2	5.8	10	37	5	6	23.2	37	4	6.1	4
Phenanthrene	1500	40	7	11	130	40	17	5.7	66	37	21	4.8	71.2	37	20	5	185
Anthracene	960	40	3	5.8	110	40	9	5.8	20	37	11	6	37	37	9	6.2	56.4
2-Methylnaphthalene	670	40	1	6.7	6.7	40	2	7.7	7.8	37	5	6.1	11.1	37	1	7.3	7.3
Total HPAHs																	
Fluoranthene	1700	40	9	4.8	140	40	21	5.7	150	37	30	5	194	37	28	5	265
Pyrene	2600	40	8	6.8	130	40	20	6.6	120	37	26	5.5	188	37	29	4.5	229
Benz[a]anthracene	1300	40	3	7.8	40	40	12	5.5	53	37	15	6.9	90.1	37	22	3.6	255
Chrysene	1400	40	5	7.5	110	40	16	7.6	120	37	22	5.1	133	37	25	4.4	466
Total benzofluoranthenes	3200	40	5	10	130	40	17	10	180	37	23	10.2	259	37	29	7.7	264
Benzo[a]pyrene	1600	40	3	6.9	37	40	13	6.8	51	37	14	6.9	92.6	37	15	5.2	91.8
Indeno[1,2,3-c,d]pyrene	600	40	3	6.5	29	40	10	5.9	38	37	12	8.2	38.7	37	13	4.5	62.8
Dibenzo[a,h]anthracene	230	40	8	2.5	13	40	9	4.6	18	37	6	7.2	13.6	37	7	6.4	22.3
Benzo[g,h,i]perylene	670	40	5	12	39	40	10	6.9	49	37	13	7.7	43.9	37	16	4.2	78.8
Chlorinated Benzenes (µg/kg)																	
1,2-Dichlorobenzene	35	40	4	2.8	3.5	40	1	2.8	2.8	37	0	–	–	37	0	–	–
1,4-Dichlorobenzene	110	40	3	2.5	3.4	40	0	–	–	37	0	–	–	37	2	1.2	2.2
1,2,4-Trichlorobenzene	31	40	3	2.6	3.5	40	0	–	–	37	0	–	–	37	0	–	–
Hexachlorobenzene	22	40	3	3.2	3.8	40	2	3.1	3.2	37	0	–	–	37	1	1.3	1.3

TABLE 5

FREQUENCY OF DETECTION OF CHEMICAL ANALYTES
Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

		Year 0 (2015)				Year 1 (2016)				Year 3 (2018)				Year 5 (2020)			
Analyte	SMS SQS Criteria	Number of Analyses	Number of Detections	Minimum Detected Value	Maximum Detected Value	Number of Analyses	Number of Detections	Minimum Detected Value	Maximum Detected Value	Number of Analyses	Number of Detections	Minimum Detected Value	Maximum Detected Value	Number of Analyses	Number of Detections	Minimum Detected Value	Maximum Detected Value
Phthalate Esters (µg/kg)																	
Dimethyl phthalate	71	40	2	2.7	3.1	40	4	2.4	8.7	37	6	1.6	14.8	37	10	0.9	5.8
Diethyl phthalate	200	40	5	19	76	40	2	22	24	37	6	35.5	115	37	0	–	–
Di-n-butyl phthalate	1400	40	0	–	–	40	0	–	–	37	5	5.7	341	37	1	6.1	6.1
Butyl benzyl phthalate	63	40	12	2.5	59	40	10	3.2	39	37	19	2.1	48.9	37	15	0.6	18
Bis[2-ethylhexyl] phthalate	1300	40	4	29	410	40	12	29	260	37	14	28.9	279	37	11	25.2	210
Di-n-octyl phthalate	6200	40	1	40	40	40	3	9.6	23	37	2	13.2	26.4	37	0	–	–
Miscellaneous (µg/kg)																	
Dibenzofuran	540	40	1	5.6	5.6	40	2	6	7.9	37	4	5.1	10.2	37	4	4.8	56.4
Hexachlorobutadiene	11	40	3	2.4	3	40	0	–	–	37	0	–	–	37	0	–	–
N-nitrosodiphenylamine	28	40	0	–	–	40	0	–	–	37	0	–	–	37	1	1.8	1.8
Ionizable Organic Compounds (µg/kg)																	
Phenol	420	40	11	8.9	570	40	14	8.5	140	37	16	8.5	192	37	16	7.6	38.8
2-Methylphenol	63	40	1	12	12	40	2	2.6	5.9	37	2	1.2	2.9	37	22	0.8	3.8
4-Methylphenol	670	40	4	19	130	40	3	20	30	37	2	15.3	36.6	37	5	13.7	41.7
2,4-Dimethylphenol	29	40	0	–	–	40	0	–	–	37	0	–	–	37	2	3.9	4.4
Pentachlorophenol	360	40	2	13	18	40	1	12	12	37	0	–	–	37	0	–	–
Benzyl alcohol	57	40	3	28	360	40	7	12	200	37	9	15.2	65.6	37	4	19.7	50.9
Benzoic acid	650	40	6	62	2600	40	11	65	710	37	8	62	343	37	3	141	311
PCBs (µg/kg)																	
Aroclor 1016	–	40	0	–	–	40	0	–	–	37	0	–	–	37	0	–	–
Aroclor 1221	–	40	0	–	–	40	0	–	–	37	0	–	–	37	0	–	–
Aroclor 1232	–	40	0	–	–	40	0	–	–	37	0	–	–	37	0	–	–
Aroclor 1242	–	40	0	–	–	40	0	–	–	37	0	–	–	37	0	–	–
Aroclor 1248	–	40	0	–	–	40	12	2.1	32	37	21	1.7	49.5	37	29	1.6	54.1
Aroclor 1254	–	40	3	5.2	68	40	19	3.6	66	37	27	1.7	45.9	37	33	2.5	55
Aroclor 1260	–	40	5	3.6	53	40	20	2.2	29	37	27	1.2	41.2	37	33	1.7	91.2
Dioxins and Furans (ng/kg) [1]																	
2,3,7,8-TCDD	–	6	4	0.124	0.164	6	2	0.19	0.196	6	2	0.077	0.337	6	0	–	–
2,3,7,8-TCDF	–	6	2	0.0539	0.0818	6	2	0.165	0.234	6	1	0.546	0.546	6	1	1.02	1.02
1,2,3,7,8-PeCDD	–	6	2	0.0592	0.0597	6	4	0.0698	0.377	6	3	0.085	0.934	6	1	1.89	1.89
1,2,3,7,8-PeCDF	–	6	6	0.0717	0.292	6	5	0.0518	0.254	6	2	0.077	0.43	6	1	0.766	0.766
2,3,4,7,8-PeCDF	–	6	0	–	–	6	3	0.0396	0.322	6	4	0.065	1.1	6	1	1.56	1.56
1,2,3,4,7,8-HxCDD	–	6	3	0.0498	0.0658	6	4	0.128	0.391	6	4	0.115	1.4	6	2	0.388	3.23
1,2,3,6,7,8-HxCDD	–	6	0	–	–	6	2	1.16	1.34	6	6	0.071	5.52	6	5	0.483	35.9
1,2,3,7,8,9-HxCDD	–	6	6	0.0379	0.109	6	5	0.0837	0.842	6	5	0.159	2.61	6	4	0.678	6.88
1,2,3,4,7,8-HxCDF	–	6	5	0.0533	0.156	6	4	0.0653	1.58	6	5	0.146	4.17	6	3	0.273	10.6
1,2,3,6,7,8-HxCDF	–	6	0	–	–	6	4	0.0851	0.52	6	4	0.112	1.42	6	3	0.201	2.86

TABLE 5

FREQUENCY OF DETECTION OF CHEMICAL ANALYTES
Post-Construction Surface Sediment Monitoring—Year 5
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

		Year 0 (2015)				Year 1 (2016)				Year 3 (2018)				Year 5 (2020)			
Analyte	SMS SQS Criteria	Number of Analyses	Number of Detections	Minimum Detected Value	Maximum Detected Value	Number of Analyses	Number of Detections	Minimum Detected Value	Maximum Detected Value	Number of Analyses	Number of Detections	Minimum Detected Value	Maximum Detected Value	Number of Analyses	Number of Detections	Minimum Detected Value	Maximum Detected Value
Dioxins and Furans (ng/kg) (cont.)																	
1,2,3,7,8,9-HxCDF	–	6	0	–	–	6	1	0.421	0.421	6	4	0.103	0.669	6	3	0.132	1.7
2,3,4,6,7,8-HxCDF	–	6	5	0.0368	0.128	6	4	0.0495	0.564	6	5	0.102	1.78	6	2	0.609	4.98
1,2,3,4,6,7,8-HpCDD	–	6	4	0.862	4.69	6	3	8.79	39.6	6	6	1.36	179	6	6	9.33	2260
1,2,3,4,6,7,8-HpCDF	–	6	3	0.095	0.816	6	6	0.202	10.1	6	6	0.269	31.5	6	6	1.87	258
1,2,3,4,7,8,9-HpCDF	–	6	4	0.0579	0.116	6	3	0.113	1.03	6	5	0.097	2.86	6	4	0.317	22.6
OCDD	–	6	1	31.8	31.8	6	3	86.3	392	6	6	10.3	1660	6	6	101	19300
OCDF	–	6	4	0.25	1.84	6	3	8.21	31.7	6	6	0.813	145	6	6	5.41	1910
Total HpCDD	–	6	4	2	12.6	6	3	22.6	92.6	6	6	3.52	467	6	6	19.1	3230
Total HpCDF	–	6	6	0.179	2.58	6	5	0.66	41.1	6	6	0.887	130	6	6	6.44	1470
Total HxCDD	–	6	6	0.414	2.55	6	6	0.586	13.7	6	6	0.414	48	6	6	0.483	141
Total HxCDF	–	6	6	0.39	2.07	6	6	0.267	16.6	6	6	0.267	51.6	6	6	2.48	235
Total PeCDD	–	6	5	0.126	0.448	6	3	1.03	3.27	6	5	0.38	7.36	6	4	0.076	8.3
Total PeCDF	–	6	6	0.333	2.9	6	6	0.176	6.39	6	6	0.054	20.1	6	6	0.231	12.5
Total TCDD	–	6	6	0.348	0.972	6	2	2.09	2.57	6	6	0.112	2.51	6	5	0.229	2.64
Total TCDF	–	6	6	0.303	2.57	6	6	0.0477	5.2	6	6	0.482	14.5	6	4	0.111	25

Note(s)
1. Detected values for dioxins/furans include EMPC values. The frequency of detections reported in the Year 0 monitoring report (Amec Foster Wheeler et al., 2015) for dioxins/furans did not include EMPC values as detected compounds.

Abbreviation(s)
EMPC = estimated maximum possible concentration
HPAHs = high-molecular-weight polycyclic aromatic hydrocarbons
LPAHs = low-molecular-weight polycyclic aromatic hydrocarbons
mg/kg = milligram(s) per kilogram
ng/kg = nanogram(s) per kilogram
PCBs = polychlorinated biphenyls
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = microgram(s) per kilogram
WAC = Washington Administrative Code

Reference(s)
Amec Foster Wheeler Environment & Infrastructure, Inc., Dalton, Olmsted & Fuglevand, Inc., and Floyd|Snider, Inc. (Amec Foster Wheeler et al.). 2015. Post-Construction Surface Sediment Monitoring—Year 0. Appendix L in Corrective Measure Implementation Report, Duwamish Sediment Other Area and Southwest Bank Corrective Measure, Boeing Plant 2, Seattle/Tukwila, Washington. Prepared for The Boeing Company, Seattle, Washington. June 2016.

Appendix A

Qualitative Sample Characteristics Forms and Photographs

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 01 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196164	1273107	7.4	f	t		0.2 Grab	11:00

Penetration				
Depth	Unit	Initials	Initials	Weather
	c m			

Silt Layer Depths: **Left:** _____

Center: _____

Right: _____

Surficial sediment characteristics:

Biological: _____ % **Debris:** _____ % **Oil Sheen:** None Trace (<5%) _____ %

Moisture
Very Wet Wet Moist Damp Dry

Color **(Circle major & underline modifying)**
Light Medium Dark Olive Gray Brown Black Other _____

Major Constituent **(Circle major & underline modifying)**
Fine Medium Coarse Gravel Sand Silt Clay _____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay _____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color **(Circle major & underline modifying)**
Light Medium Dark Olive Gray Brown Black Other _____

Major Constituent **(Circle major & underline modifying)**
Fine Medium Coarse Gravel Sand Silt Clay _____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay _____

Biological: _____ % **Debris:** _____ % **Oil Sheen:** None Trace (<5%) _____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM00120 Initials: GM

QSC Form

Date: 6 / 25 /2020 Time: 11:00

No Sample taken. Coarse Gravel
2 Attempts

Station SD-PCM001 (No Sample Collected)

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/25/20	Boeing PL2	SD-PCM 2 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
197833	1273449	6.1	f	t		0.2 Grab	1045

Penetration					
Depth	Unit		Initials	Initials	Weather
16	c	m	BL		

Silt Layer Depths: Left: 6 cm

Center: 10 cm

Right: 6 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM00220 Initials: GM

QSC Form

Date: 6/25/2020 Time: 1045

- cobbles (rip rap) there

Station SD-PCM002

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/25/20	Boeing PL2	SD-PCM 03 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
197734	1273607	4.3	f	t		0.2 Grab	1030

Penetration					
Depth	Unit		Initials	Initials	Weather
10	c	m	BC		

Silt Layer Depths: Left: 0.2 cm

Center: 0.2 cm

Right: 0.4 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM
SD-PCM00320 Initials: GM
QSC Form
Date: 6/25/2020 Time: 1030

Station SD-PCM003

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 04 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
197465	1273836	7.2	f	t		0.2 Grab	9:45

Penetration					
Depth	Unit		Initials	Initials	Weather
12	c	m	BL		

Silt Layer Depths: Left: 0.1 cm

Center: 0 cm

Right: 0.2 cm

Surficial sediment characteristics:

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM
SD-PCM00420 Initials: GM
QSC Form
Date: 6/25/2020 Time: 9:45

Station SD-PCM004

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 05 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
197126	1274223	10.5	f	t		0.2 Grab	0840

Penetration					
Depth	Unit		Initials	Initials	Weather
14	c	m	BC		

Silt Layer Depths: Left: 1 cm

Center: 2 cm

Right: 3 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet **Wet** Moist Damp Dry

Color (Circle major & underline modifying)
Light **Medium** **Dark** Olive Gray **Brown** Black Other ____

Major Constituent (Circle major & underline modifying)
Fine **Medium** Coarse Gravel **Sand** Silt Clay ____

Minor Constituent with trace
Fine **Medium** Coarse Gravel **Sand** Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose **Loose** Medium Dense Dense Very Dense

Silt / Clay - Very Soft **Soft** Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet **Wet** Moist Damp Dry

Color (Circle major & underline modifying)
Light **Medium** **Dark** Olive **Gray** **Brown** Black Other ____

Major Constituent (Circle major & underline modifying)
Fine **Medium** **Coarse** Gravel **Sand** Silt Clay ____

Minor Constituent with trace
Fine Medium **Coarse** Gravel **Sand** Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

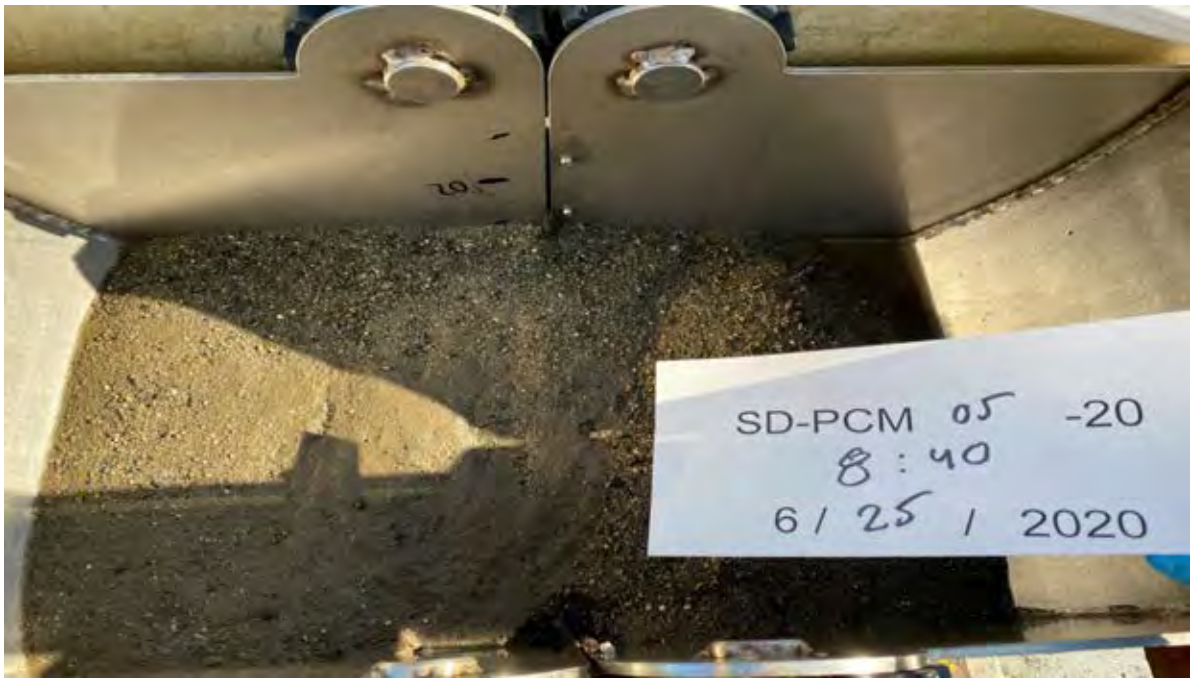
Comments:

Wood Proj. BP2 PCM

SD-PCM00520 Initials: GM

QSC Form

Date: 6 / 25 /2020 Time: 840



Station SD-PCM005

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/24 20	Boeing PL2	SD-PCM 06 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196 [illegible] 756	1274460	5	f	t		0.2 Grab	1045

Penetration				
Depth	Unit	Initials	Initials	Weather
12	c m	BL		

Silt Layer Depths: Left: 1.5 cm Center: 0.5 cm Right: 1.0 cm

Surficial sediment characteristics:

Biological: 35 % **Debris:** 10 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 65 % **Debris:** 65 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

- Wood Proj. BP2 PCM
- SD-PCM00620 Initials: EM
- QSC Form
- Date: 6/24/2020 Time: 1045

Station SD-PCM006

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/24/20	Boeing PL2	SD-PCM 206 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196746	1274657	4.9	f	t		0.2 Grab	1100

Penetration					
Depth	Unit		Initials	Initials	Weather
12	c	m	BL		

Silt Layer Depths: Left: 1 cm

Center: 3 cm

Right: 3 cm

Surficial sediment characteristics:

Biological: 40 % **Debris:** 10 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 65 % **Debris:** 65 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM
SD-PCM20620 Initials: BM
QSC Form
Date: 6/24/2020 Time: 1100

Station SD-PCM206 (Duplicate of Station SD-PCM006)

QUALITATIVE SAMPLE CHARACTERISTICS

Page 1 of 1

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/29/20	Boeing PL2	SD-PCM 07 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196421	1227601	3.6	f	t		0.2 Grab	1520

Penetration				
Depth	Unit	Initials	Initials	Weather
11	c m	BL		

Silt Layer Depths: Left: 1.0 Center: 1.0 Right: 2.5

Surficial sediment characteristics:

Biological: 50 % **Debris:** 10 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 25 % **Debris:** 25 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

- Wood Proj. BP2 PCM
- SD-PCM00720 Initials: GM
- QSC Form
- Date: 6/29/2020 Time: 1520

Station SD-PCM007

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 29 20	Boeing PL2	SD-PCM 08 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196036	1275404	10.1	f	t		0.2 Grab	9:15

Penetration				
Depth	Unit	Initials	Initials	Weather
12	c m	BL		

Silt Layer Depths: **Left:** 1.0cm **Center:** 1.0cm **Right:** 1.5cm

Surficial sediment characteristics:

Biological: 20% % **Debris:** 10% % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 65% % **Debris:** 65% % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM
SD-PCM00820 Initials: GM
QSC Form
Date: 6 / 29 /2020 Time: 9:15

Station SD-PCM008

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 / 20	Boeing PL2	SD-PCM 09 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
195 729	1275768	6.5	f	t		0.2 Grab	9:55

Penetration				
Depth	Unit	Initials	Initials	Weather
11	c m	BC		

Silt Layer Depths: Left: 4cm

Center: 3cm

Right: 5cm

Surficial sediment characteristics:

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:
Wood Proj. BP2 PCM
SD-PCM 09 20 Initials: BM — Did not fully close, cable wedged in clamp.
QSC Form
Date: 6/24/2020 Time: 9:55

Station SD-PCM009

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/25/20	Boeing PL2	SD-PCM 10 20

Coordinates		Water Depth				Time
North	East	Depth	Unit	Rep	Gear	
196751	1273235	17.7	f t		0.2 Grab	0735

Penetration					
Depth	Unit	Initials	Initials	Weather	
19	c m	BC			

Silt Layer Depths: Left: 12 cm

Center: 19 cm

Right: 12 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense NA

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

- Wood Pig BP 2 PCM
- SD-PCM010 26 GM
- QSC Form
- 6/25/20 07:35

Amec Foster Wheeler, 3500 188th St. SW, Suite 601, Lynnwood, WA 98037, (425) 921-4023 Cliff Whitmus

Station SD-PCM010

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 11 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
198199	1272986	16.4	f	t		0.2 Grab	0806

Penetration				
Depth	Unit	Initials	Initials	Weather
13	c m	BL		

Silt Layer Depths: Left: 5 cm

Center: 5 cm

Right: 5 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) <5 %

Comments:

Wood Pal; BP2 PCM
SD-PCM 011 20 GM
QSC Form
6/25/20 0806

Attempt #1 Poor Recovery 7cm
primarily silt with sand

Station SD-PCM011

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 12 20

Coordinates		Water Depth				
North	East	Depth	Unit	Rep	Gear	Time
197898	1273312	11.5	f t		0.2 Grab	11:10

Penetration				
Depth	Unit	Initials	Initials	Weather
15	c m	RC		

Silt Layer Depths: Left: 8 cm Center: 4 cm Right: 2 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM
SD-PCM 12 20 Initials: GM
QSC Form
Date: 6/25/2020 Time: 11:10

Amec Foster Wheeler, 3500 188th St. SW, Suite 601, Lynnwood, WA 98037, (425) 921-4023 Cliff Whitmus

Station SD-PCM012

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/25/20	Boeing PL2	SD-PCM 212 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
197897	1273311	10.8	f	t		0.2 Grab	1130

Penetration				
Depth	Unit	Initials	Initials	Weather
12	c m	BC		

Silt Layer Depths: Left: 0.5cm

Center: 2cm

Right: 2cm

Surficial sediment characteristics:

Biological: 10 % **Debris:** 65 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 65 % **Debris:** 65 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

- Wood Proj. BP2 PCM
- SD-PCM 212 20 Initials: GM
- QSC Form
- Date: 6/25/2020 Time: 1130

Station SD-PCM212 (Duplicate of Station SD-PCM012)

QUALITATIVE SAMPLE CHARACTERISTICS

Page ____ of ____

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	06 / 25 / 20	Boeing PL2	SD-PCM 13 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
197612	127 3630	16.7	f	t		0.2 Grab	10.0

Penetration					
Depth	Unit		Initials	Initials	Weather
17	c	m	[illegible]		

Silt Layer Depths: **Left:** 1.0cm

Center: 0.5 cm

Right: 1.5cm

Surficial sediment characteristics:

Biological: 10 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet **Wet** Moist Damp Dry

Color **(Circle major & underline modifying)**
Light **Medium** **Dark** Olive Gray **Brown** Black Other ____

Major Constituent **(Circle major & underline modifying)**
Fine Medium Coarse Gravel **Sand** Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel **Sand** **Silt** Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft **Soft** Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet **Wet** Moist Damp Dry

Color **(Circle major & underline modifying)**
Light **Medium** **Dark** Olive Gray **Brown** Black Other ____

Major Constituent **(Circle major & underline modifying)**
Fine **Medium** **Coarse** Gravel **Sand** Silt Clay ____

Minor Constituent with trace
Fine Medium **Coarse** Gravel **Sand** Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM
SD-PCM 13 20 Initials: GM
QSC
Date: 6/25/2020 Time: [illegible]

Station SD-PCM013

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 14 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
197322	1273951	1515	f	t		0.2 Grab	925

Penetration					
Depth	Unit		Initials	Initials	Weather
11	c	m	BL		

Silt Layer Depths: **Left:** 3 cm

Center: 4 cm

Right: 2 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM01420 Initials: GM

QSC Form

Date: 6 / 25 /2020 Time: 9:25

Station SD-PCM014

QUALITATIVE SAMPLE CHARACTERISTICS

Page 1 of 1

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 15 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
~~197034~~ 197035	~~1274272~~ 1274275	14.8	f	t		0.2 Grab	0900

Penetration					
Depth	Unit		Initials	Initials	Weather
13	c	m	BC		

Silt Layer Depths: Left: 2 cm

Center: 4 cm

Right: 3 cm

Surficial sediment characteristics:

Biological: 35 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM01520 Initials: GM

QSC Form

Date: 6 / 25 /2020 Time: 0900

Attempt #1 - poor recovery, 8 cm.

Station SD-PCM015

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 20	Boeing PL2	SD-PCM 16 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196 702	1274639	19.1	f	t		0.2 Grab	1030

Penetration					
Depth	Unit		Initials	Initials	Weather
10	c	m	BL		

Silt Layer Depths: **Left:** 2 cm

Center: 1 cm

Right: 1.5 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

- Wood Proj. BP2 PCM
- SD-PCM01620 Initials: BM
- QSC Form
- Date: 6/24/2020 Time: 1030

Station SD-PCM016

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 / 20	Boeing PL2	SD-PCM 17 20

Coordinates		Water Depth					
North	East	Depth	Unit	Rep	Gear	Time
196452	1274920	9.9	f t		0.2 Grab	1540

Penetration				
Depth	Unit	Initials	Initials	Weather
13	c m	BL		

Silt Layer Depths: Left: 2 cm

Center: 0.5 cm

Right: 1.5 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 65 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 65 % **Debris:** 65 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:
- Wood Proj. BP2 PCM
- SD-PCM01720 Initials: GM
- QSC Form
- Date: 6 / 24 /2020 Time: 1540

Amec Foster Wheeler, 3500 188th St. SW, Suite 601, Lynnwood, WA 98037, (425) 921-4023 Cliff Whitmus

Station SD-PCM017

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/24/20	Boeing PL2	SD-PCM 18 20

Coordinates		Water Depth				
North	East	Depth	Unit	Rep	Gear	Time
196157	1275234	10.6	f t		0.2 Grab	1445

Penetration				
Depth	Unit	Initials	Initials	Weather
13	c m	BL		

Silt Layer Depths: Left: 0.5cm

Center: 0.5cm

Right: 0.5cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

- Wood Proj. BP2 PCM
- SD-PCM01820 Initials: GM
- QSC Form
- Date: 6/24/2020 Time: 1445

Station SD-PCM018

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/24/20	Boeing PL2	SD-PCM 218 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196165	1275225	11	f	t		0.2 Grab	1510 ~~1310~~

Penetration					
Depth	Unit		Initials	Initials	Weather
15	c	m	BL		

Silt Layer Depths: Left: 0 Center: 0 Right: 0.5 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM21820 Initials: GM

QSC Form

Date: 6/24/2020 Time: ~~1310~~ 1510

Amec Foster Wheeler, 3500 188th St. SW, Suite 601, Lynnwood, WA 98037, (425) 921-4023 Cliff Whitmus

Station SD-PCM218 (Replicate of Station SD-PCM018)

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/24/20	Boeing PL2	SD-PCM 19 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
155872	1275551	11.5	f	t		0.2 Grab	1150

Penetration				
Depth	Unit	Initials	Initials	Weather
14	c m	BL		

Silt Layer Depths: Left: 2 cm

Center: 1.5 cm

Right: 0.5 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

- Wood Proj. BP2 PCM
- SD-PCM01920 Initials: GM
- QSC Form
- Date: 6 / 24 /2020 Time: 1150

barnacles on c-gravel / pebbles

Station SD-PCM019

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	06 / 25 / 20	Boeing PL2	SD-PCM 20 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
198398	1272992	N/A	f	t		0.2 Grab	1300

Penetration				
Depth	Unit	Initials	Initials	Weather
10	c m	BL		

Silt Layer Depths: Left: NA

Center: 10 cm

Right: NA

Surficial sediment characteristics:

Biological: 25 % **Debris:** 25 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense NA

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay Organics

Biological: >50 % **Debris:** 10 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:
Coolbie Cutter Core

Wood Proj. BP2 PCM

SD-PCM02020 Initials: GM

QSC Form

Date: 6/25/2020 Time: 13:00

Station SD-PCM020

QUALITATIVE SAMPLE CHARACTERISTICS

Page 1 of

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	06/29/20	Boeing PL2	SD-PCM 21 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
193281	1272992	N/A	f	t		0.2 Grab	1700

Penetration					
Depth	Unit		Initials	Initials	Weather
N/A	c	m			40°

Silt Layer Depths: **Left:** _____ **Center:** _____ **Right:** _____

Surficial sediment characteristics:

Biological: _____ % **Debris:** _____ % **Oil Sheen:** None Trace (<5%) _____ %

Moisture
Very Wet Wet Moist Damp Dry

Color **(Circle major & underline modifying)**
Light Medium Dark Olive Gray Brown Black Other _____

Major Constituent **(Circle major & underline modifying)**
Fine Medium Coarse Gravel Sand Silt Clay _____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay _____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color **(Circle major & underline modifying)**
Light Medium Dark Olive Gray Brown Black Other _____

Major Constituent **(Circle major & underline modifying)**
Fine Medium Coarse Gravel Sand Silt Clay _____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay _____

Biological: _____ % **Debris:** _____ % **Oil Sheen:** None Trace (<5%) _____ %

Comments:
NO SAMPLE COLLECTED DUE TO COURSE GRAVEL

Station SD-PCM021 (No Sample Collected)

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 / 20	Boeing PL2	SD-PCM 022 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
196 690	127 9832	5.6	f	t		0.2 Grab	8:05

Penetration				
Depth	Unit	Initials	Initials	Weather
12	c m	NL		Sun

Silt Layer Depths: **Left:** 2cm

Center: 1cm

Right: 2cm

Surficial sediment characteristics:

Biological: 5-10% % **Debris:** 5% % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5% % **Debris:** <5% % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

- Wood Proj. BP2 PCM
- SD-PCM02220 Initials: GM
- QSC Form
- Date: 6 / 24 /2020 Time: 8:05

Station SD-PCM022

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/24/20	Boeing PL2	SD-PCM 23 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
196370	1225190	7	f	t		0.2 Grab	8:25

Penetration				
Depth	Unit	Initials	Initials	Weather
17	c m	BL		

Silt Layer Depths: Left: 0.5cm

Center: 0.5cm

Right: 0.2cm

Surficial sediment characteristics:

Biological: 75% % **Debris:** <5% % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other Green Algae

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse N/A Gravel Sand Silt Clay Algae

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay

Biological: <5% % **Debris:** <5% % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM02320 Initials: BM

QSC Form

Date: 6/24/2020 Time: 8:25

Station SD-PCM023

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 20	Boeing PL2	SD-PCM 223 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196 372	1275192	5.6	f	t		0.2 Grab	8:55

Penetration					
Depth	Unit		Initials	Initials	Weather
~~5.6~~ 12 cm	c	m	BL		

Silt Layer Depths: Left: 2cm Center: 2cm Right: 2cm

Surficial sediment characteristics:

Biological: 75% % **Debris:** 75% % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other Green Algae

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse NA Gravel Sand Silt Clay Algae

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay

Biological: <5% % **Debris:** <5% % **Oil Sheen:** None Trace (<5%) ____ %

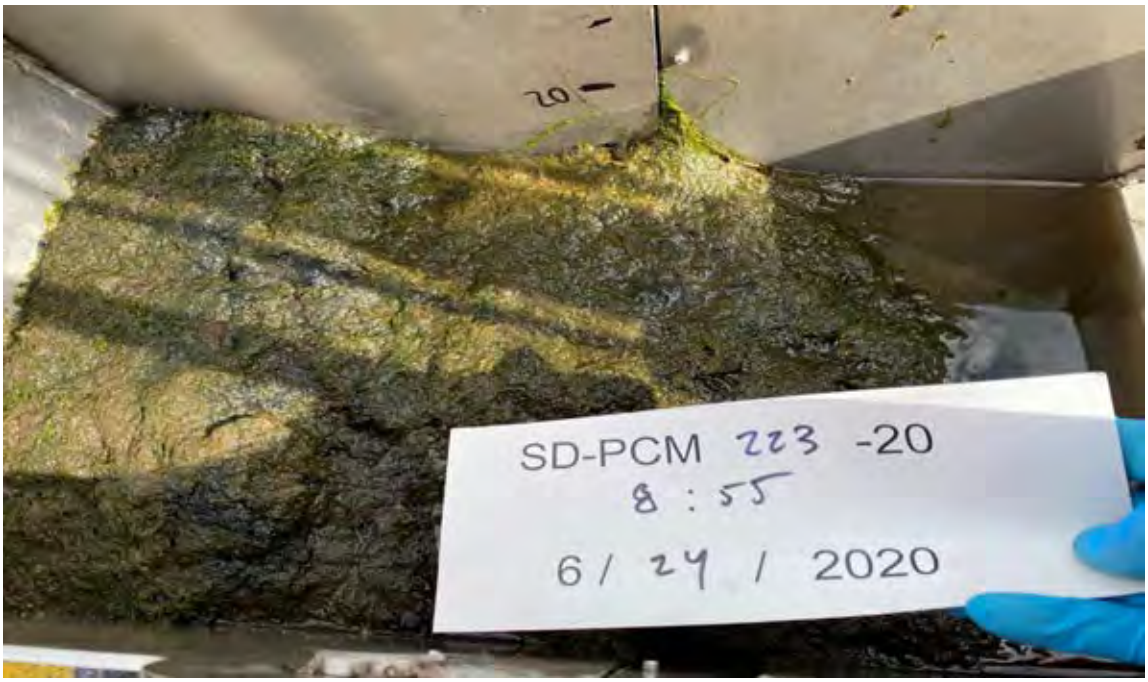
Comments:

Wood Proj. BP2 PCM

SD-PCM22320 Initials: BL

QSC Form

Date: 6 / 24 /2020 Time: 8:55



Station SD-PCM223 (Duplicate of Station SD-PCM023)

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 20	Boeing PL2	SD-PCM 24 20

Coordinates		Water Depth				Time
North	East	Depth	Unit	Rep	Gear	
196002	1275451	4.5	f t		0.2 Grab	9:35

Penetration				
Depth	Unit	Initials	Initials	Weather
13	c m	BC		

Silt Layer Depths: Left: 1.5cm

Center: 1.0cm

Right: 2.0cm

Surficial sediment characteristics:

Biological: 5-10% % **Debris:** <5% % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5% % **Debris:** <5% % **Oil Sheen:** None Trace (<5%) ____ %

Comments:
Wood Proj. BP2 PCM
SD-PCM02420 Initials: GM
QSC Form
Date: 6 / 24 /2020 Time: 9:35

Station SD-PCM024

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 25 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196533	1273056	13.2	f	t		0.2 Grab	0715

Penetration					
Depth	Unit		Initials	Initials	Weather
12	c	m	BL		

Silt Layer Depths: **Left:** 5 cm

Center: 5 cm

Right: 5 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM02520 Initials: GM

QSC Form

Date: 6 / 25 /2020 Time: 0715

Station SD-PCM025

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 26 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196926	1274539	5.4	f	t		0.2 Grab	0700

Penetration					
Depth	Unit		Initials	Initials	Weather
13	c	m	BL		

Silt Layer Depths: **Left:** 0.2 cm

Center: 0.2 cm

Right: 0.2 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM
SD-PCM02620 Initials: CM
QSC Form
Date: 6 / 25 /2020 Time: 0700

Station SD-PCM026

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 / 20	Boeing PL2	SD-PCM 27 20

Coordinates		Water Depth				
North	East	Depth	Unit	Rep	Gear	Time
1965566	1274767	16.8	f t		0.2 Grab	1935

Penetration					
Depth	Unit	Initials	Initials	Weather	
13	c m	BL			

Silt Layer Depths: Left: 1.5 cm

Center: 2.0 cm

Right: 2.0 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:
Wood Proj. BP2 PCM
SD-PCM02720 Initials: GM
QSC Form
Date: 6 / 24 /2020 Time: 1935

Station SD-PCM027

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 / 20	Boeing PL2	SD-PCM 2E 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196098	1275293	14.1	f	t		0.2 Grab	13:40

Penetration					
Depth	Unit		Initials	Initials	Weather
10	c	m	BL		

Silt Layer Depths: **Left:** 3 cm

Center: 0.5 cm

Right: 2.5 cm

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet **Wet** Moist Damp Dry

Color **(Circle major & underline modifying)**
Light **Medium** **Dark** Olive Gray **Brown** Black Other ____

Major Constituent **(Circle major & underline modifying)**
Fine **Medium** Coarse Gravel **Sand** Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel **Sand** Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose **Loose** Medium Dense Dense Very Dense

Silt / Clay - Very Soft **Soft** Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet **Wet** Moist Damp Dry

Color **(Circle major & underline modifying)**
Light Medium **Dark** Olive Gray **Brown** Black Other ____

Major Constituent **(Circle major & underline modifying)**
Fine **Medium** **Coarse** Gravel **Sand** Silt Clay ____

Minor Constituent with trace
Fine Medium **Coarse** Gravel **Sand** Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:
Wood Proj. BP2 PCM
SD-PCM02820 Initials: GM
QSC Form
Date: 6/24/2020 Time: 13:40

Station SD-PCM028

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 / 20	Boeing PL2	SD-PCM 29 20

Coordinates		Water Depth				Time
North	East	Depth	Unit	Rep	Gear	
195919	1275492	9.3	f t		0.2 Grab	1325

Penetration				
Depth	Unit	Initials	Initials	Weather
18	c m	BC		

Silt Layer Depths: Left: 9 cm

Center: 18 cm

Right: 9 cm

Surficial sediment characteristics:

Biological: 15 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM02920 Initials: GM

QSC Form

Date: 6 / 24 /2020 Time: 1325

Twig, cobble w/ barnacles

Station SD-PCM029

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 20	Boeing PL2	SD-PCM 30 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
195 751	1275652	23.2	f	t		0.2 Grab	1010

Penetration					
Depth	Unit		Initials	Initials	Weather
20	c	m	BC		

Silt Layer Depths: Left: 15cm

Center: 20cm

Right: 15cm

Surficial sediment characteristics:

Biological: 65 % **Debris:** 65 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense NA

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 65 % **Debris:** 65 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:
Wood Proj. BP2 PCM
SD-PCM03020 Initials: GM
QSC Form
Date: 6/24/2020 Time: 1010

Station SD-PCM030

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	06 / 25 / 20	Boeing PL2	SD-PCM 31 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
198282	1273066	NA	f	t		0.2 Grab	1325

Penetration					
Depth	Unit		Initials	Initials	Weather
10	c	m	BL		

Silt Layer Depths: Left: 3 cm

Center: 3 cm

Right: 3 cm

Surficial sediment characteristics:

Biological: >75 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 10 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments: Cookie Cutter, 3cm depth geofabric
- Organics top soil, brown F-M sand, geofabric 3cm depth
0-3cm
- 3-10cm, Dark gray to black to dark brown M-C sand, some F-M sand

Wood Proj. BP2 PCM

SD-PCM03120 Initials: FM

QSC Form

Date: 6 / 25 /2020 Time: 13:25

SW, Suite 601, Lynnwood, WA 98037, (425) 921-4023 Cliff Whitmus

Station SD-PCM031

Station SD-PCM031

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 25 / 20	Boeing PL2	SD-PCM 32 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
198225	1273158	N/A	f	t		0.2 Grab	13:55

Penetration					
Depth	Unit		Initials	Initials	Weather
10	c	m	BC		

Silt Layer Depths: Left: NA

Center: 0.5 CM

Right: NA

Surficial sediment characteristics:

Biological: 750 % **Debris:** 15 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay Organics

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:
Cookie Cutter, two geofabric layers 3cm depth
Organics top soil, Brown F-M sand, two geofabric layers 3cm depth
3-10 cm, Dark gray to brown to black, M to F-M sand, some C-sand

Wood Proj. BP2 PCM
SD-PCM03220 Initials: GM
QSC Form
Date: 6 / 25 /2020 Time: 13:55

SW, Suite 601, Lynnwood, WA 98037, (425) 921-4023 Cliff Whitmus

Station SD-PCM032

Station SD-PCM032

QUALITATIVE SAMPLE CHARACTERISTICS

Page ___ of ___

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	06/24/20	Boeing PL2	SD-PCM 32 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
197989	1273300	NA	f	t		0.2 Grab	1615

Penetration					
Depth	Unit		Initials	Initials	Weather
N/A	c	m			

Silt Layer Depths: **Left:** _____

Center: _____

Right: _____

Surficial sediment characteristics:

Biological: Trace % **Debris:** _____ % **Oil Sheen:** None Trace (<5%) _____ %

Moisture
Very Wet Wet Moist Damp Dry

Color **(Circle major & underline modifying)**
Light Medium Dark Olive Gray Brown Black Other _____

Major Constituent **(Circle major & underline modifying)**
Fine Medium Coarse Gravel Sand Silt Clay _____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay _____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color **(Circle major & underline modifying)**
Light Medium Dark Olive Gray Brown Black Other _____

Major Constituent **(Circle major & underline modifying)**
Fine Medium Coarse Gravel Sand Silt Clay _____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay _____

Biological: _____ % **Debris:** _____ % **Oil Sheen:** None Trace (<5%) _____ %

Comments:
NO SAMPLE COLLECTED DUE to LARGE GRAVEL

Station SD-PCM033 (No Sample Collected)

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6/24/20	Boeing PL2	SD-PCM 34 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
196437	1275182	-4	f	t		0.2 Grab	1115

Penetration					
Depth	Unit		Initials	Initials	Weather
11	c	m	BL		

Silt Layer Depths: Left: NA

Center: NA 2cm

Right: NA

Surficial sediment characteristics:

Biological: 15% Debris: 5% Oil Sheen: None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % Debris: <5 % Oil Sheen: None Trace (<5%) ____ %

Comments:

- Wood Proj. BP2 PCM
- SD-PCM03420 Initials: GM
- QSC Form
- Date: 6/24/2020 Time: 1115

Cookie Cutter

Station SD-PCM034

Station SD-PCM034

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	6 / 24 / 20	Boeing PL2	SD-PCM 35 20

Coordinates		Water Depth					Time
North	East	Depth	Unit		Rep	Gear	
196322	1275313	-4	f	t		0.2 Grab	1130

Penetration					
Depth	Unit	Initials	Initials	Weather	
12	c m	BL			

Silt Layer Depths: Left: NA

Center: 5cm

Right: NA

Surficial sediment characteristics:

Biological: 30 % **Debris:** 10 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense Dense Very Dense

Silt / Clay - Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet Moist Damp Dry

Color (Circle major & underline modifying)
Light Medium Dark Olive Gray Brown Black Other ____

Major Constituent (Circle major & underline modifying)
Fine Medium Coarse Gravel Sand Silt Clay ____

Minor Constituent with trace
Fine Medium Coarse Gravel Sand Silt Clay ____

Biological: <5 % **Debris:** <5 % **Oil Sheen:** None Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM03520 Initials: GM

QSC Form

Date: 6/24/2020 Time: 1130

cookie cutter

Station SD-PCM035

Station SD-PCM035

QUALITATIVE SAMPLE CHARACTERISTICS

Coordinate Datum	Date (mm/dd/yy)	Project Location	Station Name
WA State Plane, N Zone, NAD 83 (Conus), Survey Ft	06 / 24 / 20	Boeing PL2	SD-PCM 36 20

Coordinates		Water Depth					
North	East	Depth	Unit		Rep	Gear	Time
195919	1275636	-4	f	t		0.2 Grab	1140

Penetration					
Depth	Unit		Initials	Initials	Weather
11.5	c	m	BC		

Silt Layer Depths: Left: NA

Center: 0.5 cm

Right: NA

Surficial sediment characteristics:

Biological: 5 % **Debris:** 5 % **Oil Sheen:** None Trace (<5%) ____ %

Moisture
Very Wet Wet (Moist) Damp Dry

Color (Circle major & underline modifying)
Light (Medium) Dark Olive (Gray) (Brown) Black Other ____

Major Constituent (Circle major & underline modifying)
(Fine) (Medium) Coarse Gravel (Sand) Silt Clay ____

Minor Constituent with trace
Fine (Medium) Coarse Gravel (Sand) Silt Clay ____

Subsurface sediment characteristics:

Density / Consistency

Sand / Gravel - Very Loose Loose Medium Dense (Dense) Very Dense

Silt / Clay - (NA) Very Soft Soft Medium Stiff Stiff Very Stiff Hard

Moisture
Very Wet Wet (Moist) Damp Dry

Color (Circle major & underline modifying)
Light Medium (Dark) Olive (Gray) (Brown) Black Other ____

Major Constituent (Circle major & underline modifying)
Fine (Medium) Coarse Gravel (Sand) Silt Clay ____

Minor Constituent with trace
(Fine) (Medium) Coarse Gravel (Sand) Silt Clay ____

Biological: 5 % **Debris:** 5 % **Oil Sheen:** (None) Trace (<5%) ____ %

Comments:

Wood Proj. BP2 PCM

SD-PCM03620 Initials: BM

QSC Form

Date: 6 / 24 /2020 Time: 1140

Cookie cutter

Station SD-PCM036

Station SD-PCM036

Appendix B

Chain-of-Custody Forms

Amec Foster Wheeler
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4023 Cliff Whitmus

20F0442

CHAIN OF CUSTODY

Wood Proj. BP2 PCM
Post Construction Monitoring YR 2020
COC Number 001

Recorded by: GM
Checked by: [illegible]

		Analysis Containers			
		SMS COCs-Full List (Metals, SVOAs, SIM, PCBs) and TOC (1-L Glass)	Grain size (PSEP) (16-oz Plastic)	Dioxin/Furans (8-oz Amber)	
Wood Proj. BP2 PCM SD-PCM02220 Initials: GM COC Form Date: 6/24/2020 Time: 8:05	Date: 6/24/20 Time: 8:05	X			Number of containers: 1
Wood Proj. BP2 PCM SD-PCM02320 Initials: GM COC Form Date: 6/24/2020 Time: 8:25	Date: 6/24/20 Time: 8:25	X			Number of containers: 1
Wood Proj. BP2 PCM SD-PCM22320 Initials: GM COC Form Date: 6/24/2020 Time: 8:55	Date: 6/24/20 Time: 8:55	X			Number of containers: 1
Wood Proj. BP2 PCM SD-PCM00820 Initials: GM COC Form Date: 6/24/2020 Time: 9:15	Date: 6/24/20 Time: 9:15	X		X	Number of containers: 2
Wood Proj. BP2 PCM SD-PCM02420 Initials: GM COC Form Date: 6/24/2020 Time: 9:35	Date: 6/24/20 Time: 9:35	X			Number of containers: 1
Wood Proj. BP2 PCM SD-PCM 09 20 Initials: GM COC Form Date: 6/24/2020 Time: 9:55	Date: 6/24/20 Time: 9:55	X			Number of containers: 1
Wood Proj. BP2 PCM SD-PCM03020 Initials: GM COC Form Date: 6/24/2020 Time: 1010	Date: 6/24/20 Time: 1010	X			Number of containers: 1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amecfw.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amecfw.com ph. 206-838-8469)

Sediment samples in 1-L glass jars are unhomogenized. Samples material in 1-liter jars must be thoroughly homogenized before analysis. Dioxin (8-oz Amber) and GS (16-oz plastic) samples are homogenized.

Relinquished By	Received By
Name: Greg McGinnis	Name: Jacob Walter
Date: 6/25/20	Date: 06/25/2020
Time: 16:20	Time: 1620

Amec Foster Wheeler
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4023 Cliff Whitmus

2010442

CHAIN OF CUSTODY

Wood Proj. BP2 PCM
Post Construction Monitoring YR 2020
COC Number 002

Recorded by: GM
Checked by: [illegible]

		Analysis Containers: SMS COCs-Full List (Metals, SVOAs, SIM, PCBs) and TOC (1-L Glass)	Grain size (PSEP) (16-oz Plastic)	Dioxin/Furans (8-oz Amber)	Number of containers
Wood Proj. BP2 PCM SD-PCM01620 Initials: GM COC Form Date: 6/24/2020 Time: 1030	Date: 6/24/20 Time: 1030	X			1
Wood Proj. BP2 PCM SD-PCM00620 Initials: GM COC Form Date: 6/24/2020 Time: 1045	Date: 6/24/20 Time: 1045	X			1
Wood Proj. BP2 PCM SD-PCM20620 Initials: GM COC Form Date: 6/24/2020 Time: 1100	Date: 6/24/20 Time: 1100	X			1
Wood Proj. BP2 PCM SD-PCM03420 Initials: GM COC Form Date: 6/24/2020 Time: 1115	Date: 6/24/20 Time: 1115	X			1
Wood Proj. BP2 PCM SD-PCM03520 Initials: GM COC Form Date: 6/24/2020 Time: 1130	Date: 6/24/20 Time: 1130	X			1
Wood Proj. BP2 PCM SD-PCM03620 Initials: GM COC Form Date: 6/24/2020 Time: 1140	Date: 6/24/20 Time: 1140	X			1
Wood Proj. BP2 PCM SD-PCM01920 Initials: GM COC Form Date: 6/24/2020 Time: 1150	Date: 6/24/20 Time: 1150	X		X	2

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amecfw.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amecfw.com ph. 206-838-8469)

Sediment samples in 1-L glass jars are unhomogenized. Samples material in 1-liter jars must be thoroughly homogenized before analysis. Dioxin (8-oz Amber) and GS (16-oz plastic) samples are homogenized.

Relinquished By	Received By
Name: Greg McCormick	Name: Jacob [illegible]
Date: 6/25/20	Date: 06/25/2020
Time: 16:20	Time: 1620

Amec Foster Wheeler
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4023 Cliff Whitmus

20f0442

CHAIN OF CUSTODY

Wood Proj. BP2 PCM
Post Construction Monitoring YR 2020
COC Number 003

Recorded by: GM
Checked by: ZK

	Date / Time	SMS COCs-Full List (Metals, SVOAs, SIM, PCBs) and TOC (1-L Glass)	Grain size (PSEP) (16-oz Plastic)	Dioxin/Furans (8-oz Amber)	Number of containers
Wood Proj. BP2 PCM SD-PCM02920 Initials: GM COC Form Date: 6/24/2020 Time: 1325	Date: 6/24/20 Time: 1325	X			1
Wood Proj. BP2 PCM SD-PCM02820 Initials: GM COC Form Date: 6/24/2020 Time: 13:40	Date: 6/24/20 Time: 1340	X			1
Wood Proj. BP2 PCM SD-PCM01820 Initials: GM COC Form Date: 6/24/2020 Time: 1445	Date: 6/24/20 Time: 1445	X	X		2
Wood Proj. BP2 PCM SD-PCM21820 Initials: GM COC Form 1510 Date: 6/24/2020 Time: ~~1310~~	Date: 6/24/20 Time: 1510	X			1
Wood Proj. BP2 PCM SD-PCM00720 Initials: GM COC Form Date: 6/24/2020 Time: 1520	Date: 6/24/20 Time: 1520				2
Wood Proj. BP2 PCM SD-PCM01720 Initials: GM COC Form Date: 6/24/2020 Time: 1540	Date: 6/24/20 Time: 1540				1
Wood Proj. BP2 PCM SD-PCM02720 Initials: GM COC Form Date: 6/24/2020 Time: 1555	Date: 6/24/20 Time: 1555				

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amecfw.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amecfw.com ph. 206-838-8469)

Sediment samples in 1-L glass jars are unhomogenized. Samples material in 1-liter jars must be thoroughly homogenized before analysis. Dioxin (8-oz Amber) and GS (16-oz plastic) samples are homogenized.

Relinquished By	Received By
Name: Greg McCormick	Name: Jacob Lalte
Date: 6/25/20	Date: 06/25/2020
Time: 16:20	Time: 1620

Amec Foster Wheeler
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4023 Cliff Whitmus

2 of 44 2

CHAIN OF CUSTODY

Wood Proj. BP2 PCM
Post Construction Monitoring YR 2020
COC Number 004

Recorded by: GM
Checked by: [illegible]

		Analysis Containers			
		SMS COCs-Full List (Metals, SVOAs, SIM, PCBs) and TOC (1-L Glass)	Grain size (PSEP) (16-oz Plastic)	Dioxin/Furans (8-oz Amber)	Number of containers
Wood Proj. BP2 PCM SD-PCM02620 Initials: GM COC Form Date: 6/25/2020 Time: 0700	Date: 6/25/20 Time: 0700	X			1
Wood Proj. BP2 PCM SD-PCM02520 Initials: GM COC Form Date: 6/25/2020 Time: 0715	Date: 6/25/20 Time: 0715	X			1
Wood Proj BP2 PCM SD-PCM 06 20 GM COC Form 6/25/20 0735	Date: 6/25/20 Time: 0735	X		X	2
Wood Proj BP2 PCM SD-PCM 01 20 GM COC Form 6/25/20 08:00	Date: 6/25/20 Time: 866	X	X		2
Wood Proj. BP2 PCM SD-PCM00520 Initials: GM COC Form Date: 6/25/2020 Time: 840	Date: 6/25/20 Time: 840	X	X		2
Wood Proj. BP2 PCM SD-PCM01520 Initials: GM COC Form Date: 6/25/2020 Time: 0900	Date: 6/25/20 Time: 900	X		X	2
Wood Proj. BP2 PCM SD-PCM01420 Initials: GM COC Form Date: 6/25/2020 Time: 9:25	Date: 6/25/20 Time: 925	X	X		2

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amecfw.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amecfw.com ph. 206-838-8469)

Sediment samples in 1-L glass jars are unhomogenized. Samples material in 1-liter jars must be thoroughly homogenized before analysis. Dioxin (8-oz Amber) and GS (16-oz plastic) samples are homogenized.

Relinquished By	Received By
Name: Greg McCormick	Name: Jacob Smalter
Date: 6/25/20	Date: 06/25/2020
Time: 16:20	Time: 1600

Amec Foster Wheeler
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4023 Cliff Whitmus

2OF0442

CHAIN OF CUSTODY

Wood Proj. BP2 PCM
Post Construction Monitoring YR 2020
COC Number 005

Recorded by: GM
Checked by: LK

		Analysis Containers: SMS COCs-Full List (Metals, SVOAs, SIM, PCBs) and TOC (1-L Glass)	Grain size (PSEP) (16-oz Plastic)	Dioxin/Furans (8-oz Amber)	Number of containers
Wood Proj. BP2 PCM SD-PCM00420 Initials: GM COC Form Date: 6/25/2020 Time: 9:45	Date: 6/25/20 Time: 9:45	X		X	2
Wood Proj. BP2 PCM SD-PCM 13 20 Initials: GM COC Date: 6/25/2020 Time: 10:00	Date: 6/25/20 Time: 10:00	X			1
Wood Proj. BP2 PCM SD-PCM00320 Initials: GM COC Form Date: 6/25/2020 Time: 1030	Date: 6/25/20 Time: 10:30	X			1
Wood Proj. BP2 PCM SD-PCM00220 Initials: GM COC Form Date: 6/25/2020 Time: 1045	Date: 6/25/20 Time: 1045	X	X		2
~~Wood Proj. BP2 PCM~~ ~~SD-PCM00120 Initials: GM~~ ~~COC Form~~ ~~Date: 6/25/2020 Time: 11:00~~	~~Date:~~ ~~Time: 11:00~~	~~X~~		~~X~~	~~2~~
Wood Proj. BP2 PCM SD-PCM 12 20 Initials: GM COC Form Date: 6/25/2020 Time: 11:10	Date: 6/25/20 Time: 11:10	X			1
Wood Proj. BP2 PCM SD-PCM 212 20 Initials: GM COC Form Date: 6/25/2020 Time: 1130	Date: 6/25/20 Time: 11:30	X			1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amecfw.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amecfw.com ph. 206-838-8469)

Sediment samples in 1-L glass jars are unhomogenized. Samples material in 1-liter jars must be thoroughly homogenized before analysis. Dioxin (8-oz Amber) and GS (16-oz plastic) samples are homogenized.

Relinquished By	Received By
Name: Greg McCormick	Name: Jacob Walter
Date: 6/25/20	Date: 06/25/2020
Time: 16:20	Time: 1620

Amec Foster Wheeler
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4023 Cliff Whitmus

2of0442

CHAIN OF CUSTODY

Wood Proj. BP2 PCM
Post Construction Monitoring YR 2020
COC Number 006

Recorded by: GM
Checked by: LK

		Analysis Containers: SMS COCs-Full List (Metals, SVOAs, SIM, PCBs) and TOC (1-L Glass)	Grain size (PSEP) (16-oz Plastic)	Dioxin/Furans (8-oz Amber)	Number of containers
Wood Proj. BP2 PCM SD-PCM02020 Initials: GM COC Form Date: 6/25/2020 Time: 13:00	Date: 6/25/20 Time: 13:00	X			1
Wood Proj. BP2 PCM SD-PCM03120 Initials: GM COC Form Date: 6/25/2020 Time: 13:25	Date: 6/25/20 Time: 13:25	X			1
Wood Proj. BP2 PCM SD-PCM03220 Initials: GM COC Form Date: 6/25/2020 Time: 13:55	Date: 6/25/20 Time: 13:55	X			1
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amecfw.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amecfw.com ph. 206-838-8469)

Sediment samples in 1-L glass jars are unhomogenized. Samples material in 1-liter jars must be thoroughly homogenized before analysis. Dioxin (8-oz Amber) and GS (16-oz plastic) samples are homogenized.

Relinquished By	Received By
Name: Greg Miller	Name: Jacob Belter
Date: 6/25/20	Date: 06/25/2020
Time: 16:20	Time: 1620

Appendix C

Data Validation Report

Sayler Data Solutions, Inc.
14257 93rd Court NE Kirkland, Washington 98034 (425) 820-7504 cari.say@saylerdata.com

DATA VALIDATION REPORT

Boeing Plant 2– Long Term Post Construction Monitoring Samples, June, 2020

Prepared for:
Wood Environment and Infrastructure Solutions
3500 188th Street SW, Ste 601
Lynnwood, WA 98037-4763

August 31, 2020

1.0 Introduction

Data validation was performed on the following sediment samples:

Sample ID	Sample Date/Time	Lab ID	Analyses
SD-PCM00220	06/25/2020 10:45	20F0442-32	PCBs, Metals, SV, SIM, TOC, TS, GrnSz
SD-PCM00320	06/25/2020 10:30	20F0442-31	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM00420	06/25/2020 09:45	20F0442-29	PCBs, Metals, SV, SIM, Dxn, TOC, TS
SD-PCM00520	06/25/2020 08:40	20F0442-26	PCBs, Metals, SV, SIM, TOC, TS, GrnSz
SD-PCM00620	06/24/2020 10:45	20F0442-09	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM20620	06/24/2020 11:00	20F0442-10	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM00720	06/24/2020 15:20	20F0442-19	PCBs, Metals, SV, SIM, TOC, TS, GrnSz
SD-PCM00820	06/24/2020 09:15	20F0442-04	PCBs, Metals, SV, SIM, Dxn, TOC, TS
SD-PCM00920	06/24/2020 09:55	20F0442-06	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM01020	06/25/2020 07:35	20F0442-24	PCBs, Metals, SV, SIM, Dxn, TOC, TS
SD-PCM01120	06/25/2020 08:00	20F0442-25	PCBs, Metals, SV, SIM, TOC, TS, GrnSz
SD-PCM01220	06/25/2020 11:10	20F0442-33	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM21220	06/25/2020 11:30	20F0442-34	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM01320	06/25/2020 10:00	20F0442-30	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM01420	06/25/2020 09:25	20F0442-28	PCBs, Metals, SV, SIM, TOC, TS, GrnSz
SD-PCM01520	06/25/2020 09:00	20F0442-27	PCBs, Metals, SV, SIM, Dxn, TOC, TS
SD-PCM01620	06/24/2020 10:30	20F0442-08	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM01720	06/24/2020 15:40	20F0442-20	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM01820	06/24/2020 14:45	20F0442-17	PCBs, Metals, SV, SIM, TOC, TS, GrnSz
SD-PCM21820	06/24/2020 15:10	20F0442-18	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM01920	06/24/2020 11:50	20F0442-14	PCBs, Metals, SV, SIM, Dxn, TOC, TS
SD-PCM02020	06/25/2020 13:00	20F0442-35	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM02220	06/24/2020 08:05	20F0442-01	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM02320	06/24/2020 08:25	20F0442-02	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM22320	06/24/2020 08:55	20F0442-03	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM02420	06/24/2020 09:35	20F0442-05	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM02520	06/25/2020 07:15	20F0442-23	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM02620	06/25/2020 07:00	20F0442-22	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM02720	06/24/2020 15:55	20F0442-21	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM02820	06/24/2020 13:40	20F0442-16	PCBs, Metals, SV, SIM, TOC, TS

Sample ID	Sample Date/Time	Lab ID	Analyses
SD-PCM02920	06/24/2020 13:25	20F0442-15	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM03020	06/24/2020 10:10	20F0442-07	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM03120	06/25/2020 13:25	20F0442-36 20G0333-01	PCBs, Metals, SV, SIM, Dxn, TOC, TS
SD-PCM03220	06/25/2020 13:55	20F0442-37	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM03420	06/24/2020 11:15	20F0442-11	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM03520	06/24/2020 11:30	20F0442-12	PCBs, Metals, SV, SIM, TOC, TS
SD-PCM03620	06/24/2020 11:40	20F0442-13	PCBs, Metals, SV, SIM, TOC, TS

All analyses except grain size were performed by Analytical Resources, Inc. in Tukwila, Washington. Grain size analyses were performed by Harold L. Benny & Associates LLC.

Validation: A stage 4 (full) validation was performed on the dioxin/furan analyses. A stage 2B (summary with calibration) validation was performed on the remaining analyses. Validation was performed by Cari Sayler. Data qualifiers are summarized in section 9.0 of this report.

Analytical methods: Table 2 of the work plan and/or Table 1 of the QAPP specify the following analytical methods:

Analysis	Method
Polychorinated Biphenyls (PCBs)	EPA 8082 3665B/3660B cleanups
Metals	EPA 6010/6020/7471
Semivolatile Organics (SV)	EPA 8270D
Semivolatile Organics by Selective Ion Monitoring (SIM)	EPA 8270D SIM
Dioxins/Furans (Dxn)	EPA 1613B
Total Organic Carbon (TOC)	EPA 9060
Total Solids (TS)	EPA 160.1
Grain size (GrnSz)	PSEP 1986

The most recent version of many methods were used, including 8082A, 6010C, 6020A, 7471B, 8270E, 8270E-SIM and 9060A. Total solids analyses were performed by EPA method SM 2540G. These are considered acceptable substitutions. Additionally, PCB cleanups included silica gel in addition to the specified sulfur and acid cleanups.

Sample Receipt: Sample chain-of-custodies and sample log-in documentation were reviewed. All requested analyses were performed. Cooler receipt temperatures were within the target range of 0 to 6°C.

Sample number transcription: Sample IDs in the electronic data deliverable (EDD) were compared to the chain-of-custody for each sample. Sample IDs matched the chain of custody.

2.0 PCB Analyses

Quality control analysis frequencies: The QAPP specifies that the following quality control samples be analyzed one per analytical batch or one per twenty samples, whichever is more frequent: method blank, and laboratory control sample (LCS). A matrix spike (MS) and MS duplicate (MSD) must be analyzed one per twenty samples and a regional reference material (RRM) must be analyzed one per fifty samples. In addition, surrogate compounds must be measured in each field and quality control sample. These frequencies were met.

Field quality control sample requirements include field duplicates at a 10% frequency. This frequency was met.

Holding times: Refrigerated sediment samples must be extracted within 14 days of collection. Frozen sediment samples must be extracted within 1 year of collection. Extracts must be analyzed within 40 days of extraction. These holding times were met.

Instrument calibration: Data usability criteria for calibrations include minimum correlation coefficients (R^2) of 0.990 or maximum RSDs of ±20% for each initial calibration, and maximum % differences of ±25% for each continuing calibration. Calibration data met usability criteria for target compounds with one exception:

Standard ID	Analysis Date/Time	Analyte	% Difference	Laboratory Control Limit
SIG0253-SCV1	07/17/2020 01:48	Aroclor-1260 [2C]	27.9	80-120

The % recovery for this analyte on the primary columns was within data usability criteria, and no qualifiers are required.

Laboratory blank results: Criteria for blanks are that analyte concentrations must be below the RL, or below 10% of the lowest associated sample concentration. No contamination was detected in laboratory blanks.

Surrogate recoveries: QAPP control limits were 34-141%. Surrogate recoveries were within QAPP and laboratory control limits.

LCS recoveries: QAPP control limits were 37-116%. LCS recoveries were within QAPP and laboratory control limits.

RRM recoveries: RRM Aroclor 1260 result was within the advisory limits of 38-167 ug/kg.

MS recoveries: QAPP control limits were 37-116%. MS recoveries were within QAPP and laboratory control limits with the following exceptions:

QC ID	Analyte	% Recovery	Lab Control Limit
SD-PCM03220MS1	Aroclor-1260 [2C]	55.3	58 - 120
SD-PCM03220MSD1	Aroclor-1260 [2C]	54.9	58 - 120

Aroclor-1260 results in this MS and MSD were within limits on the primary column, and no qualifiers are required.

MS/MSD RPDs: QAPP control limits were 50%. RPDs were within QAPP and laboratory control limits.

Field duplicate variability: Field duplicate criteria include RPDs below 50% where concentrations are above five times the reporting limit and field duplicate concentrations within ± two times the reporting limit where concentrations are at or below five times the reporting limit. These criteria were met.

Laboratory narrative/flags: Seven results were flagged P to indicate the dual column RPD exceeded 40%. These results are qualified as estimated.

Reporting limits: Reporting limits met the project goal of 20 ug/Kg.

PCB data are acceptable for use as qualified.

3.0 Metals Analyses

Quality control analysis frequencies: The QAPP specifies that the following quality control samples be analyzed one per analytical batch or one per twenty samples, whichever is more frequent: method blank, and laboratory control sample (LCS). A matrix spike (MS) and laboratory duplicate must be analyzed one per twenty samples. These frequencies were met.

Field quality control sample requirements include field duplicates at a 10% frequency. This frequency was met.

Holding times: Total or dissolved mercury samples must be analyzed within 28 days of collection. Other metals samples must be analyzed within 180 days of collection. These criteria were met.

Instrument calibration: Functional guidelines criteria for calibration verifications is a maximum % difference of ±10% for ICP metals and ±15% for mercury. QAPP criterion for calibration verifications is ±10% for ICP metals and ±20% for mercury. Functional guidelines criterion for reporting limit standard recovery is 70-130%, and the QAPP specifies this standard must be within one RL of the true value. These criteria were met for standards associated with reported results.

Laboratory performance criteria for calibration blanks are that analyte concentrations must be between the negative RL and the positive RL, however, for data usability, concentrations must be between the negative DL and the positive DL. These criteria were met with the following exceptions:

Blank ID	Analysis Date/Time	Analyte	Concentration (ug/L)	DL (ug/L)	RL (ug/L)
SIG0149-CCB2	07/09/2020 17:52	Silver-107	0.026	0.017	0.2
SIG0149-CCB5	07/09/2020 20:40	Silver-107	0.022	0.017	0.2
SIG0149-CCB8	07/09/2020 22:53	Silver-107	0.023	0.017	0.2
SIG0183-CCB1	07/13/2020 13:23	Silver-107	0.022	0.017	0.2
SIG0183-CCB2	07/13/2020 14:12	Silver-107	0.036	0.017	0.2
SIG0183-CCB3	07/13/2020 15:18	Silver-107	0.019	0.017	0.2
SIG0183-CCB4	07/13/2020 16:19	Silver-107	0.021	0.017	0.2
SIG0183-CCB7	07/13/2020 19:24	Chromium-53	0.114	0.070	0.5
SIG0183-ICB1	07/13/2020 13:11	Silver-107	0.020	0.017	0.2
SIG0149-CCB1	07/09/2020 17:09	Arsenic-75a	0.037	0.022	0.2

Associated sample results within 5 times these levels are qualified “U” and should be considered not detected. Associated sample results between 5 and 10 times these levels are qualified as estimated.

Laboratory blank results: The criterion for method blanks is that analyte concentrations must be below the PQL, or below 10% of the lowest associated sample concentration. This criterion was met with the following exception:

Blank ID	Analyte	Concentration	RL
BIG0177-BLK1	Chromium-53	0.13J	0.5

Associated sample results were reported from chromium-52 and no qualifiers are required.

LCS recoveries: QAPP control limits were 80-120%. LCS recoveries were within QAPP and laboratory control limits.

MS recoveries: QAPP control limits were 75-125% for ICP metals and 80-120% for mercury. Functional guidelines criteria for both ICP metals and mercury are 75-125%. The MS recoveries were within QAPP and laboratory control limits with the following exceptions:

QC ID	Analyte	% Recovery	Lab Control Limit
SD-PCM03220MS1	Chromium-52	20.6	75 - 125
SD-PCM03220MSD1	Chromium-52	12.6	75 - 125

Results in the laboratory duplicate were significantly lower than in the sample, and inhomogeneity likely contributed to these low recoveries. A post spike was performed with acceptable recoveries. These analytes are qualified as estimated in the native sample, as well as the associated samples.

Laboratory duplicate RPDs: QAPP control limits were <20%. For duplicates with concentrations above five times the reporting limit, RPDs were within QAPP and laboratory control limits with the following exceptions:

QC ID	Analyte	RPD	Lab Control Limit
SD-PCM03220LD	Chromium-52	89.9	20
SD-PCM02220LD	Copper-63	20.9	20

These analytes are qualified as estimated in the native sample, as well as the associated samples.

For sample/duplicate pairs with concentrations below five times the reporting limit, absolute differences were within +/- the reporting limit.

Field duplicate variability: Field duplicate RPDs were below 20% where the concentrations were above five times the reporting limit with the following exceptions:

Field Duplicate ID/Parent ID	Analyte	FD Result (mg/kg)	Sample Result (mg/kg)	RPD
SD-PCM21220 / SD-PCM01220	Chromium-52	11.5	15	26.4
SD-PCM21820 / SD-PCM01820	Chromium-52	13.4	21	44.2
SD-PCM21220 / SD-PCM01220	Arsenic-75a	3.01	4.77	45.2
SD-PCM21220 / SD-PCM01220	Copper-63	12.6	19.3	42
SD-PCM21220 / SD-PCM01220	Zinc-66	27.1	42.2	43.6

Detected results for these analytes are qualified as estimated in the field duplicates and parent samples.

Field duplicate concentrations were within +/- two times the reporting limit where concentrations were at or below five times the reporting limit.

Laboratory narrative/flags: No additional qualifiers are assigned based on a review of the laboratory narrative or data flags.

Reporting limits: QAPP target reporting limits were met.

Metals data are acceptable for use as qualified.

4.0 Semivolatile Organic Analyses

Quality control analysis frequencies: The QAPP specifies that the following quality control samples be analyzed one per analytical batch or one per twenty samples, whichever is more frequent: method blank, and laboratory control sample (LCS). A matrix spike (MS) and MS duplicate (MSD) must be analyzed one per twenty samples. In addition, surrogate compounds must be measured in each field and quality control sample. Field quality control sample requirements include field duplicates at a 10% frequency. These frequencies were met.

Holding times: Refrigerated sediment samples must be extracted within 14 days of collection. Frozen sediment samples must be extracted within 1 year of collection. Extracts must be analyzed within 40 days of extraction. These holding times were met.

Instrument calibration: The current functional guidelines criteria include maximum relative standard deviations (RSDs) ranging from 20 to 40% in the initial calibration, and maximum percent differences ranging from ±20 to ±40% in the continuing calibration. Closing calibration verifications limits range from ±25% to ±50%. Method 8270E specifies Initial calibration RSDs below 20% or coefficient of determination (R^2) above 0.99, and continuing calibration ±20% differences for each opening continuing calibration and ±30% for the second source initial calibration verifications. The method also specifies a % recovery limit of 50-150% for the ICAL low standard, which is also applied in this review to the low concentration (reporting limit) calibration verifications.

Initial calibration RSDs and R^2s met criteria. Calibration verification % differences met method criteria with the following exceptions:

Standard ID	Analysis Date/Time	Analyte	% Difference	Method Limits
SIF0392-SCV1	06/26/2020 16:15	Benzyl Alcohol	34.9	+/-30
SIG0207-ICV1	07/15/2020 12:03	Benzoic Acid	-24.2	+/-20
SIG0207-ICV1	07/15/2020 12:03	Pentachlorophenol	-36.7	+/-20
Standard ID	Analysis Date/Time	Analyte	% Recovery	Method Limits
SIG0207-LCV1	07/15/2020 13:27	Benzoic Acid	39.2	+/-50
SIG0207-LCV1	07/15/2020 13:27	Pentachlorophenol	33.1	+/-50
SIG0207-LCV2	07/15/2020 14:04	Benzoic Acid	18	+/-50
SIG0207-LCV2	07/15/2020 14:04	Pentachlorophenol	24.6	+/-50

Negative percent differences represent a low response in the continuing calibrations. Benzyl alcohol was not detected in the samples associated and no qualifiers are required.

Positive and non-detect sample results for benzoic acid and pentachlorophenol associated with standard batch SIG0207 are qualified as estimated.

Additionally, the method-specified minimum relative response factor (RRF) was not met for the following low concentration calibration verification standard:

Standard ID	Analysis Date/Time	Analyte	RRF	Method Minimum RRF	FG Minimum RRF
SIG0207-LCV2	07/15/20 14:04	Pentachlorophenol	0.047	0.050	0.010

The relative response factor is slightly below the method minimum and well above the functional guidelines minimum. No additional qualifiers are assigned.

Laboratory blank results: Criteria for blanks are that analyte concentrations must be below one-half the RL, or below 10% of the lowest associated sample concentration. However, all contamination is evaluated for effect on data usability. No target compounds were detected in the method blanks.

Surrogate recoveries: QAPP control limits were 30-160%. Laboratory control limits ranged from 24-134 to 37-120%. Recoveries were within laboratory and QAPP limits.

LCS recoveries: QAPP control limits were 30-160%. Laboratory control limits ranged from 10-120 to 53-120%. These limits were met.

MS recoveries: QAPP control limits were 30-160%. Laboratory control limits ranged from 10-120 to 53-120%. MS recoveries were within laboratory and QAPP limits with the following exceptions:

QC ID	Analyte	% Recovery	Lab Control Limit
SD-PCM02220MS1	Benzo(a)anthracene	28.6	49 - 120
SD-PCM02220MS1	Chrysene	-12.8	47 - 120
SD-PCM02220MSD1	Benzo(a)anthracene	22.2	49 - 120
SD-PCM02220MSD1	Chrysene	-22.1	47 - 120

Variability in the native concentrations likely contributed to the low recoveries, and associated sample results are qualified as estimated rather than rejected.

LCS/LCSD RPDs: RPDs were within the laboratory 30% control limit.

QC ID	Analyte	RPD	Lab Control Limit
BIG0151-BSD1	Benzoic Acid	31	30

Benzoic Acid detected results are qualified as estimated in the associated samples, and non-detect results are considered unaffected.

MS/MSD RPDs: RPDs were within the QAPP limit of 40% and the laboratory control limit of 30%.

Field duplicate variability: Field duplicate RPDs were below 50% where the concentrations were above five times the reporting limit. Field duplicate concentrations were within +/- two times the reporting limit where concentrations were at or below five times the reporting limit.

Laboratory narrative/flags: No additional qualifiers are assigned based on a review of the laboratory data flags.

Reporting limits: Some RLs were elevated above QAPP levels as follows:

Analyte	Highest RL (ug/kg)	Target RL (ug/kg)	Screening Level (ug/kg)
2-Methylnaphthalene	30.3	20	670
Acenaphthene	30.2	20	500
Acenaphthylene	30.3	20	1300

Analyte	Highest RL (ug/kg)	Target RL (ug/kg)	Screening Level (ug/kg)
Anthracene	25.8	20	960
Benzofluoranthenes, Total	29.1	20	3200
Benzyl Alcohol	30.2	20	57
Bis(2-ethylhexyl)phthalate	40.5	25	1300
Dibenzo(a,h)anthracene	30.2	20	230
Dibenzofuran	30.2	20	540
Di-n-butylphthalate	30.3	20	1400
Di-n-octylphthalate	30.3	20	6200
Fluorene	30.2	20	540
Naphthalene	30.3	20	2100
Phenol	25.8	20	420

Each elevated RL was below the screening level and the impact on data use is minimal. No qualifiers are assigned on the basis of elevated reporting limits.

Semivolatile organic data are acceptable for use as qualified.

5.0 Semivolatile Organic Selective Ion Monitoring (SIM) Analyses

Quality control analysis frequencies: The QAPP specifies that the following quality control samples be analyzed one per analytical batch or one per twenty samples, whichever is more frequent: method blank, and laboratory control sample (LCS). A matrix spike (MS) and MS duplicate (MSD) must be analyzed one per twenty samples. In addition, surrogate compounds must be measured in each field and quality control sample. Field quality control sample requirements include field duplicates at a 10% frequency. These frequencies were met.

Holding times: Refrigerated sediment samples must be extracted within 14 days of collection. Frozen sediment samples must be extracted within 1 year of collection. Extracts must be analyzed within 40 days of extraction. These holding times were met.

Instrument calibration: The current functional guidelines criteria include maximum relative standard deviations (RSDs) ranging from 20 to 40% in the initial calibration, and maximum percent differences ranging from ±20 to ±40% in the continuing calibration. Closing calibration verifications limits range from ±25% to ±50%. Method 8270E specifies Initial calibration RSDs below 20% or coefficient of determination (R^2) above 0.99, and continuing calibration ±20% differences for each opening continuing calibration and ±30% for the second source initial calibration verifications, The method also specifies a % recovery limit of 50-150% for the ICAL low standard, which is also applied in this review to the low concentration (reporting limit) calibration verifications.

Initial calibration RSDs and R^2s met criteria. Calibration verification % differences met method criteria with the following exceptions:

Standard ID	Analysis Date/Time	Analyte	% Difference	MethodLimits
SIF0393-SCV1	06/26/2020 16:15	N-nitrosodiphenylamine	41.9	+/-30
SIF0395-SCV1	06/26/2020 13:44	N-nitrosodiphenylamine	65.7	+/-30
Standard ID	Analysis Date/Time	Analyte	% Recovery	Method Limits
SIG0192-LCV1	07/14/2020 13:33	1,2-dichlorobenzene	49.9	50-150
SIG0192-LCV1	07/14/2020 13:33	1,4-dichlorobenzene	49.7	50-150
SIG0192-LCV1	07/14/2020 13:33	2-methylphenol	48.9	50-150
SIG0235-LCV1	07/16/2020 13:12	1,2-dichlorobenzene	49.8	50-150

Negative percent differences represent a low response in the continuing calibrations. N-nitrosodiphenylamine was not detected in the associated samples, and no qualifiers are assigned. For the remaining analytes, associated non-detect sample results and positive sample results within 2 times the RL are qualified as estimated.

Additionally, method-specified minimum relative response factors (RRFs) were not met for the following compounds:

Standard ID	Analysis Date/Time	Analyte	RRF	Method Minimum RRF	FG Minimum RRF
SIG0192-LCV1	07/14/20 13:33	2,4-dimethylphenol	0.182	0.200	0.050
SIG0235-LCV1	07/16/20 13:12	2,4-dimethylphenol	0.189	0.200	0.050
SIG0192-LCV1	07/14/20 13:33	2-methylphenol	0.472	0.700	0.010
SIG0235-LCV1	07/16/20 13:12	2-methylphenol	0.498	0.700	0.010

Relative response factors are below the method minimum, but well above the functional guidelines minimums. No additional qualifiers are assigned.

Laboratory blank results: Criteria for blanks are that analyte concentrations must be below one-half the RL, or below 10% of the lowest associated sample concentration. However, all contamination is evaluated for effect on data usability. The following compounds were detected in the method blanks.

Blank ID	Analyte	Concentration (ug/kg)	RL (ug/kg)
BIG0151-BLK2	Diethyl Phthalate	6.1J	20
BIG0149-BLK2	Diethyl Phthalate	8.3J	20

Detected results in the associated samples within 5 times the blank level are qualified “U” and should be considered not detected. Detected results in the associated samples between 5 and 10 times the blank level are qualified as estimated.

Surrogate recoveries: Laboratory control limits ranged from 27-120 to 37-120%. Recoveries were within laboratory and QAPP limits.

LCS recoveries: QAPP control limits were 30-160%. Laboratory control limits ranged from 10-120 to 55-120%. Recoveries were within laboratory and QAPP limits.

MS recoveries: QAPP control limits were 30-160%. Laboratory control limits ranged from 10-120 to 55-120%. Recoveries were within laboratory and QAPP limits.

LCS/LCSD RPDs: RPDs were within the laboratory 30% control limit.

MS/MSD RPDs: RPDs were within the QAPP limit of 40% and the laboratory control limit of 30% with one exception:

QC ID	Analyte	RPD	Lab Control Limit
SD-PCM02220MSD2	2,4-dimethylphenol	35.3	30

This RPD was within the QAPP limit, and no qualifiers are assigned.

Field duplicate variability: Field duplicate RPDs were below 50% where the concentrations were above five times the reporting limit. Field duplicate concentrations were within +/- two times the reporting limit where concentrations were at or below five times the reporting limit.

Laboratory narrative/flags: No additional qualifiers are assigned based on a review of the laboratory data flags.

Reporting limits: Some RLs were elevated above QAPP levels as follows:

Analyte	Highest RL (ug/kg)	Target RL (ug/kg)	Screening Level (ug/kg)
1,2,4-trichlorobenzene	7.6	5	31
1,2-dichlorobenzene	7.6	5	35
1,4-dichlorobenzene	7.6	5	110
2,4-dimethylphenol	30.2	20	29
Butylbenzylphthalate	6.8	5	63
Diethyl Phthalate	30.3	5	200
Dimethylphthalate	6.8	5	71
Hexachlorobenzene	7.6	5	22

Each elevated RL except 2,4-dimethylphenol was below the screening level. No qualifiers are assigned on the basis of elevated reporting limits.

Semivolatile organic SIM data are acceptable for use as qualified.

6.0 Dioxin/Furan Analyses

Quality control analysis frequencies: The method specifies that method blank and ongoing precision and recovery (OPR) samples must be analyzed with each batch. In addition, carbon-13 labeled isotope dilution standards and a chlorine-37 labeled cleanup standard must be measured in each field and quality control sample. These criteria were met.

Analysis holding times: Method 1613B specifies a 40 day holding time between extraction and analysis, but does not specify a holding time from sampling to extraction for sediments. Functional guidelines recommends analysis holding times of one year, if frozen. These holding times were met. However, no dioxin sample jar was collected for sample SD-PCM03120 and analysis was performed on sample volume not stored in an amber jar. Because the sample had not been stored in the dark, dioxin results for this sample are qualified as estimated.

System performance checks: The tune must demonstrate a resolving power >10,000 at m/z 304.9825. In addition, the isomer specificity check must and demonstrate a valley <25% for all peaks near 2,3,7,8-TCDD and 2,3,7,8-TCDF. These criteria were met.

Instrument calibration: Initial calibration criteria include 1) maximum percent relative standard deviations (%RSD) of ≤20% for unlabeled compounds with an isotopically labeled analog and ≤35% for 1,2,3,7,8,9-HxCDD, OCDF, and labeled compounds, 2) Ion abundance ratios must be within ± 15% of theoretical, and 3) signal to noise ratios must be above 10. Continuing calibration criteria include 1) maximum percent differences (%D) between the initial calibration and the continuing calibration of ≤20% for unlabeled compounds with an isotopically labeled analog and ≤35% for 1,2,3,7,8,9-HxCDD, OCDF, and labeled compounds, 2) Ion abundance ratios must be within ± 15% of theoretical, and 3) signal to noise ratios must be above 10. These criteria were met.

The following calibration verification standard % differences were outside the laboratory control limits:

Standard ID	Analysis Date/Time	Analyte	% Difference	Lab Limits	Method Limits
SIH0079-CCV1	08/11/2020 00:25	1,2,3,4,7,8-HxCDF	11.5	+/-10	+/-10
SIH0079-CCV1	08/11/2020 00:25	1,2,3,6,7,8-HxCDF	13.6	+/-12	+/-12
SIH0079-CCV1	08/11/2020 00:25	1,2,3,7,8,9-HxCDF	11.9	+/-10	+/-10
SIH0079-ICV1	08/10/2020 20:13	1,2,3,7,8,9-HxCDF	10.3	+/-10	+/-10

These % differences were within the QAPP limits and no qualifiers are assigned.

The following continuing calibration internal standard compounds exceeded a ±15 second (0.25 minutes) retention time shift from the initial calibration average retention time:

Standard ID	Analysis Date/Time	Analyte	RT Shift	Control Limit
SIH0079-CCV1	08/11/2020 00:25	13C12-1,2,3,4-TCDD	0.317	+/- 0.25
SIH0079-CCV1	08/11/2020 00:25	13C12-1,2,3,7,8,9-HxCDD	0.276	+/- 0.25
SIH0079-ICV1	08/10/2020 20:13	13C12-1,2,3,4-TCDD	0.317	+/- 0.25
SIH0079-ICV1	08/10/2020 20:13	13C12-1,2,3,7,8,9-HxCDD	0.276	+/- 0.25

These shifts are likely due to routine column maintenance. Since remaining performance criteria in these standards were met and retention time shifts were internally consistent, no qualifiers are assigned.

Due to the use of an alternate column, method specified relative retention time windows do not apply. Alternate column relative retention time (RRT) windows were not present in the data package, and continuing calibration data were evaluated based on a relative retention time shift of ±0.002 for compounds with an isotopically labeled analog and ±0.004 for 1,2,3,7,8,9-HxCDD, OCDF, and labeled compounds. These criteria were met.

Laboratory blank results: Method 1613B states that the method blank must not contain any 2,3,7,8-substituted CDD/CDF or potentially interfering compound at greater than the minimum level or one-third the regulatory compliance level, whichever is greater. This criteria was met. Functional Guidelines states that the concentrations must be below the CRQL for 2,3,7,8-substituted CDD/CDF except OCDD and OCDF which must be below three times the CRQL. The following compounds were detected in the method blank:

Blank ID	Analyte	Concentration (ng/kg)	RL (ng/kg)
BIG0225-BLK2	OCDD	1.31 J	10
BIG0225-BLK2	OCDF	0.355 EMPC, J	2.5
BIG0225-BLK2	Total HpCDF	0.0378	1
BIG0225-BLK2	1,2,3,4,6,7,8-HpCDD	0.133 EMPC, J	2.5
BIG0225-BLK2	1,2,3,4,6,7,8-HpCDF	0.0378 J	1
BIH0023-BLK2	1,2,3,4,7,8-HxCDF	0.201 J	1
BIH0023-BLK2	1,2,3,6,7,8-HxCDD	0.121 EMPC, J	1
BIH0023-BLK2	1,2,3,6,7,8-HxCDF	0.146 J	1
BIH0023-BLK2	1,2,3,7,8-PeCDD	0.122 EMPC, J	1
BIH0023-BLK2	1,2,3,7,8-PeCDF	0.24 J	1
BIH0023-BLK2	1,2,3,4,6,7,8-HpCDF	0.175 EMPC, J	1
BIH0023-BLK2	2,3,4,7,8-PeCDF	0.221 EMPC, J	1
BIH0023-BLK2	2,3,4,6,7,8-HxCDF	0.0886 J	1
BIH0023-BLK2	Total PeCDF	0.24	1
BIH0023-BLK2	1,2,3,4,7,8-HxCDD	0.136 EMPC, J	1

Blank ID	Analyte	Concentration (ng/kg)	RL (ng/kg)
BIH0023-BLK2	Total HxCDF	0.436	1
BIH0023-BLK2	OCDF	0.395 EMPC, J	2.5
BIH0023-BLK2	OCDD	2.68J	10
BIH0023-BLK2	1,2,3,4,6,7,8-HpCDD	0.4 EMPC, J	2.5

Positive sample results within 5 times these levels were qualified "U" at the reported concentration, and should be considered not detected.

C_{13} labeled isotope dilution standard recoveries: Isotope dilution standard recoveries were within laboratory control limits.

Cl_{37} labeled cleanup standard recoveries: Cleanup standard recoveries were within laboratory control limits.

OPR recoveries: OPR recoveries were within laboratory control limits.

Laboratory duplicate variability: Duplicate RPDs were below 50% where the concentrations were above five times the reporting limit with the following exceptions:

QC ID	Analyte	RPD	Lab Control Limit
SD-PCM00820LD	1,2,3,6,7,8-HxCDD	157	25
SD-PCM00820LD	1,2,3,4,6,7,8-HpCDF	162	25
SD-PCM00820LD	1,2,3,4,6,7,8-HpCDD	180	25
SD-PCM00820LD	OCDF	184	25
SD-PCM00820LD	OCDD	181	25

These analytes are qualified as estimated in the native sample

Duplicate concentrations were within +/- two times the reporting limit where concentrations were at or below five times the reporting limit.

Compound Identification: Method criteria for compound identification include: 1) The signals of the characteristic ions must maximize within the same 2 seconds. 2) The signal to noise ratio must be greater than 2.5. 3) Ion abundance ratios must be within ± 15% of theoretical, or within ±10% of the calibration verification standard. 4) The relative retention times must be within the RT Window. 5) Interferences from polychlorinated diphenyl ether compounds must be evaluated.

These criteria were reviewed for each target analyte in the six samples. No compound identification discrepancies were noted. Where compounds did not meet ion abundance ratio requirements, the lab appropriately flagged the results as estimated maximum possible concentrations (EMPCs). One instance of interference was observed and flagged by the laboratory with an X,J qualifier. The amount of interference was reviewed, and determined to be minimal (<25%) and therefore an estimated qualifier is assigned.

Compound Quantitation: Sample concentrations were recalculated to verify quantitation. No discrepancies were noted.

Second column confirmation: Second column confirmation was not required to separate 2,3,7,8-TCDF from other TCDF isomers due to the use of RTX Dioxin-2 Column.

Estimated detection limits: Estimated detection limits (EDLs) were recalculated to verify quantitations. The laboratory utilized the 3 times signal to noise ratio specified in CLP high resolution superfund methods rather than the 2.5 times signal to noise ratio specified in method 1613B. This is considered an acceptable method modification. All EDLs met QAPP target reporting limits.

Toxicity equivalent quantity (TEQ): Region 10 guidelines indicates that three TEQs should be calculated, with the full value of detections in each case and the value of non-detects calculated at full, half and zero percent of their TEQ respectively. For the purposes of TEQ calculation, EMPCs below the RL are treated as non-detects, and EMPCs above the RL are treated as detections.

Recalculation of the TEQ was performed as follows:

Sample ID	TEQ-1	TEQ-1/2	TEQ-0
SD-PCM00420	5.36	5.18	5.00
SD-PCM00820	6.10 J	5.93 J	5.76 J
SD-PCM01020	41.4 J	40.5 J	39.7 J
SD-PCM01520	0.566	0.369	0.171 J
SD-PCM01920	0.617	0.424 J	0.230 J
SD-PCM03120	1.05 J	0.783 J	0.521 J

Where:

TEQ-1 = TEQ with 2005 WHO TEFs including full values of detections, EDLs, and EMPCs.

TEQ-½ = TEQ with 2005 WHO TEFs including full values of detections and EMPCs above the RL, and ½ values of EDLs and EMPCs below the RL.

TEQ-0 = TEQ with 2005 WHO TEFs including full values of detections and EMPCs above the RL, and excluding EDLs and EMPCs below the RL.

J Estimated TEQ. J qualifiers are assigned if more than 10% of the TEQ is derived from estimated data.

Laboratory flags: The laboratory appropriately flagged concentrations and EMPCs below the low standard as estimated "J". EMPCs below the reporting limit are qualified as non-detects "EMPC, U" as per Region 10 guidelines. No qualification was necessary for EMPCs above the reporting limits. The OCDD concentration in sample SD-PCM1020 exceeded the calibration range, and is qualified as estimated.

Overall assessment: Documentation was found to be clear and complete. No discrepancies were noted in analyte identification or result quantitation. Calibration data and system performance checks demonstrate acceptable instrument performance. Quality control results indicate acceptable accuracy. Estimated qualifiers were assigned based on elevated RPDs in the laboratory duplicate. Blank contamination resulted in estimated one concentration and several elevated reporting limits.

Dioxin/furan data are acceptable for use as qualified.

7.0 General Chemistry Analyses

Quality control analysis frequencies: For total organic carbon, a method blank, SRM, LCS, MS, and a laboratory triplicate were analyzed in each batch. For total solids, each batch included a

method blank, and laboratory triplicate. Quality control samples were sufficient to evaluate overall precision and accuracy as appropriate for the method. Field quality control sample requirements include field duplicates at a 10% frequency. This frequency was met.

Holding times: Holding times are as follows:

Analysis	Holding time if refrigerated	Holding time if frozen
TOC	14 days	6 months
Total Solids	14 days	6 months

Samples were analyzed within the holding times.

Instrument calibration: Instrument calibration criteria are as follows:

Analysis	Criteria
TOC	Initial calibration $R^2 > 0.990$ Continuing calibration recovery within 90-110%
Total Solids	Calibration mass within $\pm$ 0.1 g

These criteria were met.

Laboratory blank results: Criteria for method blanks are that analyte concentrations must be below the PQL, or below 10% of the lowest associated sample concentration. This criterion was met for all method blanks.

LCS recoveries: Control limits were 75-125% for TOC. These criteria were met.

SRM results: Control limits were 75-125% for TOC. These criteria were met.

MS recoveries: Control limits were 75-125% for TOC. These criteria were met.

Laboratory triplicate results: Control limits were 20% for TOC and total solids. These criteria were met.

Field duplicate variability: Field duplicate RPDs were below 25% where the concentrations were above five times the reporting limit with the following exceptions:

Field Duplicate ID/Sample ID	Analyte	FD Result (%)	Sample Result (%)	RPD
SD-PCM20620 / SD-PCM00620	Total Organic Carbon	0.94	0.45	70.5
SD-PCM21220 / SD-PCM01220	Total Organic Carbon	0.22	0.46	70.6
SD-PCM21820 / SD-PCM01820	Total Organic Carbon	0.05	0.2	120
SD-PCM22320 / SD-PCM02320	Total Organic Carbon	0.16	0.34	72

Total organic carbon is qualified as estimated in the field duplicate and parent sample.

General chemistry results are acceptable for use as qualified.

8.0 Grain Size Analyses

Quality control analysis frequencies: This batch included a laboratory triplicate, meeting frequency requirements.

Holding times: Sediment samples must be analyzed within 6 months of collection. Samples were analyzed within the holding time.

Laboratory triplicate RSDs: Laboratory reported RSD calculations were performed on the percent passing values. RSDs were calculated on the percent retained values, and one RSD exceeded the 20% control limit as follows::

QC Sample ID	Analyte	RSD	Lab Control Limit
SD-PCM00220 LR	Gravel, Phi Size <-1	22.8	20

Gravel results are qualified as estimated in the associated samples.

Laboratory narrative/flags: No additional qualifiers are assigned based on a review of the laboratory data flags.

Grain size data are acceptable for use as qualified.

9.0 Qualifier Summary Table

Client ID	Analyte(s)	Qualifier	Reason
Polychlorinated Biphenyl Analyses			
SD-PCM00220	Aroclor-1260	J	High dual column RPD
SD-PCM01020	Aroclor-1260	J	High dual column RPD
SD-PCM02020	Aroclor-1248, Aroclor-1254, Aroclor-1260	J	High dual column RPD
SD-PCM02220	Aroclor-1248	J	High dual column RPD
SD-PCM02520	Aroclor-1260	J	High dual column RPD
Metals Analyses			
SD-PCM00220	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM00320	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM00420	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM00520	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM00520	Silver-107	U	High continuing calibration blank
SD-PCM00620	Copper-63	J	High lab duplicate RPD
SD-PCM00620	Silver-107	U	High continuing calibration blank
SD-PCM00720	Copper-63	J	High lab duplicate RPD
SD-PCM00820	Copper-63	J	High lab duplicate RPD
SD-PCM00920	Copper-63	J	High lab duplicate RPD
SD-PCM00920	Silver-107	U	High continuing calibration blank
SD-PCM01020	Silver-107	J	High continuing calibration blank
SD-PCM01020	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM01120	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM01120	Silver-107	U	High continuing calibration blank
SD-PCM01220	Arsenic-75a, Copper-63, Zinc-66	J	High FD RPD
SD-PCM01220	Chromium-52	J	Low MS Recovery, Low MSD Recovery, High lab duplicate RPD, High FD RPD

Client ID	Analyte(s)	Qualifier	Reason
SD-PCM01320	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM01420	Silver-107	J	High continuing calibration blank
SD-PCM01420	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM01520	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM01520	Silver-107	U	High continuing calibration blank
SD-PCM01620	Copper-63	J	High lab duplicate RPD
SD-PCM01620	Silver-107	U	High continuing calibration blank
SD-PCM01720	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM01720	Silver-107	U	High continuing calibration blank
SD-PCM01820	Chromium-52	J	High FD RPD
SD-PCM01820	Copper-63	J	High lab duplicate RPD
SD-PCM01920	Copper-63	J	High lab duplicate RPD
SD-PCM02020	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM02220	Copper-63	J	High lab duplicate RPD
SD-PCM02320	Copper-63	J	High lab duplicate RPD
SD-PCM02420	Copper-63	J	High lab duplicate RPD
SD-PCM02420	Silver-107	U	High continuing calibration blank
SD-PCM02520	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM02520	Silver-107	U	High continuing calibration blank
SD-PCM02620	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM02620	Silver-107	U	High continuing calibration blank
SD-PCM02720	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM02720	Silver-107	U	High continuing calibration blank
SD-PCM02820	Copper-63	J	High lab duplicate RPD
SD-PCM02920	Copper-63	J	High lab duplicate RPD
SD-PCM03020	Silver-107	J	High continuing calibration blank
SD-PCM03020	Copper-63	J	High lab duplicate RPD
SD-PCM03120	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM03220	Chromium-52	J	Low MS & MSD recovery, High lab duplicate RPD
SD-PCM03220	Silver-107	U	High continuing calibration blank
SD-PCM03420	Copper-63	J	High lab duplicate RPD
SD-PCM03520	Copper-63	J	High lab duplicate RPD
SD-PCM03620	Copper-63	J	High lab duplicate RPD
SD-PCM20620	Copper-63	J	High lab duplicate RPD
SD-PCM20620	Silver-107	U	High continuing calibration blank
SD-PCM21220	Arsenic-75a, Copper-63, Zinc-66	J	High FD RPD

Client ID	Analyte(s)	Qualifier	Reason
SD-PCM21220	Chromium-52	J	Low MS Recovery, Low MSD Recovery, High lab duplicate RPD, High FD RPD
SD-PCM21820	Chromium-52	J	High FD RPD
SD-PCM21820	Copper-63	J	High lab duplicate RPD
SD-PCM22320	Copper-63	J	High lab duplicate RPD
Semivolatile Organics Analyses			
SD-PCM00220	Benzoic Acid, Pentachlorophenol	UJ	Low CCV Response, Low RL Std Recovery
SD-PCM01220	Benzoic Acid	UJ	Low CCV Response, Low RL Std Recovery
SD-PCM01220	Pentachlorophenol	UJ	Low RL Std Recovery, Low CCV Response
SD-PCM01720	Benzoic Acid	J	High LCS/LCSD RPD
SD-PCM02020	Benzoic Acid	UJ	Low CCV Response, Low RL Std Recovery
SD-PCM02020	Pentachlorophenol	UJ	Low RL Std Recovery, Low CCV Response
SD-PCM02220	Benzo(a)anthracene, Chrysene	J	Low MS & MSD recovery
SD-PCM03120	Benzoic Acid, Pentachlorophenol	UJ	Low CCV Response, Low RL Std Recovery
SD-PCM03220	Benzoic Acid, Pentachlorophenol	UJ	Low CCV Response, Low RL Std Recovery
SD-PCM21220	Benzoic Acid, Pentachlorophenol	UJ	Low CCV Response, Low RL Std Recovery
Semivolatile Organics by Selective Ion Monitoring Analyses			
SD-PCM00320	1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methylphenol	UJ	Low RL Std Recovery
SD-PCM00420	2-methylphenol	J	Low RL Std Recovery
SD-PCM00420	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM00420	1,2-dichlorobenzene, 1,4-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM00520	1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methylphenol	UJ	Low RL Std Recovery
SD-PCM00620	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM00620	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM00720	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM00820	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM00820	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM00920	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM00920	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM01020	2-methylphenol	J	Low RL Std Recovery
SD-PCM01020	1,2-dichlorobenzene, 1,4-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM01120	2-methylphenol	J	Low RL Std Recovery
SD-PCM01120	1,2-dichlorobenzene, 1,4-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM01320	2-methylphenol	J	Low RL Std Recovery
SD-PCM01320	1,2-dichlorobenzene, 1,4-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM01420	2-methylphenol	J	Low RL Std Recovery
SD-PCM01420	1,2-dichlorobenzene, 1,4-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM01520	1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methylphenol	UJ	Low RL Std Recovery
SD-PCM01620	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM01620	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM01720	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM01720	1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methylphenol	UJ	Low RL Std Recovery
SD-PCM01820	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM01920	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM02020	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM02220	Diethyl Phthalate	UJ	Lab blank contamination

Client ID	Analyte(s)	Qualifier	Reason
SD-PCM02220	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM02320	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM02320	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM02420	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM02420	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM02520	2-methylphenol	J	Low RL Std Recovery
SD-PCM02520	1,2-dichlorobenzene, 1,4-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM02620	1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methylphenol	UJ	Low RL Std Recovery
SD-PCM02720	1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methylphenol	UJ	Low RL Std Recovery
SD-PCM02820	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM02920	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM03020	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM03020	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM03420	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM03420	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM03520	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM03620	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM20620	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM20620	1,2-dichlorobenzene	UJ	Low RL Std Recovery
SD-PCM21820	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM22320	Diethyl Phthalate	UJ	Lab blank contamination
SD-PCM22320	1,2-dichlorobenzene	UJ	Low RL Std Recovery
Dioxin/Furan Analyses			
SD-PCM00420	1,2,3,4,7,8-HxCDD, 1,2,3,4,7,8-HxCDF, 2,3,4,6,7,8-HxCDF	EMPC,U	Region 10 guidelines for EMPC <RL
SD-PCM00820	1,2,3,4,6,7,8-HpCDF, 1,2,3,6,7,8-HxCDD, OCDF	J	High lab duplicate difference
SD-PCM00820	1,2,3,4,6,7,8-HpCDD, OCDD	J	High lab duplicate RPD
SD-PCM01020	2,3,7,8-TCDD	EMPC,U	Region 10 guidelines for EMPC <RL
SD-PCM01020	OCDD	J	Exceeded calibration; secondary result not obtained.
SD-PCM01020	1,2,3,7,8-PeCDF	J	Minimal interferences present (<25%)
SD-PCM01520	1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD	EMPC,U	Region 10 guidelines for EMPC <RL
SD-PCM01920	1,2,3,4,7,8-HxCDF	EMPC,U	Region 10 guidelines for EMPC <RL
SD-PCM03120	1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF	EMPC,UJ	Lab blank contamination, Sample Storage, Region 10 guidelines for EMPC <RL
SD-PCM03120	2,3,7,8-TCDF	EMPC,UJ	Sample Storage, Region 10 guidelines for EMPC <RL
SD-PCM03120	1,2,3,4,6,7,8-HpCDD, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,7,8,9-HxCDF, OCDD, OCDF, Total HpCDD, Total HpCDF, Total HxCDD, Total HxCDF, Total PeCDD, Total PeCDF, Total TCDD, Total TCDF	J	Sample Storage
SD-PCM03120	1,2,3,4,7,8-HxCDD, 1,2,3,4,7,8-HxCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF	UJ	Lab blank contamination, Sample Storage
SD-PCM03120	1,2,3,7,8-PeCDD, 2,3,7,8-TCDD	UJ	Sample Storage
General Chemistry Analyses			
SD-PCM00620	Total Organic Carbon	J	High FD RPD
SD-PCM01220	Total Organic Carbon	J	High FD RPD
SD-PCM01820	Total Organic Carbon	J	High FD Difference
SD-PCM02320	Total Organic Carbon	J	High FD RPD
SD-PCM03220	Total Organic Carbon	J	Analysis hold time exceeded

Client ID	Analyte(s)	Qualifier	Reason
SD-PCM20620	Total Organic Carbon	J	High FD RPD
SD-PCM21220	Total Organic Carbon	J	High FD RPD
SD-PCM21820	Total Organic Carbon	J	High FD Difference
SD-PCM22320	Total Organic Carbon	J	High FD RPD
Grain Size Analysis			
SD-PCM00220	Gravel, Phi Size <-1	J	High triplicate RSD
SD-PCM00520	Gravel, Phi Size <-1	J	High triplicate RSD
SD-PCM00720	Gravel, Phi Size <-1	J	High triplicate RSD
SD-PCM01120	Gravel, Phi Size <-1	J	High triplicate RSD
SD-PCM01420	Gravel, Phi Size <-1	J	High triplicate RSD
SD-PCM01820	Gravel, Phi Size <-1	J	High triplicate RSD

10.0 Abbreviations and Definitions

DV Qualifier	Definition
U	The material was analyzed for, but was not detected above the level of the associated value.
UY	The reporting limit was elevated due to chromatographic overlap with related compounds. The material was analyzed for, but was not detected above the level of the associated value.
J	The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
UJ	The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The sample result is rejected. The presence or absence of the analyte cannot be verified and data are not usable.
R1	This sample result has been rejected in favor of a more accurate, precise or conservative result. The other result should be used.
R2	This sample result has been rejected in favor of a more accurate, precise or conservative result from another analytical method. The other result should be used.

Abbreviation	Definition
ARI	Analytical Resources, Inc.
CCC	Calibration check compounds. These include Acenaphthene, 1,4-Dichlorobenzene, Hexachlorobutadiene, N-Nitrosodiphenylamine, Di-n-octyl phthalate, Fluoranthene, Benzo(a)pyrene, , 4-Chloro-3-methylphenol, 2,4-Dichlorophenol, 2-Nitrophenol, Phenol, Pentachlorophenol, and 2,4,6-Trichlorophenol
CRDL	Contract required detection limit
DV	Data validation
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
EDL	Estimated detection limit
EMPC	Estimated maximum possible concentration
MS	Matrix spike
MSD	Matrix spike duplicate
NA	Not Applicable
RL	Reporting limit

Abbreviation	Definition
RPD	Relative percent difference
RRM	Regional reference material
RSD	Relative standard deviations
SRM	Standard reference material

11.0 References

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