2012-2013 CONSTRUCTION SEASON COMPLETION REPORT

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

Prepared by:

AMEC Environment & Infrastructure, Inc.
3500 188th Street SW, Suite 601
Lynnwood, Washington 98037
(425) 921-4000

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 SHORELINE EXCAVATION 3

3.0 IN-WATER CONSTRUCTION ACTIVITIES 5
- 3.1 EXTENSION OF IN-WATER CONSTRUCTION WINDOW 5
- 3.2 TEMPORARY CONSTRUCTION STRUCTURES 5
- 3.3 DREDGE AND BACKFILL 5
  - 3.3.1 Dredging 5
  - 3.3.2 Backfilling 7
- 3.4 BMPS 7

4.0 TRANSLOADING OF DREDGE SEDIMENTS 9
- 4.1 TRANSLOAD FACILITY DESCRIPTION 9
- 4.2 STORMWATER MANAGEMENT 9
- 4.3 BMPS 10

5.0 DREDGE RETURN WATER PROCESSING 11
- 5.1 SYSTEM OPERATION 12
- 5.2 BMPS 12
- 5.3 SYSTEM MODIFICATIONS 12

6.0 WATER QUALITY MONITORING 13
- 6.1 *IN SITU* WATER QUALITY INSTRUMENTS 14
- 6.2 DREDGE MONITORING 15
  - 6.2.1 Results of Conventional Parameter Compliance Monitoring 15
  - 6.2.2 Results of Chemical Analysis of Water Samples 15
- 6.3 DREDGE RETURN WATER MONITORING 16
  - 6.3.1 Results of Conventional Parameter Monitoring 16
  - 6.3.2 Results of Chemical Analysis of Water Samples 16
- 6.4 DATA QUALITY REVIEW 17

7.0 PRE- AND POST-CONSTRUCTION PERIMETER MONITORING 19
- 7.1 PRE-CONSTRUCTION MONITORING – FIELD SAMPLING ACTIVITIES AND RESULTS 19
- 7.2 END OF CONSTRUCTION SEASON 1 MONITORING – FIELD SAMPLING ACTIVITIES AND RESULTS 20

8.0 POST-CONSTRUCTION CORE SAMPLING 23
- 8.1 SUMMARY OF SAMPLING ACTIVITIES 23
- 8.2 RESULTS 24
- 8.3 DATA QUALITY REVIEW 24

9.0 END OF CONSTRUCTION SEASON DECONTAMINATION 27

10.0 ARCHAEOLOGICAL MONITORING 29

11.0 REFERENCES 31

TABLE OF CONTENTS
(Continued)

TABLES

Table 1	Schedule of Dredging, Backfill, and Water Quality Monitoring
Table 2	Results of Pre-Construction Water Sampling
Table 3	Results of Water Samples Analyzed using ICP-MS and ICP-MS with Collision Cell to Remove Salinity Effects
Table 4	Analytical Results for Water Samples Collected during Dredge Monitoring
Table 5	Dredge Water Monitoring Quality Assurance Sample Results
Table 6	Dredge Return Water Conventional Parameter Data
Table 7	Analytical Results for Water Samples Collected During Dredge Return Water Monitoring
Table 8	Perimeter Monitoring Sample Locations
Table 9	Perimeter Monitoring Sample Results
Table 10	Post-Construction Coring Sample Locations
Table 11	Post-Construction Core Sample Results

FIGURES

Figure 1	Temporary Structures
Figure 2	Approval Units
Figure 3	Status of Approval Units Following 2012-2013 Construction Season
Figure 4	Perimeter Monitoring Sample Locations 2012-2013 Construction Season
Figure 5	Results of Perimeter Monitoring from 2012-2013 Construction Season
Figure 6	Post-Construction Core Sample Locations 2012-2013 Construction Season

APPENDICES

Appendix A	Construction Season 1 As-Built Drawings
Appendix B	Backfill Grain-Size Quality Assurance/Quality Control
Appendix C	Transload Waste Tickets and Waste Profile
Appendix D	Conventional Water Quality Parameters Measured by *In situ* Instruments
Appendix E	Daily Water Quality Monitoring Reports
Appendix F	Data Validation Reports
Appendix G	Qualitative Sample Characteristics Forms and Field Forms for Perimeter Sampling
Appendix H	Core Summary Logs, Photographs, and Field Forms for Post-Construction Coring
Appendix I	End of Construction Season Decontamination
Appendix J	Archaeological Monitoring Report

ACRONYMS & ABBREVIATIONS

ADC	alternative daily cover
AU	approval unit
Boeing	The Boeing Company
BMP	best management practice
CFR	Code of Federal Regulations
CKD	cement kiln dust
cm	centimeters
COCs	chemicals of concern
Corps	U.S. Army Corps of Engineers
CS1	1st Construction Season
cy	cubic yards
DAHP	Washington State Department of Archaeology and Historic Preservation
DSOA	Duwamish Sediment Other Area
EC	electro-coagulation
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
GAC	granulated activated carbon
gpm	gallons per minute
GPS	global positioning system
HDPE	high-density polyethylene
ICP-MS	inductively coupled plasma mass spectrometry
LCS	laboratory control sample
mg/L	milligrams per liter
MLLW	mean lower low water
MS/MSD	matrix spike/matrix-spike duplicate

ACRONYMS & ABBREVIATIONS (continued)

NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity units
Order	Administrative Order [RCRA Docket No 1092- 01-22-3008(h)] on Consent
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
POTW	Publicly Owned Treatment Works
ppt	parts per thousand
QA	Quality Assurance
QC	Quality Control
RBDA	Risk-Based Disposal Approval
RCRA	Resource Conservation and Recovery Act
RM	river mile
RPD	Relative Percent Difference
RTK	real-time kinematic
SMS	Washington Sediment Management Standards
SQS	Washington Sediment Quality Standards
SRM	Sediment Reference Material
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TS	total solids
TSCA	Toxic Substances Control Act
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife

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1.0 INTRODUCTION

This report summarizes the Duwamish Sediment Other Area (DSOA) and Southwest Bank Corrective Measure and Habitat Project construction work that was conducted during the 2012-2013 construction season. The DSOA and Southwest Bank Corrective Measure is being conducted pursuant to the Administrative Order [RCRA Docket No 1092- 01-22-3008(h)] on Consent (Order) issued to The Boeing Company (Boeing) in 1994 by the U.S. Environmental Protection Agency (EPA) under authority of the Resource Conservation and Recovery Act (RCRA) Section 3008(h), as amended [42 USC 6928(h)]. Concurrent with the construction of the DSOA and Southwest Bank Corrective Measure, Boeing is constructing habitat restoration projects in accordance with a Consent Decree between the Natural Resource Trustees and Boeing executed in December 2010.

The work that was conducted during the 2012-2013 construction season (1st Construction Season [CS1]) included:

- Shoreline excavation,
- Sediment dredging and backfilling,
- Transloading of dredged sediments,
- Dredge return water processing,
- Water quality monitoring which included:
  - *In situ* instrument monitoring
  - Dredge monitoring
  - Dredge return water monitoring,
- Pre- and post-construction perimeter sediment monitoring,
- Post-construction core sampling, and
- Archaeological monitoring.

All work was conducted as per the EPA approved design submittals and subsequent EPA modifications. Presented below is a description of each of these activities.

2.0 SHORELINE EXCAVATION

Shoreline excavation at the north end of Boeing Plant 2 was conducted for habitat restoration purposes as required by the Consent Decree with the Natural Resource Trustees. This work was the interim grading for the creation of an embayment. All work was conducted in compliance with agency approvals and permit requirements.

Starting in September 2012, interim grading of the North Shoreline Area was started on the uplands. Excavation of soils back of the shoreline was completed in fall of 2012 to an intermediate elevation of approximately 12 to 13 feet mean lower low water (MLLW). Excavated soils with chemical constituents below levels for non-restrictive use were reused as fill for a parking Lot 16 to bring the grade of the parking area to that of the surrounding area. Soils excavated in late October were not able to be reused as structural fill in the parking lot area due to heavy rainfall making compaction impractical. These soils were sent off site to the Waste Management, Inc. solid waste landfill near Arlington, Oregon for reuse as alternative daily cover (ADC). A total of approximately 7,800 cubic yards (cy) were used as fill in Lot 16 and approximately 1,200 cy were sent off site to the Waste Management, Inc. solid waste landfill in Oregon as ADC.

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3.0 IN-WATER CONSTRUCTION ACTIVITIES

Presented below is a description of the in-water work activities conducted in CS1. All in-water construction work was conducted in compliance with local, state, and federal agencies' permit requirements. In addition, this work was conducted in accordance with a Toxic Substances Control Act (TSCA) Risk-Based Disposal Approval (RBDA) issued by the EPA on December 20, 2012.

3.1 EXTENSION OF IN-WATER CONSTRUCTION WINDOW

The in-water construction work window that was originally authorized for CS1 ended February 15, 2013; however, EPA requested from the natural resources trust agencies under the Endangered Species Act (National Marine Fisheries Service [NMFS] and the U.S. Fish and Wildlife Service [USFWS]; the Services) an extension of the in-water work window. The Services agreed to an extension of the work window through March 8, 2013; this extension was subsequently authorized by the U.S. Army Corps of Engineers (Corps; Section 10/404 Permit) and the Washington Department of Fish and Wildlife (Hydraulic Project Approval).

3.2 TEMPORARY CONSTRUCTION STRUCTURES

The start of the in-water construction season required the contractor to install a number of temporary structures prior to dredging.

The first few days of in-water work in January 2013, nine temporary mooring piles were installed as shown on Figure 1. Two additional piles were installed for the *in situ* water quality monitoring instruments discussed in Section 6.1 (Figure 1).

Prior to the start of the in-water construction, Boeing obtained approval from the Corps (Nationwide Permit 7) to install a temporary extension to Outfall Z at the south end of the dredging area. This outfall extension will be in place until construction of the final stormwater outfalls that will be placed in the 2013 to 2014 in-water construction season. The temporary Outfall Z extension (Figure 1) was installed on November 26 and 27, 2012.

3.3 DREDGE AND BACKFILL

Presented below is a general description of the work methods for dredging and backfilling. As-built drawings for CS1 are provided in Appendix A.

3.3.1 Dredging

Dredging of the DSOA began on January 4, 2013 and placement of backfill began on January 21, 2013 (Table 1). All in-water work for CS1 was completed by March 8, 2013 (see Section 3.1). In the *Final Construction Statement of Work* (AMEC et al. 2012a), it was anticipated that the DSOA north

(downstream) of the South Park Bridge, along with areas in Slip 4, would be the first portions of the Project to be dredged. However, due to a delay in obtaining an Access Agreement with the property owner adjacent to the Slip 4 dredging areas, the Slip 4 areas were not dredged in CS1.

The dredging area was subdivided into Dredge Approval Units (AUs). The AUs were used during dredging to monitor the work and to approve areas as dredging was complete within that AU. After dredging within an AU was completed, surveyed, and accepted, an initial backfill layer approximately 6 inches thick was placed over the AU. This material was intended to prevent the potential loss of residuals within the Dredge AU, which is a project best management practice (BMP). The AUs were approximately 250 square feet and were grouped into rows (Approval Groups) from the shoreline outward to the navigation channel.

Dredging began at approximately Station 10+00 (Approval Group 20; Figure 2) and progressed north (downstream) to the end of the DSOA (Approval Group 1). When work was completed in Approval Groups 20 to 1, work began at Approval Group 21 and proceeded south (upstream) through Approval Group 28. The status of the AUs at the end of CS1 is shown on Figure 3.

Dredging equipment included a barge-mounted, instrumented excavator, binned dredged material barges (flat deck barges with containment structures), a dewatering barge, a support barge with crane, backfill barges, and auxiliary equipment such as tugboats, a survey boat, and crew boats. A total of four sediment barges were employed with sediment load capacities ranging from 350 to 650 tons. Two small backfill barges were used to place backfill and a third large backfill barge for storage of backfill within the vicinity of operations.

The dredging was performed primarily with the excavator using a 4-cy Young's dredging bucket equipped with on-board navigation software and real-time kinematic (RTK) global positioning system (GPS) in conjunction with sensor input to calculate *x*, *y*, and *z* coordinates for bucket and dredge location. This provided the contractor with sub-foot accuracy of bucket placement monitored by the dredge operator with oversight from the Boeing engineering oversight team.

A summary of CS1 dredging activities is presented below:

- 71 AUs were completed,
- The total volume of sediment dredged was approximately 36,000 cy,
- Total tonnage of sediment removed and offloaded at the transload facility was 46,500 tons, and
- On average a cubic yard of dredged sediment weighed approximately 1.3 tons.

3.3.2 Backfilling

Backfilling was conducted with a crane and clamshell bucket located on a barge. The crane/clamshell bucket offloaded backfill from a barge and placed the material in consistent arcs from the barge platform. The clamshell bucket was equipped with GPS positioning so that the granular material placed within an AU could be smoothly distributed. Weighted "rain gauge" buckets were placed within the AUs prior to backfilling and used to check that there was an even distribution of backfill within the AU. In addition, at the end of each day the backfill area was surveyed to confirm the backfill placement was meeting project specifications. Visual inspection of backfill placement was also performed during low tides on the intertidal flats near the shoreline to confirm that no low spots that could result in fish trapping were present.

Two backfill sequences were conducted in CS1: an initial 6-inch lift of material promptly following completion of dredging for an AU (a BMP to limit potential mobilization of residuals), and a second lift of backfill to place the intermediate layer. The intermediate layer generally followed the initial layer by days or weeks although in several cases the intermediate layer immediately followed placement of the initial layer. The intermediate layer at the end of CS1 resulted in a backfill that was approximately 2 feet below final grade. Backfill material for both the initial and intermediate layers was obtained from CalPortland's pit in Shelton, Washington. Chemical and grain-size testing for this material was conducted prior to delivery of the material to the site. Quality Assurance (QA) and Quality Control (QC) testing for grain-size were conducted on the backfill during the project; the results of the QA/QC samples are presented in Appendix B.

A total of approximately 9,600 tons of initial backfill and 10,000 tons of intermediate backfill were placed in the 71 AUs completed in CS1.

3.4 BMPs

A BMP when dredging in a moving water system is for dredging to proceed from upstream to downstream, which for the Duwamish Waterway is from south to north. Ideally dredging would have started at the southern boundary of the dredge area; however, with the transload facility being farther downstream, construction on the South Park Bridge this construction season would have potentially impeded Waterway traffic from the south end of the project north through the bridge area to the transload facility. In addition, remedial dredging of the Jorgensen Forge site (immediately upstream of the DSOA) was not scheduled to begin until fall 2013; therefore it was decided to defer dredging of the southern end (upstream) of the DSOA until after the Jorgensen remedial action was completed. As a result, dredging was started north of the bridge and at a point that was considered a reasonable dredging volume for the short first season.

BMPs for dredging operations were outlined in the *Final Design Report* (AMEC et al. 2012b). The BMPs were developed for this project to minimize the suspension of sediment into the water column. The precision GPS instrumented closed environmental-style bucket mounted on an excavator appeared to minimize the loss of sediment from the bucket during dredging, prevented the dredge bucket from being overfilled, and minimized the total amount of sediment that needed to be dredged. In addition, the placement of initial backfill immediately after the AU was approved minimized the potential of any residual layer that may have been present to be mobilized.

Water quality monitoring was conducted to identify potential dredging problems so that adaptive management techniques could be implemented to rectify any water quality issues being caused by the construction. Two full-time automated stationary monitoring instruments were located at each end of the dredge area (see Section 6.1 for additional detail). Water quality monitoring for the dredging operations also included active compliance monitoring within the working area of the equipment (see Section 6.2).

The automated full-time monitoring instruments were evaluated daily. This instrumentation documented many very short-term increases in turbidity on the upstream and downstream instruments. Many of these short-term transient increases were a single turbidity measurement (5-minute intervals) that could not be tied to a specific dredging activity. Other longer-duration increases in turbidity were attributed to construction operations, most commonly to the backfilling activities. In some cases, short-term increases in turbidity could be attributed to barge movements where tugboat propeller surges during barge movements in shallow water appeared to be the cause. As a result, the contractor restricted their tugboat movements to deeper water and moved the dredging activities to deeper water sooner in the tidal cycle to minimize propeller wash.

During compliance monitoring, the sampling crew was able to document a current potential exceedance of conventional water quality parameters and immediately bring it to the attention of the dredging contractor so that they could promptly respond to the situation.

4.0 TRANSLOADING OF DREDGE SEDIMENTS

The transload facility is located within the Lafarge Cement Plant at 5400 West Marginal Way Southwest in Seattle, Washington, on the west shore of the Duwamish Waterway. The plant is just south of Kellogg Island, and is designed to receive bulk materials via barge and rail car. As such, the Lafarge facility was equipped for the offloading of sediment from barges, the stabilization of sediment using cement kiln dust (CKD) or cement, and the loading of stabilized sediment onto rail cars for off-site disposal.

4.1 TRANSLOAD FACILITY DESCRIPTION

The main offloading dock is approximately 900 feet long and serviced by a large track-mounted crane capable of unloading 150 tons of material per hour. The waterfront crane utilizes a 10-cy clamshell bucket to unload sediment from the barges. The excavated sediment from the barge was placed in a concrete containment vault with dimensions of 68 feet wide by 186 feet long and 12 feet deep, and had a capacity of 5,600 cy (1.1 million gallons) or 8,000 tons of wet material.

The wet sediment in the vault was stabilized in CS1 with CKD; Portland cement and fly ash were also used during the latter part of the season when CKD was not available. The purpose of stabilization of the sediment was to absorb the excess free water prior to loading the sediment into rail cars. Sediment was transferred from the vault to railcars using an excavator. Liners were placed in the railcars prior to placement of the stabilized sediment and these liners were wrapped over the top of the sediments in an approach referred to as a “burrito wrap”.

During CS1, a total of approximately 36,000 cy or 46,500 tons of sediment were offloaded from the barges, stabilized, placed in railcars, and sent by rail to the Waste Management, Inc. solid waste landfill in Oregon for beneficial reuse in the landfill. Waste tickets for the soils sent to the landfill are included in Appendix C. A copy of the waste profile is also included in Appendix C.

4.2 STORMWATER MANAGEMENT

Stormwater in the area of the barge offloading and transfer to railcar area was segregated from the rest of the Lafarge facility. The segregated stormwater was captured, treated, and discharged to the King County Publicly Owned Treatment Works (POTW) under a King County Minor Discharge Authorization (No. 881-01). The Lafarge facility also has a King County Solid Waste Permit (PR0034434), a National Pollutant Discharge Elimination System (NPDES) permit (WA0002232), and a Washington State Department of Ecology (Ecology) approved Stormwater Pollution Prevention Plan.

The stormwater treatment system consisted of a series of holding tanks, sand filters, bag filters, and granular activated carbon. The King County discharge authorization required Lafarge personnel to routinely sample all treated stormwater prior to discharge, including analysis for polychlorinated biphenyls (PCBs). Routine sampling was performed by Waste Management/Lafarge personnel in accordance with a Sampling and Analysis Plan and Quality Assurance Project Plan prepared by Waste Management, Inc. (February 2013). There were no violations of the discharge requirements. A total of approximately 229,500 gallons of stormwater were treated and discharged during CS1. Copies of analytical reports are included in Appendix C.

4.3 BMPs

The Lafarge facility employed BMPs for offloading from the barges, placement and stabilizing sediment in the containment vault, and transferring the sediment to the railcars where the material was contained within a liner "burrito wrap". The barges were docked adjacent to the containment vault and a spill apron was draped over the barge so that any spills during transfer of sediment from the barge to the dock would fall back into the barge. The offloading area between the barge and vault was covered with Visqueen so that any incidental drips or spills could be quickly and efficiently cleaned up. A full-time spotter was present during the unloading to help guide the crane operator and to spot potential problems such as debris in the bucket. In addition, the Boeing engineering team employed a full-time observer at the transload to record tonnage offloaded, coordinate barges between the transload facility and dredging operation, and to identify and address any environmental concerns or issues.

The transload operation was able to unload a barge within 3 to 5 hours. Two minor spill incidents occurred during the 2 months of transload operations in CS1. The first involved a small amount of mud (estimated at one cubic foot of material) on the outside of the bucket falling from the bucket into the Waterway. The bucket should not have been over the water and the spotter and crane operator received additional training to minimize the potential for a future occurrence.

A second incident occurred when a full bucket being lifted from the barge accidently opened near the top of the crane-transfer process, allowing wet sediment to drop approximately 70 to 80 feet back onto the barge sediments, resulting in a large splash. The splash splattered the dock area and sediment also splashed into the Waterway. The operation was stopped immediately and the area cleaned up. The cause of the bucket opening was a combination of a mechanical issue and operator error. Additional training of the operators was conducted to address this issue.

5.0 DREDGE RETURN WATER PROCESSING

The Dredge Return Water Processing for CS1 was operated on the Plant 2 uplands just north of the 2-10 Building. The water processing system received dredge return water that was pumped from the sediment barges to the processing system via 6-inch high-density polyethylene (HDPE) piping.

The dredge return water was designed to process water that was entrained in the dredge during dredging. A full dredge bucket of sediment entrains relatively small volumes of free water. The initial dredge cuts are typically mostly sediment with little water; however, deeper subsequent cuts typically are taking less than a full bucket of sediment with the rest of the volume being water. Final shallow cleanup cuts are mostly water. On average for all dredging, the water produced was about equal to the sediment removed. The dredging crew used a large pump on the sediment barge to pump the accumulated water to the processing system on the shoreline. Because the amount of water is highly variable, the processing system must adapt to processing different amounts of water through the system. In addition, the turbidity and type of sediment entrained in the turbidity is highly variable depending on where in the Waterway they are dredging.

The dredge return water processing system was designed to treat up to 300 gallons per minute (gpm). The processing system included the following components in order of water flow:

- A surge tank that received water directly from the dredge water return pipeline;
- A shaker screen system called a Tri-flow that used a series of shaker screens to remove the coarse fraction from the water (debris, gravel, and sand down to 100 micron sieve size);
- Settling (pre-treatment) tanks that function as additional water storage to allow the fines to start to settle out of the dredge return water;
- An electro-coagulation (EC) treatment unit that used an electrical charge designed to flocculate the fines;
- Post-treatment settling tanks following the EC unit where the flocculant created by the EC settled out;
- Sand filter to remove remaining turbidity;
- Two bag filters in series with the second filter being a 1 micron filter; and
- Two granulated activated carbon (GAC) canisters operated in series to remove any dissolved organic constituents in the water, including PCBs.

5.1 SYSTEM OPERATION

The dredge return water system was operated as needed during the dredging operations. During CS1 there were 40 days when the processing system was operating normally, 8 days when there were limited operations, and 6 days when operations were suspended for maintenance. Overall the dredge return water system met all water quality compliance criteria (see Section 6.3).

The dredge return water system had a number of shutdowns during the first month of operation. The main issue causing shutdowns was related to sludge handling and inadequate water storage capacity. This resulted in the tanks becoming full of sediment and the system needing to be shut down to clean the tanks. Additional tanks were added to provide redundant capacity thereby allowing some of the tanks to be cleaned each day without impacting system operation (see Section 5.3). There was one system breakdown that was caused by the failure of an in-line turbidity meter and improper installation of the bag filters. This breakdown allowed turbid water to get into the carbon canisters and required replacement of the carbon in the canisters. This breakdown did not result in an exceedance of the water quality criteria because the system was immediately shutdown.

During CS1, a total of approximately 8,100,000 gallons of water were processed by the system and approximately 6,300,000 gallons were discharged to the Duwamish Waterway. The difference between process volume and discharge volume is the additional water volume recirculated back through the processing system to meet the turbidity requirements for discharge.

5.2 BMPS

BMPs for the water processing system consisted of good housekeeping practices within the area of the system and monitoring requirements in accordance with the *Water Quality Monitoring Work Plan* (AMEC et al. 2012c).

5.3 SYSTEM MODIFICATIONS

The dredge return water processing system was designed to treat up to 300 gpm of dredge return water; however, the peak flow rate from the dewatering pump was as high as 1,200 gpm. To accommodate the additional flow, the processing system was expanded to add additional pre- and post-treatment storage capacity. The system expansion was approved by EPA and Ecology.

6.0 WATER QUALITY MONITORING

Water quality monitoring was collected as per the Ecology Water Quality Certification (Order #9623 and the Corps of Engineers' Permit NWS-2011-0384) and the EPA and Ecology approved *Water Quality Monitoring Work Plan* (AMEC et al. 2012c).

Prior to the start of the in-water construction work, a water sample was collected in the high-salinity salt wedge (near-bottom) just upstream of Harbor Island (DUW-W1; Table 2). This sample was collected to investigate the effects of salinity on the method reporting limits. The analytical laboratory reported that elevated concentrations of copper and mercury appeared to be present in the sample. Based on the initial results and following discussions with the analytical laboratory and EPA, Boeing proposed conducting additional sampling prior to the start of dredging activities at the site.

Samples were collected in low-salinity and higher-salinity water to investigate the levels of copper, mercury, and the other metals and PCBs present in the river water flowing past the Boeing Plant 2 project site. The additional samples were collected in the Lower Duwamish Waterway between river mile (RM) 2.6 and RM 3.9, the section of the river that includes the project site. Water samples were collected at eight locations within the main navigational channel using the equipment and methods presented in the *Water Quality Monitoring Work Plan* (AMEC et al. 2012c).

Water samples were collected at near-surface (approximately 2 feet below the surface) and near-bottom (water depths between 14 and 25 feet). Near-surface water samples were collected in the lower-salinity surface water (sample IDs BP2WQ-0001, BP2WQ-0003, BP2WQ-0005, BP2WQ-0007, BP2WQ-0009, BP2WQ-0011, BP2WQ-0015, and BP2WQ-0017), and the near-bottom samples were collected within the higher-salinity salt wedge (sample IDs BP2WQ-0002, BP2WQ-0004, BP2WQ-0006, BP2WQ-0008, BP2WQ-0010, BP2WQ-0014, BP2WQ-0016, and BP2WQ-0018). One or more of the lower-salinity samples (near-surface samples) had detected concentrations of copper; however, reported concentrations were below the chronic water quality criteria (Table 2). Higher-salinity samples had reported concentrations of copper that exceeded the acute water quality criteria (Table 2).

Based on these results, and after discussions with EPA and Ecology, the higher-salinity samples were sent to a second laboratory to investigate the potential for false positives due to salinity interferences in the metals analyses. The second laboratory used different technology allowed in the analytical method (Method 200.8) than the original laboratory. The results from the second laboratory showed substantially lower detection limits for all the dissolved metals (silver, cadmium, chromium, copper, lead, and zinc) and detected concentrations of copper were below the chronic water quality criterion (Table 3). Based on these results, for the remainder of CS1, samples for dissolved metals (silver, cadmium, chromium, copper, lead, and zinc) from both dredge and dredge return water monitoring

were analyzed by the second laboratory. PCB and mercury analyses continued to be conducted by the original laboratory.

6.1 *IN SITU* WATER QUALITY INSTRUMENTS

Water quality instruments were installed in the Duwamish Waterway upstream (ambient) and downstream (downgradient) of the remedial dredging. The instruments, installed approximately 2 to 3 feet below the water surface, collected temperature (°C), salinity (parts per thousand [ppt]), pH (unitless), dissolved oxygen (milligrams per liter [mg/L]), and turbidity (nephelometric turbidity units [NTU]) data. Each of these parameters were measured every 5 minutes and downloaded to a Website site accessible to the public (http://www.leavenworth.net/amec/) every 15 to 25 minutes.

The water quality instruments occasionally recorded anomalous data. These anomalous data occurred when the instrument was out of the water (during maintenance or when the instrument and the surface float became stuck in the stilling well), when sensors malfunctioned or recorded transient phenomena, or when there were problems or interruptions in data transmission. In consultation with EPA, the following rules for displaying data in the water quality graphs on the web page were applied. The data were not displayed when:

- the depth of instrument was less than 1 foot (the instrument was out of the water or was being serviced);
- any parameter returned a result of -99 (logger was not sending data);
- a turbidity reading (representing a 5-minute interval) there was greater than a 1,000% difference in turbidity between the next AND previous records;
- pH was <5 or >9 (the instrument was out of the water or was being serviced);
- temperature was <3°C or >20°C (the instrument was out of the water or was being serviced);
- dissolved oxygen was <3 mg/L or >14 mg/L (the instrument was out of the water or was being serviced);
- salinity was <0.1 ppt or 30 ppt (the instrument was out of the water or was being serviced); and
- two or more parameters were = 0 (this may have occurred when the instrument did not send valid data).

The data collected by the *in situ* instruments were meant to supplement water quality information that was being collected pursuant to the Water Quality Certification and Water Quality Monitoring Work Plan. The data collected from the *in situ* instruments are provided in Appendix D.

6.2 DREDGE MONITORING

All dredge monitoring was conducted in accordance with the *Water Quality Monitoring Work Plan* (AMEC et al. 2012c) and in consultation with EPA and Ecology. Dredge monitoring was conducted on 31 of the 44 days of dredging and is summarized in Table 1. The results of the monitoring are presented below.

6.2.1 Results of Conventional Parameter Compliance Monitoring

The daily water quality monitoring reports are provided in Appendix E and the conventional water quality results are summarized in Table 1.

During the 31 days of monitoring, there were no exceedances of conventional water quality criteria on 27 days. There was one unconfirmed exceedance of the pH criterion on January 17, 2013. This exceedance was not confirmed due to an oversight by the field crew. There was one unconfirmed exceedance of the turbidity criterion on February 11, 2013; this exceedance was not confirmed due to dredging operations ceasing before an additional measurement could be made at the compliance station.

There were only two confirmed exceedances of the turbidity criterion: one on January 24, 2013 (9.7 NTUs vs. ambient 3.2 NTUs) and the other on January 28, 2013 (8.9 NTUs vs. ambient 3.7 NTUs) [1].

6.2.2 Results of Chemical Analysis of Water Samples

During the first week of intensive water quality monitoring, three samples (BP2WQ-0020, BP2WQ-0035, and BP2WQ-0059 plus quality assurance samples BP2WQ-0038/39 [field duplicates]) were collected and analyzed for the chemicals of concern (COCs) identified in the Water Quality Monitoring Work Plan (cadmium, chromium, copper, lead, mercury, silver, zinc, and PCBs). The results of these analyses are presented in Table 4; there were no exceedances of chronic or acute water quality criteria for any of the COCs. In addition, a filter blank and a rinsate blank were prepared using deionized water provided by the analytical laboratory as quality assurance samples (BP2WQ-0036 [filter blank] and BP2WQ-0037 [rinsate blank]). The results of the filter and rinsate blanks are presented in Table 5.

Sample BP2WQ-0137, analyzed in response to the turbidity exceedance on January 24, 2013, did not have any exceedances of the chronic or acute water quality criteria for any of the COCs (Table 4).

[1] An exceedance of the turbidity compliance criterion occurs when the turbidity is greater 5 NTUs above ambient turbidity. The compliance criterion for the exceedance on January 24, 2013 was 8.2 NTU and on January 28, 2013 the criterion was 8.7 NTU.

Additional samples collected on January 25, 2013 were analyzed for quality assurance purposes (samples BP2WQ-0145 [filter blank], BP2WQ-0146 [rinsate blank], and BP2WQ-0147/148 [field duplicates]). The results of the filter and rinsate blanks are presented in Table 5 and the duplicate sample results are presented in Table 4.

In response to the turbidity criterion exceedance at 150 feet on January 28, 2013, sample BP2WQ-0173 was analyzed for the COCs. The results for total mercury were above the chronic criterion for mercury at this location (Table 4); however, it was not a confirmed exceedance since the point of compliance for the chronic criterion was identified as 300 feet in the *Work Plan*. Subsequent analysis of samples, BP2WQ-0170, BP2WQ-0171, BP2WQ-0174, and BP2WQ-0175 demonstrated that the average daily concentration was below the chronic water quality criterion for mercury at 300 feet (Table 4). [2]

6.3 DREDGE RETURN WATER MONITORING

All dredge return water monitoring was conducted in accordance with the *Water Quality Monitoring Work Plan* (AMEC et al. 2012c) and in consultation with EPA and Ecology. Dredge return water monitoring was conducted on 29 of the 48 days of normal or limited operation and is summarized in Table 1. The results of the monitoring are presented below.

6.3.1 Results of Conventional Parameter Monitoring

During monitoring of turbidity in the dredge return water, there were no exceedances of the turbidity criterion as shown in Table 6.

6.3.2 Results of Chemical Analysis of Water Samples

During the first week of dredge return water intensive water quality monitoring, two samples (BP2WQ-0062 and BP2WQ-0064) were collected and analyzed for the COCs. The results of these analyses are presented in Table 7; there were no exceedances of chronic or acute water quality criteria for any of the COCs.

One additional sample was collected and analyzed during dredge return water monitoring (BP2WQ-0123). This sample was collected after the dredge return water processing resumed after an extensive cleaning of the system (Table 1). The results of the analyses indicate that there were no exceedances of chronic or acute water quality criteria for the COCs (Table 7).

[2] The chronic criterion for mercury is based on total recoverable and the acute criterion is based on the dissolved fraction. The calculated average daily concentration was 0.0230 µg/L. The average concentration was calculated as the arithmetic mean of the detected values and one-half of the detection limit for non-detected values. The values used in calculating the average concentration were 0.0296 µg/L (BP2WQ-0170), 0.0264 µg/L (BP2WQ-0171), 0.01 µg/L (BP2WQ-0174; value is one-half of the detection limit of 0.02 µg/L), and 0.0259 µg/L (BP2WQ-0175).

6.4 DATA QUALITY REVIEW

The results of the Stage 2B data validation on the initial round of pre-construction water samples and the water quality monitoring samples are reported in Appendix F in the Data Validation Report titled, *Boeing Plant 2 Water Quality Samples – January and February 2013*. The summary data validation found that all data were acceptable as qualified.

For the PCB analyses the overall assessment was that the documentation was found to be clear and complete. With one minor exception, calibration data demonstrate acceptable instrument performance. Laboratory quality control sample results demonstrate acceptable accuracy and precision. PCB data are acceptable for use as reported.

For the total and dissolved metals analyses the overall assessment was that documentation was found to be clear and complete. With minor exceptions, calibration data demonstrate acceptable instrument performance. Method blank, laboratory control sample (LCS) results demonstrate acceptable laboratory accuracy. Reporting limits were elevated based on field blank contamination and data were estimated based on high Reporting Limits standard recoveries and laboratory duplicate variability. The dissolved and the total metals data from the primary laboratory are acceptable for use as qualified except that dissolved metals data were rejected in favor of results from a secondary laboratory, if available.

Selected samples were analyzed (or reanalyzed) for dissolved metals by a secondary laboratory. Documentation was found to be clear and complete. LCS and matrix spike/matrix-spike duplicate (MS/MSD) results demonstrate acceptable laboratory precision and accuracy. Data were estimated based on calibration recoveries and copper reporting limits were elevated due to blank contamination. Dissolved metals data are acceptable for use as qualified.

In addition, a full data validation was conducted on the copper results from the initial round of pre-construction water samples analyzed by the primary analytical laboratory (see Section 6.0). The results are reported in Appendix F in the Data Validation Report titled, *Boeing Plant 2 Water Quality Data – Focused Copper Validation*.

Documentation was found to be clear and complete. No calculation, identification, or transcription errors were noted. Quality control results demonstrate acceptable levels of system accuracy and precision. Interference check sample results and primary and secondary ion quantitation relative percent differences indicate high bias and a potential for false positives. With the limitations described above, the metals data were acceptable as qualified.

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7.0 PRE- AND POST-CONSTRUCTION PERIMETER MONITORING

The pre- and post-construction perimeter sediment monitoring program is being conducted to determine if there are material increases in concentrations of COCs in the post-remediation perimeter surface sampling areas outside the DSOA relative to their pre-remediation concentrations. All perimeter monitoring was conducted in accordance with the *Pre- and Post-Construction Perimeter Sediment Monitoring Work Plan* (AMEC et al. 2012d) or in accordance with modifications approved by EPA.

7.1 PRE-CONSTRUCTION MONITORING – FIELD SAMPLING ACTIVITIES AND RESULTS

Sediment grab samples were collected at 51 perimeter sampling locations during the pre-construction sampling event. Four sampling locations (SD-PER508, SD-PER509, SD-PER510, and SD-511) proposed in the *Work Plan* and located on property in Slip 4 owned by Crowley Marine could not be sampled because an access agreement between Boeing and Crowley Marine was not finalized prior to the start of construction. Five additional locations could not be sampled at the original proposed sample locations because of moored barges or construction activities associated with the South Park Bridge replacement project. The sample locations (SD-PER106, SD-PER506, SD-PER203, SD-PER213, and SD-PER 301) were moved following discussions and with the approval of EPA. The new sample locations were as close as practical to the original sample locations to maintain the spatial distribution of sampling locations proposed in the original *Work Plan*.

Sampling was conducted using the methods and procedures presented in the Pre- and Post-construction Perimeter Sediment Monitoring Work Plan (AMEC et al. 2012d). At a majority of the proposed sample locations a powered grab sampler was used for sampling the surface to 10-centimeter (cm) deep sediment interval. Three grab samples were collected at each sample location. The coordinates for each acceptable grab collected at a sample location were recorded. Equal volumes of sediment from each grab (representing the 0 to 10-cm surface interval) were placed in a 1-liter glass container. Sample homogenization was performed by the analytical laboratory prior to analysis. Field duplicates were collected at five sample locations to meet quality assurance requirements.

Three sample locations near the head of Slip 4 were located on the isolation cap placed during the City of Seattle Slip 4 remediation (SD-PER501, SD-PER502, and SD-PER503). The coarse sand and gravel cap could not be sampled effectively using the powered grab sampler. Following discussions with EPA and Ecology, divers were used to locate areas with recent accumulations of finer sediments and to sample the sediments using stainless-steel “cookie cutter” style hand cores.

The averaged sample locations for the pre-construction sampling are presented in Table 8 and on Figure 4. Sample locations for the individual grab samples are provided on the Qualitative Sample Characteristics forms (Appendix G). Additional field forms (i.e., GPS check forms and chain-of-custody forms) are also provided in Appendix G.

The results of the pre-construction perimeter monitoring are presented in Figure 5 and Table 9. The PCB concentrations presented in Figure 5 are dry-weight (µg/kg) to allow for comparison between sampling events (not all PCB data could be carbon-normalized because percent TOC may have been outside the carbon-normalization range of 0.5 percent to 4 percent). The results of the Stage 2B data validation on the pre-construction perimeter monitoring are reported in Appendix F in the Data Validation Report titled, *Boeing Plant 2 Sediments – Pre-Construction Perimeter and Post-Construction Core Sample Data - December 2012 through Early March 2013*. The data validation found that all data were acceptable as qualified.

For the PCB analyses the overall assessment was that the documentation was found to be clear and complete. With one minor exception, calibration data demonstrate acceptable instrument performance. One Aroclor 1260 result was estimated due to high MS recovery and high MS/MSD Relative Percent Difference (RPD), and one Aroclor 1260 result was estimated due to field duplicate variability. LCS results demonstrate acceptable accuracy and precision. Multiple analysis results were reduced to the most appropriate to use.

For the metals analyses the overall assessment was that documentation was found to be clear and complete. Calibration data demonstrate acceptable instrument performance. Method blank, LCS, and Sediment Reference Material (SRM) results demonstrate acceptable laboratory precision and accuracy. Data were estimated based on one exceeded holding time, one low MS recovery and laboratory and field duplicate variability.

For the general chemistry analyses the overall assessment was that documentation was found to be clear and complete. Several total organic carbon (TOC) results were qualified as estimated due to low matrix spike recovery or lab or field variability.

7.2 END OF CONSTRUCTION SEASON 1 MONITORING – FIELD SAMPLING ACTIVITIES AND RESULTS

Sediment grab samples were collected at 47 perimeter sampling locations during the end of CS1 sampling event. Thirty-three of the stations previously sampled during the pre-construction sampling were reoccupied. The average of the three sets of coordinates recorded during the pre-construction sampling at each sampling location was used as the target coordinates for the reoccupied stations.

Sampling was conducted using the methods and procedures used during the pre-construction sampling.

The three sample locations near the head of Slip 4 (SD-PER501, SD-PER502, and SD-PER503) were resampled using divers and stainless-steel “cookie cutter” style hand cores.

New sampling locations on Crowley Marine property were proposed as part of the access agreement between Boeing and Crowley Marine; the revised sampling locations were approved by EPA. The four original proposed sample stations on the Crowley Marine property (SD-PER508, SD-PER509, SD-PER510, and SD-511) were moved and an additional six locations (SD-PER513, SD-PER514, SD-PER515, SD-PER516, SD-PER517, and SD-PER518) were sampled during the end of CS1 sampling event. All of the sample locations had been previously sampled by the City of Seattle during the Slip 4 cleanup.

The averaged sample locations for the end of CS1 sampling event are presented in Table 8 and on Figure 4. Sample locations for the individual grab samples are provided on the Qualitative Sample Characteristics forms (Appendix G). Additional field forms (i.e., GPS check forms and chain-of-custody forms) are also provided in Appendix G.

Sediment samples from both the pre-construction and end of CS1 monitoring were analyzed for the COCs identified in the *Work Plan* (i.e., cadmium, chromium, copper, lead, mercury, silver, zinc, and PCBs). In addition, total solids (TS) and TOC were measured in each sample.

The results of the end of CS1 perimeter monitoring are presented in Figure 5 and Table 9. The results of the Stage 2B data validation on the pre-construction perimeter monitoring are reported in Appendix F in the Data Validation Report titled, *Boeing Plant 2 Sediments – End of Construction Season 1 Post-Construction Perimeter Monitoring Data - March 2013*. The data validation found that all data were acceptable as qualified.

For the PCB analyses the overall assessment was that the documentation was found to be clear and complete. Calibration data demonstrate acceptable instrument performance. LCS results demonstrate acceptable accuracy and precision. Multiple analysis results were reduced to the most appropriate to use. Results were estimated due to field duplicate variability and dual column variability. Except for data replaced by another result, PCB data are acceptable for use as qualified.

For the metals analyses the overall assessment was that documentation was found to be clear and complete. Method blank, LCS, and SRM results demonstrate acceptable laboratory precision and accuracy. Data were estimated based on low MS recoveries and laboratory duplicate variability.

For the general chemistry analyses the overall assessment was that documentation was found to be clear and complete. Calibration data indicate acceptable performance. Method blank, LCS, and SRM results demonstrate acceptable laboratory precision and accuracy. Data were estimated based on field duplicate variability.

8.0 POST-CONSTRUCTION CORE SAMPLING

Sampling was conducted using the methods and procedures presented in the *Post-Construction Core Sampling Work Plan* (AMEC et al. 2012e). The objective of the post-construction core sampling is to characterize sediments that are left in place after completion of the remedial dredging.

During the work it was discovered that there was discrepancy between Table 2 and Figures 3a and 4 of the *Work Plan* (AMEC et al. 2012e). Table 2 of the *Work Plan* identified station SD-PCC006 as a duplicate station whereas on Figures 3a and 4 station SD-PCC008 was identified as a duplicate station. EPA approved the modification of Figures 3a and 4 to be consistent with Table 2 of the *Work Plan*.

8.1 SUMMARY OF SAMPLING ACTIVITIES

Sediment samples were collected at three post-construction coring locations during CS1 as shown on Figure 6 and in Table 10. A small vibracorer was used for sampling the post-dredge sediment surface and deeper sediment intervals. Cores were collected after the dredging activities were complete in the Approval Unit (AU), verified by a bathymetric survey, and accepted by the Boeing Construction Manager. Coring was conducted prior to the placement of the initial backfill layer. The intent of the core sampling was to collect sediment samples at and below the excavated sediment surface (i.e., leave surface). Cores collected within the DSOA were to be divided into sample intervals representing the 0- to 1-foot, 1- to 2-foot, and 2- to 3-foot *in situ* intervals below the dredge surface (if available). Multiple cores were collected at each location to collect acceptable cores. Sediments representing the 2- to 3-foot intervals were collected at two of the three sample locations. At sample location SD-PCC008 six attempts were made to collect sediments representing the 2- to 3-foot interval without success.

A field duplicate core was collected at location SD-PCC006. The field duplicate (identified as SD-PCC206) was collected within 1 foot of the parent core. A single sample interval was analyzed to meet quality assurance requirements. The remaining sample intervals (1- to 2-foot and 2- to 3-foot *in situ* intervals) were archived.

Cores were processed within 4 hours of collection. Penetration and recovery measurements were used to estimate the *in situ* depth of sediment structures and sample intervals. A qualified field geologist logged each core for Universal Soil Classification and noted the presence of any soil structures, odors, or visible oil sheens. Summary logs and photographs of each accepted core are provided in Appendix H. Additional field forms (i.e., GPS check forms and chain-of-custody forms) are also provided in Appendix H.

8.2 RESULTS

Multiple attempts were conducted at each sampling location to achieve 4 feet of penetration (see Table 10); however, the sediments present at the post-dredge surface and below were dense silty sands or firm sandy silts with low moisture content. During each attempt the vibracorer was operated until no additional penetration occurred (refusal). The sediments retained in the accepted cores appeared to be native alluvial sands and silts and were similar in appearance to the native sediments found in cores collected in support of the *DSOA and Southwest Bank Corrective Measure Alternatives Study* (AMEC and FSI 2011). In the earlier studies, the depth of penetration and sample retention of these deeper native alluvial sediments limited the depth of sampling.

Maximum core penetration at the three sample locations was 3.8 feet of penetration or less. Recovered sediments appeared undisturbed with little reworking or disturbance of the surface sediments. There was little or no visible residual layer (unconsolidated silts or sands with high water content) present on the sediment surface.

Samples representing the surface to 1-foot (A) interval and the 1- to 2-foot (B) interval were analyzed for the COCs, TS, and TOC at locations SD-PCC006, SD-PCC007, and SD-PCC008. Samples representing the 2- to 3-foot (C) interval were also collected and archived at SD-PCC006 and SD-PCC007. A 2- to 3-foot interval could not be collected at SD-PCC008 due to the lack of penetration.

A second core was collected at location SD-PCC006 (identified as SD-PCC206) for a field duplicate. The surface 1-foot interval (SD-PCC206-A) was analyzed for the COCs, TS, and TOC to meet the quality assurance requirements.

The results of the chemical analysis of the samples representing the 0- to 1-foot and the 1- to 2-foot intervals are presented in Table 11. Total PCBs were undetected in all of the samples. Table 11 lists the SMS Sediment Quality Standards (SQS) criteria for the COCs for comparison purposes only.

8.3 DATA QUALITY REVIEW

Penetration in each of the processed cores was less than the 4-foot below mudline penetration target proposed in the *Work Plan* (AMEC et al. 2012e). In addition, the sample acceptability criteria presented in the *Work Plan* proposed that depth of recovered sediment be at least 3 feet below the sediment (i.e., leave) surface. Two of the collected cores met this requirement (SD-PCC006 and SD-PCC206 with recovered sediment to 3.6 feet and 3.8 feet *in situ*, respectively). The remaining cores did not meet this penetration or recovery criteria. The core collected at SD-PCC007 recovered sediment to 2.4 feet below the sediment surface. The deepest recovered sediment in SD-PCC008 represented the sediment 1.8 feet below the sediment surface. All of the cores that were sampled contained sediments that appeared to be undisturbed by dredging activities.

The sample results showed low or undetected levels of COCs in the surface (0- to 1-foot) and the subsurface (1- to 2-foot) sediment intervals. These results demonstrate that the dredging has met the project goals and that the sampling effort has met the study objectives.

The results of the Stage 2B data validation are reported in Appendix F in the Data Validation Report titled, *Boeing Plant 2 Sediments – Pre-Construction Perimeter and Post-Construction Core Sample Data - December 2012 through Early March 2013*. The data validation found that all data were acceptable as qualified.

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9.0 END OF CONSTRUCTION SEASON DECONTAMINATION

After the completion of CS1, dedicated equipment and structures that came in contact with dredged material throughout the course of CS1 were decontaminated to meet a visually clean debris surface in accordance with 40 CFR 268.45, Table 1, footnote 3. This included the barges, dredge equipment (buckets, cranes, etc.), the offloading and loading equipment at the Lafarge facility, the vault at the Lafarge facility, and the Waste Management, Inc. railcars that were dedicated to this project. Documentation, in the form of photographs and field records, is provided in Appendix I.

Any water used to decontaminate the equipment at the Lafarge facility was captured and treated through their stormwater treatment system (described in Section 4.2) prior to discharge to the POTW.

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10.0 ARCHAEOLOGICAL MONITORING

Archaeological monitoring of the Project was performed in accordance with the Archaeological Monitoring Plan (AMEC et al. 2012f). All on-site construction personnel were trained using an archaeological training video in spotting a wide range of cultural resources that could be uncovered during construction excavation or dredging. During these training meetings, the appropriate chain of communication was established and contact information was disseminated to the construction personnel in the event of an inadvertent discovery. Also discussed were the requirements for artifact discovery. A synopsis of the monitoring program and the results of the CS1 monitoring are presented in Appendix J.

A single isolated find was documented and logged with the Washington State Department of Archaeology and Historic Preservation (DAHP) for trinomial assignment. The isolated wooden wagon wheel was in poor shape, incomplete, and in three pieces. The find was disposed of by the Transload Facility personnel after inspection and documentation by the AMEC archaeologist.

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11.0 REFERENCES

AMEC (AMEC Environment & Infrastructure, Inc., Dalton, Olmsted & Fuglevand, Inc., and Floyd|Snider, Inc.). 2012a. Final Construction Statement of Work, 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.

——— 2012b. Final Design Report, 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.

——— 2012c. Water Quality Monitoring Work Plan, Appendix C in Final Construction 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.

——— 2012d. Pre- and Post-Construction Perimeter Sediment Monitoring Work Plan, Appendix E in Final Construction 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.

——— 2012e. Post-Construction Core Sampling Work Plan, Appendix F in Final Construction 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.

——— 2012f. Archaeological Work Plan, Appendix G in Final Design Report, 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.

——— 2012g. 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.

AMEC and FSI (AMEC Environment & Infrastructure, Inc. and Floyd|Snider, Inc.). 2011. Duwamish Sediment Other Area and Southwest Bank Corrective Measure Alternatives Study, Boeing Plant 2, Seattle/Tukwila, Washington. Prepared for The Boeing Company, Seattle, Washington.

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TABLE 1

SCHEDULE OF DREDGING, BACKFILLING, AND WATER QUALITY MONITORING

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Activity in Approval Units			Water Quality Monitoring of Dredging and Initial Backfill			Dredge Return Water Plant Water Quality Monitoring				
Date	Dredged	Initial Backfill	Intermediate Backfill	Monitoring Activities	Conventional Results	Submitted Samples	Plant Operation	Monitoring Activities	Results	Submitted Samples	Comments
4-Jan-13	C20, B20, B21						Limited Operation				
5-Jan-13	C20, B20, C19, B19			Intensive Monitoring	No exceedance	BP2WQ-0020	Limited Operation				
6-Jan-13	No Dredging (Sunday)			No Dredging			Operation Suspended				
7-Jan-13	C20, C19, B20, A21, A20, A19			Intensive Monitoring	No exceedance		Limited Operation				
8-Jan-13	A21, A20, A19, A18			Intensive Monitoring	No exceedance	BP2WQ-0035 BP2WQ-0036 (FB) BP2WQ-0037 (RB) BP2WQ-0038/39 (FD)	Operating Normally	DRW 24-hr Sample Collection Started	No exceedance		
9-Jan-13	A19, A18, A17, B20			Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance	BP2WQ-0062	
10-Jan-13	B21, B20, B19, A21, A20, A19			Intensive Monitoring	No exceedance	BP2WQ-0059	Operating Normally	Intensive Monitoring	No exceedance		
11-Jan-13	A20, A19, A16, A15, A14, B18, B17, B20			Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance	BP2WQ-0064	
12-Jan-13	B20			Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance		
13-Jan-13	No Dredging (Sunday)			No Dredging			Limited Operation	Intensive Monitoring	No exceedance		
14-Jan-13	B20, B19, B18, A21, A20, A19, A18, A17, A16,			Intensive Monitoring	No exceedance		Limited Operation	Intensive Monitoring	No exceedance		
15-Jan-13	A18, A17, B19, B18, B17, B16, C20, C19			Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance		
16-Jan-13	C20, C19, C18, B19, B18, A20, A18			Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance		
17-Jan-13	A20, A19, A18, A17, B17, C18, C17			Intensive Monitoring	Unconfirmed pH exceedance		Operating Normally	Intensive Monitoring	No exceedance		
18-Jan-13	C20, C19, C17, C16, B16, B15, A16, A15			Routine-No Monitoring Conducted			Operating Normally	Intensive Monitoring	No exceedance		EPA/ECY approved routine for dredge monitoring
19-Jan-13	A20, A19, A18, A17, A16, A15, B16			Routine-No Monitoring Conducted			Operating Normally	Intensive Monitoring	No exceedance		
20-Jan-13	No Dredging (Sunday)			No Dredging			Limited Operation	Intensive Monitoring	No exceedance		
21-Jan-13	CCV full at TTD (No dredging)	B20, C20		No Dredging			Operation Suspended				
22-Jan-13	C18, C17, C16, C15, A21, A20, A19, A18, A14,			Routine Monitoring Conducted	No exceedance		Operating Normally	Intensive Monitoring	No exceedance		
23-Jan-13	A15, A14, A13, B15, B14, C15, C14	B19, B18, C19, C18		Routine-No Monitoring Conducted			Operating Normally	Intensive Monitoring	No exceedance		
24-Jan-13	B13, B12, B11, A20, A12, A11	A18, A17, B17, C17		Routine Monitoring Conducted	Turbidity exceedance	BP2WQ-0137	Operating Normally	Intensive Monitoring	No exceedance		EPA/ECY approved routine for DRW monitoring
25-Jan-13	A16, A15, A14, A13, B14	A20, A19		Intensive Monitoring	No exceedance	BP2WQ-0145 (FB) BP2WQ-0146 (RB) BP2WQ-0147/148 (FD)	Operating Normally	Routine - No Monitoring Conducted			
26-Jan-13	A15, A14, A13, A12, A11, B11		A20, A19, B20, B19, C20, C19	Intensive Monitoring	No exceedance		Operating Normally	Routine - No Monitoring Conducted			

TABLE 1

SCHEDULE OF DREDGING, BACKFILLING, AND WATER QUALITY MONITORING

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Activity in Approval Units			Water Quality Monitoring of Dredging and Initial Backfill			Dredge Return Water Plant Water Quality Monitoring				
Date	Dredged	Initial Backfill	Intermediate Backfill	Monitoring Activities	Conventional Results	Submitted Samples	Plant Operation	Monitoring Activities	Results	Submitted Samples	Comments
27-Jan-13	No Dredging (Sunday)			No Dredging			Operation Suspended				
28-Jan-13	A16, A15, A14, A13, A12, A11			Intensive Monitoring	Turbidity exceedance	BP2WQ-0170 BP2WQ-0171 BP2WQ-0173 BP2WQ-0174 BP2WQ-0175	Operating Normally	Routine - No Monitoring Conducted			
29-Jan-13	A15, A14, A13, A12, A11, A10, B15, B14, B13, B12, C15, C14			Intensive Monitoring	No exceedance		Limited Operation	Routine Monitoring Conducted	No exceedance		Elevated turbidity following plant maintenance-DRW operation suspended
30-Jan-13	Water Treatment down (No dredging)			No Dredging			Operation Suspended				
31-Jan-13	A16, A15, A11, A10, A9, B10		A18, B18, C18	Intensive Monitoring	No exceedance		Operations resumed (limited time before system shut down)	Intensive Monitoring	Elevated turbidity when operations resumed-system operations suspended.		EPA/ECY required re-initiation of Intensive monitoring following cleaning.
1-Feb-13	Water Treatment down (No dredging)	A15, B16, B15		No Dredging			Operation Suspended	No monitoring			
2-Feb-13	Water Treatment down (No dredging)	A16, A14, B14		No Dredging			Operation Suspended	No monitoring			
3-Feb-13	No Dredging (Sunday)			No Dredging			No Operations (Sunday)	No monitoring			
4-Feb-13	A13, A10, A9, B12, B9, B8	B13		Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance		EPA/ECY required water sample analysis during first 24-hour period after DRW operations resumed.
5-Feb-13	A10, A9, A8, A7, B7, B6	A13, A12, B12, C15, C14	B17	Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance	BP2WQ-0123	
6-Feb-13	B10, B9, B8, B7, B6, B5, A10, A9, A8	C16	A16, A15, B15, B14	Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance		
7-Feb-13	A10, A9, A8, A7, A6,	Driving pile, moving barge mooring area		Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance		
8-Feb-13	A8, A7, A6, A5,			Intensive Monitoring	No exceedance		Operating Normally	Intensive Monitoring	No exceedance		EPA/ECY approved routine for DRW monitoring
9-Feb-13	A8, A7, A6, A4, B8, B7, B6, B5, B4, B3	B11, A11, A10	A14, A13, B13	Intensive Monitoring	No exceedance		Operating Normally	Routine - No Monitoring Conducted			
10-Feb-13	No Dredging (Sunday)			No Dredging			No Operations (Sunday)				
11-Feb-13	A9, A8, A7, A6, A5, A4, A3, A2		A13	Intensive Monitoring	Unconfirmed turbidity exceedance		Operating Normally	Routine - No Monitoring Conducted			
12-Feb-13	Lafarge at capacity, no Shift 1 dredging; second shift A2, B3, B1	A9, B13, B12, B11, B10, B9, C15, C14, C13		Intensive Monitoring	No exceedance		Operating Normally	Routine - No Monitoring Conducted			EPA/ECY approved routine for dredge monitoring
13-Feb-13	A9, A8, A7, A6, A5, A4, A3, B5, B4, B3,			Routine-No Monitoring Conducted			Operating Normally	Routine Monitoring Conducted	No exceedance		
14-Feb-13	A3, A2, A1, B2, B1			Routine-No Monitoring Conducted			Operating Normally	Routine - No Monitoring Conducted			
15-Feb-13	A6, A5, A4, A3, A2, A1, B4, B2, B1			Routine Monitoring Conducted	No exceedance		Operating Normally	Routine Monitoring Conducted	No exceedance		

TABLE 1

SCHEDULE OF DREDGING, BACKFILLING, AND WATER QUALITY MONITORING

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Activity in Approval Units			Water Quality Monitoring of Dredging and Initial Backfill			Dredge Return Water Plant Water Quality Monitoring					
Date	Dredged	Initial Backfill	Intermediate Backfill	Monitoring Activities	Conventional Results	Submitted Samples	Plant Operation	Monitoring Activities	Results	Submitted Samples	Comments
16-Feb-13	B23, B22, B21, A23, A22			Routine-No Monitoring Conducted			Operating Normally	Routine - No Monitoring Conducted			
17-Feb-13	No Dredging (Sunday)			No Dredging			No Operations (Sunday)				
18-Feb-13	A21, C23	B8, B7, A7	C14, C13, C12, C11, C10, C9	Routine Monitoring Conducted	No exceedance		Operating Normally	Routine - No Monitoring Conducted			
19-Feb-13	A23, A22, A21, B21	B6, B5, A8, A7, A6, A5, A4, A3	B9	Routine-No Monitoring Conducted			Operating Normally	Routine Monitoring Conducted	No exceedance		
20-Feb-13	C21, C22, C23, B23, B22, B21, A21, A22	A8, A7, A6, A5, A4, A3, B2, B1		Routine-No Monitoring Conducted			Operating Normally	Routine - No Monitoring Conducted			
21-Feb-13	A22, A23, A24, B24, C24, C23	A2, A1	A18, A17, A16, A15	Routine Monitoring Conducted	No exceedance		Operating Normally	Routine - No Monitoring Conducted			
22-Feb-13	A24, A23, A22, C22, C23, B23, B25		A16, A15, B16, B15	Routine-No Monitoring Conducted			Operating Normally	Routine Monitoring Conducted	No exceedance		
23-Feb-13	A25, A24, C26, C25, B26, B25	B3, B2, B1, C(Slip 4 corner)	B13, B12, B11, B10, B9,B8, B7, B6, B5, C14	Routine-No Monitoring Conducted			Operating Normally	Routine - No Monitoring Conducted			
24-Feb-13	No Dredging (Sunday)			No Dredging			No Operations (Sunday)				
25-Feb-13	A26, A25, A24, C24, B24		B15, B14, A15, A14, A13, A10, A9, A8, A7, C(Slip 4 corner)	Routine Monitoring Conducted	No exceedance		Operating Normally	Routine - No Monitoring Conducted			
26-Feb-13	A26, A25, A23, B27, B26, B24, C26, C24		A8, A7, A6, A5, A4, A3, A1, B2	Routine-No Monitoring Conducted			Operating Normally	Routine - No Monitoring Conducted			
27-Feb-13	A27, B26, C27	C22, C21	B1	Routine-No Monitoring Conducted			Operating Normally	Routine Monitoring Conducted	No exceedance		
28-Feb-13	Lafarge at capacity, no dredging	B23, B22, B21, A23, A22, A21, C23, C22, C21	C22, C21, A22	Routine-No Monitoring Conducted			Operating Normally	Routine - No Monitoring Conducted			
1-Mar-13	A27, A26, C37, C27, C26, B27	A24, A21, B24, C24	A14, A16, A17, A18, A21, A22, A9, A7, A6, B2	Routine Monitoring Conducted	No exceedance		Operating Normally	Routine Monitoring Conducted	No exceedance		
2-Mar-13	B27, C27	A25, A23	A24, A23, A22, A21, A15, A14, B24, C24, C23, C22, C21	Routine-No Monitoring Conducted			Operating Normally	Routine - No Monitoring Conducted			
3-Mar-13	No Dredging (Sunday)			No Dredging			No Operations (Sunday)				
4-Mar-13	Dredging completed for 2012-2013 Construction Season	A28, A27, A26, B27, B25, C27, C26, C25,		No Dredging			Limited Operation (processing of barge decon water)				In water dredging completed
5-Mar-13		A28, B27, B26, C28,	C22, C21, C20	No Dredging			Limited Operation (processing of barge decon water)				
6-Mar-13			C27, C26, C25, C24, C20, C19, C18, B25, B23, A25, A24, A23, A17, A14,	No Dredging			Limited Operation (processing of barge decon water)				
7-Mar-13			A1, A2, A3, A4, A6, A7, A8, A9, A10, A11, A12, A13, A16, A24, A25, B1, B2, B15, B16, A23, A22	No Dredging			Limited Operation (processing of barge decon water)				
8-Mar-13				No Dredging			DRW plant operation completed for Season 2012-2013				

Abbreviation(s)

DRW = dredge water return
ECY = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
FB = filter blank
FD = field duplicate
RB = rinsate blank
WQ = water quality

TABLE 2

RESULTS OF PRE-CONSTRUCTION WATER SAMPLING [1,2]

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Acute Criteria [3]	Chronic Criteria [3]	Sample ID	DUW-W1			BP2WQ-0001			BP2WQ-0002			BP2WQ-0003			BP2WQ-0004			BP2WQ-0005			BP2WQ-0006			BP2WQ-0007			BP2WQ-0008			BP2WQ-0009			BP2WQ-0010			BP2WQ-0011			BP2WQ-0014			BP2WQ-0015			BP2WQ-0016			BP2WQ-0017			BP2WQ-0018		
			Sample Date	12/12/2012			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013			1/2/2013		
			Salinity (ppt)	27.6			2.74			28.54			3.7			28.31			3.42			27.72			4.5			27.55			5.15			27.4			4.42			27.2			4.32			26.86			3.62			26.85		
				Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2
Dissolved Metals (µg/L)																																																				
Cadmium	40	8.8				0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]
Chromium	1100	50				0.5	U		10	U	-- [4]	0.5	U		10	U	-- [4]	0.5	U		10	U	-- [4]	0.5	U		10	U	-- [4]	0.5			20	U	-- [4]	0.5	U		10	U	-- [4]	0.5	U		10	U	-- [4]	0.5	U		10	U	-- [4]
Copper	4.8	3.1				1.9		U	10		-- [4]	2.0		U	11		-- [4]	2.1		U	11		-- [4]	2.1		U	10		-- [4]	2.5		U	10		-- [4]	2.6		U	10		-- [4]	1.9		U	9		-- [4]	1.9		U	9		-- [4]
Lead	210	8.1				0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]	0.1	U		1	U	-- [4]
Mercury	1.8					0.02	U		0.0219		-- [4]	0.02	U		0.02	U	-- [4]	0.02	U		0.02	U	-- [4]	0.02	U		0.02	U	-- [4]	0.02	U		0.02	U	-- [4]	0.02	U		0.02	U	-- [4]	0.02	U		0.02	U	-- [4]	0.02	U		0.02	U	-- [4]
Silver	1.9	1.9				0.2	U		2	U	-- [4]	0.2	U		2	U	-- [4]	0.2	U		2	U	-- [4]	0.2	U		2	U	-- [4]	0.2	U		2	U	-- [4]	0.2	U		2	U	-- [4]	0.2	U		2	U	-- [4]	0.2	U		2	U	-- [4]
Zinc	90	81				9			40	U	-- [4]	9			40	U	-- [4]	12			40	U	-- [4]	7			40	U	-- [4]	6			40	U	-- [4]	20			40	U	-- [4]	6			40	U	-- [4]	10			40	U	-- [4]
Total Metals (µg/L)																																																			
Cadmium	NE	NE		1	U	NA																																														
Chromium	NE	NE		5	U	NA																																													
Copper	NE	NE		9		NA																																													
Lead	NE	NE		1	U	NA																																													
Mercury		0.025		0.0407		NA	0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U	
Silver	NE	NE		2	U	NA																																													
Zinc	NE	NE		40	U	NA																																													
PCBs (µg/L)																																																			
Aroclor 1016	NE	NE					0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U	
Aroclor 1242	NE	NE					0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U	
Aroclor 1248	NE	NE					0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U	
Aroclor 1254	NE	NE					0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U	
Aroclor 1260	NE	NE					0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U	
Aroclor 1221	NE	NE					0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U	
Aroclor 1232	NE	NE					0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U	
Total PCBs [5]	10	0.03					0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U	

Note(s)

1. Laboratory qualifiers (Q1) are defined as follows:

U = analyte not detected at reporting limit presented.
J = estimated concentration when the value is less than the RL.

2. Validation qualifiers (Q2) are defined as follows:

U = analyte not detected above the level of the associated value.
UJ = material was not detected; value is an estimate.
-- = no validation qualifier assigned; see data validation report (Appendix G).

3. Criteria obtained from the following:

a. Lowest of National Recommended Water Quality Criteria: Aquatic Life Criteria. U.S. Environmental Protection Agency, http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm or Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A-240).

b. Acute and chronic criteria for metals (except for mercury) are based on the dissolved fraction. The chronic criterion for mercury is based on total recoverable and the acute criterion is based on the dissolved fraction.

c. Acute and chronic criteria for chromium is for the hexavalent form. Hexavalent chromium is not one of the chemicals of concern at the Boeing Plant 2 site; therefore total chromium will be reported.

d. There is no chronic criterion for silver; the acute criterion of 1.9 µg/L is used as the chronic criterion.

e. Criteria for total PCBs based on total recoverable fraction (EPA 2002).

4. Additional data available; see Table 3.

5. Total PCBs calculated by summing detections or, if all not detected, using the highest non-detected value.

Reference(s)

EPA (U.S. Environmental Protection Agency). 2002. National Recommended Water Quality Criteria: 2002. EPA, Office of Water, Office of Science and Technology, EPA-822-R-02-047, Washington, D.C.

Abbreviation(s)

NA = not available
NE = not established
PCBs = polychlorinated biphenyls
ppt = parts per thousand
Q1 = laboratory qualifiers
Q2 = validation qualifiers
RL = reporting limit
µg/L = micrograms per liter
WAC = Washington Administrative Code

TABLE 3

RESULTS OF WATER SAMPLES ANALYZED USING ICP-MS AND ICP-MS WITH COLLISION CELL TO REMOVE SALINITY EFFECTS[1,2]

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Dissolved Ag [3]						Dissolved Cd [3]						Dissolved Cr [3]						Dissolved Cu [3]						Dissolved Pb [3]						Dissolved Zn [3]					
Sample Results	ICP-MS w/ Collision Cell to Remove Salinity Effects			ICP-MS			ICP-MS w/ Collision Cell to Remove Salinity Effects			ICP-MS			ICP-MS w/ Collision Cell to Remove Salinity Effects			ICP-MS			ICP-MS w/ Collision Cell to Remove Salinity Effects			ICP-MS			ICP-MS w/ Collision Cell to Remove Salinity Effects			ICP-MS			ICP-MS w/ Collision Cell to Remove Salinity Effects			ICP-MS		
Chronic WQ Criteria	1.9 µg/L						8.8 µg/L						50 µg/L						3.1 µg/L						8.1 µg/L						81 µg/L					
Sample ID	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
BP2WQ-0002	0.015	U		2	U	R2	0.083	J		1	U	R2	0.25	U		10	U	R2	0.76		U	10		R2	0.030	J		1	U	R2	17.7			40	U	R2
BP2WQ-0004	0.015	U		2	U	R2	0.060			1	U	R2	0.25	J		10	U	R2	1.35	J	UJ	11		R2	0.062	J		1	U	R2	10.7			40	U	R2
BP2WQ-0006	0.015	U		2	U	R2	0.096			1	U	R2	0.25	U		10	U	R2	1.34	J	UJ	11		R2	0.06	J		1	U	R2	10.8			40	U	R2
BP2WQ-0008	0.015	U		2	U	R2	0.1	J		1	U	R2	0.25	U		10	U	R2	1.28	J	UJ	10		R2	0.1	J		1	U	R2	9.83			40	U	R2
BP2WQ-0010	0.015	U		2	U	R2	0.074			1	U	R2	0.25	U		20	U	R2	1.31	J	UJ	10		R2	0.094	J		1	U	R2	12.1			40	U	R2
BP2WQ-0014	0.015	U		2	U	R2	0.085	J		1	U	R2	0.25	U		10	U	R2	1.3	J	UJ	10		R2	0.062	J		1	U	R2	18.8			40	U	R2
BP2WQ-0016	0.015	U		2	U	R2	0.068	J		1	U	R2	0.25	U		10	U	R2	0.78	J	UJ	9		R2	0.024	J		1	U	R2	9.6			40	U	R2
BP2WQ-0018	0.015	U		2	U	R2	0.052	J		1	U	R2	0.25	U		10	U	R2	0.54	J	UJ	9		R2	0.02	U		1	U	R2	7.99			40	U	R2

Note(s)

1. Laboratory qualifiers (Q1) are defined as follows:
   U = analyte not detected at reporting limit presented.
   J = estimated concentration when the value is less than the RL.
2. Validation qualifiers (Q2) are defined as follows:
   U = analyte not detected above the level of the associated value.
   UJ = material was not detected; value is an estimate.
   R2 = result rejected in favor of better results. See discussion in Section 6.0 of the 2012 -2013 Construction Season Completion Report.
3. Results reported in µg/L.

All results reflect the applied dilution and are reported in µg/L.

Abbreviation(s)

ICP-MS = inductively coupled plasma mass spectrometry
Q1 = laboratory qualifiers
Q2 = validation qualifiers
RL = reporting limit
µg/L = micrograms per liter
WQ = water quality

TABLE 4

ANALYTICAL RESULTS FOR WATER SAMPLES COLLECTED DURING DREDGE MONITORING [1,2]

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project

Boeing Plant 2
Seattle/Tukwila, Washington

		Sample ID	BP2WQ-0020			BP2WQ-0035			BP2WQ-0038			BP2WQ-0039 Field Dup. of BP2WQ-0038			BP2WQ-0059			BP2WQ-0137			BP2WQ-0147			BP2WQ-0148 Field Dup. of BP2WQ-0147			BP2WQ-0173			BP2WQ-0170 300 feet Downstream Near-Surface			BP2WQ-0171 300 feet Downstream Near-Bottom			BP2WQ-0174 300 feet Upstream Near-Surface			BP2WQ-0175 300 feet Upstream Near-Bottom		
		Sample Date	1/5/2013			1/8/2013			1/8/2013			1/8/2013			1/10/2013			1/24/2013			1/25/2013			1/25/2013			1/28/2013			1/28/2013			1/28/2013			1/28/2013			1/28/2013		
		Salinity (ppt)	4.68			3.9			25.5			25.5			1.88			2.83			3.47			3.47			27.3			5.47			10.00			6.18			27.27		
Analyte	Acute Criteria [3]	Chronic Criteria [3]	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2
Dissolved Metals (µg/L)																																								
Cadmium	40	8.8	0.2	U		0.2	U		0.053	J		0.070	J		0.2	U		0.014	J		0.016	J		0.014	J		0.071	J													
Chromium	1100	50	1	U		1	U		0.25	U		0.25	U		1	U		0.106	J		0.116	J		0.114	J		0.32	U													
Copper	4.8	3.1	2		U	2		U	0.61	J	UJ	0.94	J	UJ	2		U	1.19	J	UJ	1.11	J	UJ	0.86	J	UJ	1.2	U													
Lead	210	8.1	0.2	U		0.2	U		0.029	J		0.027	J		0.1	U		0.15	U		0.15	U		0.15	U		0.48	U													
Mercury	1.8		0.02	U		0.02	U		0.022			0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U													
Silver	1.9	1.9	0.5	U		0.5	U		0.015	U		0.015	U		0.5	U		0.0020	U		0.0020	U		0.0020	U		0.0108	J													
Zinc	90	81	10	U		10	U		3.85	J		4.88	J		10	U		3.0	J		4.0	J		3.3	J		7.0	U													
Total Metals (µg/L)																																									
Mercury		0.025	0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		**0.0285**			**0.0296**		J	**0.0264**		J	0.02	U		**0.0259**		
PCBs (µg/L)																																								
Aroclor 1016	NE	NE	0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U													
Aroclor 1242	NE	NE	0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U													
Aroclor 1248	NE	NE	0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U													
Aroclor 1254	NE	NE	0.010	U		0.010	U		0.010	U		0.010	U		0.016			0.010	U		0.010	U		0.010	U		0.010	U													
Aroclor 1260	NE	NE	0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U													
Aroclor 1221	NE	NE	0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U													
Aroclor 1232	NE	NE	0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U		0.010	U													
Total PCBs [4]	10	0.03	0.010	U		0.010	U		0.010	U		0.010	U		0.016			0.010	U		0.010	U		0.010	U		0.010	U													

Note(s)

1. Laboratory qualifiers (Q1) are defined as follows:
   U = analyte not detected at reporting limit presented.
   J = estimated concentration when the value is less than the RL.
2. Validation qualifiers (Q2) are defined as follows:
   U = analyte not detected above the level of the associated value.
   UJ = material was not detected; value is an estimate.
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from the following:
   a. Lowest of National Recommended Water Quality Criteria: Aquatic Life Criteria. U.S. Environmental Protection Agency, http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm or Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A-240).
   b. Acute and chronic criteria for metals (except for mercury) are based on the dissolved fraction. The chronic criterion for mercury is based on total recoverable and the acute criterion is based on the dissolved fraction.
   c. Acute and chronic criteria for chromium is for the hexavalent form. Hexavalent chromium is not one of the chemicals of concern at the Boeing Plant 2 site; therefore total chromium will be reported.
   d. There is no chronic criterion for silver; the acute criterion of 1.9 µg/L is used as the chronic criterion.
   e. Criteria for total PCBs based on total recoverable fraction (EPA 2002).
4. Total PCBs calculated by summing detections or, if all not detected, using the highest non-detected value.

Reference(s)

EPA (U.S. Environmental Protection Agency). 2002. National Recommended Water Quality Criteria: 2002. EPA, Office of Water, Office of Science and Technology, EPA-822-R-02-047, Washington, D.C.

Abbreviation(s)

NE = not established
PCBs = polychlorinated biphenyls
ppt = parts per thousand
Q1 = laboratory qualifiers
Q2 = validation qualifiers
RL = reporting limit
µg/L = micrograms per liter
WAC = Washington Administrative Code

TABLE 5

DREDGE WATER MONITORING QUALITY ASSURANCE SAMPLE RESULTS[1,2]

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Acute Criteria [3]	Chronic Criteria [3]	Sample ID			BP2WQ-0036			BP2WQ-0037			BP2WQ-0145			BP2WQ-0146		
						Filter Blank			Rinsate Blank			Filter Blank			Rinsate Blank		
			Sample Date			1/8/2013			1/8/2013			1/25/2013			1/25/2013		
			Salinity (ppt)			DI Water			DI Water			DI Water			DI Water		
						Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2
Dissolved Metals (µg/L)																	
Cadmium	40	8.8				0.1	U					0.010	U				
Chromium	1100	50				0.5	U					0.041	U				
Copper	4.8	3.1				0.6						0.55	J				
Lead	210	8.1				0.1	U					0.15	U				
Mercury	1.8	0.025				0.02	U					0.02	U				
Silver	1.9	1.9				0.2	U					0.0020	U				
Zinc	90	81				4	U					2.5	U				
Total Metals (µg/L)																	
Mercury	1.8	0.025							0.02	U					0.02	U	
PCBs (µg/L)																	
Aroclor 1016	NE	NE							0.010	U					0.010	U	
Aroclor 1242	NE	NE							0.010	U					0.010	U	
Aroclor 1248	NE	NE							0.010	U					0.010	U	
Aroclor 1254	NE	NE							0.010	U					0.010	U	
Aroclor 1260	NE	NE							0.010	U					0.010	U	
Aroclor 1221	NE	NE							0.010	U					0.010	U	
Aroclor 1232	NE	NE							0.010	U					0.010	U	
Total PCBs [4]	10	0.03							0.010	U					0.010	U	

Note(s)

1. Laboratory qualifiers (Q1) are defined as follows:
   U = analyte not detected at reporting limit presented.
   J = estimated concentration when the value is less than the RL.
2. Additional validation qualifiers (Q2) were not assigned
3. Criteria obtained from Table 1 of WQMWP (AMEC et al. 2012c).
4. Total PCBs calculated by summing detections or, if all not detected, using the highest non-detected value.

Abbreviation(s)

DI = deionized
NE = not established
PCBs = polychlorinated biphenyls
ppt = parts per thousand
Q1 = laboratory qualifiers
Q2 = validation qualifiers
RL = reporting limit
µg/L = micrograms per liter
WQMWP = Water Quality Monitoring Work Plan (AMEC et al. 2012c)

TABLE 6

DREDGE RETURN WATER CONVENTIONAL PARAMETER DATA

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Date	Time	Parameter Units	Temperature °C	Specific Conductivity mS/cm	Salinity ppt	Dissolved Oxygen mg/L	pH	Turbidity 1 NTU	Turbidity 2 NTU	Turbidity 3 NTU	Turbidity Average NTU	Comments
1/9/2013	11:27		7.67	25.13	15.21	9.47	8.45	0.54	0.64	0.51	0.56	Measured from Carboy
Ambient (average)	Start Date :	1/8/2013	6.57	3.23	1.71	11.04	7.22	—	—	—	7.00	
1/9/2013	15:01		9.62	26.87	16.43	7.8	8.17	0.36	0.11	0.39	0.29	
1/9/2013	17:43		9.61	27.6	16.93	8.24	8.09	0.15	0.19	0.25	0.20	
1/9/2013	19:55		9.25	28.12	17.24	7.95	8.05	0.01	0.19	0.09	0.10	
1/9/2013	22:07		8.84	28.4	17.42	7.8	8.1	0.08	0.14	0.15	0.12	
1/10/2013	0:24		9.03	28.54	17.53	7.55	7.95	0.11	0.19	0.19	0.16	
1/10/2013	2:36		8.86	24.95	15.13	6.97	7.62	0.17	0.16	0.15	0.16	
1/10/2013	4:37		8.55	25.64	15.57	6.97	7.42	0.36	0.37	0.3	0.34	
1/10/2013	9:10		6.98	27.27	16.59	9.82	7.86	0.24	0.21	0.26	0.24	Sample from Carboy
Dredge Return Water (average)			8.84	27.17	16.61	7.89	7.91	—	—	—	0.20	
Ambient (average)	Start Date :	1/9/2013	6.06	1.77	0.91	11.42	7.24	—	—	—	10.62	
1/10/2013	10:45		9.3	30.59	18.92	8.33	7.63	0.25	0.29	0.26	0.27	
1/10/2013	13:05		9.5	30.29	18.72	5.38	7.4	0.2	0.18	0.16	0.18	
1/10/2013	15:06		8.7	25.43	15.45	7.67	7.42	0.18	0.22	0.2	0.20	
1/10/2013	17:22		8.34	18.82	11.11	7.25	7.46	0.2	0.21	0.25	0.22	
1/10/2013	19:06		8.44	18.94	11.21	6.51	7.41	0.51	0.53	0.52	0.52	
1/10/2013	21:11		8.55	23.62	14.26	5.88	7.38	0.47	0.47	0.46	0.47	
1/11/2013	0:07		8.05	25.03	15.16	6.07	7.46	0.35	0.39	0.52	0.42	
1/11/2013	3:51		7.39	25.06	15.16	5.77	7.48	0.76	0.7	0.66	0.71	
1/11/2013	5:56		7.57	22.93	13.77	5.38	7.49	0.3	29	0.31	9.87	
1/11/2013	7:55		2.71	25.41	15.18	8.7	7.53	0.36	0.58	0.58	0.51	Sample from Carboy
Dredge Return Water (average)			7.86	24.61	14.89	6.69	7.47	—	—	—	1.34	
Ambient (average)	Start Date :	1/10/2013	5.09	1.45	0.73	11.71	7.23	—	—	—	7.45	
1/11/2013	10:30		7.79	21.32	12.73	6.21	7.59	0.9	0.8	0.9	0.87	
1/11/2013	11:36		7.34	20.61	12.26	5.48	7.47	0.38	0.39	0.38	0.38	
1/11/2013	13:29		7.27	17.1	10.01	7.25	7.51	0.45	0.43	0.43	0.44	
1/11/2013	19:12		7.04	14.03	8.09	6.44	7.6	0.81	0.84	0.88	0.84	
1/11/2013	21:40		6.49	13.03	7.46	7.12	7.51	0.81	0.79	0.83	0.81	
1/11/2013	23:55		6.33	12.92	7.39	6.25	7.53	0.6	0.61	0.61	0.61	
1/12/2013	2:12		5.98	13.41	7.68	6.89	7.14	0.68	0.53	0.45	0.55	
1/12/2013	4:15		6.6	13.73	7.9	5.41	7.38	0.79	0.87	0.86	0.84	
1/12/2013	6:30		6.08	13.61	7.81	8.31	7.45	0.57	0.58	0.57	0.57	
1/12/2013	8:30		6.01	12.83	7.33	3.8	7.28	1.65	1.63	1.65	1.64	
1/12/2013	10:15		1.48	15.52	8.82	9.91	7.45	0.75	0.78	0.88	0.80	Sample from Carboy
Dredge Return Water (average)			6.22	15.28	8.86	6.64	7.45	—	—	—	0.76	
Ambient (average)	Start Date :	1/11/2013	4.49	1.81	0.92	11.87	7.22	—	—	—	5.76	
1/12/2013	13:10		6.55	11.96	6.8	5.33	7.48	1.8	1.98	1.93	1.90	
1/13/2013	2:00		4.46	13.4	7.64	7.41	7.55	1.52	2.12	2.22	1.95	
1/13/2013	4:40		4.16	13.24	7.54	9.43	7.55	2.12	2.5	1.87	2.16	
1/13/2013	6:40		5.6	13.32	7.64	8.54	7.5	1.23	0.79	1.45	1.16	
1/13/2013	8:45		0.95	13.69	7.69	9.88	7.63	0.55	0.69	0.55	0.60	Sample from Carboy
Dredge Return Water (average)			4.34	13.12	7.46	8.12	7.54	—	—	—	1.55	
Ambient (average)	Start Date :	1/12/2013	3.85	2.72	1.40	11.96	7.21	—	—	—	3.91	
1/14/2013	12:38		4.24	13.65	7.77	3.65	7.57	0.83	0.83	1	0.89	
1/14/2013	14:34		4.88	13.2	7.52	4.56	7.54	0.45	0.47	0.38	0.43	
1/14/2013	16:55		4.91	13.08	7.38	5.72	7.57	0.52	0.62	0.71	0.62	
1/14/2013	20:55		5.59	13.42	7.68	7.84	7.61	0.49	0.45	0.39	0.44	
1/14/2013	22:55		5.91	15.75	9.13	8.41	7.42	0.06	0.07	0.22	0.12	
1/15/2013	0:55		6.54	19.26	11.37	7.47	7.39	0.24	0.32	0.17	0.24	
1/15/2013	3:10		7.02	22.29	13.33	7.16	7.26	0.26	0.34	0.27	0.29	
1/15/2013	5:10		7.17	20.23	12.01	7.8	7.27	0.46	0.57	0.47	0.50	
1/15/2013	8:45		3.36	17.65	10.23	9.48	7.57	0.22	0.33	0.22	0.26	Sample from Carboy
Dredge Return Water (average)			5.51	16.50	9.60	6.90	7.47	—	—	—	0.42	
Ambient (average)	Start Date :	1/14/2013	3.20	2.69	1.40	12.30	7.20	—	—	—	3.58	
1/15/2013	11:27		7.8	23.78	14.34	8.09	7.22	0.17	0.36	0.23	0.25	
1/15/2013	12:18		7.57	15.27	25.34	8.54	7.19	3.8				YSI Instrument [1]
1/15/2013	13:16		7.63	26.23	15.94	7.85	7.34	0.28	0.16	0.12	0.19	
1/15/2013	13:18		7.6	26.39	16.04	7.89	7.19	0.5				YSI Instrument [1]
1/15/2013	15:40		7.43	23.67	14.29	7.87	7.36	0.6	0.47	0.51	0.53	
1/15/2013	15:41		7.49	23.56	14.17	7.85	7.23	0.5				YSI Instrument [1]
1/15/2013	17:43		7.11	15.5	9	9.24	7.43	0.34	0.33	0.28	0.32	
1/15/2013	17:44		7.08	15.25	8.85	9.71	7.19	0.5				YSI Instrument [1]
1/15/2013	19:34		6.75	14.36	8.29	9.27	7.34	0.57	0.51	0.4	0.49	
1/15/2013	19:35		6.94	14.28	8.33	9.45	7.16	1.6				YSI Instrument [1]
1/15/2013	22:47		6.55	14.54	8.4	8.65	7.4	0.36	0.4	0.42	0.39	
1/15/2013	22:48		6.56	14.64	8.46	9	7.17	0.6				YSI Instrument [1]
1/16/2013	0:45		6.45	14.75	8.52	8.22	7.28	0.14	0.28	0.16	0.19	
1/16/2013	0:46		6.66	14.8	8.56	9.21	7.08	0.2				YSI Instrument [1]
1/16/2013	2:45		6.24	13.97	8.03	7.84	7.31	0.27	0.4	0.32	0.33	
1/16/2013	2:46		6.49	13.94	8.02	8.7	7.15	0.5				YSI Instrument [1]
1/16/2013	4:45		6.47	12.57	7.18	7.8	7.32	0.52	0.63	0.47	0.54	
1/16/2013	4:46		6.48	12.61	7.2	8.73	7.21	0.7				YSI Instrument [1]
1/16/2013	8:45		2.39	17.09	9.84	10.13	7.41	0.15	0.26	0.16	0.19	Sample from Carboy
Dredge Return Water (average)			6.48	17.65	10.38	8.50	7.34	—	—	—	0.34	
Ambient (average)	Start Date :	1/15/2013	3.91	2.37	1.23	12.01	7.19	—	—	—	3.04	

TABLE 6

DREDGE RETURN WATER CONVENTIONAL PARAMETER DATA

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Date	Time	Parameter Units	Temperature °C	Specific Conductivity mS/cm	Salinity ppt	Dissolved Oxygen mg/L	pH	Turbidity 1 NTU	Turbidity 2 NTU	Turbidity 3 NTU	Turbidity Average NTU	Comments
1/16/2013	10:53		6.06	13.04	7.46	7.06	7.44	0.99	0.87	1.26	1.04	
1/16/2013	10:54		6.2	13.01	7.44	6.39	7.35	1.2				YSI Instrument [1]
1/16/2013	13:32		6.99	15.48	9	7.76	7.4	0.27	0.51	0.29	0.36	
1/16/2013	13:33		6.95	15.49	9	7.77	7.33	0.6				YSI Instrument [1]
1/16/2013	16:10		7.04	14.28	8.25	7.09	7.43	0.53	0.49	0.56	0.53	
1/16/2013	16:11		7	14.23	8.21	7.65	7.36	1.3				YSI Instrument [1]
1/16/2013	18:20		6.87	12.71	7.27	7.87	7.44	0.45	0.64	0.57	0.55	
1/16/2013	18:21		6.91	12.57	7.18	7.92	7.36	0.3				YSI Instrument [1]
1/16/2013	22:10		6.79	12.43	7.1	6.08	7.46	0.41	0.47	0.45	0.44	
1/16/2013	22:12		6.65	12.38	7.06	6.13	7.41	0.6				YSI Instrument [1]
1/17/2013	0:17		6.3	9.35	5.22	7.68	7.48	0.63	0.84	0.83	0.77	
1/17/2013	0:18		6.32	9.325	5.21	7.66	7.34	0.7				YSI Instrument [1]
1/17/2013	2:25		6.3	9.117	5.08	7.36	7.41	0.58	0.45	0.69	0.57	
1/17/2013	2:26		6.3	9.152	5.11	7.14	7.3	0.4				YSI Instrument [1]
1/17/2013	4:37		6.18	9.217	5.14	7.35	7.39	0.65	0.65	0.48	0.59	
1/17/2013	4:38		6.15	9.251	5.16	7.32	7.3	0.6				YSI Instrument [1]
1/17/2013			2.39	11.94	6.7	10.43	7.55	0.31	0.33	0.22	0.29	Sample from Carboy
Dredge Return Water (average)			6.10	11.95	6.80	7.63	7.44	—	—	—	0.57	
Ambient (average)	Start Date :	1/16/2013	3.97	2.52	1.31	11.81	7.15	—	—	—	2.99	
1/17/2013	11:05		5.64	11.77	6.67	7.89	7.45	0.95	0.71	0.95	0.87	
1/17/2013	11:06		5.8	11.94	6.78	7.86	7.4	1.7				YSI Instrument [1]
1/17/2013	13:03		5.94	13.58	7.79	8.36	7.44	0.68	0.74	0.64	0.69	
1/17/2013	13:04		5.95	13.76	7.9	8.52	7.42	0.6				YSI Instrument [1]
1/17/2013	15:10		6.18	16.55	9.64	7.64	7.41	0.45	0.43	0.47	0.45	
1/17/2013	15:11		6.24	16.87	9.85	7.31	7.45	0.5				YSI Instrument [1]
1/17/2013	17:12		6.68	21.49	12.81	6.48	7.58	0.15	0.17	0.11	0.14	
1/17/2013	17:13		6.77	21.73	12.97	6.39	7.47	0.6				YSI Instrument [1]
1/17/2013	19:05		6.86	22.32	13.35	6.8	7.57	0.09	0.13	0.04	0.09	
1/17/2013	19:06		7	22.43	13.43	6.32	7.47	0.5				YSI Instrument [1]
1/17/2013	21:05		6.75	21.91	13.08	7.68	7.54	0.37	0.48	0.44	0.43	
1/17/2013	21:06		6.91	21.96	13.17	7.22	7.46	2.5				YSI Instrument [1]
1/17/2013	23:02		6.85	21.29	12.68	5.55	7.38	0.11	0.21	0.1	0.14	
1/17/2013	23:03		6.88	21.49	12.81	5.35	7.26	0.2				YSI Instrument [1]
1/18/2013	1:06		6.77	20.57	12.22	4.95	7.22	0.11	0.15	0.26	0.17	
1/18/2013	1:08		6.82	20.75	12.34	4.37	7.09	0.3				YSI Instrument [1]
1/18/2013	3:05		6.47	19.23	11.35	4.66	7.12	0.08	0.07	0.27	0.14	
1/18/2013	3:06		6.66	19.37	11.44	4.2	7	0.2				YSI Instrument [1]
1/18/2013	5:09		6.38	17.99	10.55	5.72	7.04	0.37	0.26	0.46	0.36	
1/18/2013	5:10		6.56	18.08	10.62	4.8	6.92	0.6				YSI Instrument [1]
1/18/2013	7:37		6.43	16.25	9.46	5.57	7.03	0.29	0.43	0.33	0.35	
1/18/2013	7:38		6.43	16.35	9.52	5.42	6.9	0.9				YSI Instrument [1]
1/18/2013	8:45		2.65	19.33	11.26	8.47	7.44	0.17	0.22	0.04	0.14	Sample from Carboy
Dredge Return Water (average)			6.13	18.52	10.91	6.65	7.35	—	—	—	0.33	
Ambient (average)	Start Date :	1/17/2013	3.80	2.70	1.41	11.74	7.13	—	—	—	2.99	
1/18/2013	9:45		6.35	14.59	8.43	5.97	6.99	0	0.14	0	0.05	
1/18/2013	9:46		6.27	14.65	--	6.44	6.91	0.4				YSI Instrument [1]
1/18/2013	11:41		6.28	13.37	7.67	6.94	7.06	0.23	0.3	1.03	0.52	
1/18/2013	11:42		6.32	13.39	7.68	7.29	6.84	0.5				YSI Instrument [1]
1/18/2013	13:31		6.64	12.76	7.29	7.13	7	0.5	0.18	0.22	0.30	
1/18/2013	13:32		6.4	12.8	7.32	7.7	6.84	0.7				YSI Instrument [1]
1/18/2013	16:22		6.28	12.3	7.01	8.02	6.71	1.94	2.9	1.69	2.18	
1/18/2013	16:23		6.28	12.35	7.04	8.6	6.92	1.1				YSI Instrument [1]
1/18/2013	18:08		6.36	12.85	7.35	8.43	6.85	0.52	0.6	0.41	0.51	
1/18/2013	18:09		6.23	12.91	7.38	9.03	7.02	0.4				YSI Instrument [1]
1/18/2013	20:14		6.38	11.61	6.59	7.64	6.75	0.3	0.24	0.5	0.35	
1/18/2013	20:15		6.24	11.67	6.62	9.27	7.05	1.2				YSI Instrument [1]
1/18/2013	22:20		6.15	11.47	6.5	9.52	6.98	0.41	0.36	0.56	0.44	
1/18/2013	22:22		6.19	11.51	6.52	9.69	7.13	0.6				YSI Instrument [1]
1/19/2013	0:17		6.07	11.51	6.52	9.68	6.99	0.42	0.3	0.26	0.33	
1/19/2013	0:18		6.05	11.54	6.54	9.67	7.18	0.3				YSI Instrument [1]
1/19/2013	2:21		6.02	11.35	6.43	9.02	7	0.16	0.34	0.18	0.23	
1/19/2013	2:23		6.13	11.36	6.43	9.25	7.17	0.9				YSI Instrument [1]
1/19/2013	4:21		6.18	11.24	6.36	9.1	6.91	0.32	0.56	0.19	0.36	
1/19/2013	4:23		6.14	11.29	6.39	9.57	7.03	1.1				YSI Instrument [1]
1/19/2013	7:36		6.12	11.48	6.51	9.08	6.87	0.3	0.3	0.55	0.38	
1/19/2013	7:37		6.09	11.52	6.53	9.26	6.9	1.3				YSI Instrument [1]
1/19/2013	8:45		2.95	12.28	6.92	10.21	7.01	0.44	0.32	0.44	0.40	Sample from Carboy
Dredge Return Water (average)			5.98	12.23	6.97	8.40	6.93	—	—	—	0.50	
Ambient (average)	Start Date :	1/18/2013	4.03	2.64	1.37	11.59	7.12	—	—	—	2.95	

TABLE 6

DREDGE RETURN WATER CONVENTIONAL PARAMETER DATA

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project

Boeing Plant 2
Seattle/Tukwila, Washington

Date	Time	Parameter Units	Temperature °C	Specific Conductivity mS/cm	Salinity ppt	Dissolved Oxygen mg/L	pH	Turbidity 1 NTU	Turbidity 2 NTU	Turbidity 3 NTU	Turbidity Average NTU	Comments
1/19/2013	11:15		5.87	11.07	6.26	8.23	6.78	1.48	1.68	1.78	1.65	
1/19/2013	11:16		6.05	11.11	6.28	8.84	6.93	0.8				YSI Instrument [1]
1/19/2013	13:27		6.07	9.73	5.47	8.47	6.61	0.21	0.37	5.01	1.86	
1/19/2013	13:28		6.15	9.94	5.58	10.8	6.87	1.3				YSI Instrument [1]
1/19/2013	15:22		6.43	14.09	8.11	8.45	6.67	0.25	0.24	0.16	0.22	
1/19/2013	15:23		6.45	14.63	8.46	9.89	6.98	0.9				YSI Instrument [1]
1/19/2013	17:20		6.75	21.06	12.53	8.21	6.88	0.12	1.16	0.45	0.58	
1/19/2013	17:21		6.9	21.47	12.81	9.69	7.12	1.1				YSI Instrument [1]
1/19/2013	18:55		7.16	23.78	14.31	9.07	7.06	0	0	0	0.00	
1/19/2013	18:56		7.09	24.26	14.63	10.23	7.28	2.3				YSI Instrument [1]
1/19/2013	21:07		7.13	25.47	15.42	7.89	7.57	0.31	0.18	0.36	0.28	
1/19/2013	21:08		7.15	26.02	15.78	9.88	7.44	0.4				YSI Instrument [1]
1/19/2013	23:05		7.17	26.47	16.08	8.79	7.84	0.3	0.15	0.11	0.19	
1/19/2013	23:06		7.34	26.94	16.4	10.02	8.29	0.2				YSI Instrument [1]
1/20/2013	1:11		7.35	27.29	16.63	7.68	8.13	0.01	0.21	0	0.07	
1/20/2013	1:12		7.44	27.87	17.02	9.58	8.54	0.4				YSI Instrument [1]
1/20/2013	3:11		7.24	27.42	16.71	8.66	7.99	0.13	0.09	0.08	0.10	
1/20/2013	3:12		7.35	27.9	17.04	9.22	8.28	0.3				YSI Instrument [1]
1/20/2013	5:22		7.12	27.27	16.61	8.89	8.09	0.2	0.19	0.32	0.24	
1/20/2013	5:23		7.43	27.83	17	8.98	8.42	1.4				YSI Instrument [1]
1/20/2013	8:45		2.99	22.64	13.37	10.16	7.81	0.01	0	0.26	0.09	Sample From Carboy
Dredge Return Water (average)			6.48	21.48	12.86	8.59	7.40	—	—	—	0.48	
Ambient (average)	Start Date :	1/19/2013	4.32	2.64	1.38	11.35	7.11	—	—	—	3.13	
1/22/2013	11:17		4.83	29.29	17.82	5.1	7.46	0.86	0.56	0.47	0.63	
1/22/2013	11:18		5.78	29.67	18.13	5.6	7.75	2.6				YSI Instrument [1]
1/22/2013	13:15		5.6	16.62	7.27	7.74	0	0	0		0.00	
1/22/2013	13:16		5.22	27.75	16.83	7.24	8.11	1				YSI Instrument [1]
1/22/2013	15:11		6.15	24.27	14.59	7.51	7.84	0.85	0.41	0.17	0.48	
1/22/2013	15:12		5.92	24.54	14.76	8.09	8.13	0.2				YSI Instrument [1]
1/22/2013	17:04		6.43	23.26	13.94	7.88	7.78	0	0	0	0.00	
1/22/2013	17:05		6.18	23.6	14.16	8.39	8.02	1.6				YSI Instrument [1]
1/22/2013	19:00		6.65	22.59	13.52	7.86	7.73	0.06	0.06	0.13	0.08	
1/22/2013	19:01		6.52	22.91	13.72	8.44	7.93	1				YSI Instrument [1]
1/23/2013	1:26		6.39	22.64	13.54	7.62	7.66	0.34	0.41	0.53	0.43	
1/23/2013	1:27		6.38	23.07	13.82	7.46	7.94	0.3				YSI Instrument [1]
1/23/2013	3:29		6.73	24.03	14.46	8.98	7.68	0.36	0.45	0.22	0.34	
1/23/2013	3:30		6.69	24.45	14.74	9.19	7.92	0.2				YSI Instrument [1]
1/23/2013	5:36		6.88	24.6	14.83	9.05	7.68	1.32	0.91	1.11	1.11	
1/23/2013	5:37		6.92	24.97	15.1	9.28	7.95	2.3				YSI Instrument [1]
1/23/2013	7:35		7.54	26.69	16.24	9.08	7.72	0.48	0.64	1.09	0.74	
1/23/2013	7:36		7.57	27.21	16.6	9.57	7.99	0.3				YSI Instrument [1]
1/23/2013	8:40		4.71	25.65	15.41	9.55	7.81	0.85	0.77	0.91	0.84	Sample From Carboy
Dredge Return Water (average)			6.19	23.96	14.16	8.04	6.94	—	—	—	0.47	
Ambient (average)	Start Date :	1/22/2013	4.18	3.09	1.61	11.45	7.14	—	—	—	2.81	
1/23/2013	10:26		7.97	28.35	17.36	7.94	7.7	1.47	1.42	1.42	1.44	
1/23/2013	10:27		7.94	28.8	17.66	8.54	7.97	1.4				YSI Instrument [1]
1/23/2013	12:20		8.51	29.3	18.02	8.81	7.79	0.38	0.59	0.72	0.56	
1/23/2013	12:21		8.19	29.74	18.3	8.43	8.03	0.6				YSI Instrument [1]
1/23/2013	14:18		8.16	25.72	15.62	9.08	7.86	0	0.35	0.49	0.28	
1/23/2013	14:19		7.99	25.95	15.76	9.02	8.05	0.3				YSI Instrument [1]
1/23/2013	16:17		8.06	24.02	14.5	8.58	7.86	0	0.17	0.16	0.11	
1/23/2013	16:18		7.84	24.36	14.71	9.73	8.06	0.4				YSI Instrument [1]
1/23/2013	18:25		7.73	23.32	14.03	7.93	7.82	0.01	0.17	0.11	0.10	
1/23/2013	18:26		7.74	23.67	14.26	8.74	8.04	0.6				YSI Instrument [1]
1/23/2013	20:03		7.88	22.91	13.77	7.2	7.85	0.03	0.1	0.22	0.12	
1/23/2013	20:04		7.83	22.31	14.03	7.83	8.05	1				YSI Instrument [1]
1/24/2013	1:01		7.61	22.75	13.65	7.1	7.81	0.51	1.01	0.58	0.70	
1/24/2013	1:02		7.74	23.14	13.91	8.54	8	0.8				YSI Instrument [1]
1/24/2013	3:26		7.45	22.16	13.27	7.96	7.85	0.56	0.71	0.71	0.66	
1/24/2013	3:27		7.59	22.57	13.54	9.41	8.01	0.1				YSI Instrument [1]
1/24/2013	5:46		7.64	20.49	12.19	6.98	7.84	0.18	0.08	0.25	0.17	
1/24/2013	5:47		7.66	20.82	12.4	8.07	8.01	0				YSI Instrument [1]
1/24/2013	7:44		7.82	20.08	11.93	7.2	7.8	0.58	0.37	0.69	0.55	
1/24/2013	7:45		7.74	20.51	12.21	7.82	7.99	0.5				YSI Instrument [1]
1/24/2013	8:45		5.45	26.55	16.02	9.52	7.82	0.28	0.09	0.29	0.22	Sample From Carboy
Dredge Return Water (average)			7.66	24.15	14.58	8.03	7.82	—	—	—	0.45	
Ambient (average)	Start Date :	1/23/2013	4.38	4.15	2.20	11.34	7.14	—	—	—	3.09	
1/24/2013	9:52		7.67	20.81	12.39	7.4	7.79	0.25	0.36	0.22	0.28	
1/24/2013	9:53		7.75	21.06	12.56	7.59	7.99	0.6				YSI Instrument [1]
1/24/2013	9:52		7.67	20.81	12.39	7.4	7.79	0.25	0.36	0.22	0.28	
1/24/2013	9:53		7.75	21.06	12.56	7.59	7.99	0.6				YSI Instrument [1]
1/24/2013	11:48		8.19	21.02	12.93	7.56	7.8	0.03	0.26	0.18	0.16	
1/24/2013	11:49		8.02	21.98	13.17	7.39	7.98	1.1				YSI Instrument [1]
1/24/2013	13:37		8.26	21.06	12.59	7.25	7.81	0.32	0.42	0.43	0.39	
1/24/2013	13:38		8.24	21.45	12.83	7.78	7.97	0.3				YSI Instrument [1]
1/24/2013	15:01		8.59	20.58	12.28	7.12	7.68	0.69	0.26	0.28	0.41	
1/24/2013	15:02		8.31	20.92	12.49	7.72	7.95	0.3				YSI Instrument [1]
1/24/2013	17:14		8.31	20.55	12.25	7.3	7.75	1.1	0.88	1	0.99	
1/24/2013	17:15		8.29	20.95	12.52	8.96	7.96	1.2				YSI Instrument [1]
1/24/2013	19:06		8.45	21.21	12.68	7.15	7.75	1.33	1.2	1.25	1.26	
1/24/2013	19:07		8.19	21.53	12.89	7.5	7.96	2.11				YSI Instrument [1]
Dredge Return Water (average)			8.16	20.86	12.50	7.31	7.77	—	—	—	0.54	
Ambient (average)	Start Date :	1/24/2013	4.82	3.11	1.62	11.55	7.20	—	—	—	4.86	

TABLE 6

DREDGE RETURN WATER CONVENTIONAL PARAMETER DATA

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Date	Time	Parameter Units	Temperature °C	Specific Conductivity mS/cm	Salinity ppt	Dissolved Oxygen mg/L	pH	Turbidity 1 NTU	Turbidity 2 NTU	Turbidity 3 NTU	Turbidity Average NTU	Comments
1/29/2013	7:36		9.17	34.26	21.41	8	6.26	3.5	3.71	3.85	3.69	
1/29/2013	7:35		9.14	35.16	22.02	8.4	5.72	3.8				YSI Instrument [1]
1/29/2013	9:26		9.17	34.96	21.9	6.01	8.02	10.75	6.42	11.15	9.44	
1/29/2013	9:27		9.18	35.86	22.51	5.47	8.34	16.5				YSI Instrument [1]
Dredge Return Water (average)			9.17	34.61	21.66	7.01	7.14	—	—	—	6.56	
Ambient (average)	Start Date :	1/29/2013	5.90	2.68	1.40	11.44	7.25	—	—	—	9.06	
1/31/2013	0:10		10.49	26.88	16.48	30.1	8.27	4.58	4.91	4.67	4.72	
1/31/2013	0:10		9.99	27.05	16.56	7.23	8.43	0.8				YSI Instrument [1]
1/31/2013	0:29		10.4	25.45	16.18	9.51	8.23	1.91	2.01	1.62	1.85	
1/31/2013	0:29		9.98	26.92	16.47	7.33	8.44	1.2				YSI Instrument [1]
1/31/2013	3:05		10.5	25.3	15.41	7.76	8.18	4.95	4.63	5.54	5.04	
1/31/2013	3:05		10.05	25.65	15.63	7.74	8.49	15.9				YSI Instrument [1]
1/31/2013	3:43		10.4	24.72	15.02	9.7	8.19	4.67	4.61	4.35	4.54	
1/31/2013	3:43		10.18	25.09	15.25	11.47	8.5	25.8				YSI Instrument [1]
1/31/2013	13:06		10.16	24.58	14.91	7.88	8.2	8.62	8.93	10.24	9.26	
1/31/2013	13:07		10	7.54	14.69	11.48	8.4	7.4				YSI Instrument [1]
1/31/2013	14:07		10.31	24.65	14.97	8.16	8.15	3.05	1.99	2.78	2.61	
1/31/2013	14:08		10.2	23.76	14.96	8.3	8.2	10.18				YSI Instrument [1]
1/31/2013	17:31		10.2	21.67	13.01	8.5	8.31	12.59	14.89	14.94		
1/31/2013	17:33		10.15	21.29	12.75	10.63	8.59	NM				YSI Instrument [1]
Dredge Return Water (average)			10.35	24.75	15.14	11.66	8.22	—	—	—	4.67	
Ambient (average)	Start Date :	1/31/2013	6.39	1.32	0.67	11.78	7.28	—	—	—	10.10	
2/4/2013	0:48		7.32	19.84	11.77	6.81	8.43	0.03	0.17	0.2		YSI Instrument [1]
2/4/2013	6:07		8.44	15.31	8.92	0.12	8.48	-0.1				YSI Instrument [1, 2]
2/4/2013	6:07		8.63	15.11	8.79	3.08	8.32	0.17	0.11	0.06	0.11	
2/4/2013	6:46		8.49	14.87	8.61	0.22	8.35	0.2				YSI Instrument [1]
2/4/2013	7:05		8.5	14.85	8.62	0.16	8.35	-0.1				YSI Instrument [1, 2]
2/4/2013	7:05		8.66	14.6	8.47	3.98	8.21	0.15	0.15	0.15	0.15	
2/4/2013	8:25		8.57	14.28	8.26	0.09	8	-0.1				YSI Instrument [1, 2]
2/4/2013	8:25		8.72	13.92	8.05	2.9	7.94	0	0	0	0.00	
Dredge Return Water (average)			8.67	14.54	8.44	3.32	8.16	—	—	—	0.09	
Ambient (average)	Start Date :	2/3/2013	5.64	1.29	0.65	11.95	7.28	—	—	—	5.40	
2/4/2013	10:25		8.68	13.35	7.7	0.1	7.64	-0.2				YSI Instrument [1, 2]
2/4/2013	10:25		8.89	13.02	7.49	2.4	7.63	0.11	0	0.09	0.07	
2/4/2013	13:15		12.07	12.07	6.91	2.43	7.75	0.44	0	0.47	0.30	
2/4/2013	13:29		9.17	11.86	6.78	0.14	7.87	0.1				YSI Instrument [1]
2/4/2013	15:14		10.25	10.2	5.77	2.15	7.91	0.08	0.44	0.55	0.36	
2/4/2013	15:15		9.2	4.209	6.01	0.74	8.03	0.4				YSI Instrument [1]
2/4/2013	17:09		9.39	10.05	5.67	2.85	7.89	0.1	0.33	0.37	0.27	
2/4/2013	17:10		9.17	10.14	5.73	0.67	8.23	0.8				YSI Instrument [1]
2/4/2013	18:10		9.46	10.13	5.73	2.51	7.86	0.28	0.38	0.39	0.35	
2/4/2013	19:17		9.29	10.22	5.77	2.82	8.21	0.39	0.51	0.31	0.40	
2/4/2013	19:18		9.16	10.27	5.81	0.41	8.81	0.1				YSI Instrument [1]
2/5/2013	0:00		10.08	10.74	6.12	6.22	7.9	0.33	0.33	0.32	0.33	
2/5/2013	1:07		9.04	10.81	6.13	1.74	8.57	2.3				YSI Instrument [1]
2/5/2013	1:08		9.26	10.78	6.13	5.52	8.22	0.38	0.33	0.32	0.34	
2/5/2013	2:02		9.05	10.63	6.03	1.02	8.58	10.7				YSI Instrument [1]
2/5/2013	2:02		9.14	10.45	5.91	2.67	8.19	0.37	0.26	0.3	0.31	
2/5/2013	3:46		9.1	10.63	6.02	1.32	7.74	6				YSI Instrument [1]
2/5/2013	3:46		9.18	10.53	5.97	4.03	7.55	0.34	0.27	0.27	0.29	
2/5/2013	5:17		9.05	11.96	6.84	1.36	7.08	0.2				YSI Instrument [1]
2/5/2013	5:17		9.27	11.82	6.76	4.52	7.3	0.33	0.33	0.33	0.33	
2/5/2013	6:03		9.04	12.37	7.09	1.55	6.97	0.1				YSI Instrument [1]
2/5/2013	6:03		9.12	12.27	7.03	3.52	7.19					
2/5/2013	7:00		8.99	12.16	6.96	2.08	6.91	0.3				YSI Instrument [1]
2/5/2013	7:00		9.19	12.08	6.91	3.92	7.08	0.46	0.47	0.47	0.47	
2/5/2013	8:15		9.57	11.67	6.64	7.12	7.56	0.46	0.6	0.51	0.52	Sample from Carboy
Dredge Return Water (average)			9.58	11.15	6.34	3.76	7.73	—	—	—	0.33	
Ambient (average)	Start Date :	2/4/2013	5.94	1.40	0.71	11.83	7.29	—	—	—	5.48	
2/5/2013	10:14		9.05	11.2	6.38	4.67	7.41	0.81	1.01	1.07	0.96	
2/5/2013	10:15		8.88	11.28	6.42	2.03	7.08	2.4				YSI Instrument [1]
2/5/2013	13:04		9.22	8.19	4.56	5.99	7.22	2.18	2.3	2.29	2.26	
2/5/2013	13:06		9	4.415	2.43	5.98	7.12	1.1				YSI Instrument [1]
2/5/2013	14:54		9.67	13.81	7.99	5.61	7.08	0.72	0.95	0.8	0.82	
2/5/2013	14:54		9.3	13.99	8.11	4.99	7.26	0.9				YSI Instrument [1]
2/5/2013	18:35		9.29	14.59	8.47	5.35	7.23	1.15	0.82	1.16	1.04	
2/5/2013	18:35		9.26	14.73	8.56	4.14	7.37	2				YSI Instrument [1]
2/5/2013	19:48		9.22	17.92	10.58	7.6	7.18	1.07	1.09	1.02	1.06	
2/5/2013	19:48		9.24	18.49	10.92	7.12	7.51	2.1				YSI Instrument [1]
2/6/2013	0:01		9.4	22.12	13.32	5.15	7.49	1.6				YSI Instrument [1]
2/6/2013	0:01		9.38	22	13.2	6.2	7.35	0.68	0.63	0.64	0.65	
2/6/2013	1:53		9.32	22.38	13.46	6.01	7.48	2				YSI Instrument [1]
2/6/2013	1:53		9.24	22.04	13.23	6.4	7.22	2	1.58	1.5	1.69	
2/6/2013	3:50		9.34	21.66	12.99	5.76	7.59	1.3				YSI Instrument [1]
2/6/2013	3:50		9.28	21.26	12.73	6.46	7.29	0.95	0.73	0.72	0.80	
2/6/2013	6:02		9.23	20.46	12.21	5.87	7.48	2.6				YSI Instrument [1]
2/6/2013	6:02		9.16	20.24	12.07	6.86	7.35	0.43	0.42	0.43	0.43	
2/6/2013	7:44		9.21	22.23	NM	6.56	7.44	0.2				YSI Instrument [1]
2/6/2013	7:44		9.14	21.96	13.17	7.09	7.29	0.74	0.67	0.68	0.70	
2/6/2013	8:15		8.49	16.55	9.75	7.96	7.37	1.11	1.17	0.73	1.00	Sample from Carboy
Dredge Return Water (average)			9.19	17.25	10.19	6.38	7.27	—	—	—	1.04	
Ambient (average)	Start Date :	2/5/2013	6.56	1.81	0.93	11.42	7.28	—	—	—	5.77	

TABLE 6

DREDGE RETURN WATER CONVENTIONAL PARAMETER DATA

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Date	Time	Parameter Units	Temperature °C	Specific Conductivity mS/cm	Salinity ppt	Dissolved Oxygen mg/L	pH	Turbidity 1 NTU	Turbidity 2 NTU	Turbidity 3 NTU	Turbidity Average NTU	Comments
2/6/2013	9:31		9.18	21.3	12.75	6.92	7.18	1.07	0.36	0.94	0.79	
2/6/2013	9:31		9.16	21.66	12.98	6.72	7.46	4.4				YSI Instrument [1]
2/6/2013	11:26		9.44	19.52	11.61	7.56	7.26	0.33	0.1	0.32	0.25	
2/6/2013	11:26		9.26	19.77	11.77	7.38	7.45	0.1				YSI Instrument [1]
2/6/2013	13:14		9.49	18.9	11.21	7.36	7.31	0.26	0.33	0.08	0.22	
2/6/2013	13:14		9.42	19.17	11.38	7.26	7.45	0.1				YSI Instrument [1]
2/6/2013	15:38		9.54	18.79	11.14	6.12	7.27	0.43	0.34	0.13	0.30	
2/6/2013	15:38		9.46	19	11.27	6.2	7.23	1				YSI Instrument [1]
2/6/2013	17:04		9.35	18.63	11.03	7.02	7.22	0.36	0.38	0.11	0.28	
2/6/2013	17:04		9.37	18.83	11.16	6.59	7.19	1.2				YSI Instrument [1]
2/6/2013	19:13		9.64	18.89	11.2	9.1	7.22	0.71	0.55	0.85	0.70	
2/6/2013	19:13		9.52	18.71	11.18	9.5	7.22	1				YSI Instrument [1]
2/7/2013	1:03		9.32	18.55	11.01	5.98	7.26	6.8				YSI Instrument [1]
2/7/2013	1:03		9.28	18.39	10.88	7.12	7.33	0.6	0.58	0.57	0.58	
2/7/2013	2:44		8.85	18.47	10.93	7.29	7.25	1.7				YSI Instrument [1]
2/7/2013	2:44		8.97	18.39	10.87	7.43	7.25	0.69	0.61	0.6	0.63	
2/7/2013	4:55		9.27	18.44	10.91	8.66	7.28	0.33	0.27	0.31	0.30	
2/7/2013	5:03		9.1	18.36	10.8	7.47	7.15	0.9				YSI Instrument [1]
2/7/2013	7:10		9.1	20.45	12.21	6.75	7.14	0.5				YSI Instrument [1]
2/7/2013	7:10		9.34	20.36	12.15	7.51	7.38	0.59	0.54	0.52	0.55	
2/7/2013	8:15		9.04	19.16	11.44	8.48	7.38	0.44	0.37	0.39	0.40	Sample from Carboy
Dredge Return Water (average)			9.32	19.16	11.38	7.57	7.28	—	—	—	0.46	
Ambient (average)	Start Date :	2/6/2013	6.82	2.02	1.04	11.27	7.28	—	—	—	5.14	
2/7/2013	8:47		9.22	23.01	13.87	6.87	7.22	0.54	0.13	0.45		YSI Instrument [1]
2/7/2013	8:47		9.11	23.28	14.05	6.81	7.12	-0.1			-0.10	
2/7/2013	10:40		9.08	24.37	14.76	6.25	7.26	0.5	0.64	0.31	0.48	
2/7/2013	10:40		9.21	24.48	14.69	6.83	7.16	0.8				YSI Instrument [1]
2/7/2013	13:12		9.4	24.83	15.07	7.59	7.26	0.62	0.36	0.25	0.41	
2/7/2013	13:12		9.45	24.43	14.97	7.82	7.2	1				YSI Instrument [1]
2/7/2013	16:33		10.17	25.18	15.31	7.57	7.29	0.27	0.58	0.29	0.38	
2/7/2013	16:33		10.25	25.31	15.43	8.1	7.15	0.9				YSI Instrument [1]
2/7/2013	19:07		9.74	27.29	16.71	6.45	7.21	0.66	0.54	0.68	0.63	
2/7/2013	19:07		9.71	25.42	12.37	7.33	7.09	0.8				YSI Instrument [1]
2/7/2013	20:00		9.62	28.05	17.22	6.75	7.11	2.9				YSI Instrument [1]
2/7/2013	20:00		9.66	27.83	17.06	8.42	7.24	0.51	0.47	0.45	0.48	
2/8/2013	0:10		9.4	28.68	17.63	5.98	7.16	not recordable				YSI Instrument [1]
2/8/2013	0:10		9.28	28.25	17.34	7.36	7.35	0.52	0.59	0.49	0.53	
2/8/2013	2:20		9.4	29.65	18.18	6.65	7.13	4.9				YSI Instrument [1]
2/8/2013	2:20		9.23	29.56	18.2	8.42	7.39	0.54	0.52	0.51	0.52	
2/8/2013	4:08		9.21	29.03	17.9	5.78	7.06	1.4				YSI Instrument [1]
2/8/2013	4:08		9.17	28.7	17.63	7.83	7.28	0.5	0.48	0.44	0.47	
2/8/2013	10:26		10.15	26.45	16.18	9.03	7.52	0.07	0.2	0.14	0.14	Sample from Carboy
Dredge Return Water (average)			9.50	26.57	16.23	7.57	7.29	—	—	—	0.39	
Ambient (average)	Start Date :	2/7/2013	6.63	2.28	1.18	11.28	7.28	—	—	—	4.98	
2/8/2013	12:58		9.38	28.68	17.61	7.25	7.2	0.07	0.02	0.01	0.03	
2/8/2013	12:58		9.41	0.448	8.74	5.2	6.88	0.1				YSI Instrument [1]
2/8/2013	16:49		10.17	29.13	17.97	6.42	7.13	0.53	0.42	0.73	0.56	
2/8/2013	16:49		9.66	29.56	18.24	5.49	6.93	-0.1				YSI Instrument [1, 2]
Dredge Return Water (average)			9.78	28.91	17.79	6.84	7.17	—	—	—	0.30	
Ambient (average)	Start Date :	2/8/2013	6.01	2.46	1.27	11.50	7.26	—	—	—	4.51	
2/12/2013	8:32		9.6	30.25	18.61	5.62	7.21	0.4	0.15	0.36	0.30	
2/12/2013	8:32		9.41	30.3	18.6	1.42	6.8	0.2				YSI Instrument [1]
2/12/2013	13:40		9.94	29.53	18.22	3.57	7.03	0	0	0	0.00	
2/12/2013	13:40		9.13	29.79	18.37	0.54	6.8	0				YSI Instrument [1]
2/12/2013	16:11		9.6	27.76	17.02	4.86	7.06	0	0	0.06	0.02	
2/12/2013	16:11		9.52	28.15	17.28	3.88	6.7	0				YSI Instrument [1]
2/12/2013	18:00		10.24	24.64	14.98	5.77	7.21	0	0	0	0.00	
2/12/2013	18:00		9.55	25.12	15.27	5.37	6.85	0				YSI Instrument [1]
2/12/2013	19:10		9.78	23.6	14.27	6.28	7.23	0	0	0	0.00	
2/12/2013	19:10		9.58	23.85	14.43	5.82	7.07	0				YSI Instrument [1]
2/13/2013	0:25		9.64	23.12	13.95	3.4	7.12	0				YSI Instrument [1]
2/13/2013	0:25		10.04	22.91	13.83	5.22	7.33	0	0.01	0.03	0.01	
2/13/2013	2:17		9.57	22.99	13.86	2.99	7.15	0				YSI Instrument [1]
2/13/2013	2:17		9.68	22.97	13.84	5.29	7.35	0.3	0.07	0.06	0.14	
2/13/2013	4:17		9.68	23.84	14.43	5.58	7.37	0				YSI Instrument [1]
2/13/2013	4:17		9.95	23.6	14.25	6.41	7.35	0	0	0	0.00	
2/13/2013	6:19		9.62	26.84	16.42	5.84	7.47	0				YSI Instrument [1]
2/13/2013	6:19		9.71	26.57	16.23	5.83	7.42	0	0	0	0.00	
2/13/2013	7:30		9.69	30.66	18.91	6.18	7.64	0				YSI Instrument [1]
2/13/2013	7:30		9.61	30.05	18.56	6.48	7.5	0	0	0	0.00	
Dredge Return Water (average)			9.82	26.19	15.98	5.53	7.27	—	—	—	0.05	
Ambient (average)	Start Date :	2/12/2013	6.99	2.94	1.55	11.22	7.26	—	—	—	3.87	

TABLE 6

DREDGE RETURN WATER CONVENTIONAL PARAMETER DATA

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Date	Time	Parameter Units	Temperature °C	Specific Conductivity mS/cm	Salinity ppt	Dissolved Oxygen mg/L	pH	Turbidity 1 NTU	Turbidity 2 NTU	Turbidity 3 NTU	Turbidity Average NTU	Comments
2/14/2013	8:34		9.4	28.98	17.83	1.71	7.59	0				YSI Instrument [1]
2/14/2013	8:34		10.09	28.61	17.62	4.33	7.58	0	0.01	0.22	0.08	
2/14/2013	10:53		9.83	29.14	17.96	0.66	7.49	0				YSI Instrument [1]
2/14/2013	10:53		10.12	28.93	17.83	2.74	7.39	0	0	0	0.00	
2/14/2013	13:15		10.37	29.63	18.3	0.74	7.43	0				YSI Instrument [1]
2/14/2013	13:15		10.78	29.22	18.07	3.3	7.54	0	0.34	0.05	0.13	
2/14/2013	15:25		10.58	30.82	19.12	2.43	7.32	-0.1				YSI Instrument [1, 2]
2/14/2013	15:25		10.54	30.57	18.92	5.05	7.41	0	0.06	0	0.02	
2/14/2013	19:39		10.44	28.59	17.61	3.34	7.62	-0.1				YSI Instrument [1, 2]
2/14/2013	19:39		10.83	28.19	17.35	5.68	7.59	0.68	0	0	0.23	
2/15/2013	0:06		10.4	24.95	15.17	2.64	7.71	0				YSI Instrument [1]
2/15/2013	0:06		10.51	24.73	15.04	5.82	7.63	0	0	0	0.00	
2/15/2013	1:33		10.32	23.58	14.25	2.81	7.75	0				YSI Instrument [1]
2/15/2013	1:33		10.23	23.67	14.13	4.7	7.7	0	0	0	0.00	
2/15/2013	3:31		10.13	22.78	13.74	3.6	7.79	-0.1				YSI Instrument [1, 2]
2/15/2013	3:31		10.06	22.7	13.68	5.44	7.72	0	0	0	0.00	
2/15/2013	5:31		9.99	21.36	12.81	4.06	7.79	-0.1				YSI Instrument [1, 2]
2/15/2013	5:31		9.84	21.33	12.78	5.76	7.75	0	0	0	0.00	
2/15/2013	7:37		9.58	18.38	10.87	4.5	7.79	-0.1				YSI Instrument [1, 2]
2/15/2013	7:37		9.33	18.65	11.04	7.29	7.79	0	0	0	0.00	
Dredge Return Water (average)			10.23	25.66	15.65	5.01	7.61	—	—	—	0.05	
Ambient (average)	Start Date : 2/14/2013		7.37	2.47	1.29	11.13	7.25	—	—	—	3.50	
2/19/2013	7:56		8.54	14.38	8.33	5.95	7.82	—	—	—	-0.1	YSI Instrument
2/19/2013	8:21		8.61	14.87	8.64	5.96	7.83	—	—	—	-0.1	YSI Instrument
2/19/2013	8:36		8.62	15.10	8.79	5.86	7.84	—	—	—	-0.1	YSI Instrument
2/19/2013	8:41		8.65	15.60	9.10	6.25	7.84	—	—	—	-0.1	YSI Instrument
2/19/2013	9:06		8.71	16.43	9.62	6.11	7.86	—	—	—	-0.1	YSI Instrument
2/19/2013	9:11		8.77	17.05	10.02	6.44	7.86	—	—	—	-0.1	YSI Instrument
2/19/2013	9:16		8.81	17.65	10.40	6.66	7.87	—	—	—	-0.1	YSI Instrument
2/19/2013	9:26		8.85	18.11	10.69	6.56	7.88	—	—	—	-0.2	YSI Instrument
2/19/2013	9:31		8.93	18.65	11.04	6.82	7.90	—	—	—	-0.1	YSI Instrument
2/19/2013	9:56		9.01	19.07	11.31	6.50	7.90	—	—	—	-0.2	YSI Instrument
2/19/2013	10:11		9.82	19.16	11.38	6.32	7.94	—	—	—	-0.2	YSI Instrument
2/19/2013	10:16		9.22	19.98	11.90	6.72	7.94	—	—	—	-0.2	YSI Instrument
2/19/2013	10:21		9.24	20.58	12.29	6.91	7.98	—	—	—	-0.2	YSI Instrument
2/19/2013	10:36		9.27	21.27	12.73	6.81	7.97	—	—	—	-0.2	YSI Instrument
2/19/2013	10:41		9.32	21.89	13.14	6.95	8.05	—	—	—	-0.1	YSI Instrument
2/19/2013	10:46		9.36	22.37	13.45	7.07	8.09	—	—	—	-0.2	YSI Instrument
2/19/2013	11:11		9.39	22.52	13.55	6.69	8.00	—	—	—	-0.2	YSI Instrument
2/19/2013	11:16		9.47	22.99	13.86	6.82	8.04	—	—	—	-0.2	YSI Instrument
2/19/2013	11:21		9.47	23.34	14.09	6.93	8.06	—	—	—	-0.2	YSI Instrument
2/19/2013	11:46		9.51	23.58	14.25	6.59	8.02	—	—	—	-0.2	YSI Instrument
2/19/2013	11:51		9.57	23.91	14.47	6.74	8.05	—	—	—	-0.2	YSI Instrument
2/19/2013	11:56		9.59	24.17	14.64	6.83	8.07	—	—	—	-0.2	YSI Instrument
2/19/2013	12:21		9.68	24.46	14.84	6.57	8.04	—	—	—	-0.2	YSI Instrument
2/19/2013	12:26		9.71	24.69	14.99	6.71	8.07	—	—	—	-0.2	YSI Instrument
2/19/2013	13:21		10.60	25.09	15.27	6.15	8.06	—	—	—	-0.2	YSI Instrument
2/19/2013	13:26		9.87	25.17	15.31	6.14	8.03	—	—	—	-0.2	YSI Instrument
2/19/2013	13:31		9.90	25.41	15.47	6.30	8.05	—	—	—	-0.2	YSI Instrument
2/19/2013	14:06		10.62	25.65	15.64	5.79	8.05	—	—	—	-0.2	YSI Instrument
2/19/2013	14:11		10.14	25.66	15.64	5.90	8.02	—	—	—	-0.2	YSI Instrument
2/19/2013	14:51		10.21	25.93	15.82	5.62	8.01	—	—	—	-0.2	YSI Instrument
2/19/2013	14:56		10.27	26.07	15.92	5.78	8.02	—	—	—	-0.2	YSI Instrument
2/19/2013	15:36		10.25	26.19	16.00	5.35	8.01	—	—	—	-0.2	YSI Instrument
2/19/2013	15:41		10.30	26.37	16.12	5.56	8.03	—	—	—	-0.2	YSI Instrument
2/19/2013	16:11		10.51	26.44	16.17	5.33	8.03	—	—	—	-0.2	YSI Instrument
2/19/2013	16:16		10.27	26.73	16.36	5.45	8.03	—	—	—	-0.2	YSI Instrument
2/19/2013	16:21		10.20	26.90	16.47	5.69	8.04	—	—	—	-0.2	YSI Instrument
2/19/2013	17:11		10.21	26.93	16.49	5.46	8.04	—	—	—	-0.2	YSI Instrument
2/19/2013	17:16		10.12	27.19	16.66	5.36	8.04	—	—	—	-0.2	YSI Instrument
2/19/2013	17:21		10.05	27.34	16.76	5.67	8.06	—	—	—	-0.2	YSI Instrument
2/19/2013	19:11		9.91	27.40	16.79	5.04	8.02	—	—	—	-0.2	YSI Instrument
2/19/2013	19:16		9.68	27.56	16.89	4.71	8.05	—	—	—	-0.1	YSI Instrument
2/19/2013	19:21		9.64	27.68	16.97	5.02	8.07	—	—	—	-0.2	YSI Instrument
2/19/2013	19:31		9.49	27.82	17.06	5.04	8.08	—	—	—	-0.2	YSI Instrument
2/19/2013	19:56		9.52	27.93	17.14	5.00	8.06	—	—	—	-0.2	YSI Instrument
2/19/2013	20:01		9.54	28.04	17.21	5.31	8.09	—	—	—	-0.1	YSI Instrument
2/19/2013	20:06		9.57	28.15	17.28	5.59	8.10	—	—	—	-0.2	YSI Instrument
2/19/2013	20:16		9.54	28.25	17.35	5.65	8.11	—	—	—	-0.2	YSI Instrument
2/19/2013	20:21		9.61	28.36	17.43	5.88	8.11	—	—	—	-0.2	YSI Instrument
2/19/2013	20:41		9.42	28.38	17.43	5.85	8.11	—	—	—	-0.2	YSI Instrument
2/19/2013	20:46		9.60	28.52	17.53	5.93	8.11	—	—	—	-0.2	YSI Instrument
2/19/2013	20:51		9.63	28.60	17.59	6.20	8.12	—	—	—	-0.2	YSI Instrument
2/20/2013	1:16		9.06	28.77	17.68	3.90	8.08	—	—	—	-0.2	YSI Instrument
2/20/2013	1:46		8.71	28.81	17.70	3.74	8.09	—	—	—	-0.2	YSI Instrument
2/20/2013	1:51		8.70	28.82	17.71	3.97	8.11	—	—	—	-0.1	YSI Instrument
2/20/2013	1:56		8.70	28.82	17.70	4.12	8.12	—	—	—	-0.2	YSI Instrument
2/20/2013	2:16		8.75	28.82	17.70	3.97	8.10	—	—	—	-0.2	YSI Instrument
2/20/2013	2:21		8.86	28.79	17.69	4.26	8.11	—	—	—	-0.2	YSI Instrument
2/20/2013	2:41		8.91	28.75	17.67	4.24	8.10	—	—	—	-0.2	YSI Instrument
2/20/2013	2:46		8.93	28.68	17.62	4.54	8.10	—	—	—	-0.2	YSI Instrument
2/20/2013	3:11		8.95	28.58	17.55	4.53	8.10	—	—	—	-0.1	YSI Instrument
2/20/2013	3:16		8.95	28.48	17.49	4.91	8.10	—	—	—	-0.2	YSI Instrument
2/20/2013	3:41		8.92	28.34	17.39	4.87	8.10	—	—	—	-0.2	YSI Instrument
2/20/2013	3:46		8.92	28.21	17.31	5.24	8.11	—	—	—	-0.2	YSI Instrument
2/20/2013	4:06		8.79	28.12	17.24	5.32	8.12	—	—	—	-0.1	YSI Instrument
2/20/2013	4:11		8.86	27.95	17.13	5.36	8.12	—	—	—	-0.2	YSI Instrument
2/20/2013	4:16		8.88	27.79	17.02	5.67	8.13	—	—	—	-0.2	YSI Instrument
2/20/2013	4:36		8.76	27.72	16.97	5.55	8.13	—	—	—	-0.2	YSI Instrument
2/20/2013	4:41		8.81	27.51	16.83	5.65	8.13	—	—	—	-0.1	YSI Instrument
2/20/2013	5:06		8.56	27.38	16.74	5.77	8.15	—	—	—	-0.1	YSI Instrument
2/20/2013	5:11		8.72	27.08	16.54	5.78	8.14	—	—	—	-0.2	YSI Instrument
2/20/2013	5:31		8.65	26.88	16.41	5.74	8.15	—	—	—	-0.2	YSI Instrument
2/20/2013	5:36		8.66	26.65	16.25	5.88	8.15	—	—	—	-0.1	YSI Instrument
2/20/2013	5:41		8.64	26.40	16.09	6.14	8.16	—	—	—	-0.1	YSI Instrument
Dredge Return Water (average)			9.35	25.05	15.24	5.72	8.04	—	—	—	-0.18	
Ambient (average)	Start Date : 2/19/2013		6.26	1.76	0.90	11.43	7.27	—	—	—	3.00	

TABLE 6

DREDGE RETURN WATER CONVENTIONAL PARAMETER DATA

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Date	Time	Parameter Units	Temperature °C	Specific Conductivity mS/cm	Salinity ppt	Dissolved Oxygen mg/L	pH	Turbidity 1 NTU	Turbidity 2 NTU	Turbidity 3 NTU	Turbidity Average NTU	Comments
2/22/2013	8:18		8.53	21.44	12.83	7.31	7.72	—	—	—	-0.2	YSI Instrument
2/22/2013	8:23		8.47	21.85	13.10	7.54	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	8:28		8.51	22.20	13.32	7.65	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	8:53		8.52	22.01	13.20	7.28	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	8:58		8.56	22.59	13.58	7.41	7.77	—	—	—	-0.2	YSI Instrument
2/22/2013	9:03		8.59	22.84	13.74	7.57	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	9:18		8.54	23.10	13.91	7.46	7.78	—	—	—	-0.2	YSI Instrument
2/22/2013	9:23		8.57	23.43	14.13	7.59	7.81	—	—	—	-0.2	YSI Instrument
2/22/2013	9:28		8.62	23.69	14.30	7.68	7.82	—	—	—	-0.2	YSI Instrument
2/22/2013	9:48		8.60	23.86	14.41	7.42	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	9:53		8.59	24.12	14.59	7.56	7.81	—	—	—	-0.2	YSI Instrument
2/22/2013	9:58		8.62	24.35	14.73	7.64	7.82	—	—	—	-0.2	YSI Instrument
2/22/2013	10:13		8.60	24.50	14.83	7.38	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	10:18		8.63	24.73	14.99	7.55	7.81	—	—	—	-0.2	YSI Instrument
2/22/2013	10:48		8.65	25.06	15.20	7.26	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	10:53		8.66	25.19	15.29	7.40	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	10:58		8.67	25.35	15.39	7.47	7.81	—	—	—	-0.2	YSI Instrument
2/22/2013	11:33		8.64	25.42	15.44	7.07	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	11:38		8.62	25.59	15.55	7.16	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	11:48		8.64	25.65	15.59	6.98	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	11:53		8.64	25.73	15.64	7.10	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	13:58		8.58	25.86	15.73	5.93	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	14:18		8.50	26.01	15.82	5.89	7.79	—	—	—	-0.1	YSI Instrument
2/22/2013	14:23		8.55	26.09	15.88	5.90	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	14:43		8.45	26.23	15.97	5.82	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	14:48		8.50	26.35	16.05	5.77	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	15:58		8.63	26.55	16.19	5.25	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	16:03		8.67	26.62	16.24	5.45	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	16:18		8.70	26.62	16.23	5.36	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	16:23		8.74	26.55	16.19	5.62	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	16:38		8.83	26.29	16.02	5.83	7.78	—	—	—	-0.2	YSI Instrument
2/22/2013	16:53		8.85	26.16	15.94	5.90	7.78	—	—	—	-0.2	YSI Instrument
2/22/2013	16:58		8.86	25.97	15.81	6.27	7.77	—	—	—	-0.2	YSI Instrument
2/22/2013	17:08		8.84	25.76	15.67	6.49	7.77	—	—	—	-0.2	YSI Instrument
2/22/2013	17:13		8.82	25.53	15.52	6.58	7.77	—	—	—	-0.2	YSI Instrument
2/22/2013	17:18		8.80	25.41	15.44	6.80	7.77	—	—	—	-0.2	YSI Instrument
2/22/2013	17:23		8.80	25.42	15.45	6.74	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	17:28		8.75	25.44	15.46	6.72	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	17:33		8.74	25.43	15.45	6.64	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	17:38		8.71	25.44	15.46	6.62	7.77	—	—	—	-0.2	YSI Instrument
2/22/2013	17:43		8.78	25.41	15.44	6.39	7.77	—	—	—	-0.2	YSI Instrument
2/22/2013	17:48		8.72	25.17	15.28	6.60	7.77	—	—	—	-0.2	YSI Instrument
2/22/2013	17:58		8.71	24.99	15.16	6.78	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	18:03		8.65	24.83	15.05	6.79	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	18:23		8.61	24.57	14.88	6.79	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	18:28		8.57	24.32	14.71	7.06	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	18:53		8.53	24.02	14.51	6.96	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	19:28		8.44	23.58	14.22	6.98	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	19:33		8.40	23.36	14.08	7.29	7.76	—	—	—	-0.2	YSI Instrument
2/22/2013	19:43		8.36	23.19	13.96	7.42	7.77	—	—	—	-0.2	YSI Instrument
2/22/2013	20:13		8.08	23.02	13.84	7.23	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	20:18		8.29	22.83	13.73	7.39	7.79	—	—	—	-0.2	YSI Instrument
2/22/2013	20:38		8.19	22.67	13.62	7.25	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	20:43		8.22	22.47	13.49	7.51	7.80	—	—	—	-0.2	YSI Instrument
2/22/2013	20:48		8.24	22.31	13.39	7.67	7.79	—	—	—	-0.2	YSI Instrument
2/23/2013	1:18		6.07	22.38	13.36	7.02	7.82	—	—	—	-0.1	YSI Instrument
2/23/2013	1:23		7.88	22.10	13.24	5.15	7.77	—	—	—	0.0	YSI Instrument
2/23/2013	4:23		6.59	22.03	13.16	5.12	7.78	—	—	—	-0.1	YSI Instrument
2/23/2013	4:28		7.28	21.82	13.04	3.74	7.76	—	—	—	-0.1	YSI Instrument
2/23/2013	4:48		7.34	21.66	12.94	3.52	7.75	—	—	—	-0.1	YSI Instrument
2/23/2013	4:53		7.31	21.52	12.85	3.41	7.74	—	—	—	-0.2	YSI Instrument
2/23/2013	4:58		7.47	21.39	12.77	3.48	7.73	—	—	—	-0.2	YSI Instrument
2/23/2013	5:08		7.56	21.31	12.72	3.59	7.72	—	—	—	-0.2	YSI Instrument
2/23/2013	5:13		7.64	21.22	12.66	4.09	7.71	—	—	—	-0.2	YSI Instrument
2/23/2013	5:38		7.72	21.13	12.61	4.47	7.71	—	—	—	-0.2	YSI Instrument
2/23/2013	5:43		7.75	21.10	12.59	5.12	7.69	—	—	—	-0.2	YSI Instrument
2/23/2013	5:53		7.77	21.09	12.58	5.54	7.66	—	—	—	-0.2	YSI Instrument
2/23/2013	5:58		7.78	21.09	12.58	5.58	7.66	—	—	—	-0.2	YSI Instrument
2/23/2013	6:03		7.81	21.10	12.59	6.00	7.63	—	—	—	-0.2	YSI Instrument
2/23/2013	6:13		7.79	21.12	12.61	6.24	7.62	—	—	—	-0.2	YSI Instrument
2/23/2013	6:18		7.86	21.16	12.63	6.30	7.60	—	—	—	-0.2	YSI Instrument
2/23/2013	6:38		7.81	21.22	12.67	6.58	7.57	—	—	—	-0.1	YSI Instrument
2/23/2013	6:43		7.89	21.29	12.72	6.35	7.58	—	—	—	-0.2	YSI Instrument
2/23/2013	6:48		7.92	21.39	12.78	6.56	7.54	—	—	—	-0.2	YSI Instrument
2/23/2013	6:58		7.92	21.49	12.85	6.42	7.56	—	—	—	-0.2	YSI Instrument
2/23/2013	7:03		7.96	21.66	12.96	6.56	7.50	—	—	—	-0.2	YSI Instrument
2/23/2013	7:18		8.03	21.98	13.17	6.51	7.48	—	—	—	-0.2	YSI Instrument
2/23/2013	7:23		8.06	22.15	13.28	6.69	7.43	—	—	—	-0.2	YSI Instrument
2/23/2013	7:58		8.09	22.39	13.44	6.09	7.49	—	—	—	-0.2	YSI Instrument
Dredge Return Water (average)			8.30	23.67	14.28	6.42	7.74	—	—	—	-0.19	
Ambient (average)	Start Date : 2/22/2013		6.03	3.55	1.88	11.15	7.23	—	—	—	4.34	

TABLE 6

DREDGE RETURN WATER CONVENTIONAL PARAMETER DATA

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Date	Time	Parameter Units	Temperature °C	Specific Conductivity mS/cm	Salinity ppt	Dissolved Oxygen mg/L	pH	Turbidity 1 NTU	Turbidity 2 NTU	Turbidity 3 NTU	Turbidity Average NTU	Comments
2/27/2013	8:57		8.34	20.24	12.05	5.40	7.08	—	—	—	-0.1	YSI Instrument
2/27/2013	9:02		8.26	20.26	12.06	5.76	7.09	—	—	—	-0.1	YSI Instrument
2/27/2013	9:07		8.32	20.28	12.07	6.08	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	9:32		8.42	20.31	12.10	6.45	7.09	—	—	—	-0.2	YSI Instrument
2/27/2013	9:37		8.50	20.33	12.11	6.30	7.09	—	—	—	-0.1	YSI Instrument
2/27/2013	9:42		8.53	20.36	12.13	6.80	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	9:47		8.58	20.40	12.16	7.15	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	10:12		8.58	20.41	12.17	7.20	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	10:17		8.64	20.45	12.19	7.23	7.10	—	—	—	-0.1	YSI Instrument
2/27/2013	10:22		8.65	20.49	12.22	7.64	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	10:47		8.94	20.59	12.29	7.94	7.12	—	—	—	-0.2	YSI Instrument
2/27/2013	10:52		8.75	20.57	12.27	7.62	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	10:57		8.80	20.60	12.29	8.06	7.12	—	—	—	-0.2	YSI Instrument
2/27/2013	11:42		8.91	20.66	12.33	7.75	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	11:47		9.00	20.70	12.36	8.05	7.11	—	—	—	-0.1	YSI Instrument
2/27/2013	12:32		9.13	20.75	12.40	7.65	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	12:37		9.19	20.78	12.42	7.87	7.10	—	—	—	-0.1	YSI Instrument
2/27/2013	13:22		9.51	20.84	12.46	7.91	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	13:27		9.31	20.84	12.46	7.47	7.10	—	—	—	-0.1	YSI Instrument
2/27/2013	13:32		9.31	20.87	12.48	7.70	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	14:07		9.48	20.91	12.51	7.72	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	14:12		9.38	20.91	12.51	7.33	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	14:17		9.39	20.94	12.53	7.57	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	14:52		9.54	20.99	12.56	7.66	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	14:57		9.44	21.00	12.56	7.23	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	15:02		9.45	21.04	12.59	7.49	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	15:32		9.47	21.09	12.62	7.55	7.10	—	—	—	-0.2	YSI Instrument
2/27/2013	15:37		9.47	21.13	12.65	7.46	7.10	—	—	—	-0.1	YSI Instrument
2/27/2013	16:02		9.47	21.18	12.68	7.64	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	16:07		9.49	21.23	12.71	7.47	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	16:12		9.51	21.27	12.74	7.69	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	16:42		9.52	21.30	12.76	7.34	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	16:47		9.53	21.35	12.80	7.60	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	17:32		9.45	21.40	12.82	7.73	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	17:37		9.53	21.41	12.83	7.15	7.11	—	—	—	-0.2	YSI Instrument
2/27/2013	17:42		9.54	21.45	12.86	7.43	7.11	—	—	—	-0.1	YSI Instrument
2/27/2013	17:47		9.53	21.48	12.88	7.60	7.12	—	—	—	-0.2	YSI Instrument
Dredge Return Water (average)			9.10	20.83	12.45	7.34	7.10	—	—	—	-0.18	
Ambient (average)	Start Date : 2/27/2013		6.94	3.39	1.80	10.95	7.19	—	—	—	3.34	

TABLE 6

DREDGE RETURN WATER CONVENTIONAL PARAMETER DATA

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Date	Time	Parameter Units	Temperature °C	Specific Conductivity mS/cm	Salinity ppt	Dissolved Oxygen mg/L	pH	Turbidity 1 NTU	Turbidity 2 NTU	Turbidity 3 NTU	Turbidity Average NTU	Comments
3/1/2013	7:15		10.13	21.05	12.61	2.17	6.95	—	—	—	-0.1	YSI Instrument
3/1/2013	7:20		10.08	21.03	12.59	2.18	6.96	—	—	—	-0.1	YSI Instrument
3/1/2013	7:45		10.16	21.03	12.60	2.78	6.96	—	—	—	-0.1	YSI Instrument
3/1/2013	7:50		10.13	21.00	12.58	2.35	6.97	—	—	—	-0.1	YSI Instrument
3/1/2013	8:45		10.16	20.99	12.57	1.97	6.99	—	—	—	-0.1	YSI Instrument
3/1/2013	9:15		10.17	20.97	12.56	2.34	6.99	—	—	—	-0.1	YSI Instrument
3/1/2013	9:20		10.19	20.91	12.52	3.06	7.00	—	—	—	-0.1	YSI Instrument
3/1/2013	9:45		10.19	20.86	12.49	3.17	7.00	—	—	—	-0.1	YSI Instrument
3/1/2013	9:50		10.20	20.81	12.46	3.54	7.00	—	—	—	-0.1	YSI Instrument
3/1/2013	10:15		10.22	20.84	12.48	3.67	7.02	—	—	—	-0.1	YSI Instrument
3/1/2013	10:20		10.25	20.91	12.52	4.39	7.02	—	—	—	-0.1	YSI Instrument
3/1/2013	10:35		10.32	20.95	12.55	4.73	7.01	—	—	—	-0.1	YSI Instrument
3/1/2013	10:40		10.31	21.04	12.61	4.63	7.02	—	—	—	-0.2	YSI Instrument
3/1/2013	11:10		10.36	21.13	12.67	4.51	7.03	—	—	—	-0.1	YSI Instrument
3/1/2013	11:15		10.45	21.26	12.75	4.87	7.02	—	—	—	-0.1	YSI Instrument
3/1/2013	11:20		10.47	21.41	12.85	5.33	7.01	—	—	—	-0.2	YSI Instrument
3/1/2013	11:25		10.53	21.62	12.99	5.65	6.99	—	—	—	-0.2	YSI Instrument
3/1/2013	11:35		10.56	21.79	13.10	5.57	7.00	—	—	—	-0.2	YSI Instrument
3/1/2013	12:00		10.70	22.22	13.39	5.77	6.98	—	—	—	-0.2	YSI Instrument
3/1/2013	12:05		10.74	22.24	13.40	5.85	6.98	—	—	—	-0.1	YSI Instrument
3/1/2013	12:10		10.81	22.23	13.39	5.81	6.97	—	—	—	-0.2	YSI Instrument
3/1/2013	12:15		11.00	22.19	13.37	5.80	6.97	—	—	—	-0.2	YSI Instrument
3/1/2013	12:20		10.99	22.13	13.33	5.80	6.99	—	—	—	-0.1	YSI Instrument
3/1/2013	12:25		10.98	22.12	13.32	5.79	6.99	—	—	—	-0.2	YSI Instrument
3/1/2013	12:30		11.02	22.11	13.32	5.78	6.99	—	—	—	-0.2	YSI Instrument
3/1/2013	12:35		11.06	22.14	13.34	5.78	6.99	—	—	—	-0.1	YSI Instrument
3/1/2013	12:40		11.14	22.20	13.38	5.77	6.99	—	—	—	-0.2	YSI Instrument
3/1/2013	12:45		11.24	22.25	13.41	5.72	6.99	—	—	—	-0.2	YSI Instrument
3/1/2013	12:50		11.42	22.37	13.50	5.67	6.98	—	—	—	-0.1	YSI Instrument
3/1/2013	12:55		11.63	22.43	13.53	5.64	6.99	—	—	—	-0.1	YSI Instrument
3/1/2013	13:00		10.86	22.31	13.45	4.55	7.01	—	—	—	-0.1	YSI Instrument
3/1/2013	13:05		11.12	22.48	13.56	4.95	6.98	—	—	—	-0.1	YSI Instrument
3/1/2013	13:10		11.31	22.66	13.68	5.18	6.96	—	—	—	-0.2	YSI Instrument
3/1/2013	13:15		11.35	22.82	13.79	5.37	6.94	—	—	—	-0.2	YSI Instrument
3/1/2013	13:50		11.60	22.70	13.71	5.40	6.94	—	—	—	-0.2	YSI Instrument
3/1/2013	13:55		11.33	22.99	13.90	4.72	6.96	—	—	—	-0.2	YSI Instrument
3/1/2013	14:00		11.32	23.07	13.95	5.17	6.94	—	—	—	-0.2	YSI Instrument
3/1/2013	14:25		11.62	23.11	13.98	5.47	6.94	—	—	—	-0.2	YSI Instrument
3/1/2013	14:30		11.42	23.18	14.02	5.17	6.94	—	—	—	-0.2	YSI Instrument
3/1/2013	14:35		11.38	23.19	14.03	5.64	6.93	—	—	—	-0.2	YSI Instrument
3/1/2013	15:55		12.66	23.35	14.16	5.80	6.94	—	—	—	-0.2	YSI Instrument
3/1/2013	16:00		11.62	23.17	14.03	4.44	6.95	—	—	—	-0.1	YSI Instrument
3/1/2013	16:05		11.68	23.16	14.02	5.15	6.94	—	—	—	-0.2	YSI Instrument
3/1/2013	16:10		11.91	23.12	14.00	5.59	6.93	—	—	—	-0.2	YSI Instrument
3/1/2013	16:35		11.82	23.08	13.97	5.26	6.95	—	—	—	-0.2	YSI Instrument
3/1/2013	16:40		11.74	23.05	13.95	5.92	6.93	—	—	—	-0.2	YSI Instrument
3/1/2013	16:45		11.70	23.00	13.91	6.45	6.92	—	—	—	-0.2	YSI Instrument
3/1/2013	16:50		11.66	22.93	13.86	6.89	6.92	—	—	—	-0.2	YSI Instrument
3/1/2013	17:00		11.62	22.86	13.82	6.87	6.92	—	—	—	-0.2	YSI Instrument
3/1/2013	17:05		11.60	22.78	13.77	7.42	6.91	—	—	—	-0.2	YSI Instrument
3/1/2013	17:10		11.59	22.68	13.70	7.81	6.91	—	—	—	-0.2	YSI Instrument
3/1/2013	17:25		11.57	22.50	13.58	7.93	6.91	—	—	—	-0.2	YSI Instrument
3/1/2013	17:40		11.60	22.47	13.56	8.03	6.91	—	—	—	-0.2	YSI Instrument
3/1/2013	17:45		11.57	22.38	13.50	7.70	6.92	—	—	—	-0.2	YSI Instrument
3/1/2013	17:50		11.58	22.26	13.43	7.96	6.91	—	—	—	-0.2	YSI Instrument
Dredge Return Water (average)			11.03	22.14	13.34	5.22	6.97	—	—	—	-0.16	
Ambient (average)	Start Date : 3/1/2013		8.10	2.86	1.51	11.00	7.28	—	—	—	3.53	

Note(s)
1. Installed YSI Data Sonde readings. Values not included in calculated average conventional parameters. Included for comparison purposes only.
2. Negative turbidity readings may results from slight contamination of 0 NTU (or 0.2 NTU) standard during calibration or interference from gray (not black) reflective surface in piping.

Abbreviation(s)
°C = degrees Celsius
mg/L = milligrams per liter
mS/cm = milliSiemens per centimeter
NTU = nephelometric turbidity unit
ppt = parts per thousand

TABLE 7

ANALYTICAL RESULTS FOR WATER SAMPLES COLLECTED DURING DREDGE RETURN WATER MONITORING [1,2]

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

		Sample ID	BP2WQ-0062			BP2WQ-0064			BP2WQ-0123		
		Sample Date	1/9/2013			1/11/2013			2/5/2013		
		Salinity (ppt)	15.21			15.18			6.64		
Analyte	Acute Criteria [3]	Chronic Criteria [3]	Result	Q1	Q2	Result	Q1	Q2	Result	Q1	Q2
Dissolved Metals (µg/L)											
Cadmium	40	8.8	0.016	J		0.014	J		0.05	U	UJ
Chromium	1100	50	0.25	U		0.25	U		0.17	U	UJ
Copper	4.8	3.1	0.26	U		0.30	J	UJ	0.77	J	UJ
Lead	210	8.1	0.020	U		0.020	U		0.1	U	UJ
Mercury	1.8	0.025	0.02	U		0.02	U		0.02	U	
Silver	1.9	1.9	0.015	U		0.015	U		0.017	U	
Zinc	90	81	3.33	J		10.3			3.70	J	J
Total Metals (µg/L)											
Mercury	1.8	0.025	0.02	U		0.02	U		0.02	U	
PCBs (µg/L)											
Aroclor 1016	NE	NE	0.010	U		0.010	U		0.010	U	
Aroclor 1242	NE	NE	0.010	U		0.010	U		0.010	U	
Aroclor 1248	NE	NE	0.010	U		0.010	U		0.010	U	
Aroclor 1254	NE	NE	0.010	U		0.010	U		0.010	U	
Aroclor 1260	NE	NE	0.010	U		0.010	U		0.010	U	
Aroclor 1221	NE	NE	0.010	U		0.010	U		0.010	U	
Aroclor 1232	NE	NE	0.010	U		0.010	U		0.010	U	
Total PCBs [4]	10	0.03	0.010	U		0.010	U		0.010	U	

Note(s)

1. Laboratory qualifiers (Q1) are defined as follows:
   U = analyte not detected at reporting limit presented.
   J = estimated concentration when the value is less than the RL.
2. Validation qualifiers (Q2) are defined as follows:
   UJ = material was not detected; value is an estimate.
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from Table 1 of WQMWP (AMEC et al. 2012c).
4. Total PCBs calculated by summing detections or, if all not detected, using the highest non-detected value.

Abbreviation(s)

NE = not established
PCBs = polychlorinated biphenyls
ppt = parts per thousand
Q1 = laboratory qualifiers
Q2 = validation qualifiers
RL = reporting limit
µg/L = micrograms per liter
WQMWP = Water Quality Monitoring Work Plan (AMEC et al. 2012c)

TABLE 8

PERIMETER MONITORING SAMPLE LOCATIONS

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Pre-Construction Sampling		WA State Plane, North Zone, NAD 83, Survey Feet (Average Location of 3 Grabs for Composite Sample)		End of Season 1 Monitoring		WA State Plane, North Zone, NAD 83, Survey Feet (Average Location of 3 Grabs for Composite Sample)	
Sample Location	**Sample ID**	**Date Sampled**	**Easting**	**Northing**	**Sample ID**	**Date Sampled**	**Easting**	**Northing**
SD-PER501	SD-PER501-1212	12/21/2012	1273442 [1]	199190 [1]	SD-PER501-0313	3/27/2013	1273442 [1]	199190 [1]
SD-PER502	SD-PER502-1212	12/21/2012	1273412 [1]	199041 [1]	SD-PER502-0313	3/27/2013	1273412 [1]	199041 [1]
SD-PER503	SD-PER503-1212	12/21/2012	1273335 [1]	198899 [1]	SD-PER503-0313	3/27/2013	1273335 [1]	198899 [1]
SD-PER504	SD-PER504-1212	12/14/2012	1273284	198819	SD-PER504-0313	3/6/2013	1273281	198820
SD-PER505	SD-PER505-1212	12/13/2012	1273132	198657	SD-PER505-0313	3/6/2013	1273131	198661
SD-PER525	SD-PER525-1212	12/13/2012	1273129	198656	SD-PER525-0313	3/6/2013	1273128	198658
SD-PER506	SD-PER506-1212	12/13/2012	1272919	198488	SD-PER506-0313	3/7/2013	1272916	198485
SD-PER507	SD-PER507-1212	12/5/2012	1272778	198477	SD-PER507-0313	3/7/2013	1272779	198475
SD-PER508					SD-PER508-0313	3/5/2013	1273193	198871
SD-PER509					SD-PER509-0313	3/6/2013	1273229	198834
SD-PER510					SD-PER510-0313	3/5/2013	1273119	198765
SD-PER511					SD-PER511-0313	3/6/2013	1273145	198695
SD-PER512	SD-PER512-1212	12/5/2012	1272600	198651	SD-PER512-0313	3/8/2013	1272599	198649
SD-PER513					SD-PER513-0313	3/5/2013	1273051	198706
SD-PER514					SD-PER514-0313	3/6/2013	1273061	198633
SD-PER515					SD-PER515-0313	3/5/2013	1272979	198641
SD-PER516					SD-PER516-0313	3/7/2013	1272912	198570
SD-PER517					SD-PER517-0313	3/7/2013	1272881	198543
SD-PER518					SD-PER518-0313	3/7/2013	1272814	198599
SD-PER101	SD-PER101-1212	12/4/2012	1271447	199743	SD-PER101-0313	3/8/2013	1271447	199740
SD-PER102	SD-PER102-1212	12/4/2012	1271397	199655	SD-PER102-0313	3/8/2013	1271397	199656
SD-PER103	SD-PER103-1212	12/4/2012	1271502	199658	SD-PER103-0313	3/8/2013	1271502	199656
SD-PER104	SD-PER104-1212	12/4/2012	1271350	199569	SD-PER104-0313	3/8/2013	1271350	199569
SD-PER105	SD-PER105-1212	12/4/2012	1271448	199571	SD-PER105-0313	3/8/2013	1271447	199570
SD-PER106	SD-PER106-1212	12/11/2012	1271457	199431	SD-PER106-0313	3/12/2013	1271460	199434
SD-PER126	SD-PER126-1212	12/11/2012	1271459	199432	SD-PER126-0313	3/12/2013	1271459	199432
SD-PER201	SD-PER201-1212	12/11/2012	1272555	198394	SD-PER201-0313	3/11/2013	1272555	198395
SD-PER202	SD-PER202-1212	12/5/2012	1272925	198122	SD-PER202-0313	3/11/2013	1272926	198122
SD-PER203	SD-PER203-1212	12/11/2012	1272624	198135	SD-PER203-0313	3/11/2013	1272623	198133
SD-PER204	SD-PER204-1212	12/5/2012	1273013	197917	SD-PER204-0313	3/11/2013	1273014	197915
SD-PER205	SD-PER205-1212	12/6/2012	1273380	197720	SD-PER205-0313	3/11/2013	1273380	197718
SD-PER206	SD-PER206-1212	12/5/2012	1273137	197706	SD-PER206-0313	3/11/2013	1273138	197707
SD-PER207	SD-PER207-1212	12/5/2012	1273483	197502	SD-PER207-0313	3/12/2013	1273482	197503
SD-PER208	SD-PER208-1212	12/6/2012	1273794	197344	SD-PER208-0313	3/12/2013	1273795	197344
SD-PER209	SD-PER209-1212	12/5/2012	1273588	197312	SD-PER209-0313	3/12/2013	1273589	197314
SD-PER210	SD-PER210-1212	12/6/2012	1273945	197084	SD-PER210-0313	3/13/2013	1273947	197083
SD-PER230	SD-PER230-1212	12/6/2012	1273946	197088	SD-PER230-0313	3/13/2013	1273944	197090
SD-PER211	SD-PER211-1212	12/6/2012	1274299	196841	SD-PER211-0313	3/13/2013	1274297	196840
SD-PER212	SD-PER212-1212	12/6/2012	1274130	196823	SD-PER212-0313	3/13/2013	1274128	196823
SD-PER213	SD-PER213-1212	12/11/2012	1274380	196679	SD-PER213-0313	3/13/2013	1274381	196677
SD-PER301	SD-PER301-1212	12/11/2012	1274638	196477				
SD-PER302	SD-PER302-1212	12/10/2012	1274771	196412				
SD-PER303	SD-PER303-1212	12/7/2012	1274849	196261				
SD-PER304	SD-PER304-1212	12/6/2012	1275025	196190				
SD-PER305	SD-PER305-1212	12/7/2012	1275098	196038				
SD-PER306	SD-PER306-1212	12/10/2012	1275276	196015				
SD-PER307	SD-PER307-1212	12/7/2012	1275277	195866				
SD-PER327	SD-PER327-1212	12/7/2012	1275277	195868				
SD-PER308	SD-PER308-1212	12/10/2012	1275486	195832				
SD-PER309	SD-PER309-1212	12/10/2012	1275548	195655				
SD-PER310	SD-PER310-1212	12/10/2012	1275762	195589				
SD-PER311	SD-PER311-1212	12/10/2012	1275684	195403				
SD-PER312	SD-PER312-1212	12/7/2012	1274832	196224				
SD-PER313	SD-PER313-1212	12/7/2012	1275092	195987				
SD-PER401	SD-PER401-1212	12/10/2012	1276141	194399	SD-PER401-0313	3/14/2013	1276141	194399
SD-PER402	SD-PER402-1212	12/10/2012	1275993	194314	SD-PER402-0313	3/14/2013	1275994	194313
SD-PER403	SD-PER403-1212	12/10/2012	1276091	194314	SD-PER403-0313	3/14/2013	1276091	194316
SD-PER404	SD-PER404-1212	12/11/2012	1275943	194224	SD-PER404-0313	3/14/2013	1275942	194227
SD-PER405	SD-PER405-1212	12/14/2012	1276045	194230	SD-PER405-0313	3/14/2013	1276047	194231
SD-PER406	SD-PER406-1212	12/19/2012	1276147	194229	SD-PER406-0313	3/13/2013	1276149	194227
SD-PER426	SD-PER426-1212	12/19/2012	1276145	194224	SD-PER426-0313	3/13/2013	1276146	194224

Note(s)
1. Diver core: approximate location of sample collection.

Abbreviation(s)
NAD = North American Datum
WA SPC = Washington State Plane Coordinates

TABLE 9-1

PERIMETER MONITORING SAMPLE RESULTS [1, 2]
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Event		**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**
Location		**SD-PER101**	**SD-PER101**	**SD-PER102**	**SD-PER102**	**SD-PER103**	**SD-PER103**	**SD-PER104**	**SD-PER104**	**SD-PER105**	**SD-PER105**	**SD-PER106**	**SD-PER106**	**SD-PER126**	**SD-PER126**
														Field Dup. of SD-PER106	**Field Dup. of SD-PER106**
Collection Date		**12/4/2012**	**3/8/2013**	**12/4/2012**	**3/8/2013**	**12/4/2012**	**3/8/2013**	**12/4/2012**	**3/8/2013**	**12/4/2012**	**3/8/2013**	**12/11/2012**	**3/12/2013**	**12/11/2012**	**3/12/2013**
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-PER101-1212**	**SD-PER101-0313**	**SD-PER102-1212**	**SD-PER102-1212**	**SD-PER103-1212**	**SD-PER103-0313**	**SD-PER104-1212**	**SD-PER104-0313**	**SD-PER105-1212**	**SD-PER105-0313**	**SD-PER106-1212**	**SD-PER106-0313**	**SD-PER126-1212**	**SD-PER126-0313**
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**
Conventionals															
Total Organic Carbon (percent)	—	2.78	3	2.33	2.73	2.43	3.3	2.79	2.98	2.04	1.62	2.64	3 J	2.35	1.7 J
Metals (mg/kg)															
Arsenic	57	12.3	12.5	11.9	11.7	12.4	11.1	10.2	11.8	11	9.7	14.8	13.9	13.5	12.6
Cadmium	5.1	0.6	1	0.5	0.9	0.6	0.9	0.5	0.9	0.5	0.8	0.6	1.2	0.6	1
Chromium	260	29	31	26	29	29	30	28	28	26	27.8	30	35	29	31
Copper	390	47.6	49.4	42.4	45.2	48.6	47.9	46.3	45.5	38.2	41	47.7	56.2	45.6	46
Lead	450	18	18	15	17	18	18	16	19	14	14	21	22	20	18
Mercury	0.41	0.11	0.19 J	0.11	0.15	0.13	0.14	0.08	0.19	0.09	0.12	0.15	0.19	0.14	0.14
Silver	6.1	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Zinc	410	102 J	102	90 J	96	127 J	104	96 J	94	84 J	96	107	117	104	101
PCBs (µg/kg)															
Aroclor 1016	NE	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	4 U	3.9 U	3.9 U	19 U	3.8 U
Aroclor 1221	NE	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	4 U	3.9 U	3.9 U	19 U	3.8 U
Aroclor 1232	NE	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	4 U	3.9 U	3.9 U	19 U	3.8 U
Aroclor 1242	NE	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	4 U	3.9 U	3.9 U	19 U	3.8 U
Aroclor 1248	NE	27	46	24	45	26	49	22	40	19	42	27	17 J	34	33 J
Aroclor 1254	NE	61	72	58	70	58	80	42	63	54	62	59	31 J	86	52 J
Aroclor 1260	NE	36	46	31	42	39	80	26	110 P J	73	41	36 J	26	79 J	40
Total PCBs (µg/kg Dry-Weight)	130	124	164	113	157	123	209	90	213	146	145	122	74	199	125
Total PCBs (mg/kg OC)	12	4.5	5.5	4.8	5.8	5.1	6.3	3.2	7.1	7.2	9.0	4.6	2.5	8.5	7.4

Note(s)

1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   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.
2. Validation qualifiers (Q2) are defined as follows:
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).

Abbreviation(s)

ft = feet
mg/kg = milligrams per kilogram
mg/kg OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight

TABLE 9-2

PERIMETER MONITORING SAMPLE RESULTS [1, 2]

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Event		Pre-Construction		End—Season 1		Pre-Construction		End—Season 1		Pre-Construction		End—Season 1		Pre-Construction		End—Season 1		Pre-Construction		End—Season 1	
Location		SD-PER201		SD-PER201		SD-PER202		SD-PER202		SD-PER203		SD-PER203		SD-PER204		SD-PER204		SD-PER205		SD-PER205		SD-PER206		SD-PER206		SD-PER207		SD-PER207	
Collection Date		12/11/2012		3/11/2013		12/5/2012		3/11/2013		12/11/2012		3/11/2013		12/5/2012		3/11/2013		12/6/2012		3/11/2013		12/5/2012		3/11/2013		12/5/2012		3/12/2013	
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	
Sample ID		SD-PER201-1212		SD-PER201-0313		SD-PER202-1212		SD-PER202-0313		SD-PER203-1212		SD-PER203-0313		SD-PER204-1212		SD-PER204-0313		SD-PER205-1212		SD-PER205-0313		SD-PER206-1212		SD-PER206-0313		SD-PER207-1212		SD-PER207-0313	
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**
Conventionals																													
Total Organic Carbon (percent)	—	2.06		1.77		2.2	J	2.06		2.07		1.93		2.37	J	2.6		2.46		2.13		1.83	J	1.21		2.71	J	3.62	
Metals (mg/kg)																													
Arsenic	57	10.1		11.9		14.1		10.4		14.9		12.7		11.8		12.1		10.3		11.4		9.6		5.3		10.5		12.5	
Cadmium	5.1	0.5		0.9		0.5		1		0.6		1		0.5		1		0.5		0.9		0.3	U	0.5		0.4		0.9	
Chromium	260	24.1		29		28.6		30.7		32		31		28		28.6		32.3		27.9		23.4		19.5		24.4		26	
Copper	390	32.8		44.4		41.9		44.6		61.9		74.4		42.9		43.8		35.4		41.3		30.9		26.2		35.7		40.6	
Lead	450	32		16		15		17		29		35		16		25		14		18		19		18		14		17	
Mercury	0.41	0.14		0.13	J	0.44		0.15		0.17		0.13		0.1		0.14		0.1		0.15		0.1		0.12		0.09		0.12	J
Silver	6.1	0.6	U	0.6	U	0.5	U	0.5	U	0.7	U	0.6	U	0.6	U	0.6	U	0.6	U	0.5	U	0.5	U	0.5	U	0.6	U	0.6	U
Zinc	410	75		96		93	J	95		158		154		93	J	97		110	J	96		75	J	59		79	J	86	
PCBs (µg/kg)																													
Aroclor 1016	NE	3.8	U	3.9	U	3.9	U	3.9	U	4.0	U	4	U	4.0	U	4	U	3.9	U	3.9	U	3.9	U	4	U	4.0	U	3.8	U
Aroclor 1221	NE	3.8	U	3.9	U	3.9	U	3.9	U	4.0	U	4	U	4.0	U	4	U	3.9	U	3.9	U	3.9	U	4	U	4.0	U	3.8	U
Aroclor 1232	NE	3.8	U	3.9	U	3.9	U	3.9	U	4.0	U	4	U	4.0	U	4	U	3.9	U	3.9	U	3.9	U	4	U	4.0	U	3.8	U
Aroclor 1242	NE	3.8	U	3.9	U	3.9	U	3.9	U	4.0	U	4	U	4.0	U	4	U	3.9	U	3.9	U	3.9	U	4	U	4.0	U	3.8	U
Aroclor 1248	NE	16		41		20	Y UY	41		15		29		20	Y UY	38		25		84		16	Y UY	25		20	Y UY	29	Y UY
Aroclor 1254	NE	45		65		68	Y UY	66		32		46		54		60		61		140		35		42		46		62	
Aroclor 1260	NE	31		45		360		49		24		38		36		43		52		180		28		28		28		44	
Total PCBs (µg/kg Dry-Weight)	130	92		151		360		156		71		113		90		141		138		404		63		95		74		106	
Total PCBs (mg/kg OC) [4]	12	4.5		8.5		16.4		7.6		3.4		5.9		3.8		5.4		5.6		19.0		3.4		7.9		2.7		2.9	

Note(s)

1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   Y = analyte not detected at the reporting limit provided.
   The reporting limit is raised due to chromatographic interferences.
2. Validation qualifiers (Q2) are defined as follows:
   UY = material was not detected; raised reporting limit.
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).
4. — = no carbon normalized value calculated due to carbon being outside the normal carbon normalization range of 0.5 to 4.0 percent

Abbreviation(s)

ft = feet
mg/kg = milligrams per kilogram
mg/kg OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight

TABLE 9-2

PERIMETER MONITORING SAMPLE RESULTS [1, 2]
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Event		**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**
Location		**SD-PER208**	**SD-PER208**	**SD-PER209**	**SD-PER209**	**SD-PER210**	**SD-PER210**	**SD-PER211**	**SD-PER211**	**SD-PER212**	**SD-PER212**	**SD-PER213**	**SD-PER213**	**SD-PER230**	**SD-PER230**
														Field Dup. of SD-PER210	**Field Dup. of SD-PER210**
Collection Date		**12/6/2012**	**3/12/2013**	**12/5/2012**	**3/12/2013**	**12/6/2012**	**3/13/2013**	**12/6/2012**	**3/13/2013**	**12/6/2012**	**3/13/2013**	**12/11/2012**	**3/13/2013**	**12/6/2012**	**3/13/2013**
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-PER208-1212**	**SD-PER208-0313**	**SD-PER209-1212**	**SD-PER209-0313**	**SD-PER210-1212**	**SD-PER210-0313**	**SD-PER211-1212**	**SD-PER211-0313**	**SD-PER212-1212**	**SD-PER212-0313**	**SD-PER213-1212**	**SD-PER213-0313**	**SD-PER230-1212**	**SD-PER230-0313**
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**
Conventionals															
Total Organic Carbon (percent)	—	2.13	2.26	1.09 J	0.438	2.66	2.35	2.03	2.66	1.39	1.37	2.22	2.67	2.21	2.53
Metals (mg/kg)															
Arsenic	57	11.5	11.5	6.7	3.9	12.1	10.7	9.2	9.4	9	6.4	9.4	8.2	11.5	9.8
Cadmium	5.1	0.5	1	0.3 U	0.5	0.5	0.9	0.4	0.9	0.3 U	0.6	0.6	1	0.5	0.9
Chromium	260	26.8	29.9	23	11.6	28.5	26.3	23.8	25.4	15.2	20	27	32	28.3	28
Copper	390	38.1	42.3	12.9	10.2	39.5	39.1	33.6	36.8	26.5	54.4	41.7	49.3	39.5	39
Lead	450	14	17	7	4	15	16 J	15	16	17	37	18	21	16	15
Mercury	0.41	0.11	0.13	0.03 U	0.03 U	0.1	0.11 J	0.08	0.17	0.04	0.08	0.1	0.15	0.11	0.11
Silver	6.1	0.5 U	0.6 U	0.4 U	0.4 U	0.6 U	0.6 U	0.4 U	0.6 U	0.4 U	0.5 U	0.6 U	0.6 U	0.6 U	0.5 U
Zinc	410	86 J	96	36 J	25	90 J	88	77 J	85	67 J	98	90	108	89 J	87
PCBs (µg/kg)															
Aroclor 1016	NE	3.8 U	4 U	3.9 U	3.7 U	3.9 U	3.7 U	3.8 U	3.8 U	3.8 U	3.9 U	4.0 U	3.8 U	3.8 U	3.9 U
Aroclor 1221	NE	3.8 U	4 U	3.9 U	3.7 U	3.9 U	3.7 U	3.8 U	3.8 U	3.8 U	3.9 U	4.0 U	3.8 U	3.8 U	3.9 U
Aroclor 1232	NE	3.8 U	4 U	3.9 U	3.7 U	3.9 U	3.7 U	3.8 U	3.8 U	3.8 U	3.9 U	4.0 U	3.8 U	3.8 U	3.9 U
Aroclor 1242	NE	3.8 U	4 U	3.9 U	3.7 U	3.9 U	3.7 U	3.8 U	3.8 U	3.8 U	3.9 U	4.0 U	3.8 U	3.8 U	3.9 U
Aroclor 1248	NE	27	36	5.8 Y UY	3.7 U	26	30	43	190 Y UY	15	43	28	61	19	34
Aroclor 1254	NE	66 J	57	18	3.5 J	48 J	49	77 J	600	34 J	81	61	120	39 J	48
Aroclor 1260	NE	53	37	13	3.7 U	50	38	45	79	27	96	34	70	35	32
Total PCBs (µg/kg Dry-Weight)	130	146	130	31	3.5 J	124	117	165	679	76	220	123	251	93	114
Total PCBs (mg/kg OC) [4]	12	6.9	5.8	2.8	—	4.7	5.0	8.1	25.5	5.5	16.1	5.5	9.4	4.2	4.5

Note(s)

1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   Y = analyte not detected at the reporting limit provided.
   The reporting limit is raised due to chromatographic interferences.
2. Validation qualifiers (Q2) are defined as follows:
   UY = material was not detected; raised reporting limit
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).
4. — = no carbon normalized value calculated due to carbon being outside the normal carbon normalization range of 0.5 to 4.0 percent

Abbreviation(s)

ft = feet
mg/kg = milligrams per kilogram
mg/kg OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight

TABLE 9-3

PERIMETER MONITORING SAMPLE RESULTS [1, 2]
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Event		**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**
Location		**SD-PER301**		**SD-PER302**		**SD-PER303**		**SD-PER304**		**SD-PER305**		**SD-PER306**		**SD-PER307**	
Collection Date		**12/11/2012**		**12/10/2012**		**12/7/2012**		**12/6/2012**		**12/7/2012**		**12/10/2012**		**12/7/2012**	
Sample Depth (ft)		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**	
Sample ID		**SD-PER301-1212**		**SD-PER302-1212**		**SD-PER303-1212**		**SD-PER304-1212**		**SD-PER305-1212**		**SD-PER306-1212**		**SD-PER307-1212**	
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**	
Conventionals															
Total Organic Carbon (percent)	—	1.72		1.75		2.17		1.38		2.18		2.98		2.25	
Metals (mg/kg)															
Arsenic	57	8.5		8.3		10.9		7.6		9.7		10.9		9	
Cadmium	5.1	0.5		0.4		0.5		0.4		0.4		0.5		0.4	
Chromium	260	23.8		19.3		20		24		21		25		22.4	
Copper	390	29.3		22.5		27.2		27.2		26.7		36.9		29.3	
Lead	450	10		8		9		8		9		13		11	
Mercury	0.41	0.06		0.06		0.09		0.06		0.08		0.13		0.06	
Silver	6.1	0.5 U		0.5 U		0.6 U		0.5 U		0.6 U		0.6 U		0.6 U	
Zinc	410	68		59		62		68 J		63		84		65	
PCBs (µg/kg)															
Aroclor 1016	NE	3.8 U		3.8 U		3.9 U		3.8 U		3.9 U		3.8 U		4.0 U	
Aroclor 1221	NE	3.8 U		3.8 U		3.9 U		3.8 U		3.9 U		3.8 U		4.0 U	
Aroclor 1232	NE	3.8 U		3.8 U		3.9 U		3.8 U		3.9 U		3.8 U		4.0 U	
Aroclor 1242	NE	3.8 U		3.8 U		3.9 U		3.8 U		3.9 U		3.8 U		4.0 U	
Aroclor 1248	NE	9.8		7.1		9.8 Y UY		8		12 Y UY		21		9.9 Y UY	
Aroclor 1254	NE	21		13		23		14 J		25		35		20	
Aroclor 1260	NE	17		8.6		22		10		20		22		19	
Total PCBs (µg/kg Dry-Weight)	130	47.8		28.7		45		32		45		78		39	
Total PCBs (mg/kg OC)	12	2.8		1.6		2.1		2.3		2.1		2.6		1.7	

Note(s)
1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   Y = analyte not detected at the reporting limit provided.
   The reporting limit is raised due to chromatographic interferences.
2. Validation qualifiers (Q2) are defined as follows:
   UY = material was not detected; raised reporting limit.
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).

Abbreviation(s)
ft = feet
mg/kg = milligrams per kilogram
mg/kg OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight

TABLE 9-3

PERIMETER MONITORING SAMPLE RESULTS [1, 2]
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Event		**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**
Location		**SD-PER308**		**SD-PER309**		**SD-PER310**		**SD-PER311**		**SD-PER312**		**SD-PER313**		**SD-PER327**	
														Field Dup. of SD-PER307	
Collection Date		**12/10/2012**		**12/10/2012**		**12/10/2012**		**12/10/2012**		**12/7/2012**		**12/7/2012**		**12/7/2012**	
Sample Depth (ft)		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**		**0 - 0.33**	
Sample ID		**SD-PER308-1212**		**SD-PER309-1212**		**SD-PER310-1212**		**SD-PER311-1212**		**SD-PER312-1212**		**SD-PER313-1212**		**SD-PER327-1212**	
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**	
Conventionals															
Total Organic Carbon (percent)	—	3.47		2.67		2.62		2.15		2.19		2.15		2.05	
Metals (mg/kg)															
Arsenic	57	8.2		7.3		8.1		26.8		10		12		8.6	
Cadmium	5.1	0.5		0.4		0.7		0.5		0.5		0.5		0.4	
Chromium	260	25		21.8		33		26		25		26		22	
Copper	390	36.2		25.6		56.3		32.4		37.8		37.8		29	
Lead	450	13		8		28		11		11		12		9	
Mercury	0.41	0.13		0.05		0.14		0.09		0.07		0.1		0.09	
Silver	6.1	0.6 U		0.5 U		0.6 U		0.6 U		0.7 U		0.7 U		0.6 U	
Zinc	410	85		64		119		81		79		80		63	
PCBs (µg/kg)															
Aroclor 1016	NE	3.9 U		4.0 U		3.8 U		3.8 U		3.9 U		3.9 U		3.9 U	
Aroclor 1221	NE	3.9 U		4.0 U		3.8 U		3.8 U		3.9 U		3.9 U		3.9 U	
Aroclor 1232	NE	3.9 U		4.0 U		3.8 U		3.8 U		3.9 U		3.9 U		3.9 U	
Aroclor 1242	NE	3.9 U		4.0 U		3.8 U		3.8 U		3.9 U		3.9 U		3.9 U	
Aroclor 1248	NE	30		11		47		14		9.7 Y UY		9.7 Y UY		9.8 Y UY	
Aroclor 1254	NE	44		23		87		29		27		24		20	
Aroclor 1260	NE	24		14		51		27		27		29		22	
Total PCBs (µg/kg Dry-Weight)	130	98		48		185		70		54		53		42	
Total PCBs (mg/kg OC)	12	2.8		1.8		7.1		3.3		2.5		2.5		2.0	

Note(s)
1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   Y = analyte not detected at the reporting limit provided.
   The reporting limit is raised due to chromatographic interferences.
2. Validation qualifiers (Q2) are defined as follows:
   UY = material was not detected; raised reporting limit
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).

Abbreviation(s)
ft = feet
mg/kg = milligrams per kilogram
mg/kg OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight

TABLE 9-4

PERIMETER MONITORING SAMPLE RESULTS [1, 2]
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Event		**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**
Location		**SD-PER401**	**SD-PER401**	**SD-PER402**	**SD-PER402**	**SD-PER403**	**SD-PER403**	**SD-PER404**	**SD-PER404**	**SD-PER405**	**SD-PER405**	**SD-PER406**	**SD-PER406**	**SD-PER426** Field Dup. of SD-PER406	**SD-PER426** Field Dup. of SD-PER406
Collection Date		**12/10/2012**	**3/14/2013**	**12/10/2012**	**3/14/2013**	**12/10/2012**	**3/14/2013**	**12/11/2012**	**3/14/2013**	**12/14/2012**	**3/14/2013**	**12/19/2012**	**3/13/2013**	**12/19/2012**	**3/13/2013**
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-PER401-1212**	**SD-PER401-0313**	**SD-PER402-1212**	**SD-PER402-0313**	**SD-PER403-1212**	**SD-PER403-0313**	**SD-PER404-1212**	**SD-PER404-0313**	**SD-PER405-1212**	**SD-PER405-0313**	**SD-PER406-1212**	**SD-PER406-0313**	**SD-PER426-1212**	**SD-PER426-0313**
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**
Conventionals															
Total Organic Carbon (percent)	—	2.05	1.91	1.94	3.76	1.95	1.66	1.54	1.34	2.14	2.58	2.84 J	1.15	2.31 J	1.21
Metals (mg/kg)															
Arsenic	57	8.6	10.6	9.9	8.4	7.9	9.6	9.9	8	10.2	8.3	10.1	8.6	9.4	7
Cadmium	5.1	0.5	0.9	0.5	0.8	0.5	0.8	0.4	0.6	0.4	0.7	0.6	0.9	0.7	0.9
Chromium	260	29	31	25.4	28	27	28	25.4	23.5	25	23.3	26.3 J	29	36.3 J	28.6
Copper	390	35.7	42.5	33.2	40.3	33.7	36	31.8	30	29.7	31.6	34.4 J	31.4	52.1 J	35
Lead	450	18	23	11	13	11	12	16	14	12	10	18 J	10	131 J	12
Mercury	0.41	0.1	0.16	0.08	0.1	0.05 U	0.08	0.08	0.14	0.09	0.07	0.1	0.08	0.09	0.11
Silver	6.1	0.6 U	0.7 U	0.6 U	0.7 U	0.6 U	0.6 U	0.4 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.5 U
Zinc	410	88	98	82	93	80	87	82	77	75	75	82 J	82	136 J	85
PCBs (µg/kg)															
Aroclor 1016	NE	3.9 U	3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	3.8 U	4 U	3.9 U	3.9 U	3.9 U	3.8 U	3.9 U	3.9 U
Aroclor 1221	NE	3.9 U	3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	3.8 U	4 U	3.9 U	3.9 U	3.9 U	3.8 U	3.9 U	3.9 U
Aroclor 1232	NE	3.9 U	3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	3.8 U	4 U	3.9 U	3.9 U	3.9 U	3.8 U	3.9 U	3.9 U
Aroclor 1242	NE	3.9 U	3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	3.8 U	4 U	3.9 U	3.9 U	3.9 U	3.8 U	3.9 U	3.9 U
Aroclor 1248	NE	26	38	13	23	10	16	19	29	11	17	27	27	25	20
Aroclor 1254	NE	50	63	26	33	17	25	48	40	39	26	45	44	63	35
Aroclor 1260	NE	29	28	21	18	11	13	26	24	55	17	29	26	33	20
Total PCBs (µg/kg Dry-Weight)	130	105	129	60	74	38	54	93	93	105	60	101	97	121	75
Total PCBs (mg/kg OC)	12	5.1	6.8	3.1	2.0	1.9	3.3	6.0	6.9	4.9	2.3	3.6	8.4	5.2	6.2

Note(s)
1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   Y = analyte not detected at the reporting limit provided.
   The reporting limit is raised due to chromatographic interferences.
2. Validation qualifiers (Q2) are defined as follows:
   UY = material was not detected; raised reporting limit
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).

Abbreviation(s)
ft = feet
mg/kg = milligrams per kilogram
mg/kg OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight

TABLE 9-5

PERIMETER MONITORING SAMPLE RESULTS [1, 2]
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Event		**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**
Location		**SD-PER501**	**SD-PER501**	**SD-PER502**	**SD-PER502**	**SD-PER503**	**SD-PER503**	**SD-PER504**	**SD-PER504**	**SD-PER505**	**SD-PER505**	**SD-PER506**	**SD-PER506**	**SD-PER507**	**SD-PER507**
Collection Date		**12/21/2012**	**3/27/2013**	**12/21/2012**	**3/27/2013**	**12/21/2012**	**3/27/2013**	**12/14/2012**	**3/6/2013**	**12/13/2012**	**3/6/2013**	**12/13/2012**	**3/7/2013**	**12/5/2012**	**3/7/2013**
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-PER501-1212**	**SD-PER501-0313**	**SD-PER502-1212**	**SD-PER502-0313**	**SD-PER503-1212**	**SD-PER503-0313**	**SD-PER504-1212**	**SD-PER504-0313**	**SD-PER505-1212**	**SD-PER505-0313**	**SD-PER5061212**	**SD-PER506-0313**	**SD-PER507-1212**	**SD-PER507-0313**
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**
Conventionals															
Total Organic Carbon (percent)	—	2.13 J	0.805	1.48 J	1.26	2.73 J	4.14	3.21	3.86	3.05	2.34 J	3.02	3.53	3.35 J	3.56
Metals (mg/kg)															
Arsenic	57	7.4	3.2	4.2	4.2	11.5	11.7	15.8	14.7	13	13.1	10.6	10.1	19.3	11.8
Cadmium	5.1	0.6	0.4	0.4	0.5	0.6	0.9	0.7	1.1	0.7	0.9	0.8	0.9	0.6	0.9
Chromium	260	27.2	14.5 J	25.6	17.6	34	29	35	35	33	30	32	28	31	27
Copper	390	41.1	20.9 J	20.9	19.4	43.6	50.6	64.7	68.8	58.4	52.8	54.3	46.7	53.3	42.4
Lead	450	17	3	5	4	15	18	25	23	25	20	20	18	21	13
Mercury	0.41	0.06	0.02 U	0.06	0.03	0.11	0.12	0.19	0.17	0.14	0.12	0.13 J	0.13	0.13	0.17
Silver	6.1	0.5 U	0.3 U	0.4 U	0.4 U	0.5 U	0.7 U	0.8 U	0.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.8 U
Zinc	410	99	33	45	38	93	98	123	122	116	103	110	97	110 J	88
PCBs (µg/kg)															
Aroclor 1016	NE	4.0 U	3.7 U	3.9 U	3.8 U	3.9 U	3.9 U	20 U	3.9 U	20 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1221	NE	4.0 U	3.7 U	3.9 U	3.8 U	3.9 U	3.9 U	20 U	3.9 U	20 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1232	NE	4.0 U	3.7 U	3.9 U	3.8 U	3.9 U	3.9 U	20 U	3.9 U	20 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1242	NE	4.0 U	3.7 U	3.9 U	3.8 U	3.9 U	3.9 U	20 U	3.9 U	20 U	3.9 U	3.9 U	4 U	3.8 U	3.9 U
Aroclor 1248	NE	30	5.6 Y UY	13	9.6 Y UY	26	50	44	51	99	100 J	32	62	38 Y UY	64
Aroclor 1254	NE	57	9.9	31	18	54	83	110	86	230	160 J	66	100	83	100
Aroclor 1260	NE	30	4.6	14	11	36	61	75	64	93	99	35	55	55	59
Total PCBs (µg/kg Dry-Weight)	130	117	14.5	58	29	116	194	229	201	422	359	133	217	138	223
Total PCBs (mg/kg OC) [4]	12	5.5	1.8	3.9	2.3	4.2	—	7.1	5.2	13.8	15.3	4.4	6.1	4.1	6.3

Note(s)

1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   Y = analyte not detected at the reporting limit provided.
   The reporting limit is raised due to chromatographic interferences.
2. Validation qualifiers (Q2) are defined as follows:
   UY = material was not detected; raised reporting limit
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).
4. — = no carbon normalized value calculated due to carbon being outside the normal carbon normalization range of 0.5 to 4.0 percent
5. These samples were collected by the City of Seattle and reported analytes were determined by the City.

Abbreviation(s)

ft = feet
mg/kg = milligrams per kilogram
mg/kg OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight

TABLE 9-5

PERIMETER MONITORING SAMPLE RESULTS [1, 2]
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sampling Event	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**
	Location	**SD-PER508**	**SD-PER508**	**SD-PER509**	**SD-PER509**	**SD-PER510**	**SD-PER510**	**SD-PER511 [6]**	**SD-PER511 [6]**	**SD-PER511**	**SD-PER512**	**SD-PER512**
		City of Seattle Station BD-5 [5]		**City of Seattle Station BD-6 [5]**		**City of Seattle Station SG-18 [5]**		**City of Seattle Station SL4-3 [5]**	**City of Seattle Station SL4-3 [5]**			
	Collection Date	**2/14/2012**	**3/5/2013**	**2/14/2012**	**3/6/2013**	**10/31/2012**	**3/5/2013**	**10/31/2012**	**10/31/2012**	**3/6/2013**	**12/5/2012**	**3/8/2013**
	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**
	Sample ID	**SD0052**	**SD-PER508-0313**	**SD0051**	**SD-PER509-0313**	**SD0058**	**SD-PER510-0313**	**SD0062**	**SD0063**	**SD-PER511-0313**	**SD-PER512-1212**	**SD-PER512-0313**
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**
Conventionals												
Total Organic Carbon (percent)	—	0.085	3.54	0.171	2.57	3.19	3.85	3.14	3.14	4.55	2.48	2.21
Metals (mg/kg)												
Arsenic	57		15.3		14.9		16			13.2	16	31.7
Cadmium	5.1		1.1		1.1		1.2			1.2	0.4	0.8
Chromium	260		35		34		36			33	29	27.3
Copper	390		69.4		67.8		75.5			61.2	49.1	58.1
Lead	450		24		21		24			23	23	27
Mercury	0.41		0.18		0.16		0.2			0.15	0.1	0.07
Silver	6.1		0.7 U		0.8 U		0.7 U			0.8 U	0.6 U	0.5 U
Zinc	410		128		117		124			120	146	160
PCBs (µg/kg)												
Aroclor 1016	NE	4 U	3.8 U	3.9 U	3.9 U	19 U	3.8 U	19 U	20 U	3.9 U	3.9 U	4 U
Aroclor 1221	NE	4 U	3.8 U	3.9 U	3.9 U	19 U	3.8 U	19 U	20 U	3.9 U	3.9 U	4 U
Aroclor 1232	NE	4 U	3.8 U	3.9 U	3.9 U	19 U	3.8 U	19 U	20 U	3.9 U	3.9 U	4 U
Aroclor 1242	NE	4 U	3.8 U	3.9 U	3.9 U	19 U	3.8 U	19 U	20 U	3.9 U	3.9 U	4 U
Aroclor 1248	NE	4 U	68	3.9 U	63	150	95	130	160	69	19 Y	36
Aroclor 1254	NE	4 U	100	3.9 U	110	320	130	300	370	120	55	63
Aroclor 1260	NE	4 U	73	3.9 U	73	150	84	110	150	78	37	37
Total PCBs (µg/kg Dry-Weight)	130	4 U	241	3.9 U	246	620	309	540	680	267	92	136
Total PCBs (mg/kg OC) [4]	12	—	6.8	—	9.6	19.4	8.0	17.2	21.7	—	3.7	6.2

Note(s)

1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   Y = analyte not detected at the reporting limit provided.
   The reporting limit is raised due to chromatographic interferences.
2. Validation qualifiers (Q2) are defined as follows:
   UY = material was not detected; raised reporting limit
   J = analyte positively identified; value is approximate concentration in sample.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).
4. — = no carbon normalized value calculated due to carbon being outside the normal carbon normalization range of 0.5 to 4.0 percent
5. These samples were collected by the City of Seattle and reported analytes were determined by the City.
6. Split sample analyzed at this location

Abbreviation(s)

ft = feet
mg/kg = milligrams per kilogram
mg/kg OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight

TABLE 9-5

PERIMETER MONITORING SAMPLE RESULTS [1, 2]
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Sampling Event		**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**	**Pre-Construction**	**End—Season 1**
Location		**SD-PER513**	**SD-PER513**	**SD-PER514**	**SD-PER514**	**SD-PER515**	**SD-PER515**	**SD-PER516**	**SD-PER516**	**SD-PER517**	**SD-PER517**	**SD-PER518**	**SD-PER518**	**SD-PER525**	**SD-PER525**
		City of Seattle Station SG-20 [5]		**City of Seattle Station SG-22 [5]**		**City of Seattle Station SG-21 [5]**		**City of Seattle Station SL4-2 [5]**		**City of Seattle Station SG-25 [5]**		**City of Seattle Station SG-24 [5]**		**Field Dup. of SD-PER505**	**Field Dup. of SD-PER505**
Collection Date		**10/31/2012**	**3/5/2013**	**10/30/2012**	**3/6/2013**	**10/30/2012**	**3/5/2013**		**3/7/2013**		**3/7/2013**		**3/7/2013**	**12/13/2012**	**3/6/2013**
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**
Sample ID		**SD0059**	**SD-PER513-0313**	**SD0061**	**SD-PER514-0313**	**SD0060**	**SD-PER515-0313**		**SD-PER516-0313**		**SD-PER517-0313**		**SD-PER518-0313**	**SD-PER525-1212**	**SD-PER525-0313**
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**
Conventionals															
Total Organic Carbon (percent)	—	3.78	3.89	2.92	4.73	3.35	4.07		3.41		6.27		2.34	2.64	3.39 J
Metals (mg/kg)															
Arsenic	57		14.7		11.7		13.1		9.6		11.2		13.9	10.4	13.1
Cadmium	5.1		1.2		1.1		1.1		0.9		0.7		0.9	0.7	1.2
Chromium	260		36		32		34		26		19		30	29	34
Copper	390		73.5		57.8		62.5		46.1		33		58.1	48.2	65
Lead	450		24		21		24		18		14		23	22	26
Mercury	0.41		0.23		0.18		0.17		0.15		0.11		0.15 J	0.08	0.17
Silver	6.1		0.8 U		0.7 U		0.7 U		0.7 U		0.8 U		0.7 U	0.7 U	0.7 U
Zinc	410		120		111		116		94		67		109	101	124
PCBs (µg/kg)															
Aroclor 1016	NE	19 U	3.8 U	40 U	4 U	38 U	3.9 U		3.8 U		4 U		4 U	19 U	3.9 U
Aroclor 1221	NE	19 U	3.8 U	40 U	4 U	38 U	3.9 U		3.8 U		4 U		4 U	19 U	3.9 U
Aroclor 1232	NE	19 U	3.8 U	40 U	4 U	38 U	3.9 U		3.8 U		4 U		4 U	19 U	3.9 U
Aroclor 1242	NE	19 U	3.8 U	40 U	4 U	38 U	3.9 U		3.8 U		4 U		4 U	19 U	3.9 U
Aroclor 1248	NE	68	130	38	81	29	68		60		75		86	99	190 J
Aroclor 1254	NE	150	150	84	130	64	100		100		130		140	200	300 J
Aroclor 1260	NE	98	82	48	97	47	82		53		76		100	86	120
Total PCBs (µg/kg Dry-Weight)	130	316	362	170	308	140	250		213		281		326	385	610
Total PCBs (mg/kg OC) [4]	12	8.4	9.3	5.8	—	4.2	—		6.2		—		13.9	14.6	18.0

Note(s)

1. Laboratory data flags (Q1) are as follows:
   U = analyte not detected at the reporting limit provided.
   Y = analyte not detected at the reporting limit provided.
   The reporting limit is raised due to chromatographic interferences.
2. Validation qualifiers (Q2) are defined as follows:
   UY = material was not detected; raised reporting limit
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3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).
4. — = no carbon normalized value calculated due to carbon being outside the normal carbon normalization range of 0.5 to 4.0 percent
5. These samples were collected by the City of Seattle and reported analytes were determined by the City.
6. Split sample analyzed at this location

Abbreviation(s)

ft = feet
mg/kg = milligrams per kilogram
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PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
RPD = relative percent difference
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight

TABLE 10

POST-CONSTRUCTION CORING SAMPLE LOCATIONS

2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Location	Coring Attempts	Date	Time	Planned State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Actual State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Total Penetration	Maximum Depth of Recovered Sediment	Sample ID	Depth Interval (Feet Below Sediment Surface)
				Easting	Northing	Easting	Northing				
SD-PCC006 [1]	3	2/18/2013	14:05	1273051	198151	1273055	198144	3.6 ft	3.6 ft	SD-PCC006-A [2]	0 to 1
										SD-PCC006-B [2]	1 to 2
										SD-PCC006-C	2 to 3
SD-PCC206 [1]	1	2/18/2013	13:40	1273051	198151	1273056	198144	3.8 ft	3.8 ft	SD-PCC206-A [2]	0 to 1
										SD-PCC206-B	1 to 2
										SD-PCC206-C	2 to 3
SD-PCC007	2	2/1/2013	15:05	1273463	197770	1273468	197772	3.5 ft	2.4 ft	SD-PCC007-A [2]	0 to 1
										SD-PCC007-B [2]	1 to 2
										SD-PCC007-C	2 to 3
SD-PCC008	6	3./4/2013	12:51	1273836	197464	1273829	197474	2.3 ft	1.8 ft	SD-PCC008-A [2]	0 to 1
										SD-PCC008-B [2]	1 to 2

Note(s)

1. Field duplicate sample collected at this location. Sample ID identified by a 200 series sequential location ID (e.g., SD-PCC006, SD-PCC206).
2. Sample intervals analyzed.

Abbreviation(s)

NAD = North American Datum
WA SPC = Washington State Plane Coordinates

TABLE 11

POST-CONSTRUCTION CORE SAMPLE RESULTS[1,2]
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

	Sample_ID	SD-PCC007-A			SD-PCC007-B			SD-PCC006-A			SD-PCC206-A Field Duplicate of SD-PCC006			SD-PCC006-B			SD-PCC008-A			SD-PCC008-B		
	Sample Date	2/1/2013			2/1/2013			2/18/2013			2/18/2013			2/18/2013			3/4/2013			3/4/2013		
	Sample Interval	0 to 1 ft			1 to 2 ft			0 to 1 ft			0 to 1 ft			1 to 2 ft			0 to 1 ft			1 to 2 ft		
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
Total Organic Carbon	—	0.639			0.411			2.84		J	0.522		J	0.553			0.318			0.590		
Metals (mg/kg Dry-Weight)																						
Arsenic	57	1.7			1.5			1.9			1.6			1.3			0.9		J	1.7		J
Cadmium	5.1	0.2	U		0.2	U		0.4			0.3			0.2			0.3			0.3		
Chromium	260	11.7			9.8			13.7		J	10.2		J	10.5			14.5			11.7		
Copper	390	12.8			10.5			15.7		J	9.9		J	8.6		J	8.0			10.9		
Lead	450	2	U		2	U		8		J	3			2	U	J	2	U		2	U	
Mercury	0.41	0.02	U		0.02	U		0.02	U		0.03	U		0.03	U		0.03	U		0.02	U	
Silver	6.1	0.4	U		0.3	U		0.4	U		0.4	U		0.4	U		0.4	U		0.3	U	
Zinc	410	24			23			31		J	22		J	21			22			23		
PCBs (µg/kg Dry-Weight)																						
Aroclor 1016	NE	3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.6	U	
Aroclor 1242	NE	3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.6	U	
Aroclor 1248	NE	3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.6	U	
Aroclor 1254	NE	3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.6	U	
Aroclor 1260	NE	3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.6	U	
Aroclor 1221	NE	3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.6	U	
Aroclor 1232	NE	3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.6	U	
Total PCBs [4]	130 [5]	3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U		3.6	U	
Total PCBs (mg/kg-OC)	12	0.6	U		NA			0.1	U		0.7	U		0.7	U		NA			0.6	U	

Note(s)

1. Laboratory qualifiers (Q1) are defined as follows:
   U = Indicates that the target analyte was not detected at the reported concentration.
2. Validation qualifiers (Q2) are defined as follows:
   J = The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample.
3. Criteria obtained from Table 3 of Construction and Post-Construction Sediment Monitoring QAPP (AMEC et al. 2012g).
4. Total PCBs calculated by summing detections or, if all not detected, using the highest non-detected value.
5. Comparison of total PCBs (µg/kg dry-weight) to the SMS SQS dry weight criteria is inappropriate when total organic carbon in the sample is <0.5% or >4%.

Abbreviation(s)

ft = feet
mg/kg = milligrams per kilogram
mg/kg-OC = milligrams per kilogram organic carbon
NA = not applicable, TOC <0.5 percent
NE = not established
PCBs = polychlorinated biphenyls
Q1 = laboratory qualifiers
Q2 = validation qualifiers
QAPP = Quality Assurance Project Plan
SMS SQS = Washington Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg = micrograms per kilogram
µg/kg Dry-Weight = micrograms per kilogram dry weight
WAC = Washington Administrative Code

FIGURES

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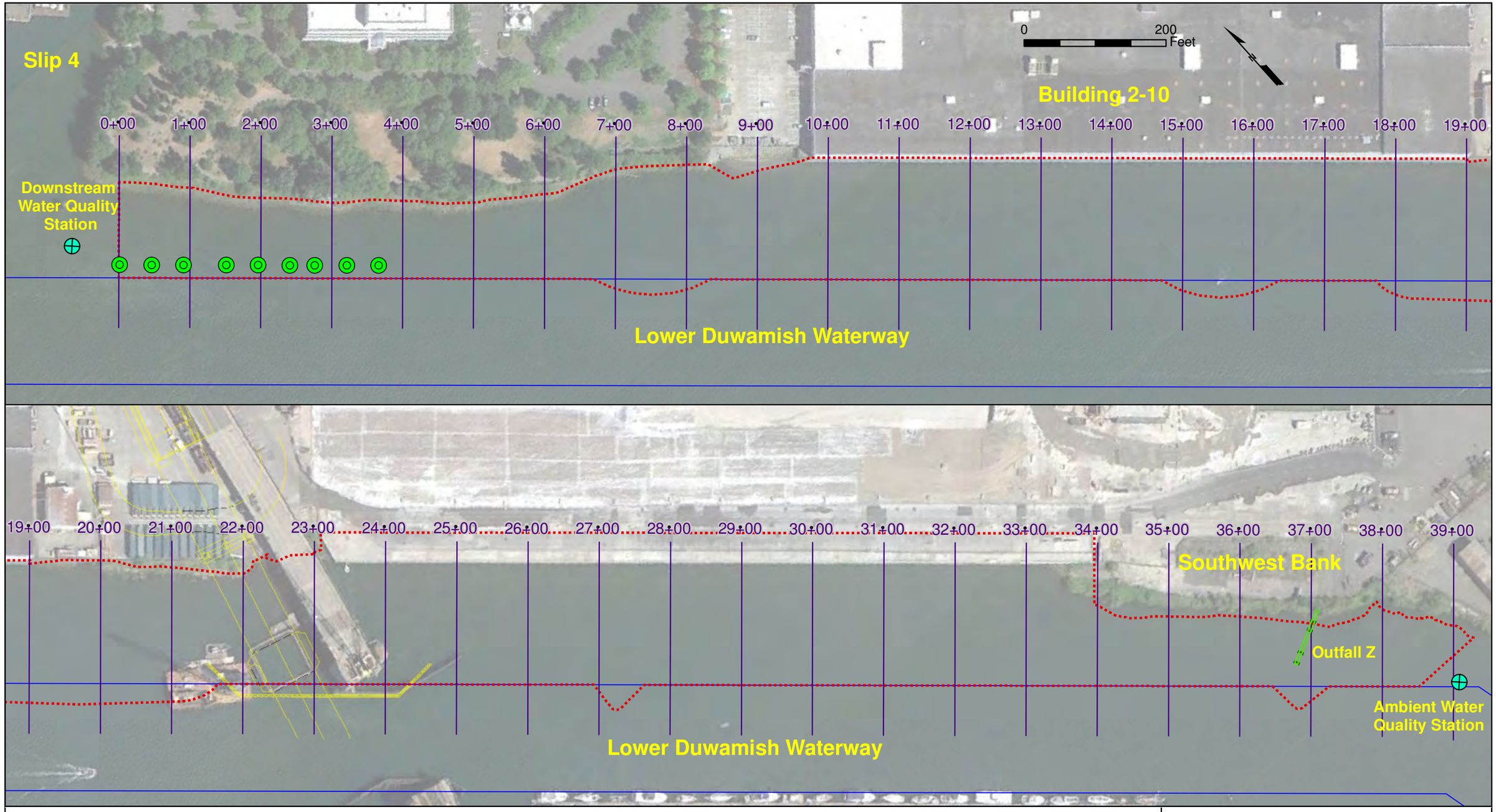

Legend

- Mooring Piles
- Water Quality Monitoring Pile
- Outfall Z (Temporary Extension with Piles)
- 3+00 Cross Section Positions
- Duwamish Sediment Other Area
- Navigation Channel Boundary

BOEING

TEMPORARY STRUCTURES
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

By: RHG	Date:9/20/2013	Project No. 0131320080
		Figure 1

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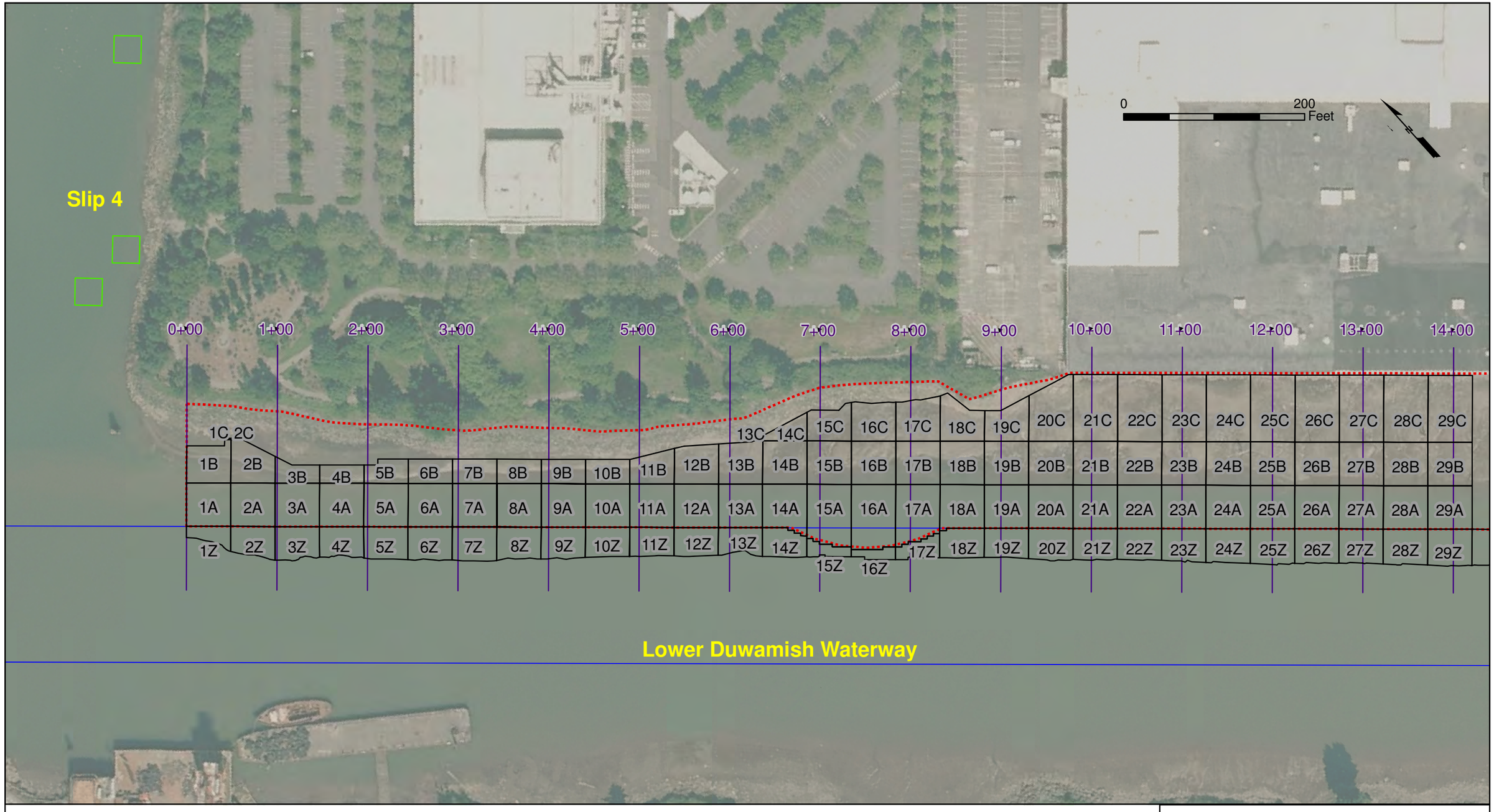

Approval Units (AUs)

Slip 4 Dredge Areas

3+00 Cross Section Positions

Duwamish Sediment Other Area

Navigation Channel Boundary

BOEING

APPROVAL UNITS
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

By: RHG	Date:5/7/2013	Project No. 0131320080
		Figure 2

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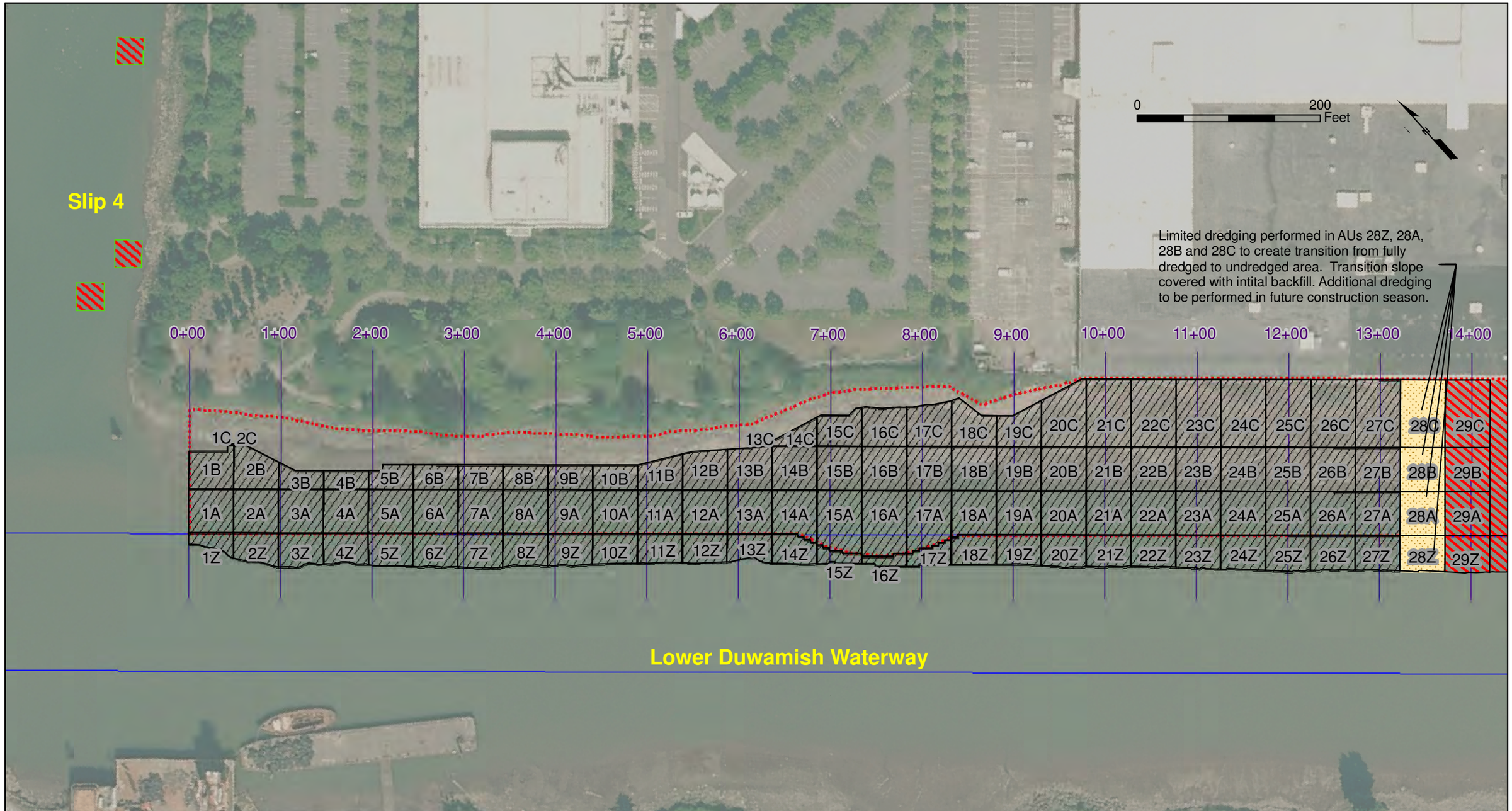


Approval Units (AUs)

Undredged

Initial Backfill

Dredged & Intermediate Backfill

3+00 Cross Section Positions

Duwamish Sediment Other Area

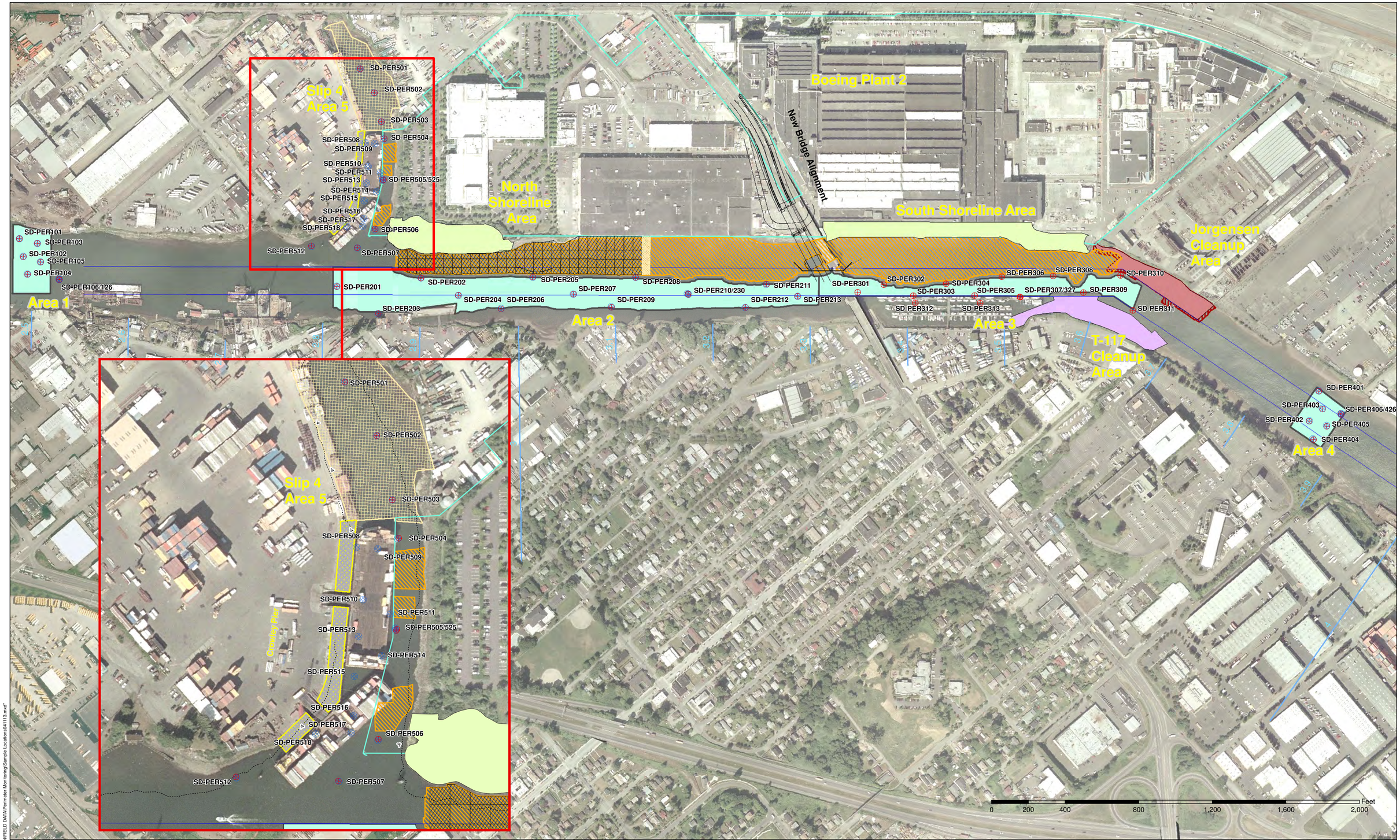
Navigation Channel Boundary

Slip 4 Dredge Areas

BOEING

STATUS OF APPROVAL UNITS FOLLOWING
2012-2013 CONSTRUCTION SEASON
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest
Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

By: RHG	Date:5/20/2013	Project No. 0131320080
		Figure 3



Legend

- Boeing Limits of Dredging
- Crowley Pier
- Jorgensen Cleanup Area
- Jorgensen Limits of Dredging
- T-117 Cleanup Area
- Slip 4 Cap Area
- Dredged Units
- Initial Backfill
- Perimeter Monitoring Areas
- Boeing Plant 2 Parcel
- Navigation Channel Boundary

Pre-construction Samples (December 2012)
SD-PER106/126 (Field Duplicate)

End of Season 1 (March 2013)
SD-PER508

Note:
Markers are positioned at average location based on three grab samples for all locations except SD-PER501, SD-PER502, and SD-PER503. Samples collected on Slip 4 cap (SD-PER501, SD-PER502, and SD-PER503) were sampled using hand cores and divers. Symbol placed at approximate sample location.

PERIMETER MONITORING SAMPLE LOCATIONS
2012-2013 CONSTRUCTION SEASON
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest
Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

By: RHG	Date:5/7/2013	Project No. 0131320080

Figure 4

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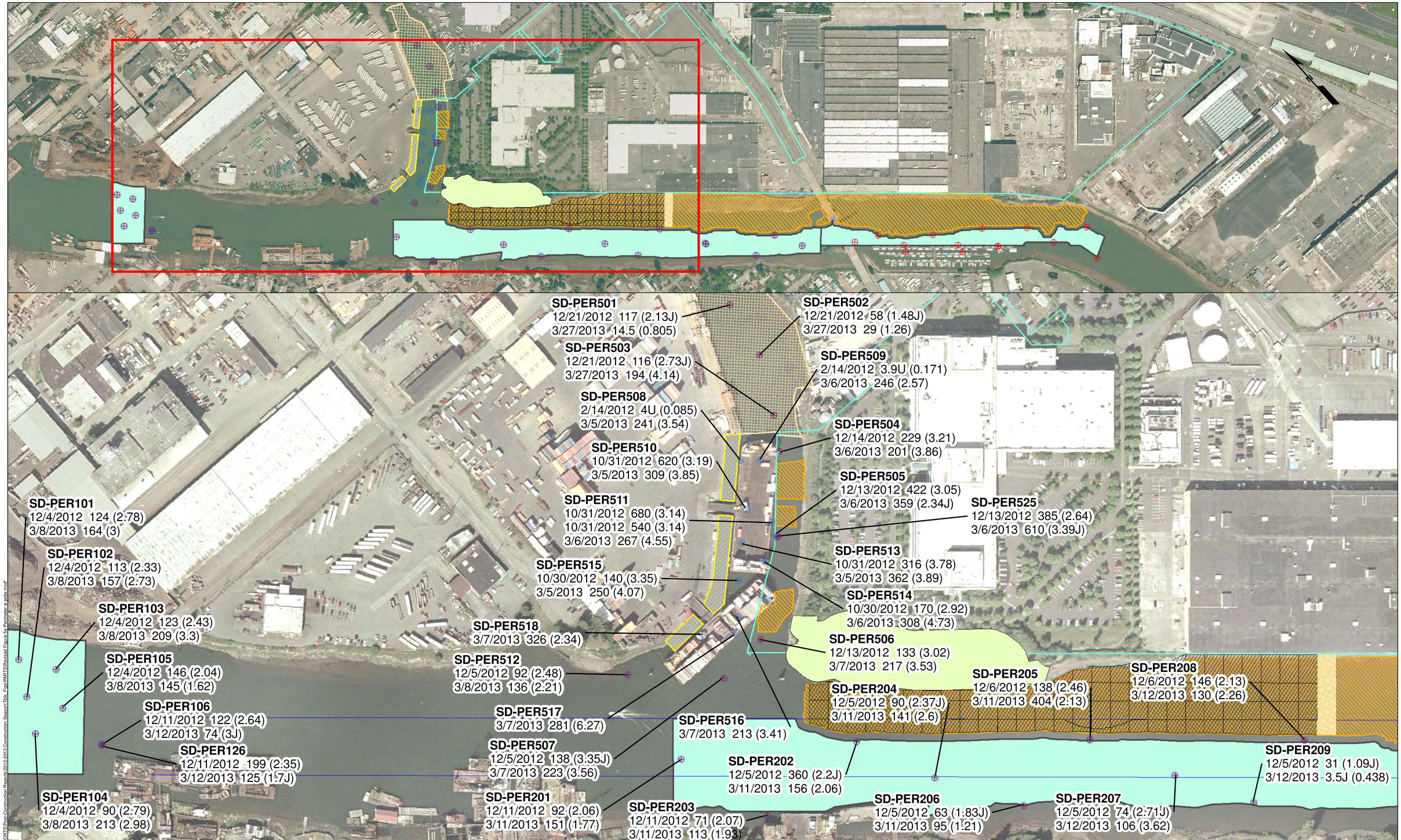

Legend

- Boeing Limits of Dredging
- Jorgensen Limits of Dredging
- Dredged Units
- Boeing Plant 2 Parcel
- Crowley Pier
- T-117 Cleanup Area
- Initial Backfill
- Navigation Channel Boundary
- Jorgensen Cleanup Area
- Slip 4 Cap Area
- Perimeter Monitoring Areas

- Pre-construction Samples (December 2012)
- End of Season 1 (March 2013)

Location ID SD-PER508
Sample Dates 12/8/2012 179 (2.83) — TOC %
3/17/2013 156 (2.18)
Total PCBs ppb dw

NA = Not Available

Note:
Markers are positioned at average location based on three grab samples for all locations except SD-PER501, SD-PER502, and SD-PER503. Samples collected on Slip 4 cap (SD-PER501, SD-PER502, and SD-PER503) were sampled using hand cores and divers. Symbol placed at approximate sample location.

RESULTS OF PERIMETER MONITORING FROM 2012-2013 CONSTRUCTION SEASON
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

By: RHG	Date 9/18/2013	Project No. 0131320080
		Figure 5a

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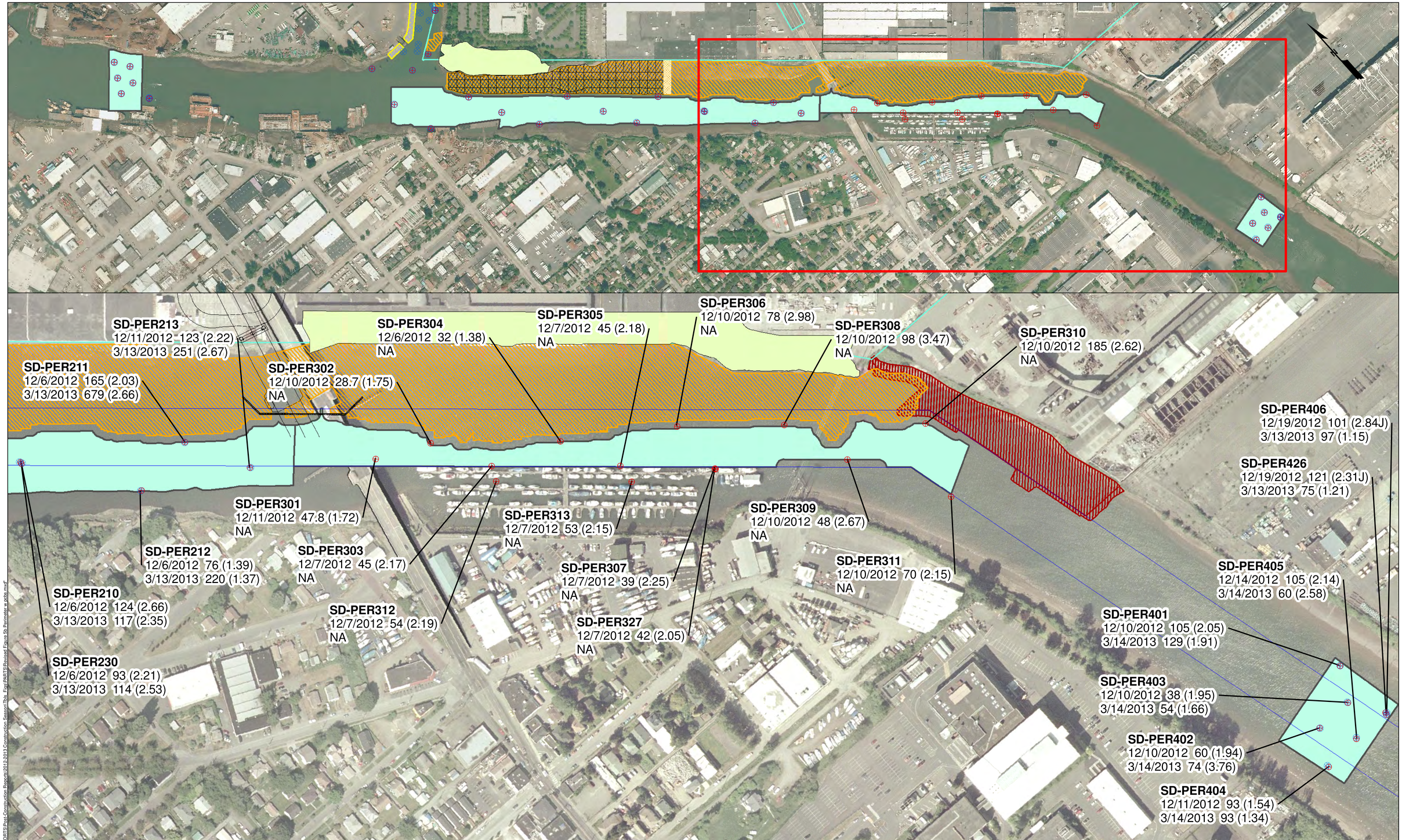

Legend

- Boeing Limits of Dredging
- Jorgensen Limits of Dredging
- Dredged Units
- Boeing Plant 2 Parcel
- Crowley Pier
- T-117 Cleanup Area
- Initial Backfill
- Navigation Channel Boundary
- Jorgensen Cleanup Area
- Slip 4 Cap Area
- Perimeter Monitoring Areas

- Pre-construction Samples (December 2012)
- End of Season 1 (March 2013)

Location ID SD-PER508
Sample Dates 12/8/2012 179 (2.83) — TOC %
3/17/2013 156 (2.18) — Total PCBs ppb dw

NA = Not Available

Note:
Markers are positioned at average location based on three grab samples for all locations except SD-PER501, SD-PER502, and SD-PER503. Samples collected on Slip 4 cap (SD-PER501, SD-PER502, and SD-PER503) were sampled using hand cores and divers. Symbol placed at approximate sample location.

RESULTS OF PERIMETER MONITORING FROM
2012-2013 CONSTRUCTION SEASON
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest
Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

By: RHG	Date 9/19/2013	Project No. 013132008
		Figure 5b

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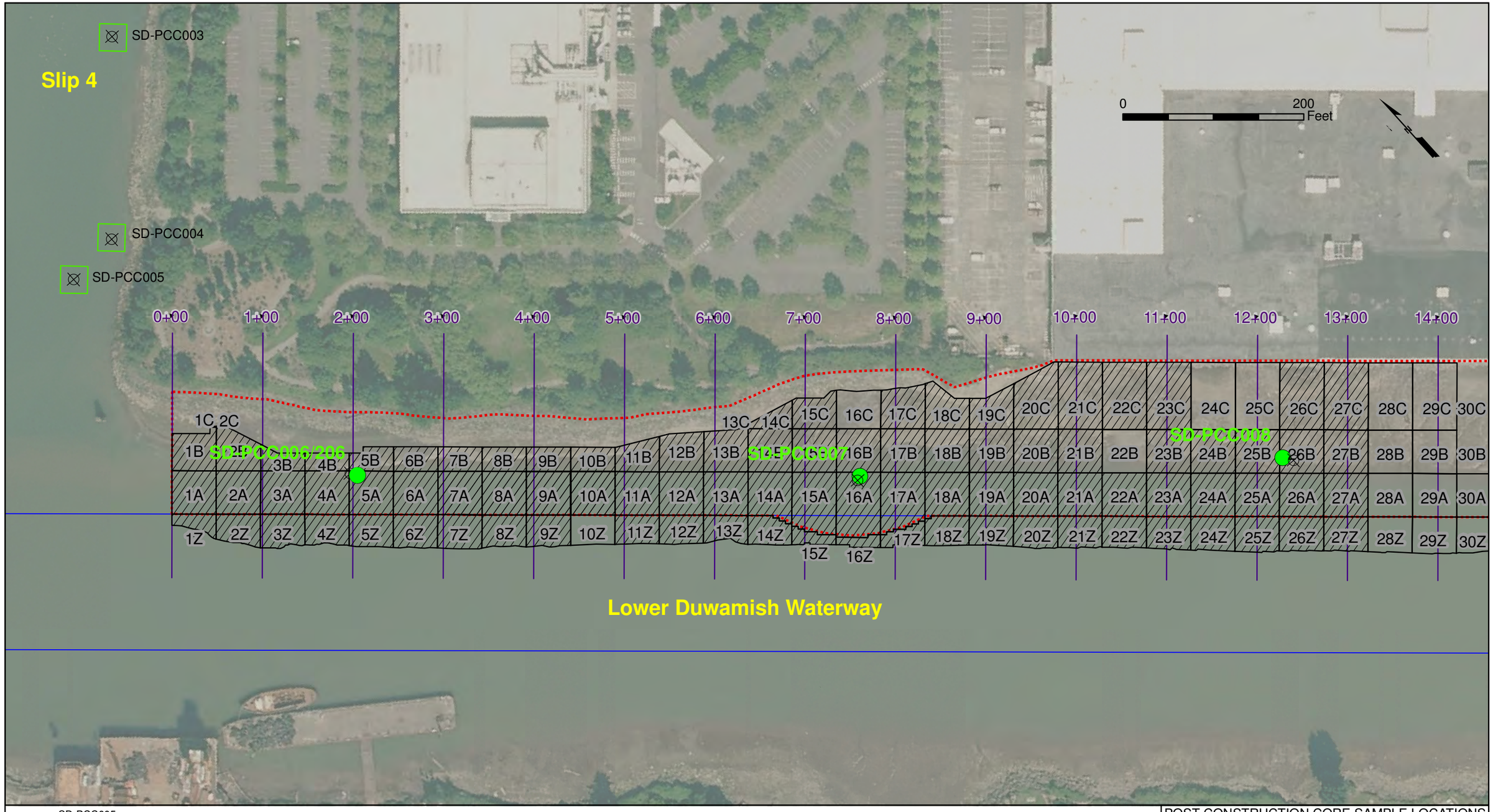

SD-PCC005 Proposed Sample Locations

SD-PCC008 Actual Core Locations

Dredged & Intermediate Backfill

Approval Units (AUs)

3+00 Cross Section Positions

Duwamish Sediment Other Area

Navigation Channel Boundary

Slip 4 Dredge Areas

BOEING

POST-CONSTRUCTION CORE SAMPLE LOCATIONS
2012- 2013 CONSTRUCTION SEASON
2012-2013 Construction Season Completion Report
Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

By: RHG	Date: 9/18/2013	Project No. 0131320080
		Figure 6

APPENDIX A

Construction Season 1 As-Built Drawings

Appendix A included as separate pdf on CD

APPENDIX B

Backfill Grain-Size Quality Assurance/Quality Control

Appendix B included as separate pdf on CD

APPENDIX C

Transload Waste Tickets and Waste Profile

(Provided in PDF Format on CD)

Appendix C included as separate pdf on CD

APPENDIX D

Conventional Water Quality Parameters Measured by *In situ* Instruments

(Provided in Excel Format on CD)

Appendix D included as separate Excel file on CD

APPENDIX E

Daily Water Quality Monitoring Reports

Appendix E included as separate pdf on CD

APPENDIX F

Data Validation Reports

Appendix F included as separate pdf file on CD

APPENDIX G

Qualitative Sample Characteristics Forms and Field Forms for Perimeter Sampling

(Provided in PDF Format on CD)

Appendix G included as separate pdf file on CD

APPENDIX H

Core Summary Logs, Photographs, and Field Forms for Post-Construction Coring

Appendix H included as separate pdf file on CD

APPENDIX I

End of Construction Season Decontamination

Appendix I included as separate pdf file on CD

APPENDIX J

Archaeological Monitoring Report

Appendix J included as separate pdf file on CD