BRIDGEWATER GROUP, INC.

Data Gap Analysis and Sampling and Analysis Plan
Source Control Evaluation
Crawford Street
Portland, Oregon

TO: Jim Orr/Oregon DEQ

CC: Mat Cusma/Schnitzer
Mark Myers/Williams Kastner

FROM: Ross Rieke/Bridgewater Group

DATE: October 29, 2015

This memorandum presents the results of the source control evaluation (SCE) data gap analysis for the Crawford Street Corporation (CSC) site in Portland, Oregon (Site) (Figure 1, Figure 2). The data gap analysis was performed by assessing the potential contaminant migration pathways from the Site to the Willamette River using the results of sampling and analysis performed to date at the Site. This memorandum also presents a sampling and analysis plan to address the identified data gaps.

Data Gap Analysis

Summary of Existing Data and SLV Comparisons

Soil, groundwater, storm water, and seep water samples have been collected at the Site and analyzed for a range of chemicals. Figure 3 shows the location of the collected samples. The samples were collected and analyzed in accordance with sampling plans approved by the Oregon Department of Environmental Quality (DEQ). The results of the previous sampling and analysis have been presented to DEQ in memoranda and reports over the past 15 years.

Table 1, Table 2, and Table 3 present the results of soil, groundwater/seep, and storm water sample analyses, respectively. The tables also show a comparison between the measured chemical concentrations and Portland Harbor Screening Level Values (SLVs). The SLVs are based on the DEQ Joint Source Control Strategy (JSCS) SLVs and the July 2015 Portland Harbor Superfund Site Preliminary Remediation Goals (PRGs).

Conceptual Site Model and Potential Pathways of Concern

The conceptual model for the Site considers the Chemicals of Interest (COIs) associated with the Site and the potential pathways for the COIs to migrate to the Willamette River and pose a material risk to river sediments and surface water.

Chemicals of Interest (COIs)

The COIs for the Site are based on the current and historical site operations and the COIs identified in the Portland Harbor Superfund site sediments adjacent to the Site.

COIs associated with the current and historical site operations are noted in the June 14, 2000 *Preliminary Assessment* and February 4, 2002 *Preliminary Assessment, Soil and Groundwater Sampling* reports prepared by Bridgewater Group. These COIs are polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and metals.

The Portland Harbor COIs are those identified in Area of Potential Concern (AOPC) 12 as noted in Figure 5.1-1 of the March 30, 2012 *Portland Harbor Draft Feasibility Study*, prepared by the Lower Willamette Group The COIs in AOPC 12 are those noted in the August 18, 2010 Draft Table 12, *AOPC 12: Status of Adjacent or Immediate Upstream Current and Ongoing and Potentially Ongoing Upland and Overwater Sources*, prepared by the Lower Willamette Group. The COIs identified for AOPC 12 are copper, mercury, tributyltin (TBT), and polychlorinated biphenyls (PCBs).

Thus, considering both indicators of COIs, the COIs for the Site are the following:

- Metals (including copper and mercury);
- PCBs;
- PAHs;
- VOCs; and
- TBT.

Source Control Pathway Analysis

A source control pathway analysis was performed by considering each of the COI migration pathways noted in Section 5 of the December 2005 DEQ *Portland Harbor Joint Source Control Strategy* document. Specifically, the following pathways were assessed:

- Erodible soil;
- Groundwater;
- Storm water; and
- Overwater activities.

In addition, as requested by DEQ, track-out of surface soil to adjacent streets was also assessed as a potential COI migration pathway.

The potential for the Site COIs to migrate from the Site to the Willamette River through these pathways was assessed by considering the results of soil, groundwater, and storm water sampling and analysis performed at the Site and the physical setting and conditions at the Site. The assessment included a comparison of the sampling results to applicable SLVs.

Erodible Soil – Riverbank

CSC assessed the potential for riverbank soil to erode and be a material pathway for COIs to the Willamette River in 2010. The assessment included a detailed evaluation of the erodibility of the riverbank soil and collection of soil samples from identified areas of potential erosion. A December 20, 2010 memorandum *Riverbank Assessment Report, Crawford Street Corporation Site* presents the results of the assessment. The report concluded that the vast majority of the riverbank is stabilized with trees, shrubs, and brush along with large concrete debris, and that the erodible soil pathway from the riverbank to the adjacent Willamette River is not a significant COI migration pathway from the Site.

Soil samples T2-S1, OF4-S1, and T6-S1 were collected from limited areas of potential erosion along the riverbank as part of the 2010 riverbank assessment. Surface soil samples were also collected from along the riverbank as part of the 2001 site assessment (SS-6, SS-7, SS-8, and SS-9). The results of the 2001 site assessment are presented in a February 4, 2002 *Preliminary Assessment, Soil and Groundwater Sampling Report*. Figure 3 shows the riverbank soil sample locations. Surface soil samples collected from the Willamette River beach (CS, BS,

P, B, and SS-5) are within the in-water portion of the Portland Harbor Superfund site and outside the Site being addressed through the DEQ SCE process. As such, COIs present in the areas represented by these samples are anticipated to be addressed, as necessary, through the Portland Harbor in-water remedial action.

Table 1 presents the results of the chemical analysis performed on the riverbank surface soil samples. As shown on Table 1, PCBs, metals, and phthalates were not detected in any of the riverbank surface soil samples at concentrations greater than 10 times the associated SLV. Five of the seven riverbank surface soil samples analyzed for PAHs had PAH concentrations less than 10 times the SLV. One sample had carcinogenic PAH (CPAH) concentrations greater than 100 times (but less than 1000 times) the CPAH SLV. Based on these limited and modest SLV exceedances, erosion of riverbank surface soil is not a material pathway of COI migration from the Site to the Willamette River.

Erodible Soil – Storm Water Flow Pathways

In 2010, CSC assessed the potential for soil along storm water flow pathways to be a material source of COIs to the Willamette River. An August 10, 2010 memorandum *Erodible Surface Soil Sampling and Analysis Results, Crawford Street Corporation Site* presents the results of this assessment. Surface soil samples SW1-S1, SW1-S2, SW2-S1, SW3-S1, SW3-S2, SW3-S3, SW4-S1, SW4-S2, and SW4-S3 were collected from along storm water flow pathways and analyzed for COIs as part of the 2010 assessment. Surface soil samples were collected at the SW-1, SW-2, and SW-3 storm water discharge points (SS-SW-1, SS-SW-2, and SS-SW-3, respectively) in 2008. The results of the 2008 storm water flow path soil sampling and analysis was presented in a December 3, 2008 memorandum *Preliminary Source Control Evaluation, Sampling and Analysis Results, Crawford Street Site*.

Upland surface soil samples were also collected as part of the 2001 site assessment (SS-1, SS-2, SS-3, and SS-4). While the 2001 samples were not targeted toward storm water flow paths, they provide some added insight regarding the potential for upland surface soils to contribute to COIs in the storm water runoff. Figure 3 shows the locations of the upland storm water flow path surface soil samples.

Table 1 presents the results of the chemical analysis performed on the storm water flow path surface soil samples. As shown on Table 1, no metals were detected in the 16 soil samples at concentrations more than 10 times their respective SLVs except for nickel in sample SS-1. SS-1 is located in the interior of the Columbia Forge area where storm water discharges to a sand filter before discharging to the Basin A. PCBs were either not detected or detected at a concentration less than 10 times the SLV in 11 of 12 soil samples analyzed for PCBs. One sample noted a PCB concentration about 20 times the SLV. PAHs were either not detected, or were detected at concentrations less than 10 times the SLV, in six of the 16 soil samples analyzed for PAHs. Only five of the 16 samples noted PAH concentrations more than 100 times (but less than 1000 times) the SLV. Based on these limited and modest SLV exceedances, surface soil along the upland storm water flow pathways is not a material pathway of COI migration from the Site to the Willamette River. Notwithstanding this conclusion, the storm water sampling and analysis results discussed below provide a more direct line of evidence regarding whether storm water discharge from the Site is a material source of COIs to the Willamette River.

Groundwater

Groundwater samples were collected from the southern portion of the Site (i.e., toward the Willamette River) in 2001 and 2006. Groundwater samples were also collected in the northern portion of the Site in 2006. The 2001 groundwater samples were collected from groundwater monitoring wells and the results of this sampling and analysis was presented in the February 4, 2002 *Preliminary Assessment, Soil and Groundwater Sampling Report*. The 2006 samples were

collected using temporary push probes as part of a site characterization work performed by the current property owner (i.e., not CSC). Figure 3 shows the location of the groundwater samples. The groundwater samples were collected from the first-encountered groundwater at a depth of about 25 to 30 feet.

The results of the chemical analysis of the groundwater samples are presented in Table 2. As shown in Table 2, PAHs were not detected at nine of the ten groundwater sampling locations. PAHs were not detected in a second sample collected from PP-3 where PAHs were detected in the initial sample. As a result of the analytical method used, the detection limits for the PAH analysis were greater than SLVs.

VOCs were not detected in any of the seven groundwater samples collected in 2006. Arsenic was detected at a concentration of less than 1000 times the SLV in an unfiltered groundwater sample from PP-3. A filtered groundwater sample collected from PP-3 at the same time noted an arsenic concentration less than 100 times the SLV. Lead was detected at a concentration of about 30 times the SLV in the unfiltered sample but was not detected in the filtered sample.

Based on the results of the groundwater sampling and analysis, groundwater does not appear to be a material source of Site COIs to the Willamette River.

Storm Water

Storm water discharges directly from the Site to adjacent properties occur to the City of Portland Bureau of Environmental Services Water Pollution Control Laboratory property (Basin A and Basin B), the North Richmond Street right-of-way (Basin C and Basin D), and to the Willamette River (Basin E) (Figure 4). Most of these discharges are anticipated to infiltrate after leaving the site and not discharge directly to the Willamette River. However, during extended periods of rainfall and high river levels, discharge from Basin E may directly discharge to the Willamette River. Also during extended periods of rainfall, discharge from Basin A and Basin B flows across the City BES WPCL property, comingles with the WPCL runoff, and is discharged to the Willamette River at City Outfall 50.

As shown on Figure 4, storm water samples SW-1, SW-2, SW-3, and SW-4 are representative Basin A, Basin B, Basin C, and Basin E, respectively. Given the similar operations and site conditions in Basin C and Basin D, storm water sample SW-3 is also representative of Basin D discharge.

Based on observations during wet and dry weather conditions, seeps observed along the Willamette River bank during wet weather conditions are representative of storm water discharge from the site. The seeps result from ponding of storm water runoff along the top of the bank and the subsequent infiltration and migration of the ponded water through the bank soil to where the seeps daylight out the riverbank slope. Seep samples Seep-1 and Seep-2 are representative of this storm water-based discharge from the Site.

The results of the storm water sampling and analysis were previously provided to DEQ in the following Bridgewater Group documents:

- *Preliminary Source Control Evaluation, Sampling and Analysis Results, Crawford Street Site*, December 3, 2008.
- *Source Control Evaluation, Supplemental Storm Water Sampling and Analysis Results, Crawford Street Corporation*, August 15, 2012.
- Source Control Evaluation, Supplemental Storm Water Sampling and Analysis Results, Crawford Street Corporation, April 5, 2013.

Table 3 presents the results of the storm water sampling and analyses performed at the

locations representative of direct offsite discharge to adjacent properties and the Willamette River.

As shown on Table 3, PCBs were detected in only one of the 16 storm water samples analyzed for PCBs. Phthalates were not detected in the representative storm water samples. Only one of the storm water samples noted metal concentrations greater than 1000 times the SLV (arsenic in Seep-1). Storm water PAH SLV exceedances greater than 1000 were noted for 70 percent of the storm water samples. Seven of the 20 storm water samples noted metal concentrations greater than 100 times the associated SLV. Based on these sampling and analysis results, storm water discharge from the Site is a potential pathway of PAHs, and possibly metals, migration to adjacent properties and the Willamette River.

Storm water runoff from the building roofs in the northern portion of the Site discharge to the City of Portland storm water system and are eventually discharged to the Willamette River at Outfall 52. Storm water samples representative of these discharges have not been collected.

Overwater Activities

There are no current overwater activities or related structures at the Site. Therefore, this pathway is not applicable to the Site.

Track-Out to City Streets

Recent aerial photographs were reviewed to assess for evidence of soil track-out from the Site into the neighboring City streets. In particular, Google Earth aerial photographs from 2006 to 2015 were reviewed for evidence of material track-out. Erodible soil sampling and analysis results were also reviewed to assess whether any tracked-out soil would contain COIs at concentrations high enough to suggest that track-out could be a material migration pathway.

Evidence of material track-out was not observed in reviewed aerial photographs and, as discussed previously, only limited exceedances of SLVs were noted in the surface soil samples Based on these results and the presence of paved surfaces across much of the Site, track out to City streets and subsequent migration to the City storm water system is not a material source of COIs to the Willamette River.

Pathway Analysis Data Gaps

The source control pathway analysis was reviewed to identify data gaps that preclude determining whether material migration of Site COIs to the Willamette River is occurring.

Erodible Soil

Comprehensive soil sampling has been performed to assess the erodible soil pathway. Laboratory analyses have included most of the Site COIs, including the key COIs PAHs, metals, and PCBs. One deep soil sample was analyzed for VOCs (PP-1) and no VOCs were detected in this sample. Given their volatile nature, VOCs are not anticipated to be present in the surface soil. No samples were analyzed for TBT. TBT is not associated with any historical or current Site activities and the lack of this analysis does not pose a material data gap.

Groundwater

Representative groundwater samples have been collected across the Site, including along the southern edge of the Site (i.e., above the Willamette River bank). All of the groundwater samples have been analyzed for PAHs. However, due to the laboratory analysis used, detection limits more than 100 times the SLV were realized in the 2001 groundwater samples collected above the river bank.

Groundwater samples from seven locations distributed around the Site were collected and analyzed for VOCs in 2006. As noted above, VOCs were not detected in any of the 2006 groundwater samples. While the groundwater samples collected from above the riverbank in

2001 were not analyzed for VOCs, the lack of VOC analysis in these samples does not represent a material data gap given the complete lack of VOCs in any of the 2006 groundwater samples.

Because PCBs were not identified as a Site COI in the preliminary assessment work performed in the early 2000s, none of the groundwater samples were analyzed for PCBs. PCBs were subsequently identified as a COI in the Portland Harbor sediments adjacent to the Site. Only one of the groundwater samples collected on the Site was analyzed for metals.

The lack of groundwater sample analyses for PAHs, metals, and PCBs at sufficiently low detection limits is a data gap in the groundwater pathway analysis. The lack of TBT is not a material data gap given that TBT is not associated with any historical or current Site activities analyses.

Storm Water
Comprehensive sampling and analysis has been performed on storm water discharging to adjacent properties and to the Willamette River. However, no samples have been collected of roof runoff from the Columbia Forge and Lampros buildings in the northern portion of the Site, which discharges to the City conveyance system and ultimately to the river at City Outfall 52. This lack of roof runoff samples is a data gap in the storm water pathway analysis.

Overwater Activities
There are no data gaps regarding the overwater pathway.

Track-Out to City Streets
As noted above, comprehensive surface soil sampling and analysis has been performed at the Site, including soil that could theoretically be tracked out of the Site on to City streets. Given these analyses and the numerous aerial photos that were reviewed to assess the relative visual magnitude of track-out occurring (16 aerial photographs covering the past 10 years), there are no material data gaps regarding assessment of the track-out pathway.

Sampling and Analysis Plan

The following sampling and analysis plan addresses the source control pathway analysis data gaps noted above.

Groundwater Pathway Sampling and Analysis

Two groundwater monitoring wells will be drilled, constructed, developed, and sampled near the shoreline to address the identified groundwater pathway data gaps. Figure 5 shows the approximate location of the two groundwater monitoring wells. The wells will be drilled to a depth of about 35 feet and screened from a depth of about 25 feet to 35 feet (i.e., 10-foot screen). The wells will be drilled, constructed, and developed using the procedures described in Appendix A. The wells will be allowed to sit at least 48 hours after development prior to sampling.

Immediately prior to sampling, the well will be purged using low-flow purging (i.e., a rate of less than 500 ml per minute) using a peristaltic or bladder sample pump prior to sample collection. During low flow purging, groundwater field parameters (i.e., pH, electrical conductivity, dissolved oxygen, and temperature) will be measured every two minutes (i.e., about every one liter removed) using a flow-through measurement cell. Purging will be considered complete when three consecutive readings are within 10 percent or the borehole purges dry. Once the field parameters are stable, a groundwater sample will be collected using the same pump and tubing but at a lower pumping rate (laminar flow without inducing air bubbles in the sample vial).

The groundwater samples will be collected in laboratory supplied containers and placed in chilled coolers for transport to the analytical laboratory under chain-of-custody procedures.

The groundwater samples will be analyzed for the following:

- Aluminum, antimony, arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, and zinc;
- PAHs;
- PCB aroclors, congeners, and homologs;
- Total suspended solids (TSS); and
- Total organic carbon (TOC).

Table 4 shows the specific analytical methods, laboratory containers, holding times, and preservatives to be used for each parameter for the water analysis. Table 5 shows the analytical laboratory detection limits for each chemical for the water analysis and compares the limits to the JSCS SLVs and Portland Harbor PRGs SLVs. As noted on Table 5, the laboratory detection limits are approximately equal to or less than the JSCS SLVs except for a few metals. The detection limits are greater than the Portland Harbor PRGs SLVs for PAHs, PCBs, and arsenic.

Storm Water Pathway Sampling and Analysis

Two sets of storm water samples collected from three representative building roof drains. Figure 5 shows the roof drain storm water sampling locations. The sample locations are representative of runoff from metal roofs (RD-1 and RD-2) and a tar roof (RD-3). The samples will be collected directly from downspouts, prior to discharge to the local City of Portland storm water system.

Roof drain storm water samples will be collected at both locations during two qualifying rain events. Each storm water sampling event will be preceded by at least 24 hours with no more than 0.1 inches of precipitation. The storm water samples will be collected within the first three hours of discharge. In addition, if practical, the storm water samples will be collected within the first 30 minutes of discharge. Rainfall gauge data from the Port of Portland Terminal 4 rain gauge will be used to document the rainfall event conditions for each sampling event.

The storm water samples will be collected in laboratory supplied containers and placed in chilled coolers for transport to the analytical laboratory under chain-of-custody procedures.

The storm water samples will be analyzed for the same parameters as noted for the groundwater samples above.

Reporting

A memorandum presenting the data gap sampling and analysis results will be submitted to DEQ within 30 days of receipt of the final analytical laboratory report. The data report will include figures identifying well and downspout sample locations and tables presenting results of the laboratory analysis and a comparison with JSCS SLVs. The report will also include the analytical laboratory report, well drilling boring and well construction logs, and rainfall event data.

Attachments:

Table 1 – Soil Sample Analytical Laboratory Results

Table 2 – Groundwater Sample Analytical Laboratory Results
Table 3 – Storm Water Sample Analytical Laboratory Results
Table 4 – Water Analytical Laboratory Methods, Sample Containers, Holding Times, and Preservation
Table 5 – Water Analytical Laboratory Detection Limits
Figure 1 – Site Location Map
Figure 2 – Site Plan
Figure 3 – Soil and Groundwater Sample Locations
Figure 4 – Storm Water Sample Locations
Figure 5 – Proposed Data Gap Sampling Locations
Appendix A – Groundwater Monitoring Well Installation and Development Procedures

Tables

Table 1
Soil Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values[3]	SS-01 0.5 ft 4/22/2001	SS-02[6] 0.5 ft 4/26/2001	SS-03[6] 0.5 ft 4/26/2001	SS-04 0.5 ft 4/26/2001	SS-05[5] 0.5 ft 4/24/2001	SS-06[6] 0.5 ft 4/24/2001	SS-07 0.5 ft 4/24/2001	SS-08 0.5 ft 4/24/2001	SS-09 0.5 ft 4/24/2001	SS-10[4] 2 ft 4/26/2001	SS-11[5] 0.25 ft 4/24/2001	PP-1-24[6] 24 ft 4/25/2001	PP-2-20 20 ft 4/25/2001	PP-3-24 24 ft 4/24/2001	SS-SW-1 0.25 ft 8/14/2008	SS-SW-2 0.25 ft 8/14/2008	SS-SW-3 0.25 ft 8/14/2008	SW1-S1 0.25 6/30/2010	SW1-S2 0.25 6/30/2010	SW2-S1 0.25 6/30/2010	SW3-S1 0.25 6/30/2010	SW3-S2 0.25 6/30/2010	SW3-S3 0.25 6/30/2010
PAHs (ug/kg)																										
2-Methylnaphthalene	200																									
Acenaphthene	300			67 U	134 U	670 U	168 U	67 U	330 U	330 U	330 U	330 U	96		330 U	330 U	13 U	215 U	94 U	135 J	43 U	39 U	41 U	39 U	40 U	15 U
Acenaphthylene	200			67 U	134 U	670 U	168 U	67 U	330 U	330 U	330 U	330 U	670 U		330 U	330 U	13 U	110 U	48 U	63 J	81 J	39 U	45 J	39 U	40 U	15 U
Anthracene	845			67 U	134 U	670 U	168 U	67 U	330 U	330 U	330 U	330 U	12		330 U	330 U	13 U	129 U	57 U	305 J	140	39 U	94	39 U	40 U	15 U
Benzo(a)anthracene	1050			67 U	2680 U	670 U	259	68	330 U	330 U	330 U	330 U	498		330 U	330 U	13 U	829 U	191 J	1610 J	264	64 J	201	64 J	117	50
Benzo(a)pyrene	1450			67 U	670 U	670 U	401	83	330 U	330 U	330 U	330 U	768		330 U	330 U	13 U	850 J	360 J	2660	350	75 J	234	59 J	135	48
Benzo(b)fluoranthene				123	670 U	670 U	566	81	330 U	330 U	330 U	330 U	728		330 U	330 U	13 U									
Benzo(b+k)fluoranthene	13000																	7270 U	3170 U	4540	1290	109	521	172	405	147
Benzo(g,h,i)perylene	300			95	670 U	670 U	486	74	330 U	330 U	330 U	330 U	573		330 U	330 U	13 U	726 J	303 J	1420 J	619	116	388	75 J	154	58
Benzo(k)fluoranthene	13000			68	670 U	670 U	340	72	330 U	330 U	330 U	330 U	682		330 U	330 U	13 U									
Chrysene	1290			110	2680 U	670 U	438	84	330 U	330 U	330 U	330 U	632		330 U	330 U	13 U	523 J	158 J	2730	675	166	315	112	254	103
Dibenzo(a,h)anthracene	1300			67 U	670 U	670 U	168 U	67 U	330 U	330 U	330 U	330 U	168		330 U	330 U	13 U	618 J	263 J	554 J	128	39 U	74 J	39 U	40 U	15 U
Fluoranthene	2230			86	1340 U	670 U	384	144	330 U	330 U	330 U	330 U	927		330 U	330 U	13 U	316 J	150 J	2720	334	93	270	75	123	89
Fluorene	536			67 U	670 U	670 U	168 U	67 U	330 U	330 U	330 U	330 U	100		330 U	330 U	13 U	403 U	176 U	211 U	43 U	39 U	41 U	39 U	40 U	15 U
Indeno(1,2,3-cd)pyrene	100			67 U	670 U	670 U	379	67 U	330 U	330 U	330 U	330 U	515		330 U	330 U	13 U	752 J	316 J	1590 J	544	60 J	311	73 J	157	55
Naphthalene	561			67 U	134 U	670 U	168 U	67 U	330 U	330 U	330 U	330 U	67 U		330 U	330 U	13 U	382 U	167 U	200 U	86 U	77 U	81 U	79 U	79 U	31 U
Phenanthrene	1170			67 U	134 U	670 U	224	168	330 U	330 U	330 U	330 U	658		330 U	330 U	13 U	640 U	279 U	1060 J	135	51 U	105	52 U	52 U	26 J
Pyrene	1520			92	2680 U	670 U	314	127	330 U	330 U	330 U	330 U	742		330 U	330 U	0.013 U	342 J	155 J	2960	340	119	254	74 J	125	80
Detected CPAHs (BaP TEF)		12		14	0	0	530	99	0	0	0	0	1123		0	0	0	1551	677	4005	695	99	415	91	205	74
Detected PAHs		23000	15000	574	0	0	3791	901	0	0	0	0	7099		0	0	0	4127	1896	22347	4900	801	2812	704	1470	656
PCBs (ug/kg)																										
Aroclor 1016	530							67 U					67 U					78 U	79 U	78 U	4.3 U	3.8 U	3.7 U	3.7 U	3.2 U	3.4 U
Aroclor 1221								134					134 U					51 U	51 U	50 U	4.3 U	3.8 U	3.7 U	3.7 U	3.2 U	3.4 U
Aroclor 1232								67 U					67 U					83 U	84 U	82 U	4.3 U	3.8 U	3.7 U	3.7 U	3.2 U	3.4 U
Aroclor 1242								67 U					67 U					61 U	61 U	60 U	4.3 U	3.8 U	3.7 U	3.7 U	3.2 U	3.4 U
Aroclor 1248	1500							67 U					67 U					32 U	32 U	32 U	4.3 U	3.8 U	3.7 U	3.7 U	3.2 U	3.4 U
Aroclor 1254	300							67 U					1110					22 U	22 U	22 U	61	11	3.7 U	3.7 U	3.2 U	3.4 U
Aroclor 1260	200							224					67 U					54 U	72 J	54 U	126	25	43	3.7 U	5.7	3.4 U
Total Detected PCB aroclors	0.39	9	150					358					1110					0	72	0	187	36	43	0	5.7	0
Phthalates (ug/kg)																										
Bis(2-ethylhexyl) phthalate	330	135	30000						2000 U	2000 U	2000 U	2000 U			2000 U			1280 U	560 U	672 U	429 U	486 J	404 U	392 U	395 U	153 U
Butylbenzyl phthalate									330 U	330 U	330 U	330 U			330 U			1300 U	569 U	682 U	429 U	384 U	404 U	392 U	395 U	153 U
Diethyl phthalate	600								330 U	330 U	330 U	330 U			330 U			567 U	247 U	297 U	429 U	384 U	404 U	392 U	395 U	153 U
Dimethyl phthalate									330 U	330 U	330 U	330 U			330 U			1170 U	512 U	614 U	429 U	384 U	404 U	392 U	395 U	153 U
Dibutyl phthalate									1000 U	1000 U	1000 U	1000 U			1000 U			1120 U	489 U	586 U	429 U	384 U	404 U	392 U	395 U	153 U
Di-n-octyl phthalate	60								330 U	330 U	330 U	330 U			330 U			310	135 U	783 JB	429 U	384 U	404 U	392 U	395 U	153 U
Metals (mg/kg)																										
Aluminum																										
Antimony	64			3.3	1.2	1.3	0.92		0.50 U	0.50 U	0.50 U	0.50 U					0.50 U									
Arsenic	7	3	10	16	11	18	10		2.9	5.2	5.7	13		13			8.1	5.0	4.3	4.9	5.2	1.5	5.7	1.4 J	1.4 J	1.0 J
Barium																										
Cadmium	1	5	2	3.1	0.5	2.4	0.81	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U				0.50 U	0.72 J	0.44 J	0.49 J	0.74 J	0.17 J	0.75 J	0.24 J	0.37 J	0.17 J
Chromium	111		130	390	812	125	49	202	26	24	69	32	174	83			21	204	111	143	159	28	162	44	47	26
Copper	149	149	500	612	136	247	172		25	30	170	30		122			24	165	80	93	160	41	141	53	62	43
Lead	17	128	300	124	106	123	184	65	41	18	46	37	140	29			15	39	22	63	55	7.1	53	8.6	11	4.8
Manganese	1100																									
Mercury	0.07	1.1	0.35	0.10 U	0.10 U	0.10 U	0.14	0.10 U	0.41	0.13	0.17	0.10 U	0.10 U				0.10 U	0.11	0.041 U	0.22	0.38	0.062 J	0.032 U	0.031 U	0.031 U	0.031 U
Nickel	48.6		60	1240	81	409	62		22	28	29	25		55			20	65	34	43	62	13	46	18	22	11
Silver	5		0.7	1.0 U	1.0 U	1.0 U	1.0 U		0.50 U	0.50 U	0.50 U	0.50 U					0.50 U									
Zinc	459	459	1000	265	246	526	375		23 U	101	178	122		209			88	368	291	183	373	68	826	76	105	54
Total Petroluem Hydrcarbons (mg/kg)																										
Gasoline				4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.8	4.0 U	4.0 U	4.0 U	4.0 U		4.0 U	4.8	4.0 U									
Diesel				250 U	1000 U	250 U	500 U	25 U	25 U	32	25 U	25 U	78		25 U	25 U	25.00 U									
Oil				3130	13500	5350	6350	50 U	50 U	70	194	50 U	180		50 U	50 U	50.00 U									

U - Not detected at noted detection limit
J - Estimated value
1 - Table 3-1 PH JSCS Guidance, 7/16/2007 revision
2 -Draft PH Feasibilty Study Section 2.2 Tables. July 2015. RAO 9 PRGs.
3 - October 2010, DEQ Guidance for Evaluating Stormwater Pathway at Upland Sites, Appendix E, Tool For Evaluating Stormwater Data
4 - Soil representend by sample removed during 10/2001 removal work.
5 - Sample collected from the in-water portion of the Portland Harbor site.
6 - Sample analyzed for VOCs. None were detected.

Detected concentration > 10 x PRG (or JSCS SLV if no PRG)
Detected concentration > 100 x PRG (or JSCS SLV if no PRG)
Detected concentration > 1000 x PRG (or JSCS SLV if no PRG)

Table 1
Soil Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values[3]	SW4-S1 0.25 6/30/2010	SW4-S2 0.25 6/30/2010	SW4-S3 0.25 6/30/2010	T6-S1 0.25 10/13/2010	OF4-S1 0.25 10/13/2010	T2-S1 0.25 10/13/2010	BS-1A[4,5] 0.5 ft 6/22/2001	BS-1B[4,5] 0.5 ft 6/22/2001	BS-1C[4,5] 0.5 ft 6/22/2001	BS-1D[4,5] 0.5 ft 6/22/2001	CS-1[4,5] 0.5 ft 7/17/2001	CS-2[4,5] 0.5 ft 7/17/2001	CS-3[4,5] 0.5 ft 7/17/2001	CS-4[4,5] 0.5 ft 7/17/2001	B-1[5] 0.5 ft 10/20/2001	B-2[5] 0.5 ft 10/20/2001	B-3[5] 0.5 ft 10/20/2001	B-3D[5] 0.5 ft 10/20/2001	B-4[5] 0.5 ft 10/20/2001	B-5[5] 0.5 ft 10/20/2001	B-6[5] 0.5 ft 10/20/2001	B-7[5] 0.5 ft 10/20/2001
PAHs (ug/kg)																									
2-Methylnaphthalene	200																								
Acenaphthene	300			53 J	71 J	107	227 U	4.7 U	41 U									50 U	50 U	105	105	95	75 U	50 U	50 U
Acenaphthylene	200			40 U	52 J	40 U	227 U	4.7 U	64 J									50 U	50 U	55	65	55	50 U	50 U	50 U
Anthracene	845			158	224	271	266 J	4.7 U	51 J									100	50	575	510	445	225	130	50
Benzo(a)anthracene	1050			1110	1330	2050	1600	14	137									80	70	405	500	435	240	115	80
Benzo(a)pyrene	1450			1230	1270	2250	1780	15	175									95	95	495	585	525	280	175	135
Benzo(b)fluoranthene																		65	60	315	385	370	205	115	90
Benzo(b+k)fluoranthene	13000			2420	958	4290	3190	27	288																
Benzo(g,h,i)perylene	300			1170	958	2030	2570	22	310									50 U	95	295	470	345	245	165	165
Benzo(k)fluoranthene	13000																	100	90	435	645	485	275	155	105
Chrysene	1290			1490	1870	2650	1890	17	220									120	110	480	595	545	305	165	120
Dibenzo(a,h)anthracene	1300			218	213	383	516	4.7 U	41 U									50 U	50 U	90	50 U	100	65	50 U	50 U
Fluoranthene	2230			1690	1830	3190	2880	27	381									215	165	1060	1210	1040	690	265	160
Fluorene	536			40 U	54 J	44 J	227 U	4.7 U	41 U									50 U	50 U	200	170	170	110	50 U	50 U
Indeno(1,2,3-cd)pyrene	100			1100	941	1920	2250	19	244									50 U	55	235	350	275	190	105	100
Naphthalene	561			81 U	77 J	81 U	453 U	9.4 U	147 J									50 U	50 U	140	90	85	55	50 U	50 U
Phenanthrene	1170			567	700	1070	1070	14	285									180	90	1040	1040	925	640	205	80
Pyrene	1520			1680	1730	3140	3160	29	361									205	17	1010	1540	1000	585	280	185
Detected CPAHs (BaP TEF)		12		1924	1817	3482	3028	22	245									111	115	688	720	742	414	212	165
Detected PAHs		23000	15000	12886	12277	23395	21172	184	2662									1160	897	6935	8260	6895	4110	1875	1270
PCBs (ug/kg)																									
Aroclor 1016	530			4.1 U	3.6 U	3.7 U	4.5 U	4.2 U	4.0 U									50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1221				4.1 U	3.6 U	3.7 U	4.5 U	4.2 U	4.0 U									50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1232				4.1 U	3.6 U	3.7 U	4.5 U	4.2 U	4.0 U									50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1242				4.1 U	3.6 U	3.7 U	4.5 U	4.2 U	4.0 U									50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1248	1500			4.1 U	3.6 U	3.7 U	4.5 U	4.2 U	4.0 U									50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1254	300			26	35	12	4.5 U	4.2 U	4.0 U									50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1260	200			25	17	17	11	4.2 U	6.6 J									50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Total Detected PCB aroclors	0.39	9	150	51	53	29	11	0	6.6									0	0	0	0	0	0	0	0
Phthalates (ug/kg)																									
Bis(2-ethylhexyl) phthalate	330	135	30000	928	4270	660 J	2260 U	47 U	410 U																
Butylbenzyl phthalate				402 U	363 U	402 U	2260 U	47 U	410 U																
Diethyl phthalate	600			402 U	743	402 U	2260 U	47 U	410 U																
Dimethyl phthalate				402 U	363 U	402 U	2260 U	47 U	410 U																
Dibutyl phthalate				402 U	2020	402 U	2260 U	47 U	410 U																
Di-n-octyl phthalate	60			402 U	363 U	402 U	2260 U	47 U	410 U																
Metals (mg/kg)																									
Aluminum																									
Antimony	64																								
Arsenic	7	3	10	3.7	9.0	3.3	4.2	7.9	9.4																
Barium																									
Cadmium	1	5	2	0.55 J	0.53	0.54 J	0.37 J	0.40 J	0.49 J																
Chromium	111		130	172	144	188	15	18	21									51	76	99	100	139	144	79	33
Copper	149	149	500	176	474	125	29	25	32									396	558	764	968	1390	1380	1130	292
Lead	17	128	300	26	32	36	56	17	44	*52*	*59*	*89*	*558*	*42*	*28*	*2150*	*26*	47	1890	240	85	265	46	36	31
Manganese	1100																								
Mercury	0.07	1.1	0.35	0.066 J	0.033 J	0.15	0.34	0.10 U	0.24									0.10	0.21 U	0.10	0.12 U	0.10	0.10	0.10	0.10
Nickel	48.6		60	29	23	40	35	17	21									28	129	44	67	73	104	54	25
Silver	5		0.7																						
Zinc	459	459	1000	185	327	213	100	83	112									152	262	282	384	302	246	183	132
Total Petroluem Hydrcarbons (mg/kg)																									
Gasoline																		22.2 U	22 U	25 U	23 U	23 U	22 U	22 U	24 U
Diesel																		56 U	56 U	63 U	58 U	56 U	55 U	54 U	53
Oil																		111 U	111 U	125 U	116 U	112 U	110 U	109 U	179 U

U - Not detected at noted detection limit
J - Estimated value
1 - Table 3-1 PH JSCS Guidance, 7/16/2007 revision
2 -Draft PH Feasibilty Study Section 2.2 Tables. July 2015. RAO 9 PRGs.
3 - October 2010, DEQ Guidance for Evaluating Stormwater Pathway at Upland S
4 - Soil representend by sample removed during 10/2001 removal work.
5 - Sample collected from the in-water portion of the Portland Harbor site.
6 - Sample analyzed for VOCs. None were detected.

Detected concentration > 10 x PRG (or JSCS SLV if no PRG)
Detected concentration > 100 x PRG (or JSCS SLV if no PRG)
Detected concentration > 1000 x PRG (or JSCS SLV if no PRG)

Table 1
Soil Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	PRG[2]	DEQ App E Values[3]	P-01[5] 0.5 ft 10/20/2001	P-02[5] 0.5 ft 10/20/2001	P-03[5] 0.5 ft 10/20/2001	P-04[5] 0.5 ft 10/20/2001	P-05[5] 0.5 ft 10/20/2001	P-06[5] 0.5 ft 10/20/2001	P-07[5] 0.5 ft 10/20/2001	P-07D[5] 0.5 ft 10/20/2001	P-08[5] 0.5 ft 10/20/2001	P-09[5] 0.5 ft 10/20/2001	P-10[5] 0.5 ft 10/20/2001	P-11[5] 0.5 ft 10/20/2001	P-15[5] 0.5 ft 10/20/2001	P-17[5] 0.5 ft 10/20/2001	P-18[5] 0.5 ft 10/20/2001	P-19[5] 0.5 ft 10/20/2001	P-20[5] 0.5 ft 10/20/2001
PAHs (ug/kg)																				
2-Methylnaphthalene	200																			
Acenaphthene	300			50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	75	65
Acenaphthylene	200			50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	85	50
Anthracene	845			50 U	130	205	50 U	180	50 U	50 U	50 U	50 U	50 U	50 U	70	210	50 U	50	500	160
Benzo(a)anthracene	1050			50 U	220	190	50 U	85	50 U	50 U	50 U	50 U	50 U	50 U	75	110	50 U	55	600	195
Benzo(a)pyrene	1450			50 U	230	210	50 U	80	50 U	50 U	50 U	50 U	50 U	50 U	140	115	50 U	65	885	275
Benzo(b)fluoranthene				50 U	180	155	50 U	55	50 U	50 U	50 U	50 U	50 U	50 U	110	70	50 U	50	560	210
Benzo(b+k)fluoranthene	13000																			
Benzo(g,h,i)perylene	300			50 U	180	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	690	275
Benzo(k)fluoranthene	13000			50 U	215	230	50 U	90	50 U	50 U	50 U	50 U	50 U	50 U	85	145	50 U	85	780	285
Chrysene	1290			50 U	285	260	50 U	115	50 U	50 U	50 U	50	50 U	50 U	150	145	50 U	75	845	245
Dibenzo(a,h)anthracene	1300			50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Fluoranthene	2230			65	605	470	50 U	250	70	50	65	110	50	50 U	195	310	65	135	1490	490
Fluorene	536			50 U	50 U	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	65	50 U	50 U	150	90
Indeno(1,2,3-cd)pyrene	100			50 U	130	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	470	185
Naphthalene	561			50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	60	50 U	50 U	95	50 U
Phenanthrene	1170			50 U	460	385	50 U	250	50	50	50	90	50 U	50 U	145	290	50 U	85	795	475
Pyrene	1520			70	515	540	50 U	250	70	55	80	115	60	50 U	260	415	80	160	2060	570
Detected CPAHs (BaP TEF)		12		0	287	247	0	95	0	0	0	0.050	0	0	160	135	0	76	1064	340
Detected PAHs		23000	15000	135	3150	2695	0	1355	190	155	195	365	110	0	1230	1935	145	760	10080	3570
PCBs (ug/kg)																				
Aroclor 1016	530			50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1221				50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1232				50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1242				50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1248	1500			50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1254	300			50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Aroclor 1260	200			50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Total Detected PCB aroclors	0.39	9	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phthalates (ug/kg)																				
Bis(2-ethylhexyl) phthalate	330	135	30000																	
Butylbenzyl phthalate																				
Diethyl phthalate	600																			
Dimethyl phthalate																				
Dibutyl phthalate																				
Di-n-octyl phthalate	60																			
Metals (mg/kg)																				
Aluminum																				
Antimony	64																			
Arsenic	7	3	10																	
Barium																				
Cadmium	1	5	2																	
Chromium	111		130	104	93	137	96	61	111	90	87	99	84	111	87	120	116	101	179	142
Copper	149	149	500	745	760	1260	752	581	926	784	718	897	846	801	857	1240	1730	1200	1890	1330
Lead	17	128	300	21	48	404	14	51	21	19	14	12	15	14	49	26.1	55.9	3130	656	434
Manganese	1100																			
Mercury	0.07	1.1	0.35	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Nickel	48.6		60	73	59	76	35	27	50	44	35	33	34	58	38	78	144	285	140	51
Silver	5		0.7																	
Zinc	459	459	1000	107	157	279	95	139	102	111	106	98.6	103	101	111	146	167	314	312	269
Total Petroluem Hydrcarbons (mg/kg)																				
Gasoline				21 U	21 U	22 U	21 U	22 U	20 U	20 U	20 U	20 U	22 U	20 U	21 U	20 U	20 U	22 U	21 U	22 U
Diesel				52 U	52 U	54 U	52 U	22 U	51 U	51 U	51 U	51 U	22 U	51 U	21 U	51 U	51 U	54 U	30	54 U
Oil				103 U	104 U	109 U	104 U	87	102 U	101 U	102 U	101 U	54 U	102 U	57	102 U	101 U	108 U	69	108 U

U - Not detected at noted detection limit
J - Estimated value
1 - Table 3-1 PH JSCS Guidance, 7/16/2007 revision
2 -Draft PH Feasibilty Study Section 2.2 Tables. July 2015. RAO 9 PRGs.
3 - October 2010, DEQ Guidance for Evaluating Stormwater Pathway at Upland S
4 - Soil representend by sample removed during 10/2001 removal work.
5 - Sample collected from the in-water portion of the Portland Harbor site.
6 - Sample analyzed for VOCs. None were detected.

Detected concentration > 10 x PRG (or JSCS SLV if no PRG)
Detected concentration > 100 x PRG (or JSCS SLV if no PRG)
Detected concentration > 1000 x PRG (or JSCS SLV if no PRG)

Table 2
Groundwater Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values	PP-1 4/25/2001	PP-2 4/25/2001	PP-3 4/25/2001	PP-3 6/20/2001	GP-1 1/19/2006	GP-2 1/19/2006	GP-3 1/19/2006	GP-4 1/20/2006	GP-5 1/20/2006	GP-6 1/20/2006	GP-7 1/20/2006
PAHs (ug/l)														
2-Methylnaphthalene														
Acenaphthene	0.2			5.0 U	5.0 U	0.10 U	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Acenaphthylene	0.2			5.0 U	5.0 U	0.10 U	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Anthracene				5.0 U	5.0 U	0.10 U	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Benzo(a)anthracene	0.018	0.0012		5.0 U	5.0 U	0.10 U	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Benzo(a)pyrene	0.018	0.00012		5.0 U	5.0 U	0.13	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Benzo(b)fluoranthene	0.018	0.0012		5.0 U	5.0 U	0.10 U	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Benzo(g,h,i)perylene	0.2			5.0 U	5.0 U	0.12	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Benzo(k)fluoranthene	0.018	0.0013		5.0 U	5.0 U	0.10 U	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Chrysene	0.018	0.0013		5.0 U	5.0 U	0.10 U	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Dibenzo(a,h)anthracene	0.018	0.00012		5.0 U	5.0 U	0.10 U	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Fluoranthene	0.2			5.0 U	5.0 U	0.17	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Fluorene	0.2							0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Indeno(1,2,3-cd)pyrene	0.018	0.0012		5.0 U	5.0 U	0.10 U	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Naphthalene	0.2			5.0 U	5.0 U	0.10 U	0.10 U	0.089	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Phenanthrene	0.2			5.0 U	5.0 U	0.14	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Pyrene	0.2			5.0 U	5.0 U	0.24	0.10 U	0.049 U	0.051 U	0.048 U	0.049 U	0.063 U	0.049 U	0.049 U
Total Detected CPAHs (BaP TEF)		0.00012		0	0	0.13	0	0	0	0	0	0	0	0
Total Detected PAHs			1	0	0	0.80	0	0	0	0	0	0	0	0
VOCs (ug/l)														
1,1,1,2-Tetrachloroethane	2.5							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	11							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	0.33							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	1.2							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	47							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene		7.0						1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloropropene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,3-Trichlorobenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,3-Trichloropropane	0.0095							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane (EDB)	0.033							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane (EDC)	0.73							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	0.97							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichloropropane								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table 2
Groundwater Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values	PP-1 4/25/2001	PP-2 4/25/2001	PP-3 4/25/2001	PP-3 6/20/2001	GP-1 1/19/2006	GP-2 1/19/2006	GP-3 1/19/2006	GP-4 1/20/2006	GP-5 1/20/2006	GP-6 1/20/2006	GP-7 1/20/2006
2,2-Dichloropropane								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone (MEK)	7100							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Chlorotoluene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Hexanone	99							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chlorotoluene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Isopropyltoluene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methyl-2-pentanone (MiBK)	170							20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acetone	1500							50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acrylonitrile	0.12							5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	1.2	0.44						0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U
Bromobenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromochloromethane								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	1.1							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	8.5							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	8.7							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide	0.92							2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Carbon tetrachloride	0.51							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	50	74						1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	23							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	0.17							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane	2.1							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	590	9.9						1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	0.055							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromomethane	61							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dichlorodifluoromethane	390							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	7.3	68						1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Hexachlorobutadiene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Iodomethane														
Isopropylbenzene	660							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	1.8							2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl tert-butyl ether (MTBE)	37							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene chloride	8.9							20 U	20 U	20 U	20 U	20 U	20 U	20 U
Naphthalene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
n-Butylbenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
n-Propylbenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	13	10000						1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
sec-Butylbenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	100							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
tert-Butylbenzene								1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	1.2	0.24						1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	9.8	57						1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table 2
Groundwater Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values	PP-1 4/25/2001	PP-2 4/25/2001	PP-3 4/25/2001	PP-3 6/20/2001	GP-1 1/19/2006	GP-2 1/19/2006	GP-3 1/19/2006	GP-4 1/20/2006	GP-5 1/20/2006	GP-6 1/20/2006	GP-7 1/20/2006
trans-1,2-Dichloroethene	110							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	0.055							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene (TCE)	0.17	0.6						1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	1300							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl chloride	0.015	0.022						1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Metals Total (ug/l)														
Aluminum														
Antimony	6					2.0 U								
Arsenic	0.045	0.018	2			13								
Barium														
Cadmium	0.094		0.5			2.0 U								
Chromium	100	100	5			38								
Copper	2.7	1300	40			52								
Lead	0.54		20			18								
Manganese	50	50												
Mercury	0.77		0.15			0.53								
Nickel	16		8			44								
Silver	0.12		0.05			2.0 U								
Zinc	36		500			123								
Metals Dissolved (ug/l)														
Aluminum														
Antimony	6					1.0 U								
Arsenic	0.045	0.018	2			1.75								
Barium														
Cadmium	0.094		0.5			1.0 U								
Chromium	100	100	5			1.0 U								
Copper	2.7	1300	40			2.0 U								
Lead	0.54		20			1.0 U								
Manganese	50	50												
Mercury	0.77		0.15			0.20 U								
Nickel	16		8			4.2								
Silver	0.12		0.05			1.0 U								
Zinc	36		500			53								
Pertroleum Hydrocarbons (mg/l)														

Table 2
Groundwater Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values	PP-1 4/25/2001	PP-2 4/25/2001	PP-3 4/25/2001	PP-3 6/20/2001	GP-1 1/19/2006	GP-2 1/19/2006	GP-3 1/19/2006	GP-4 1/20/2006	GP-5 1/20/2006	GP-6 1/20/2006	GP-7 1/20/2006
Gasoline				80 U	80 U	80 U		0.24 U	0.26 U	0.25 U	0.25 U	0.29 U	0.25 U	
Diesel				250 U	250 U	250 U		0.60 U	0.65 U	0.62 U	0.62 U	0.73 U	0.64 U	
Oil				500 U	500 U	500 U		0.60 U	0.65 U	0.62 U	0.62 U	0.73 U	0.64 U	

U - Not detected at noted detection limit
B- Detected in method blank. Raised detection limit.
J- Estimated value
Blank cells - Not analyzed

1 - Table 3-1 PH JSCS Guidance, 7/16/2007 revision
2 -Draft PH Feasibilty Study Section 2.2 Tables. July 2015. RAO 4 PRGs.
3 - October 2010, DEQ Guidance for Evaluating Stormwater Pathway at Upland Sites, Appendix E, Tool For Evaluating Stormwater Data. Typical storm water concentrations in Portland Harbor.

Detected concentration > 10 x PRG (or JSCS SLV if no PRG)
Detected concentration > 100 x PRG (or JSCS SLV if no PRG)
Detected concentration > 1000 x PRG (or JSCS SLV if no PRG)
For SLV use higher of JSCS and lowest PRG

Table 3
Storm Water Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values	SW-1 4/21/2007	SW-1 9/28/2007	SW-1 11/19/2007	SW-1 3/13/2008	SW-1 4/19/2012	SW-1 3/6/2013	SW-2 4/21/2007	SW-2 4/19/2012	SW-2 3/6/2013	SW-3 4/21/2007	SW-3 11/19/2007	SW-3 3/13/2008	SW-3 4/19/2012	SW-3 3/6/2013	SW-4 11/19/2007	SW-4 3/13/2008	SW-4 4/19/2012	SW-4 3/6/2013	Runon 9/14/2006 (COPW-8)
PAHs (ug/l)																						
2-Methylnaphthalene																						
Acenaphthene	0.2			0.026 U	0.018 J	0.030 J	0.059 U	0.24 U	0.25 U	0.024 U	0.097 U	0.24 U	0.020 J	0.015 J	0.012 U	0.13 J	0.23 U	0.025 J	0.029 U	0.097 U	0.23 U	0.19 U
Acenaphthylene	0.2			0.028 U	0.013 U	0.013 U	0.062 U	0.24 U	0.25 U	0.032 J	0.097 U	0.24 U	0.015 J	0.0074 U	0.013 U	0.094 U	0.23 U	0.013 U	0.031 U	0.097 U	0.23 U	0.19 U
Anthracene				0.030 J	0.025 J	0.021 J	0.041 J	0.24 U	0.25 U	0.023 J	0.11 J	0.24 U	0.018 J	0.011 J	0.017 J	0.29	0.23 U	0.032 J	0.034 J	0.097 U	0.23 U	0.19 U
Benzo(a)anthracene	0.018	0.0012		0.043 J	0.027 J	0.040 J	0.17 JB	0.44 J	0.26 J	0.046 J	0.40	0.26 J	0.044 J	0.039 J	0.097 U	2.0	0.58 J	0.27	0.27	0.50	0.52	0.28 J
Benzo(a)pyrene	0.018	0.00012		0.055 J	0.033 J	0.034 J	0.16 J	0.50	0.29 J	0.065 J	0.42	0.33 J	0.052	0.048 J	0.13	3.0	0.23 U	0.42	0.36	0.70	0.73	0.45
Benzo(b)fluoranthene	0.018	0.0012		0.088 J	0.081	0.095 J	0.32 J			0.10			0.054	0.076	0.27 J			0.60	0.75 J	1.0		0.63
Benzo(k)fluoranthene	0.018	0.0013		0.055 J	0.019 J	0.011 U	0.12 J			0.058 J			0.051 J	0.019 J	0.27 J			0.19	0.75 J	0.33		0.63
Benzo(b+k)fluoranthene	0.018	0.0013						1.4	0.81 J		1.1 J	0.82				5.7	0.47 U				1.4	
Benzo(g,h,i)perylene	0.2			0.070 J	0.054	0.058 J	0.081 J	0.77	0.51	0.074 J	0.50	0.49	0.043 J	0.032 J	0.048 J	2.7	0.23 U	0.30	0.11 J	0.62	0.68	0.48
Chrysene	0.018	0.0013		0.13	0.089	0.10	0.38 J	1.2	0.77	0.13	1.2	0.68	0.082	0.059	0.17	2.8	0.58 U	0.39	0.42	0.84	0.95	0.59
Dibenzo(a,h)anthracene	0.018	0.00012		0.052 J	0.026 J	0.013 J	0.061 U	0.24 U	0.25 U	0.042 J	0.11 J	0.24 U	0.025 J	0.0081 J	0.014 J	0.50	0.23 U	0.060 J	0.030 U	0.12 J	0.23 U	0.20 J
Fluoranthene	0.2			0.13	0.10	0.15	0.45	0.73	0.51	0.11	0.73	0.40 J	0.081	0.078	0.18	3.4	0.23 U	0.45	0.45	0.79	0.81	0.82
Fluorene	0.2			0.058 U	0.027 U	0.026 J	0.063 U	0.24 U	0.25 U	0.052 U	0.097 U	0.24 U	0.030 J	0.011 J	0.013 U	0.094 U	0.23 U	0.018 J	0.031 U	0.10 U	0.23 U	0.19 U
Indeno(1,2,3-cd)pyrene	0.018	0.0013		0.080 J	0.069 J	0.039 J	0.18 U	0.56	0.33 J	0.093 J	0.41	0.35 J	0.050 J	0.041 J	0.063 J	2.6	0.23 U	0.32	0.14 J	0.61	0.61	0.51
Naphthalene	0.2	12		0.037 J	0.022 J	0.032 U	0.16 U	0.47 U	0.51 U	0.035 J	0.19 U	0.48 U	0.023 J	0.023 J	0.032 U	0.19 U	0.47 U	0.034 U	0.078 U	0.19 U	0.47 U	0.39 U
Phenanthrene	0.2			0.084 J	0.093	0.079 J	0.12 J	0.26 J	0.25 U	0.061 U	0.47	0.24 U	0.046 J	0.058 J	0.083	1.2	0.23 U	0.15	0.14 J	0.31	0.25 J	0.34 J
Pyrene	0.2			0.12	0.090	0.14	0.40	0.87	0.67	0.11	0.81	0.58	0.074	0.075	0.18	3.6	0.24 J	0.47	0.48	0.84	1.0	0.72
Total Detected CPAHs (BaP TEF)		0.00012		0.13	0.078	0.065	0.22	0.75	0.44	0.13	0.71	0.48	0.092	0.073	0.18	4.5	0.058	0.60	0.48	1.0	0.99	0.80
Total Detected PAHs			1	0.98	0.73	0.80	2.2	6.7	4.2	0.92	6.2	3.9	0.69	0.58	1.4	28	0.82	3.7	3.9	6.7	7.0	5.7
PCBs (ug/l)																						
Aroclor 1016	0.96			0.077 U	0.077 U	0.077 U	0.083 U	0.052 U		0.077 U	0.049 U		0.077 U	0.077 U	0.077 U	0.047 U		0.077 U	0.079 U	0.047 U		0.0000022 U
Aroclor 1221	0.034			0.16 U	0.17 U	0.17 U	0.18 U	0.052 U		0.16 U	0.049 U		0.16 U	0.17 U	0.16 U	0.047 U		0.17 U	0.17 U	0.047 U		0.0000014 U
Aroclor 1232	0.034			0.18 U	0.18 U	0.18 U	0.19 U	0.052 U		0.18 U	0.049 U		0.18 U	0.18 U	0.18 U	0.047 U		0.18 U	0.18 U	0.047 U		0.0000034 U
Aroclor 1242	0.034			0.10 U	0.10 U	0.10 U	0.11 U	0.052 U		0.10 U	0.049 U		0.099 U	0.099 U	0.10 U	0.047 U		0.10 U	0.10 U	0.047 U		0.022
Aroclor 1248	0.034			0.039 U	0.039 U	0.039 U	0.042 U	0.052 U		0.04 U	0.049 U		0.039 U	0.039 U	0.039 U	0.047 U		0.039 U	0.040 U	0.047 U		0.000010 U
Aroclor 1254	0.034			0.12 U	0.12 U	0.12 U	0.13 U	0.052 U		0.12 U	0.049 U		0.12 U	0.12 U	0.12 U	0.047 U		0.12 U	0.12 U	0.047 U		0.066
Aroclor 1260	0.034			0.16 U	0.16 U	0.16 U	0.17 U	0.052 U		0.16 U	0.049 U		0.16 U	0.16 U	0.16 U	0.047 U		0.16 U	0.16 U	0.047 U		0.057
Detected Total PCB Aroclors	0.000064	0.0000064	0.3	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0		0.15
Phthalates (ug/l)																						
Bis(2-ethylhexyl) phthalate	2.2	0.2	4	1.3 U	1.3 U	0.50 JB	0.79 UB			1.3 U			1.3 U	0.37 JB	0.64 UB			0.36 JB	0.51 UB			0.89 J
Butylbenzyl phthalate	3			1.0 U	1.0 U	0.41 U	2.0 UB			2.0			1.0 U	0.37 JB	0.50 UB			0.43 U	1.0 U			0.50 U
Diethyl phthalate	3			1.1 U	1.1 U	0.082 JB	0.15 U			1.1 U			1.1 U	0.17 J	0.030 U			0.055 J	0.074 U			0.56 J
Dimethyl phthalate	3			1.3	1.3	0.035 J	0.15 U			1.3 U			1.3 U	0.021 J	0.31 U			0.041 J	0.077 U			0.50 U
Dibutyl phthalate	3			1.1 U	1.1 U	0.37 U	1.9 U			1.1 U			1.1 U	0.22 U	0.37 U			0.39 U	0.92 U			0.50 U
Di-n-octyl phthalate	3			0.94 U	0.94 U	0.016 U	0.30 UB			0.94 U			0.94 U	0.0093 U	0.061 UB			0.02 U	0.14 UB			0.50 U
Dioxins (pg/l)																						
1,2,3,4,6,7,8-HeptaCDD																						100
1,2,3,4,6,7,8-HeptaCDF																						27 J
1,2,3,4,7,8,9-HeptaCDF																						18 U
1,2,3,4,7,8-HexaCDD																						9.8 U
1,2,3,4,7,8-HexaCDF																						9.6 U
1,2,3,6,7,8-HexaCDD																						12 U
1,2,3,6,7,8-HexaCDF																						9.6 U
1,2,3,7,8,9-HexaCDD																						10 U
1,2,3,7,8,9-HexaCDF																						9.6 U
1,2,3,7,8-PentaCDD																						16 U
1,2,3,7,8-PentaCDF																						13 U
2,3,4,6,7,8-HexaCDF																						9.6 U
2,3,4,7,8-PentaCDF																						14 U
2,3,7,8-TetraCDD	0.0051	0.00051																				13 U
2,3,7,8-TetraCDF																						8.8 U
OCDD																						43 U
OCDF																						730
HeptaCDD homologs																						200
HeptaCDF homologs																						67
HexaCDD homologs																						9.6 U
HexaCDF homologs																						26 J
PentaCDD homologs																						9.6 U
PentaCDF homologs																						9.6 U
TetraCDD homologs																						1.9 U
TetraCDF homologs																						9.2
Total Dioxin TEQ (ND=DL/2)	0.051	0.00051																				22

Table 3
Storm Water Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values	SW-1 4/21/2007	SW-1 9/28/2007	SW-1 11/19/2007	SW-1 3/13/2008	SW-1 4/19/2012	SW-1 3/6/2013	SW-2 4/21/2007	SW-2 4/19/2012	SW-2 3/6/2013	SW-3 4/21/2007	SW-3 11/19/2007	SW-3 3/13/2008	SW-3 4/19/2012	SW-3 3/6/2013	SW-4 11/19/2007	SW-4 3/13/2008	SW-4 4/19/2012	SW-4 3/6/2013	Runon 9/14/2006 (COPW-8)
Total Dioxin TEQ (ND=0)	0.051	0.00051																				1.5
Metals Total (ug/l)																						
Aluminum																						
Antimony	6																					
Arsenic	0.045	0.018	2	1.1	0.69 J	0.23 J	0.69 J	3.4	3.5	0.92 J	8.3	3.9	0.94 J	0.13 U	0.41 J	3.4	0.84 J	0.64 J	1.3	1.1 J	1.0 J	2.7
Barium																						
Cadmium	0.094		0.5	0.39 J	0.10 U	0.10 U	0.16 J	0.52 J	0.71 J	0.34 J	1.3	1.1	0.44 J	0.10 U	0.12 J	1.0 U	0.50 U	0.43 J	0.24 J	0.50 U	0.50 U	2.0
Chromium	100	100	5	13	6.5	7.0	9.6	67	58	13	217	180	7.5	3.8	6.4	35	11	13	30	11	15	23
Copper	2.7	3	40	66	28	24	24	83	94	20	238	162	43	12	22	55	28	21	51	30	29	153
Lead	0.54		20	12	9.5	9.0	11	41	50	7.5	77	62	8.7	3.7	6.1	56	18	9.1	30	11	13	54
Manganese	50	50																				
Mercury	0.77		0.15	0.080 J	0.0375 U	0.038 U	0.038 U	0.20	0.17	0.070 J	0.17	0.13	0.060 J	0.038 U	0.038 U	0.14	0.040 U	0.038 U	0.063 J	0.040 U	0.040 U	0.20 U
Nickel	16		8	8.3	7.0	8.8	8.2	34	34	6.1	72	46	10	3.9	7.1	29	9.0	10	21	8.8	12	16
Silver	0.12		0.05																			
Zinc	36	36.5	500	97	65	52	73	307	337	73	806	573	57	24	48	166	93	62	143	106	111	267
Metals Dissolved (ug/l)																						
Aluminum																						
Antimony	6																					
Arsenic	0.045	0.018	2					0.50 U	0.50 U		0.50 U	0.50 U				0.50 U	0.50 U			0.50 U	0.50 U	
Barium																						
Cadmium	0.094		0.5					0.50 U	0.50 U		0.50 U	0.50 U				0.50 U	0.50 U			0.50 U	0.50 U	
Chromium	100	100	5					0.78 J	0.50 U		1.1 J	0.50 U				1.7 J	0.50 U			0.50 U	0.50 U	
Copper	2.7	1300	40					4.4	2.9		4.4	2.5				3.4	3.4			2.7	2.8	
Lead	0.54		20					0.50 U	0.50 U		0.50 U	0.50 U				0.50 U	0.50 U			0.50 U	0.50 U	
Manganese	50	50																				
Mercury	0.77		0.15					0.040 U	0.040 U		0.040 U	0.040 U				0.040 U	0.040 U			0.040 U	0.040 U	
Nickel	16		8					2.3	0.89 J		1.3 J	0.50 U				1.7 J	0.67 J			1.0 J	0.83 J	
Silver	0.12		0.05																			
Zinc	36	36.5	500					5.4	4.4		2.0 J	2.3 J				2.2 J	4.6			8.7	4.5	
TSS (mg/l)			30	95	28	51	79	586	808	40	1390	1270	56	24	49	383	241	118	80	98	241	299

U - Not detected at noted detection limit
B- Detected in method blank. Raised detection limit.
J- Estimated value
Blank cells - Not analyzed

1 - Table 3-1 PH JSCS Guidance, 7/16/2007 revision
2 -Draft PH Feasibilty Study Section 2.2 Tables. July 2015. RAO 3, 4, and 7 PRGs.

3 - October 2010, DEQ Guidance for Evaluating Stormwater Pathway at Upland Sites, Appendix E, Tool For Evaluating Stormwater Data. Typical storm water concentrations in Portland Harbor.

Detected concentration > 10 x PRG (or JSCS SLV if no PRG)
Detected concentration > 100 x PRG (or JSCS SLV if no PRG)
Detected concentration > 1000 x PRG (or JSCS SLV if no PRG)

Table 3
Storm Water Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values	Runon 10/3/2007	Runon 4/19/2012	Seep 1 11/19/2007	Seep 2 11/19/2007
PAHs (ug/l)							
2-Methylnaphthalene							
Acenaphthene	0.2			0.063 U	0.019 U	0.014 J	0.0060 U
Acenaphthylene	0.2			0.066 U	0.019 U	0.014 U	0.0063 U
Anthracene				0.062 U	0.019 U	0.026 J	0.010 J
Benzo(a)anthracene	0.018	0.0012		0.21 J	0.049	0.12	0.035 J
Benzo(a)pyrene	0.018	0.00012		0.24 J	0.059	0.17	0.047 J
Benzo(b)fluoranthene	0.018	0.0012		0.50		0.28	0.080
Benzo(k)fluoranthene	0.018	0.0013		0.14 J		0.082 J	0.024 J
Benzo(b+k)fluoranthene	0.018	0.0013			0.14		
Benzo(g,h,i)perylene	0.2			0.15 J	0.087	0.11 J	0.030 J
Chrysene	0.018	0.0013		0.44	0.11	0.17	0.057
Dibenzo(a,h)anthracene	0.018	0.00012		0.054 U	0.019 U	0.021 J	0.0073 J
Fluoranthene	0.2			0.40	0.11	0.21	0.059
Fluorene	0.2			0.14 U	0.019 U	0.014 U	0.0063 U
Indeno(1,2,3-cd)pyrene	0.018	0.0013		0.19 J	0.060	0.11	0.030 J
Naphthalene	0.2	12		0.072 JB	0.056	0.035 U	0.016 U
Phenanthrene	0.2			0.21 J	0.059	0.095 J	0.024 J
Pyrene	0.2			0.37	0.11	0.21	0.066
Total Detected CPAHs (BaP TEF)		0.00012		0.34	0.085	0.24	0.069
Total Detected PAHs			1	2.9	0.85	1.6	0.47
PCBs (ug/l)							
Aroclor 1016	0.96			0.077 U	0.047 U	0.077 U	0.077 U
Aroclor 1221	0.034			0.17 U	0.047 U	0.17 U	0.17 U
Aroclor 1232	0.034			0.18 U	0.047 U	0.18 U	0.18 U
Aroclor 1242	0.034			0.10 U	0.047 U	0.10 U	0.099 U
Aroclor 1248	0.034			0.039 U	0.047 U	0.039 U	0.039 U
Aroclor 1254	0.034			0.12 U	0.047 U	0.12 U	0.12 U
Aroclor 1260	0.034			0.16 U	0.047 U	0.27 J	0.16 U
Detected Total PCB Aroclors	0.000064	0.0000064	0.3	0	0	0.27	0
Phthalates (ug/l)							
Bis(2-ethylhexyl) phthalate	2.2	0.2	4	1.4		0.29 JB	0.42 JB
Butylbenzyl phthalate	3			1.0 U		0.45 U	0.32 JB
Diethyl phthalate	3			1.1 U		0.051 J	0.024 J
Dimethyl phthalate	3			1.3 U		0.034 U	0.016 U
Dibutyl phthalate	3			1.1 U		0.41 U	0.19 U
Di-n-octyl phthalate	3			0.94 U		0.017 U	0.0079 U
Dioxins (pg/l)							
1,2,3,4,6,7,8-HeptaCDD							
1,2,3,4,6,7,8-HeptaCDF							
1,2,3,4,7,8,9-HeptaCDF							
1,2,3,4,7,8-HexaCDD							
1,2,3,4,7,8-HexaCDF							
1,2,3,6,7,8-HexaCDD							
1,2,3,6,7,8-HexaCDF							
1,2,3,7,8,9-HexaCDD							
1,2,3,7,8,9-HexaCDF							
1,2,3,7,8-PentaCDD							
1,2,3,7,8-PentaCDF							
2,3,4,6,7,8-HexaCDF							
2,3,4,7,8-PentaCDF							
2,3,7,8-TetraCDD	0.0051	0.00051					
2,3,7,8-TetraCDF							
OCDD							
OCDF							
HeptaCDD homologs							
HeptaCDF homologs							
HexaCDD homologs							
HexaCDF homologs							
PentaCDD homologs							
PentaCDF homologs							
TetraCDD homologs							
TetraCDF homologs							
Total Dioxin TEQ (ND=DL/2)	0.051	0.00051					

Table 3
Storm Water Sample Analytical Laboratory Results
Crawford Street

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	DEQ App E Values	Runon 10/3/2007	Runon 4/19/2012	Seep 1 11/19/2007	Seep 2 11/19/2007
Total Dioxin TEQ (ND=0)	0.051	0.00051					
Metals Total (ug/l)							
Aluminum							
Antimony	6						
Arsenic	0.045	0.018	2	2.6	1.4	23	9.0
Barium							
Cadmium	0.094		0.5	0.80 J	0.57	2.2	0.54 J
Chromium	100	100	5	19	14	111	36
Copper	2.7	3	40	69	55	423	52
Lead	0.54		20	49	28	142	108
Manganese	50	50					
Mercury	0.77		0.15	0.050 J	0.040 U	0.11 J	0.038 U
Nickel	16		8	15	11	70	33
Silver	0.12		0.05				
Zinc	36	36.5	500	160	103	487	198
Metals Dissolved (ug/l)							
Aluminum							
Antimony	6						
Arsenic	0.045	0.018	2		0.50 U		
Barium							
Cadmium	0.094		0.5		0.50 U		
Chromium	100	100	5		0.89		
Copper	2.7	1300	40		10		
Lead	0.54		20		0.061		
Manganese	50	50					
Mercury	0.77		0.15		0.040 U		
Nickel	16		8		1.6 U		
Silver	0.12		0.05				
Zinc	36	36.5	500		8.0		
TSS (mg/l)			30	263	54	376	950

U - Not detected at noted detection limit
B- Detected in method blank. Raised detection limit.
J- Estimated value
Blank cells - Not analyzed

1 - Table 3-1 PH JSCS Guidance, 7/16/2007 revision
2 -Draft PH Feasibilty Study Section 2.2 Tables. July 2015. RAO 3, 4, and 7 PRGs.

3 - October 2010, DEQ Guidance for Evaluating Stormwater Pathway at Upland Sites, Appendix E, Tool For Evaluating Stormwater Data. Typical storm water concentrations in Portland Harbor.

Detected concentration > 10 x PRG (or JSCS SLV if no PRG)
Detected concentration > 100 x PRG (or JSCS SLV if no PRG)
Detected concentration > 1000 x PRG (or JSCS SLV if no PRG)

Table 4
Water Analytical Laboratory Methods, Sample Containers, Holding Times, and Preservation

Analytical Parameter	Analytical Method	Container	Holding Time	Preservation
Aluminum Antimony, Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Zinc	EPA 6020	500-ml HDPE bottle	6 months Hg 28-days	HNO_3 pH<2, 4 ±2°C
PCB Aroclors, Congeners, and Homologs	EPA 1668A	1-liter amber	1 year	4 ±2°C
PAHs	EPA 8270SIM	1-liter amber	7 day extract 40 days analysis	4 ±2°C
Total Organic Carbon	SM 5310 Mod	250-ml HDPE bottle	28 days	H_2SO_4 pH<2, 4 ±2°C
Total Suspended Solids	SM 2540D	250-ml HDPE bottle	7 days	4 ±2°C

Table 5
Water Analytical Laboratory Detection Limits

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	Analytical Laboroatory Detection Limit
PAHs (ug/l)			
Acenaphthene	0.2		0.010
Acenaphthylene	0.2		0.010
Anthracene			0.010
Benzo(a)anthracene	0.018	0.0012	0.010
Benzo(a)pyrene	0.018	0.00012	0.015
Benzo(b)fluoranthene	0.018	0.0012	0.015
Benzo(k)fluoranthene	0.018	0.0013	0.015
Benzo(b+k)fluoranthene	0.018	0.0013	0.015
Benzo(g,h,i)perylene	0.2		0.010
Chrysene	0.018	0.0013	0.010
Dibenzo(a,h)anthracene	0.018	0.00012	0.010
Fluoranthene	0.2		0.010
Fluorene	0.2		0.010
Indeno(1,2,3-cd)pyrene	0.018	0.0013	0.010
Naphthalene	0.2	12	0.020
Phenanthrene	0.2		0.010
Pyrene	0.2		0.010
Total Detected CPAHs (BaP TEF)		0.00012	
PCBs (ug/l)			
Aroclor 1016	0.96		0.02
Aroclor 1221	0.034		0.02
Aroclor 1232	0.034		0.02
Aroclor 1242	0.034		0.02
Aroclor 1248	0.034		0.02
Aroclor 1254	0.034		0.02
Aroclor 1260	0.034		0.02
Aroclor 1262			0.02
Aroclor 1268			0.02
Total Aroclors	0.000064	0.0000064	0.02
PCB Congeners (pg/l)			
PCB001			0.5
PCB002			0.5
PCB003			0.5
PCB004 & 010			0.5
PCB005 & 008			0.5
PCB006			0.5
PCB007 & 009			0.5
PCB011			0.5
PCB012 & 013			0.5
PCB014			0.5
PCB015			0.5
PCB016 & 032			0.5
PCB017			0.5
PCB018			0.5
PCB019			0.5
PCB020 & 021 & 033			0.5
PCB022			0.5
PCB023			0.5
PCB024 & 027			0.5
PCB025			0.5
PCB026			0.5
PCB028			0.5
PCB029			0.5
PCB030			0.5
PCB031			0.5
PCB034			0.5
PCB035			0.5
PCB036			0.5
PCB037			0.5
PCB038			0.5

Table 5
Water Analytical Laboratory Detection Limits

Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	Analytical Laboroatory Detection Limit
PCB039			0.5
PCB040			0.5
PCB041 & 064 & 071 & 072			0.5
PCB042 & 059			0.5
PCB043 & 049			0.5
PCB044			0.5
PCB045			0.5
PCB046			0.5
PCB047			0.5
PCB048 & 075			0.5
PCB050			0.5
PCB051			0.5
PCB052 & 069			0.5
PCB053			0.5
PCB054			0.5
PCB055			0.5
PCB056 & 060			0.5
PCB057			0.5
PCB058			0.5
PCB061 & 070			0.5
PCB062			0.5
PCB063			0.5
PCB065			0.5
PCB066 & 076			0.5
PCB067			0.5
PCB068			0.5
PCB073			0.5
PCB074			0.5
PCB077			0.5
PCB078			0.5
PCB079			0.5
PCB080			0.5
PCB081			0.5
PCB082			0.5
PCB083			0.5
PCB084 & 092			0.5
PCB085 & 116			0.5
PCB086			0.5
PCB087 & 117 & 125			0.5
PCB088 & 091			0.5
PCB089			0.5
PCB090 & 101			0.5
PCB093			0.5
PCB094			0.5
PCB095 & 098 & 102			0.5
PCB096			0.5
PCB097			0.5
PCB099			0.5
PCB100			0.5
PCB103			0.5
PCB104			0.5
PCB105			0.5
PCB106 & 118			0.5
PCB107 & 109			0.5
PCB108 & 112			0.5
PCB110			0.5
PCB111 & 115			0.5
PCB113			0.5
PCB114			0.5
PCB119			0.5
PCB120			0.5
PCB121			0.5
PCB122			0.5

Table 5
Water Analytical Laboratory Detection Limits

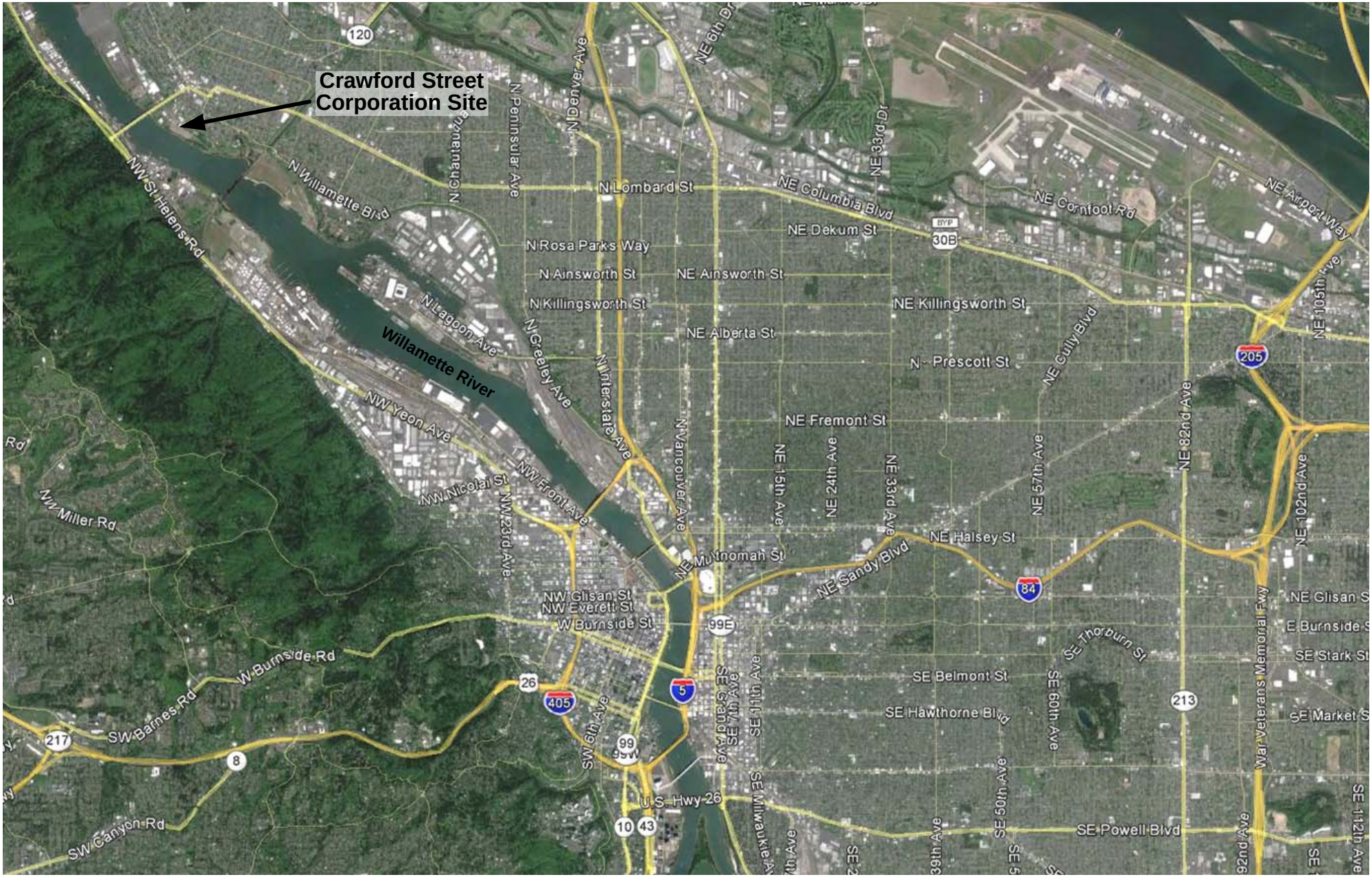
Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	Analytical Laboroatory Detection Limit
PCB123			0.5
PCB124			0.5
PCB126			0.5
PCB127			0.5
PCB128 & 162			0.5
PCB129			0.5
PCB130			0.5
PCB131			0.5
PCB132 & 161			0.5
PCB133 & 142			0.5
PCB134 & 143			0.5
PCB135			0.5
PCB136			0.5
PCB137			0.5
PCB138 & 163 & 164			0.5
PCB139 & 149			0.5
PCB140			0.5
PCB141			0.5
PCB144			0.5
PCB145			0.5
PCB146 & 165			0.5
PCB147			0.5
PCB148			0.5
PCB150			0.5
PCB151			0.5
PCB152			0.5
PCB153			0.5
PCB154			0.5
PCB155			0.5
PCB156			0.5
PCB157			0.5
PCB158 & 160			0.5
PCB159			0.5
PCB166			0.5
PCB167			0.5
PCB168			0.5
PCB169			0.5
PCB170			0.5
PCB171			0.5
PCB172			0.5
PCB173			0.5
PCB174			0.5
PCB175			0.5
PCB176			0.5
PCB177			0.5
PCB178			0.5
PCB179			0.5
PCB180			0.5
PCB181			0.5
PCB182 & 187			0.5
PCB183			0.5
PCB184			0.5
PCB185			0.5
PCB186			0.5
PCB188			0.5
PCB189			0.5
PCB190			0.5
PCB191			0.5
PCB192			0.5
PCB193			0.5
PCB194			0.5
PCB195			0.5
PCB196 & 203			0.5

Table 5
Water Analytical Laboratory Detection Limits

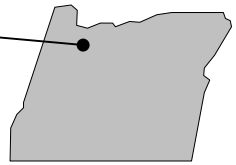
Chemical	Portland Harbor SLV JSCS[1]	Portland Harbor SLV PRG[2]	Analytical Laboroatory Detection Limit
PCB197			0.5
PCB198			0.5
PCB199			0.5
PCB200			0.5
PCB201			0.5
PCB202			0.5
PCB204			0.5
PCB205			0.5
PCB206			0.5
PCB207			0.5
PCB208			0.5
PCB209			0.5
Total PCB congeners	64	6.4	1 to 30
PCB Homologs (pg/l)			
Monochlorobiphenyl			0.5
Dichlorobiphenyl			0.5
Trichlorobiphenyl			0.5
Tetrachlorobiphenyl			0.5
Pentachlorobiphenyl			0.5
Hexachlorobiphenyl			0.5
Heptachlorobiphenyl			0.5
Octachlorobiphenyl			0.5
Nonachlorobiphenyl			0.5
Total PCBs (Method 1668)	64	6.4	0.5
Metals (ug/l)			
Aluminum			4.0
Antimony	6		0.50
Arsenic	0.045	0.018	0.50
Cadmium	0.094		0.50
Chromium	100		0.50
Copper	2.7	100	1.0
Lead	0.54	3	0.50
Manganese	50		0.50
Mercury	0.77	50	0.040
Nickel	16		0.50
Selenium	5		0.50
Silver	0.12		0.50
Zinc	36	36.5	2.0
TSS (mg/l)			5

1 - Table 3-1 PH JSCS Guidance, 7/16/2007 revision
2 -Draft PH Feasibilty Study Section 2.2 Tables. July 2015. RAO 3, 4, and 7 PRGs.

Figures



Portland,
Oregon



Base photograph April 2015

N

Approximate Scale

6000 feet

Figure 1
Site Location Map
Crawford Street Corporation

BRIDGEWATER GROUP, INC.

Base photograph April 2015

Project Actual

Approximate Scale

120 ft.

Figure 2
Site Plan
Crawford Street Corporation
Portland, OR

BRIDGEWATER GROUP, INC.

Base photograph April 2015

Project Actual

Approximate Scale

120 ft.

- 2006 Lampros Phase 2 Push Probe Location
- 2001 Preliminary Assessment Push Probe Location
- 2001 Preliminary Assessment Surface Soil Sample Location
- 2010 River Bank Erodible Surface Soil Sample
- 2008, 2010 Storm Water Pathway Surface Soil Sample Location

Figure 3
Soil and Groundwater Sample Locations
Crawford Street Corporation
Portland, OR

BRIDGEWATER GROUP, INC.

Base photograph April 2015

Project Actual

Approximate Scale

120 ft.

A Offsite Storm Water Discharge Drainage Basin and Discharge Points

SW-1 Storm Water Sample

SEEP-1 Approximate Wet Weather Seep Locations

Figure 4
Storm Water Sample Locations
Crawford Street Corporation
Portland, OR

BRIDGEWATER GROUP, INC.

Base photograph April 2015

Project Actual

Approximate Scale

120 ft.

2006 Lampros Phase 2 Push Probe Location

2001 Preliminary Assessment Push Probe Location

Proposed Groundwater Monitoring Well

Proposed Roof Drain Storm Water Sample

Figure 5
Proposed Data Gap Sample Locations
Crawford Street Corporation
Portland, OR

BRIDGEWATER GROUP, INC.

Appendix A - Groundwater Monitoring Well Installation and Development Procedures

The following well installation and development procedures are consistent with those established in the DEQ-approved, October 29, 2001, Phase I Remedial Investigation Sampling and Analysis Plan.

Groundwater Monitoring Well Installation

The groundwater monitoring well boring will be drilled using a truck- or trailer-mounted, hollow-stem auger or sonic drill rig. The field technician will observe and document the drilling activities and prepare a detailed field log for the boring noting the soil and groundwater conditions encountered.

The monitoring well will be constructed in the soil boring in accordance with OAR 690-240 and DEQ guidance, *Groundwater Monitoring Well Drilling, Construction, and Decommissioning* (1992). A start card will be filed by the driller in accordance with OAR 690-240.

The well will be completed using 2-inch diameter, flush-threaded, Schedule 40 PVC casing. The screened interval will be 10 feet long and consist of 10-slot, machine slotted, PVC screen with a PVC end cap threaded to the bottom of the screen. The well screen section will be pre-packed with 20/40 silica sand. The well screen will be placed at a depth anticipated to span the water table surface throughout seasonal fluctuations. The top of the casing will be capped with a lockable, water-tight cap.

A clean 10/20 silica sand pack will be placed between the boring wall and the pre-packed PVC screen/riser (i.e., the annulus) from the bottom of the well to approximately one to two feet above the screened interval. A bentonite seal will be placed above the sand to about one to two feet of the ground surface.

The surface completion may consist of a concrete surface seal securing a flush-mounted, traffic rated monument with tamper-resistant cover (either pentagonal or Allen bolts), or a locking, steel stick-up monument protected with bollards (to be determined based on final placement of the well). The monument will be permanently marked with the well identification number permanently marked with the well.

The field technician will document the well construction activities in field notes and a well construction log. Details to be noted include:

- Length of well components.
- Measurements of bentonite, sand, and concrete depths.
- Types, brands, and amounts of materials used.
- Documentation of equipment decontamination procedures.
- Any deviation from standard procedures or problems encountered during the well installation activities.

The drilling contractor will be responsible for conforming to all applicable regulations pertaining to well construction.

Drill spoils will be contained and managed as Investigation Derived Waste (IDW). Spoils will be sampled and characterized as necessary for offsite disposal.

Groundwater Monitoring Well Development

The new groundwater monitoring well will be developed after construction to minimize the turbidity of groundwater samples to be collected for analysis, and to optimize the hydraulic efficiency of the well. The well will be developed by surging with a slug rod and purging at least three casing volumes of water from the well using a stainless steel bailer or two-stage pump.

During development, electrical conductivity, temperature, dissolved oxygen, turbidity, and pH will be measured for each casing volume removed from the well to assess the effectiveness of the development. Development is considered complete when no additional reduction in the turbidity of the well water is observed and the above parameters have stabilized to within 10 percent for three successive casing volumes.

Development water will be contained and sampled and characterized, as necessary, for offsite disposal.