APPENDIX B
SUPPLEMENTAL RI SUPPORTING INFORMATION

ANCHOR
QEA

720 Olive Way, Suite 1900
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Brian Sato, Washington State Department of Ecology	**Date:**	January 31, 2014
From:	Jessica Goin, Halah Voges, and Ben Howard, Anchor QEA, LLC	**Project:**	120007-01.01
Cc:	Brian Gouran, Port of Bellingham		
Re:	Gasoline Range Total Petroleum Hydrocarbons at the Central Waterfront Site		

This memorandum summarizes Anchor QEA's review of the analytical results for the November 2013 Supplemental Remedial Investigation sampling event at the former Time Oil facility and recommendations for a follow-up groundwater sampling event.

INTRODUCTION

Anchor QEA's data quality review of the analytical results for the Central Waterfront Supplemental Remedial Investigation (CWSRI) November 2013 sampling event at the former Time Oil facility noted potential concerns with the gasoline range total petroleum hydrocarbons (TPHG) results. These concerns include poor reproducibility between duplicate samples, apparent inconsistency between reported TPHG concentrations and the concentrations of individual gasoline constituents (benzene, toluene, ethylbenzene, and xylene [BTEX]) by Method 8260C, and inconsistency between reported groundwater TPHG and soil TPHG concentrations. Following are examples of potential data quality concerns:

- The reported TPHG concentration for CWSRI-04-7-9.5 was 150 milligrams per kilogram (mg/kg), while the duplicate sample (CWSRI-54-7-9.5) had a reported concentration of 5,900 mg/kg.
- The reported TPHG concentration of CWSRI-54-7-9.5 was 5,900 mg/kg; however, the individual BTEX compounds were all less than 1.2 micrograms per kilogram (µg/kg) by Method 8260C.
- The relative concentrations of TPHG in groundwater and soil were 1.2/17 parts per million (ppm) at CWSRI-02 and 0.44/150 ppm (or 0.44/5,900 ppm) at CWSRI-04.

While these inconsistencies are theoretically possible, each is unlikely. Taken together, they strongly suggest method interference. Therefore, a thorough review of the data was performed.

ANALYTICAL RESULT SUMMARY

The Northwest Total Petroleum Hydrocarbons (NWTPH; Washington Department of Ecology 1997) gasoline and diesel range hydrocarbons (TPHD) determined by gas-chromatography flame ionization detector (GC-FID) and BTEX concentrations determined by gas-chromatography/mass spectroscopy (GC-MS; USEPA 2006) are summarized in Table 1. Consistent with screening levels developed for the Central Waterfront site, soil results were originally reported as mg/kg (ppm), while the groundwater results were reported in µg per liter (µ/L; parts-per-billion). However, for the purpose of facilitating cross media comparisons, groundwater and soil results in Table 1 are both presented as ppm. TPHD analysis included a silica gel clean-up step to correct for matrix interference from non-petroleum hydrocarbons per the Supplemental Remedial Investigation Work Plan, Addendum #6 (Anchor QEA 2013).

The BTEX concentration shown in Table 1 is the sum of the benzene, toluene, ethylbenzene, and total xylene concentrations, incorporating non-detects at one-half of the method detection limit, and converted to ppm. Xylene was detected in the blank; therefore, values reported for xylene as below the reporting level were incorporated into the sum concentration as the value reported, but were considered non-detects. BTEX was detected in two samples, groundwater at CWSRI-02 (benzene 0.32 µg/L, toluene 0.73 µg/L, ethylbenzene 0.2 µg/L, m,p xylene 2.6 µg/L and o-xylene 0.39 µg/L, sum BTEX 0.0042 ppm) and soil sample CWSRI-03-7-9 (benzene 5 µg/kg, toluene <1.1 µg/kg, ethylbenzene 1.3 µg/kg, m,p xylene 5.8 µg/kg, and o-xylene 0.9 [estimated] µg/kg, sum BTEX of 0.0739 ppm).

The analytical results are presented as compared to screening levels in the January 16 CWSRI Results Package (Attachment A). The soil samples from CWSRI-01-11-13, CWSRI-02-11-13, and CWSRI-04-12-14 were not analyzed for BTEX. The only reported values that exceed the relevant, most stringent screening level are for TPHG in soil at CWSRI-04-7-9.5 and groundwater at CWSRI-02.

Table 1
Summary of Analytical Results

Sample		TPH_{D} (ppm)	TPH_{G} (ppm)	BTEX (ppm)
CWSRI-01	Soil 6-8 feet	<6	<6.9	<0.0033
	Soil 11-13 feet	<6	<7.6	-
	Groundwater	<0.1	<0.25	<0.0005
CWSRI-02	Soil 6-8 feet	**720**	**17**	<1.475
	Soil 11-13 feet	**9.9**	<6.5	-
	Groundwater	**0.14**	**1.2**	**0.0042**
CWSRI-03	Soil 7-9 feet	<5.9	<8.7	**0.0739**
CWSRI-04	Soil 7-9.5 feet	**1,200**	**150**	<0.185
	Soil 7-9.5 feet Duplicate	**1,200**	**5,900**	<0.003
	Soil 12-14 feet	**9**	**20**	-
	Groundwater	**0.39**	**0.44**	<0.005

Notes:
Values in **bold** type represent concentrations greater than the method detection limit
BTEX = benzene, toluene, ethylbenzene, and xylene
TPH_{G} = gasoline range total petroleum hydrocarbons
TPH_{D} = diesel range total petroleum hydrocarbons
ppm = parts per million
CWSRI-04-7-9.5 duplicate is identified as CWSRI-54-7-9.5

Soil sample CWSRI-04-7-9.5 was also analyzed for volatile petroleum hydrocarbon/ extractable petroleum hydrocarbons (VPH/EPH) by NWTPH. The EPH detections were for the aliphatic and aromatics in the C10-C21 range, consistent with diesel. Aliphatics and aromatics in the C8 to C10 range were below the detection limit of 12,000 µg/kg. The VPH results were below the detection limit for C5 to C12 aliphatics (detection limit of 57,000 µg/kg), and concentrations of the individual gasoline fraction hydrocarbons, including BTEX, methyl tertiary butyl ether (MTBE) and straight chain aliphatics in the C5 to C10 range (pentane, hexane, octane, and decane) were below the 5,700 µg/kg detection limit. The diesel range aliphatic dodecane (12 carbons) had a concentration of 85,000 µg/kg. The C8 to C10 aromatic fraction was reported as 290,000 µg/kg; however, the absence of individual gasoline compounds suggests matrix interference by non-petroleum hydrocarbons in the gasoline range.

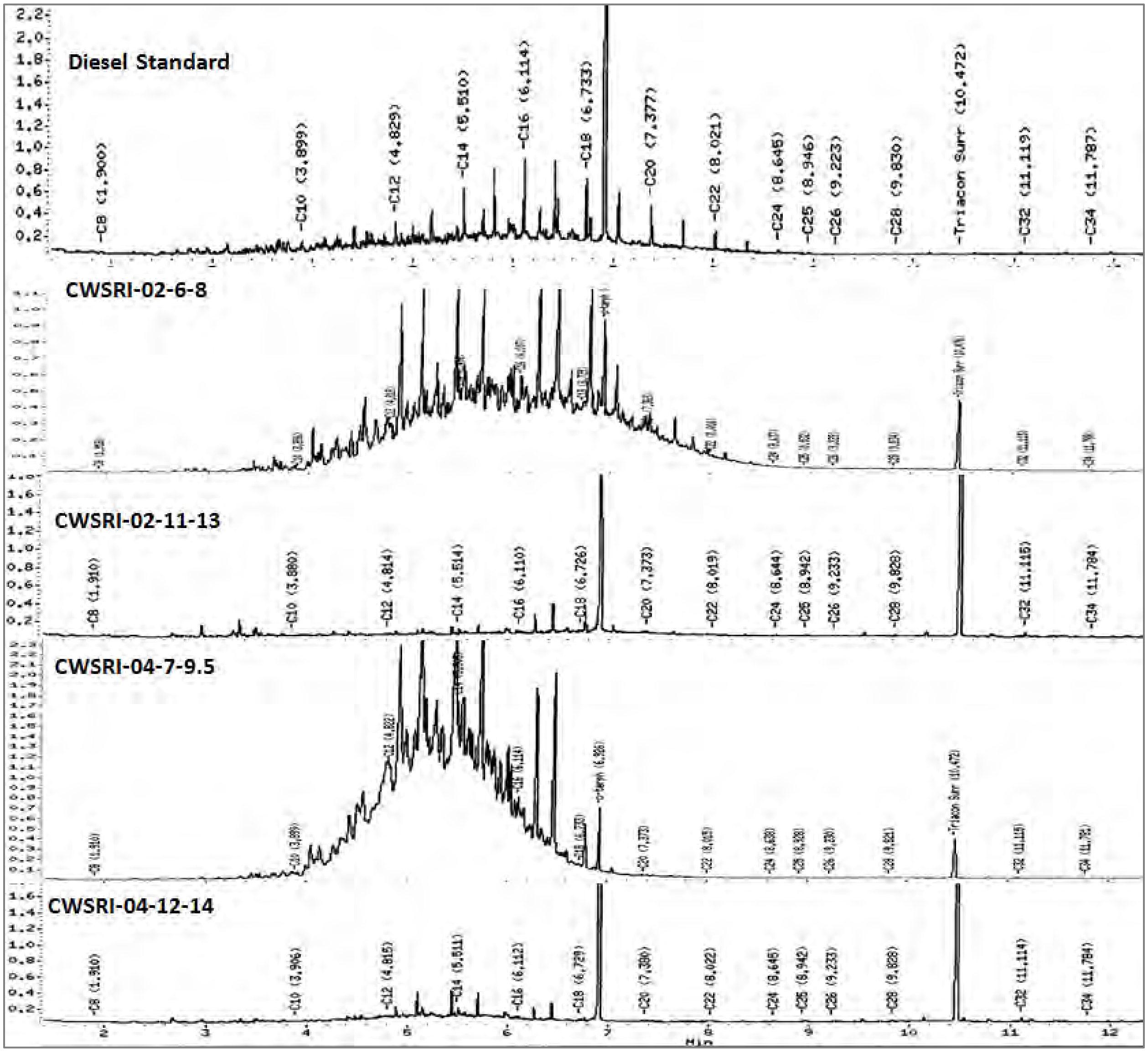
RAW DATA REVIEW

The GC-FID chromatogram traces were included in the data reports provided by Analytical Resources Incorporated (ARI). Raw data were reviewed for TPH_D and TPH_G analysis, as well as the data reports for VPH/EPH and BTEX.

Diesel Range Hydrocarbons

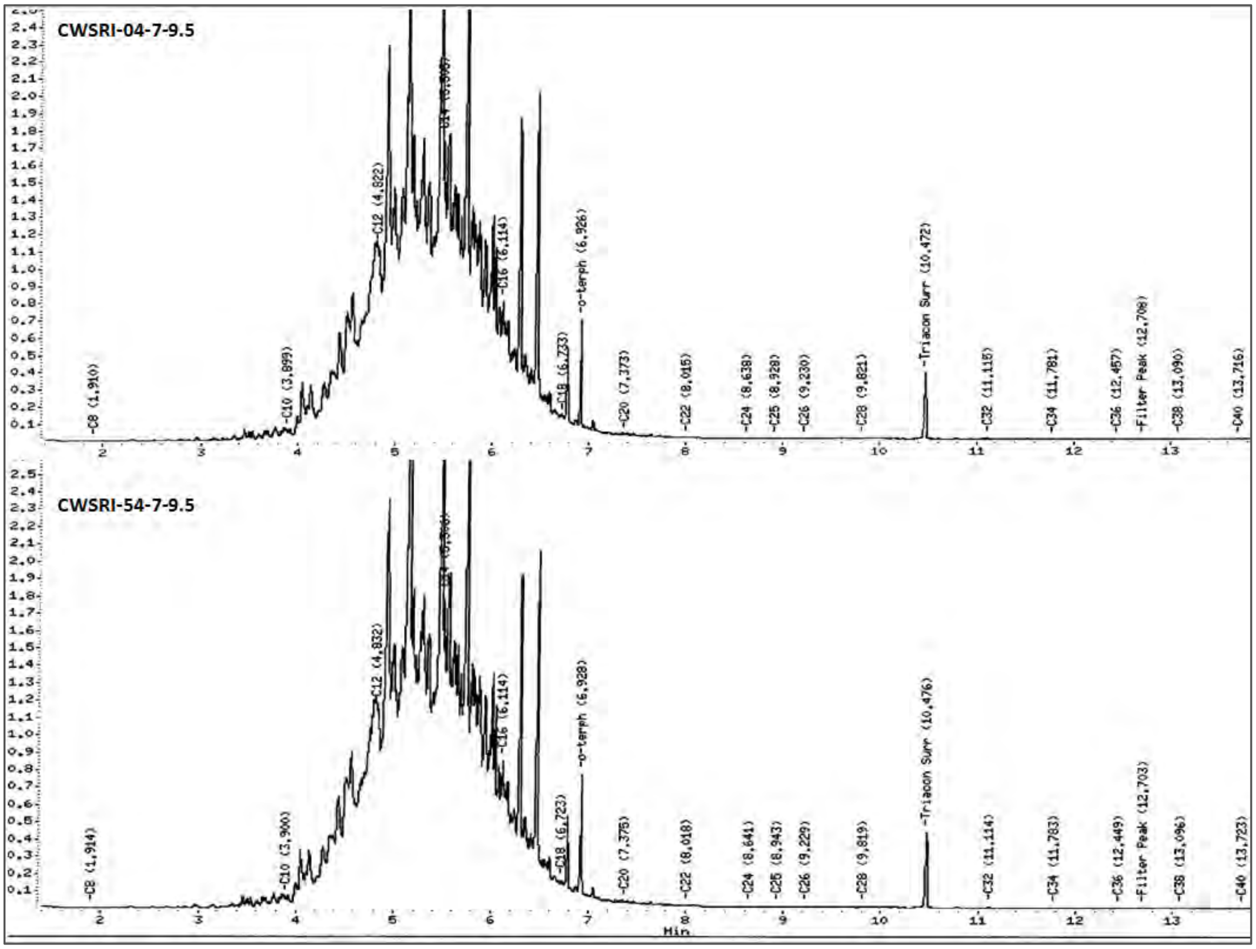
The NWTPH with silica gel diesel/motor oil range chromatograms of the samples with detectable concentrations (CWSRI-02-6-8 and CWSRI-02-11-13; CWSRI-04-7-9.5 and CWSRI-04-12-14) are similar and match the peak pattern and elution range of the diesel standard analyzed in conjunction with these samples (see Figure 1). Chromatograms are aligned by matching the C10 and terphenyl standard peaks. Intensity (y-axis) varies between samples with minimal diesel concentrations (e.g., CWSRI-02-11-13) and elevated diesel concentrations (e.g., CWSRI-02-6-8). To allow comparison of the trace patterns, the applicable chromatograms were reduced in size and the high-intensity peaks cropped to allow paneling of multiple traces. The original chromatograms capture the entire signal.

Figure 1. Chromatograms of the soil samples with TPH_D detections.



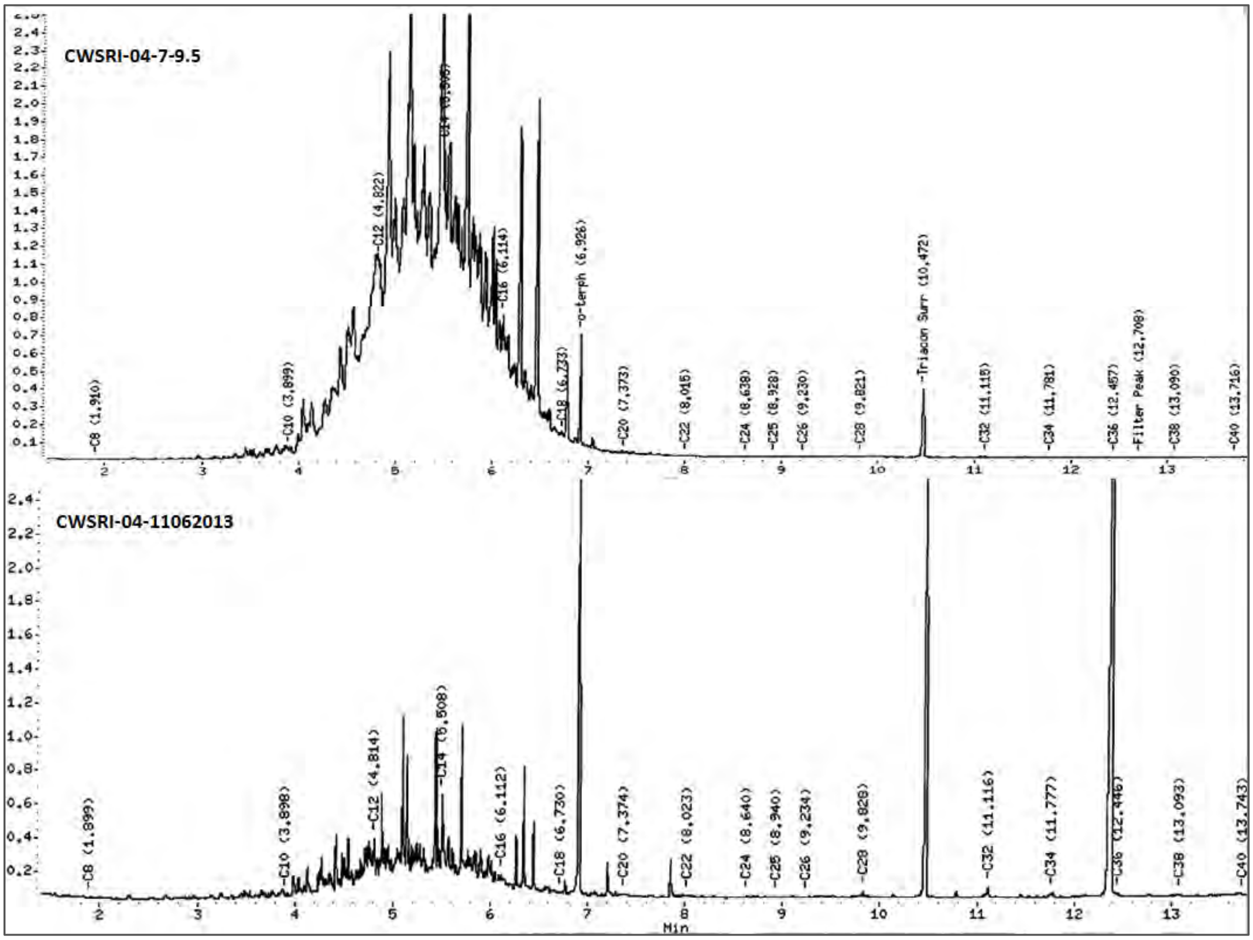
The BTEX concentrations determined by GC-MS were below the screening level, consistent with the absence of gasoline peaks on the diesel range GC-FID chromatograms following silica gel cleanup. Duplicate samples have consistent TPH_D chromatogram patterns (see Figure 2) and equivalent result values. Samples where analysis was repeated at a ten-fold dilution were also consistent in trace pattern and result values with undiluted samples.

Figure 2. TPH_D chromatograms for soil samples CWSRI-4 -7 – 9.5 and duplicate sample CWSRI-54-7-9.5. The TPH_D concentration was 1,200 mg/kg for both samples.



The TPH_D chromatograms for the corresponding water samples are consistent with diesel and similar to the soil profiles (see Figure 3).

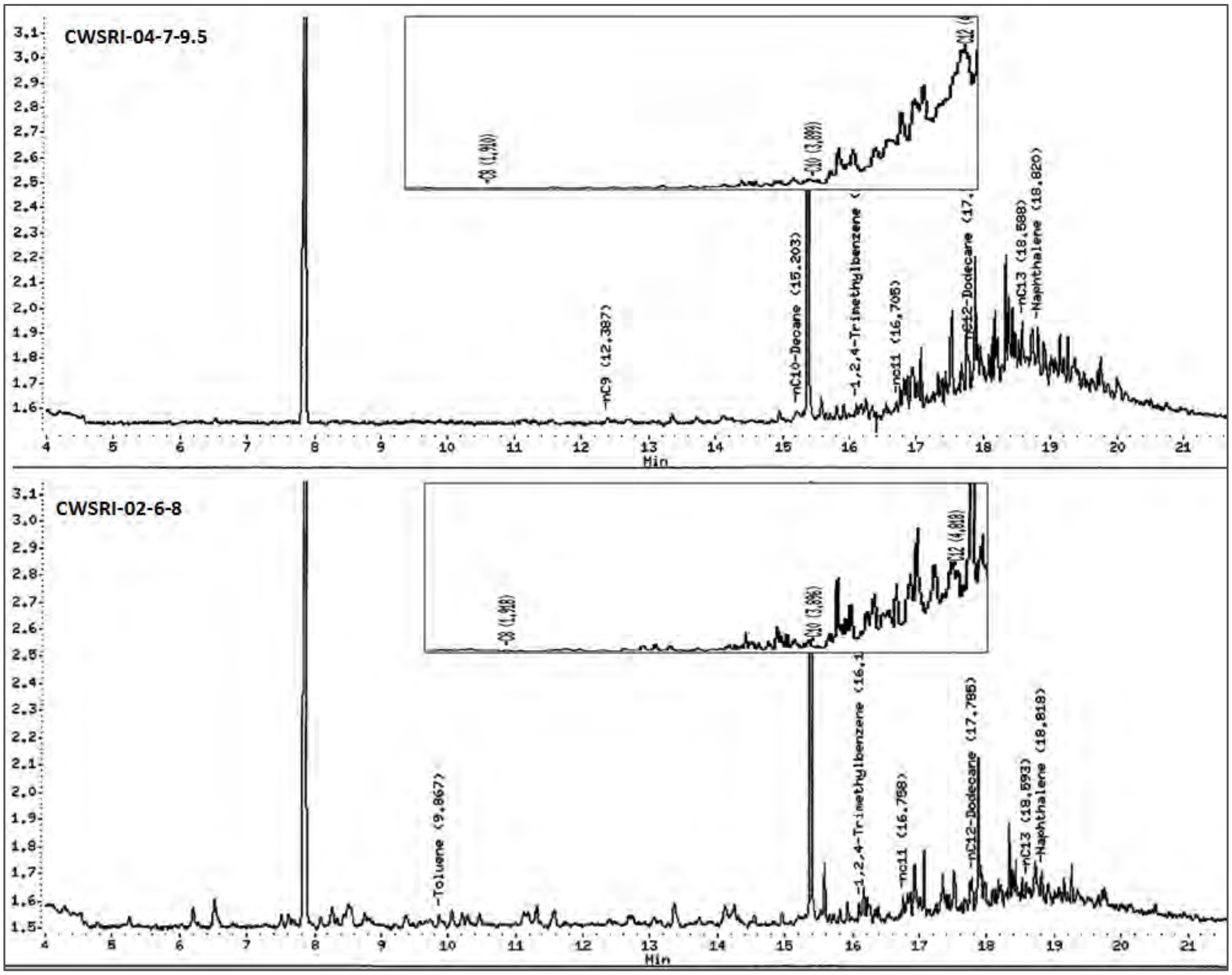
Figure 3. TPH$_D$ chromatogram traces for CWSRI-04 -7-9.5 soil and the CWSRI-04 groundwater sample.



APPARENT TPH$_G$ DETECTIONS

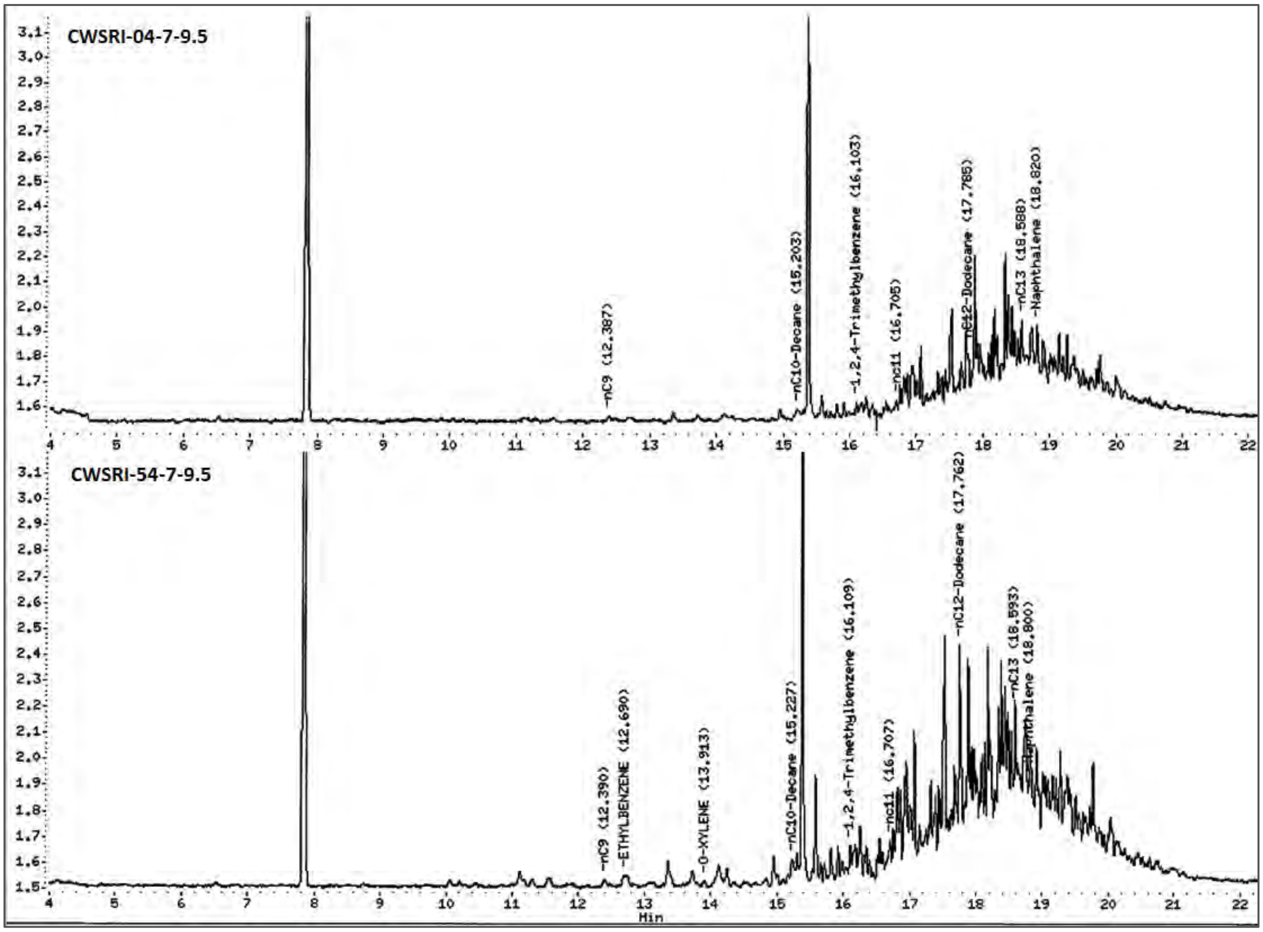
The gasoline range hydrocarbons results appear to be skewed towards elevated concentrations by matrix/method interference. Peaks present to the left of the diesel range for the TPH$_G$ chromatogram are absent or minimized in the TPH$_D$ chromatogram following silica gel cleanup (Figure 4).

Figure 4. TPH_G chromatograms for soil samples CWSRI-04-7-9.5 and CWSRI-02-6-8 with an inset of the light end of the diesel range TPH_D chromatograms for each sample. The elution times differ between the gasoline and diesel range chromatograms, the inset portion of the diesel range trace is expanded to align the C10 and C12 notations.



The duplicate samples are not well-matched for TPHG. Note the peaks to the left of the diesel range UCM compared to individual peak intensity (see Figure 5) as well as the distinct ethylbenzene peak (ethylbenzene was less than 1.2 μg/kg in this sample by GC-MS). This variability is consistent with method interference, especially as compared to the TPHD chromatograms, which were uniform between the duplicate samples.

Figure 5. TPH$_G$ chromatogram traces for soil samples CWSRI-4-7-9.5 and duplicate sample CWSRI-54-7-9.5. Note the greater UCM contribution on the trace for the duplicate sample, with a reported concentration of 5,900 mg/kg while CWSRI-4-7-9.5 had a reported concentration of 150 mg/kg.

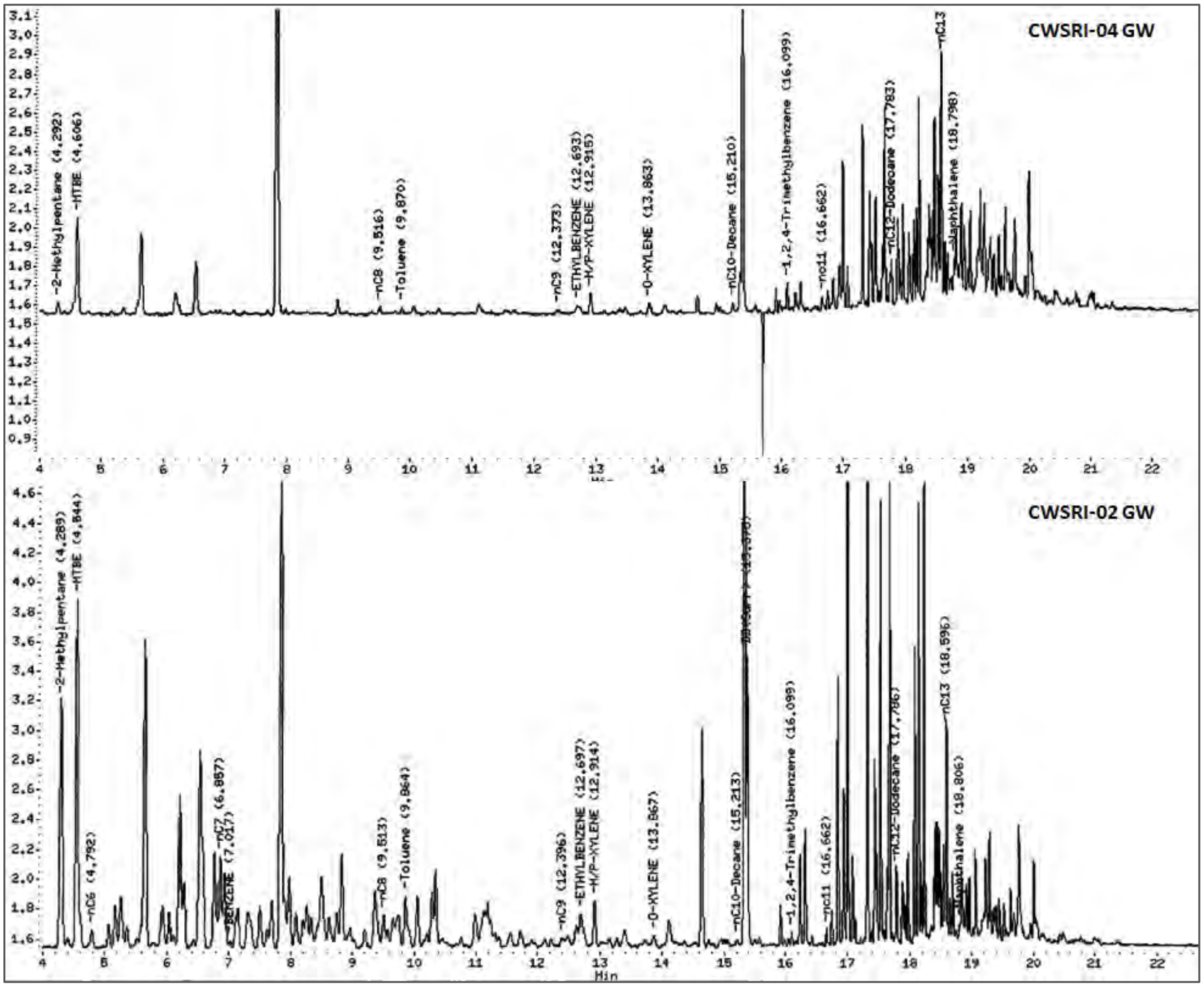


The TPH$_G$ results are inconsistent with the GC-MS results for BTEX concentrations, and the GC-MS has greater specificity by compound (i.e., less sensitive to interference) than the FID detector. BTEX concentrations in the groundwater samples from CWSRI-01 and CWSRI-04 were below the detection limit (<0.2 and <2 ppb, respectively), with the exception of xylene, which was measured at levels equivalent to the trip blank. Soil samples for CWSRI-01 and CWSRI 04 were also below the detection limit for the BTEX compounds. The BTEX concentrations at CWSRI-02 were 4.4 µg/L in groundwater, predominantly composed of xylene, and less than the 0.59 mg/kg detection limit in the soil sample from CWSRI-02-6-8.

These low concentrations (or non-detections) of BTEX are inconsistent with the presence of significant gasoline fraction hydrocarbons.

A comparison of the TPH$_G$ chromatograms for the groundwater samples to the gasoline standard indicates that gasoline fraction may be present in CWSRI-02 (consistent with the low-level detections of BTEX by GC-MS). However, it is clear on review of the chromatograms that diesel range compounds account for at least 50% of the total peak area on the chromatogram. TPH$_D$ was reported as 140 µg/L, while TPH$_G$ was reported as 1,200 µg/L. Additionally, while the reported concentration of TPH$_G$ in CWSRI-02 was 1,200 µg/L, the total BTEX was less than 5 µg/L. Ethylbenzene, for example, shown as a distinct peak on the chromatogram, would account for 0.02% of the reported TPH$_G$. This comparison to the GC-MS and TPH$_D$ data indicates that TPH$_G$ is being over-reported by at least an order of magnitude in this sample.

Figure 6. TPH$_G$ groundwater chromatogram traces for CWSRI-04 and CWSRI-02



The gasoline fraction reported in the CWSRI-04 soil samples may also reflect reporting of the light end (i.e., C10 to C12) of the diesel range as both diesel range and gasoline range hydrocarbons. The range quantified is from toluene to naphthalene, and while naphthalene has only 10 carbons, the effective carbon number of naphthalene is 11.6 (Gustafson et al. 1997).

SUMMARY AND RECOMMENDATIONS

This review of the results and raw analytical data indicates that the TPH$_G$ fraction reported for soil at CWSRI-04 reflects matrix interference and measurement of a portion of the diesel range as gasoline range hydrocarbons. The TPH$_G$ chromatograms for CWSRI-02 are consistent with gasoline range hydrocarbons; however, review of the analytical data indicates that the concentration of TPHG in the CWSRI-02 soil sample is likely significantly over-reported, due to the matrix interference and inclusion of diesel range hydrocarbons noted for CWSRI-04. The groundwater chromatographs were consistent with low levels of gasoline hydrocarbons at CWSRI-02 and absence of gasoline hydrocarbons at CWSRI-04.

Recommendations

- Flag the TPHG results from this monitoring event to reflect the influence of matrix interference on this method
- Request that ARI modify the reported TPHG range when TPHD is also reported, to ensure that the reported fractions do not overlap
- Resample groundwater at wells CWSRI-02 and -04 and analyze for NWTPH-Dx (with silica gel) and both TPHG fraction and BTEX by USEPA Method 8260C Modified, for which ARI is accredited by Ecology
- Request that ARI re-report the TPHG results from this sampling event (if possible), truncated at the diesel range to provide increased understanding of the relative contributions of matrix interference and diesel hydrocarbons to the apparent TPHG concentrations

REFERENCES

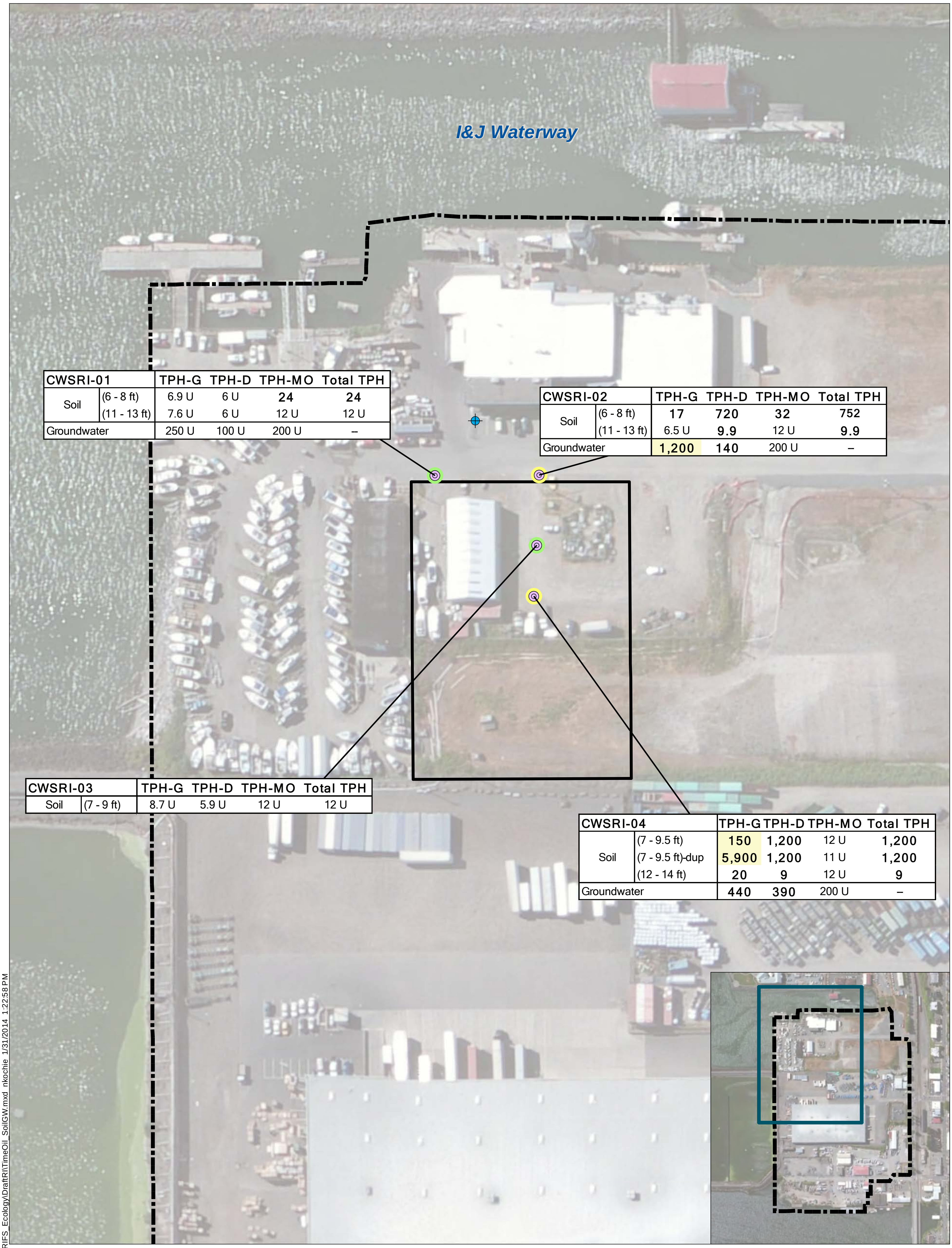
Anchor QEA (Anchor QEA, LLC), 2013. Letter to Brian Sato, P.E., Washington State Department of Ecology. Regarding: Central Waterfront Site – Agreed Order No. DE 3441 – RI/FS Work Plan, Addendum #6. October 18, 2013.

Ecology (Washington State Department of Ecology – Toxics Cleanup Program), 1997. Analytical Methods for Petroleum Hydrocarbons. Publication No. ECY 97-602: June.

Gustafson, John B., Joan Griffith Tell, and Doug Orem, 1997. *Selection of Representative TPH Fractions Based on Fate and Transport Considerations*. Total Petroleum Hydrocarbon Criteria Working Group Series, Volume 3. Amherst Scientific: Amherst, Massachusetts, July.

USEPA (U.S. Environmental Protection Agency), 2006. Method 8260C: Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 3, SW846; August.

ATTACHMENT A
NOVEMBER 2013 SUPPLEMENTAL REMEDIAL INVESTIGATION FORMER TIME OIL RESULT TABLES



CWSRI-01		TPH-G	TPH-D	TPH-MO	Total TPH
Soil	(6 - 8 ft)	6.9 U	6 U	**24**	**24**
	(11 - 13 ft)	7.6 U	6 U	12 U	12 U
Groundwater		250 U	100 U	200 U	–

CWSRI-02		TPH-G	TPH-D	TPH-MO	Total TPH
Soil	(6 - 8 ft)	**17**	**720**	**32**	**752**
	(11 - 13 ft)	6.5 U	**9.9**	12 U	**9.9**
Groundwater		**1,200**	**140**	200 U	–

CWSRI-03		TPH-G	TPH-D	TPH-MO	Total TPH
Soil	(7 - 9 ft)	8.7 U	5.9 U	12 U	12 U

CWSRI-04		TPH-G	TPH-D	TPH-MO	Total TPH
Soil	(7 - 9.5 ft)	**150**	**1,200**	12 U	**1,200**
	(7 - 9.5 ft)-dup	**5,900**	**1,200**	11 U	**1,200**
	(12 - 14 ft)	**20**	**9**	12 U	**9**
Groundwater		**440**	**390**	200 U	–

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▭ Approximate Former Time Oil Area

▭ Central Waterfront Site Boundary

⌖ Soil and Groundwater Boring

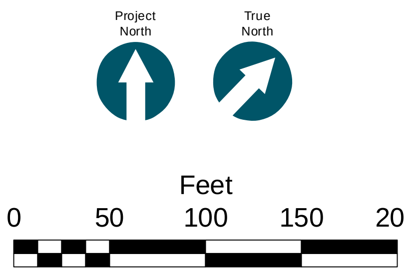
Soil Screening Level	TPH-G	TPH-D	TPH-MO	TPH (D+MO)
	30	2,000	2,000	2,000

Groundwater Screening Level	TPH-G	TPH-D	TPH-MO
	800	500	500

◎ Below Screening Level

◎ Above Screening Level

NOTES:
1. All soil and groundwater BTEX compounds results below screening levels.
2. All soil results reported in mg/kg.
3. All groundwater results reported in µg/L.
4. TPH-G = Gasoline Range Hydrocarbons
5. TPH-D = Diesel Range Hydrocarbons
6. TPH-MO = Motor Oil Range Hydrocarbons
7. Total TPH = sum of detected diesel- and motor oil-range TPH.
8. U = Not Detected



ANCHOR QEA

Figure A-1

Additional Supplemental RI Sampling – Former Time Oil
Central Waterfront RI/FS
Bellingham, WA

Table A-1
Former Time Oil Area Groundwater Results

	Location ID	CWSRI-01	CWSRI-02	CWSRI-04
	Sample ID	CWSRI-1-11062013	CWSRI-2-11062013	CWSRI-4-11062013
	Sample Date	11/06/2013	11/06/2013	11/06/2013
Constituent	**Screening Level**			
Total Petroleum Hydrocarbons (µg/L)				
Gasoline range hydrocarbons	800	250 U	🟨 **1,200**	**440**
Diesel range hydrocarbons	500	100 U	**140**	**390**
Motor oil range	500	200 U	200 U	200 U
Volatile Organics (µg/L)				
Benzene	2.4	0.2 U	**0.32**	2 UJ
Toluene	7,300	0.2 U	**0.73**	2 UJ
Ethylbenzene	2,100	0.2 U	**0.2**	2 UJ
m,p-Xylene	--	**0.15 J**	**2.6**	**1 J**
o-Xylene	440	**0.11 J**	**0.39**	2 UJ
Total Xylene (U = 1/2)	--	**0.26 J**	**2.99**	**2 J**

Notes:

🟨 Detected concentration is greater than Most Stringent screening level

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Table A-2
Former Time Oil Area Soil Results

	Location ID	**CWSRI-01**		**CWSRI-02**		**CWSRI-03**	**CWSRI-04**		
	Sample ID	**CWSRI-1-6-8**	**CWSRI-1-11-13**	**CWSRI-2-6-8**	**CWSRI-2-11-13**	**CWSRI-3-7-9**	**CWSRI-4-7-9.5**	**CWSRI-54-7-9.5**	**CWSRI-4-12-14**
	Sample Date	**11/05/2013**	**11/05/2013**	**11/05/2013**	**11/05/2013**	**11/05/2013**	**11/05/2013**	**11/05/2013**	**11/05/2013**
	Depth	**6 - 8 ft**	**11 - 13 ft**	**6 - 8 ft**	**11 - 13 ft**	**7 - 9 ft**	**7 - 9.5 ft**	**7 - 9.5 ft**	**12 - 14 ft**
Constituent	**Screening Level**								
Total Petroleum Hydrocarbons (mg/kg)									
Gasoline range hydrocarbons	30	6.9 U	7.6 U	**17**	6.5 U	8.7 U	**150**	**5,900**	**20**
Diesel range hydrocarbons	2,000	6 U	6 U	**720**	**9.9**	5.9 U	**1,200**	**1,200**	**9**
Motor oil range	2,000	**24**	12 U	**32**	12 U	12 U	12 U	11 U	12 U
TPH (DO+MO)	2,000	**24**	12 U	**752**	**9.9**	12 U	**1,200**	**1,200**	**9**
Volatile Organics (mg/kg)									
Benzene	0.005	0.0013 U	--	0.590 U	--	**0.005**	0.074 U	0.0012 U	--
Toluene	10	0.0013 U	--	0.590 U	--	0.0011 U	0.074 U	0.0012 U	--
Ethylbenzene	3.9	0.0013 U	--	0.590 U	--	**0.0013**	0.074 U	0.0012 U	--
m,p-Xylene	--	0.0013 U	--	0.590 U	--	**0.0058**	0.074 U	0.0012 U	--
o-Xylene	0.95	0.0013 U	--	0.590 U	--	**0.0009 J**	0.074 U	0.0012 U	--
Total Xylene (U = 1/2)	16,000	0.0013 U	--	0.590 U	--	**0.0067 J**	0.074 U	0.0012 U	--

Notes:

🟨 Detected concentration is greater than Most Stringent screening level

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Table A-3
Former Time Oil Area Soil VPH/EPH Results

Location ID	**CWSRI-04**
Sample ID	**CWSRI-4-7-9.5**
Sample Date	**11/05/2013**
Depth	**7 - 9.5 ft**
Volatile Petroleum Hydrocarbons (mg/kg)	
Benzene	5.7 UJ
Ethylbenzene	5.7 UJ
m,p-Xylene	11 UJ
Methyl tert-butyl ether (MTBE)	5.7 UJ
n-Decane (C10)	5.7 UJ
n-Dodecane (C12)	**85 J**
n-Hexane (C6)	5.7 UJ
n-Octane (C8)	5.7 UJ
n-Pentane (C5)	5.7 UJ
o-Xylene	5.7 UJ
Toluene	5.7 UJ
C5-C6 Aliphatics	57 UJ
C6-C8 Aliphatics	57 UJ
C8-C10 Aliphatics	57 UJ
C10-C12 Aliphatics	57 UJ
C8-C10 Aromatics	**290 J**
C10-C12 Aromatics	**1,200 J**
C12-C13 Aromatics	**220 J**
Extractable Petroleum Hydrocarbons (mg/kg)	
C8-C10 Aliphatics	12 U
C10-C12 Aliphatics	**180**
C12-C16 Aliphatics	**600**
C16-C21 Aliphatics	**110**
C21-C34 Aliphatics	12 U
C8-C10 Aromatics	12 U
C10-C12 Aromatics	**16**
C12-C16 Aromatics	**160**
C16-C21 Aromatics	**120**
C21-C34 Aromatics	12 UJ

Notes:

🟨 Detected concentration is greater than Most Stringent screening level

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Table A-4
Central Waterfront Nearshore Wells Results

	Location ID	**MW-1B**	**MW-4(O)**	**MW-8(O)**	**MW-8(O)**	**RMW-20**	**RMW-3D**	**RMW-5**	**RMW-7**
	Sample ID	**MW-1B-10302013**	**MW-4(O)-10302013**	**MW-8(O)-10292013**	**MW-8(O)-FD-10292013**	**RMW-20-10292013**	**RMW-3D-10292013**	**RMW-5-10302013**	**RMW-7-10312013**
	Sample Date	**10/30/2013**	**10/30/2013**	**10/29/2013**	**10/29/2013**	**10/29/2013**	**10/29/2013**	**10/30/2013**	**10/31/2013**
Constituent	**Screening Level**								
Conventional Parameters (mg/L)									
Total suspended solids	--	**12.7**	**7.8**	**16.9**	**16.6**	1.1 U	**1.7**	1.1 U	**3.5**
Total dissolved solids	--	**2,810**	**884**	**520**	**520**	**1,900**	**2,260**	**1,880**	**14,800**
Metals, Dissolved (µg/L)									
Antimony	--	**0.25 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**2.3**	**6**
Arsenic	5	**0.8 J**	**0.15 J**	0.5 U	0.5 U	**0.45 J**	**0.4 J**	**6**	**8**
Barium	--	**98**	**15**	**17**	**17**	**22**	**8**	**268**	**92**
Beryllium	--	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Cadmium	8.8	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.9**	0.5 U
Chromium	260	**69**	**16**	**0.3 J**	**0.3 J**	**4**	**60**	**1,100**	**6**
Chromium VI	50	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	**0.027 J**	0.03 U
Copper	3.1	2 U	1 U	1 U	1 U	1 U	1 U	**19**	**4**
Lead	8.1	**1**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**60.2**	**0.4 J**
Mercury	0.059	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.112**	0.02 U
Nickel	8.2	**0.7 J**	**5**	**0.28 J**	**0.38 J**	**0.88 J**	**1.22 J**	**10**	**1.35 J**
Selenium	71	**1.3 J**	**0.65 J**	**0.38 J**	**0.42 J**	1 U	**0.75 J**	**0.72 J**	**0.8 J**
Silver	1,900	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.2 J**	1 U
Thallium	--	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Zinc	81	**7 J**	**2.8 J**	**3.6 J**	10 U	10 U	10 U	**80**	**4.5 J**
Polycyclic Aromatic Hydrocarbons (µg/L)									
1-Methylnaphthalene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
2-Methylnaphthalene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Acenaphthene	3.3	--	0.01 U	**0.049**	**0.052**	--	--	--	--
Acenaphthylene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Anthracene	9.6	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(a)anthracene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(a)pyrene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(b)fluoranthene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(g,h,i)perylene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(k)fluoranthene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Chrysene	0.02	--	**0.013**	0.01 U	0.01 U	--	--	--	--
Dibenzo(a,h)anthracene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Fluoranthene	3.3	--	0.01 U	**0.018**	**0.021**	--	--	--	--
Fluorene	3	--	0.01 U	**0.048**	**0.05**	--	--	--	--
Indeno(1,2,3-c,d)pyrene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Naphthalene	83	--	**0.014**	**0.011**	**0.016**	--	--	--	--
Phenanthrene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Pyrene	15	--	0.01 U	**0.022**	**0.025**	--	--	--	--
Total cPAH TEQ (U = 1/2)	0.02	--	**0.008**	0.01 U	0.01 U	--	--	--	--
Dibenzofuran	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--

Notes:

🟨 Detected concentration is greater than Most Stringent screening level

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

ANCHOR QEA

720 Olive Way, Suite 1900
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

April 30, 2014

Brian Sato, P.E.
Toxics Cleanup Program
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, Washington 98008-5452

Re: Central Waterfront Site – Agreed Order No. DE 3441
Remedial Investigation/Feasibility Study Update Meeting Materials

Dear Brian:

The Port of Bellingham (the Port) and Anchor QEA, LLC (Anchor QEA) have completed supplemental Remedial Investigation (RI) activities to fill field-related data gaps to support completion of the RI/Feasibility Study (FS) for the Central Waterfront Site (Site). The work was performed at the Site in accordance with Agreed Order No. DE 3441 and consistent with the Supplemental RI Work Plan dated October 18, 2013 (Anchor QEA, 2013). The following describes the Supplemental RI sampling and analytical reporting; additional information is provided for soil and groundwater total petroleum hydrocarbons (TPH) results for the former Time Oil area. This information, as well as preliminary Conceptual Site Model (CSM) graphics, is provided in anticipation of a Central Waterfront RI/FS update meeting with Ecology. Upon Ecology review of the information presented with this letter, the Port and Anchor QEA would like to schedule a meeting at your earliest convenience.

Supplemental RI Activities

Former Time Oil Area Sampling

Sampling activities at the former Time Oil area were conducted in November 2013 and included:

- Four geoprobe borings as shown in Figure 1,
- Soil sampling from each boring with sampling at two depth intervals; 1) at the groundwater smear zone and 2) depth below the smear zone,
- Groundwater sampling at three borings where one-inch monitoring wells were installed.

In consultation with Ecology, additional groundwater sampling was conducted in February 2014 to confirm the results from the initial testing. Sampling activities included:

- Groundwater sampling at the three one-inch monitoring wells consistent with the sampling performed during November 2013.

Supplemental RI soil and groundwater results for the former Time Oil area are presented in Tables 1 to 5. Sampling locations are shown on Figure 1.

Site-Wide Nearshore Groundwater Sampling

Groundwater sampling was performed by a field geologist at seven existing Site monitoring wells as shown on Figure 1. Sampling and testing included:

- Groundwater sampling was performed using low-flow methodology at existing nearshore monitoring wells MW-8(O), MW-4(O), RMW-20, RMW-3D, RMW-5, RMW-7, and MW-1B.
- Groundwater samples were tested for dissolved metals (field filtered) at all well locations and polycyclic aromatic hydrocarbons (PAHs) from two wells (MW-4(O) and MW-8(O)) located along the northern shoreline. Water samples for PAH analyses were centrifuged by the laboratory prior to extraction.
- Due to potential salinity interference from adjacent marine water, metals analyses were conducted using ICP-MS instrumentation in Universal Cell Technology (UCT).

Supplemental RI nearshore groundwater sampling results are presented in Table 6. Sampling locations are shown on Figure 1.

Landfill Gas Monitoring

Landfill gas monitoring was performed to confirm the presence of landfill-associated gas (e.g., methane) measured in 2001 along Roeder Avenue. Landfill gas monitoring results in other areas have shown a declining concentration over time; however, there was a need to confirm monitoring results along Roeder Avenue. Landfill gas monitoring included:

- Landfill gas monitoring was performed at three monitoring wells (RMW-16, MW-12(B), and MW-5(B)) in this area to evaluate whether concentrations have declined, consistent with other areas of the site.
- Monitoring was conducted using a combustible gas monitor (%LEL) and PID to record %LEL, percent oxygen, carbon monoxide, and hydrogen sulfide.

Supplemental RI landfill gas monitoring results are presented in Table 7 and monitoring locations are shown on Figure 1.

TPH$_G$ ANALYTICAL RESULTS REPORTING

Anchor QEA's data quality review of the analytical results for the Supplemental RI November 2013 sampling event at the former Time Oil area noted potential concerns with the gasoline range total petroleum hydrocarbons (TPH$_G$) results. The data quality review was described in detail in a January 31, 2014 Memorandum (Anchor QEA, 2014).

As recommended in the January 31, 2014 Memorandum, the initial November 2013 TPH$_G$ results were flagged to reflect the influence of matrix interference from the method. It was requested that the analytical laboratory (Analytical Resources, Inc.) re-report the TPH$_G$ data to ensure that the reported fractions do not overlap with the reported diesel range total petroleum hydrocarbons (TPH$_{Dx}$) results. The re-reported results were truncated at the diesel range to provide increased understanding of the relative contributions of matrix interference and diesel hydrocarbons to the apparent TPH$_G$ concentrations. The truncated ranges resulted in TPH$_G$ reported for the carbon range of C-6 to C-10, and TPH$_{Dx}$ reported for the range of C-10 to C-24. Groundwater sampling results from the February 2014 event were reported consistent with the modified truncated ranges.

Tables 1 to 5 present TPH results for the initial November 2013 sampling, the re-reported November 2013 data, and February 2014 data.

TPHG GROUNDWATER SCREENING LEVEL

TPHG analytical groundwater results are presented in Table 1 and are compared to the screening level of 800 micrograms per liter (µg/L; based on presence of benzene). This screening level is derived from the MTCA Method A cleanup level for TPHG for the protection of drinking water. Although groundwater at the Central Waterfront Site is non-potable, TPH screening levels for groundwater protective of surface water are not available. However, screenings levels for benzene are available. In addition, Marine SCO values are not available for the lighter end compounds in gasoline to calculate groundwater concentrations of individual compounds protective of marine sediments. Application of the Method A screening level to groundwater is believed to be sufficiently conservative to protect surface water, sediment and associated receptors.

The TPHG results were detected below the MTCA Method A cleanup level of 800 µg/L in all monitoring wells at the former Time Oil area sampled in both November 2013 and February 2014. These data collaborate with the low benzene concentration detected at one monitoring well in November 2013 (this same well was non-detect for benzene in February 2014). The absence of benzene in groundwater and distance of the Time Oil area from the I&J Waterway indicates that the groundwater-to-surface water and groundwater-to-sediment pathways are not complete for TPHG concentrations at the former Time Oil area.

Conceptual Site Model Development

The data collected as part of the Supplemental RI will be incorporated into the Site-Wide Conceptual Site Model (CSM). The Central Waterfront CSM consists of historical site use and contaminants of concern, nature and extent of contamination, fate and transport, and exposure pathways and receptors. Preliminary graphics have been developed to outline the Central Waterfront CSM for incorporation into the RI report. Preliminary graphics include:

- Figure 2: Historical Site Operations and Land Use
    - Presents former operations throughout the Site and includes the location of former or existing underground storage tanks (USTs).
- Figures 3 to 7: Nature and Extent of Contamination

  - Presents areas exceeding Site-specific screening levels for TPH_G and benzene, TPH_{Dx}, carcinogenic PAHs, metals, and landfill gas distribution. Contaminant specific notes are provided on each figure.
- Figure 8: Exposure pathways for soil and groundwater screening level development

REFERENCES

Anchor QEA, 2013. Letter to Brian Sato, P.E., Washington State Department of Ecology. Regarding: Central Waterfront Site – Agreed Order No. DE3441 – RI/FS Work Plan, Addendum #6. October 18, 2013.

Anchor QEA, 2014. Memorandum to Brian Sato, P.E., Washington State Department of Ecology. Regarding: Gasoline Range Total Petroleum Hydrocarbons at the Central Waterfront Site. January 31, 2014.

Sincerely,

Halah Voges, P.E.
Anchor QEA, LLC

cc: Brian Gouran, Port of Bellingham
Ben Howard, Anchor QEA
Steve Germiat, Aspect Consulting

Attachments:

Figure 1 – Supplemental RI Sampling Locations
Figure 2 – Historical Site Operations and Land Use
Figure 3 – TPH-Gasoline and BTEX Concentrations Above Screening Levels
Figure 4 – TPH-Dx Concentrations Above Screening Levels
Figure 5 – Total cPAH and Naphthalene Concentrations Above Screening Levels

Table 1
Former Time Oil Area Groundwater Results:
Total Petroleum Hydrocarbons

Well ID		**CWSRI-01**			**CWSRI-02**			**CWSRI-04**		
Sample Date		**11/06/2013**		**02/19/2014**	**11/06/2013**		**02/19/2014**	**11/06/2013**		**02/19/2014**
	Screening Level	**GC/FID-Original**	**GC/FID-Re-report**	**GC/MS**	**GC/FID-Original**	**GC/FID-Re-report**	**GC/MS**	**GC/FID-Original**	**GC/FID-Re-report**	**GC/MS**
Total Petroleum Hydrocarbons (µg/L)										
Gasoline range hydrocarbons	800	250 U	250 U	250 U	**1,200**	**620**	**720**	**440**	250 U	250 UJ
Diesel range hydrocarbons	500	100 U	100 U	100 U	**140**	**260**	**120**	**390**	**440**	100 U
Motor oil range hydrocarbons	500	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U

Notes:

Bold = Detected result

🟨 Detected concentration is greater than screening level

µg/L = microgram per liter

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Diesel and oil range hydrocarbons analyzed by NWTPH-Dx

Gasoline range hydrocarbons analyzed by GC/FID for samples collected on 11/6/2013 and analyzed by GC/MS for samples collected on 2/19/2014.

Gasoline range hydrocarbons results from 11/6/2013 were re-reported for the range of C6-C10.

Gasoline range hydrocarbons results from 2/19/2014 are presented for range from C6-C10.

Table 2
Former Time Oil Area Groundwater Results: BTEX

	Well ID	**CWSRI-01**		**CWSRI-02**		**CWSRI-04**	
	Sample Date	**11/06/2013**	**02/19/2014**	**11/06/2013**	**02/19/2014**	**11/06/2013**	**02/19/2014**
	Screening Level						
BTEX Compounds (µg/L)							
Benzene	2.4	0.2 U	0.5 U	**0.32**	0.5 U	2 UJ	0.5 UJ
Toluene	7,300	0.2 U	0.5 U	**0.73**	0.5 U	2 UJ	0.5 UJ
Ethylbenzene	2,100	0.2 U	0.5 U	**0.2**	0.5 U	2 UJ	0.5 UJ
m,p-Xylene	--	**0.15 J**	1 U	**2.6**	**3.5**	**1 J**	1 UJ
o-Xylene	440	**0.11 J**	0.5 U	**0.39**	**0.6**	2 UJ	**0.5 J**

Notes:

Bold = Detected result

🟨 Detected concentration is greater than screening leve

µg/L = microgram per liter

BTEX = benzene, toluene, ethylbenzene, and xylene

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Table 3
Former Time Oil Area Soil Results:
Total Petroleum Hydrocarbons

Well ID		CWSRI-01				CWSRI-02			
Sample Date		11/05/2013				11/05/2013			
Depth		6 - 8 feet		11 - 13 feet		6 - 8 feet		11 - 13 feet	
	Screening Level	Original	Re-report	Original	Re-report	Original	Re-report	Original	Re-report
Total Petroleum Hydrocarbons (mg/kg)									
Gasoline range hydrocarbons	30	6.9 U	6.9 U	7.6 U	7.6 U	**17**	6.5 U	6.5 U	6.5 U
Diesel range hydrocarbons	2,000	6 U	6 U	6 U	6 U	**720**	**680**	**9.9**	**9.4**
Motor oil range hydrocarbons	2,000	**24**	**24**	12 U	12 U	**32**	**32**	12 U	12 U
Total Petroleum Hydrocarbons (diesel + motor oil)	2,000	**24**	**24**	12 U	12 U	**752**	**712**	**9.9**	**9.4**

Well ID		CWSRI-03		CWSRI-04				CWSRI-04 Field Duplicate	
Sample Date		11/05/2013		11/05/2013				11/05/2013	
Depth		7 - 9 feet		7 - 9.5 feet		12 - 14 ft		7 - 9.5 feet	
	Screening Level	Original	Re-report	Original	Re-report	Original	Re-report	Original	Re-report
Total Petroleum Hydrocarbons (mg/kg)									
Gasoline range hydrocarbons	30	8.7 U	8.7 U	**150**	35 U	**20**	6.4 U	**5,900**	700 U
Diesel range hydrocarbons	2,000	5.9 U	5.9 U	**1,200**	**1,200**	**9**	**9.4**	**1,200**	**1,200**
Motor oil range hydrocarbons	2,000	12 U	12 U	12 U	12 U	12 U	12 U	11 U	11 U
Total Petroleum Hydrocarbons (diesel + motor oil)	2,000	12 U	12 U	**1,200**	**1,200**	**9**	**9.4**	**1,200**	**1,200**

Notes:
Bold = Detected result
🟨 Detected concentration is greater than screening level
🟦 Non-detected result is greater than screening level
mg/kg = milligram per kilogram
J = Estimated value
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
Diesel and oil range hydrocarbons analyzed by NWTPH-Dx with silica gel cleanup
Gasoline range hydrocarbons analyzed by GC/FID for samples collected on 11/5/2013.
Gasoline range hydrocarbons results from 11/5/2013 were re-reported for the range of C6-C10.
Diesel range hydrocarbons results from 11/5/2013 were re-reported for the range of C10-C24.

Table 4
Former Time Oil Area Soil Results: BTEX

Location ID		**CWSRI-01**	**CWSRI-02**	**CWSRI-03**	**CWSRI-04**	
Sample Date		**11/05/2013**	**11/05/2013**	**11/05/2013**	**11/05/2013**	**11/05/2013**
Depth		**6 - 8 feet**	**6 - 8 feet**	**7 - 9 feet**	**7 - 9.5 feet**	**7 - 9.5 feet**
	Screening Level					**Field Duplicate**
BTEX Compounds (mg/kg)						
Benzene	0.005	0.0013 U	0.590 U	**0.005**	0.074 U	0.0012 U
Toluene	--	0.0013 U	0.590 U	0.0011 U	0.074 U	0.0012 U
Ethylbenzene	--	0.0013 U	0.590 U	**0.0013**	0.074 U	0.0012 U
m,p-Xylene	--	0.0013 U	0.590 U	**0.0058**	0.074 U	0.0012 U
o-Xylene	--	0.0013 U	0.590 U	**0.0009 J**	0.074 U	0.0012 U

Notes:

Bold = Detected result

🟨 Detected concentration is greater than screening level

🟦 Non-detected result is greater than screening level

mg/kg = milligram per kilogram

BTEX = benzene, toluene, ethylbenzene, and xylene

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

BTEX compounds analyzed by GC/MS 8260.

Table 5

Former Time Oil Area Soil Results:
Extractable and Volatile Petroleum Hydrocarbons

	Location ID	**CWSRI-04**
	Sample Date	**11/05/2013**
	Depth	**7 - 9.5 feet**
	Screening Level	
Extractable Petroleum Hydrocarbons (mg/kg)		
C8-C10 Aliphatics	--	12 U
C10-C12 Aliphatics	--	**180**
C12-C16 Aliphatics	--	**600**
C16-C21 Aliphatics	--	**110**
C21-C34 Aliphatics	--	12 U
C12-C16 Aromatics	--	**160**
C16-C21 Aromatics	--	**120**
C21-C34 Aromatics	--	12 UJ
Volatile Petroleum Hydrocarbons (mg/kg)		
Methyl tert-butyl ether (MTBE)	--	5.7 UJ
n-Decane (C10)	--	5.7 UJ
n-Dodecane (C12)	--	**85 J**
n-Hexane (C6)	--	5.7 UJ
n-Octane (C8)	--	5.7 UJ
n-Pentane (C5)	--	5.7 UJ
C5-C6 Aliphatics	--	57 UJ
C6-C8 Aliphatics	--	57 UJ
C8-C10 Aromatics	--	**290 J**
C10-C12 Aromatics	--	**1,200 J**
C12-C13 Aromatics	--	**220 J**

Notes:
Bold = Detected result
mg/kg = milligram per kilogram
EPH = Extractable Petroleum Hydrocarbons
VPH = Volatile Petroleum Hydrocarbons
J = Estimated value
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit

Table 6
Site-Wide Neashore Groundwater Sampling Results

	Location ID	**MW-1B**	**MW-4(O)**	**MW-8(O)**	**MW-8(O)**	**RMW-20**	**RMW-3D**	**RMW-5**	**RMW-7**
	Sample ID	**MW-1B-10302013**	**MW-4(O)-10302013**	**MW-8(O)-10292013**	**MW-8(O)-FD-10292013**	**RMW-20-10292013**	**RMW-3D-10292013**	**RMW-5-10302013**	**RMW-7-10312013**
	Sample Date	**10/30/2013**	**10/30/2013**	**10/29/2013**	**10/29/2013**	**10/29/2013**	**10/29/2013**	**10/30/2013**	**10/31/2013**
Constituent	**Screening Level**								
Conventional Parameters (mg/L)									
Total suspended solids	--	**12.7**	**7.8**	**16.9**	**16.6**	1.1 U	**1.7**	1.1 U	**3.5**
Total dissolved solids	--	**2,810**	**884**	**520**	**520**	**1,900**	**2,260**	**1,880**	**14,800**
Metals, Dissolved (µg/L)									
Antimony	--	**0.25 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**2.3**	**6**
Arsenic	5	**0.8 J**	**0.15 J**	0.5 U	0.5 U	**0.45 J**	**0.4 J**	**6**	**8**
Barium	--	**98**	**15**	**17**	**17**	**22**	**8**	**268**	**92**
Beryllium	--	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Cadmium	8.8	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.9**	0.5 U
Chromium	260	**69**	**16**	**0.3 J**	**0.3 J**	**4**	**60**	**1,100**	**6**
Chromium VI	50	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	**0.027 J**	0.03 U
Copper	3.1	2 U	1 U	1 U	1 U	1 U	1 U	**19**	**4**
Lead	8.1	**1**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**60.2**	**0.4 J**
Mercury	0.059	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.112**	0.02 U
Nickel	8.2	**0.7 J**	**5**	**0.28 J**	**0.38 J**	**0.88 J**	**1.22 J**	**10**	**1.35 J**
Selenium	71	**1.3 J**	**0.65 J**	**0.38 J**	**0.42 J**	1 U	**0.75 J**	**0.72 J**	**0.8 J**
Silver	1,900	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.2 J**	1 U
Thallium	--	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Zinc	81	**7 J**	**2.8 J**	**3.6 J**	10 U	10 U	10 U	**80**	**4.5 J**
Polycyclic Aromatic Hydrocarbons (µg/L)									
1-Methylnaphthalene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
2-Methylnaphthalene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Acenaphthene	3.3	--	0.01 U	**0.049**	**0.052**	--	--	--	--
Acenaphthylene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Anthracene	9.6	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(a)anthracene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(a)pyrene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(b)fluoranthene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(g,h,i)perylene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Benzo(k)fluoranthene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Chrysene	0.02	--	**0.013**	0.01 U	0.01 U	--	--	--	--
Dibenzo(a,h)anthracene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Fluoranthene	3.3	--	0.01 U	**0.018**	**0.021**	--	--	--	--
Fluorene	3	--	0.01 U	**0.048**	**0.05**	--	--	--	--
Indeno(1,2,3-c,d)pyrene	0.02	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Naphthalene	83	--	**0.014**	**0.011**	**0.016**	--	--	--	--
Phenanthrene	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--
Pyrene	15	--	0.01 U	**0.022**	**0.025**	--	--	--	--
Total cPAH TEQ (U = 1/2)	0.02	--	**0.008**	0.01 U	0.01 U	--	--	--	--
Dibenzofuran	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--

Notes:

🟨 Detected concentration is greater than Most Stringent screening level

Bold = Detected result

mg/L = milligrams per liter

ug/L = micrograms per liter

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

TEQ = toxic equivalency quotient

Table 7
Supplemental RI Landfill Gas Monitoring Results

Well ID	Time Interval (minutes)	% LEL	O_2 (%)	CO (ppm)	H_2S (ppm)	PID (ppm)
RMW-16	0	0	21.3	--	--	--
	1	0	20.9	0	0	--
	2	0	20.9	0	0	--
	3	--	--	--	--	0.2-0.3
	4	0	20.9	0-6	0	--
	5	0	20.9	0	0	--
	6	--	--	--	--	0.2-0.4
	7	0	20.9	0-6	0	--
	8	0	20.9	0-6	0	--
	9	--	--	--	--	0.2-0.3
MW-12(B)	0	100 +	--	--	--	--
	1	0	20.9	0	0	--
	2	0	20.9	0	0	--
	3	--	--	--	--	0.0
	4	0	20.9	0	0	--
	5	0	20.9	0	0	--
	6	--	--	--	--	0.0
	7	0	20.9	0	0	--
	8	0	20.9	0	0	--
	9	--	--	--	--	0.0
MW-5(B)	0	100 +	--	--	--	--
	1	58	20.0	0	0	--
	2	0	20.9	0	0	--
	3	--	--	--	--	0.0
	4	0	20.9	0	0	--
	5	0	20.9	0	0	--
	6	--	--	--	--	0.0
	7	0	20.9	0	0	--
	8	0	20.9	0	0	--
	9	--	--	--	--	0.0-0.1

Notes:

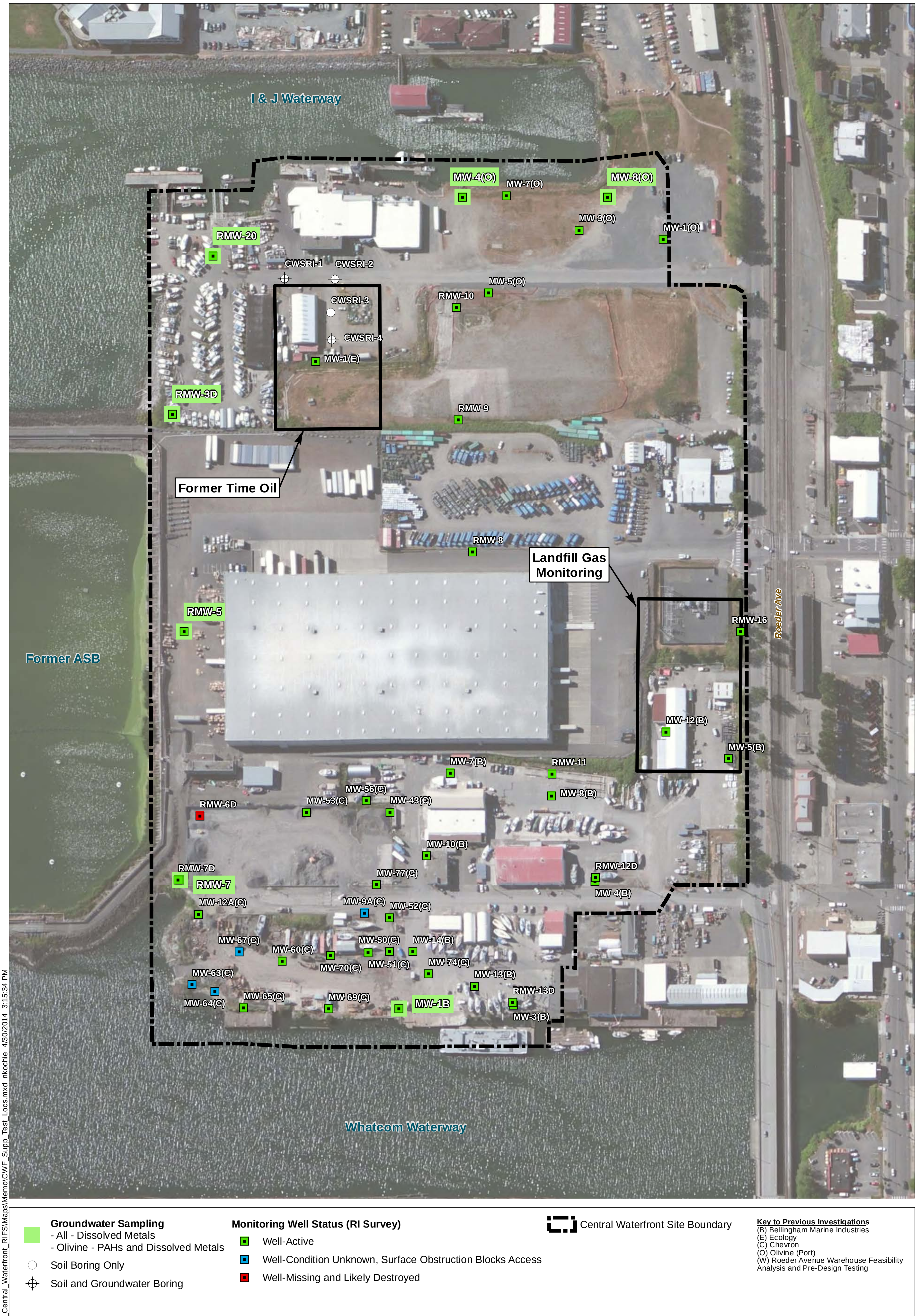
Landfill gas monitoring performed on September 19, 2013.

MiniPro combustible gas meter used to measure % LEL, O_2, CO, and H_2S.

Ion Science PhoCheck+ 1000Ex PID (10.6eV lamp) used to measure volatile compounds (PID).

ppm = parts per million

% = percent



NOTES:
1. Aerial by Bing © 2010 Microsoft Corporation and its data suppliers.

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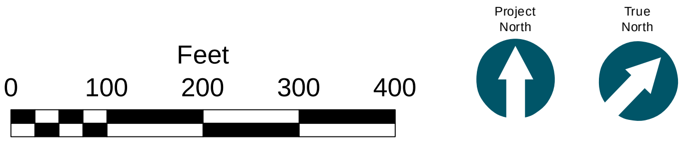

Figure 1
Supplemental RI Sampling Locations
Central Waterfront RI/FS
Bellingham, WA

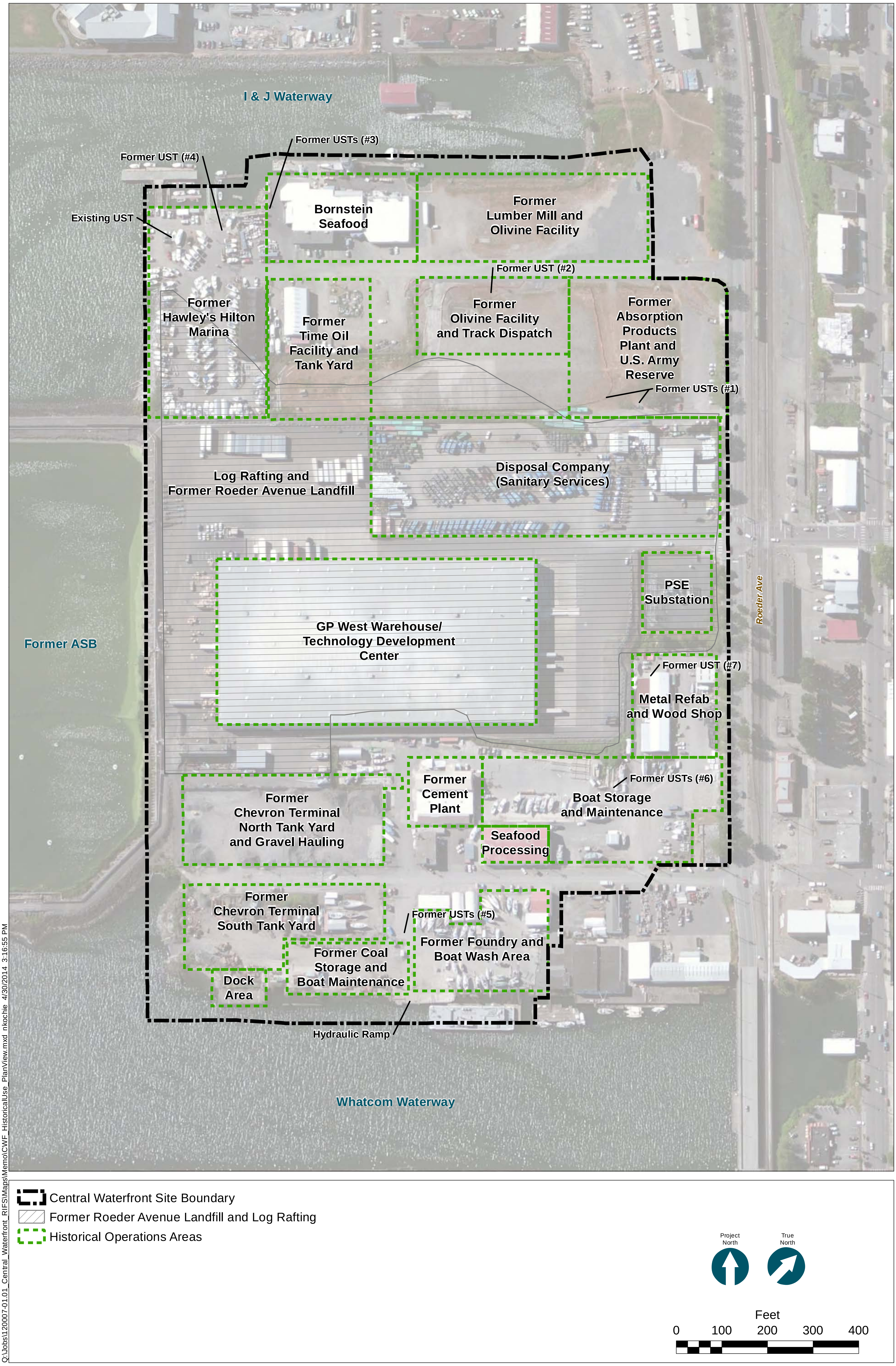

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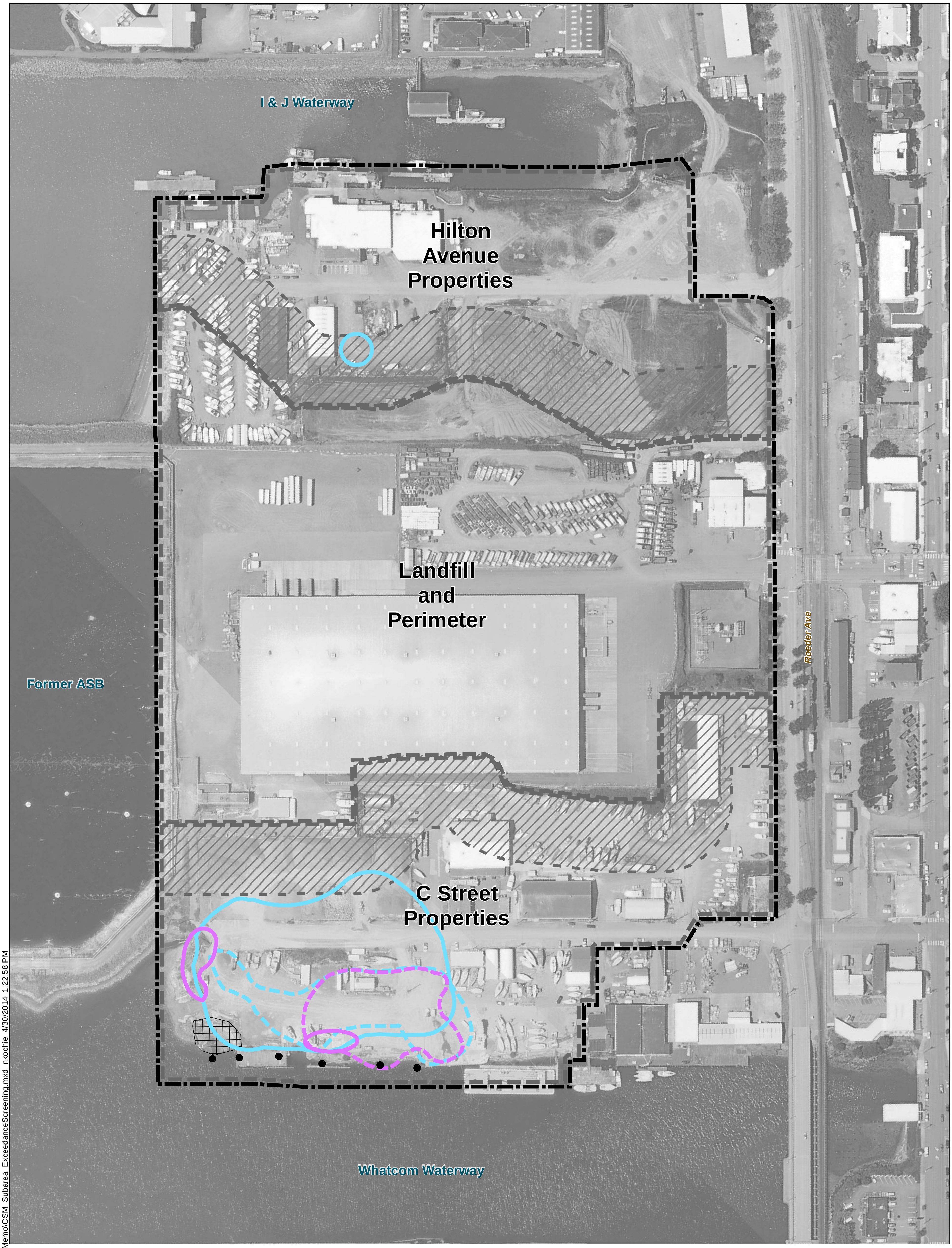
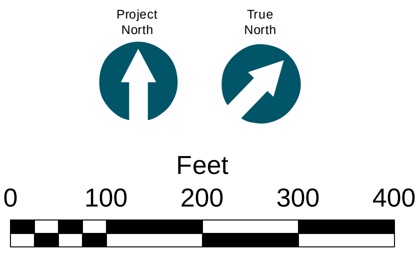
Figure 2
Historical Site Operations and Land Use
Central Waterfront RI/FS
Bellingham, WA



● Porewater Samping Location
▭ Extent of TPH-G Exceedances in Soil
▭ Extent of TPH-G Exceedances in Groundwater and Porewater
▭ Extent of BTEX Exceedances in Soil
▭ Extent of BTEX Exceedances in Groundwater and Porewater
▭ Central Waterfront Site Boundary
▭ Subarea Boundary
▨ Landfill Perimeter
▦ Interim Action Removal Area



NOTES:
1. Lateral extent of TPH-G and BTEX exceedances in soil, groundwater, and porewater are approximate and based on the most stringent screening levels.
2. For locations with multiple samples, the highest concentration was used; groundwater and porewater results include 2002-current.
3. TPH-G = Gasoline range hydrocarbons; BTEX = benzene, toluene, ethylbenzene, and xylene.
4. Aerial by U.S. Geological Survey: July 2009.

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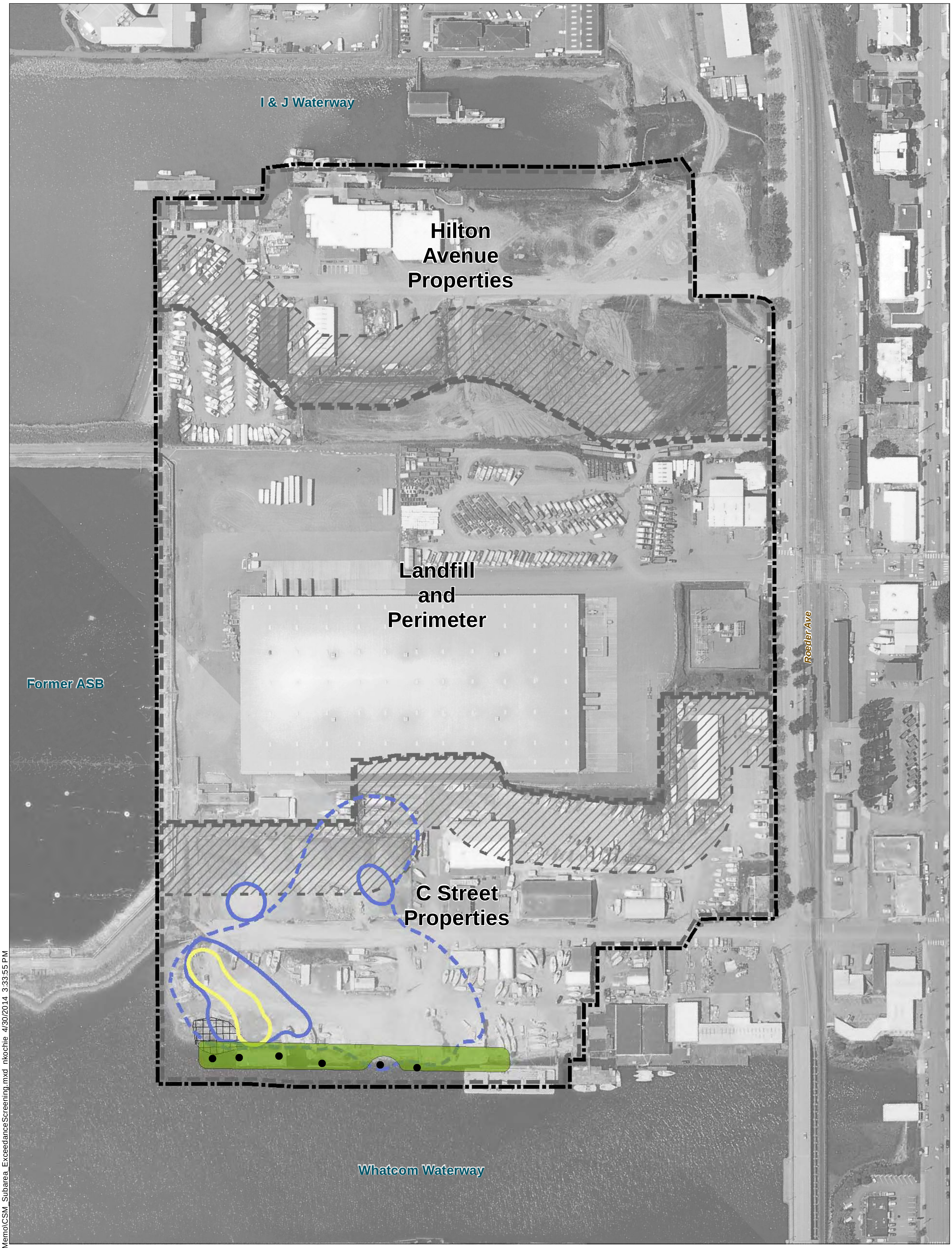
ANCHOR QEA

Figure 3
TPH-Gasoline and BTEX Concentrations Above Screening Levels
Central Waterfront RI/FS
Bellingham, WA



● Porewater Samping Location

▭ Extent of TPH-Dx in Soil with Silica Gel Cleanup

▭ Extent of TPH-Dx in Soil without Silica Gel Cleanup

⬚ Extent of TPH-Dx in Groundwater and Porewater without Silica Gel Cleanup

🟩 Area Below Screening Levels with most recent (2012/2013) Silica Gel Methodology

⬚ Central Waterfront Site Boundary

⬚ Subarea Boundary

▨ Landfill Perimeter

▦ Interim Action Removal Area

NOTES:
1. Lateral extent of TPH-Dx exceedances in soil, groundwater, and porewater are approximate and based on the most stringent screening levels.
2. For locations with multiple samples, the highest concentrations were used; groundwater and porewater results include 2002-current.
3. Results above include the sum of diesel and motor oil range hydrocarbons.
4. No groundwater samples analyzed with silica gel cleanup exceeded screening levels.
5. Aerial by U.S. Geological Survey: July 2009.

Project North

True North

Feet
0 100 200 300 400

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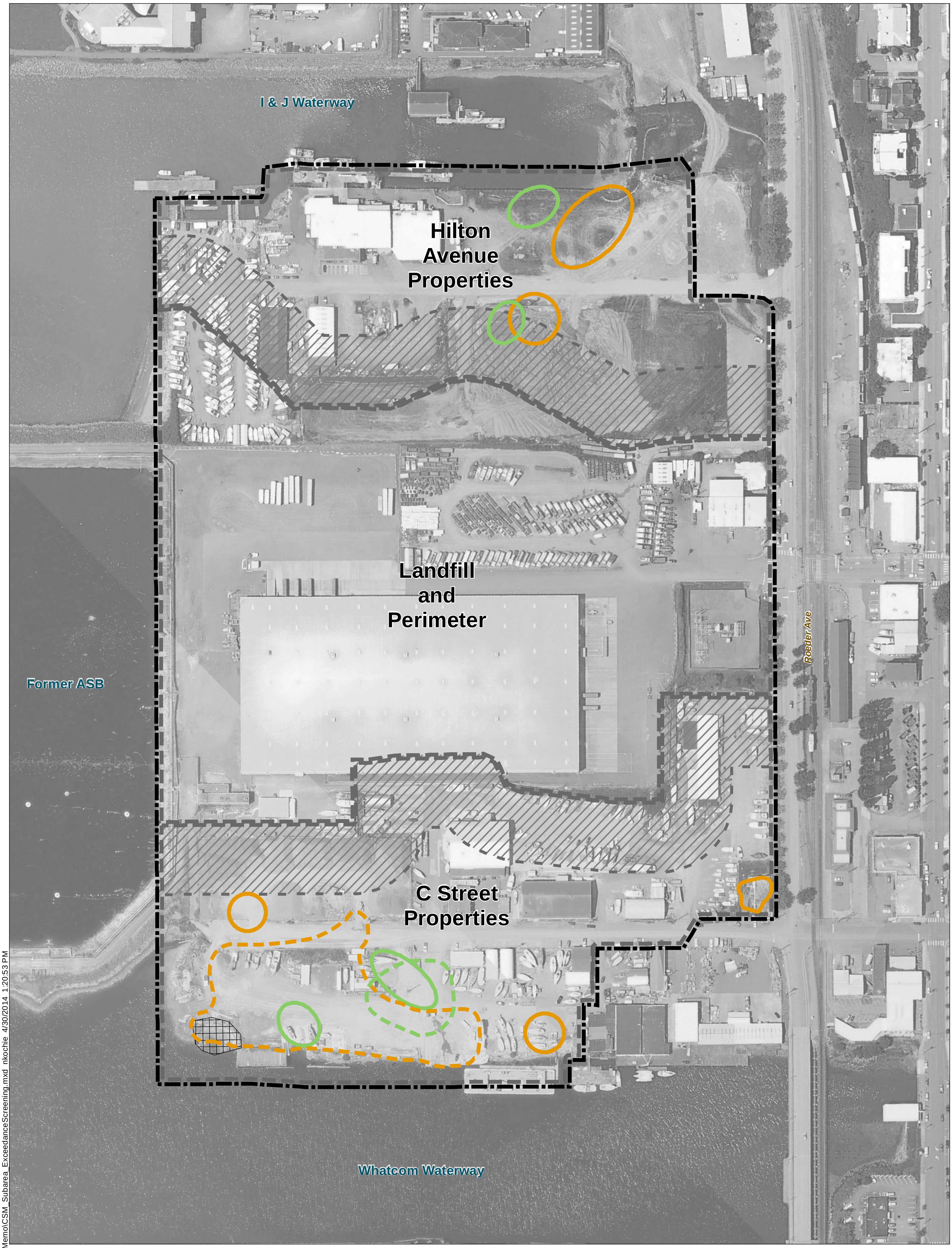
ANCHOR QEA

Figure 4
TPH-Dx Concentrations Above Screening Levels
Central Waterfront RI/FS
Bellingham, WA



Extent of Total cPAH Exceedances in Soil

Extent of Total cPAH Exceedances in Groundwater

Extent of Naphthalene Exceedances in Soil

Extent of Naphthalene Exceedances in Groundwater

Central Waterfront Site Boundary

Subarea Boundary

Landfill Perimeter

Interim Action Removal Area

Project North

True North

Feet

0 100 200 300 400

NOTES:
1. Lateral extent of cPAH and naphthalene exceedances in soil and groundwater are approximate and based on the most stringent screening levels.
2. For locations with multiple samples, the highest concentration was used; groundwater results include 2002-current.
3. cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbon.
4. Aerial by U.S. Geological Survey: July 2009.

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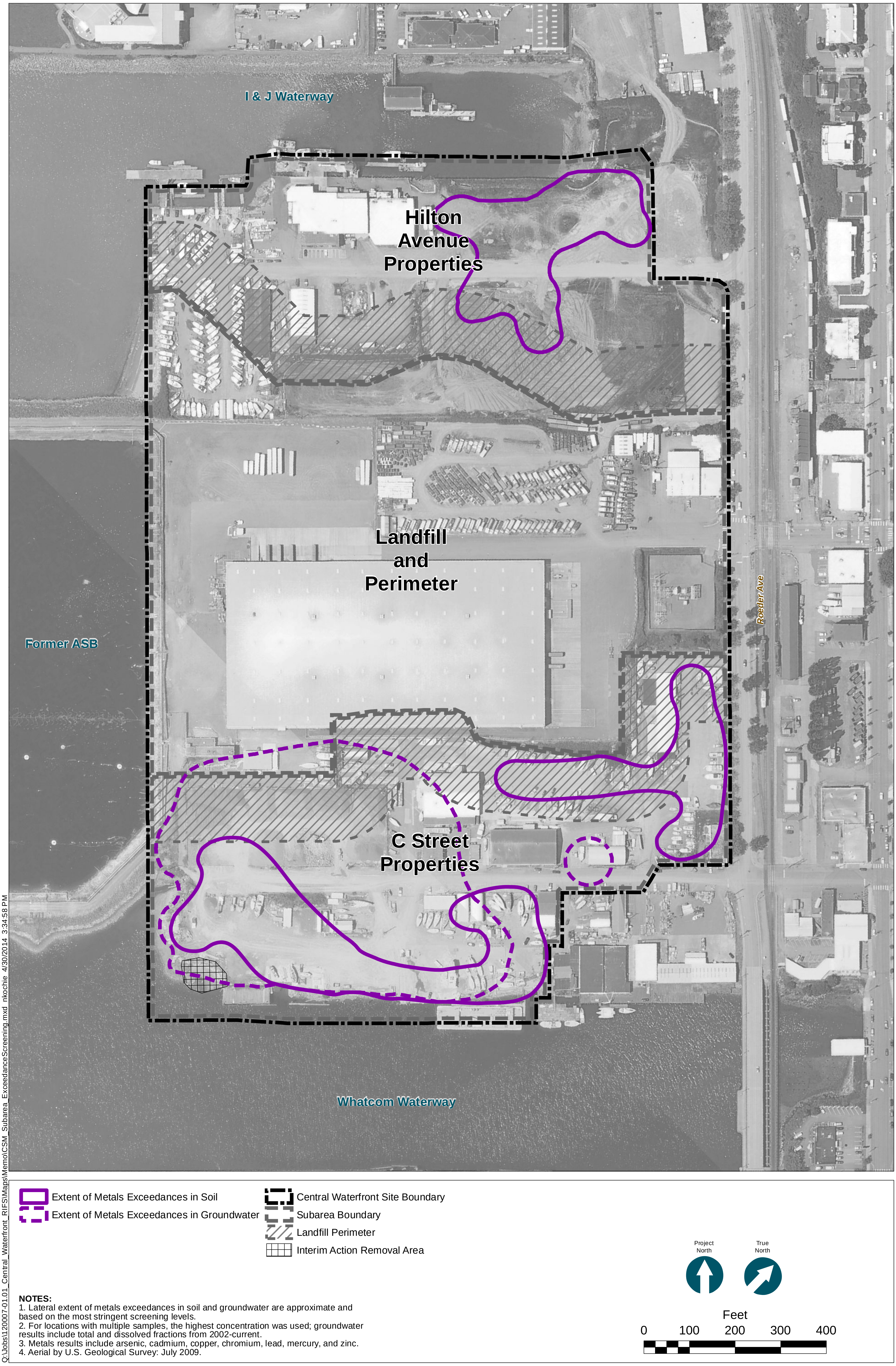
Figure 5
Total cPAH and Naphthalene Concentrations Above Screening Levels
Central Waterfront RI/FS
Bellingham, WA



NOTES:
1. Lateral extent of metals exceedances in soil and groundwater are approximate and based on the most stringent screening levels.
2. For locations with multiple samples, the highest concentration was used; groundwater results include total and dissolved fractions from 2002-current.
3. Metals results include arsenic, cadmium, copper, chromium, lead, mercury, and zinc.
4. Aerial by U.S. Geological Survey: July 2009.

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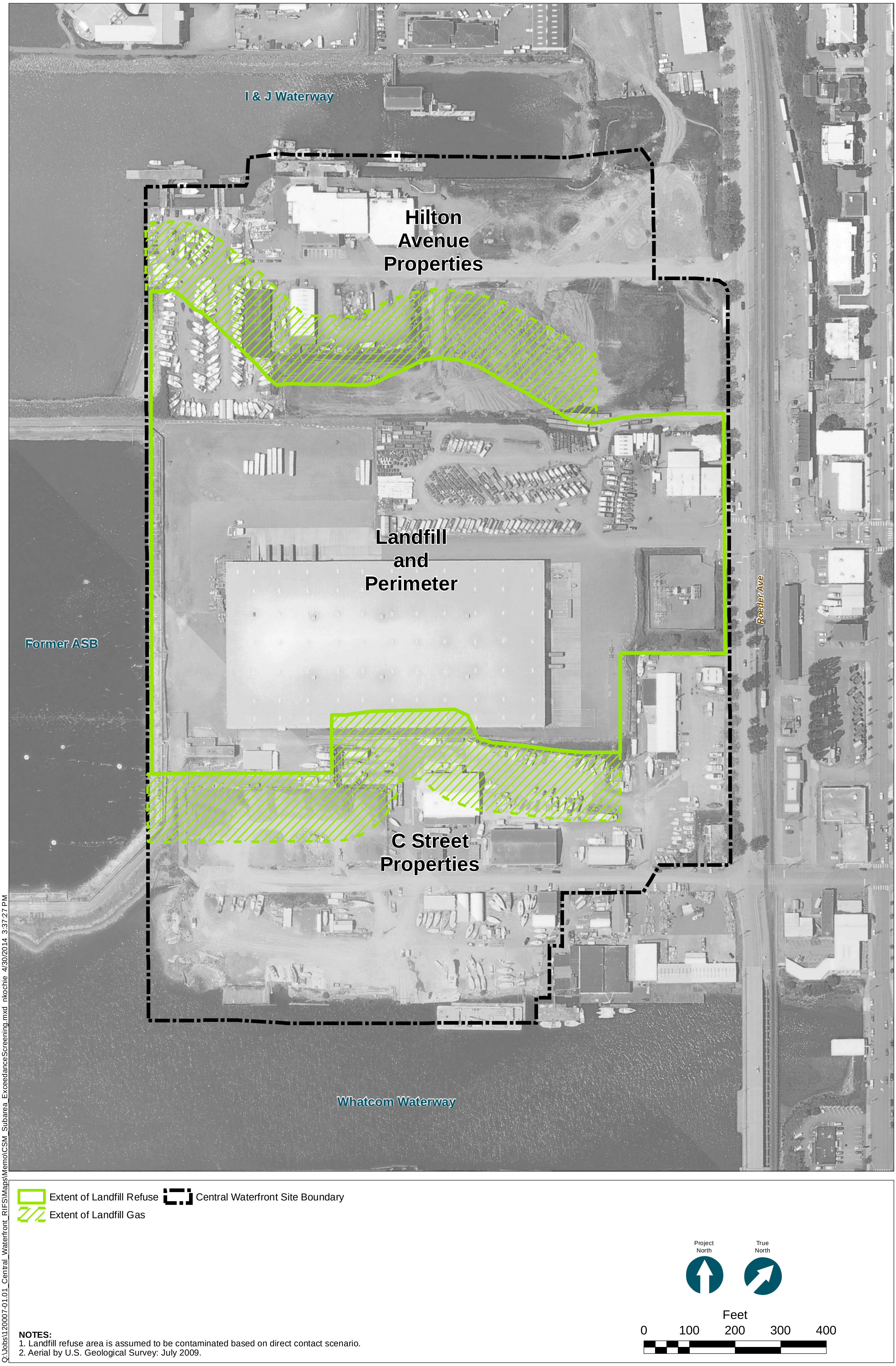
Figure 6
Metals Concentrations Above Screening Levels
Central Waterfront RI/FS
Bellingham, WA



NOTES:
1. Landfill refuse area is assumed to be contaminated based on direct contact scenario.
2. Aerial by U.S. Geological Survey: July 2009.

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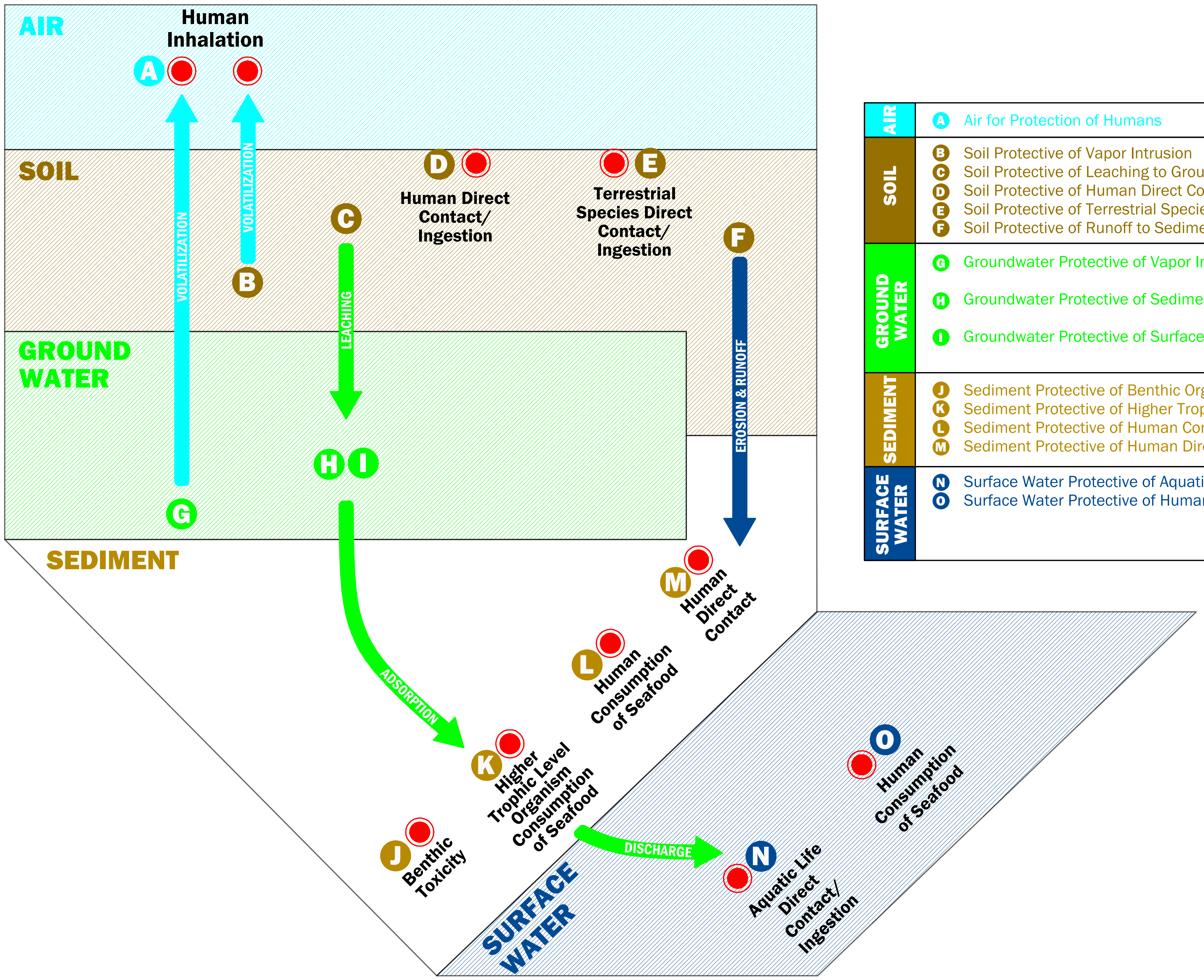
Figure 7
Landfill Gas Monitoring Distribution
Central Waterfront RI/FS
Bellingham, WA



AIR	Ⓐ Air for Protection of Humans	Groundwater and soil screening levels protective of vapor intrusion
SOIL	Ⓑ Soil Protective of Vapor Intrusion Ⓒ Soil Protective of Leaching to Groundwater Ⓓ Soil Protective of Human Direct Contact Ⓔ Soil Protective of Terrestrial Species Ⓕ Soil Protective of Runoff to Sediments	Subarea-specific empirical soil vapor data Calculated soil screening levels protective of groundwater (Table 4-2a) Soil screening levels protective of direct contact from CLARC (Table 4-2a) Pathway incomplete at Site (refer to Section 3.4.1) Sub-Area specific
GROUND WATER	Ⓖ Groundwater Protective of Vapor Intrusion Ⓗ Groundwater Protective of Sediment Ⓘ Groundwater Protective of Surface Water	Groundwater screening levels protective of vapor intrusion from Ecology (2009) (Table 4-1) & subarea-specific empirical soil vapor data Calculated groundwater (porewater) screening levels protective of sediment (Table 4-1) Groundwater screening levels protective of marine water from CLARC (Table 4-1)
SEDIMENT	Ⓙ Sediment Protective of Benthic Organisms Ⓚ Sediment Protective of Higher Trophic Level Organisms Ⓛ Sediment Protective of Human Consumption of Seafood Ⓜ Sediment Protective of Human Direct Contact	Site does not include sediment in adjacent Whatcom Waterway and I & J Waterway site. However, groundwater screening levels applied at Site protect against recontamination of Whatcom Waterway and I & J Waterway sediment (exposure pathway H), as described in Section 4.2.1.
SURFACE WATER	Ⓝ Surface Water Protective of Aquatic Life Ⓞ Surface Water Protective of Human Consumption of Seafood	Site does not include surface water in adjacent Whatcom Waterway and I & J Waterway site. However, groundwater screening levels applied at Site are protective of Whatcom Waterway and I & J Waterway surface water (exposure pathway I), as described in Section 4.2.1.

SOURCE: Drawing prepared from data provided by Aspect Consulting.

Figure 8
Exposure Pathways Considered for Soil and Groundwater Screening Level Development
Central Waterfront RI/FS
Bellingham, WA

APPENDIX C
COMPILATION OF PHYSICAL TESTING RESULTS

LIMITED GEOTECHNICAL ENGINEERING REPORT
FORMER CHEVRON BULK TERMINAL
1020 "C" STREET
BELLINGHAM, WASHINGTON
SITE NO. 1001350

Submitted To:

Chevron U.S.A. Products Company
Site Assessment and Remediation Group
P.O. Box 5004
San Ramon, California 94583

Submitted By:

AGRA Earth & Environmental, Inc.
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

June 1995

File #11-10067-04

AGRA
Earth & Environmental

AGRA
Earth & Environmental

AGRA Earth &
Environmental, Inc.
11335 NE 122nd Way
Suite 100
Kirkland, Washington
U.S.A. 98034-6918
Tel (206) 820-4669
Fax (206) 821-3914

22 June 1995
11-10067-04

Chevron U.S.A. Products Company
Site Assessment and Remediation Group
P.O. Box 5004
San Ramon, California 94583

Attention: Mr. Rene White

Subject: Limited Geotechnical Engineering Evaluation
Former Chevron Bulk Terminal
1020 "C" Street
Bellingham, Washington
Site No. 1001350

Dear Mr. White:

At your request, AGRA Earth & Environmental (AEE) is pleased to submit this report describing the results of our recent limited geotechnical engineering evaluation for the former Chevron bulk plant. The purpose of this evaluation, which satisfies Task 4 and Task 4B of our *Project Outline and Generalized Cost Estimate* dated March 1995, was to interpret general surface and subsurface site conditions in order to determine geotechnical constraints associated with backfilling the existing excavation pit and to formulate recommendations for such backfilling and site grading. Our evaluation represents a limited scope of work that encompassed a data review, a site reconnaissance, limited laboratory testing, geotechnical analysis, and report preparation; no subsurface explorations, groundwater pump tests, or comprehensive laboratory tests were performed under this specific scope. We received your authorization for our services in March 1995. This report has been prepared for the exclusive use of Chevron U.S.A. Products Company and their agents, in accordance with generally accepted geotechnical engineering practice.

PROJECT DESCRIPTION

The project site is a former bulk fuel plant located at 1020 "C" Street in Bellingham, Washington, as shown on the attached *Location Map* (Figure 1). This plant measures approximately 440 by 480 feet overall and is bounded by a dryland marina on the northeast, a Georgia Pacific pulp plant on the northwest, Laurel Street and Bellingham Bay on the southwest, and the Whatcom Creek Waterway on the southeast. "C" Street runs in a northeast-southwest direction through the middle of the plant, dividing it into halves. The attached *Site & Exploration Plan* (Figure 2) illustrates the site boundaries and adjacent features.

Currently, the project site is occupied by a medium-size soil stockpile at the northern corner; a small soil stockpile at the eastern corner; a large, water-filled excavation pit at the southern corner; and a large soil stockpile at the western corner. An 85-foot-square warehouse occupies the area between the eastern stockpile and excavation pit, and various other portions of the site are covered by asphalt or concrete. Figure 2 illustrates these existing site features.

We understand that Chevron U.S.A. Products Company wishes to (1) backfill the excavation pit using only the on-site stockpiled soils and (2) place any remaining stockpiled soils over the entire site in a fairly uniform thickness. Both of these procedures are intended to restore the site to a condition that will be presentable to potential purchasers. This goal does not necessarily mean that the site will become suitable for construction of footing-supported buildings or conventional pavement sections, although this would be desirable.

It should be emphasized that the conclusions and recommendations contained in this report are based on our understanding of the currently proposed utilization of the project site, as derived from verbal information supplied to us. Consequently, if any changes are made in the proposed utilization, we may need to modify our conclusions and recommendations to reflect those changes. Furthermore, the selection of various alternative means of backfilling the hole should involve the property owner's review of intended future uses of the site compared to initial costs of various backfill materials and methods. In general, the lowest cost backfill materials and methods would likely result in the highest cost of construction or maintenance of future settlement-sensitive utilities, pavements, or structures built on the backfill.

EVALUATION METHODS

We evaluated surface conditions at the project site by means of a visual reconnaissance and a review of topographic survey maps and notes prepared by David Evans & Associates (DEA). Water levels in the excavation pit were measured by DEA during their survey and by AEE during our reconnaissance. We evaluated subsurface conditions across the site by reviewing the descriptive logs of exploratory borings previously conducted by AEE and others, and by reviewing groundwater elevation data from the monitoring wells installed in these borings. The approximate locations of these borings/monitoring wells are shown on Figure 2, and the associated logs are attached to this report.

DEA estimated the mud thickness and bottom elevation within the excavation pit by performing hand probings from a rowboat. To characterize the soil properties of the three on-site stockpiles, we performed grain-size analyses on one composite sample obtained from each stockpile. To estimate areas and volumes of the pit, mud layer, water, and stockpiles, we utilized a three-dimensional modeling program (SURFER) as well as graphical counting methods. All input data for these areal and volumetric calculations was derived from the topographic survey maps prepared by DEA. As such, all output data should be considered accurate only to the degree permitted by the survey maps and our calculation methods.

SITE CONDITIONS

The following sections present our observations, measurements, findings, and interpretations concerning conditions at the excavation pit and the three soil stockpiles. Descriptive logs of the on-site borings/monitoring wells and graphic results of our laboratory tests are attached to this report.

Excavation Pit Conditions

The excavation pit is an irregularly shaped depression that measures about 150 feet by 165 feet overall, with a bottom area of about 14,000 square feet and a top area of about 20,000 square feet. According to the survey maps prepared by DEA, this pit has a bottom elevation of approximately 4 to 4½ feet (project datum), which corresponds to a depth of about 8 to 10 feet below adjacent grades. DEA estimated that about 1 foot of soft mud mantles the pit bottom. Our previous borings advanced around the perimeter of the pit indicate that the surrounding and underlying soils generally are loose, fine to medium, silty sands. The attached *Geologic Cross-Sections* (Figures 3 and 4) illustrate the excavation pit and interpreted subsurface soil conditions.

Currently, the excavation pit is about half full of water. Approximate water surface elevations of 8½ feet and 7½ feet were measured in the pit on 4 May 1995 and 1 June 1995, respectively. Assuming a bottom elevation of 4 feet at the center of the pit, these water surface elevations correspond to water depths ranging from about 3½ to 4½ feet. We estimate that the pit contained about 370,000 gallons of water on 1 June 1995, but this quantity appears to be decreasing as the seasons progress from winter to summer.

Surveyed groundwater elevations in our six closest perimeter monitoring wells ranged from 7.64 to 8.50 feet on 1 June 1995, with an average elevation of 7.96 feet. Because the water levels in the pit closely match the groundwater levels in our monitoring wells, we interpret the pit water level to be controlled mainly by local groundwater levels. Apparently, both the pit water level and local groundwater level fluctuate slightly over time due to tidal cycles and precipitation patterns. Furthermore, our long-term groundwater measurements reveal a seasonal drop from winter to summer; we observed that the average groundwater level declined from 9.50 feet on 2 February 1995 to 7.96 feet on 1 June 1995. The average groundwater elevation in all six wells during this four-month period was about 8.84 feet. Table 1, below, summarizes the groundwater elevations measured in these six closest perimeter wells.

TABLE 1
SURVEYED GROUNDWATER ELEVATIONS IN PERIMETER MONITORING WELLS

Date of Measurement	MW-5A	MW-6A	MW-8A	MW-10A	MW-12A	MW-18	Average
2 Feb 1995	9.41	9.46	9.54	9.62	9.49	N/M	9.50
9 Feb 1995	8.92	8.99	9.21	9.42	9.12	9.52	9.20
23 Feb 1995	9.08	9.15	9.37	9.53	9.26	9.69	9.35
2 Mar 1995	8.55	8.68	8.82	9.06	8.81	9.37	8.88
4 May 1995	7.81	8.01	8.02	8.36	8.13	8.61	8.16
1 Jun 1995	7.64	7.81	7.81	8.13	7.87	8.50	7.96
Average	8.57	8.68	8.80	9.02	8.78	9.14	8.84

Elevation datum: project N/M = no measurement taken

Stockpile Conditions
The western stockpile is a large, low mound approximately 4 feet high at the crown. We understand that this stockpile consists of petroleum-contaminated soils derived from the aforementioned excavation pit location and subsequently treated using bioremediation techniques. Our grain-size analysis performed on a composite sample of the stockpile soils yielded a silt content of 17 percent, a sand content of 68 percent, and a gravel content of 15 percent, with a moisture content of 4 percent. This grain-size distribution corresponds to a gravelly, silty sand. We performed a volume calculation on the western stockpile and estimate that it contains about 4,500 cubic yards of soil.

The northern and eastern stockpiles are smaller mounds composed of imported soils. Our grain-size analysis performed on a composite sample of the northern stockpile revealed this soil to be a gravelly sand with 11 percent silt and a moisture content of 3 percent. Based on our volume calculations, the northern stockpile contains approximately 1,700 cubic yards of soil. Our grain-size analysis performed on a composite sample obtained from the eastern stockpile revealed this soil to be a silty sand with some gravel; we measured a fines content of 41 percent and a moisture content of 12 percent. Our volume calculations indicate that the eastern stockpile contains about 150 cubic yards of soil.

Table 2, below, summarizes the approximate volumes and measured soil properties of each stockpile. The total volume of stockpiled soils appears to be about 6,350 cubic yards. It should be noted, however, that these data are based on interpolation of surface topography and on limited laboratory testing of soil samples. As such, our calculated volumes should not be relied upon for contracting or bidding purposes. Furthermore, variations in grain-size distributions and moisture contents likely exist throughout each stockpile, and moisture contents are also subject to change over time in response to weather conditions.

TABLE 2
APPROXIMATE STOCKPILE VOLUMES AND SOIL PROPERTIES

Stockpile	Calculated Volume (cubic yards)	Measured Silt Content (percent)	Measured Sand Content (percent)	Measured Gravel Content (percent)	Measured Moisture Content (percent)
Western	4,500	17	68	15	4
Northern	1,700	11	70	19	3
Eastern	150	41	46	13	12
Note: All calculated and measured values are approximations based on limited data.					

CONCLUSIONS AND RECOMMENDATIONS

The proposed project involves backfilling the existing excavation pit with on-site stockpiled soils and subsequently spreading any remaining soils over the entire site. Our general geotechnical conclusions and recommendations are presented below.

- Feasibility: Backfilling of the excavation pit with on-site soils appears feasible, but the results will depend greatly on the water level at the time of backfilling and, to a lesser extent, on the thickness of mud mantling the bottom. For best results, the water and mud would need to be completely removed before any backfill is placed. We understand, however, that dewatering is contingent on the owner obtaining the appropriate discharge permits. If such permits cannot be obtained, thereby requiring that backfill be placed underwater, the results would be considerably less favorable.

- Definition of "Results": Our comments regarding backfilling results encompass several considerations. During the actual earthwork operation, a favorable result means that adequate compaction of the backfill soil is relatively easy to obtain with proper equipment under dry weather conditions; an unfavorable result means that more time and effort (and cost) would be required. After completion of earthwork, a favorable results means that long-term surface settlement will be relatively small, thereby allowing construction of lower-cost shallow foundations and conventional pavements; an unfavorable result means that surface settlements will be larger, requiring expensive site preparation and/or deep foundations.

- <u>Backfilling Options</u>: Although one of the project goals is to use on-site soils exclusively, backfilling results can be improved by selectively using imported quarry spalls and/or geotextiles, regardless of whether the pit can be dewatered. Table 3, below, summarizes our recommended procedures and expected results for eight backfilling options, listed in descending order based on the expected results; that is, Option 1 would provide the most favorable results, and Option 8 would provide the least favorable results. This table provides a means of evaluating the earthwork requirements and cost of each option versus the earthwork problems, settlement characteristics, and development suitability associated with each option.

TABLE 3
SUMMARY OF OPTIONS FOR BACKFILLING EXCAVATION PIT
(in descending order based on results)

Option	Recommended Procedure	Expected Results
1	Drain pit completely. Strip all mud from bottom. Place 1-foot layer of quarry spalls over bottom. Place and compact on-site stockpiled soils over quarry spall layer to reach final grade.	Adequate compaction of on-site soils can be readily achieved in dry weather. Backfill surface settlement will be minimal (1 inch or less) to small (1 to 2 inches) depending on workmanship. Surface may be suitable for paving or construction of certain footing-supported buildings.
2	Drain pit completely. Strip all mud from bottom of pit. Place geotextile over bottom of pit. Place and compact on-site stockpiled soils over geotextile to reach final grade.	Adequate compaction of lower lifts will be difficult, but compaction of upper lifts can be readily achieved in dry weather. Backfill surface settlement will be minimal (1 inch or less) to small (1 to 2 inches) depending on workmanship. Surface may be suitable for paving or construction of certain footing-supported buildings.
3	Drain pit completely. Place 2-foot layer of quarry spalls over mud layer. Place geotextile over quarry spall/mud layer. Place and compact on-site stockpiled soils over geotextile to reach final grade.	Adequate compaction of lower lifts will be difficult, but compaction of upper lifts can be readily achieved in dry weather. Backfill surface settlement will be small (1 to 2 inches). Surface may be suitable for paving or construction of certain footing-supported buildings.

TABLE 3
SUMMARY OF OPTIONS FOR BACKFILLING EXCAVATION PIT
(Continued)

Option	Recommended Procedure	Expected Results
4	Drain pit completely. Strip all mud from bottom of pit. Place and compact on-site stockpiled soil over bottom of pit to reach final grade.	Adequate compaction of lower lifts will be difficult or impossible, but compaction of upper lifts can be readily achieved in dry weather. Backfill surface settlement will be small (1 to 2 inches). Surface may be suitable for paving or construction of certain footing-supported buildings.
5	Drain pit completely. Place several feet of on-site stockpiled soil over mud layer. Place geotextile over soil/mud layer. Place and compact on-site stockpiled soil over geotextile to reach final grade.	Adequate compaction of lower lifts will be difficult, but compaction of upper lifts can be achieved with effort in dry weather. Backfill surface settlement will be moderate (2 to 4 inches). Surface may be suitable for paving or construction of lightly loaded, settlement-tolerant, footing-supported structures.
6	Drain pit completely. Place several feet of on-site stockpiled soil over mud layer. Place and compact on-site soil in lifts over soil/mud layer to reach final grade.	Adequate compaction of lower lifts will be difficult or impossible, but compaction of upper lifts can be achieved with effort in dry weather. Backfill surface settlement will be moderate (2 to 5 inches). Surface may be suitable for paving or construction of light loaded, settlement-tolerant, footing-supported structures.
7	Dump on-site stockpiled soils into pit (underwater placement) until backfill surface is 2 feet above water level. Place 1-foot layer of quarry spalls over backfill surface. Place and compact on-site stockpiled soils over quarry spall layer to reach final grade.	Adequate compaction of backfill soils below quarry spall layer will be impossible; adequate compaction of backfill soils above quarry spall layer will be difficult even in dry weather. Backfill surface settlement will be large (10 to 15 inches). Surface will not be suitable for construction of footing-supported structures but may be marginally suitable for paving.
8	Dump on-site stockpiled soils into pit (underwater placement) until backfill surface is 3 feet above water level. Place geotextile over backfill. Place and compact on-site stockpiled soils over geotextile to reach final grade.	Adequate compaction of backfill soils below geotextile will be impossible; adequate compaction of backfill soils above geotextile will be very difficult even in dry weather. Surface settlement will be very large (12 to 24 inches). Surface will not be suitable for construction of footing-supported structures or paving.

- Volumetric Errors: Our volumetric estimates indicate that the total volume of on-site stockpiled soils is about 6,350 cubic yards. Using a shrinkage factor of 10 percent, we estimate that the in-place (compacted) volume will be about 5,700 cubic yards, which is roughly equivalent to the excavation pit volume. However, given the uncertainties inherent in such estimates, we interpret a potential error of up to 20 percent. Therefore, earthwork planning should account for the possibility that there will be (1) a deficit of on-site soils ranging up to about 1,000 cubic yards, thereby requiring import of additional soil, or (2) a surplus of on-site soils ranging up to about 1,000 cubic yards.

- Surcharging: In the event that backfill must be placed underwater because the pit cannot be dewatered, surcharging of the backfill area could be performed to provide significantly better results, although not as favorable as can be obtained by dewatering the pit and compacting the backfill. Any stockpiled soils remaining after completion of the backfilling operation would be suitable for use as surcharge material, but additional soil will probably need to be imported in order to construct an adequately high surcharge embankment.

- Site Grading: Any stockpiled soils remaining after the pit has been backfilled, as well as any other soils used for surcharging, can be placed in a thin, uniform layer over the entire site. However, the ultimate condition of this layer will depend on the soil moisture content and weather conditions at the time of compaction. For best results, all fill placement and compaction should be scheduled for the drier summer months.

- Additional Studies: The options presented in this letter are intended to assist the property owner's planning efforts. However, in order to acquire construction permits, obtain construction bids, or complete a design, it will be necessary to perform additional geotechnical studies. The nature of these additional studies will depend on which option is selected. AEE would be pleased to submit a proposal for conducting additional geotechnical studies upon request.

- Development Limitations: After completion of the earthworking operations, we expect that the project site will be in a condition presentable to potential buyers. However, this does not imply that the site will be ready for construction using conventional methods, such as shallow spread footings or typical pavement sections. Pile foundations, special pavement sections, and other items may be required.

The sections below present our specific recommendations concerning dewatering, mud stripping, geotextiles, quarry spalls, backfilling surcharging, site grading, and additional studies. It should be emphasized that much of this information is based on limited data and analyses; as such, it should not be used for bidding purposes.

Dewatering

If proper discharge permits can be obtained, the excavation pit should be dewatered completely before any backfill is placed. We offer the following comments, conclusions, and recommendations for preliminary planning of a dewatering system.

Existing Water Volume: Based on a measured water surface elevation of about 7 ½ feet on 1 June 1995, we estimate that the pit contained about 370,000 gallons of water at that time. However, the water level appears to be dropping slowly as part of a normal winter-to-summer fluctuation. Therefore, the actual water volume will likely be somewhat smaller in the summer and early fall months, and somewhat larger during the winter and spring months.

Inflow Rate: For the purpose of calculating a groundwater inflow rate after the pit has been drained, we estimated a soil permeability on the order of 0.01 centimeters per second or 1,000 gallons per square feet per day, based on limited grain-size distribution data. Using this value, we estimate that the total groundwater inflow rate may range from 50 to 500 gallons per minute (gpm). However, the actual inflow rate will vary with season, precipitation patterns, tidal cycles, and other factors.

Dewatering Pumps: Based on our estimation of existing water volume and groundwater inflow rate, we recommend that the dewatering pump (or pumps) have a minimum combined discharge capacity of 1,000 gpm. Assuming an initial water volume of 370,000 gallons and an inflow rate of 50 to 500 gpm, a 1,000-gpm system may require about 6 to 24 hours to drain the pit. The pump (or pumps) should be placed at the pit's lowest point, which we interpret to be at the western corner. Because the intake water will likely contain a significant amount of suspended sediment, we recommend that sediment-resistant pumps be utilized. Sediment filtration or other extraordinary measures may be needed for discharge, depending on the permit requirements.

Mud Stripping

If the excavation pit can be completely dewatered as previously discussed, the mud layer currently mantling the bottom will be exposed. Ideally, this mud layer would be stripped and removed before any backfill is placed, in order to minimize backfilling difficulties and post-construction settlements. The following comments and recommendations are offered for preliminary planning and earthworking purposes.

Mud Volume: Based on underwater hand probings conducted by DEA, the existing mud layer appears to be about 1 foot thick. Using our calculated pit bottom area of 14,000 square feet, we estimate the mud volume to be on the order of 500 cubic yards.

Mud Treatment: In our opinion, the stripped mud would not be suitable for use as backfill soil until it has undergone extensive drying. Therefore, the mud should be spread out in a thin layer elsewhere on the site to promote aeration, although such a method would be successful only during a long period of hot, dry weather. If aeration is deemed impractical due to space constraints, weather conditions, or other reasons, the mud may need to be exported from the site.

Geotextiles

The use of a geotextile was included with Options 2, 3, 5, and 8 of Table 3 to separate wet subgrade soils or wet backfill soils from the overlying backfill soils. Our comments and recommendations below are given for preliminary planning and installation purposes.

Geotextile Quantity: Based on our calculations, the pit bottom has an area of about 14,000 square feet. Assuming an additional 15 percent for overlap and waste, we estimate that approximately 16,000 square feet of geotextile will be required to blanket the pit.

Geotextile Types: We recommend that a durable, woven geotextile such as Mirafi 500X be used as a separating fabric. Other brands and types having similar properties would also be suitable.

Geotextile Installation: We recommend that the geotextile be installed with a minimum overlap of 18 inches along all edges. Subsequent backfill placement should be performed so that soil is pushed ahead of any equipment, thereby preventing damage to the fabric.

Quarry Spalls

The use of quarry spalls was included with Options 1, 3, and 7 of Table 3 in order to provide a stable base for subsequent backfilling. We offer the following comments and recommendations concerning quarry spalls for preliminary planning and construction purposes.

Quarry Spall Quantities: Based on our calculated pit bottom area of about 14,000 square feet, we estimate that 500 cubic yards of quarry spalls will be required to attain a 1-foot-thick layer per Option 1 and that 1,000 cubic yards will be required to attain a 2-foot-thick layer per Option 3. However, an additional 50 to 100 cubic yards would be useful to fill in low areas across the pit bottom. Based on our calculated mid-height area of about 18,000 square feet, we estimate that approximately 650 cubic yards of quarry spalls will be required to attain a 1-foot-thick layer per Option 7.

Thickness Limitations: In our opinion, a layer of quarry spalls on the order of 1 to 2 feet thick (per our recommendations) would not significantly interfere with the future installation of driven or drilled piles. However, thicker layers (3 feet or more) could potentially obstruct such piles. Therefore, quarry spall layers greater than about 2 feet thick should not be placed if pile foundations will be used for future developments.

Quarry Spall Sizes: We recommend that coarse (4- to 8-inch-diameter) quarry spalls be used for placement over the mud layer (per Option 3) or wet backfill (per Option 7). On the other hand, we recommend that medium-size (2- to 4-inch-diameter) quarry spalls be used for placement over a stripped subgrade (per Option 1). We feel that the coarse material will provide a better "bridging" action when placed over mud or wet backfill, whereas the medium-size material will minimize the risk of future backfill piping.

Quarry Spall Alternatives: As a lower-cost alternative to conventional quarry spalls, it would be acceptable to use concrete fragments having a size range as recommended above. Either on-site or imported concrete could be utilized for this purpose.

Backfilling

All options outlined in Table 3 involve the use of on-site stockpiled soils as backfill for the excavation pit. The comments, conclusions, and recommendations below are given for preliminary planning and earthwork purposes.

Backfill Quantities: Based on our calculations of the excavation pit volume, we estimate that approximately 5,500 cubic yards of in-place (compacted) soil will be required to completely backfill the pit. However, this quantity would decrease to approximately 5,000 cubic yards if 1 foot of quarry spalls is placed over the bottom (per Option 1), or to approximately 4,500 cubic yards if 2 feet of quarry spalls are placed (per Option 3). In all cases, a stockpile-to-in-place shrinkage factor of about 10 percent can be assumed.

Backfill Sources: The on-site soils available for backfilling are presently located at the western, northern, and eastern stockpiles, which we estimate to have volumes of about 4500, 1700, and 150 cubic yards, respectively. Of these three, the northern (medium-size) stockpile appears to offer the best source for backfill soil; our grain-size analysis revealed this soil to be a gravelly sand with about 11 percent silt. The western (largest) stockpile appears to offer the second best source; our testing indicated that this soil is a gravelly, silty sand with about 17 percent silt. Soils within the eastern (smallest) stockpile were found to contain about 41 percent silt, rendering them least suitable for backfill use.

Material Applications: We recommend that the northern stockpile soils be used for the lower lifts of backfill. These soils will likely provide about 5 to 8 vertical feet of backfill, based on our aforementioned volume estimates. When the northern stockpile has been depleted, we recommend using the eastern and western stockpile soils in alternate lifts until top-of-pit grade is reached or the soils are depleted. In the latter case, additional soils will need to be imported to fill the pit.

Backfill Placement and Compaction: Wherever possible, backfill soils should be placed in horizontal lifts having a maximum loose thickness of 8 inches, and each lift should be compacted with a heavy roller to achieve a firm, unyielding condition. We recommend that a minimum compaction of 90 percent of the modified Proctor maximum dry density (ASTM:D-1557) be used as a goal. However, adequate compaction will not be possible if the soils are placed underwater, nor if the backfill soils become too wet due to wicking of underlying water or to precipitation.

Underwater Placement: If backfill must be placed underwater (per Options 7 and 8), we recommend that placement begin at the sides of the pit and proceed inward. Low-pressure track-mounted equipment will likely be required to operate on the advancing backfill surface. Backfilling should be performed at a sufficiently slow rate to allow equilibration of the water level and to prevent overflow.

Surcharging

"Surcharging" refers to the temporary placement of a heavy load on a loose or soft soil surface in order to cause and/or accelerate consolidation of the underlying soils. In our opinion, surcharging would offer significant improvement to the final backfill surface when a large portion of the backfill has been placed underwater (per Options 7 and 8), but results would not be as favorable as could be obtained by dewatering and compaction. We are providing the following preliminary comments and recommendations in the event that surcharging is logistically feasible.

Surcharge Materials: We recommend that any on-site stockpiled soils remaining after the pit has been backfilled be used as surcharge material. Based on our volume calculations, however, it appears that only a small quantity (if any) of stockpiled soil may be available for surcharging. Therefore, we expect that additional soil would need to be imported.

Embankment Geometry: Because no building plans have been developed for the site, we tentatively recommend that the entire footprint of the backfilled excavation pit be surcharged. This would involve constructing a soil embankment over the backfill surface. Typically, an embankment on the order of 5 to 10 feet high would be used to cover the backfill surface, with 2H:1V sideslopes extending beyond the backfill limits.

Surcharge Duration: The appropriate surcharge duration will depend on several factors, including the initial backfill density, the rate of backfill consolidation, the surcharge height and density, and the future site utilization. As such, we cannot establish a specific duration at this time. Nonetheless, our experience on other projects suggests that a minimum duration in the range of 6 to 12 months would likely be necessary to achieve an adequate degree of consolidation.

Settlement Monitoring: Because surcharging always involves one or more uncertain variables, field monitoring is routinely performed to monitor the actual rate of settlement. This requires the installation of settlement plates at the bottom of the surcharge embankment, with vertical risers extending upward through the embankment. We typically recommend that at least five settlement plates be installed across the backfill surface in a quincunx pattern (four in a square pattern and one in the center). Elevations should be measured at weekly or monthly intervals throughout the surcharging period.

Site Grading

Regardless of which backfilling option is selected, the final phase of the proposed project involves raising site grades by spreading any remaining stockpiled soils over the entire site. We are providing the comments and recommendations below for preliminary planning and earthwork purposes.

Fill Type and Quantity: Based on our previously described volume calculations, we expect that less than 1,000 cubic yards of stockpiled soils will remain after the excavation pit has been backfilled. Assuming a site area of 200,000 square feet, this quantity of fill corresponds to a grade rise of only 1 to 2 inches. It is also possible that no excess soils will be available, or that a greater quantity will be available if imported soils are used for pit backfilling purposes.

Subgrade Preparation: Before site grading begins, all slabs, pavements, structures, and other existing features located within the grading areas should be stripped and wasted. Any zones of wet surficial soils should be scarified and aerated during warm, dry weather, then recompacted to a firm, unyielding condition.

Fill Placement and Compaction: All site fill should be placed in horizontal lifts having a maximum loose thickness of 8 inches. Each lift should be compacted with a heavy vibratory roller to achieve a uniform density of at least 95 percent of the modified Proctor maximum dry density (ASTM:D-1557).

Weather Considerations: Because the on-site soils are moderately to highly silty, they are moisture-sensitive and susceptible to disturbance when wet. Consequently, we recommend that all site grading be performed during an extended period of warm, dry weather, such as typically occurs between July and September. Even during these months, however, precipitation can cause excessive wetting of the surficial soils, thereby requiring that the surface be scarified, aerated, and recompacted.

CLOSURE

The conclusions, estimates, and recommendations presented in this report are based, in part, on the previous explorations and limited laboratory testing performed for this study. If variations in subsurface conditions are discovered during earthwork, we may need to modify this report. Because the success of the earthwork will depend on proper procedures, monitoring by experienced geotechnical personnel should be considered an integral part of earthwork. AEE is available to provide geotechnical monitoring services throughout the project.

We understand project timing to be critical to Chevron on this project, and that backfilling and site grading activities are likely to take place during the summer months of 1995. We recommend that discussions begin immediately with the respective City, County, or State agencies, such that all necessary approvals, construction monitoring contracts, and/or permits can be obtained in a timely manner, and project time-lines can begin to be generated.

We appreciate the opportunity to be of service on this project. Should you have any questions or desire additional information, please do not hesitate to call.

Respectfully submitted,

AGRA Earth & Environmental, Inc.

JAMES M. BRISBINE
27763
EXPIRES 2/11/96

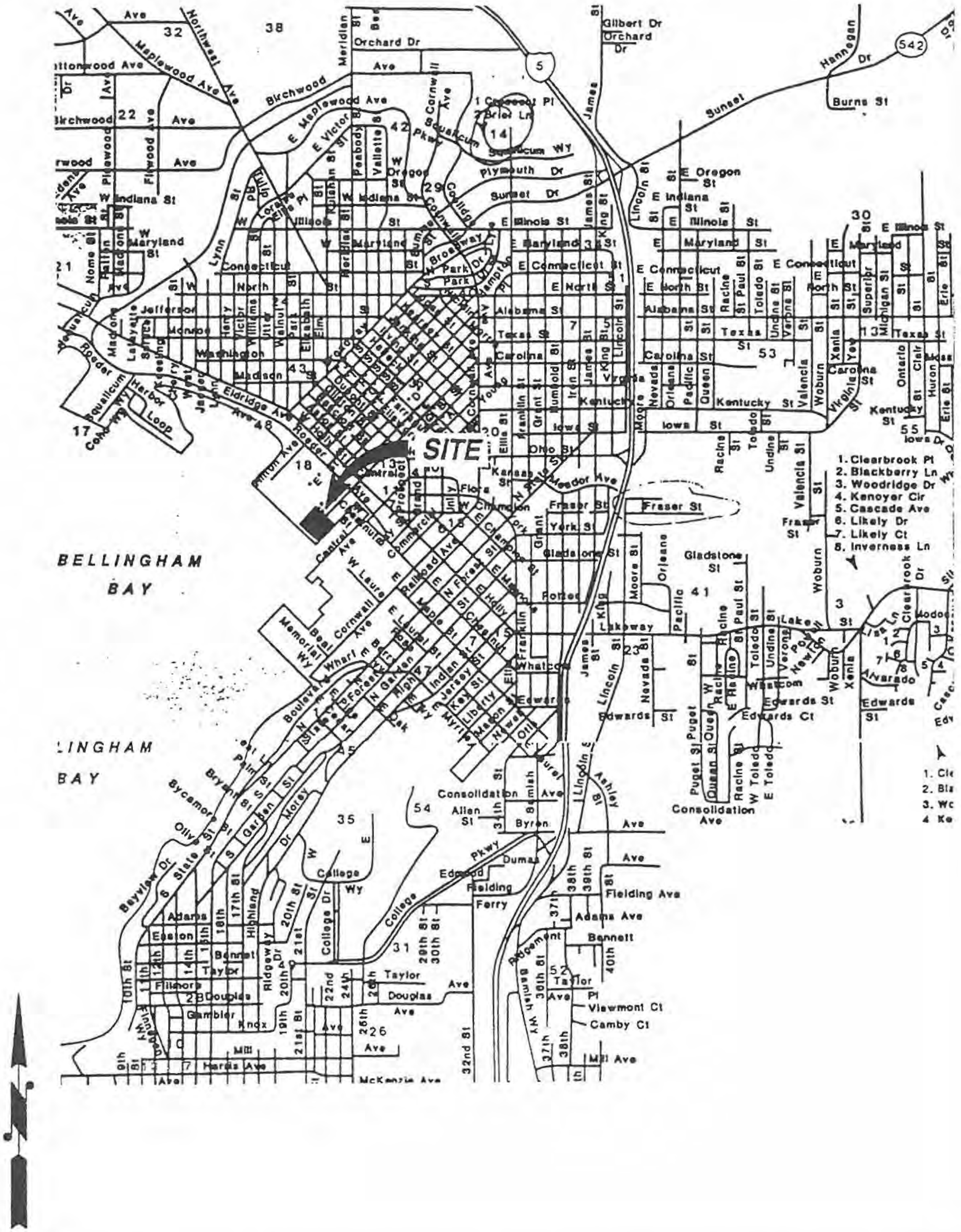
James M. Brisbine, P.E.
Senior Project Engineer

JOHN E. ZIPPER
22611
EXPIRES 1/24/97

John E. Zipper, P.E.
Senior Associate

JMB/JEZ/caj

Enclosures: Figure 1 - Location Map
Figure 2 - Site & Exploration Plan
Figure 3 - Geologic Cross-Section A-A'
Figure 4 - Geologic Cross-Section B-B'
Boring Logs
Grain Size Distribution Graph



AGRA
Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	11-10067-04
DESIGN	SLN
DRAWN	JMR
DATE	JUN 1995
SCALE	N.T.S.

FORMER CHEVRON BULK TERMINAL
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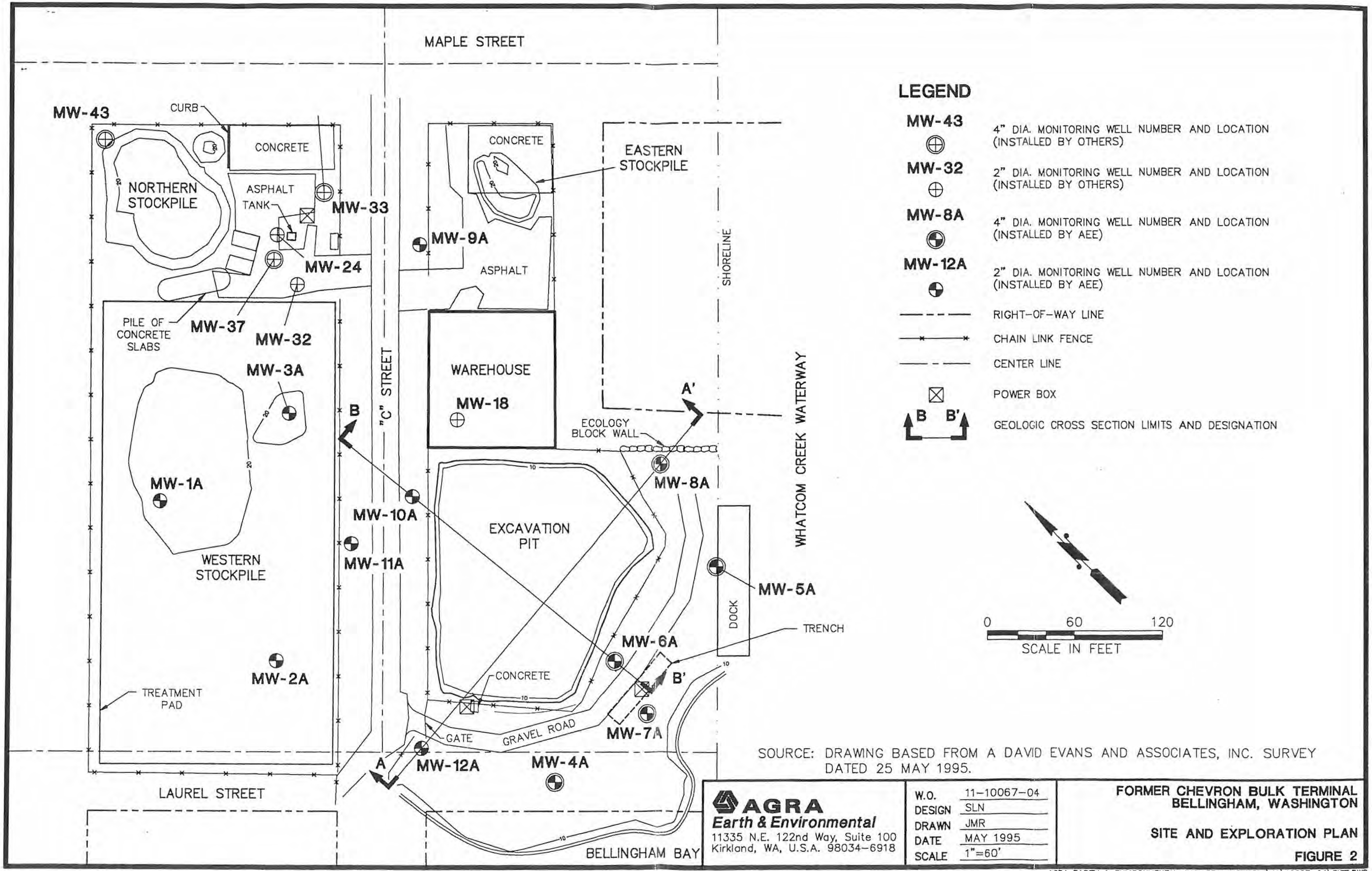
LOCATION MAP

FIGURE 1

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \11\10067-04\LOCATION.DWG



SOURCE: DRAWING BASED FROM A DAVID EVANS AND ASSOCIATES, INC. SURVEY DATED 25 MAY 1995.

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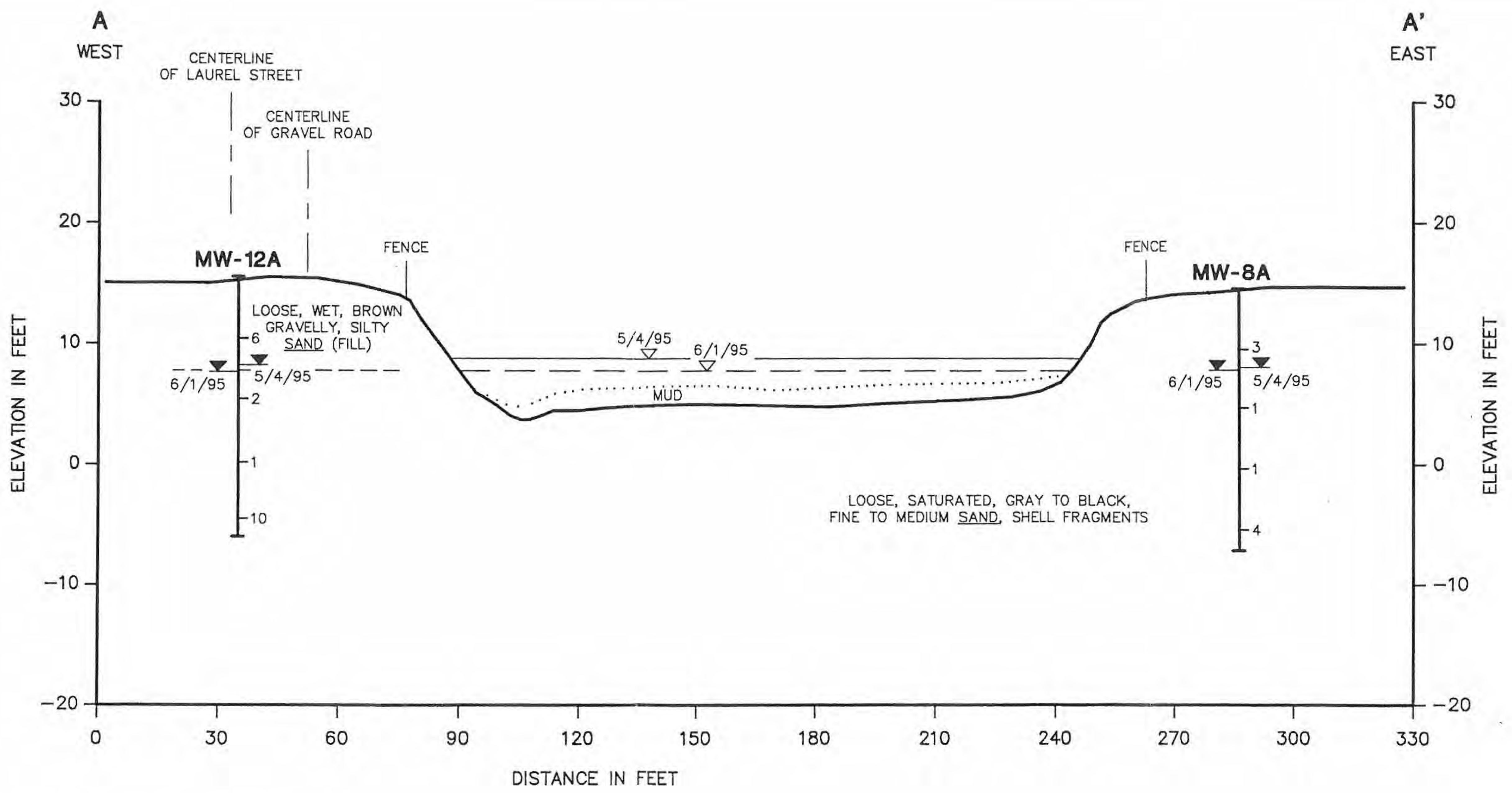
SITE AND EXPLORATION PLAN

FIGURE 2

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \11\10067-04\SITE.DWG



LEGEND

MW-12A MONITORING WELL NUMBER AND LOCATION

⊢8 STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

— — — — INTERFACE LINE

▼ GROUNDWATER LEVEL AT DATE SPECIFIED

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W.O. 11–10067–04
DESIGN KSS
DRAWN MJF
DATE JUN 1995
SCALE 1:10V, 1:30H

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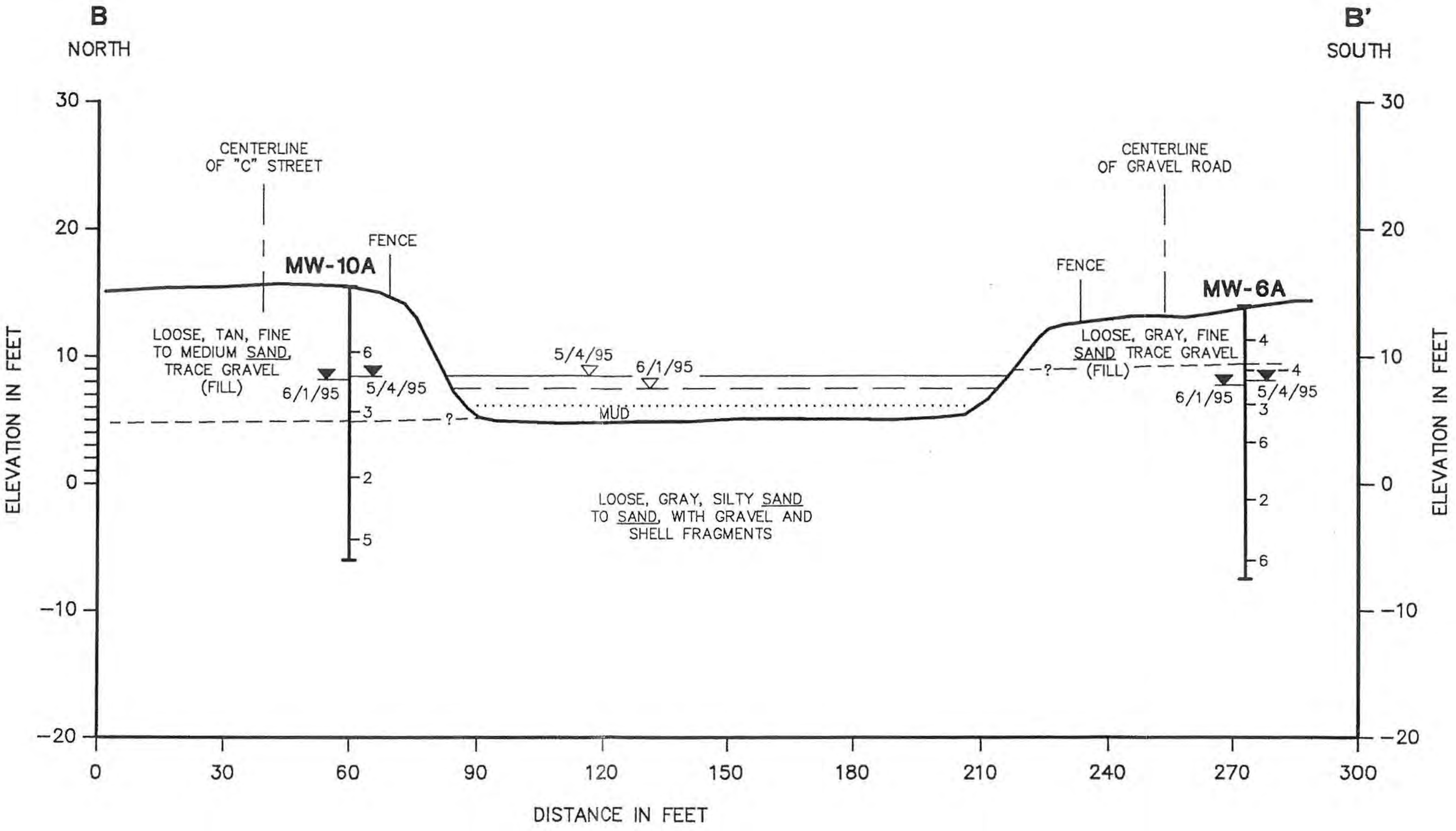
GEOLOGIC CROSS SECTION A-A'

FIGURE 3

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \11\10067-04\X-S-A.DWG



LEGEND

MW-10A	MONITORING WELL NUMBER AND LOCATION
8	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
— — — —	INTERFACE LINE
▼	GROUNDWATER LEVEL AT DATE SPECIFIED

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Kirkland, WA, U.S.A. 98034-6918

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DESIGN KSS
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DATE JUN 1995
SCALE 1:10V, 1:30H

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GEOLOGIC CROSS SECTION B-B'

FIGURE 4

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \11\10067-04\X-S-B.DWG

PROJECT: *Chevron Bulk Plant* W.O. *11-10067-00* WELL NO. *MW-5A*

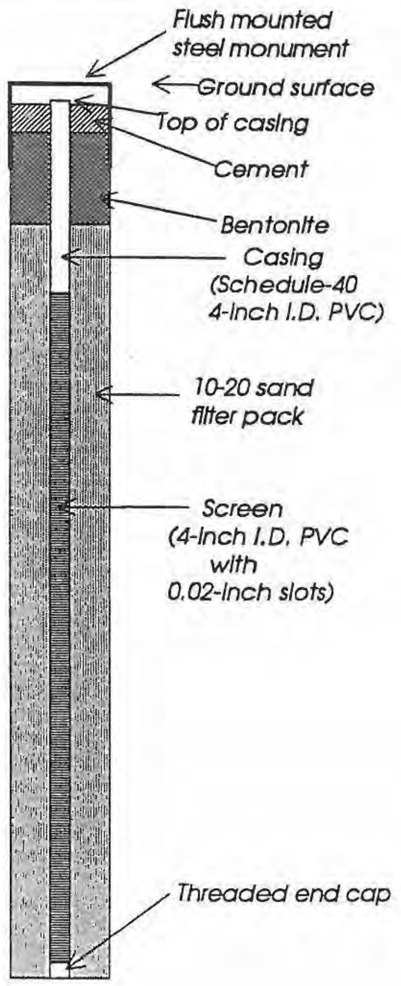
Elevation reference: *Unknown*
Ground surface elevation: *Unknown*

Well completed: *31 January 1995*
Casing elevation: *Unknown*

AS-BUILT DESIGN

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0							
	Loose, moist, gray, fine SAND with trace to some gravel *(Fill Soils)*	I	*S-1*	*3*	*7*		Pb PAH G/BTEX D-Ex
5	*(Native Soils)* *Loose, moist to wet, gray-brown, silty, fine SAND with shell fragments*	I	*S-2*	*1*	*2*		
	Wood fragments are common	I	*S-3*	*5*	*6*		
10	*Loose, saturated, gray-brown, fine to medium SAND with trace to some gravel*	I	*S-4*	*4*	*4*	▼ ATD	Pb G/BTEX D-Ex
15	*Loose, saturated, gray-brown, SAND with some gravel to silty, fine SAND with shell fragments*	I	*S-5*	*5*	*1*		D-Ex TOC
20	*Loose to medium dense, saturated, gray-brown, fine to medium SAND with trace silt and wood fragments*	I	*S-6*	*10*	*3*		Pb G/BTEX D-Ex
	Bottom of boring at 21.5 feet.						
25							
30							



Note: Collapsed formation from 19 to 20 feet.

LEGEND

I 2-inch O.D. split-spoon sample

▼ ATD Observed groundwater level ATD = at time of drilling

WDOE ID No. ABN-140

Anlytical Testing

Pb - Total Lead, EPA Method 7420
PAH = Polynuclear Aromatic Hydrocarbons, EPA Method 8310
G/BTEX = WTPH-G with BTEX Distinction, by Method TPH-G/EPA 8020
D-EX = WTPH-D Extended, by Method WTPH-D Extended
TOC = Total Organic Carbon, by EPA 9060 Modified.

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Drilling started: *31 January 1995* Drilling completed: *31 January 1995* Logged by: *SLN*

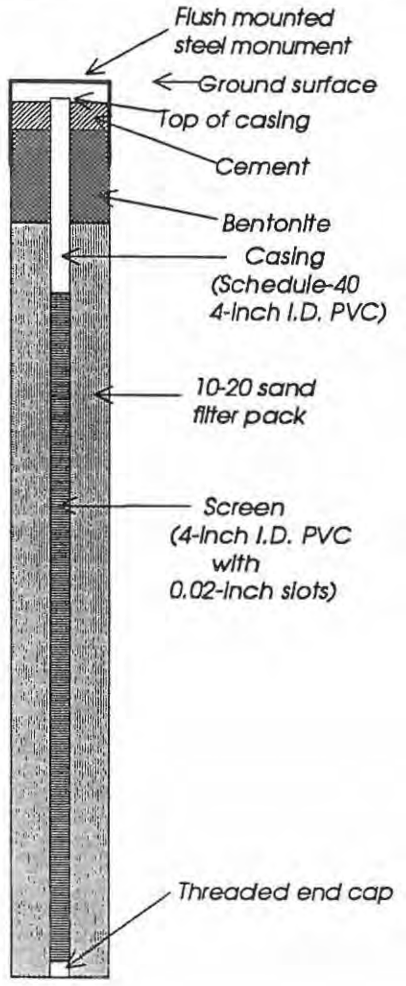
PROJECT: *Chevron Bulk Plant* W.O. *11-10067-00* WELL NO. *MW-6A*

Elevation reference: *Unknown*
Ground surface elevation: *Unknown*
Well completed: *01 February 1995*
Casing elevation: *Unknown*

AS-BUILT DESIGN

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0							
	Loose, moist, gray, fine to medium SAND	I	S-1	4	0		Pb PAH G/BTEX D-Ex
5	Becomes wet	I	S-2	4	0		D-Ex TOC
	Becomes black	I	S-3	3	30	▼ ATD	Pb G/BTEX D-Ex
10	Grades to trace gravel	I	S-4	6	7		
15	Becomes gray-brown	I	S-5	2	4		
20	Grades to some gravel	I	S-6	6	6		Pb G/BTEX D-Ex
	Bottom of boring at 21.5 feet.						
25							
30							



Note: Collapsed formation from 19 to 20 feet.

LEGEND

I 2-inch O.D. split-spoon sample

▼ ATD Observed groundwater level ATD = at time of drilling

WDOE ID No. ABN-139

Anlytical Testing

Pb - Total Lead, EPA Method 7420
PAH = Polynuclear Aromatic Hydrocarbons, EPA Method 8310
G/BTEX = WTPH-G with BTEX Distinction, by Method TPH-G/EPA 8020
D-EX = WTPH-D Extended, by Method WTPH-D Extended
TOC = Total Organic Carbon, by EPA 9060 Modified.

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Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: *31 January 1995* Drilling completed: *31 January 1995* Logged by: *SLN*

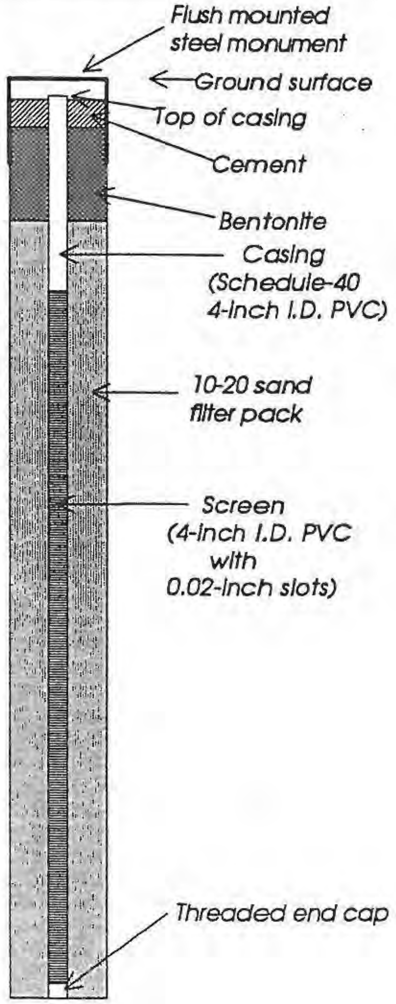
PROJECT: *Chevron Bulk Plant* W.O. *11-10067-00* WELL NO. *MW-8A*

Elevation reference: *Unknown*
Ground surface elevation: *Unknown*
Well completed: *01 February 1995*
Casing elevation: *Unknown*

AS-BUILT DESIGN

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0							
5	*Loose, saturated, black to dark gray, fine to medium SAND*	I	*S-1*	*3*	*320*		Pb PAH G/BTEX D-Ex
						▼ ATD	
10	*Becomes gray-brown with shell fragments*	I	*S-2*	*1*	*32*		
15		I	*S-3*	*1*	*11*		
20	*Wood fragments are common*		*S-4*	*4*	*60*		Pb G/BTEX D-Ex
	Bottom of boring at 21.5 feet.						
25							
30							



Note: Collapsed formation from 19.5 to 20 feet.

LEGEND

I 2-inch O.D. split-spoon sample

▼ ATD Observed groundwater level ATD = at time of drilling

WDOE ID No. ABN-138

Anlytical Testing

Pb - Total Lead, EPA Method 7420
PAH = Polynuclear Aromatic Hydrocarbons, EPA Method 8310
G/BTEX = WTPH-G with BTEX Distinction, by Method TPH-G/EPA 8020
D-EX = WTPH-D Extended, by Method WTPH-D Extended
TOC = Total Organic Carbon, by EPA 9060 Modified.

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Drilling started: *01 Febuary 1995* Drilling completed: *01 Febuary 1995* Logged by: *SLN*

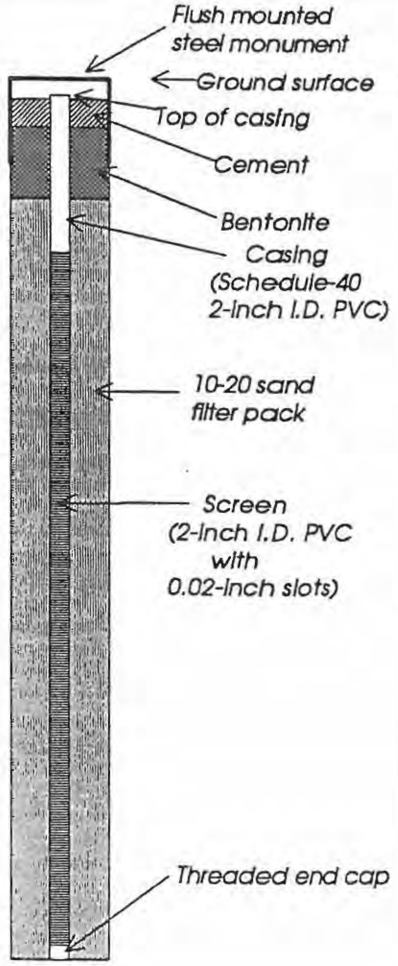
PROJECT: *Chevron Bulk Plant* W.O. *11-10067-00* WELL NO. *MW-10A*

Elevation reference: *Unknown*
Ground surface elevation: *Unknown*
Well completed: *01 February 1995*
Casing elevation: *Unknown*

AS-BUILT DESIGN

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0							
5	*Loose, moist to wet, tan, fine to medium SAND with trace gravel*	I	S-1	6	7		Pb PAH G/BTEX D-Ex
10	*(Fill Soils)* *(Native Soils)* *Grades with trace gravel*	I	S-2	3	179	▼ ATD	Pb G/BTEX D-Ex
15	*Loose, saturated, gray-brown, SAND with shell fragments*	I	S-3	2	16		
20		I	S-4	5	7		Pb G/BTEX D-Ex
	Bottom of boring at 21.5 feet.						
25							
30							



Note: Collapsed formation from 18.75 to 20 feet.

LEGEND

I 2-inch O.D. split-spoon sample

▼ Observed groundwater level
ATD = at time of drilling

WDOE ID No. ABN-135

Anlytical Testing
Pb - Total Lead, EPA Method 7420
PAH = Polynuclear Aromatic Hydrocarbons, EPA Method 8310
G/BTEX = WTPH-G with BTEX Distinction, by Method TPH-G/EPA 8020
D-EX = WTPH-D Extended, by Method WTPH-D Extended
TOC = Total Organic Carbon, by EPA 9060 Modified.

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Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

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Drilling started: *01 Febuary 1995* Drilling completed: *01 Febuary 1995* Logged by: *SLN*

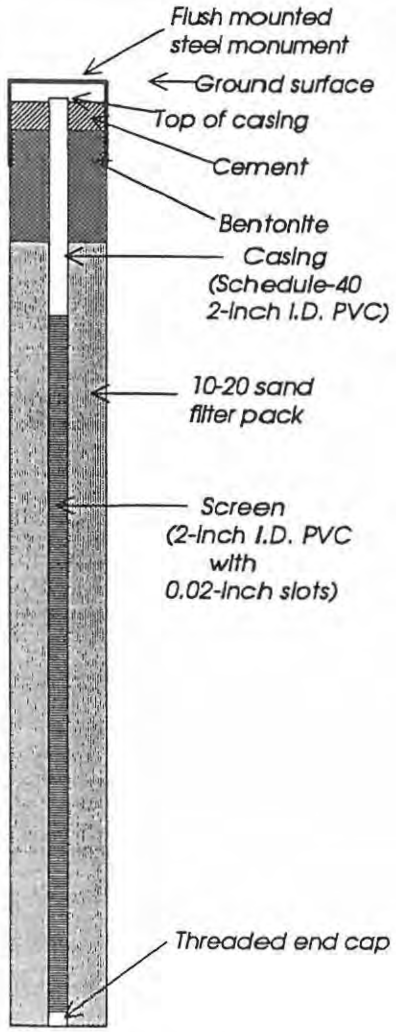
PROJECT: *Chevron Bulk Plant* W.O. *11-10067-00* WELL NO. *MW-12A*

Elevation reference: *Unknown*
Ground surface elevation: *Unknown*
Well completed: *01 February 1995*
Casing elevation: *Unknown*

AS-BUILT DESIGN

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0							
5	*Loose, wet, brown, gravelly SAND with some silt to gravelly, silty SAND*	I	S-1	6	1		Pb PAH G/BTEX D-Ex
	(Fill Soils) *(Native Soils)*						
10	*Loose, wet to satruated, gray-brown, fine to medium SAND with shell fragments*	I	S-2	2	1	▼ ATD	Pb G/BTEX D-Ex
15		I	S-3	1	3		
20			S-4	10	4		Pb G/BTEX D-Ex
	Bottom of boring at 21.5 feet.						
25							
30							



LEGEND

I 2-inch O.D. split-spoon sample

▼ ATD Observed groundwater level ATD = at time of drilling

WDOE ID No. ABN-133

Anlytical Testing
Pb - Total Lead, EPA Method 7420
PAH = Polynuclear Aromatic Hydrocarbons, EPA Method 8310
G/BTEX = WTPH-G with BTEX Distinction, by Method TPH-G/EPA 8020
D-EX = WTPH-D Extended, by Method WTPH-D Extended
TOC = Total Organic Carbon, by EPA 9060 Modified.

AGRA
Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: *01 Febuary 1995* Drilling completed: *01 Febuary 1995* Logged by: *SLN*

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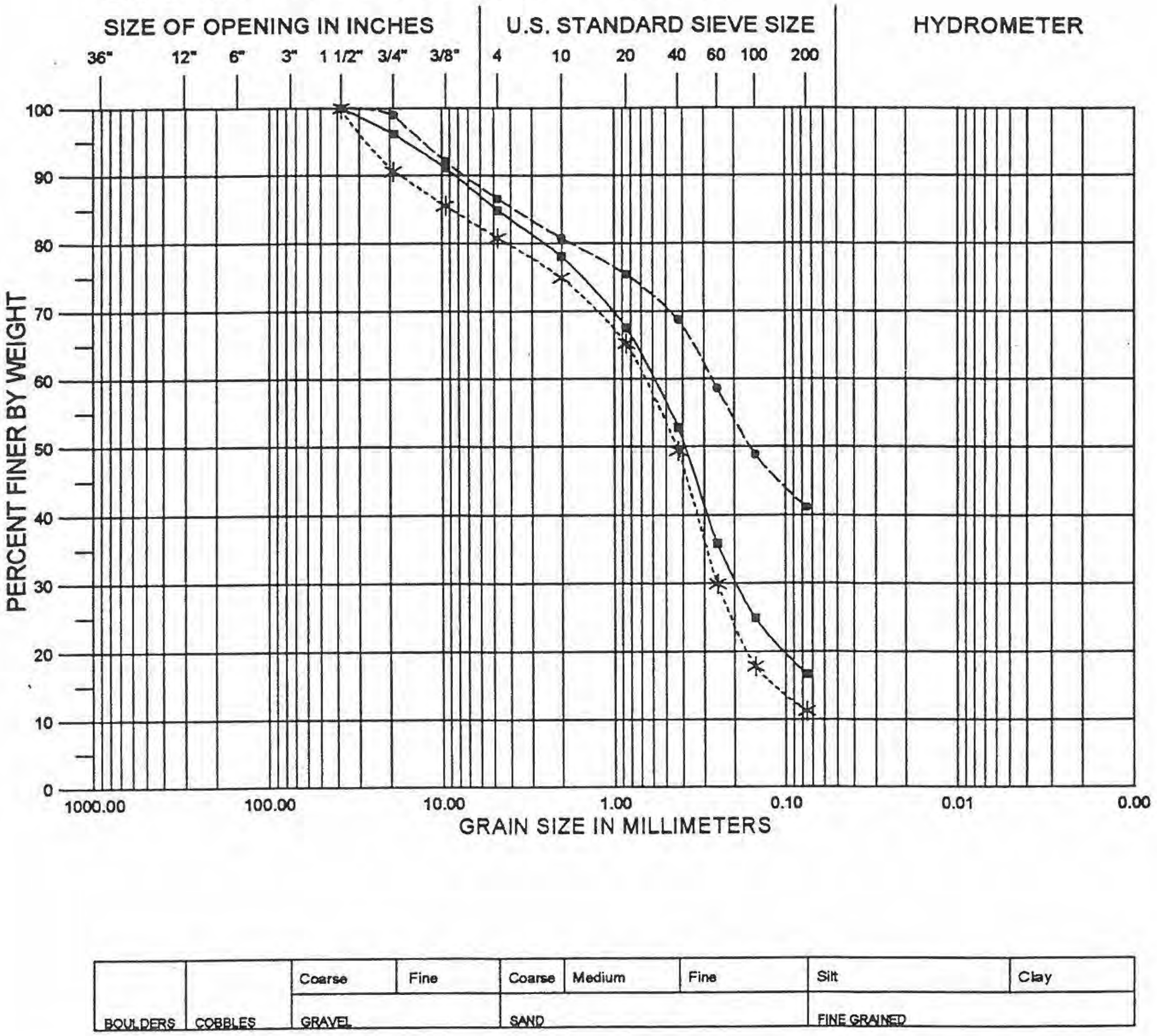
GRAIN SIZE DISTRIBUTION



	Source	Sample	Depth	Moisture	Fines	Soil Description
■-■-■-■-■	Western Stockpile		Comp.	4%	17%	Gravelly Silty SAND
●-●-●-●-●	Eastern Stockpile		Comp.	12%	41%	Silty SAND, some gravel
✱-✱-✱-✱-✱	Northern Stockpile		Comp.	3%	11%	Gravelly SAND, some silt

Project: Chevron Bulk Plant

Work Order: 11-10067-01

Date: 1-31-95

AGRA
Earth & Environmental
11335 NE 122nd Way
Suite 100
Kirkland, Washington 98034-6918

RETEC

Pre-Design Testing Report for the Roeder Avenue Warehouse Project Bellingham, Washington

Prepared by:

Remediation Technologies, Inc.
1011 S. W. Klickitat Way, Suite #207
Seattle, Washington 98134

RETEC Project No.: 3-2538-450

Prepared for:

Port of Bellingham
P.O. Box 1677
Bellingham, WA 98227-1677

December 16, 1997

Pre-Design Testing Report for the Roeder Avenue Warehouse Project Bellingham, Washington

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Prepared by:

Joe Gibbens, Project Geologist

Mark Larsen, Redevelopment Specialist

Reviewed by:

Bryan Stone

Bryan Stone, Project Manager

December 16, 1997

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SECTION 1

1 Introduction

This report describes the results of Pre-Design engineering tests performed by Remediation Technologies, Inc., (RETEC) as part of the Roeder Avenue Warehouse Feasibility Study. RETEC conducted the work under contract with the Port of Bellingham (Port).

The Warehouse Study is being conducted under a joint agreement between the Port, Georgia Pacific West Corporation (G-P) and the City of Bellingham (City) to evaluate the feasibility of constructing a 250,000 square foot warehouse on the former Roeder Avenue Landfill in Bellingham, Washington (Figure 1-1).

1.1 Objectives of Testing

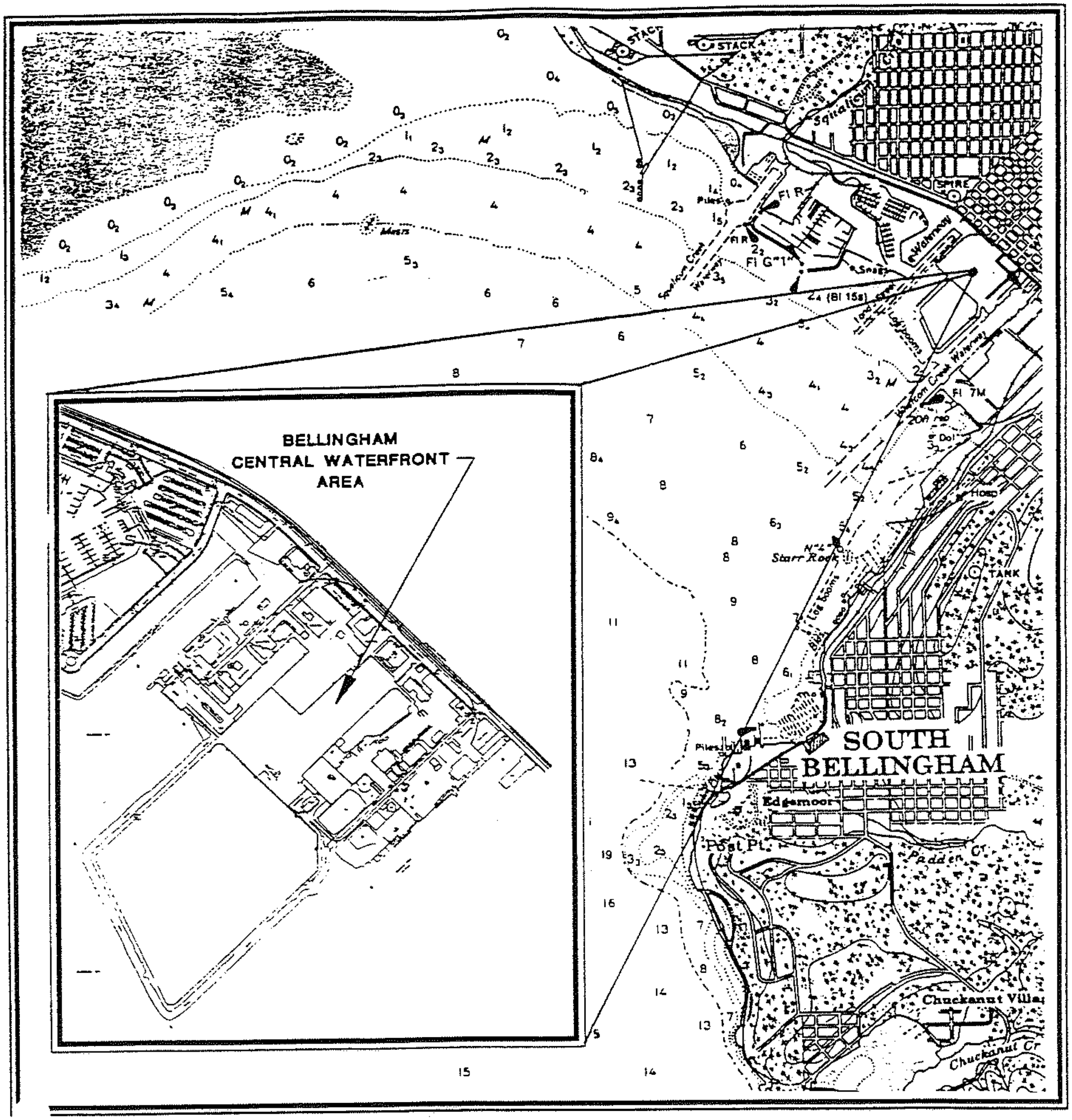
As part of the feasibility analysis, RETEC previously completed an evaluation of existing environmental and geotechnical data for the warehouse area and produced a conceptual design for the warehouse. The initial conceptual design and the supporting data are included in the Roeder Avenue Phase 1 Report prepared by RETEC. That report identified groundwater, engineering and geotechnical data gaps as related to completing the warehouse design.

After the Phase 1 Report was produced, G-P revised its estimates of warehouse space requirements. The original warehouse design size of 200,000 square feet was increased to 250,000 square feet to accommodate this revision.

The objective of Pre-design testing was to collect the data necessary to address each of the data gaps defined in the Phase 1 report. In this way, engineering assumptions could be confirmed prior to initiation of the design phase of the project. Specific data gaps identified in the Phase 1 report and addressed during Pre-Design testing included the following:

- Areal extent and depth of the landfill: The approximate areal extent and depth of the landfill had been estimated during the Phase 1 study using historical information. Testing was required to confirm the landfill area in order to support the capping and grading analysis, as well as to confirm the distribution of landfill ownership between the Port, G-P, Sanitary Services and other parties. Confirming the depth of the landfill was required to support the geotechnical analysis of potential settlement rates.

FIGURE 1-1
CENTRAL WATERFRONT AREA



- Landfill soil cover characteristics: The conceptual design for the Warehouse project assumed that a portion of the existing landfill soil cover could be amended with bentonite and used as low-permeability capping material for the landfill. Testing was required to confirm the amount of soil cover and the suitability of these materials for clay amendment and use as capping material.

- Site grading plan assumptions: A conceptual least-cost grading plan was developed in the Phase 1 report. That plan was based on expected depths to refuse that were developed using historical information.

- Pile design assumptions: A piling design had been developed based on available stratigraphic information for the soils in the vicinity of the warehouse site. The use of geotechnical soil borings and physical testing was required to confirm the subsurface stratigraphy, the depth to the clay soil layer and the structural properties of the sand and clay layers beneath the landfill refuse.

- Groundwater assumptions: Using data from wells located around the landfill boundary, the Phase 1 report developed assumptions about the depth to groundwater, the flow gradients, and the extent of tidally-influenced groundwater fluctuation. These parameters are important to the site grading plan and capping analysis, as well as to ultimate resolution of potential environmental liabilities at the landfill for groundwater contamination.

- Landfill gas production: The Phase 1 report had assumed that the landfill would produce low to moderate levels of landfill gas. Measurement of landfill gas quantity and quality was required to support sizing and design of the landfill gas recovery and disposal system.

- Site survey data: The Phase 1 report was developed using a base map developed from an aerial survey of the project area. A formal site survey including current site topography and utilities was required prior to initiation of the design effort.

1.2 Overview of Work Conducted

The scope of work conducted by RETEC was intended to specifically address each of the above-described data gaps. Work tasks conducted during Pre-Design Testing included the following:

- Test pits were advanced to determine the lateral extent of the landfill, the composition of the landfill refuse, and the thickness and composition of the soil cover.

- Temporary piezometers were installed in selected test pit locations to provide shallow groundwater elevation measurements and to determine the extent of tidally-influenced groundwater fluctuation within the landfill refuse layer.

- Seven deep geotechnical borings were placed within and adjacent to the proposed warehouse building footprint to provide stratigraphic data for piling design. Soil samples were taken from each geotechnical boring for laboratory physical testing to quantify soil properties. These borings also provided information regarding the depth of the landfill refuse, and the characteristics of the soils immediately underlying the refuse layer. One of the geotechnical borings was completed as a deep groundwater monitoring well for later use during the future environmental investigation phase of the Warehouse project.

- Four landfill gas probes were installed within the refuse layer. Gas quantity and composition were measured to support the design of landfill gas control systems. These probes will also serve as monitoring points for evaluation of groundwater quality during the environmental portion of the warehouse project.

- A parcel boundary and topographic survey was conducted of the landfill area. That survey was conducted by a separate contractor to the Port in parallel with the RETEC testing work. Sampling points (e.g., piezometer locations and elevations) from Pre-Design Testing were located during the survey. These new survey data were used in the data analysis and reporting steps for Pre-Design Testing.

Section 2 of this report describes in detail the methods used to complete each task. The results and conclusions of testing are summarized in Sections 3 and 4 of this report, respectively. Where the results of testing impact the conceptual design assumptions previously used in the Phase 1 report, these impacts are discussed in Section 4.

The data presented in this report are intended to be used in the design effort as the Roeder Avenue Warehouse Project progresses.

SECTION 2

2 Field Investigation Methods

This section describes the testing methods used by RETEC to complete Pre-Design testing.

2.1 Test Pits

Forty five test pits were excavated by RETEC personnel using either a tracked excavator or a rubber-tired backhoe at selected areas across the property (Figure 2-1). These test pits were excavated to depths between 4 and 17 feet below ground surface (bgs).

At each location, observations of soil cover thickness and stratigraphy were made and recorded. If refuse was present, the depth and type of refuse was noted. The test pits were designated RTP-1 through RTP-46. Test pit RTP-5 was omitted due to the potential for encountering a buried high pressure water line. Test pit stratigraphic logs are included in Appendix A.

Temporary piezometers were installed at twelve of the test pit locations for monitoring shallow groundwater elevation and fluctuations. These piezometers were constructed with slotted 1-inch Schedule 40 PVC pipe which was set to the bottom of the test pit in direct contact with the refuse. A wood frame was used to support the piezometer while the test pit was backfilled and compacted. Field measurements of shallow groundwater temperature, conductivity and pH were also taken at eleven test pit locations.

During each test pit excavation, air circulation brush fans were used as engineering controls to disperse landfill gasses and potential organic vapors within the work zone. A hand-held organic vapor meter (OVM), combustible gas indicator (CGI) and Sensidyne Tubes were used to monitor the breathing zone to ensure safe working conditions.

Following completion of the data collection, each test pit was backfilled with the excavated soil and refuse and compacted using the excavator or backhoe bucket. In all cases the soil was replaced from the same locations from which it had been removed, and no test pits were left open overnight. Labeled stakes were set in place at each test pit and yellow caution flagging was taped to each stake. These stakes and flagging provided measurement points for the site survey conducted in parallel with the RETEC activities. The location and elevation of each test pit was surveyed by the Port's contractor, and that information was provided to RETEC for use in this report.

2.2 Bucket Auger Borings

A bucket auger was used during portions of Pre-Design testing to facilitate completion of soil borings within the landfill and to complete the installation of the landfill gas probes. The bucket auger was operated by Slead Construction, Inc. of Tacoma, Washington.

Three-foot diameter borings were advanced to the base of the refuse at 10 locations on the landfill with a bucket auger rig. Six of these borings were designed to provide penetration through the refuse for the follow-up geotechnical borings (RGB-1 through RGB-6; Figure 2-1). At these locations the borings were backfilled to the surface with pea gravel after penetration into the underlying sediment. The geotechnical drilling could then proceed in the prepared borings without being obstructed by landfill debris.

Landfill gas probes were constructed at the other four bucket auger locations (RGP-1 through RGP-4). The primary purpose of the gas probes was to permit measurement of landfill gas, but the probe design is also appropriate for groundwater monitoring (gas probe construction is similar to that of a standard environmental monitoring well).

The gas probes were placed in pre-drilled 3-foot diameter borings prepared by the bucket auger. The borings were completed to the base of the landfill refuse. The probes were constructed with 2-inch diameter Schedule 40 PVC, with the total depth of each completed monitoring well varying from 24 to 30 feet. The screened lengths varied between 20 and 25 feet bgs. The top of screen was set at 4 feet bgs. A pea gravel filter pack was set in place in each well extending from one foot below the screen to one foot above the screen. The remainder of the boring was backfilled with bentonite and capped with concrete. Each probe was completed with an above ground locking steel monument and concrete pad.

The refuse which was generated at each bucket auger location was immediately buried adjacent to the boring using the tracked excavator. During advancement of each bucket auger boring, brush fans were used to disperse potential landfill gasses and vapors within the work zone. A hand-held OVM, a CGI and Sensidyne Tubes were used to monitor gasses and vapors in the breathing zone.

The bucket auger boring locations described above are shown on Figure 2-1. The geologic logs and well construction diagrams for each boring are included in Appendix A. Each boring location was marked with a stake and labeled for later surveying. The steel monitoring well monuments were also labeled and surveyed.

2.3 Geotechnical Testing

Geotechnical testing included the completion of seven deep geotechnical borings, standard penetration testing during boring completion, and physical testing of selected soil samples. Geotechnical drilling oversight, stratigraphic logging and sample collection was performed by PacRim Geotechnical Inc. (PGI) of Seattle, Washington.

Geotechnical Borings

Seven geotechnical borings were advanced on and adjacent to the landfill by Gregory Drilling, Inc., (Gregory) of Bellevue, Washington (Figure 2-1). The borings were designated B-1 through B-7 and completed to depths between 80 and 105 feet bgs. Five of these borings were located within the former landfill boundary (B-2 through B-6), and two borings were advanced adjacent to the landfill, one to the east (B-1) and one to the west (B-7). Three of the geotechnical borings within the landfill were advanced through backfilled borings which had been previously drilled and labeled using the bucket auger (RGB-2/B-2, RGB-3/B-3 and RGB-1/B-4).

Soil was classified in the field in general accordance with American Society of Testing and Materials (ASTM) D-2488, "Standard Practice for Description of Soils (Visual-Manual Procedure)". Summary logs for the borings are included in Appendix B. Graphic symbols are used in a column of the exploration logs to display soil type with depth. The graphic symbols are described on the legend that precedes the logs in Appendix B. Notice that one symbol can represent more than one soil descriptor (such as the ML symbol, which stands for both silt and sandy silt). The legend also defines several symbols that are used to describe the sampler type.

The geotechnical borings were advanced using a CME 85 truck mounted drill rig utilizing a combination of hollow stem auger and rotary mud drilling. The hollow stem auger was used to penetrate through the pea gravel in the pre-drilled holes, or through the landfill material in areas where pre-drilled holes were not present. Once sampling indicated that the hollow stem augers were sealed into the underlying natural deposits, mud rotary drilling techniques were utilized to complete the borings to the depths indicated on the boring logs.

Borings B-1 through B-3 and B-5 through B-7 were advanced using a 4-7/8 inch inside diameter hollow stem augers and a 3-7/8 inch diameter fish tail rotary drilling bit. Following completion of stratigraphic logging and soil sampling, the borings were abandoned by backfilling with bentonite chips. The soil cuttings, refuse and drilling mud generated at each boring location was reburied on the landfill.

Boring B-4 was completed using 6-inch inside diameter hollow stem augers through the landfill and 3-7/8 and 5-inch diameter fish tail mud rotary drilling bits. Below the landfill material, B-4 was first drilled and sampled using the 3-7/8 inch diameter drill bit and bentonite drilling mud. Upon completion of the boring, the drilling mud was flushed from the hole and replaced with fresh water. The hole was then drilled using the 5 inch diameter bit and water without bentonite drilling mud. The second drill-out was performed in order to minimize the impact of bentonite drilling mud on the hydraulic characteristics of the soil.

A deep monitoring well was installed in boring B-4 following the second drill-out. This well was constructed with 2-inch Schedule 40 PVC to a total depth of 80 feet with a screened interval from 80 to 70 feet bgs. A 10/20 silica sand pack was placed around the screen and extending 5 feet above the screen. The remainder of the annuls was backfilled with bentonite chips and capped with concrete. The well was completed with a locking above-ground steel monument and a concrete pad.

Ring drive samples were obtained in all of the borings by driving a 2-1/2-inch inside diameter, 3-1/4-inch outside diameter ring sampler with a 300-pound automatic trip hammer falling freely from a height of 30 inches. The number of blows required for penetration was recorded during field explorations. The blow count is reported on the boring logs for each sample, in blows per six inch interval. This resistance, or blow count, relates qualitatively to density for cohesionless soil and to consistency for cohesive soil. Retrieved ring samples were wrapped in watertight bags, placed in tubes, sealed, and temporarily stored in padded boxes for transportation to the laboratory for further classification and testing.

Soil samples were tested to develop parameters for use in evaluating subsurface conditions and preparing geotechnical engineering recommendations for the proposed project. The laboratory testing program included: classification tests for identification and correlation purposes; triaxial compression unconsolidated undrained tests, and one-dimensional consolidation tests. The tests were performed in the PacRim laboratory, and by REG and AGI Technologies laboratories. The work was performed in general accordance with the ASTM standard test procedures.

Soil Classification Tests

Classification tests were performed on selected samples to aid in assigning index properties of tested samples and to permit correlation of engineering properties of tested samples with similar soil types. Field logs were updated appropriately with the laboratory results of classification tests in general accordance with ASTM D-2487, "Standard Test Method for Classification of Soils for Engineering Purposes".

Moisture content determinations were performed on selected soil samples in general accordance with ASTM D-2216. The test results were used for classification and correlation of the various soil encountered at the site. Moisture contents were also used in correlating soil strength characteristics of cohesive soil. Moisture content results are shown at the respective sample depths on the boring logs presented in Appendix A. Dry densities were determined from selected drive samples. The results are shown at the respective sample depths on the boring logs, presented in Appendix B.

Sieve analyses were performed on selected samples to determine the grain size distributions of soil retained on the U.S. number 200 sieve (particle sizes larger than 75 micrometers). The grain size analyses were performed in general accordance with ASTM D-422. Grain size distribution curves are presented in Appendix C.

Laboratory vane shear tests were performed in general accordance with ASTM D-4648, by AGI Technologies of Bellevue, Washington. The samples tested are indicated on the boring logs with the letters “LV”. Test results are summarized in a table presented in this text.

Triaxial tests were performed to determine the shear strength of soil specimens subjected to confining pressures and loads that simulate anticipated field conditions. The tests were performed on soil samples of approximately 6 inches in height and 2.4 or 2.8 inches in diameter, at a constant rate of deformation. Each sample was placed in a rubber membrane, set in the triaxial testing apparatus, and the triaxial chamber was filled with water. A confining cell pressure was applied, and remained constant throughout the test. After the set-up, an unconsolidated undrained test was performed. In general accordance with ASTM D-2850, the loads were applied at a constant strain rate of 0.3 to 1.0

percent of sample height per minute. Drainage of pore water from the specimen was not permitted. The stresses measured during loading represent the total stresses: pore pressure plus the effective intergranular stresses. The value of the shear strength is taken at peak deviator stress or at 10 percent strain if no peak is apparent.

2.4 Landfill Gas Monitoring

Landfill gas monitoring was performed using the four gas probes installed as described in Section 2.2 above. Monitoring included measurement of the landfill gas composition and production rates.

The gas probes were allowed to equilibrate for several days between installation and sampling. The testing protocol involved initial gas pressure and composition measurements followed by sequential pumping tests (vacuum tests) on each monitoring well. The pumping tests measured the area of influence around each probe during pumping, as well as the static gas production rates.

Initial measurements taken at each well included background atmospheric conditions of temperature and barometric pressure, and the initial concentrations of oxygen, carbon dioxide, and methane in the landfill gas. Gas composition was measured with a Landtec GA90 gas analyzer, calibrated with a certified calibration gas.

After initial measurements had been taken, a blower and combustible gas burner unit were connected to each well sequentially. The burner unit was operational during all testing to combust the gases produced during testing. At the beginning of each pump test, the vacuum on the well was set to approximately 3 inches of water. Gas measurements were taken periodically to determine the minimum vacuum at which methane concentrations would reach static conditions. Monitoring for pressure at the other probes was also performed hourly to determine the pressure area of influence around the probe location.

If gas composition remained static during the first 4-hour test, the blower vacuum was increased and the test repeated. For those wells where non-static or declining gas concentrations were observed, the pressure was reduced for the second test to identify the vacuum required to maintain static gas concentrations. Gas measurements of the pump stream and pressures at the surrounding probes were taken periodically during the second test.

When the gas compositions were found to remain static, additional pump tests were performed at sequentially higher vacuum settings using the same probe. At the conclusion of the testing sequence, each well was placed under maximum vacuum to measure the radius of influence. Test results are presented in Appendix D.

SECTION 3

3 Field Investigation Results

3.1 Landfill Characteristics

Areal Extent of the Landfill

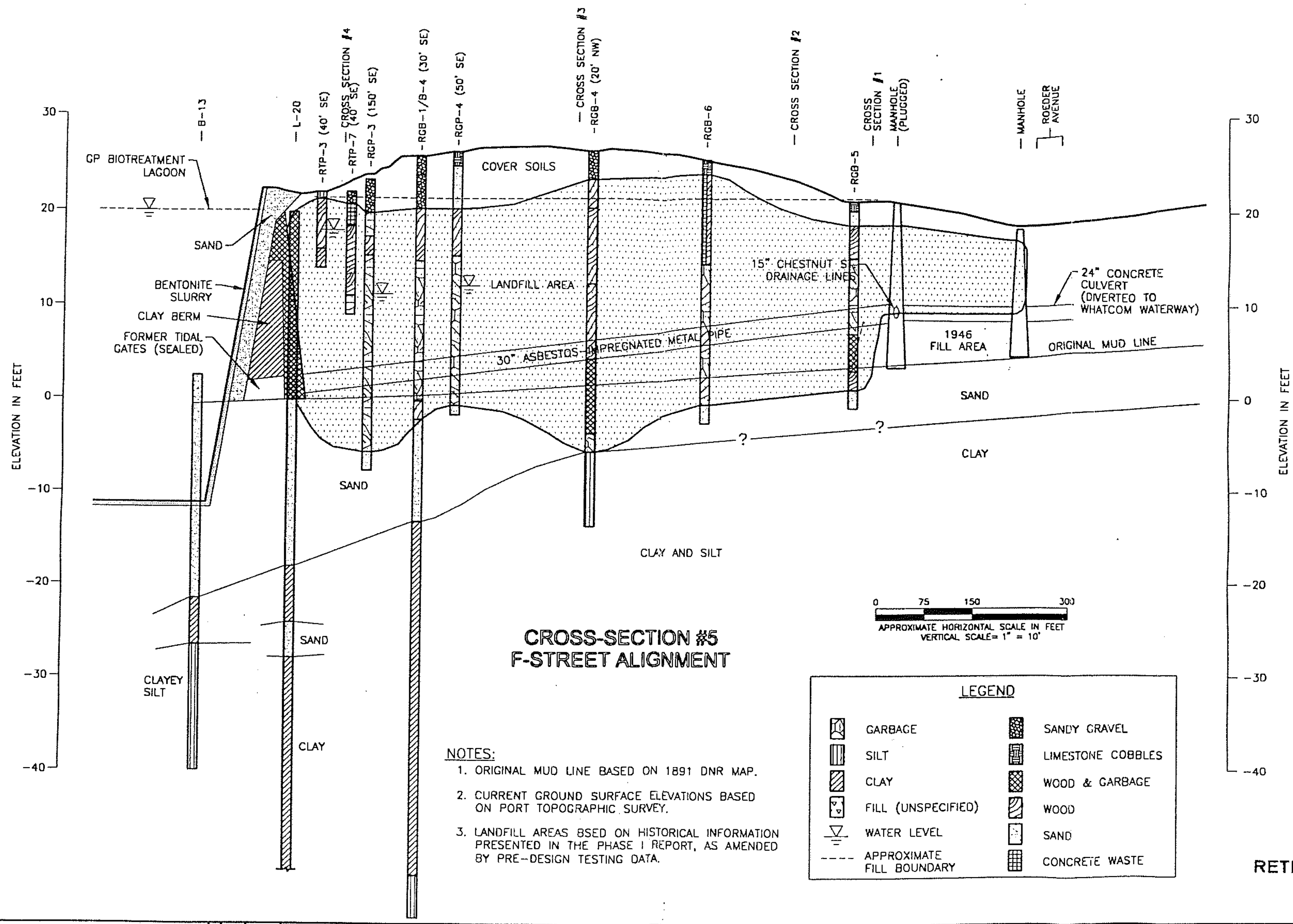
Test pits and geotechnical borings advanced around the edge of the landfill were used to more clearly delineate the areal extent of the refuse along Hilton Avenue. During the Phase 1 report, this was the portion of the landfill with the greatest uncertainty. As shown in Figure 2-1, the landfill boundaries outlined in the Phase I Report (RETEC, 1996) were largely correct. However, in one portion of this area, test pits indicated that the boundary of the landfill was located closer to Hilton Avenue then previously reported. The additional area of the landfill revealed from these test pits added approximately 25,000 square feet (2.5%) to the previously estimated landfill area. The area in question is currently owned by the Port.

Based on historical information, it was presented in the Phase 1 report that a clay berm was present in subsurface soils along the Laurel Street alignment. During Pre-Design testing, sticky clay from this berm soil was encountered in test pit RTP-14, confirming the presence of the former berm. The refuse boundary in this area was consistent with expectations.

Refuse Top, Bottom and Thickness

Generalized cross-sections using data from the test pits, bucket auger borings and geotechnical drilling logs were constructed showing the thickness of soil cover and refuse across the landfill area. The cross-sections are shown in Figures 3-1 and 3-2.

In the Phase 1 report, RETEC had projected that the top of the refuse would be about 20 feet above MSL within the main landfill and about 14 feet above MSL along the Hilton Avenue properties. These projections were based on historical information presented in the Phase 1 report. The work conducted during Pre-design testing generally confirmed that municipal wastes were confined to elevations less than 20 feet MSL.



CROSS-SECTION #5
F-STREET ALIGNMENT

NOTES:
1. ORIGINAL MUD LINE BASED ON 1891 DNR MAP.
2. CURRENT GROUND SURFACE ELEVATIONS BASED ON PORT TOPOGRAPHIC SURVEY.
3. LANDFILL AREAS BSED ON HISTORICAL INFORMATION PRESENTED IN THE PHASE I REPORT, AS AMENDED BY PRE-DESIGN TESTING DATA.

3-2538-450

CROSS SECTION #5
OF THE LANDFILL AREA

RETEC
REMEDIATION TECHNOLOGIES INC
FIGURE 3-2

However, in many areas, wood waste was present in significant quantities at elevations greater than 20 feet. This wood waste was intermixed with cover soils and debris, presumably dating from G-P's use of the landfill for log storage after 1975, and from placement of G-P log yard wastes and dredged sediments on the landfill. Because these wood waste materials have the potential for landfill gas production and for differential settlement from decomposition, these wood waste materials will require management as refuse during site grading and capping. The presence of the wood waste in site cover soils will not necessarily require an increase in the final floor elevation of the warehouse, because the materials can likely be placed in low-lying areas of the landfill (e.g., along Hilton Avenue) during rough grading of the site. The logs from test pits and borings can be used during the design process to modify the grading plan to incorporate these materials within the refuse layer.

Based on historical information presented in the Phase 1 report, the elevation of the bottom of landfill refuse had been estimated to range from a high of 0 feet MSL along Roeder Avenue to a depth of -10 feet MSL along Laurel street. The actual bottom elevations for the refuse layer were generally within 5 feet of the predicted elevations.

Within the main landfill area, the thickness of the combined refuse and overlying wood waste layers averaged about 23 feet. The thickest area measured was in RGB-4, located immediately northeast of the proposed warehouse footprint. At this location the combined thickness of the landfill refuse and overlying wood waste was approximately 34 feet.

Refuse Characteristics

The previous Phase I Report had estimated that wastes disposed within the landfill were composed of roughly 50% municipal refuse placed by the City and its contractor, Sanitary Services, and 50% pulp and wood waste placed by G-P. This distribution was generally supported by the observations made during Pre-Design Testing. Test pits and borings advanced during testing encountered substantial quantities of both material types. The stratigraphy of materials within the landfill was heterogenous.

Municipal solid waste encountered in the test pits and borings was primarily small, household-type materials (newspaper, cardboard, plastic, bottles, cans), with some automotive materials (gaskets, spark plugs) also encountered, including numerous tires. A small amount of industrial-type refuse was also encountered in some areas, including steel cable, wire, crushed drums, chain, conveyor belts and concrete wastes.

Significant amounts of wood and wood waste were encountered within and above the municipal solid waste. These materials ranged in size from logs up to 2 feet in diameter (RTP-1) to thin (<1 foot) layers of wood chips, dust and fibers. Concrete waste and limestone were also encountered in cover soils, typically in the northeastern portion of the landfill.

The materials present within the refuse layer did not substantially obstruct excavation or drilling activity. All borings initiated in the refuse were completed, including both those drilled with the bucket auger and those drilled with a hollow-stem auger. No large physical obstructions such as automobile bodies were encountered. The presence of concrete wastes, especially along the southeastern edge of the landfill, had been a concern expressed during the Phase 1 report, but borings placed in these areas were completed without incident. However, in one of the test pits (RTP-11) concrete or lime wastes were present at a depth of 7 feet and prevented completion of this test pit with the backhoe.

During Pre-Design testing there were no indications that significant quantities of hazardous materials were present within the landfill. As described in the Phase 1 report, the landfill has been previously evaluated by both EPA and the Whatcom County Health Department, and both concluded that the landfill did not appear to have received hazardous wastes for disposal. The only evidence of fill material contamination noted during Pre-Design Testing was the presence of a sheen and creosote odor on the groundwater within test pit RTP-3. This odor appeared to be associated with creosote-treated wood present in that test pit. Petroleum-like odors were noted in test pit RTP-36, but this was located outside of the landfill boundaries.

3.2 Soil Cover Characteristics

There are currently no areas of exposed refuse at the landfill. Based on information presented in the Phase 1 report, the refuse is covered by a combination of soils, wood waste, fill materials, and limestone. The thickness and characteristics of these cover materials were assessed as they relate to site grading and capping plans.

Thickness and Elevation

The cross-sections (Figures 3-1 and 3-2) summarize the observations made from test pits and borings at the site regarding landfill soil cover. The thickness and elevation of soil cover was generally similar to that estimated in the Phase 1 report. The cover soils ranged from 1-2 feet to over 10 feet in thickness. However, as described above, wood waste and other wastes were present within the cover soils such that portions of the cover soils will require management as refuse.

The pile of Chestnut street soils was not sampled during testing. These soils were generated during an off-site construction project and have been stockpiled on site by G-P for later use. The volume of soil was estimated to be approximately 20,000 cubic yards in the Phase 1 report. These soils are excluded from the discussion of cover soil type below.

Soil composition

Soil cover stratigraphy was highly heterogeneous, typically made up of thin (< 1 foot thick) layers of silt, sand, clay, gravel, fine lime, limestone cobbles, ash, wood, and building materials such as cinder blocks, bricks and wood planking. Total soil cover thicknesses were similar those predicted in the Phase I Report (RETEC, 1996), though the level of heterogeneity in the materials was greater than had been expected.

A very hard surface layer of limestone cobbles is present in the north central segment of the landfill, between cross-sections 1 and 3. This is the area currently used by G-P as a stockpiling and loading area for coarse limestone. Soil cover below the limestone cap in this area consisted of a sandy gravel with discarded construction debris (cinder blocks, concrete wastes, bricks and lumber).

The remainder of the soil cover on the landfill was primarily a sandy gravel with areas of ash, fine lime and wood. Wood waste and mixtures of sand and wood waste were observed extensively in cover soils in the southwesterly portion of the landfill. These may represent G-P log yard wastes or sediments and wood waste excavated by G-P during construction of the biotreatment lagoon as described in the Phase 1 report.

3.3 Groundwater Properties

Temporary piezometers were installed in thirteen of the test pits and two of the bucket auger borings to provide data on daily shallow groundwater fluctuations. Groundwater elevation data were also collected from the four landfill gas probes. Field measurements of pH, temperature and conductivity were also taken from sixteen test pits which encountered the shallow groundwater during excavation.

Elevation, Fluctuation and Gradients

Groundwater elevation measurements were taken hourly from the temporary piezometers and gas probes over a nine-hour time period on October 7, 1997 to evaluate potential tidal influences on shallow groundwater elevations within the landfill. The relationships between the measured groundwater levels and the reported tidal level in Bellingham Bay are shown on Figure 3-3. None of the groundwater data appeared to exhibit any tidal influence. The elevation of the shallow groundwater at the landfill was above the tidally controlled water level in Bellingham Bay in all test pits and borings, including test pit RTP-16 located less than 150 feet from the Bay, and test pit 14 which was located within the former clay berm along Laurel street.

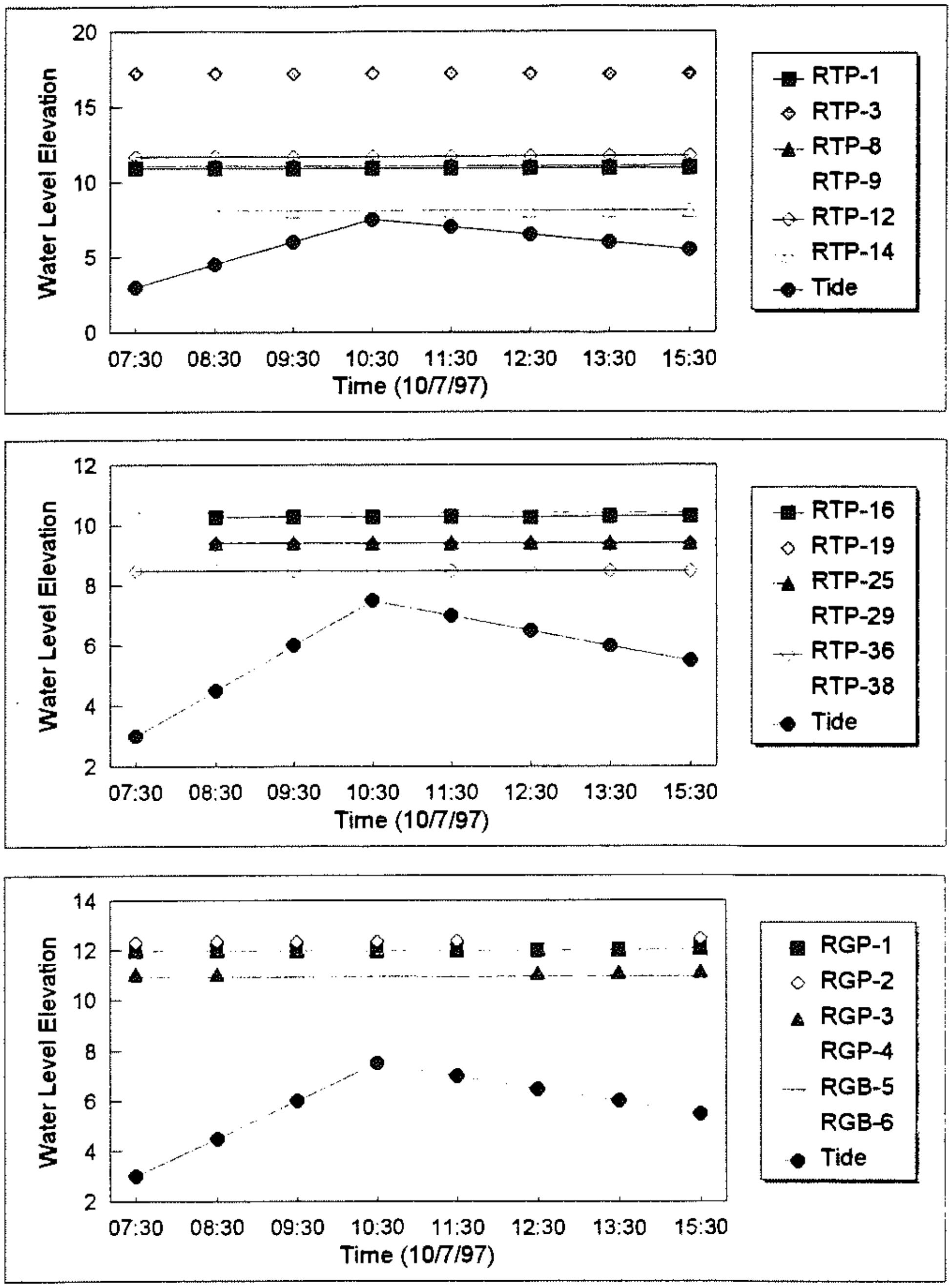
A shallow groundwater contour map for the landfill was made using one set of these hourly data (Figure 3-4). This contour map indicates a groundwater "mound" in the center portion of the landfill 1-3 feet above groundwater levels in adjacent areas. This mounding is consistent with the preliminary groundwater water balance analysis performed in the Phase 1 report. That analysis had suggested that the primary source of groundwater recharge was rainwater infiltration.

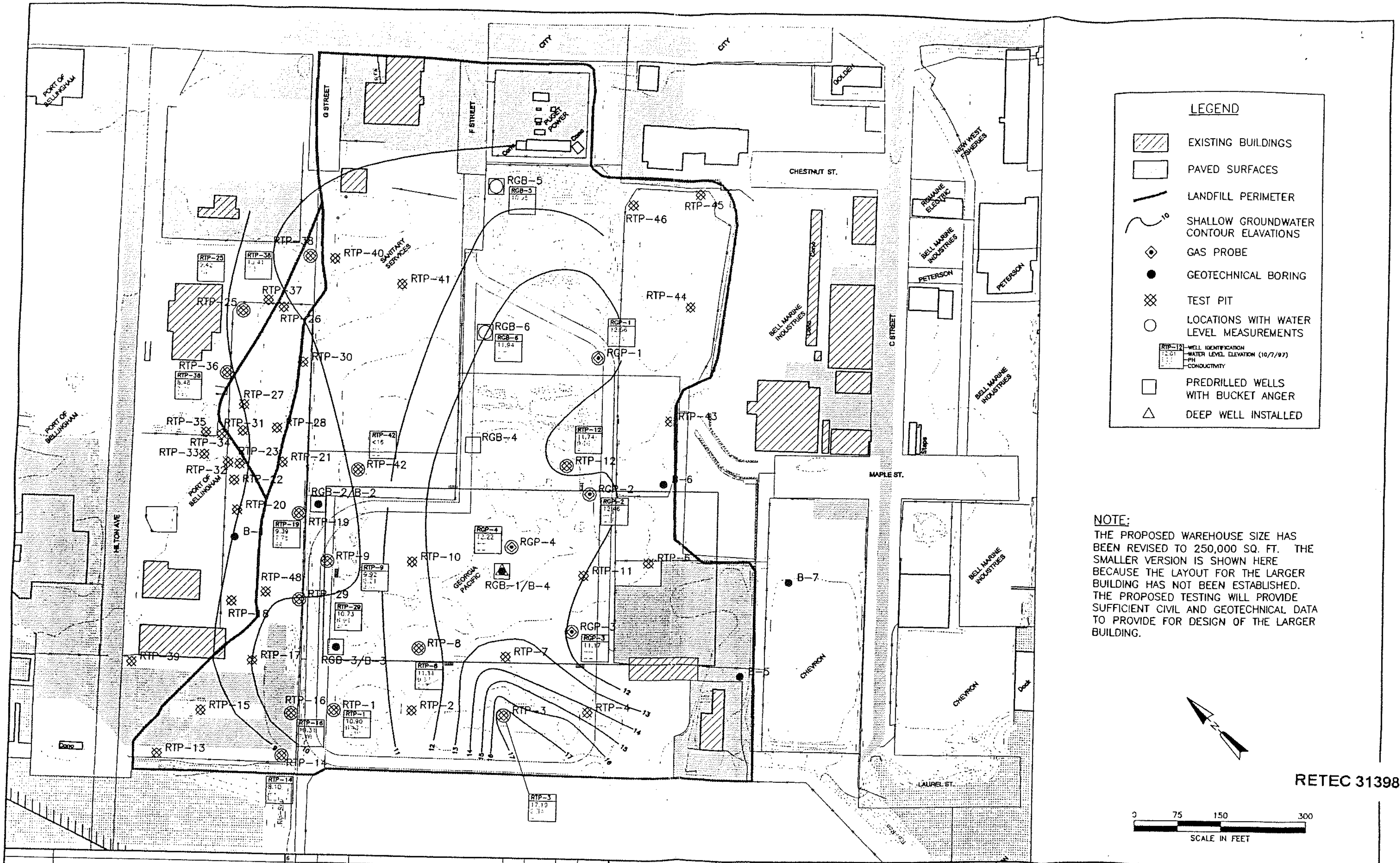
In most portions of the landfill the groundwater level ranged between 10 and 13 feet above MSL. This provided a distance of 7 to greater than 12 feet between groundwater and the ground surface.

The highest groundwater elevations were measured in the southern portion of the landfill, near test pits RTP-3, RTP-4 and RTP-7. In RTP-3, groundwater was present at over 17 feet above MSL. This was only 5 feet below ground surface. It is not known whether the high groundwater in this area is caused by surface water accumulation and infiltration, or whether groundwater may be derived from leakage from the nearby G-P biotreatment lagoon. However, this area represents a low point in the landfill surface, and standing water was observed here during Pre-Design testing and in the past. Vegetation associated with wet soils (cattails) are also present in this area. These factors suggest that surface water accumulations and infiltration are the source of high groundwater elevations in this area.

One of the deep geotechnical borings (B-4) was completed as a deep monitoring well. The well was screened at the bottom of the boring (70 to 82 feet bgs) across a clay and silt interface as shown in Figure 3-1. The groundwater elevation

Figure 3-3. Shallow Groundwater Fluctuations with Time





NOTE:
THE PROPOSED WAREHOUSE SIZE HAS BEEN REVISED TO 250,000 SQ. FT. THE SMALLER VERSION IS SHOWN HERE BECAUSE THE LAYOUT FOR THE LARGER BUILDING HAS NOT BEEN ESTABLISHED. THE PROPOSED TESTING WILL PROVIDE SUFFICIENT CIVIL AND GEOTECHNICAL DATA TO PROVIDE FOR DESIGN OF THE LARGER BUILDING.

RETEC 313985

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
6							
5							
4							
3							
2							
1	N.S.	12/17/97	DRAFT				
0	E.F.	11/3/1997	DRAFT				

REFERENCE DWG DESCRIPTION

ROEDER AVE. WAREHOUSE PROJECT
3-2538-450

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CURRENT DATE 12/17/97 CAD FILE 25385175

SHALLOW GROUNDWATER CONTOURS
AT ROEDER AVENUE

RETEC
REMEDIATION TECHNOLOGIES INC

DRAWING NO FIGURE 3-4 REV 0

measured in this deep well was approximately 1 foot below that measured in the adjacent shallow gas probe well, but several feet above the elevation of surface water in Bellingham Bay. The difference between the shallow and deep groundwater elevations suggests that the clay soils beneath the landfill act as a partial confining layer.

Groundwater Characteristics

Chemical analytical testing of site groundwater was not performed as part of Pre-Design testing. That type of testing will be performed at a later date as part of the environmental portion (RI/FS) of the Warehouse project. The four gas probe wells and the deep monitoring well remain on site for that purpose. Limited testing of groundwater was performed as necessary to evaluate the potential corrosivity of site groundwater.

Groundwater conductivity values in shallow groundwater within the landfill ranged from 820 to 181 micro-siemens/cm (*u*s/cm). There was no consistent pattern in the conductivity data. The measured values were three orders of magnitude below that for seawater, indicating that the groundwater within the landfill is nonsaline. The conductivity values obtained from the test pits are included on Figure 3-4.

The pH values observed in shallow groundwater ranged from a near-neutral value of 6.48 to an alkaline value of 9.76. The groundwater was surprisingly alkaline given the tendency of landfill leachate to be acidic. The alkaline groundwater pH may result from the limestone screening and stockpiling activities which occur there.

Groundwater obtained from within the landfill was generally black, turbid and odorous. In contrast, the water from the newly-developed deep monitoring well was clear with little or no odor. The difference in water quality of the deep well suggests that the deep groundwater has not been impacted by landfill leachate. Further testing of the groundwater may be conducted during the RI/FS portion of the project.

3.4 Geotechnical Testing

Soil Stratigraphy

In the Phase 1 report, the stratigraphy of soils beneath the landfill was projected based on available data for the area. Soils underlying the landfill were expected to consist of a sand layer of variable thickness underlain by a deep clay layer containing lenses of silt. The observations from Pre-Design testing generally confirmed the expected soil stratigraphy. Figures 3-1 and 3-2 summarize the observed soil characteristics.

The landfill deposits consisted of wood chips, sawdust, pieces of wood, plastic, wire, paper and other municipal waste. Where soil was encountered in the landfill, the material was organic silt, or silt mixed with wood chips and sawdust.

Blow counts (number of blows required for the last 12 inches of penetration) obtained in the landfill material ranged from 1 or 2 to about 16, with an average value of about 6. In general, the higher blow counts were attributed to sampling through intact wood.

In areas outside the landfill footprint, fill materials associated with former development of submerged tidelands were encountered as expected. The soil fill was encountered in borings B-1 (sand and silt), B-5 (sand fill), B-7 (sand). These fill materials were generally found to be loose or soft. Shell fragments were observed in some fill materials, confirming that some of the fill had been obtained through dredging of adjacent waterways.

Beach deposits were found below the fill in all borings with the exception of boring B-6 where landfill was found to extend to the top of the underlying fine grained deposit. The beach deposits were found to be predominantly sand, with occasional interbeds of silt, silty sand, and clayey silt. The unit contained numerous shell fragments and occasional wood chips and saw dust particles. The unit was found to generally thickest in the southern corner of the landfill, and thinnest in the northern corner. The thickness of the unit beneath the proposed warehouse footprint ranged from zero (boring B-6) to about 15 feet. The beach deposit unit was also found to vary in density (based on blow count information) from loose to medium dense. In general the first few feet of the unit were loose, and the density increased with depth.

Fine grained deposits associated with the most recent (Vashon Stade) glaciation of the Puget Sound region were encountered in all of the borings below the beach deposits, or below the refuse where no beach deposits were present. The unit continued to the depths explored in all of the explorations. The unit is wide spread in the Bellingham area and is termed Glacial Marine Drift. Although the unit was thought to have been deposited during glacial times by active advancing glaciers, it was never compacted by the weight of glacial ice. The soil was deposited in a marine environment with a layer of water between the base of the glacial ice and the soils depositional environment. Glacial marine drift can contain grain size particles that range from clay size to cobble or even boulder size. In general, the soil does not show distinct bedding, although sand interbeds can be found.

The glacial marine drift encountered at the site consisted predominantly of silty clay or clayey silt. Fine to medium sand and occasional fine to coarse gravel were found to be within the predominantly fine grained matrix. Occasional fine sand partings and sand interbeds were also noted, but the interbeds appeared discontinuous. In general, the amount of fine sand partings and sand interbeds increased with depth. The only layer that could be remotely correlated was the sandy silt and silty fine sand layers encountered in borings B-4 and B-5 at about elevation –55 feet.

The fine-grained deposits graded from soft to stiff with increasing depth. Blow counts in the material were consistently low throughout the materials (see boring logs in Appendix C), but shear strength measurements differed with depth as described below.

Soil Physical Testing

The undrained shear strength of the clay utilized in pile capacity calculations was developed by field shear strength measurements, laboratory vane shear testing and triaxial unconsolidated undrained (UU) tests. Table 3-1 contains the field torvane measurements made at the time of drilling. Table 3-2 contains the results of the laboratory vane shear tests and the UU tests.

Potential Piling Design Capacities

A design value of 1,500 psf was chosen to develop preliminary pile capacities given the soil strengths shown in Tables 3-1 and 3-2.

The geotechnical investigation indicated that the warehouse could be supported on driven wood pilings to allowable design loads of 25 tons per pile. The length of piles will vary across the site, and will depend on the thickness of the landfill and the thickness and characteristics of the underlying sand. The length of the individual piles is expected to vary from about 60 feet to about 80 feet. This recommended length is greater than the 42 to 60 feet assumed in the Phase 1 report. Since the landfill contains significant amounts of organic material and will settle as degradation takes place, the building floor loads will also need to be pile supported, as was assumed in the Phase 1 report.

Table 3-1 – Field Torvane Measurements

Torvane Measurements in Pounds per Square Foot (psf)							
Depth	B-1	B-2	B-3	B-4	B-5	B-6	B-7
30	--	--	--	--	--	--	700
35	1100	--	1600	--	--	--	1300
40	1200	900	1500	500	800	--	1500
45	--	900	1300	300	1100	--	1500
50	--	--	1800	1700	1300	1500	1400
55	--	1200	1800	1500	1600	1200	1400
60	--	--	--	1350	1700	--	1500
65	1500	1500	1700	1400	1400	1600	1300
70	1600	1500	2000	--	1800	1600	1500
75	1700		1350	--	--	1800	1200
80	1760	2200	--	--	--	--	1600
85	--	--	--	--	--	--	--
90	1500	--	--	--	--	--	--

Table 3-2 – Laboratory Shear Strength Results

Laboratory Shear Strength (psf)			
Depth (ft bgs)	UU Test	Lab Vane (corrected)	
--	Boring B-5	Boring B-2	Boring B-6
40	1025	970	--
45	--	1058	--
50	1600	--	572
55	--	1500	1000
60	1550	--	--
65	--	1645	786
70	2000	--	2003
75	--	--	1574
80	1950	--	--

The geotechnical design work to be conducted as part of warehouse design tasks will contain a more detailed analysis that will result in a more accurate prediction of the pile lengths. The landfill material is not expected to provide any pile support, and may cause small amounts of downdrag on the pile as the material settles. In addition, loose saturated sand in the soil column is expected to liquefy during a moderate level seismic event. This liquefaction will result in settlement of the loose sand, and some downdrag of overlying soils. A more detailed analysis of liquefaction and expected results will be performed at a later date as part of Warehouse design tasks.

It is expected that all piles will terminate within the glacial marine drift (referred to hereafter as clay). The majority of the pile resistance to loading will be derived based on friction along the sides of the wood pile in the clay and sand. Not all of the sand is expected to contribute significantly to pile support. For instance in geotechnical boring B-5 where the total beach deposit sand thickness was found to be 15 feet, the upper 6 feet was found to be very loose, and will contribute little to the pile capacity. Likewise, the strength of the clay was found to increase with depth. The upper portion of the clay is expected to contribute smaller amounts while the deeper portions are expected to contribute more.

The wood piles will require some form of treatment in order to provide a useful design life to the structure. The level of this treatment will be determined during the design phase of the project.

3.5 Landfill Gas Monitoring

Gas Testing Data

As part of the pre-design testing, four landfill gas probes were installed and monitored. These probes (RGP-1 through RGP-4) were blower tested with well head vacuums between 1 inch and 26 inches of water column. The raw data from testing are included in Appendix D.

Gas production rates and composition varied among the different locations sampled. The gas from probe RGP-1 located northeast of the proposed warehouse footprint produced a sustained flame with 58% methane, 33% carbon dioxide and 3% oxygen under a 2 to 3 inch water column vacuum. The three probes that were located within the warehouse footprint were depleted of methane (<5%) under a 2-inch water column within the first two hours of the blower test.

Gas System Design Considerations

In the Phase 1 report, it was assumed that a small gas burner and gas collection trenches would be required. The gas collection trenches would be installed directly beneath the low-permeability cap layers and would extend down into the refuse. The trenches would be constructed of perforated plastic pipe laterals surrounded by sand and geotextile connecting to non-perforated manifold piping. The manifold piping would be routed to a header with a network of valves used for balancing the system prior to burner, blower or filter unit.

Because one of the wells produced a static methane concentration above 50% under a 2 to 3-inch water column vacuum, a small temporary flare system may be needed until the landfill gas concentrations of methane decline below 20%. After that point, GAC could be used without a flame for emissions control. The minimum landfill gas stream generally required to sustain flare use is provided in Table 3-3.

Table 3-3. Minimum Gas Stream Required to Sustain Flame

Parameter	Requirements for Sustained Flame
Methane	50%
Inlet temperature	0 to 80oF
Inlet pressure	1 - 5 psig
Flare gas BTU value	600 BTU/scf

However, because of the variability in gas production within different areas of the landfill, a dual collection system for handling landfill gas is recommended. The recommended system consists of a small flare system coupled with a separate granular activated carbon (GAC) unit. The gas collection laterals would be connected to a dual manifold system to permit gas from each lateral to be directed to either the flare system or the GAC unit. The use of the small flare would reduce the frequency of GAC regeneration caused by routing landfill gas with higher gas concentrations into the GAC system. Conversely, use of the GAC system will prevent dilution of the flare system gas concentrations which could prevent a sustained flame.

The other components of the landfill gas collection system would remain similar to the conceptual design with slight modifications to accommodate a flare system. The collection piping would remain unchanged. Landfill gas collection trenches would be installed 3 feet into the refuse on a spacing of approximately 150 to 200 feet horizontally. The only variation of the conceptual design for landfill gas collection would be the addition of a second manifold parallel to the original manifold constructed so that individual LFG laterals could be directed to either the GAC unit or Flare. The design should provide provisions for both systems to allow long term flexibility depending upon gas generation after the cap has been placed. Additional blower tests will be required after capping to balance the system.

With regard to the under-warehouse gas collection and inside-warehouse gas detection systems, the final design will not deviate significantly from the conceptual design. The under warehouse gas collection system will likely be designed to provide an active ventilation system discharging to the atmosphere. Monitoring of the discharge air quality will likely be included in an operations and maintenance plan. Coordination with the warehouse architect will be required to provide ventilation louvers and blowers for use under the warehouse floor. The gas detection system design will follow the plan outlined in the conceptual design.

SECTION 4

4 Conclusions

4.1 Comparison of Findings with Phase 1 Assumptions

Table 4-1 summarizes the main findings and conclusions from Pre-Design testing and compares these to the conceptual design assumptions from the Phase 1 Report. In general, the assumptions made during Phase 1 were shown to be valid. However, significant differences relevant to the warehouse design were noted on the issues:

- Landfill Characteristics: The landfill was found to extend onto an additional 1/2 acre of Port-owned property along Hilton Avenue. This correction is noted in Figure 2-1. Assuming that this area will be capped as part of the Warehouse project, this will result in an increase in total costs proportionate to the additional area of landfill. The other properties of the landfill, including refuse type, depth and thickness were basically unchanged from the Phase 1 assumptions.

- Landfill Soil Cover: The landfill soil cover was found to be extremely heterogenous and to contain extensive wood debris, cobbles and other materials. These materials make it impractical to amend the soils with bentonite for use as the low-permeability landfill cap. As described in Section 4.2, RETEC recommends that the original grading and capping plans be modified to incorporate this conclusion, and to identify cost savings in the grading plan which can be used to offset the costs of this change.

- Groundwater Properties: Groundwater elevations and gradients were generally similar to the Phase 1 predictions. However, there was an area along the southwest side of the proposed warehouse with especially high groundwater elevation. This groundwater is likely due to surface water collection and infiltration.

- Geotechnical Findings: The stratigraphy of the site soils underlying the landfill was similar to expected conditions. However, the strength of the upper portion of the sands and the upper portion of the clay layers were both very low. Based on the soils testing data, it is estimated that piling lengths of between 60 and 80 feet will be required to achieve a bearing capacity of 25 tons per pile. The pile tips will all be located within the stiff

Table 4-1. Comparison of Findings with Phase 1 Design Assumptions

Design Issue	Phase 1 Assumptions	Conclusions of Pre-Design Testing
CHARACTERISTICS OF THE LANDFILL		
Areal Extent	Boundaries per Figure 2-1 in Phase 1 Report. Total landfill estimated at 21.2 acres.	Additional refuse detected at Port properties along Hilton. Total acreage revised to 21.7 acres. Additional 0.5 acres under Port ownership.
Refuse Top, Bottom and Thickness	Refuse thickness estimated at 10 to 25 feet, with the thickest portion between Maple street and Laurel street. Refuse top estimated at 20ft MSL in main landfill area. Maximum depth 5-8feet below former mud line (est. elevation -5 ft MSL)	Thickness measured between 10 and 34 feet, with thickness profiles similar to Phase 1 estimates. Refuse top confirmed at 19-20 ft MSL in main landfill area, but wood wastes present to 24-25 ft MSL in some areas. Maximum depth 12 feet below projected original mud line (elevation -10 ft MSL)
Refuse Characteristics	Estimated 50% municipal waste and 50% pulp and wood waste. No known hazardous materials.	Observations are consistent with 50/50 estimate. Extensive pulp and wood waste encountered in fill. Some drums, but no evidence of hazardous materials.
LANDFILL SOIL COVER CHARACTERISTICS		
Depth and Thickness	Original cover soils 2 feet thick. Total thickness variable across the landfill. G-P sediments and fill up to 8 feet thick in places overlying the original soil cover.	Cover thickness ranged from 2 feet to 12 feet.
Cover Soil Type	Cover soils assumed to include misc. fill soils, G-P dredged sediments and G-P log yard wastes. Soil pile from Chestnut street project in NE corner of landfill.	Cover soils include coarse soils, gravels, wood waste, silts and limestone. Coarse soils present at Sanitary Services and in the Chestnut Street soils pile.
Usability	Original grading plan assumed cut/fill balance on site, with a portion of the cover soils suitable for bentonite admixture and capping use. Soil import assumed for base course and select fill under development features.	Reuse of cover soils for capping will require extensive screening and segregation, making it cost prohibitive. However some soils suitable for select fill or base course use. Capping soil will require import material.
GROUNDWATER CHARACTERISTICS		
Depth to Groundwater	Anticipated to be 7-15 feet bgs.	Generally 10-14 feet bgs.. Shallow groundwater 5 feet bgs was encountered in one test pit in the southern portion of the landfill next to the G-P lagoon.
Extent of Tidal Fluctuation	Tidal influence expected to be signficiant only immediately adjacent to the shoreline. Tidal influence assumed to be minimal within the main landfill.	No significant tidal influence measured in refuse layer. No tidal influence adjacent to former clay berm.
Seasonal Fluctuation	Assumed seasonal fluctuation of 1-2 feet.	Gas probe water levels can be monitored to confirm seasonal fluctuation.
Gradients	Expected gradients toward Bellingham Bay. Possible gradient from Roeder Avenue as well.	Gradients toward the two waterways confirmed. Gradient also measured toward Roeder Avenue. Confirms expectation that infiltration is greater influence than recharge from off-site.
Est. Water Balance	On-site infiltration estimated to be the source of over 75% of groundwater recharge at the landfill. Possible additional inflows across Roeder Avenue or from the G-P biotreatment lagoon.	Gradients flow from center of landfill outward, consistent with infiltration as primary source of groundwater recharge. High water levels near G-P lagoon, likely due to surface water infiltration patterns. Could alternately be due to lagoon source.
Groundwater Characteristics	Possible acidic pH. Black and odorous Elevated chromium concentrations suspected.	Groundwater pH alkaline in limestone management areas. No pH measurements below 6.0. Groundwater turbid, black and odorous within refuse layer. Groundwater from the deep monitoring well clear and without odor. No contaminant analyses performed during Pre-Design Testing. Gas probes and deep monitoring well provide groundwater monitoring points for the Warehouse project area.
GEOTECHNICAL ASSUMPTIONS		
Stratigraphy of Underlying Soils	Refuse rests on sand layer overlying clay and silt. Sand thickness 2 to 20 feet, thickest along Laurel street. Sand/clay interface at elevations 0 to -20 ft MSL. Soft clay will require friction piles.	Refuse rests on sand layer overlying clay and silt. Sand thickness ranges from 0 to 17 feet beneath the landfill refuse layer. Thickest along Laurel street. Sand/clay interface at elevations 0 to -20 ft MSL. Increasing stiffness and shear strength with depth.
Piling Type	Driven, treated timber piles Most bearing capacity from pile friction	Driven, treated timber piles Bearing capacity from pile friction
Piling Length and Bearing Capacity	Piles ended in the sand layer or in upper clay. Length 42 to 60 feet for 25 ton/pile capacity.	Piles ended in the lower, stiffer portions of the silt/clay layer, where shear strength is adequate. Length estimated 60 to 80 feet for 25 ton/pile capacity.
LANDFILL GAS MANAGEMENT		
Gas Production	Low to moderate gas production assumed. Gas production probably sufficient to require use of burner system rather than GAC only.	Gas production highly variable. In some areas, little or no methane was detected. In other areas, gas production was sufficient to require the use of a burner system.
Collection System	Perforated gas collection pipe in trenches, leading to single manifold. Under-floor collection system in warehouse.	Gas collection system unchanged, except dual manifolds recommended to permit flow control and use of burner and GAC systems as appropriate to gas production.
Destruction System	Small burner system.	Dual burner and GAC system recommended for maximum flexibility.

silts and clays. This estimated pile length is greater than the 42 to 60 feet which was estimated in the Phase 1 report.

- Landfill Gas: The Phase 1 report had assumed that gas production would be relatively low, but still sufficient to require the use of a burner. Findings from gas testing indicated that gas production is variable across the landfill, but that a burner will be required for areas of significant gas production. A dual collection gas system is recommended to provide flexibility to handle variable gas production within different areas of the landfill. This will also permit better control over gases over time. The dual collection system is virtually the same as that proposed in the Phase 1 report, such that the incremental costs for the additional equipment will be low.

4.2 Design Impacts and Considerations

Based on the above-described differences, some changes to the conceptual design will be required. These changes should be incorporated during the initial design effort for the Warehouse.

Site Capping and Grading Assumptions

Prior to initiation of Pre-Design testing, the conceptual plan for the Warehouse had already been modified to accommodate larger G-P space requirements. The increased size of the warehouse (250,000 square feet rather than the originally proposed size of 200,000 square feet) will require modifications to the original cut-and-fill plan presented in the Phase 1 report. The modifications will be required to accommodate the lower grade of the properties on the outer edges of the warehouse footprint (the Chevron property or the Hilton Avenue property).

Based on the results of Pre-Design testing, two additional changes must be incorporated into the cut-and-fill plan. First, an additional 1/2 acre of landfill area was identified. This will affect the final cut-and-fill calculations for the project, and will increase total grading and capping costs. Using the unit cost of $3.93 per square foot from the Phase 1 report, the 25,000 square foot increase will impact project costs about $100,000. Actual costs will be developed during the design process.

Second, the site cover soils were found to contain considerable amounts of wood debris and other materials (bricks, concrete, lime cobbles). The presence of this material renders the existing soil cover unsuitable for bentonite amendment as proposed in the Phase 1 conceptual design. Soils containing substantial wood debris may also require management as refuse. These soils may be graded and placed such that final floor elevation of the warehouse will be unchanged from the Phase 1 design.

The major impact of the cover soil characteristics will be to change the cut and fill ratio for the site. The original design had helped to reduce overall project costs by minimizing the amount of fill material imported to the site. In the original plan, the native soils were to be rough graded, and bentonite was then to be imported for use as a soil amendment. Bentonite was to have been added to the site soils at 10 percent by weight. Sand, select fill and crushed rock materials were to be imported for use between the cap layer and final site improvements.

Because the much of the site cover soils is extremely coarse, soil amendment would only be possible after extensive sieving and debris removal, and would require high bentonite admixture ratios. The alternate method for capping involves importing clay soils for use directly as the capping material. The higher costs of material purchase and transportation are partially offset by the reduced materials handling costs. However, the fill import will increase total project costs.

There are several options which could be exercised to offset this cost increase. Because the Chestnut street soils and some of the cover soils in the northeastern portion of the landfill are relatively coarse (gravels, cobbles, concrete debris, sands), it may be possible to remove and stockpile these materials prior to rough grading the site. These coarse materials could then be used for general fill under paved areas or elsewhere on the site. This would reduce the amount of import fill required to meet the design elevations. This will be evaluated during the initial design process. Other recommendations for the site grading design include the following:

> Phasing of the Grading Work: Install landfill gas (LFG) collection trenches during rough grading of the site to accommodate LFG trench spoils. This would minimize off-site disposal of trench spoils and aid in meeting a cut to fill soils balance.
>
> Alternate Cap Materials: Investigate local pit supplies for native clay soils suitable for use as a cover material. If a local source of soil meeting permeability requirements can be located, the need for bentonite amending may be eliminated or reduced and thereby generate some cost savings over other import fill materials.

Alternate Construction of Warehouse Slab Subgrade: Costs may be reduced if alternative slab subgrade construction is used. If the soil bentonite layer can be raised, an increased volume of refuse or unsuitable material could be placed under the Warehouse slab thereby allowing a more balanced cut to fill ratio. Additionally, it may be possible to form an elevated slab thereby minimizing fill materials. These details will need to be coordinated with the building architect and a economic analysis performed during the initial design effort.

Geotechnical Assumptions

The main modification to the geotechnical design will be to use longer piles than had been originally proposed. The longer piles are required due to the variable thickness and strength of the sand layer, and due to the soft characteristics of the upper clay soils beneath the landfill. The longer piles will add to the costs of the Warehouse.

In the design process, a more detailed evaluation should be conducted for pile lengths and the effect of liquefaction and downdrag forces on piles penetrating the sand layer. This analysis will be used to establish the final design length of the piles.

Groundwater Assumptions

The groundwater findings are consistent with earlier assumptions. No changes to the conceptual design for the Warehouse are required at this time.

The four gas probe wells and the single deep monitoring well installed during testing are available for use as environmental groundwater monitoring wells. RETEC recommends that water levels in these wells be monitored quarterly for groundwater elevations to determine the extent of seasonal fluctuation in groundwater levels. No additional monitoring is required for Warehouse design purposes.

Landfill Gas Management

The dual collection gas system will provide needed design flexibility at a minimal incremental cost. The details of the system will be developed during the initial design step.

APPENDIX A

APPENDIX A

TEST PIT AND BUCKET AUGER STRATIGRAPHIC LOGS, WELL CONSTRUCTION DIAGRAMS AND PIEZOMETER MONITORING DATA

RETEC

BORING LOG
RGB-1 (B-4)

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-420 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *09/29/97* TIME: *11:00*
COMPLETION DATE: *09/29/97* TIME: *14:15*
WATER LEVEL DURING DRILLING: *' bgs*
DATE MEASURED:
BORING ID: *36 inches*
BORING DEPTH: *28.0 feet bgs*
SURFACE ELEV.: *25.80 feet (MSL)*
M. P. ELEVATION: *28.31 feet (MSL)*
CLIENT: *Port of Bellingham*
DRILLING CO.: *Slead Construction*
DRILLER: *Chuck*
RIG TYPE:
METHOD: *Bucket Auger*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								FILL: Black silty soil with concrete blocks and wood; two 30-gallon drums filled with concrete visible.
						ML		CLAYEY SILT: Gray.
5								WOOD WASTE: Chips, fiber, planks, some poles.
10								GARBAGE: Rags, glass, paper, plastic, rubber, auto tires, newspaper, cardboard.
15								
20								
25						SM		SILTY SAND: Gray.
								Total depth = 28.0 feet bgs.
30								
35								
40								
45								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

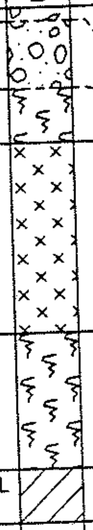
RETEC

BORING LOG

RGB-2 (B-2)

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-420 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *09/29/97* TIME: *15:00*
COMPLETION DATE: *09/29/97* TIME: *18:00*
WATER LEVEL DURING DRILLING: *' bgs*
DATE MEASURED:
BORING ID: *36 inches*
BORING DEPTH: *19.0 feet bgs*
SURFACE ELEV.: *22.54 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
DRILLING CO.: *Slead Construction*
DRILLER: *Chuck*
RIG TYPE:
METHOD: *Bucket Auger*
LOGGED BY: *J. Gibbens*



DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								LIMESTONE COBBLES
						GP		SILTY SANDY GRAVEL; Gray.
								GARBAGE; Paper, plastic.
5								WOOD WASTE; Chips, planks, fibers; some garbage (<10%).
10								
								GARBAGE; Auto tires.
15								
						CL		SILTY CLAY; Gray; with wood/peat.
								Total depth = 19.0 feet bgs.
20								
25								
30								
35								
40								
45								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

BORING LOG
RGB-3 (B-3)

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-420 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington;*
DRILLING CO.: *Slead Construction*
START DATE: *09/30/97* TIME: *08:00*
BORING ID: *36 inches*
DRILLER: *Chuck*
COMPLETION DATE: *09/30/97* TIME: *10:30*
BORING DEPTH: *26.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: *' bgs*
SURFACE ELEV.: *26.3 feet (MSL)*
METHOD: *Bucket Auger*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GW		SANDY COBBLY GRAVEL; Gray; very hard.
						GP		COARSE GRAVEL; Gray.
5								GARBAGE; Black paper, plastic, steel cable tires, cardboard.
10								WOOD WASTE; Red; chips, fibers.
15 20								GARBAGE; Mostly cardboard.
								GARBAGE MIXED WITH WOOD WASTE; 30% garbage, 70% wood waste.
25						SC		CLAYEY SAND; Tan/gray.
30 35 40 45								Total depth = 26.0 feet bgs.

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

BORING LOG
RGB-4

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-420 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington;*
DRILLING CO.: *Slead Construction*
START DATE: *09/30/97* TIME: *11:00*
BORING ID: *36 inches*
DRILLER: *Chuck*
COMPLETION DATE: *09/30/97* TIME: *15:00*
BORING DEPTH: *40.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: *' bgs*
SURFACE ELEV.: *26.38 feet (MSL)*
METHOD: *Bucket Auger*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GW		SANDY GRAVEL; With limestone cobbles; very hard.
5								WOODY DEBRIS; Poles, planking.
10								GARBAGE; 10% garbage mixed with wood waste.
15 20								WOOD WASTE; Chips, fibers, some planks and timbers.
25								GARBAGE; 50% garbage, 50% wood waste.
30 35								GARBAGE; Lots of rubber tires, conveyor belt.
						ML		CLAYEY SILT; Gray.
40 45								Total depth = 40.0 feet bgs.

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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RETEC

BORING LOG
RGB-5

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-420 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington;*
START DATE: *09/30/97* TIME: *15:20*
COMPLETION DATE: *09/30/97* TIME: *17:45*
WATER LEVEL DURING DRILLING: *' bgs*
DATE MEASURED:

BORING ID: *36 inches*
BORING DEPTH: *22.0 feet bgs*
SURFACE ELEV.: *21.09 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*

CLIENT: *Port of Bellingham*
DRILLING CO.: *Slead Construction*
DRILLER: *Chuck*
RIG TYPE:
METHOD: *Bucket Auger*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA							SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						SM	⋮ ⋮	SILTY SAND: Tan; with limestone cobbles.
							· · ·	SANDY ASH: Black.
5							× ×	WOOD WASTE: Red.
10							∫ ∫	GARBAGE: Paper, plastic.
15							× ∫ ×	GARBAGE AND WOOD WASTE: 50% garbage, 50% wood waste.
							× ×	WOOD WASTE: Fibers, chips.
20						SP	· · ·	SAND: Gray; with broken shell fragments.
								Total depth = 22.0 feet bgs.
25								
30								
35								
40								
45								

REMARKS:

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BORING LOG
RGB-6

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-420 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
DRILLING CO.: *Slead Construction*
LOCATION: *Bellingham, Washington;*
DRILLER: *Chuck*
START DATE: *10/02/97* TIME: *13:00*
BORING ID: *36 inches*
RIG TYPE:
COMPLETION DATE: *10/02/97* TIME: *17:00*
BORING DEPTH: *28.0 feet bgs*
METHOD: *Bucket Auger*
WATER LEVEL DURING DRILLING: *' bgs*
SURFACE ELEV.: *25.46 feet (MSL)*
LOGGED BY: *J. Gibbens*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								LIMESTONE COBBLE; Very hard.
						GP		SANDY GRAVEL; Black; with concrete blocks and wood debris.
5								
10								
								GARBAGE; Paper, plastic, bailing wire.
15								
20								
25								
						SM		CLAYEY SILTY SAND; Gray.
								Total depth = 28.0 feet bgs.
30								
35								
40								
45								

REMARKS:

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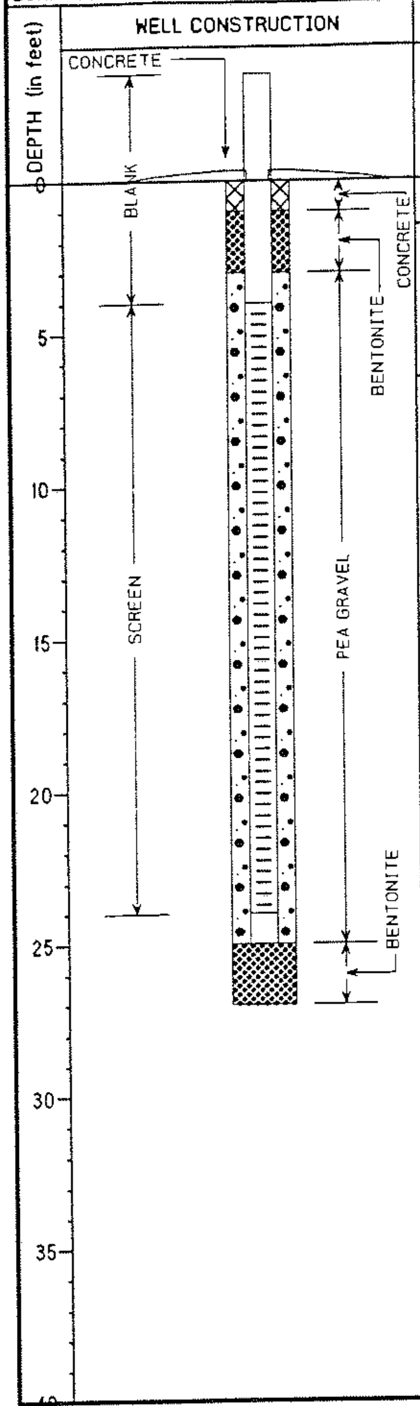
WELL INSTALLATION LOG

Gas Probe RGP-1

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-440 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington;*
START DATE: *10/01/97* TIME: *08:00*
COMPLETION DATE: *10/01/97* TIME: *10:30*
WATER LEVEL DURING DRILLING: *' bgs*
SURFACE ELEV.: *26.50 feet (MSL)*
BORING ID: *36 inches*
TOTAL DEPTH: *27.0 feet bgs*
TOP OF CASING: *30.00 feet (MSL)*
MP ELEV.: *29.08 feet (MSL)*
CLIENT: *Port of Bellingham*
DRILLING CO.: *Slead Construction*
DRILLER: *Chuck*
RIG TYPE: *John Deere*
METHOD: *Excavator*
LOGGED BY: *J. Gibbens*



		SOIL DESCRIPTION	SAMPLE DATA				
U.S.C.S.	LITHOLOGY		TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)
		LIMESTONE COBBLE: Very hard.					
SP		ASHY SAND: Gray; with concrete chunks.					
		GARBAGE: Plastic, paper, wood (40%), steel cable, wood fibers, auto tires, belts.					
		GARBAGE AND WOOD WASTE: 40% garbage, 60% wood waste.					
ML		CLAYEY SILT: Gray; with gravel.					
		Total depth = 27.0 feet bgs.					

REMARKS:

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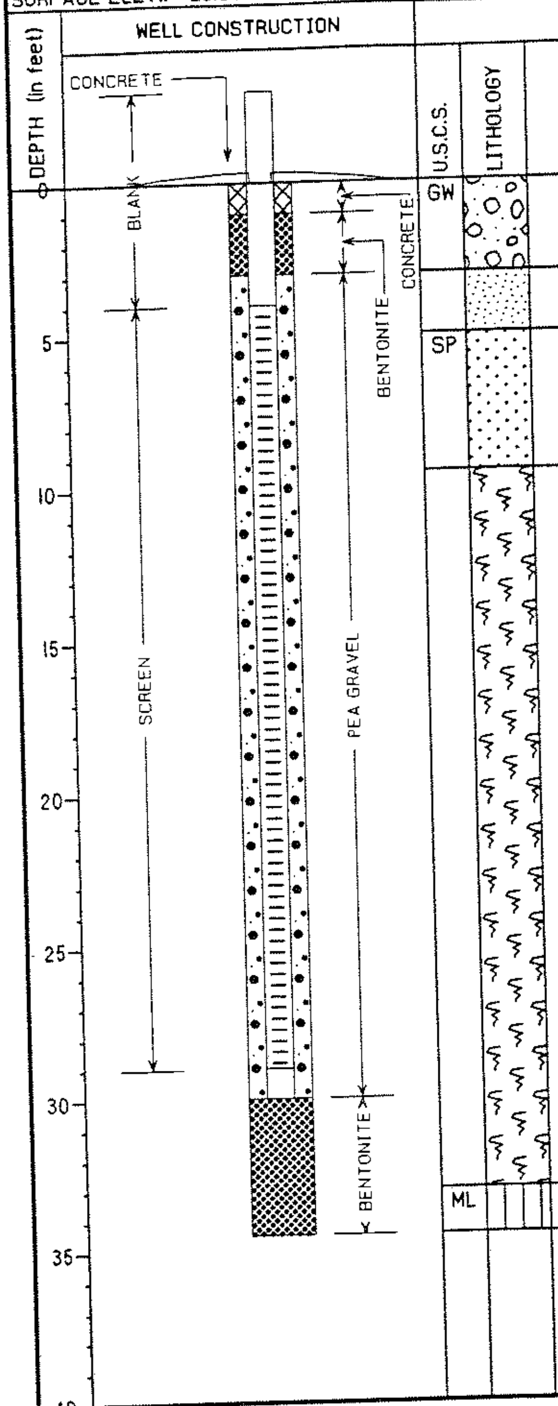
WELL INSTALLATION LOG
Gas Probe RGP-2

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-440 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington;*
START DATE: *10/01/97* TIME: *12:00*
COMPLETION DATE: *10/01/97* TIME: *14:15*
WATER LEVEL DURING DRILLING: *' bgs*
SURFACE ELEV.: *25.80 feet (MSL)*
BORING ID: *36 inches*
TOTAL DEPTH: *34.5 feet bgs*
TOP OF CASING: *28.80 feet (MSL)*
MP ELEV.: *27.90 feet (MSL)*
CLIENT: *Port of Bellingham*
DRILLING CO.: *Slead Construction*
DRILLER: *Chuck*
RIG TYPE: *John Deere*
METHOD: *Excavator*
LOGGED BY: *J. Gibbens*



U.S.C.S.	SOIL DESCRIPTION	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)
GW	SILTY SANDY GRAVEL; Black; with limestone cobbles.					
	ASH; Reddish/gray.					
SP	MEDIUM-GRAINED SAND; Black; with wood debris (20%).					
	GARBAGE; Plastic, paper, bottles, steel wire, cables, tires.					
ML	SANDY SILT; Gray.					
	Total depth = 34.5 feet bgs.					

REMARKS:

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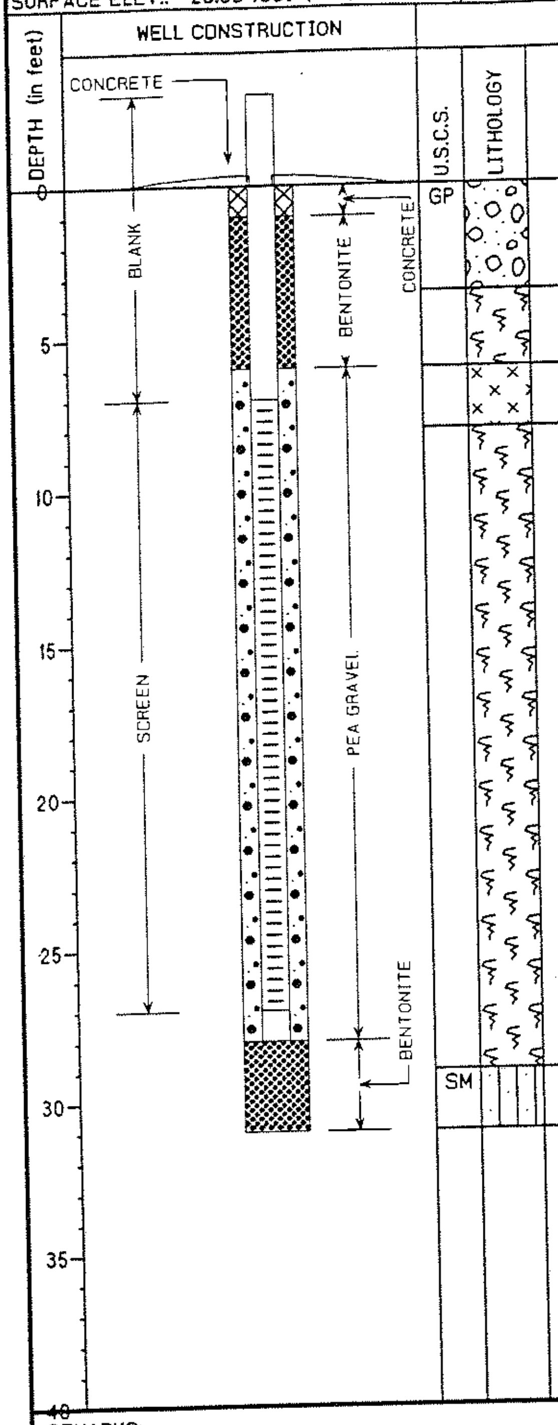
WELL INSTALLATION LOG
Gas Probe RGP-3

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-440 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington;*
START DATE: *10/01/97* TIME: *14:45*
COMPLETION DATE: *10/01/97* TIME: *18:15*
WATER LEVEL DURING DRILLING: *' bgs*
SURFACE ELEV.: *23.30 feet (MSL)*
BORING ID: *36 inches*
TOTAL DEPTH: *31.0 feet bgs*
TOP OF CASING: *26.30 feet (MSL)*
MP ELEV.: *25.44 feet (MSL)*
CLIENT: *Port of Bellingham*
DRILLING CO.: *Slead Construction*
DRILLER: *Chuck*
RIG TYPE: *John Deere*
METHOD: *Excavator*
LOGGED BY: *J. Gibbens*



U.S.C.S.	SOIL DESCRIPTION	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)
GP	SANDY GRAVEL; Gray.					
	GARBAGE; Plastic, paper.					
	WOOD WASTE; Strips.					
	GARBAGE; Rags, plastic, glass bottles, tires, cable.					
SM	SILTY SAND; Gray; with shells.					
	Total depth = 31.0 feet bgs.					

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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Page 1 of 1

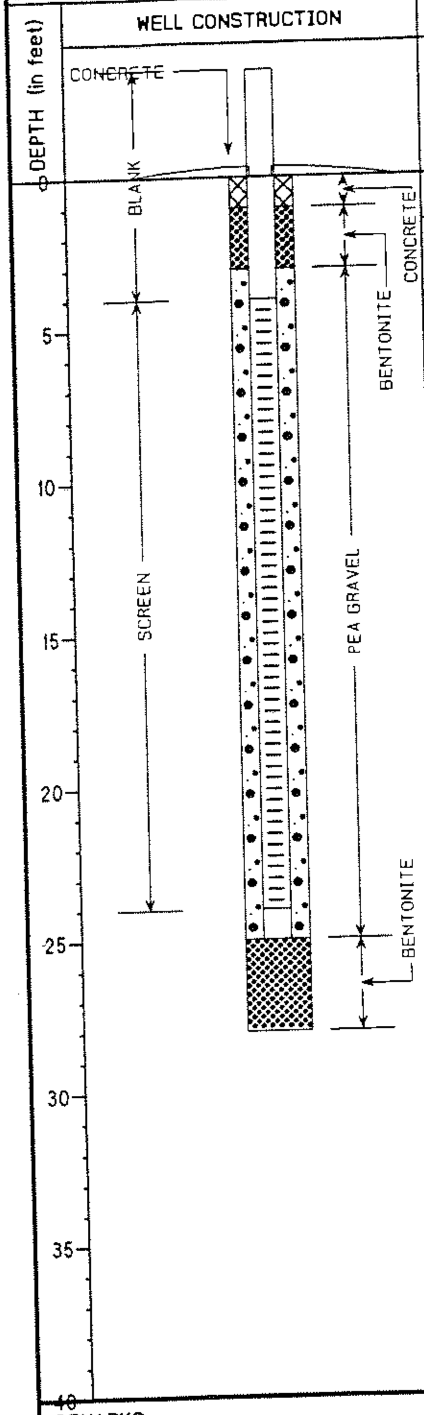
RETEC

WELL INSTALLATION LOG

Gas Probe RGP-4

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-440 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington;*
START DATE: *10/02/97* TIME: *08:00*
COMPLETION DATE: *10/02/97* TIME: *12:45*
WATER LEVEL DURING DRILLING: *'bgs*
SURFACE ELEV.: *26.30 feet (MSL)*
BORING ID: *36 inches*
TOTAL DEPTH: *28.0 feet bgs*
TOP OF CASING: *29.80 feet (MSL)*
MP ELEV.: *28.69 feet (MSL)*
CLIENT: *Port of Bellingham*
DRILLING CO.: *Slead Construction*
DRILLER: *Chuck*
RIG TYPE: *John Deere*
METHOD: *Excavator*
LOGGED BY: *J. Gibbens*



		SOIL DESCRIPTION	SAMPLE DATA				
U.S.C.S.	LITHOLOGY		TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)
		<u>LIMESTONE COBBLE</u>					
		<u>SANDY LIME</u>: Gray; with ash.					
		<u>WOOD WASTE</u>: With sand; wood debris.					
		<u>GARBAGE</u>: Plastic, paper, bricks, tires.					
SP		<u>SAND</u>: Gray; with shells.					
		Total depth = 28.0 feet bgs.					

REMARKS:

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TEST PIT LOG
RTP-1

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*		CONTRACTOR: *RETEC*
START DATE: *09/29/97* TIME: *10:00*	TEST PIT ID: *36 inches*	OPERATOR: *Shawn*
COMPLETION DATE: *09/29/97* TIME: *12:30*	TEST PIT DEPTH: *15.0 feet bgs*	RIG TYPE:
WATER LEVEL DURING DRILLING: *14.2'*	*SURFACE ELEV.: 22.40 feet (MSL)*	METHOD: *Excavator*
DATE MEASURED: *09/29/97*	M. P. ELEVATION: *feet (MSL)*	LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								FILL: Dark brown soil with roots and wood; posts up to 3 feet long.
						CL		SILTY CLAY: Blue-gray; with gravel.
5								GARBAGE: Plastic, rubber tubing, glass, auto tire, flat 1/8-inch steel sheet 1.5 feet by 4.0 feet.
10								Large log (1.7 feet diameter). *13.0'* - Less garbage.
						▼		WOOD WASTE: Black; wood debris, chips, fibers.
15								Total depth = 15.0 feet bgs.
20								

REMARKS:

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RETEC

TEST PIT LOG
RTP-2

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *09/29/97* TIME: *12:40*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *09/29/97* TIME: *14:20*
TEST PIT DEPTH: *15.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: *14.0'*
SURFACE ELEV.: *23.58 feet (MSL)*
METHOD: *Excavator*
DATE MEASURED: *09/29/97*
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PIO (ppm)	U.S.C.S.	LITHOLOGY	
0						ML		GRAVELLY SILT: Gray.
								WOOD WASTE: 100% chips.
						GP		GRAVELLY SAND: Gray.
								WOOD WASTE
5						SP		SAND: Black; with wood debris (50%).
10								GARBAGE: Wood, insulation, planking, torn-up 55-gallon drum with bullet holes, green foundry glass, melted trash from fire.
						▼		WOOD: Large log.
15								Total depth = 15.0 feet bgs.
20								

REMARKS:

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RETEC

TEST PIT LOG
RTP-3

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *09/29/97* TIME: *14:45*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *09/29/97* TIME: *16:30*
TEST PIT DEPTH: *8.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: *5.2'*
SURFACE ELEV.: *21.97 feet (MSL)*
METHOD: *Excavator*
DATE MEASURED: *09/29/97*
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								SOIL: Dark brown soil with roots.
						GM		SILTY GRAVEL: Gray; with 40% wood; and concrete blocks and chunks.
5						▼		5.2' - Water.
								WOOD: Logs; sheen and strong creosote odor on wood; sheen on water.
								Total depth = 8.0 feet bgs.
10								
15								
20								

REMARKS:

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RETEC

TEST PIT LOG

RTP-4

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *09/29/97* TIME: *16:40*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *09/29/97* TIME: *17:30*
TEST PIT DEPTH: *11.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: *10.0'*
SURFACE ELEV.: *21.29 feet (MSL)*
METHOD: *Excavator*
DATE MEASURED: *09/29/97*
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0						GP		GRAVEL: Gray; coarse; with asphalt.
								WOOD WASTE: Red; chips; fiber.
								GARBAGE: Plastic, 1-inch diameter steel cable; wood poles; bailing wire; reinforced black liner; automotive (head gasket, spark plugs).
5								
10						▼		*10.0'* - Water.
								Total depth = 11.0 feet bgs.
15								
20								

REMARKS:

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RETEC

TEST PIT LOG
RTP-6

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*		CONTRACTOR: *RETEC*
START DATE: *10/01/97* TIME: *13:00*	TEST PIT ID: *36 inches*	OPERATOR: *Shawn*
COMPLETION DATE: *10/01/97* TIME: *14:00*	TEST PIT DEPTH: *13.0 feet bgs*	RIG TYPE:
WATER LEVEL DURING DRILLING:	*SURFACE ELEV.: 23.50 feet (MSL)*	METHOD: *Excavator*
DATE MEASURED:	M. P. ELEVATION: *feet (MSL)*	LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA							SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL: Gray; very hard.
5								ASH: Gray; fine; with occasional piece of trash; some bricks; and wood.
						ML		SILT: Gray; with wood.
10								GARBAGE: Plastic, paper, cinder blocks, cardboard.
								Total depth = 13.0 feet bgs.
15								
20								

REMARKS:

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RETEC

TEST PIT LOG
RTP-7

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*		CONTRACTOR: *RETEC*
START DATE: *09/29/97* TIME: *17:45*	TEST PIT ID: *36 inches*	OPERATOR: *Shawn*
COMPLETION DATE: *09/29/97* TIME: *18:15*	TEST PIT DEPTH: *13.0 feet bgs*	RIG TYPE:
WATER LEVEL DURING DRILLING: *12.0'*	SURFACE ELEV.: *22.02 feet (MSL)*	METHOD: *Excavator*
DATE MEASURED: *09/29/97*	M. P. ELEVATION: *feet (MSL)*	LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						SP		SAND: Tan; medium-grained.
						GP		GRAVEL: Coarse; with asphalt; very hard.
								CONCRETE: Blocks/chunks; very hard.
								WOOD WASTE: Red; chips; fibers; with some bricks.
5								
								7.0' - Larger wood pieces (1 to 2 feet diameter).
10								Grades to red wood waste.
								GARBAGE: Plastic, paper, wood.
						▼		*12.0'* - Water.
								Total depth = 13.0 feet bgs.
15								
20								

REMARKS:

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RETEC

TEST PIT LOG
RTP-8

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *09/30/97* TIME: *07:50*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *09/30/97* TIME: *09:10*
TEST PIT DEPTH: *15.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: *14.0'*
SURFACE ELEV.: *24.43 feet (MSL)*
METHOD: *Excavator*
DATE MEASURED: *09/30/97*
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						SP	· · ·	SAND: Gary; medium-grained; with 1-foot diameter limestone cobbles.
						SM	⋮	SILTY SAND: Black; with wood chips and fibers (70%).
5							× ×	WOOD WASTE: And debris; with some garbage (20%); crystalline sulfur present as coating on rocks.
10							ʃ ʃ	GARBAGE: Aerosol cans, plastic, paper, bottles.
						▼		Water.
15								Total depth = 15.0 feet bgs.
20								

REMARKS:

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RETEC

TEST PIT LOG
RTP-9

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*	CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*	CONTRACTOR: *RETEC*
START DATE: *09/30/97* TIME: *10:00* / TEST PIT ID: *36 inches*	OPERATOR: *Shawn*
COMPLETION DATE: *09/30/97* TIME: *12:40* / TEST PIT DEPTH: *14.0 feet bgs*	RIG TYPE:
WATER LEVEL DURING DRILLING: *13.0'* / *SURFACE ELEV.: 23.45 feet (MSL)*	METHOD: *Excavator*
DATE MEASURED: *09/30/97* / M. P. ELEVATION: *feet (MSL)*	LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						SP		SOIL INTERBEDDED WITH ASHY SAND; Black soil; and gray sand.
5						SP		ASHY SAND; Black; with occasional piece of garbage.
								GARBAGE; Plastic, paper, cans, aerosol cans.
							× × ×	WOOD WASTE; Fiber; chips.
10								GARBAGE; Burned trash.
							× × ×	WOOD; Planking.
						▼		GARBAGE; Cardboard; newspaper dated 1972. *13.0'* - Water.
15								Total depth = 14.0 feet bgs.
20								

REMARKS:

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RETEC

TEST PIT LOG
RTP-10

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *09/30/97* TIME: *12:50*
COMPLETION DATE: *09/30/97* TIME: *14:20*
WATER LEVEL DURING DRILLING:
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *16.0 feet bgs*
SURFACE ELEV.: *27.85 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Excavator*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0						GP		SANDY GRAVEL; Gray; with concrete blocks and bricks.
5						SP		ASHY SAND INTERBEDDED WITH WOOD WASTE; Black sand; occasional piece of trash.
10								GARBAGE; Paper, plastic.
								WOOD WASTE; Red; fibers; chips.
15								GARBAGE; Paper, bottles, plastic.
20								Total depth = 16.0 feet bgs.

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-11

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-2538-430 Roeder Avenue Warehouse Feasibility Analysis
LOCATION: Bellingham, Washington
START DATE: 09/30/97 TIME: 15:00
COMPLETION DATE: 09/30/97 TIME: 17:30
WATER LEVEL DURING DRILLING:
DATE MEASURED:
TEST PIT ID: 36 inches
TEST PIT DEPTH: 7.0 feet bgs
SURFACE ELEV.: 24.59 feet (MSL)
M. P. ELEVATION: feet (MSL)
CLIENT: Port of Bellingham
CONTRACTOR: RETEC
OPERATOR: Shawn
RIG TYPE:
METHOD: Excavator
LOGGED BY: J. Gibbens

DEPTH (in feet)	SAMPLE DATA							SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL; Gray.
						GP		SILTY SANDY GRAVEL; Black.
5								WOOD
								LIME; Gray; fine-grained; very hard.
								Refusal. Total depth = 7.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-12

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/01/97* TIME: *08:30*
COMPLETION DATE: *10/01/97* TIME: *10:30*
WATER LEVEL DURING DRILLING: *14.0'*
DATE MEASURED: *10/01/97*
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *16.0 feet bgs*
SURFACE ELEV.: *25.23 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						SP		ASHY SAND: Tan; with limestone cobbles.
5						SM		SILTY SAND: Black.
								SANDY LIME: Gray; very hard. 7.0' - Water inflow.
							× ×	LARGE PIECE OF WOOD
10 15						▼	× ×	WOOD: Mixed with garbage (70% wood); 8 auto tires, newspaper dated 1974. 14.0' - Water.
20								Total depth = 16.0 feet bgs.

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-13

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/01/97* TIME: *14:30*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/01/97* TIME: *14:50*
TEST PIT DEPTH: *4.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: '
SURFACE ELEV.: *15.37 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		GRAVEL; Gray; coarse.
						SM		SILTY SAND; Gray.
								GARBAGE; Plastic, paper.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

TEST PIT LOG
RTP-14

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/01/97* TIME: *15:00*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/01/97* TIME: *15:40*
TEST PIT DEPTH: *14.5 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: '
SURFACE ELEV.: *15.80 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA							SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								TOPSOIL; Black; with roots.
						SM		SILTY SAND; Gray.
								GARBAGE; Paper.
5 10						CL	▨	SILTY CLAY Gray; very sticky.
15 20								Total depth = 14.5 feet bgs.

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-15

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/01/97* TIME: *17:30*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/01/97* TIME: *18:15*
TEST PIT DEPTH: *4.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *12.94 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		GRAVEL; Gray; coarse.
						SM		SILTY SAND; Gray.
								GARBAGE; Paper, plastic, glass.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

TEST PIT LOG
RTP-16

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/02/97* TIME: *08:30*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/02/97* TIME: *08:50*
TEST PIT DEPTH: *12.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *16.72 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)			
0								<u>TOPSOIL</u>; Black; with roots.
						SP		<u>SAND</u>; Gray-black.
5								<u>WOOD WASTE</u>; Debris and fiber; with occasional piece of trash.
10								<u>GARBAGE</u>; Paper, plastic, some wood (10%).
15 20								Total depth = 12.0 feet bgs.

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG

RTP-17

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-2538-430 Roeder Avenue Warehouse Feasibility Analysis
LOCATION: Bellingham, Washington
START DATE: 10/02/97 TIME: 09:10
COMPLETION DATE: 10/02/97 TIME: 09:30
WATER LEVEL DURING DRILLING:
DATE MEASURED:
TEST PIT ID: 36 inches
TEST PIT DEPTH: 4.0 feet bgs
SURFACE ELEV.: 15.11 feet (MSL)
M. P. ELEVATION: feet (MSL)
CLIENT: Port of Bellingham
CONTRACTOR: RETEC
OPERATOR: Shawn
RIG TYPE:
METHOD: Backhoe
LOGGED BY: J. Gibbens

DEPTH (in feet)	SAMPLE DATA							SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		GRAVEL: Gray.
						SM		SILTY SAND: Gray.
								GARBAGE: Plastic, paper.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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RETEC

TEST PIT LOG
RTP-18

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/02/97* TIME: *09:50*
COMPLETION DATE: *10/02/97* TIME: *10:30*
WATER LEVEL DURING DRILLING:
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *6.0 feet bgs*
SURFACE ELEV.: *15.33 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL; Brown.
						ML		CLAYEY SANDY SILT; Gray; with shell fragments.
5								
								Total depth = 6.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-19

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/02/97* TIME: *10:40*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/02/97* TIME: *11:20*
TEST PIT DEPTH: *7.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: '
SURFACE ELEV.: *16.74 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								SANDY SOIL: Tan.
						SM		SILTY SAND: Gray.
5								GARBAGE: Paper, plastic, steel banding; wood.
								Total depth = 7.0 feet bgs.
10								
15								
20								

REMARKS:

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RETEC

TEST PIT LOG

RTP-20

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/02/97* TIME: *11:30*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/02/97* TIME: *12:15*
TEST PIT DEPTH: *8.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *14.40 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (In feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		GRAVEL: Gray.
						SM		SILTY SAND: Gray.
5						SC		CLAYEY SAND: Gray; with shell fragments.
								Total depth = 8.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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TEST PIT LOG
RTP-21

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/02/97* TIME: *13:10*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/02/97* TIME: *13:30*
TEST PIT DEPTH: *4.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *15.73 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		GRAVEL; Gray.
						GP		SANDY GRAVEL; Black.
								GARBAGE; Paper, plastic.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

TEST PIT LOG
RTP-22

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/02/97* TIME: *13:40*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/02/97* TIME: *13:55*
TEST PIT DEPTH: *4.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *13.87 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL; Black.
								GARBAGE; Bottles, paper.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-23

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-2538-430 Roeder Avenue Warehouse Feasibility Analysis
LOCATION: Bellingham, Washington
START DATE: 10/02/97 TIME: 14:00
COMPLETION DATE: 10/02/97 TIME: 14:15
WATER LEVEL DURING DRILLING:
DATE MEASURED:

TEST PIT ID: 36 inches
TEST PIT DEPTH: 4.0 feet bgs
SURFACE ELEV.: 13.58 feet (MSL)
M. P. ELEVATION: feet (MSL)

CLIENT: Port of Bellingham
CONTRACTOR: RETEC
OPERATOR: Shawn
RIG TYPE:
METHOD: Backhoe
LOGGED BY: J. Gibbens

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL; Black.
								GARBAGE; Paper, plastic.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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RETEC

TEST PIT LOG
RTP-24

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/02/97* TIME: *14:25*
COMPLETION DATE: *10/02/97* TIME: *14:40*
WATER LEVEL DURING DRILLING: '
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *4.0 feet bgs*
SURFACE ELEV.: *12.70 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA							SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL; Gray; with some cobbles.
								GARBAGE; Plastic.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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RETEC

TEST PIT LOG
RTP-25

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/02/97* TIME: *14:45*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/02/97* TIME: *15:00*
TEST PIT DEPTH: *8.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *13.42 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP	°	SANDY GRAVEL: Gray.
						CL	▨	SILTY CLAY: Gray.
							⁘	SAND: Tan/gray; medium-grained; with shell fragments.
5						SP	⁘	
								Total depth = 8.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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TEST PIT LOG

RTP-26

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/02/97* TIME: *15:00*
COMPLETION DATE: *10/02/97* TIME: *15:10*
WATER LEVEL DURING DRILLING: *'*
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *4.5 feet bgs*
SURFACE ELEV.: 14.15 feet (MSL)
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								TOPSOIL
						GP		SANDY GRAVEL; Gray.
								GARBAGE; Paper, bottles.
5								Total depth = 4.5 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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TEST PIT LOG
RTP-27

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/02/97* TIME: *15:15*
COMPLETION DATE: *10/02/97* TIME: *15:25*
WATER LEVEL DURING DRILLING: '
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *4.0 feet bgs*
SURFACE ELEV.: *12.85 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA							SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL: Gray.
								GARBAGE: Paper, plastic.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG

RTP-28

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/02/97* TIME: *15:30*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/02/97* TIME: *15:40*
TEST PIT DEPTH: *4.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: '
SURFACE ELEV.: *14.91 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)			
0						GP		SANDY GRAVEL; Gray; with some cobbles.
								GARBAGE; Paper, bottles.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-29

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
LOCATION: *Bellingham, Washington*
OPERATOR: *Shawn*
START DATE: *10/02/97* TIME: *15:45*
TEST PIT ID: *36 inches*
RIG TYPE:
COMPLETION DATE: *10/02/97* TIME: *15:55*
TEST PIT DEPTH: *4.5 feet bgs*
METHOD: *Backhoe*
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *16.36 feet (MSL)*
LOGGED BY: *J. Gibbens*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								TOPSOIL
						GP		SANDY GRAVEL; Gray.
								GARBAGE; Plastic, newspaper.
5								Total depth = 4.5 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-30

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/02/97* TIME: *16:00*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/02/97* TIME: *16:20*
TEST PIT DEPTH: *4.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *16.13 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL: Gray.
								GARBAGE: Paper, plastic.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-31

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/02/97* TIME: *16:40*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/02/97* TIME: *17:15*
TEST PIT DEPTH: *4.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *13.47 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL; Tan.
						SM		SILTY SAND; Black.
								GARBAGE; Paper.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG

RTP-32

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/03/97* TIME: *08:00*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/03/97* TIME: *08:15*
TEST PIT DEPTH: *4.5 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: '
SURFACE ELEV.: *13.92 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						SP		GRAVELLY SAND; Gray.
						SM		SILTY SAND; Black; with wood.
								GARBAGE; Paper, bricks.
								Total depth = 4.5 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-33

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-2538-430 Roeder Avenue Warehouse Feasibility Analysis
LOCATION: Bellingham, Washington
START DATE: 10/03/97 TIME: 08:30
COMPLETION DATE: 10/03/97 TIME: 08:50
WATER LEVEL DURING DRILLING: '
DATE MEASURED:
TEST PIT ID: 36 inches
TEST PIT DEPTH: 6.0 feet bgs
SURFACE ELEV.: 13.43 feet (MSL)
M. P. ELEVATION: feet (MSL)
CLIENT: Port of Bellingham
CONTRACTOR: RETEC
OPERATOR: Shawn
RIG TYPE:
METHOD: Backhoe
LOGGED BY: J. Gibbens

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP	○	<u>SANDY GRAVEL</u>; Gray.
						SP	⁘	<u>SAND</u>; Black; medium-grained; with shell fragments.
5								
								Total depth = 6.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-34

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/03/97* TIME: *09:10*
COMPLETION DATE: *10/03/97* TIME: *09:30*
WATER LEVEL DURING DRILLING:
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *5.0 feet bgs*
SURFACE ELEV.: *12.74 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)			
0						GP		GRAVEL: Gray.
						SP		SAND: Tan; fine-grained.
								GARBAGE: Paper, plastic.
5								Total depth = 5.0 feet bgs.
10								
15								
20								

REMARKS:

RETEC

TEST PIT LOG
RTP-35

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-2538-430 Roeder Avenue Warehouse Feasibility Analysis
CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington
CONTRACTOR: RETEC
START DATE: 10/03/97 TIME: 09:40
TEST PIT ID: 36 inches
OPERATOR: Shawn
COMPLETION DATE: 10/03/97 TIME: 09:55
TEST PIT DEPTH: 7.0 feet bgs
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: 12.46 feet (MSL)
METHOD: Backhoe
DATE MEASURED:
M. P. ELEVATION: feet (MSL)
LOGGED BY: J. Gibbens

DEPTH (In feet)	SAMPLE DATA							SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL; Gray.
						SM		SILTY SAND; Black.
5						SM		SILTY SAND; Gray.
								Total depth = 7.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG

RTP-36

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/03/97* TIME: *10:10*
COMPLETION DATE: *10/03/97* TIME: *10:30*
WATER LEVEL DURING DRILLING: '
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *7.0 feet bgs*
SURFACE ELEV.: *12.33 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (In feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP	○ ○	SANDY GRAVEL; Gray.
						SP	⁚⁚	SAND; Gray; fine- to medium-grained; diesel odor and sheen.
5								
								Total depth = 7.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

TEST PIT LOG

RTP-37

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-2538-430 Roeder Avenue Warehouse Feasibility Analysis
CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington
CONTRACTOR: RETEC
START DATE: 10/03/97 TIME: 11:15
TEST PIT ID: 36 inches
OPERATOR: Shawn
COMPLETION DATE: 10/03/97 TIME: 11:45
TEST PIT DEPTH: 6.0 feet bgs
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: 12.82 feet (MSL)
METHOD: Backhoe
DATE MEASURED:
M. P. ELEVATION: feet (MSL)
LOGGED BY: J. Gibbens

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		GRAVEL; Gray.
						SM		SILTY SAND; Gray; fine-grained.
5								
								Total depth = 6.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG

RTP-38

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/03/97* TIME: *12:10*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/03/97* TIME: *12:50*
TEST PIT DEPTH: *7.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *14.07 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (In feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								TOPSOIL: Black.
						GP		SANDY GRAVEL: Gray.
								GARBAGE: Thin layer that ends on southeast side of pit.
						SP		SAND: Gray; fine-grained; with shells.
5								
								Total depth = 7.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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RETEC

TEST PIT LOG
RTP-39

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/03/97* TIME: *14:00*
COMPLETION DATE: *10/03/97* TIME: *14:30*
WATER LEVEL DURING DRILLING:
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *4.0 feet bgs*
SURFACE ELEV.: *14.73 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		GRAVEL: Gray.
						SP		GRAVELLY SAND: Gray; with broken shells.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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Page 1 of 1

RETEC

TEST PIT LOG
RTP-40

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/06/97* TIME: *08:30*
COMPLETION DATE: *10/06/97* TIME: *09:00*
WATER LEVEL DURING DRILLING:
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *6.0 feet bgs*
SURFACE ELEV.: *20.75 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL; Gray; with cinder blocks; brick.
5								GARBAGE; Rags, paper, plastic.
								Total depth = 6.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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Page 1 of 1

RETEC

TEST PIT LOG

RTP-41

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/06/97* TIME: *09:10*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/06/97* TIME: *09:30*
TEST PIT DEPTH: *5.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING: '
SURFACE ELEV.: *23.07 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		GRAVEL; Gray; coarse.
						GP		SANDY GRAVEL; Brown.
								GARBAGE; Paper, plastic.
5								Total depth = 5.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG

RTP-42

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/06/97* TIME: *09:40*
COMPLETION DATE: *10/06/97* TIME: *10:00*
WATER LEVEL DURING DRILLING: *'*
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *12.0 feet bgs*
SURFACE ELEV.: *26.92 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		SANDY GRAVEL; Gray.
						SP		ASHY SAND; Black; with some concrete blocks.
								GARBAGE; Paper, plastic.
5								WOOD WASTE; Red; with black sandy gravel (50%).
								SANDY ASH; Tan.
10								GARBAGE; Paper, plastic.
								Total depth = 12.0 feet bgs.
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-43

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington*
CONTRACTOR: *RETEC*
START DATE: *10/06/97* TIME: *11:15*
TEST PIT ID: *36 inches*
OPERATOR: *Shawn*
COMPLETION DATE: *10/06/97* TIME: *11:45*
TEST PIT DEPTH: *4.0 feet bgs*
RIG TYPE:
WATER LEVEL DURING DRILLING:
SURFACE ELEV.: *22.77 feet (MSL)*
METHOD: *Backhoe*
DATE MEASURED:
M. P. ELEVATION: *feet (MSL)*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)			
0								LIMESTONE COBBLES
								SANDY ASH; Gray.
								GARBAGE; Paper, glass.
								Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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TEST PIT LOG
RTP-44

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/06/97* TIME: *12:00*
COMPLETION DATE: *10/06/97* TIME: *12:40*
WATER LEVEL DURING DRILLING: *'*
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *8.0 feet bgs*
SURFACE ELEV.: 26.56 feet (MSL)
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								LIMESTONE COBBLES
						GP		SANDY GRAVEL: Gray.
5								WOOD WASTE: Red; with black sand (50%).
								GARBAGE
								Total depth = 8.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-45

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-2538-430 Roeder Avenue Warehouse Feasibility Analysis
LOCATION: Bellingham, Washington
START DATE: 10/06/97 TIME: 13:10
COMPLETION DATE: 10/06/97 TIME: 13:30
WATER LEVEL DURING DRILLING:
DATE MEASURED:
TEST PIT ID: 36 inches
TEST PIT DEPTH: 4.0 feet bgs
SURFACE ELEV.: 26.10 feet (MSL)
M. P. ELEVATION: feet (MSL)
CLIENT: Port of Bellingham
CONTRACTOR: RETEC
OPERATOR: Shawn
RIG TYPE:
METHOD: Backhoe
LOGGED BY: J. Gibbens

DEPTH (in feet)	SAMPLE DATA					SOIL DESCRIPTION		
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0						GP		GRAVEL; Gray; coarse. SAND; Gray; with gravel and concrete.
						SP		3.0' - Some trash.
								Concrete slag; refusal. Total depth = 4.0 feet bgs.
5								
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
RTP-46

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-2538-430 Roeder Avenue Warehouse Feasibility Analysis*
LOCATION: *Bellingham, Washington*
START DATE: *10/06/97* TIME: *14:00*
COMPLETION DATE: *10/06/97* TIME: *14:30*
WATER LEVEL DURING DRILLING:
DATE MEASURED:
TEST PIT ID: *36 inches*
TEST PIT DEPTH: *8.0 feet bgs*
SURFACE ELEV.: *27.23 feet (MSL)*
M. P. ELEVATION: *feet (MSL)*
CLIENT: *Port of Bellingham*
CONTRACTOR: *RETEC*
OPERATOR: *Shawn*
RIG TYPE:
METHOD: *Backhoe*
LOGGED BY: *J. Gibbens*

DEPTH (in feet)	SAMPLE DATA							SOIL DESCRIPTION
	TYPE	DEPTH	BLOWS/6"	%RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	
0								<u>LIMESTONE COBBLES</u>: Gray.
								<u>SANDY ASH</u>: Black.
5								<u>GARBAGE</u>: Plastic; pipe; steel cable.
								Total depth = 6.0 feet bgs.
10								
15								
20								

REMARKS:

REMEDIATION TECHNOLOGIES, INC.
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Roeder Avenue Temporary Piezometers - Depth to Water from TOC (feet)

DAY	HOUR	TIDES (feet)	RTP-1 (1.9)	RTP-2	RTP-3 (2.33)	RTP-4
surface el			22.34	22.87	21.05	21.4
	09:30	7.2				
10/6/97	13:00					
	14:00		13.41		6.98	
	15:00	5.0				
	16:00		13.42		7	
	17:00		13.41		7	
10/7/97	07:30		13.4		7.08	
	08:30		13.4		7.07	
	09:30		13.4		7.11	
	10:30	7.2	13.4		7.11	
	11:30		13.4		7.11	
	12:30		13.4		7.11	
	13:30		13.4		7.13	
	15:30	5.50	13.4		7.11	
10/10/97	16:00		13.3		7.22	
10/15/97	15:00		13.4		7.3	
elevation			10.84		16.27	
DAY	HOUR	TIDES	RTP-1	RTP-2	RTP-3	RTP-4
09/29/97		Temp	20.5	19	16.8	14.2
		Cond	243	181	820	206
		pH	6.48	7.11	9.34	9.76

(1.9) = Distance from TOC to ground surface

Roeder Avenue Temporary Piezometers - Depth to Water from TOC (feet)

DAY	HOUR	TIDES (feet)	RTP-7	RTP-8 (0.55)	RTP-9 (0.9)	RTP-12 (0.0)
surface el			23.3	24.4	25.5	25.5
	09:30	7.2				
10/6/97	13:00					
	14:00			13.92	14.49	13.6
	15:00	5.0				
	16:00			13.91	14.46	13.62
	17:00			13.93	14.47	13.61
10/7/97	07:30			13.9	14.47	13.54
	08:30			13.9	14.45	1355
	09:30			13.9	14.46	13.54
	10:30	7.2		13.9	14.45	13.55
	11:30			13.9	14.42	13.54
	12:30			13.9	14.44	13.52
	13:30			13.9	14.42	13.52
	15:30	5.50		13.87	14.43	13.49
10/10/97	16:00			13.8	14.34	13.21
10/15/97	15:00			13.9	14.4	13.3
elevation				11.08	11.97	12.01

DAY	HOUR	TIDES	RTP-7	RTP-8	RTP-9	RTP-12
09/29/97		Temp	14.2	15.2	16.1	15.2
		Cond	350	217	420	420
		pH	9.72	9.37	8.21	9.26

(1.9) = Distance from TOC to ground surface

WATER.WK4

Roeder Avenue Temporary Piezometers - Depth to Water from TOC (feet)

DAY	HOUR	TIDES (feet)	RTP-14 (1.5)	RTP-16 (1.0)	RTP-19 (0.4)	RTP-25 (2.2)
surface el			15.95	16.8	16.34	13
	09:30	7.2				
10/6/97	13:00				7.8	5.95
	14:00					
	15:00	5.0				
	16:00		9.26	7.45	7.79	5.87
	17:00		9.24	7.42	7.77	5.89
10/7/97	07:30					
	08:30		9.2	7.45	7.75	6
	09:30		9.2	7.43	7.76	6
	10:30	7.2	9.2	7.44	7.76	6
	11:30		9.2	7.44	7.77	6
	12:30		9.2	7.45	7.77	6
	13:30		9.2	7.41	7.76	6
	15:30	5.50	9.2	7.41	7.75	6
10/10/97	16:00		8.96	7.32	7.65	5.75
10/15/97	15:00		9.3	7.4	7.6	
elevation			8.25	10.39	8.99	9.2
DAY	HOUR	TIDES	RTP-14	RTP-16	RTP-19	RTP-25
09/29/97		Temp	na	14.9	15	15.1
		Cond	na	311	440	223
		pH	na	7.16	7.78	7.2

(1.9) = Distance from TOC to ground surface

WATER.WK4

Roeder Avenue Temporary Piezometers - Depth to Water from TOC (feet)

DAY	HOUR	TIDES (feet)	RTP-29 (3.1)	RTP-36 (2.45)	RTP-38 (1.2)	RTP-42 (0.2)
surface el			16.5	12.6	13.2	28.2
	09:30	7.2				
10/6/97	13:00		8.76	6.36	4.68	>12.2
	14:00					>12.2
	15:00	5.0				
	16:00		8.73	6.24	4.69	>12.2
	17:00		8.72	6.27	4.71	>12.2
10/7/97	07:30			6.3	4.86	>12.2
	08:30		8.72	6.3	4.87	>12.2
	09:30		8.74	6.3	4.87	>12.2
	10:30	7.2	8.74	6.3	4.87	>12.2
	11:30		8.74	6.3	4.86	>12.2
	12:30		8.74	6.3	4.87	>12.2
	13:30		8.79	6.3	4.87	>12.2
	15:30	5.50	8.73	6.3	4.87	>12.2
10/10/97	16:00		8.7	6.16	4.52	>12.2
10/15/97	15:00		8.7	6.3	4.7	12.1
elevation			10.87	8.75	9.53	'>12.2
DAY	HOUR	TIDES	RTP-29	RTP-36	RTP-38	RTP-42
09/29/97		Temp	14.6	15	14.8	
		Cond	400	189	251	na
		pH	6.99	7.01	7.3	na

(1.9) = Distance from TOC to ground surface

WATER.WK4

Roeder Avenue Temporary Piezometers - Depth to Water from TOC (feet)

DAY	HOUR	TIDES (feet)	RGP-1 (3)	RGP-2 (3)	RGP-3 (3)	RGP-4 (3)
surface el			25	25.2	22.5	26.06
	09:30	7.2				
10/6/97	13:00					
	14:00				14.54	
	15:00	5.0				
	16:00				14.49	16.54
	17:00				14.48	16.54
10/7/97	07:30		17.11	15.59	14.39	16.55
	08:30		17.11	15.56	14.39	16.54
	09:30		17.11	15.57		16.54
	10:30	7.2	17.11	15.55		16.55
	11:30		17.1	15.54		16.54
	12:30		17.09		14.35	16.52
	13:30		17.07		14.32	16.5
	15:30	5.50	17.02	15.44	14.27	16.47
10/10/97	16:00		16.52	14.93	13.7	16.29
10/15/97	15:00		17	15.2	13.8	16.4
elevation			10.98	12.76	11.23	12.59
DAY	HOUR	TIDES	RGP-1	RGP-2	RGP-3	RGP-4
09/29/97		Temp				
		Cond				
		pH				

(1.9) = Distance from TOC to ground surface

WATER.WK4

Roeder Avenue Temporary Piezometers - Depth to Water from TOC (feet)

DAY	HOUR	TIDES (feet)	RGB-5 (3.6)	RGB-6 (2.8)
surface el			20.5	25
	09:30	7.2		
10/6/97	13:00			
	14:00		13.76	16.66
	15:00	5.0		
	16:00		13.78	16.59
	17:00		13.77	16.57
10/7/97	07:30		13.76	16.48
	08:30		13.75	16.47
	09:30		13.76	16.47
	10:30	7.2	13.74	16.46
	11:30		13.75	16.43
	12:30		13.74	16.4
	13:30		13.74	16.37
	15:30	5.50	13.74	16.32
10/10/97	16:00		13.66	15.7
10/15/97	15:00		13.7	15.9
elevation			10.36	11.48
DAY	HOUR	TIDES	RGB-5	RGB-6
09/29/97		Temp Cond pH		

(1.9) = Distance from TOC to ground surface

WATER.WK4

APPENDIX B

APPENDIX B

GEOTECHNICAL BORING LOGS

LEGEND FOR EXPLORATION LOGS

LOG SAMPLER AND WELL SYMBOLS

- ✋ Grab Sample
- ○ No Sample Recovery
- ⧗ 3.25" Split Barrel - disturbed
- ⊠ 3.25" Split Barrel - undisturbed
- ◧ Standard Penetration Test
- ■ Shelby Tube

DRAFT

Water Level (date) ▼

- ▧ Cement Grout Surface Seal
- ◼ Bentonite Seal
- ▥ Filter Pack with Blank
- ▤ Screened Casing with Filter Pack

SOIL CLASSIFICATION SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPHIC	LETTER	
	GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	SM	SILTY SANDS, SAND - SILT MIXTURES
	SC	CLAYEY SANDS, SAND - CLAY MIXTURES
	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
	CH	INORGANIC CLAYS OF HIGH PLASTICITY
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

Figure A-1

BORING B-1

Surface Elevation = 15 feet

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol	Description	Elevation (feet)	Well Detail
			1 2 2	☒	5	SM	░	Light brown to black fine to coarse sandy SILT, trace to little clay, trace fine gravel, trace shells, trace metal debris, very moist, soft. (FILL)	10 ATD ▼	
			1 1 1	☒	10	SP	░	Gray fine to coarse SAND, subangular to rounded, very loose, wet. (sand FILL)	5	
			1 1 1	☒	15	SW	░	Gray fine to medium SAND, interbedded with sawdust/wood chips and organic silt, trace shells, very loose, wet.	0	
			2 3 4	☒	20	SM	░	Gray silty fine to medium SAND, trace coarse sand, loose, wet; numerous shell fragments. (Beach Deposits)	-5	
	107	22	1 1 2	☒	25		▨	Gray silty CLAY, trace fine to medium sand in matrix, very soft, wet; trace discontinuous interbeds of fine to medium sand. (Glacial Marine Drift)	-10	
	109	22	0 2 3	☒	30		▨	Grades with trace fine to coarse sand in matrix, trace fine gravel; no interbeds	-15	
tv = 0.55 tsf	106	23	1 2 2	☒	35		▨	Becomes very moist	-20	
tv = 0.60 tsf	109	21	1 2 3	☒	40		▨	Becomes medium stiff	-25	
			1 2 2	○	45		▨		-30	

DRAFT

Date Drilled: 10/2/97
Elevation Datum: 1949 NGVD
Completion Depth: 91.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-2 **LOG OF BORING B-1**
SHEET 1 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROEDER.GPJ PACRIM.GDT 10/31/97

BORING B-1

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol		Elevation (feet)	Well Detail
			2 2 3	○			▨			
			1 2 3	⧗	55	CH	▨		-40	
		22	1 3 4	⧗	60		▨		-45	
tv = 0.75 tsf	110	22	2 3 4	☒	65		▨		-50	
tv = 0.80 tsf	113	20	2 3 4	☒	70		▨		-55	
tv = 0.85 tsf	111	21	4 3 4	☒	75		▨		-60	
tv = 0.88 tsf	114	19	2 3 4	☒	80		▨		-65	
			2 3 4	○	85		▨		-70	
tv = 0.75 tsf	92	40	2 3 3	☒	90	CH	▨	Gray clay, medium stiff, wet.	-75	
					95			Boring completed on 10/2/97. Backfilled with heavy drilling mud, soil and bentonite chips	-80	

DRAFT

Date Drilled: 10/2/97
Elevation Datum: 1949 NGVD
Completion Depth: 91.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-3 **LOG OF BORING B-1**
SHEET 2 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROEDER.GPJ PACRIM.GDT 10/31/97

BORING B-2

Surface Elevation = 24 feet

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol	Description	Elevation (feet)	Well Detail
						GW		Pea gravel fill resulting from pre-drilled hole (FILL).		
									20	
					5					
									15	
					10					
									ATD ▼ 10	
					15					
									5	
			1 0 1	☒	20	OL		Black SILT with wood debris and plastic pieces, loose, wet		
									0	
			4 3 2	☒	25					
									-5	
			2 3 4	☒	30	SP		Gray silty fine to medum sand, numerous shell fragments, loose, wet. (Beach Deposits)		
									-10	
		19	7 11 12	☒	35			Grades with less shell fragments		
									-15	
tv=0.45 tsf pp=0.75 tsf vs	110	20	0 1 2	☒	40			Gray silty CLAY, trace fine to coarse sand and fine gravel in matrix, soft, wet (Glacial Marine Drift)		
									-20	
tv=0.45 tsf pp=0.75 tsf vs	111	21	1 1 3	☒	45					
									-25	

Date Drilled: 10/3/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-4 **LOG OF BORING B-2**
SHEET 1 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROEDER.GPJ PACRIM.GDT 10/31/97

BORING B-2

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol		Elevation (feet)	Well Detail
	111	20	1 2 3	☒			▨			
							▨		-30	
tv = 0.60 tsf pp = 1.50 tsf vs	104	29	1 2 3	☒	55		▨			
							▨		-35	
			2 2 3	☒	60	CH	▨			
							▨	DRAFT	-40	
tv = 0.75 tsf pp = 1.75 tsf vs			2 2 3	☒	65		▨			
							▨		-45	
tv = 0.75 tsf pp = 1.50 tsf			2 2 5	☒	70		▨	Becomes medium stiff		
							▨		-50	
			3 3 5	☒	75		▨			
							▨		-55	
tv = 1.10 tsf pp = 2.0 tsf			3 5 7	☒	80		▨			
								Boring completed on 10/3/97. Backfilled with heavy drilling mud and bentonite chips and soil cuttings in upper 25 feet.	-60	
					85					
									-65	
					90					
									-70	
					95					
									-75	

Date Drilled: 10/3/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-5 **LOG OF BORING B-2**
SHEET 2 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING B-3

Surface Elevation = 25 feet

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol	Description	Elevation (feet)	Well Detail
						GP	▩	Pre-drilled boring backfilled with pea gravel.		
					5				20	
					10				15	
									ATD ▼	
					15				10	
					20				5	
					25				0	
						SP	░	Gray fine to medium SAND, trace silt, numerous shell fragments, loose, wet. (Beach Deposits)		
			2 4 6	☒	30				-5	
						CL	▧	Gray clayey SILT, trace fine to medium sand and fine gravel in matrix, very soft, wet. (Glacial Marine Drift)		
tv = 0.80 tsf pp = 1.5 tsf	112	18	1 1 1	☒	35				-10	
					40	CH	▨	Gray silty CLAY, trace fine to coarse sand in matrix, soft, wet.	-15	
tv = 0.75 tsf pp = 1.25 tsf uu			1 2 3	☒						
tv = 0.65 tsf pp = 1.25 tsf	105	22	1 2 4	☒	45				-20	
								Gray clayey SILT to fine sandy SILT, with		

Date Drilled: 10/6/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-6 **LOG OF BORING B-3**
SHEET 1 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING B-3

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol		Elevation (feet)	Well Detail
tv = 0.90 tsf pp = 2.25 tsf	120	15	2 4 4	☒		SM	░	scattered discontinuous partings to stratifications of silty fine to medium sand, medium stiff, wet		
					55				-30	
tv = 0.90 tsf pp = 1.5 tsf	113	21	2 2 4	☒		MH	▥	Gray clayey SILT, trace fine to coarse sand and fine gravel in matrix, medium stiff, moist		
					60				-35	
						CH	▨	Gray silty CLAY to CLAY, trace fine to coarse sand in matrix, medium stiff, moist		
tv = 0.85 tsf pp = 1.25 tsf	109	21	2 2 3	☒	65		▨		-40	
tv = 1.0 tsf pp = 1.25 tsf	113	21	2 2 4	☒	70		▨		-45	
tv = 0.675 tsf pp = 1.25 tsf			2 3 4	☒	75		▨	Grades with trace fine sand stringers, wet.	-50	
					80		▨		-55	
								Boring completed on 10/6/97. Boring backfilled with heavy drilling mud and chips and soil cuttings in upper 25 feet.		
					85				-60	
					90				-65	
					95				-70	

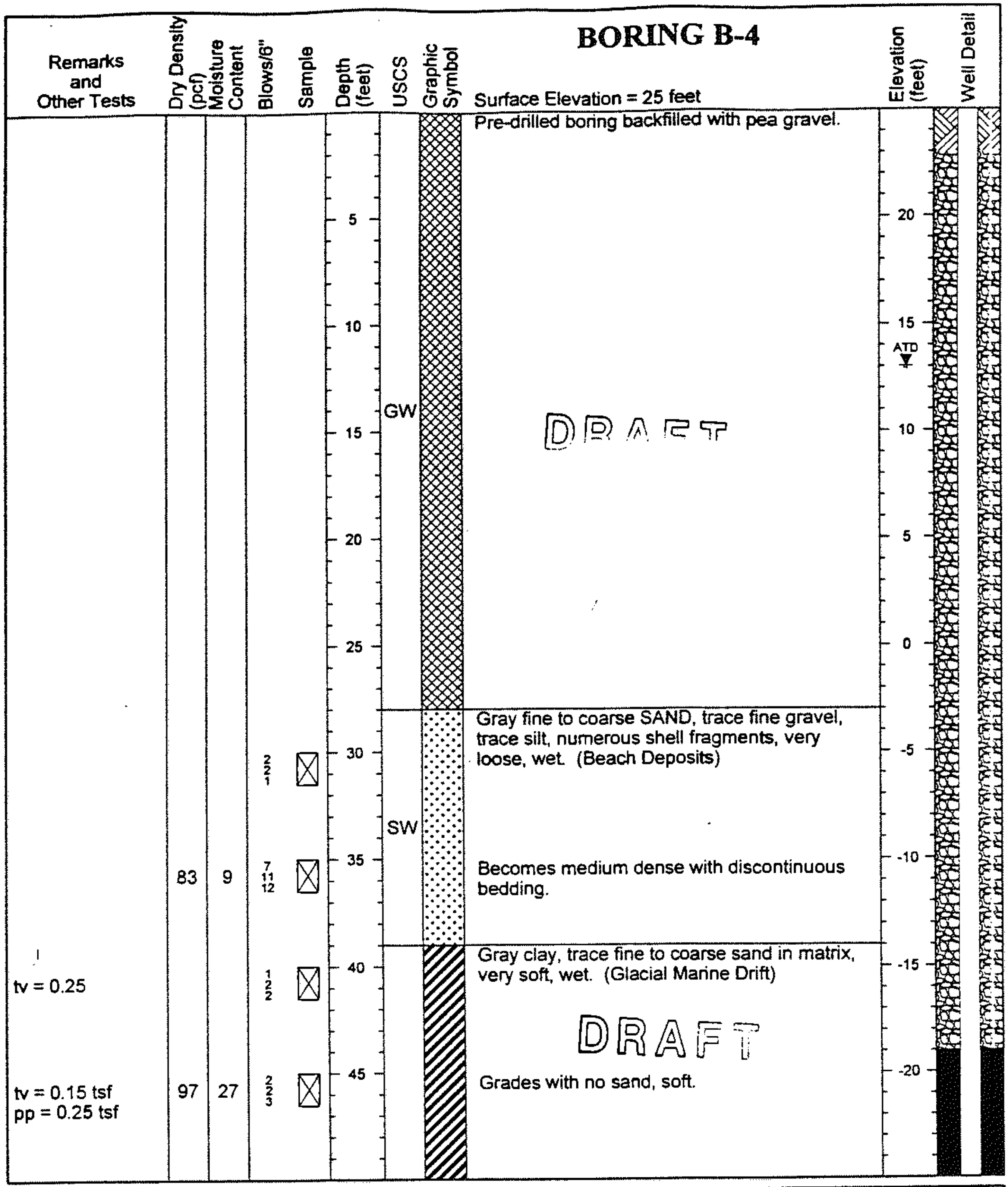
Date Drilled: 10/6/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-7 **LOG OF BORING B-3**
SHEET 2 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING B-4



Surface Elevation = 25 feet

Pre-drilled boring backfilled with pea gravel.

Gray fine to coarse SAND, trace fine gravel, trace silt, numerous shell fragments, very loose, wet. (Beach Deposits)

Becomes medium dense with discontinuous bedding.

Gray clay, trace fine to coarse sand in matrix, very soft, wet. (Glacial Marine Drift)

Grades with no sand, soft.

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample
			2 2 1	☒
	83	9	7 11 12	☒
tv = 0.25			1 2 2	☒
tv = 0.15 tsf pp = 0.25 tsf	97	27	2 2 3	☒

Date Drilled: 10/6/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-8 **LOG OF BORING B-4**

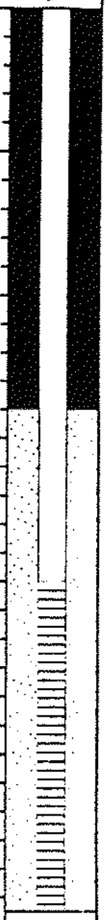
SHEET 1 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROEDER.GPJ PACRIM.GDT 10/31/97

BORING B-4

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Description	Elevation (feet)
tv = 0.85 tsf pp = 1.0 tsf	99	28	2 2 3	☒			Grades with fine to coarse sand in matrix.	
tv = 0.75 tsf pp = 1.0 tsf			2 2 2	☒	55			-30
						CH		
tv = 0.675 tsf pp = 1.25 tsf	110	20	2 2 3	☒	60			-35
tv = 0.7 tsf pp = 1.25 tsf			2 2 4	☒	65		Becomes medium stiff, trace fine to coarse sand and fine gravel in matrix.	-40
			2 2 4	○	70			-45
			2 4 4	○	75			-50
						SM	Gray fine sandy SILT, trace fine gravel, medium stiff, wet.	
			2 4 4	⧗	80			-55
							Boring completed on 10/7/97.	
					85			-60
					90			-65
					95			-70



DRAFT

Date Drilled: 10/6/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-9 **LOG OF BORING B-4**
SHEET 2 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROEDE. J PACRIM.GDT 10/31/97

BORING B-5

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol	Surface Elevation = 21 feet	Elevation (feet)	Well Detail
								3" asphalt pavement.	20	
						SW		Brown fine to coarse SAND with fine to coarse gravel, moist. (FILL)		
			2 2 3	☒	5	SM		Brown silty fine to coarse SAND with fine to coarse gravel, loose, moist.	15	
								Wood waste, sawdust and wood chips.		
			2 2 1	☒	10			DRAFT	ATD ▼ 10	
			6 6 4	☒	15			4 inch thick wood in sampler tip.	5	
	99	22	3 1 4	☒	20	SW		Gray fine to medium SAND, trace to little silt, loose, wet.	0	
	106	18	0 2 1	☒	25	SM		Gray mottled brown silty fine to medium SAND, trace shell fragments, trace wood chips, loose, wet. (Beach Deposits)	-5	
	107	23	3 5 10	☒	30	SP		Gray fine to medium SAND, trace to little silt, trace shell fragments, medium dense, wet, indistinctly bedded.	-10	
	112	20	6 11 12	☒	35			Grades with no bedding evident.	-15	
tv = 0.4 tsf pp = 0.75 tsf	94	30	1 1 2	☒	40	CH		Gray silty CLAY with scattered inclusions of shell fragments and silty fine sand, soft, wet	-20	
tv = 0.55 tsf pp = 1.25 tsf	99	27	1 2 2	☒	45			Gray silty CLAY, trace fine to coarse sand in matrix, soft, wet. (Glacial Marine Drift)	-25	

BORING_WELL ROEDE[illegible]PJ PACRIM.GDT 10/31/97

Date Drilled: 10/7/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-10 **LOG OF BORING B-5**
SHEET 1 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING B-5

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol		Elevation (feet)	Well Detail
tv = 0.65 tsf pp = 1.50 tsf uu	92	31	1 2 2	☒		CH			-30	
tv = 0.80 tsf pp = 1.50 tsf	105	19	1 2 3	☒	55				-35	
tv = 0.85 tsf pp = 1.75 tsf uu	100	26	2 1 3	☒	60			Gray clayey SILT, trace fine to coarse sand in matrix, scattered fine sand partings, soft, wet.	-40	
tv = 0.70 tsf pp = 1.50 tsf	92	32	1 3 2	☒	65	MH			-45	
tv = 0.90 tsf pp = 2.0 tsf uu	95	29	2 5 5	☒	70				-50	
	113	19	13 12 9	☒	75	SM		Gray silty fine SAND, trace clay, medium dense, moist to wet; scattered interbeds of fine sandy silt.	-55	
uu			5 10 12	☒	80			Becomes medium stiff	-60	
								Boring completed on 10/7/97		
					85				-65	
					90				-70	
					95				-75	

Date Drilled: 10/7/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-11 **LOG OF BORING B-5**
SHEET 2 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROED. .PJ PACRIM.GDT 10/31/97

BORING B-6

Surface Elevation = 23.5 feet

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol	Description	Elevation (feet)	Well Detail
							▩	2" crushed rock cover Black silty CLAY, fine to coarse sand, wood and plastic debris, soft		
							▩		20	
			1 2 1	☒	5		▩			
							▩		15	
							▩		ATD ▼	
			2 3 3	○	10		▩			
							▩	Becomes loose, wet		
							▩		10	
			5 5 3	⧗	15		▩			
							▩	Becomes wood chips and sawdust.		
							▩		5	
			7 10 6	☒	20		▩			
							▩		0	
			8 7 4	☒	25		▩			
							▩		-5	
			4 2 4	⧗	30		▩			
							▥	Gray clayey SILT, trace fine sand, soft, wet	-10	
			2 2 3	○	35		▥			
						MH	▥		-15	
			3 3 3	⧗	40		▥			
							▥	Gray mottled brown clayey SILT, trace fine to medium sand partings andstringer, soft, wet	-20	
			2 3 2	⧗	45		▥			
							▥		-25	

BORING_WELL ROEDER.GPJ PACRIM.GDT 12/18/97

Date Drilled: 10/9/97
Elevation Datum: 1949 NGVD
Completion Depth: 106.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-12

LOG OF BORING B-6

SHEET 1 OF 3

PACRIM GEOTECHNICAL INC.

GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

RETEC 314111

BORING B-6

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol		Elevation (feet)	Well Detail
tv = 0.75 tsf pp = 1.25 tsf vs	93	33	1 2	☒						
									-30	
					55					
tv = 0.60 tsf pp = 1.25 tsf vs	102	27	1 1 3	☒				Grades with fine to coarse sand in matrix		
						MH			-35	
					60					
			1 1 3	○						
									-40	
					65					
tv = 0.80 tsf pp = 1.25 tsf vs	104	24	1 2 3	☒						
									-45	
					70					
tv = 0.80 tsf pp = 1.25 tsf vs	114	19	2 2 3	☒				Grades with increasing CLAY		
									-50	
					75			Gray interbedded clayey SILT, trace fine to coarse sandand fine sandy silt, medium stiff, wet trace clay, trace fine gravel.		
tv = 0.90 tsf pp = 2.50 tsf vs	132	22	2 3 4	☒						
						MH SP				
									-55	
					80			Gray fine to medium sandy SILT, trace clay, trace coarse sand and fine gravel, moist to wet, medium stiff.		
			5 5 8	☒						
						ML			-60	
					85					
			2 3 4	○						
								Gray clayey SILT, trace fine to coarse sand, medium stiff, wet	-65	
					90					
			2 3 4	☒						
									-70	
					95					
			2 3 5	☒				Grades with increasing CLAY		
						MH				
									-75	

Date Drilled: 10/9/97
Elevation Datum: 1949 NGVD
Completion Depth: 106.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-13 **LOG OF BORING B-6**

SHEET 2 OF 3

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROEDER.GPJ PACRIM.GDT 12/18/97

BORING B-6

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol		Elevation (feet)	Well Detail
			2 3	☒						
									-80	
					105					
			1 1 3	☒						
								Boring completed 10/9/97, boring backfilled with drilling mud,soil, and bentonite chips.		
									-85	
					110					
									-90	
					115					
									-95	
					120					
									-100	
					125					
									-105	
					130					
									-110	
					135					
									-115	
					140					
									-120	
					145					
									-125	

Date Drilled: 10/9/97
Elevation Datum: 1949 NGVD
Completion Depth: 106.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-14 **LOG OF BORING B-6**

SHEET 3 OF 3

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROEDER.GPJ PACRIM.GDT 12/16/97

BORING B-7

Surface Elevation = 14 feet

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol	Description	Elevation (feet)	Well Detail
								1 1/4 " crushed gravel surface		
								Brown to black fine to coarse SAND, trace silt wet, loose	10	
			2 1 3	☒	5	SW		Slight to moderate hydrocarbon odor	ATD	
	99	23	1 3 4	☒	10			Slight hydrocarbon odor		
								Light brown-gray fine to medium SAND, trace to little silt, numerous shell fragments, wet, loose, trace wood chips and sawdust. (Beach Deposits)	0	
	103	16	0 2 1	☒	15				-5	
	99	25	0 1	☒	20	SP		Grades with fine to coarse silty SAND	-10	
	115	17	5 17 22	☒	25			Becomes medium dense, fine to medium SAND, with trace coarse sand, shell fragments		
								Gray clayey SILT, scattered discontinuous layers of silty fine sand, soft, wet. (Glacial Marine Drift)	-15	
tv = 0.35 tsf pp = 0.50 tsf	88	35	1 1 1	☒	30	MH			-20	
tv = 0.65 tsf pp = 0.75 tsf	87	38	1 1 2	☒	35			Gray silty CLAY, soft, wet.	-25	
tv = 0.75 tsf pp = 1.0 tsf	89	35	1 1 2	☒	40			Scattered fine sand stringers, trace fine to coarse sand in matrix	-30	
tv = 0.75 tsf pp = 1.0 tsf	102	24	1 2 2	☒	45				-35	

Date Drilled: 10/10/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-15 **LOG OF BORING B-7**
SHEET 1 OF 2

PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROEDE... PACRIM GDT 10/31/97

BORING B-7

Remarks and Other Tests	Dry Density (pcf)	Moisture Content	Blows/6"	Sample	Depth (feet)	USCS	Graphic Symbol		Elevation (feet)	Well Detail
tv = 0.7 tsf pp = 1.0 tsf	102	24	1 2 2	☒			▨			
							▨		-40	
					55		▨			
tv = 0.70 tsf pp = 1.0 tsf	113	16	2 2 3	☒		CH	▨	Trace fine sand stringers		
							▨		-45	
					60		▨			
tv = 0.75 tsf pp = 1.25 tsf	96	29	2 2 2	☒			▨	Trace shell fragments		
							▨		-50	
					65		▨			
tv = 0.65 tsf			1 2 2	☒			▨			
							▨		-55	
					70		▨			
tv = 0.75 tsf pp = 0.75 tsf			1 2 2	☒			▨			
							▨		-60	
					75		▨			
tv = 0.60 tsf pp = 1.0 tsf			1 2 2	☒			▨			
							▨		-65	
					80					
tv = 0.80 tsf pp = 1.25 tsf			1 2 2	☒						
								Boring completed 10/10/97. Boring backfilled with heavy mud, bentonite chips, soil		
									-70	
					85					
									-75	
					90					
									-80	
					95					
									-85	

DRAFT

Date Drilled: 10/10/97
Elevation Datum: 1949 NGVD
Completion Depth: 81.5 feet
Drilling Method: Mud Rotary
Sampling Method: 3.25" Ring, 300# Auto Trip
Groundwater Level: ▼

Remediation Technologies Inc.
Roeder Avenue Warehouse Job No. 048-002

FIGURE A-16 **LOG OF BORING B-7**
SHEET 2 OF 2

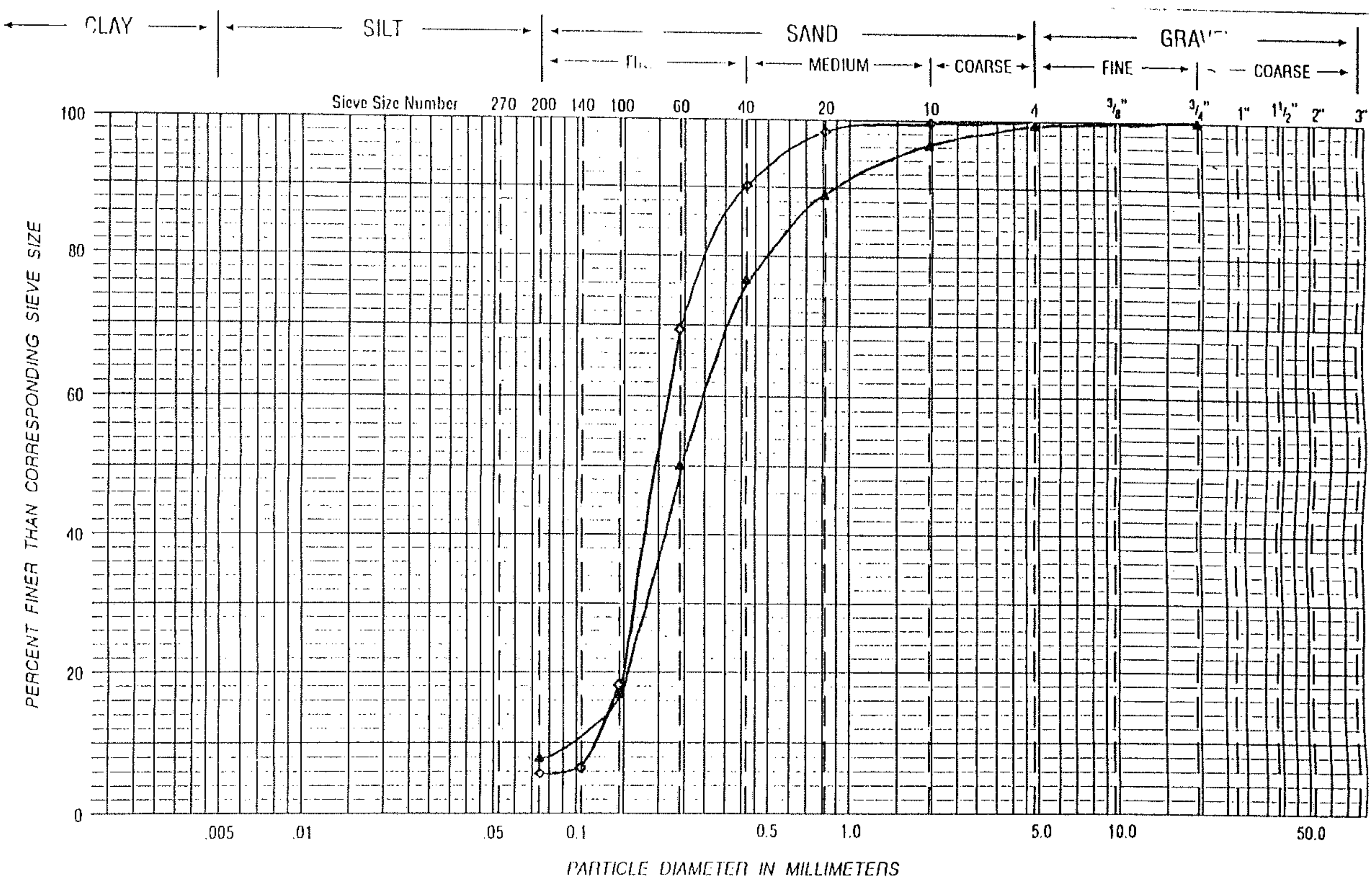
PACRIM GEOTECHNICAL INC.
GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES

BORING_WELL ROEDE...GJ PACRIM.GDT 10/31/97

APPENDIX C

APPENDIX C

GEOTECHNICAL SOILS TESTING RESULTS



GRAIN-SIZE DISTRIBUTION CHART

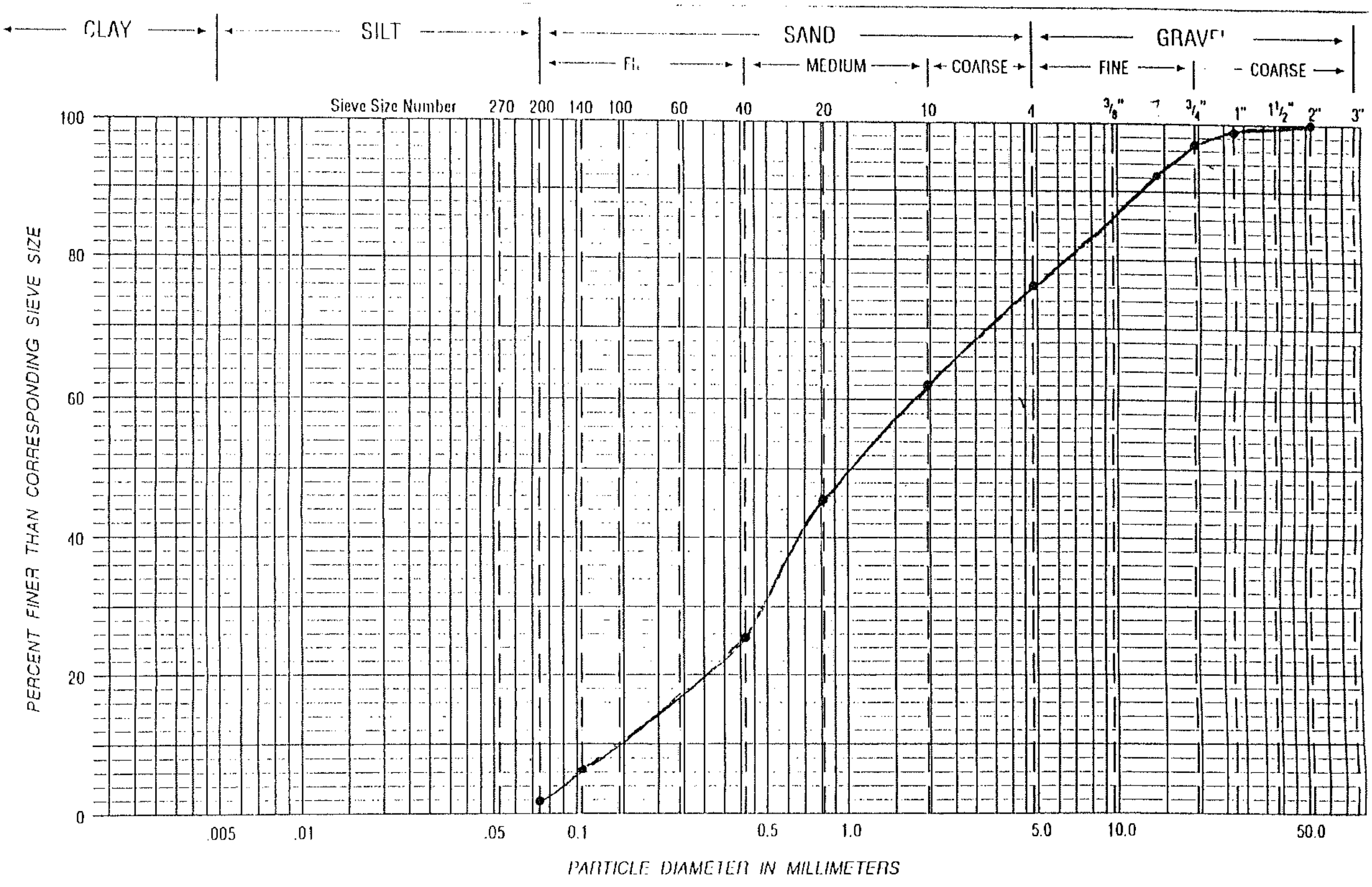
Project No.

Roeder Warehouse 048-002

PACRIM GEOTECHNICAL INC.

Figure No.

1



GRAIN-SIZE DISTRIBUTION CHART

Project No.
Roeder Warehouse 048-002

PACRIM GEOTECHNICAL INC.

Figure No.
2

PACRIM GEOTECHNICAL INC. **MEMORANDUM** **GEOTECHNICAL ENGINEERING AND APPLIED EARTH SCIENCES**
10700 MERIDIAN AVE. N., STE 210, SEATTLE, WA 98133

Date	October 31, 1997	Project	Roeder Avenue Warehouse 048-002
To	Bryan Stone- RETEC	Subject	Summary Geotechnical Memorandum
From	Michael G. Byers, P.E./Harbans L. Chabra P.E.		

This memorandum presents our general conclusions and recommendations for foundation support of the 250,000 square foot warehouse planned along the waterfront south of Roeder Avenue between C Street and G Street. Our services were performed under contract with Remediation Technologies, Inc., the prime contractor for the Roeder Avenue Warehouse Project. The purpose of this memorandum is to is to verify the foundation assumptions developed during a phase I geotechnical study performed by others. The phase I report was dated August 29, 1997, and completed by Merit Engineering Inc. of Bellingham.

The phase I report utilized existing information around the site to develop a subsurface profile consisting of 20 to 25 feet of landfill debris underlain by 16 to 20 feet of sand, which was underlain by 90 feet or more of clay. The report concluded that wood piles could be utilized to support the structure. For a 12 inch diameter pile, a 25 ton allowable capacity could be achieved by piles between 42 and 60 feet in length.

Field Explorations

A total of seven geotechnical borings were completed at the site from October 2 to October 10, 1997. The approximate locations of the explorations are shown on Figure 1. Summary logs for the borings are attached to this memorandum as Appendix A. The borings were completed to depths from 80 to 105 feet below the ground surface at the boring locations. All of the borings completed in the landfill except borings B-5 and B-6 were completed through pre-drilled holes. Borings B-2, B-3, B-5 and B-6 were completed in the proposed corners of the warehouse. Boring B-4 was completed in the approximate center of the footprint. Borings B-1 and B-7 were completed west and east, respectively, of the planned footprint so that subsurface information was available should the footprint slide either east or west.

Pre-drilling consisted of drilling through the landfill debris using a 2.5 foot diameter bucket auger. Since municipal landfill debris and wood waste was encountered, the hole diameter increased based on the amount of caving that occurred during drilling. Once through the landfill, the bucket auger hole was backfilled with pea gravel so that geotechnical exploration drilling could be easily advanced through the landfill zone. Pre-drilling was completed under supervision of RETEC and was completed prior to our work on the site.

The geotechnical explorations on the site consisted of a combination of hollow stem auger and rotary mud drilling. The hollow stem auger was used to penetrate through the pea gravel in the pre-drilled holes, or through the landfill material in areas where pre-drilled holes were not completed. Where the borings penetrated through the pre-drilled borings, sampling did not begin until the bottom of the pea gravel was encountered. Once sampling indicated that the hollow stem augers were sealed into the underlying natural deposits, mud rotary drilling techniques were utilized to complete the borings to the depths indicated on the boring logs.

Explorations were located in the field by hand taping and pacing relative to existing and permanent physical features, or in the case of the pre-drilled holes, the locations were established prior to drilling. The elevation of the ground surface at the locations of the explorations were estimated based on existing topography. The datum is NGVD 1949. The location and elevation of the explorations should be considered accurate to the degree implied by the method used to obtain them.

An engineer from PacRim Geotechnical Inc. (PGI) was present throughout the drilling of boreholes to observe the explorations, assist in sampling, and prepare descriptive logs of subsurface conditions. Soil was classified in the field in general accordance with ASTM D-2488, "Standard Practice for Description of Soils (Visual-Manual Procedure)".

Graphic symbols are used in a column of the exploration logs to display soil type with depth. The graphic symbols are described on the legend that precedes the logs in Appendix A. Notice that one symbol can represent more than one soil descriptor (such as the ML symbol, which stands for both silt and sandy silt). The legend also defines several symbols that are used to describe the sampler type.

The borings were drilled by Gregory Drilling of Redmond, Washington using a CME 85 truck mounted drill rig. Borings B-1 through B-3 and B-5 through B-7 were advanced using a 4-7/8 inch inside diameter hollow stem augers and a 3-7/8 inch diameter fish tail rotary drilling bit. Boring B-4 was completed using 6-inch inside diameter hollow stem augers through the landfill and 3-7/8 and 5-inch diameter fish tail mud rotary drilling bits. Below the landfill material, B-4 was first drilled and sampled using the 3-7/8 inch diameter drill bit and bentonite drilling mud. Upon completion of the boring, the drilling mud was flushed from the hole and replaced with fresh water. The hole was then drilled using the 5 inch diameter bit and water without bentonite drilling mud. The second drill out was performed in order to minimize the impact of bentonite drilling mud on the hydraulic characteristics of the soil since a monitoring well was installed in the completed boring. The groundwater monitoring well consisted of 1 inch diameter, flush threaded pvc blank pipe and 1 inch diameter flush threaded 10-slot screen. The location of the 10 foot screen section and backfilling materials are shown on the boring log for B-4 under the well construction section.

Ring drive samples were obtained in all of the borings by driving a 2-1/2-inch inside diameter, 3-1/4-inch outside diameter ring sampler with a 300-pound automatic trip hammer falling freely from a height of 30 inches. The number of blows required for penetration was recorded during field explorations. The blow count is reported on the boring logs for each sample, in blows per six inch interval. This resistance, or blow count, relates qualitatively to density for cohesionless soil and to consistency for cohesive soil. Retrieved ring samples were wrapped in watertight bags, placed in tubes, sealed, and temporarily stored in padded boxes for transportation to our laboratory for further classification and testing.

Laboratory Testing

Soil samples were tested to develop parameters for use in evaluating subsurface conditions and preparing geotechnical engineering recommendations for the proposed project. The laboratory testing program included: classification tests for identification and correlation purposes; triaxial compression unconsolidated undrained tests, and one-dimensional consolidation tests. The tests were performed in the PacRim laboratory, and by REG and AGI Technologies laboratories. The work was performed in general accordance with the American Society of Testing and Materials (ASTM) standard test procedures. Some of the laboratory test results were not available at the time of this preliminary memorandum. For this reason, only the laboratory test results that were available in final form are attached in Appendix B. Laboratory test results that were available, but not in final form are summarized on tables and the final results including the raw data will be included in the final design report for the project.

Classification Tests

Classification tests were performed on selected samples to aid in assigning index properties of tested samples and to permit correlation of engineering properties of tested samples with similar soil types. Field logs were updated appropriately with the laboratory results of classification tests in general accordance with ASTM D-2487, "Standard Test Method for Classification of Soils for Engineering Purposes".

Moisture Content

Moisture content determinations were performed on selected soil samples in general accordance with ASTM D-2216. The test results were used for classification and correlation of the various soil encountered at the site. Moisture contents were also used in correlating soil strength characteristics of cohesive soil. Moisture content results are shown at the respective sample depths on the boring logs presented in Appendix A.

Dry Density

Dry densities were determined from selected drive samples. The results are shown at the respective sample depths on the boring logs, presented in Appendix A.

Grain Size Analysis

Sieve analyses were performed on selected samples to determine the grain size distributions of soil retained on the U.S. number 200 sieve (particle sizes larger than 75 µm). The grain size analyses were performed in general accordance with ASTM D-422. Grain size distribution curves are presented in Appendix B.

Laboratory Vane Shear Tests

Laboratory vane shear tests were performed in general accordance with ASTM D-4648, by AGI Technologies of Bellevue, Washington. The samples tested are indicated on the boring logs with the letters "LV". Test results are summarized in a table presented in this text.

Triaxial Tests

Triaxial tests were performed to determine the shear strength of soil specimens subjected to confining pressures and loads that simulate anticipated field conditions. The tests were performed on soil samples of approximately 6 inches in height and 2.4 or 2.8 inches in diameter, at a constant rate of deformation. Each sample was placed in a rubber membrane, set in the triaxial testing apparatus, and the triaxial chamber was filled with water. A confining cell pressure was applied, and remained constant throughout the test. After the set-up, an unconsolidated undrained test was performed. In general accordance with ASTM D-2850, the loads were applied at a constant strain rate of 0.3 to 1.0 percent of sample height per minute. Drainage of pore water from the specimen was not permitted. The stresses measured during loading represent the total stresses: pore pressure plus the effective intergranular stresses. The value of the shear strength is taken at peak deviator stress or at 10 percent strain if no peak is apparent. The results are summarized in a table presented in this text.

Subsurface Conditions

Soil

The general conditions encountered at the warehouse site consisted of landfill material of differing thickness underlain by natural deposits of sand, and silt/clay. A brief description of each soil unit is presented in this section in the order of youngest to oldest.

Fill

Fill encountered on the site consisted of landfill material and sand fill which may have resulted from dredging operations. Where encountered (either in holes that were not pre-drilled, or in pre-drilled holes that did not fully penetrate the landfill) the landfill deposits consisted of wood chips, sawdust, pieces of wood, plastic, wire, paper and other municipal waste. Where soil was encountered in the landfill, the material was organic silt, or silt mixed with wood chips and sawdust. Within the landfill boundaries, the thickness of the landfill ranged from a minimum of 33-1/2 feet in boring B-6 to 24 feet in boring B-5. The average thickness of the landfill as about 29 feet. Blow counts (number of blows required for the last 12 inches of penetration) obtained in the landfill material ranged from 1 or 2 to about 16, with an average value of about 6. In general, the higher blow counts were attributed to sampling through intact wood.

In addition to the landfill material, other soil fill was encountered in borings B-1 (sand and silt), B-5 (sand fill), B-7 (sand). The other fill was generally found to be loose or soft, and is attributed to grading at the site, or possibly from dredging activities.

Beach Deposits

Beach deposits were found below the fill in all borings with the exception of boring B-6 where landfill was found to extend to the top of the underlying fine grained deposit. The beach deposits were found to be predominantly sand, with occasional interbeds of silt, silty sand, and clayey silt. The unit contained numerous shell fragments and occasional wood chips and saw dust particles. The unit was found to generally increase in thickness from west to east across the site, with the exception of the location of boring B-6 where the unit was not present. The thickness ranged from about 6 to 9 feet in the west to about 15 feet on the east. The beach deposit unit was also found to vary in density (based on blow count information) from loose to medium dense. In general the first few feet of the unit were loose, and the density increased with depth.

Glacial Marine Drift

Fine grained deposits generally associated with the most recent (Vashon Stade) glaciation of the Puget Sound region were encountered in all of the borings below the beach deposits, or the fill where no beach deposits were present. The unit continued to the depths explored in all of the explorations. The unit is wide spread in the Bellingham area and is termed Glacial Marine Drift. Although the unit was though to have been deposited during glacial times by active advancing glaciers, it was never compacted by the weight of glacial ice. The soil was deposited in a marine environment with a layer of marine water between the base of the glacial ice and the soils depositional environment. Glacial marine drift can contain grain size particles that range from clay size to cobble or even boulder size. In general, the soil does not show distinct bedding, although sand interbeds can be found. The glacial marine drift encountered at the site consisted predominantly of silty clay or clayey silt. Fine to medium sand and occasional fine to coarse gravel were found to be within the predominantly fine grained matrix. Occasional fine sand partings and sand interbeds were also noted, but the interbeds appeared discontinuous. In general, the amount of fine sand partings and sand interbeds increased with depth. The only layer that could be remotely correlated was the sandy silt and silty fine sand layers encountered in borings B-4 and B-5 at about elevation -55 feet.

Groundwater

Groundwater was encountered in all of the borings within about 10 to 15 feet of the ground surface. The groundwater level is very near to mean sea level.

Conclusions

In general, it is our opinion that the warehouse could be supported on driven wood pilings to allowable design loads of 25 tons per pile. The length of piles will vary across the site, and will depend on the thickness of the landfill (assumed to provide no support to the pile) and the thickness and characteristics of the sand. The length of the individual piles is expected to vary from about 60 feet to about 80 feet. Since the landfill contains significant amounts of organic material and will settle as degradation takes place, the building floor loads will also need to be pile supported.

Soil Strength

The undrained shear strength of the clay utilized in pile capacity calculations was developed by field shear strength measurements, laboratory vane shear testing and triaxial unconsolidated undrained (UU) tests. Table 1 contains the field torvane measurements made at the time of drilling. Table 2 contains the results of the laboratory vane shear tests and the UU tests.

Table 1 – Field Torvane Measurements

Depth (ft)	Torvane Measurements in Pounds per Square Foot (psf)						
	B-1	B-2	B-3	B-4	B-5	B-6	B-7
30							700
35	1100		1600				1300
40	1200	900	1500	500	800		1500
45		900	1300	300	1100		1500
50			1800	1700	1300	1500	1400
55		1200	1800	1500	1600	1200	1400
60				1350	1700		1500
65	1500	1500	1700	1400	1400	1600	1300
70	1600	1500	2000		1800	1600	1500
75	1700		1350			1800	1200
80	1760	2200					1600
85							
90	1500						

Table 2 – Laboratory Shear Strength Results

Depth (ft)	Laboratory Shear Strength (psf)		
	UU Test	Lab Vane (corrected)	
	Boring B-5	Boring B-2	Boring B-6
40	1025	970	
45		1058	
50	1600		572
55		1500	1000
60	1550		
65		1645	786
70	2000		2003
75			1574
80	1950		

Given the soil strengths presented on Tables 1 and 2, a design value of 1,500 psf was chosen to develop preliminary pile capacities.

Pile Capacity Considerations

In general, it is our opinion that the warehouse can be supported by driven wood piles developing an allowable capacity of 25 tons per pile. The pile lengths should be in the range of 60 to 80 feet. An average value of 70 feet should be suitable for planning purposes. The final design report will contain a more detailed analysis that will result in a more accurate prediction of the pile lengths. The landfill material is not expected to provide any pile support, and may cause small amounts of downdrag on the pile as the material settles. In addition, loose saturated sand in the soil column is expected to liquefy during a moderate level seismic event. This liquefaction will result in settlement of the loose sand, and some downdrag of overlying soils. A more detailed analysis of liquefaction and expected results will be performed at a later date.

It is expected that all piles will terminate within the glacial marine drift (referred to hereafter as clay). The majority of the pile resistance to loading will be derived based on friction along the sides of the wood pile in the clay and sand. Not all of the sand is expected to contribute significantly to pile support. For instance in B-5 where the total beach deposit sand thickness was found to be 15 feet, the upper 6 feet was found to be very loose, and will contribute little to the pile capacity. Likewise, the strength of the clay was found to increase with depth. The upper portion of the clay is expected to contribute smaller amounts while the deeper portions are expected to contribute more.

The wood piles will require some form of treatment in order to provide a useful design life to the structure. The level of this treatment will be determined during the design phase of the project.

Closure

Conclusions presented in this memorandum were prepared in accordance with generally accepted professional geotechnical engineering principles and practice in this area at the time this report was prepared. We make no other warranty, either express or implied. These conclusions were based on the site conditions as observed at the time of our explorations, and should not be construed as a warranty of subsurface conditions. The information contained herein was developed to the extent required to verify and modify conclusions presented in earlier work. We recommend that these preliminary conclusions be further developed during design in order to provide information useful for design of the structure foundations.

It has been a pleasure to be of service to RETEC and the Port of Bellingham on this very interesting project. We look forward to continued involvement as the project continues into the design phase.

MICHAEL G. BYERS
30498

10/31/97

EXPIRES 12/11/98

Attachments:

Appendix A – Summary Boring Logs

Appendix B – Laboratory Testing Results

APPENDIX D

APPENDIX D

LANDFILL GAS MONITORING DATA

ROEDER AVENUE LANDFIL.
Landfill Gas Blower Test Results

RPG-1
Date: 10/6/97

Time	CH4 % by Vol	CO2 % by Vol	O2 % by Vol	Blower Vacuum Inches H2O	Blower Pressure Inches H2O	Flow CFM	Barometric Pressure Inches Hg	Comments
Initial	65.4	37.7	0	0			29.8	Sustained Flame
03:25	56.4	32.8	1.9	2.2			29.8	Sustained Flame
03:35	56.7	33.7	1.9	1			29.8	Sustained Flame
03:45	58.7	34.6	1.2	1			29.8	Sustained Flame
03:46	58.7	34.8	1.2	3.8			29.8	Sustained Flame
03:50	56.8	34	1.5	3.8			29.8	Sustained Flame
04:10	56.1	32.8	2.2	3.8			29.8	Sustained Flame
04:30	56.8	32.7	2.5	3.8			29.8	Sustained Flame
05:00	57.9	32.7	2.6	3.8			29.8	Sustained Flame
05:30	58.9	33.1	2.6	3.8			29.8	Sustained Flame
05:35	58.9	33.1	2.6	6			29.8	Sustained Flame
06:00	59.7	33.4	3	8			29.8	Sustained Flame
06:03	58.3	32.3	3.1	12			29.8	Sustained Flame
06:30	58.1	32.6	3.4	12			29.8	Sustained Flame
07:00	56.9	32.7	3.5	12			29.8	Sustained Flame
07:30	55.2	32.7	3.6	12			29.8	Sustained Flame
08:00	53.3	32.7	3.6	12			29.9	Sustained Flame

RPG-2
ate: 10/7/97

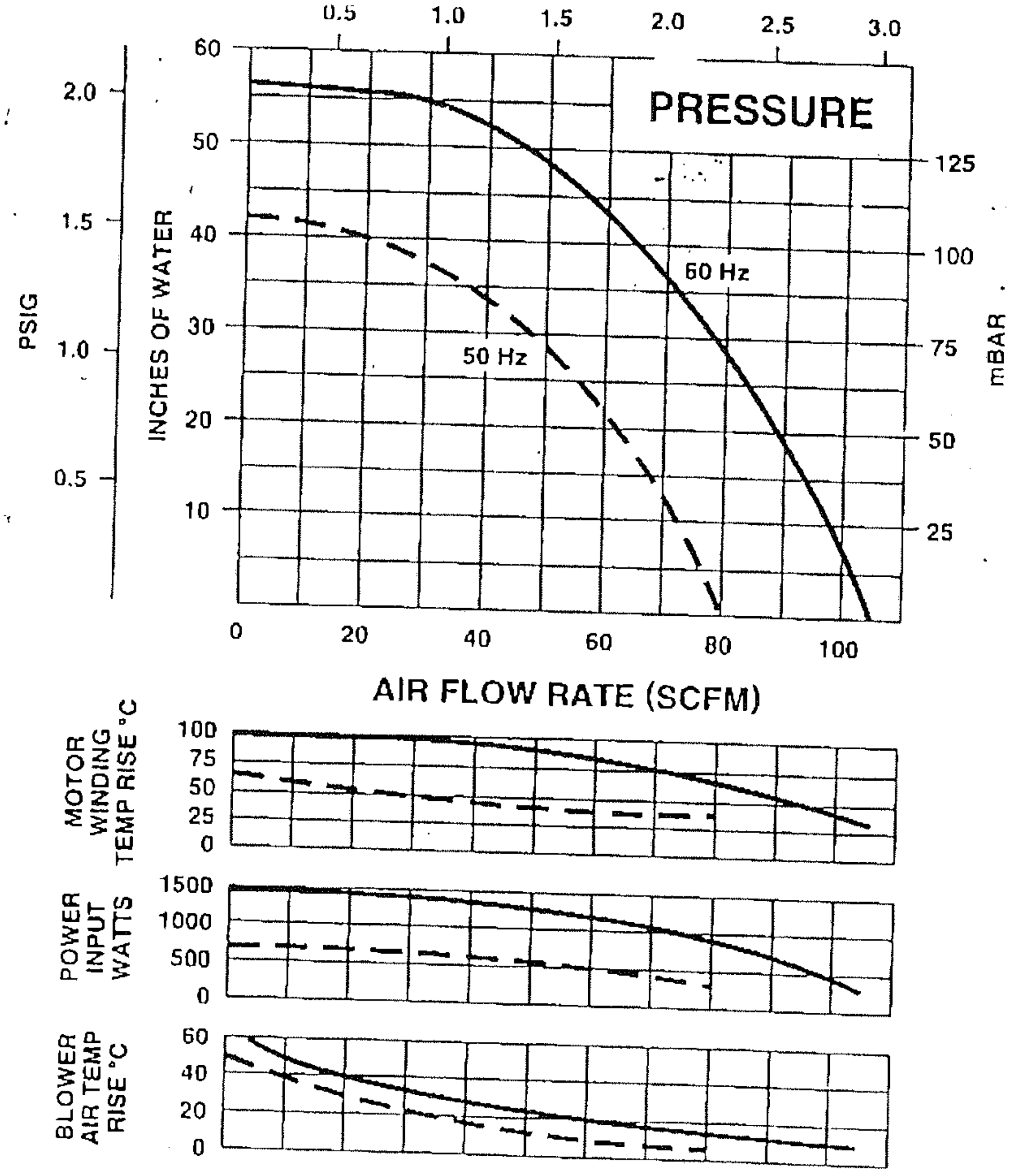
Time	CH4 % by Vol	CO2 % by Vol	O2 % by Vol	Blower Vacuum Inches H2O	Blower Pressure Inches H2O	Flow CFM	Barometric Pressure Inches Hg	Comments
Initial								
12:35	26.5	11.3	0.3	0	0		29.8	Unsustained Flame
01:01	16.5	10.1	1.7	2	47		29.8	
01:02	13.9	9.6	3.4	2	49		29.8	
01:03	8.6	8.9	7.1	2	49		29.8	
01:05	3.8	8	10.7	2	50		29.7	Below %5 CH4
01:08	2.7	7.6	11.4	2	49		29.7	
01:12	2.4	7.5	12.1	2	49		29.7	
01:14	2.1	7.4	12.3	2	49		29.7	
01:20	2.1	7.6	12.7	2	49		29.7	
01:30	1.7	7.2	13	2	49		29.7	
01:46	1.5	7.1	13.3	2	49		29.7	
02:00	1.5	6.8	13.5	2	49		29.7	
02:30	1.3	6.5	13.8	2	49		29.7	
02:40	1.8	7	13.3	16	10		29.7	
02:41	4.7	8.4	10.3	21	9		29.7	
02:42	3.4	8.1	10.7	22	9		29.7	
02:43	3	8	11.1	23	9		29.7	
02:44	2.9	7.8	11.3	23	9		29.7	
02:48	2.6	7.6	11.8	24	8		29.7	
02:50	2.5	7.4	12.1	26	8		29.7	

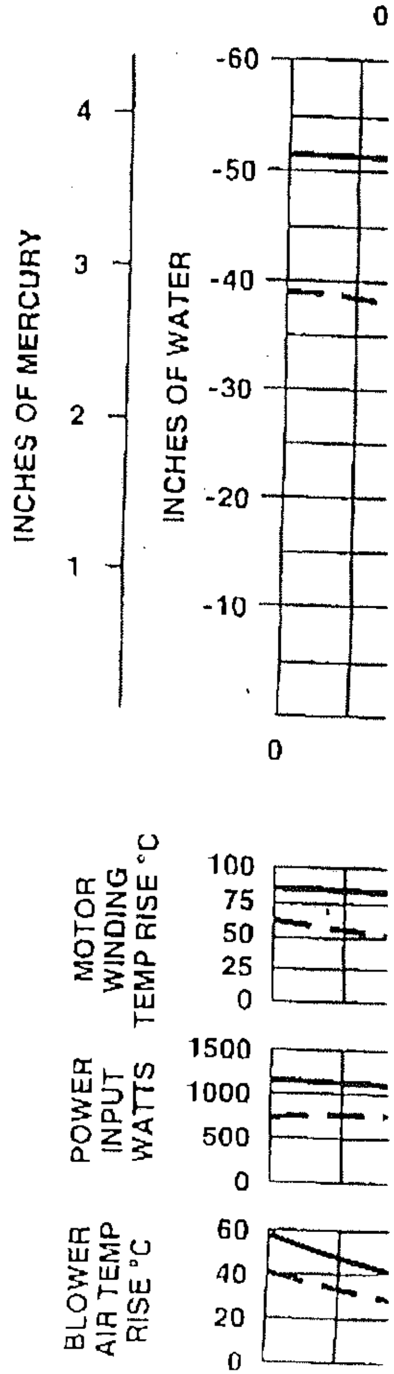
RPG-
ate: 10/7/97

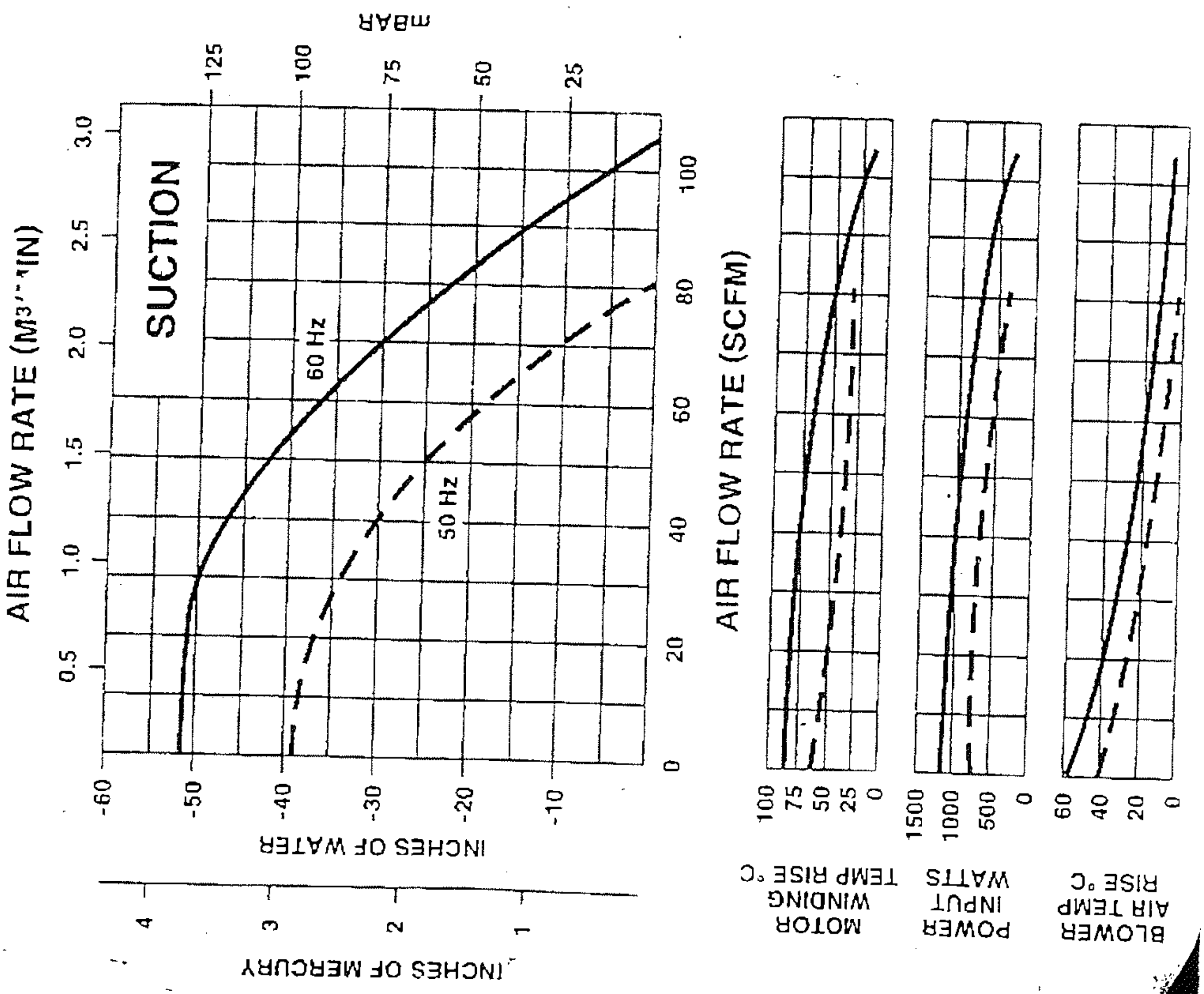
Time	CH4 % by Vol	CO2 % by Vol	O2 % by Vol	Blower Vacuum Inches H2O	Blower Pressure Inches H2O	Flow CFM	Barometric Pressure Inches Hg	Comments
Initial	18.5	26.6	2.9	0	0			
09:40	18.5	26.6	2.9	0	0		29.9	Unsustained Flame
09:43	10.4	18.5	0	2.8	49		29.9	
09:46	8.6	16.2	10.3	2.8	49		29.9	
09:48	7.4	15	11.3	2.9	49		29.8	
09:50	7.3	14.6	11.6	2.9	49		29.8	Below %5 CH4
09:54	7.3	14.8	11.5	3.1	49		29.8	
09:55	7.3	14.7	11.6	3.1	49		29.8	
10:00	6.9	14.4	11.9	3.2	49		29.8	
10:06	6.7	14.3	12.1	3.1	49		29.8	
10:10	6.4	14	12.3	3.1	49		29.8	
10:20	6.3	14	12.4	3.1	48		29.8	
10:30	6	13.8	12.5	3.1	48		29.8	
10:45	6	13.6	12.6	3.1	48		29.8	
11:15	5.6	13.4	13.1	3.2	48		29.8	
11:45	5.6	13.7	13.7	3.2	48		29.8	
11:50	5.4	13.5	8.5	3.2	48		29.8	
11:53	9.3	19.1	5.7	25	8		29.8	
11:54	15.1	20.5	6.3	28	7		29.8	
11:56	14.3	20	7.2	31	7		29.8	
11:58	13	18.9	12.1	33	7		29.8	

RPG-4
ate: 10/6/97

Time	CH4 % by Vol	CO2 % by Vol	O2 % by Vol	Blower Vacuum Inches H2O	Blower Pressure Inches H2O	Flow CFM	Barometric Pressure Inches Hg	Comments
Initial	28.9	16.6	9.1	3	44			
11:00	4.5	3.6	17.8	3	44		29.9	Unsustained Flame
11:20	4.2	3.2	16.1	3	44		29.9	Below %5 CH4
11:24	4	3.1	18.2	3	44		29.9	
11:40	3.6	2.9	18.4	3	44		29.9	
12:00	3.2	2.6	18.8	3	44		29.9	
12:20	2.9	2.5	19	3	44		29.9	
12:40	2.9	2.5	19	3	44		29.9	
01:45	2.5	2.4	18.8	3	44		29.9	
01:50	2.8	2.6	18.6	12	3.4		29.9	
02:00	14.7	13.6	9.5	19	6		29.9	
02:20	13.3	13.1	9.7	21	5		29.9	
02:40	9.9	11	11	21	5		29.9	
03:00	8	9.9	11.6	21	5		29.8	


PRESSURE
PSIG
2.0
1.5
1.0
0.5
INCHES OF WATER
60
50
40
30
20
10
0.5
1.0
1.5
2.0
2.5
3.0
60 Hz
50 Hz
mBAR
125
100
75
50
25
0
20
40
60
80
100
AIR FLOW RATE (SCFM)
MOTOR WINDING TEMP RISE °C
100
75
50
25
0
POWER INPUT WATTS
1500
1000
500
0
BLOWER AIR TEMP RISE °C
60
40
20
0


INCHES OF MERCURY
4
3
2
1
INCHES OF WATER
-60
-50
-40
-30
-20
-10
0
0
MOTOR WINDING TEMP RISE °C
100
75
50
25
0
POWER INPUT WATTS
1500
1000
500
0
BLOWER AIR TEMP RISE °C
60
40
20
0


AIR FLOW RATE (M3/MIN)
0.5
1.0
1.5
2.0
2.5
3.0
SUCTION
60 Hz
50 Hz
mBAR
125
100
75
50
25
0
20
40
60
80
100
-60
-50
-40
-30
-20
-10
INCHES OF WATER
4
3
2
1
INCHES OF MERCURY
AIR FLOW RATE (SCFM)
100
75
50
25
0
MOTOR WINDING TEMP RISE °C
1500
1000
500
0
POWER INPUT WATTS
60
40
20
0
BLOWER AIR TEMP RISE °C

FN/CP 404

Explosion-Proof Regenerative Blower

FEATURES

- Manufactured in the USA
- Maximum flow: 107 SCFM
- Maximum pressure: 57 IWG
- Maximum vacuum: 52 IWG
- Standard motor: 1.0 HP, explosion-proof
- Cast aluminum blower housing, cover, impeller & manifold; cast iron flanges (threaded); teflon lip seal
- UL & CSA approved motor with permanently sealed ball bearings for explosive gas atmospheres Class I Group D minimum
- Sealed blower assembly
- Quiet operation within OSHA standards

MOTOR OPTIONS

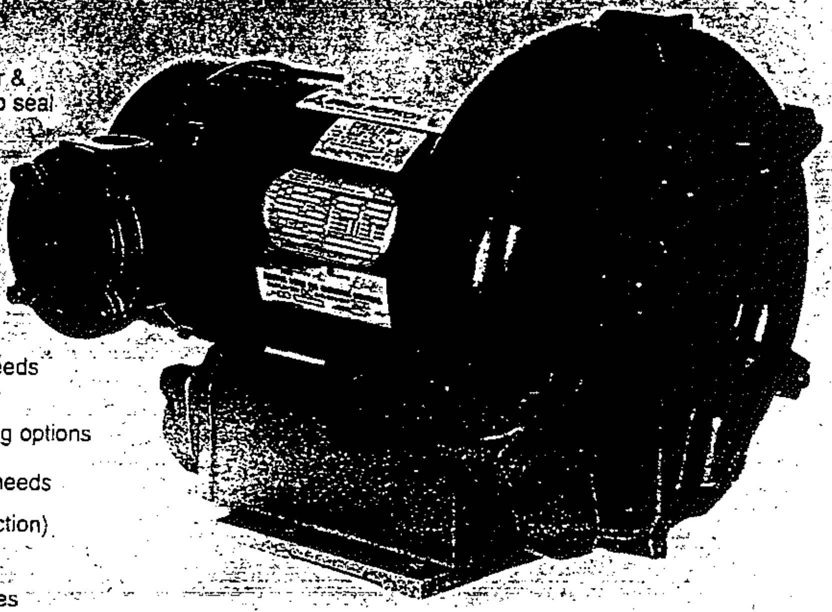
- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepowers for application-specific needs

BLOWER OPTIONS

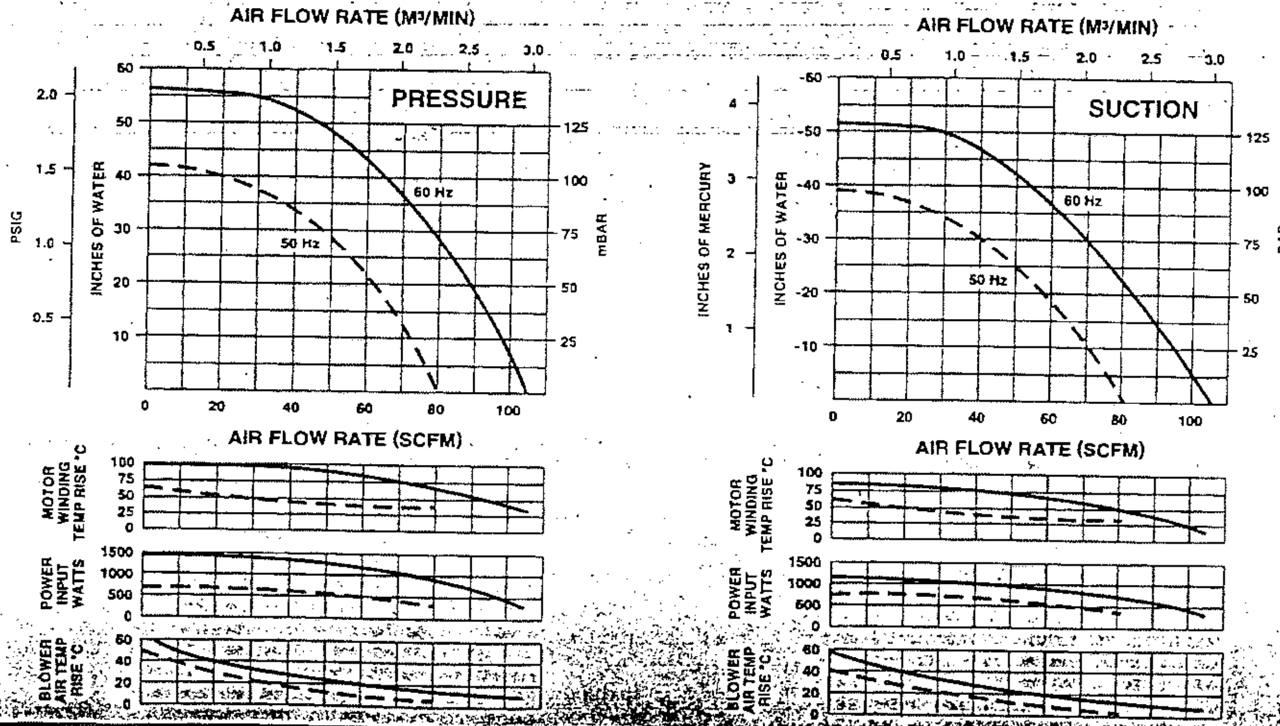
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES (See Catalog Accessory Section)

- Flowmeters reading in SCFM
  ers & moisture separators
- essure gauges, vacuum gauges & relief valves
- Switches – air flow, pressure, vacuum or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)



BLOWER PERFORMANCE AT STANDARD CONDITIONS



Herrera Environmental Consultants
2200 Sixth Avenue, Suite #601
Seattle, WA 98121

October 29, 1997

Mark Larson
RETEC
1011 S.W. Klickitat Way, Suite #207
Seattle, WA 98134

Dear Mark:

The purpose of this letter is to convey the design impacts resulting from our pre-design data collection activities for the Roeder Avenue Warehouse Project. As part of pre-design testing, Herrera conducted landfill gas (LFG) blower tests necessary to assess the assumptions made in the conceptual Warehouse design and to support the final Warehouse design. Landfill gas composition and production rates were assessed to determine the size and type of gas control systems to be installed within the warehouse building and beneath associated parking areas. Herrera performed on-site landfill gas blower tests the first week of October 1997.

Data collected during the pre-design testing included the following:

- Barometric Pressure
- Temperature
- Initial gas concentrations
- Well head pressure
- Blower pressure and vacuum
- Well head vacuum (at test well and perimeter wells for radius of influence)
- Flow rate
- Gas Concentrations (at set pressures and vacuums)
  Percent CH_4
  Percent CO_2
  Percent O_2

As part of the pre-design testing, four landfill gas wells were blower tested (RPG 1, RPG 2, RPG 3 & RPG 4). Blower tests were conducted with well head vacuums between 1 inch and 26 inches of water column. The testing results showed that one well (RPG 1), produced a sustained flame with 58% methane, 33% carbon dioxide, and 3 % oxygen under a 2 to 3 inch water column vacuum. The other three wells were depleted of methane (below 5%) under a 2 inch water column within the first couple of hours of the blower test.

Because one of the wells produced a static methane concentration over 50 percent under a 2 to 3 inch water column vacuum , a small flare system may be needed, temporarily, until the landfill gas concentrations (methane) decline below 20%. Generally the minimum landfill gas stream required to sustain flare use include:

• Methane	50%
• Inlet temperature	0 to 80 F
• Inlet Pressure	1 - 5 Psig

- Flare Gas BTU Value 600 Btu/SCF

For that reason, a dual collection system is proposed as a final design concept; a small flare system and a granular activated carbon (GAC) unit. The use of small flare would reduce the frequency of GAC regeneration caused by routing landfill gas with higher gas concentrations into the GAC system. Conversely, use of the GAC system will prevent dilution of the flare system gas concentrations which could prevent a sustained flame.

The other components of the landfill gas collection system would remain similar to the conceptual design with slight modifications to accommodate a flare system. The collection piping would remain unchanged; landfill gas collection trenches would be installed 3 feet into the refuse on a spacing of approximately 150 to 200 feet horizontally. The only variation of the conceptual design for landfill gas collection would be the addition of a second manifold parallel to the original manifold constructed so that individual LFG laterals could be directed to either the GAC unit or Flare. The design should provide provisions for both systems to allow long term flexibility depending upon gas generation after the cap has been placed. Blower tests will be required after capping to balance the system.

With regard to the other components of the landfill gas system: under warehouse gas collection and gas detection inside the warehouse, the final design will not deviate significantly from the conceptual design. The under warehouse gas collection system will likely be designed to provide an active ventilation system discharging to atmosphere. Monitoring of the discharge air quality will likely be included in an operations and maintenance plan. Coordination with the Warehouse architect will be required to provide ventilation louvers and blowers for use under the warehouse floor. The gas detection system design will follow the plan outlined in the conceptual design.

Lastly, the thickness of the landfill soil cover was assumed to be suitable for amending with bentonite to form a soil-bentonite capping layer. The soil thickness data was used to estimate settlement properties, determine cap area requirements, and were used in grading and cut-to-fill calculations. Observations of the test pit material, made during our blower testing activities, concern us regarding the suitability of the existing cover material. The existing cover material had considerable amounts of wood debris and other deleterious materials. This material does not appear suitable for bentonite amendment (required and assumed to be used as part of the capping system). The design team geotechnical engineers should review this material for bentonite amendment and capping suitability and settlement properties.

In closing, I look forward meeting with the other design team members and beginning design. If I can provide any other information, please call me at (206) 989-3061.

Sincerely,

Michael Spillane
Senior Engineer

MMS

cc: RPH

Herrera Environmental Consultants
2200 Sixth Avenue, Suite #601
Seattle, WA 98121

November 3, 1997

Joe Gibbens, PE
RETEC
1011 S.W. Klickitat Way, Suite #207
Seattle, WA 98134

Dear Joe:

The purpose of this letter is to summarize our meeting on October 31, 1997 regarding the grading and capping of the Roeder Avenue Landfill as part of the Roeder Avenue Warehouse Project; specifically, our observations of the existing cover materials. During our pre-design gas data collection activities, we observed considerable amounts of wood debris and deleterious material within the existing cover material which is unsuitable for bentonite amendment (required and assumed to be used as part of the capping system). This was confirmed with the boring logs prepared by RETEC during the geotechnical investigations the week prior to our pre-design gas data collection activities. As a result, I recommended in my October 29, 1997 memo that the design team geotechnical engineers review the existing cover material for bentonite amendment, capping suitability and settlement properties.

In our opinion, the existing site cover soils are not suitable for use as a capping material even if screened and processed. The impact to the originally assumed conceptual design would be an increase in the amount of import fill material required for capping. Additionally, this will likely change the assumed conceptual design soils balance.

During the meeting, these issues were discussed as well as potential grading options which may off-set the increased existing fill materials and cost of importing additional cover material.

The following are specific ways, discussed during our meeting, which could potentially minimize the costs associated with importing additional cover material:

> <u>Evaluate Cut to Fill Soils Balance</u>: rough grade the site using the existing cover materials to meet drainage and grading requirements thereby providing a soils balance. The Warehouse slab elevation may need to be raised or lowered to accommodate grading and drainage of the entire landfill capping area.
>
> <u>Sanitary Services Existing Cover Material</u>: the existing operating surface materials could be stockpiled prior to rough grading the site and used for

general fill under paved areas or elsewhere on the site. This would reduce the amount of import fill required to meet the design elevations.

Existing Stockpiled Chestnut Street Spoils: the existing stockpile located in the northeast corner of the site could be used as fill material above the capping system thereby off-setting the need for other import materials. We recommend collecting seive samples to determine the most appropriate use of this material.

Phasing of the Grading Work: install landfill gas (LFG) collection trenches during rough grading of the site to accommodate LFG trench spoils. This would minimize off-site disposal and aid in meeting a cut to fill soils balance.

Alternate Materials: we are currently investigating local pit supplies for native tills suitable for use as a cover material. If a local source of till meeting our permeability requirements can be located, the need for bentonite amending may be eliminated or reduced and thereby generate some cost savings over other import fill materials.

Alternate Construction of Warehouse Slab Subgrade: costs may be reduced if alternative slab subgrade construction is used. If the soil bentonite layer can be raised, an increased volume of refuse or unsuitable material could be placed under the Warehouse slab thereby allowing a more balanced cut to fill ratio. Additionally, it may be possible to form an elevated slab thereby minimizing fill materials. These details will need to be coordinated with the building architect and a economic analysis performed.

Because the existing soils are unsuitable as an impermeable cover material, which was assumed otherwise in the conceptual design, additional costs will be incurred for the cap construction. Despite this, we are confident that by coordinating with the other team members, and implementing the engineering controls listed above, the increased costs can be minimized.

We will continue to review and investigate other options for reducing the costs associated with the increased import fill material required.

In closing, I look forward meeting with you ant the other design team members to begin design. If I can provide any other information, please call me at (206) 989-3061.

Sincerely,

Michael Spillane
Senior Engineer

MMS

Golder Associates Ltd.

500 - 4260 Still Creek Drive
Burnaby, British Columbia, Canada V5C 6C6
Telephone (604) 298-6623
Fax (604) 298-5253

Golder Associates

E/98/1074
982-1069

July 14, 1998

Sandwell Engineering Inc.
1190 Hornby Street
Vancouver, B.C.
V6Z 2H6

Attention: Mr. John Sherstobitoff, P.Eng.

RE: PRELIMINARY GEOTECHNICAL AND ENVIRONMENTAL DESIGN INPUT - PROPOSED GEORGIA PACIFIC TISSUE WAREHOUSE, BELLINGHAM, WASHINGTON, USA

Dear John:

This letter summarizes the preliminary results of the geotechnical and environmental investigations carried out at the proposed site of the GP Tissue Warehouse and our preliminary input on specific items requested by Sandwell during our meeting of June 30, 1998.

The soil stratigraphy inferred based on the most recent as well as previous site investigations carried out at the site along nine selected cross sections is shown in Figures 2 and 3. The test hole and settlement monitoring locations together with the locations of the nine cross sections are shown in Figure 1.

The draft borehole and cone penetration test logs are presented in Appendix I and II of this memorandum, and the draft geotechnical laboratory test results are presented in Appendix III of this memorandum. Certain details on these sheets will be changed for the final report.

The following sections summarize our preliminary design input and comments on the specific items discussed during our meeting of June 30, 1998. It must be emphasized that the design parameters and comments provided herein may be changed, perhaps significantly, as a result of our on-going work. Our final comments and recommendations will be contained in our final report to be issued in mid-August 1998.

1.0 WORK PLANS

The updated Phase I Work Plan is included in Appendix IV of this memorandum. A draft copy of the updated work plan was faxed to Sandwell on July 8, 1998.

2.0 PILES

The following subsections address some of the issues related to corrosion, pile capacities and difficulties during installation. Both timber and pre-stressed concrete piles have been considered.

Corrosion Concerns

We have not carried out specific tests on the groundwater to assess corrosion potential. We will be collecting groundwater samples during the test pile program later in July 1998. The water samples will be tested for sulphate and hydrogen sulphide.

For purposes of costing, the use of sulphate resistant concrete and timber piles treated over their full lengths should be considered. The use of partially treated (and therefore spliced) timber piles is not recommended. The use of spliced concrete piles is also not recommended.

Geotechnical Compression Capacity of Timber *Piles*

The maximum vertical compression load to which a pile could be subjected is dependent on the structural capacity, geotechnical capacity and the magnitude of permissible deformations.

At the subject site, the geotechnical capacity of piles is influenced by the magnitude of down drag loads resulting from settlement of refuse surrounding the piles, as well as the properties of the bearing stratum. The estimated down drag load/pile for the timber piles is close to 10 tons.

The accepted practice in Fraser Lower Mainland British Columbia is to design timber piles for an allowable vertical compression load ranging from 20 tons/pile to a maximum of 30 tons/pile.

Obstructions During Pile Installation

Wooden planks, logs and concrete debris have been encountered in the various test holes put down through the refuse. Considerable variations in the penetration resistance have been observed in the silty sand deposit immediately below the refuse. The shear strength of the silty clay/clayey silt deposit underlying the silty sand is also variable with inter-layered stiff to very stiff zones.

Out of the two test piles that penetrated into the deeper silty clay/clayey silt layer, one pile met with practical refusal to further penetration, for the equipment used, at a depth of 49 ft. whereas the second pile penetrated to 63 ft. The 49 ft. long pile encountered high resistance to penetration within the silty sand layer encountered at a depth of about 35 ft.

In view of the above observations, it is our assessment that obstructions and/or high resistance to pile driving should be expected both within the refuse and the underlying native strata. These may result in:

- piles that will be out of plumb (more than 2%);
- refusal to further pile penetration at shallower than anticipated depths and perhaps reduced geotechnical load carrying capacity; and
- pile breakage (especially for concrete piles).

During cone penetration testing, a discontinuous dense layer of silty sand/sand has been encountered at 50% (4 out of 8) of the locations. During auger testing within refuse, auger flight installation difficulties were encountered at 25% (2 out of 8) of the locations. Based on these observations, we have made a preliminary estimate that pile installation difficulties may be encountered at least at 25% of the pile locations.

The risk of encountering obstructions within refuse can be reduced considerably by pre-augering and/or punching holes with a Becker hammer drill (7 inch diameter casings) at the pile locations. in advance of installation.

Concrete piles penetrating from a strong layer into a weak layer, such as from the silty sand layer (at some locations) to the underlying silt/clayey silt deposit, will have a high risk of breakage if pile driving energy is not well controlled.

The following approximate contingencies are recommended in developing preliminary cost estimates for timber and concrete piles at the site:

	Without Pre-augering	With Pre-augering
Timber	15%	<5%
Concrete	25%	<5%

Pile Settlements

The piled floor slab should be designed to accommodate a differential settlement of 0.25 inches over 20 ft. (horizontal) distance. These settlements should be treated as permanent consolidation settlements.

3.0 SEISMIC DESIGN CONSIDERATIONS

Site Seismicity

The design seismic ground motion parameters for the subject site have been obtained from the USGS Web Site for Zip Code 98225. In accordance with the Uniform Building Code (1997), the site is located in Seismic Zone 3 and the ground motions shall, as a minimum, correspond to an event having a 10-percent probability of being exceeded in 50 years.

The design firm ground motions for the site are as follows:

Peak Ground Acceleration	0.24 g
0.2 Second Spectral Acceleration	0.49 g
0.3 Second Spectral Acceleration	0.42 g
1.0 Second Spectral Acceleration	0.16 g

Liquefaction Potential of Soils

We have carried out analyses to assess the liquefaction potential of foundation soils under the design seismic loading conditions. The results of the cone penetration tests and SPT N values have been used in these analyses. The analyses have been carried out for ground surface accelerations of 0.24 g (amplification factor 1.0) and 0.34 g (amplification factor of 1.4). An earthquake of magnitude M7 has been considered representative for the area.

The results indicate that portions of the native silty sand deposit sandwiched between the refuse and the deep marine silt deposit, have a high risk of liquefaction. The estimated thickness of the liquefiable soils ranges from 1 to 4 m. The underlying marine clay deposit, however, has a low risk of liquefaction.

Consequences of Liquefaction

The estimated liquefaction-induced lateral ground displacements range from 0.5 m to 0.9 m at the south end of the warehouse (near the lagoon) and from 0.2 m to 0.4 m at the north end of the warehouse (near Roeder Avenue). These movements are likely to occur primarily towards the lagoon.

The estimated post-earthquake vertical settlements range from 0.025 m to 0.100 m.

Piled foundations penetrating the potentially liquefiable soils would be subjected to additional loads due to the lateral soil movements. We have carried out analyses to assess the impact of the liquefaction-induced soil loads on timber piles. The results are shown in Figures 4 and 5.

5.0 GEOMEMBRANE

Based on our telephone conversations with Chip Hilarides, we understand that the memorandum summarizing the advantages of using PVC versus HDPE is not required until August 5, 1998. We will prepare the memorandum to meet this schedule.

For costing purposes, you should assume 60 mil HDPE geo-membrane, with booted penetrations. Assuming that the gas control system is only passive (i.e. not active), consider 4 inch diameter perforated drain pipe that meets specifications equivalent to those used by BC MOTH. Pipe would be provided with a drain rock gravel surround.

Assume 6 inches of sand under grade beams, overlying HDPE geo-membrane, overlying 6 inches of clean sand [Note that the actual thickness will be dependent on the accuracy of grading carried out]. In pavement areas, the geo-membrane should be provided with at least 600 mm of soil/pavement cover.

With regards to treatment at the perimeter, 60 mil HDPE geo-membrane cannot be tightly rolled. Therefore, the asphalt pavement should be extended 1 ft. beyond the edge of the geomembrane to minimize the quantity of water to be handled above the geo-membrane. Provide vertical cutoff on east (BMI site) and north sides of site.

6.0 A. C. PAVEMENT AND GRAVEL SURFACES

The WSDOT and City of Bellingham standards on the minimum thickness of asphaltic concrete are given in Appendix V.

It is recommended that provision be made for a 4 inch perforated PVC pipe surrounded by drain rock, all completely encapsulated in geotextile filter fabric such as Nilex C41 or equivalent to act as a “bottom drainage outlet” for the topside of the geo-membrane. If an asphaltic concrete pavement is not provided, the diameter and number of pipes should be reviewed in light of the anticipated run-off volumes.

We assume that run-off collected could be discharged into the lagoon.

The use of geotextiles to strengthen soft/weaker areas, in our experience, is generally more expensive than sub-excavating the weak areas and placing compacted granular fill. However, if offsite disposal is required for subexcavated material, than the use of geotextiles may be cost effective to limit the excavation depth.

Based on the 1993 AASHTO Guide for the Design of Pavement Structures, and provided that the site preparation is carried out as described below, the following pavement structures are expected to be suitable for the warehouse traffic:

Alternative-1: Conventional Asphalt Concrete Pavement

3 inches	Asphalt Concrete
10 inches	¾ inch minus crushed granular base course, compacted to 95% Modified Proctor Dry Density (MPDD)
12 inches	clean sand compacted to 95% MPDD
60 mil	Geo-membrane
12 inches	clean sand compacted to 95% MPDD

[It is assumed that the geo-membrane layer provides no structural improvement to the pavement, and hence has been ignored in the analysis].

Alternative-2: Asphalt Treated Base

3 inches	Asphalt Concrete
6 inches	Asphalt treated base consisting of ¾ inch minus crushed granular base course mixed with approximately 4% asphalt emulsion and compacted to 95% MPDD
12 inches	clean sand compacted to 95% MPDD
60 mil	Geo-membrane
12 inches	clean sand compacted to 95% MPDD

Alternative-3: Without Gas Collection Layer

4 inches	Asphalt Concrete
10 inches	¾ inch minus crushed granular base course, compacted to 95% MPDD
20 inches	3 inch minus pit run sand and gravel compacted to 95% MPDD

The above pavement design assumes the load equivalency factors for various axle configurations provided to us by GP in their fax dated July 6, 1998. The number of equivalent 1 kip single axle loads (ESAL's) used in the design are based on the following:

- Design life = 20 years;
- Annular growth rate in traffic = 0%;
- 80 semi-trailers/day and 96 shuttle trucks/day; and
- Truck factor = 1.0 ESAL/semi-trailer and 1.0 ESAL/shuttle truck and based on average gross truck weight of 60 kips.

Site preparation for the pavement construction should include undercutting to the required depth of underside of sub-base or granular gas collection layer, and proof-rolling the exposed subgrade using a fully loaded dump truck.

The exposed subgrade should be inspected by experienced geotechnical personnel prior to placement of any pavement layers to confirm that the subgrade conditions are consistent with those assumed for design, with provision to sub-excavate and replace weak disturbed soils/refuse with compacted granular fill. Provision should also be made to replace a geo-textile separation layer such as Nilex C34 or equivalent, over any silty layers exposed during undercutting.

Alternative 3 – Staged Construction to Accommodate Settlements

Long-term settlements of the road surface should be expected, with resultant undulations of the asphalt surface. A staged construction could be considered, whereby 2.5 inches of asphalt surfacing is initially placed, with provision for overlaying with at least 2.5 inches of asphalt concrete in 8 to 10 years. Depending on the amount of settlement occurring in the pavement, an asphalt concrete leveling course may be required prior to overlaying.

7.0 SETTLEMENT

The total vertical settlement expected due to loads imposed by a cast-in-place concrete floor slab (150 psf for a period of 3 days) is estimated to vary from approximately 1 inch to 2 inches depending on the location. Settlements due to fills would be in addition to these settlements.

These settlements occur primarily within the refuse/wood waste and are based on back analysis of data from settlement of other similar landfills. If a more accurate prediction of settlements is required, we recommend that consideration be given to a small (20 ft by 20 ft by 3 ft. thick) test preload area within the footprint of the warehouse. This test preload must be monitored under the direction of a geotechnical engineer.

8.0 CONSTRUCTION SEQUENCE AND CONSTRUCTABILITY

For piled foundations. the preferred construction sequence is:

1. Regrade site and compact subgrade soils/fills;
2. Place "below membrane" granular bedding for the membrane;
3. Drive piles;
4. Backcut trench for gas collection piping;
5. Place membrane with boots around piles;
6. Place above membrane granular fill (for HDPE); and
7. Place concrete (not on membrane if HDPE is used).

Our comments on constructability issues are based on the following information:

- Soil stratigraphy sections shown in Figures 2 and 3;
- Top of floor slab would be at elevations +30 ft., +28 ft., +26 ft., and +24 ft. at the north west, north east, south west and south east corners of the warehouse, respectively; and
- An average of approximately 2.5 ft. of granular fill will be placed below the underside of the floor slab.

Refuse has been encountered at the test locations at elevations as high as +23 ft.; however, generally it is below about elevation +20 ft. We therefore recommend that the bulk excavation not extend below elevation +20 ft. It should be noted that the soil and fill conditions between test hole locations have been inferred and therefore may vary from those shown in the stratigraphy sections. Regardless of this, it may be prudent to allow a contingency to cover the cost of encountering say 1,000 cu. yds. of refuse during excavations.

An allowance should also be made for costs associated with health and safety issues during excavation and foundation preparation, especially into the refuse. If refuse is encountered in the excavations, there should be one qualified health and safety person on site to monitor conditions full-time. Some stand-bye time may be required in the event that the air quality, due to excavation into the refuse, temporarily does not meet applicable health and safety regulations.

Unless it is required to truck the excavated spoil out of the site, a bulking factor equal to 1.0 should be assumed. If trucking is required, a bulking factor of 1.3 should be assumed.

The top layer of mixed refuse and wood waste can be moved, graded and compacted using a bulldozer. Both cut and fill areas could be compacted by running an excavator over these materials. Fill areas should be placed and compacted in 1 ft. loose thickness lifts.

Mineral fills such as sands and gravels may be compacted using a 10 ton roller.

Logs, chunks of concrete and planks may be encountered during site preparation work. We recommend a nominal allowance be made to handle these large size materials.

If refuse or wood waste is encountered during preparation of the subgrade for the cast-in-place floor slab, these areas should be sub-excavated a minimum of 1 ft. and backfilled with compacted granular fills.

9.0 FOLLOW-UPS ON PREVIOUS MEETINGS

The two memoranda are currently under preparation and will be provided to you shortly.

We trust this letter provides the preliminary information required at this time. Since our work is ongoing, our final report may contain comments and recommendations that are different from those contained in this letter. Please refer to our final report, to be issued in mid-August 1998, for our final comments and recommendations.

Yours very truly,

GOLDER ASSOCIATES LTD.

Upul D. Atukorala, P.Eng.
Principal

Colin L.Y. Wong, P.Eng.
Associate

Reviewed by:

Trevor P. Fitzell, P.Eng.
Principal

UDA/CLYW/TPF/ggg
982-1069
Attachments

J:\LET-98\JUL\CLYW-1069.DOC

LATPILE Analysis of Timber Piles

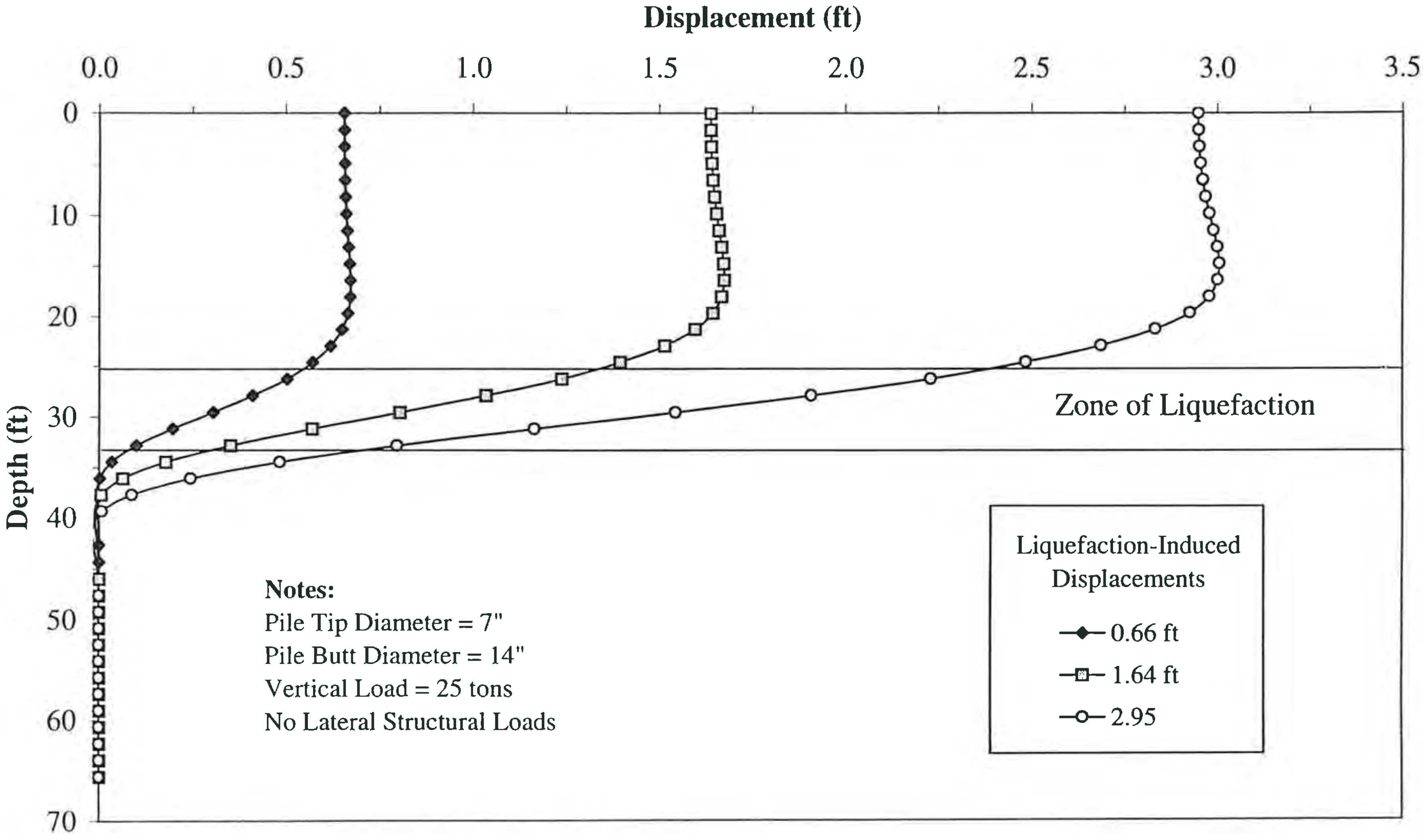


Figure 4

LATPILE Analysis of Timber Piles

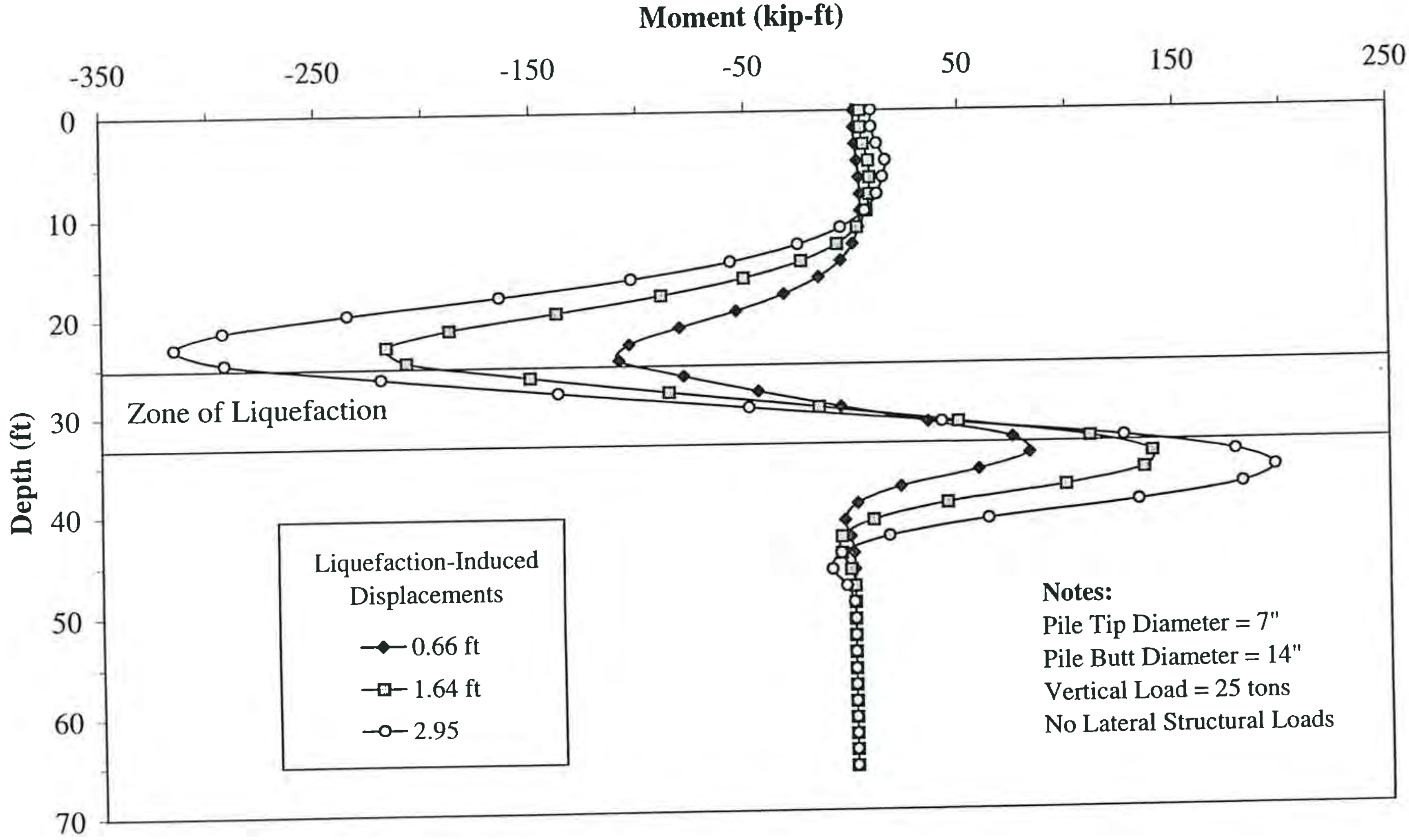


Figure 5

APPENDIX I

RECORD OF BOREHOLE SHEETS

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

RECORD OF BOREHOLE CPT98-1

BORING DATE: June 1-2, 1998

SHEET 1 OF 1

DATUM: Geodetic

DEPTH S FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft. SHEAR STRENGTH Cu, lb./sq.ft. nat.V - + Q - ● rem V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s WATER CONTENT, PERCENT Wp ⊢—○W—⊣ Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		26.9							
		Loose to compact, brown SAND and GRAVEL, some silt. (FILL).	▨	0.0							
		Firm, dark brown, clayey SILT, trace gravel, some wood, cloth/rubber fibers and topsoil. (FILL).	▨	23.9 3.0	1	AS					
		Loose, moist to wet, brown wood/ coarse paper fibres, trace bark. (REFUSE FILL).	▨	20.9 6.0				Temp. 16.3 deg. C			
10	7 Inch dia. Solid Stem Auger	Loose, wet, dark brown wood fibres and bark, some silt, plastic sheets/bags, foam cups, trace rubber tire and wire. (REFUSE FILL).	▨	15.9 11.0	2	AS		Temp. 17.0 deg. C			∇ June 1/98
20		Loose, wet, brown wood bark and fibers, some organic silt. (REFUSE FILL).	▨	6.9 20.0	3	AS		Temp. 16.0 deg. C			
		Loose, wet, grey SAND with silty sand, layers, little gravel, trace shells.	⁘	2.9 24.0							
30		End of Borehole.		-3.1 30.0							
40											
50											
60											
70											
80											

DRAFT

DATA INPUT S. June/98

DEPTH SCALE
1 inch to 10 feet

Golder Associates

LOGGED: L.W.
CHECKED: C.W.

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

RECORD OF BOREHOLE CPT98-2

BORING DATE: June 2, 1998

SHEET 1 OF 1

DATUM: Geodetic

DEPTH S FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES NUMBER	TYPE	BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft. SHEAR STRENGTH Cu, lb./sq.ft. nat V - + Q - ● rem V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s WATER CONTENT, PERCENT Wp —○W— Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		24.8							
0	7 inch dia. Solid Stem Auger	Loose to compact, moist, SAND and GRAVEL, some silt. (FILL) >	▨	0.0 22.8							
		Firm, moist, grey SILT/limestone SILTS, some gravel and sand. (FILL).	▨	2.0 18.8							
		Loose, moist, brown wood fibres and bark, some organic silt, trace silty gravel and plastic sheets. (REFUSE FILL).	▨	6.0 14.8	1	AS		Temp. 12.6 deg. C			
10		Loose, dark brown wood bark and fibers, some organic silt, trace silt, some plastic sheets and paper, trace gravel and sand, wire and glass, tin cans. (REFUSE FILL).	▨	10.0 4.8	2	AS		Temp. 16.6 deg. C			▽ June 2/98
20		Loose, wet, black stained wood and bark, some sand and gravel, some paper, plastic sheets, trace glass. (REFUSE FILL).	▨	20.0 -3.2	3	AS		Temp. 16.4 deg. C			
		Loose, wet, grey, silty SAND/ SAND layers.	⁙	28.0 -5.2							
30		End of Borehole.		30.0							
40											
50											
60											
70											
80											

DRAFT

DATA INPUT: S S. June/98

DEPTH SCALE

1 inch to 10 feet

Golder Associates

LOGGED: L.W.

CHECKED: C.W.

PROJECT: 982-1069

RECORD OF BOREHOLE CPT98-3

SHEET 1 OF 1

LOCATION: Roeder Avenue, Bellingham

BORING DATE: June 2-3, 1998

DATUM: Geodetic

SAMPLER HAMMER, 140lb; DROP, 30in

DEPTH SC FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft; SHEAR STRENGTH Cu, lb./sq.ft nat.V - + Q - ● rem.V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT, PERCENT Wp ├─○W─┤ Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		22.9							
0	7 Inch dia. Solid Stem Auger	Loose to compact, moist SAND and GRAVEL, trace silt and organics. (FILL).	▩	0.0							
		Loose, moist, dark brown, sandy SILT and grey clayey SILT, some topsoil, wood and gravel. (FILL).	▩	20.9 2.0							
		Loose, moist to wet, dark brown, black stained SILT/organic SILT and stained wood fibres/bark. Some plastic sheets, paper, glass and bricks, trace wire cans, gravel and sand. (REFUSE FILL).	▩	17.9 5.0	1	AS		Temp. 16.0 deg. C			
10											▽ June 2/98
					2	AS		Temp. 14.5 deg. C			
20		Loose, wet, brownish grey SILT, some wood bark and fibres, trace sand. (FILL).	▩	2.9 20.0	3	AS		Temp. 15.8 deg. C			
		Loose, wet, grey, silty SAND, some shells, little gravel.	⁘	0.9 22.0	4	AS			○	M	
30		End of Borehole.		-7.1 30.0							
40											
50											
60											
70											
80											

DATA INPUT: S.S. June/98

DEPTH SCALE

1 inch to 10 feet

Golder Associates

LOGGED: L.W.

CHECKED: C.W.

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

RECORD OF BOREHOLE CPT98-4

BORING DATE: June 4, 1998

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft. / SHEAR STRENGTH Cu, lb./sq.ft. nat.V - + Q - ● rem.V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT, PERCENT Wp ├──○W──┤ Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	7 inch dia. Solid Stem Auger	Ground Surface		25.8							
0		Loose to compact, moist, dark brown stained SAND and GRAVEL, some silt, trace topsoil and wood pieces. (FILL).	▨	0.0 20.8							
		Loose, moist, black stained woodwaste, bark and fibres, trace silt, sand and gravel. (FILL). Log at 9' - 10'	▨	5.0 12.8	1	AS		Temp. 16.5 deg. C			
10											▽ June 4/98
		Loose, wet, black stained paper, plastic sheets, some tin/metal cans, trace woodwaste, cloth and plastic strips. (REFUSE FILL).	▨	13.0 8.8	2	AS		Temp. 14.1 deg. C			
		Loose, wet, black stained woodwaste (bark, strips, chips), paper and plastic sheets/strips, trace silt and gravel. (REFUSE FILL).	▨	17.0 -0.2	3	AS		Temp. 14.1 deg. C			
20											
		Loose, black stained woodwaste-hogfuel strips and bark, trace paper and plastic, trace silt and sand. (REFUSE FILL).	▨	26.0 -3.2	4	AS		Temp. 15.2 deg. C			
30		Loose, grey/black, silty SAND.		29.0 30.0	5	AS					
		End of Borehole.									
40											
50											
60											
70											
80											

DRAFT

DATA INPUT: S S June/98

DEPTH SCALE

1 inch to 10 feet

Golder Associates

LOGGED: L.W.

CHECKED: C.W.

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

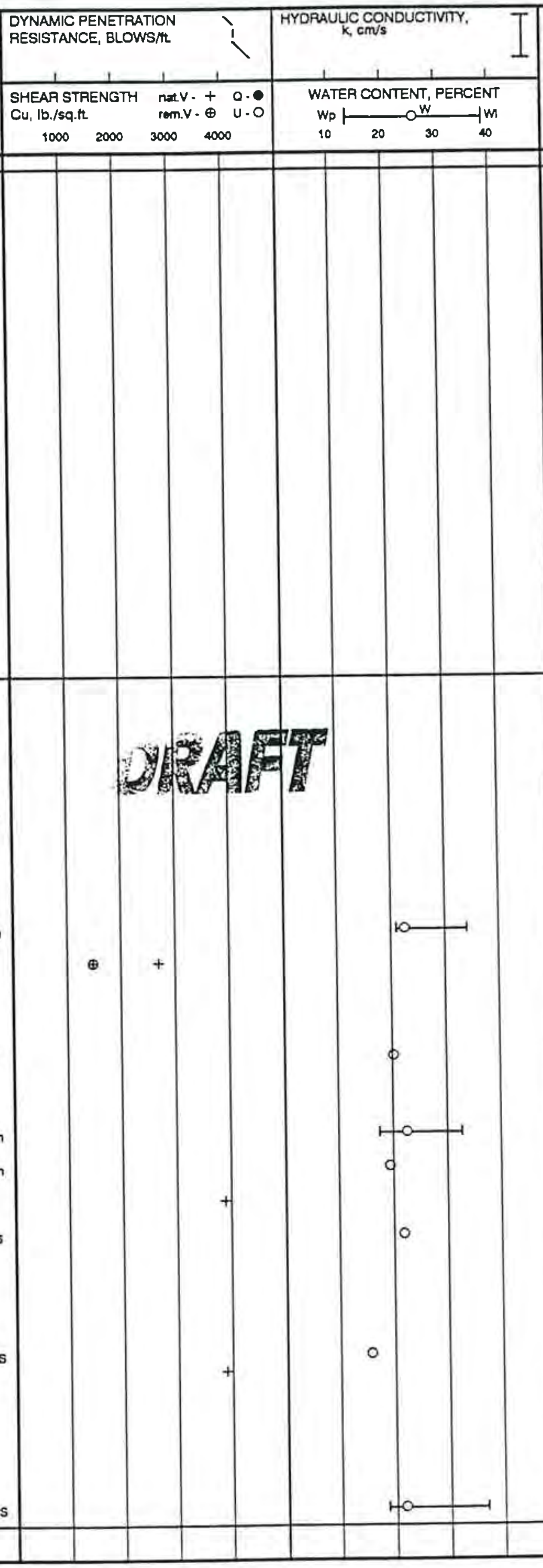
RECORD OF BOREHOLE CPT/BH98-4

BORING DATE: June 4,9-10, 98

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	ELEV. DEPTH (ft)	SAMPLES NUMBER	TYPE	BLOWS/ft.	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	7 Inch dia. Solid Stem Auger	Ground Surface	25.8 0.0					
10		See CPT98-4						
30	3.75 in. dia. Mud Rotary	Loose, wet woodwaste, some black stained silt, trace shells.	-4.2 30.0	1	2" DO	6		
		Loose, wet, black-grey SILT to sandy SILT, trace clay, wood and shells.	-6.2 32.0	2	2 DO	9	M	
		Compact to dense, wet, grey SAND, little silt, trace gravel and shells.	-8.2 34.0	3	2 DO	40	M	
				4	2 DO	17		
40		Stiff to very stiff, moist, grey, medium plastic silty CLAY, trace fine gravel and sand.	-12.2 38.0	5	3 TO	Ph	C,MH CIU	Gs = 2.68
50				6	2 DO	9		
				7	3 TO	Ph	C	
60		Very stiff, moist, grey, medium plastic, silty CLAY, trace sand and gravel. Hard layer at 62' - 64'.	-32.2 58.0	7	3 TO	Ph		
				8	2 DO	16		
70				9	3 TO	PS		
80		End of Borehole.	-54.2 80.0	10	3 TO	PS	C	



DATA INPUT: S.S. June/98

DEPTH SCALE

1 inch to 10 feet

Golder Associates

LOGGED: L.W.

CHECKED: C.W.

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

RECORD OF BOREHOLE CPT98-5

BORING DATE: June 4-5, 1998

SHEET 1 OF 1

DATUM: Geodetic

DEPTH S FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft. / SHEAR STRENGTH Cu, lb./sq.ft. nat.V - + Q - ● rem.V - ⊕ U - O	HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT, PERCENT Wp ⊢—O^W—⊣ Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	7 inch dia. Solid Stem Auger	Ground Surface		26.1							
		Loose to compact, moist, brown and dark brown stained GRAVEL and SAND, some silt and cobbles. (FILL).		0.0 21.6							
10		Loose, moist to wet, brown and black stained woodwaste or hogfuel, bark and shredded wood, trace organic silt, gravel, sand, plastic sheets and glass. (REFUSE FILL).		4.5 11.1	1 2	AS AS		Temp. 17.8 deg. C Temp. 12.9 deg. C			▽ June 4/98
		Loose, wet, black stained woodwaste and organic SILT, trace gravel, sand and plastic sheets. (REFUSE FILL).		15.0 8.1	3	AS		Temp. 13.8 deg. C			
20		Loose, grey SAND and silty SAND layers, trace gravel, shells and organics.		18.0 6.1	4	AS			○	M	
		End of Borehole.		20.0							
30											
40											
50											
60											
70											
80											

DRAFT

DATA INPUT S. June/98

DEPTH SCALE

1 inch to 10 feet

Golder Associates

LOGGED: L.W.

CHECKED: C.W.

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

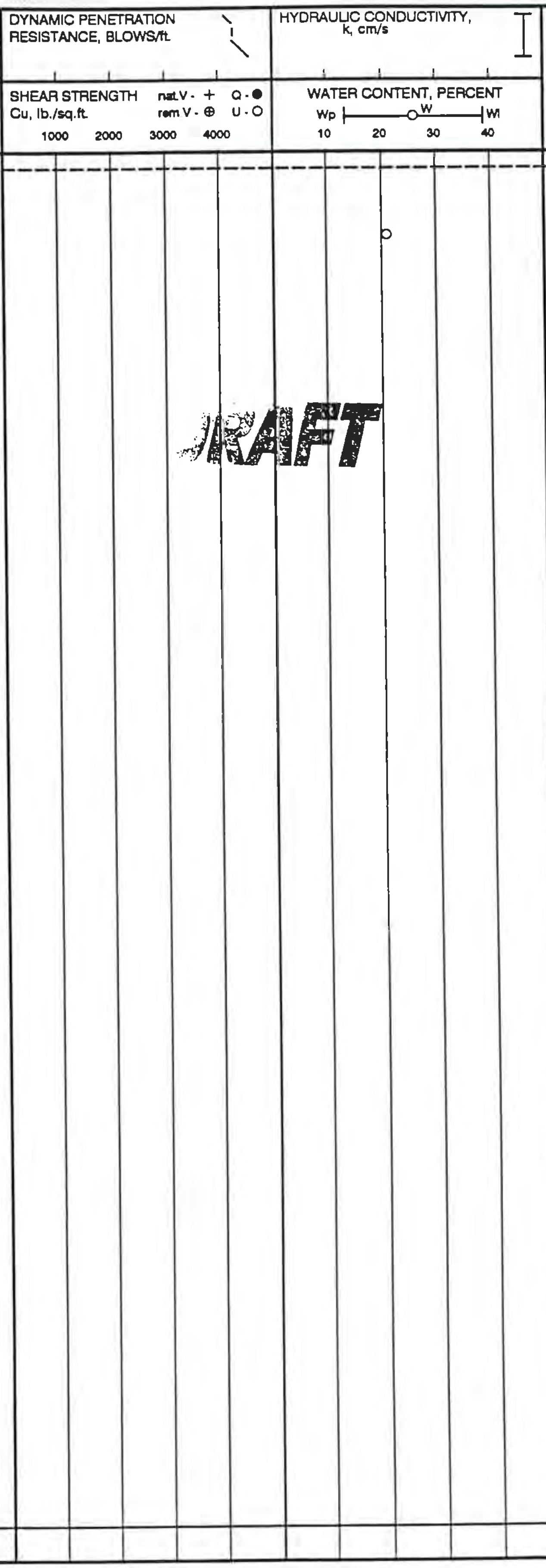
RECORD OF BOREHOLE CPT/BH98-5

BORING DATE: June 12, 1998

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/ft.	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
80	3.75 inch dia. Mud Rotary	CONTINUED FROM PREVIOUS PAGE Same as Above.	▨	-57.4 83.5	5	2 DO	22		
90–140		Very stiff, grey, silty CLAY, some hard, silty CLAY, layers with trace sand and gravel in mixture.	▨	-115.4 141.5					
150		Hard, grey, clayey SILT, trace sand and gravel. (Till-Like).	▨	-133.9 160.0					
160		End of Borehole.							



DATA INPUT S June/98

DEPTH SCALE

1 inch to 10 feet

Golder Associates

LOGGED: L.W.

CHECKED: C.W.

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

RECORD OF BOREHOLE CPT98-7

BORING DATE: June 8, 1998

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/ft.	HYDRAULIC CONDUCTIVITY, k, cm/s	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	NUMBER	TYPE	BLOWS/ft.	SHEAR STRENGTH Cu, lb./sq.ft. nat.V - + Q - ● rem.V - ⊕ U - ○	WATER CONTENT, PERCENT Wp ├──○W──┤ Wl 10 20 30 40		
		Ground Surface		20.7							
0	7 Inch dia. Solid Stem Auger	Loose to compact, moist, brown, silty SAND and GRAVEL. (FILL).	▨	0.0 18.2							
		Loose, moist mixture of black stain woodwaste of shredded wood and sandy SILT to clayey SILT. (FILL).	▨	2.5 14.7							
		Very loose, moist to wet, dark brown woodwaste, shredded wood, sawdust, paper and topsoil. Some plastic sheet, trace grass, metal wire and rope, trace silt and sand. (REFUSE FILL).	▨	6.0	1	AS		Temp. 18.7 deg. C			▽
10											June 8/98
					2	AS		Temp. 14.6 deg. C			
					3	AS		Temp. 15 deg. C			
20				-0.3							
		Loose, wet, grey, silty SAND, little gravel and shells.	⁘	21.0							
					4	AS			○	M	
				-9.3							
30		End of Borehole.		30.0							
40											
50											
60											
70											
80											

DRAFT

DATA INPU S. June/98

DEPTH SCALE

1 inch to 10 feet

Golder Associates

LOGGED: L.W.

CHECKED: C.W.

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

RECORD OF BOREHOLE CPT98-8

BORING DATE: June 8, 1998

SHEET 1 OF 1

DATUM: Geodetic

DEPTH S FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES NUMBER	TYPE	BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft. SHEAR STRENGTH Cu, lb./sq.ft. nat.V - + Q - ● rem.V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s WATER CONTENT, PERCENT Wp ├──○W──┤ Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		21.5							
0	7 Inch dia. Solid Stem Auger	Loose to compact, moist, brown SAND and GRAVEL. (FILL).	▨	0.0 20.0 1.5							
		Loose, brown woodwaste of shredded wood, black and organic silt, trace silt, sand and gravel. (FILL).	▨	16.5 5.0							
10		Loose, dark brown and black stained woodwaste of shredded wood, bark and organic SILT. Some paper plastic sheets and white silt, trace sand and gravel. Possible concrete between 12' - 14'. (REFUSE FILL).	▨	6.5 15.0	1 2	AS AS		Temp. 15.2 deg. C Temp. 15.0 deg. C			▽ June 8/98
		Loose, brown/black stained woodwaste, shredded wood mixed with grey silty SAND, little gravel, trace paper, plastic and glass. (REFUSE FILL).	▨	3.5 18.0	3	AS		Temp. 13.8 deg. C			
20		Loose, wet, grey, silty SAND, little gravel and shells, trace wood organics.	⁘	1.5 20.0	4	AS			○	M	
		End of Borehole.									
30											
40											
50											
60											
70											
80											

DRAFT

DATA INPUT S. June/98

DEPTH SCALE

1 inch to 10 feet

Golder Associates

LOGGED: L.W.

CHECKED: C.W.

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

RECORD OF BOREHOLE OGW98-1

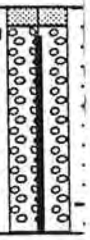
BORING DATE: June 15, 1998

SHEET 1 OF 1

DATUM: Geodetic

DRAFT

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft. SHEAR STRENGTH Cu, lb./sq.ft. nat.V - + rem.V - ⊕ Q - ● U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s WATER CONTENT, PERCENT Wp ├──○W──┤ Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		14.5							
0	8 inch dia. Hollow Stem Auger	0.2 ft. Asphalt Dense, grey SAND and GRAVEL, trace silt. (FILL).	▩	0.0 13.0							
			▩	1.5 11.5							
		Compact, brown SAND and GRAVEL some shredded woodwaste. (FILL).		3.0 4.0	2	2 DO	16				
		Concrete Slab.	▩								
10		Loose to compact, brown and black stained silty SAND and GRAVEL, trace wood. (FILL).	▩		3	AS					
				3.0							
		End of Borehole.		11.5							
20											
30											
40											
50											
60											
70											
80											



DATA INPUT S. June/98

DEPTH SCALE
1 inch to 10 feet

Golder Associates

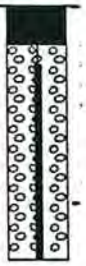
LOGGED: L.W.
CHECKED: C.W.

RECORD OF BOREHOLE AH/MW98-1

PROJECT: 982-1069
LOCATION: Roeder Avenue, Bellingham
SAMPLER HAMMER, 140lb; DROP, 30in

BORING DATE: June 15, 1998

SHEET 1 OF 1
DATUM: Geodetic

DEPTH FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft. / SHEAR STRENGTH Cu, lb./sq.ft. nat.V - + rem.V - ⊕ Q - ● U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT, PERCENT Wp ├─○W─┤ Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		21.7							
0	11 Inch dia. Hollow Stem Auger	Loose to compact, brown SAND and GRAVEL. (FILL).	▨	0.0							 Bentonite Seal
		Loose, brown woodwaste and organic silt. (FILL).	▨	19.7 2.0							3" PVC Standpipe
		Loose, wet, black stained woodwaste of shredded wood and bark, and organic silt, some plastic and paper, trace glass, ceramics, gravel and silt. (REFUSE FILL).	▨	16.7 5.0	1	AS		Temp. 13.6 deg. C			▽ June 29/98
10											PVC Pipe Pea Gravel
				7.7	2	AS		Temp. 13.8 deg. C			
		Loose, grey SAND, some silt and gravel.	▨	14.0	3	AS			○	M	
		End of Borehole.		15.0							
20											
30											
40											
50											
60											
70											
80											

DRAFT

DATA INPU S. June/98

DEPTH SCALE
1 inch to 10 feet

Golder Associates

LOGGED: L.W.
CHECKED: C.W.

RECORD OF BOREHOLE AH/MW98-3

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

SAMPLER HAMMER, 140lb; DROP, 30in

BORING DATE: June 16, 1998

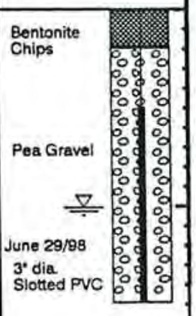
SHEET 1 OF 1

DATUM: Geodetic

BORING METHOD: 7 Inch dia. Solid Stem Auger

DEPTH SCALE FEET	SOIL PROFILE DESCRIPTION	ELEV. DEPTH (ft)	SAMPLES NUMBER	TYPE	BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft. / SHEAR STRENGTH Cu, lb./sq.ft. nat V - + Q - ● rem V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT, PERCENT Wp W Wl 10 20 30 40	ADDITIONAL LAB. TESTING
0	Ground Surface	27.6						
	Loose to compact, moist GRAVEL and SAND, some silt. (FILL).	0.0 25.6 2.0						
	Loose, moist, dark brown, organic SILT/decomposed woodwaste, some grey silt and trace gravel in mixture. At 5 ft. concrete. (FILL).	21.6 6.0	1	AS		Temp. 19.8 deg. C		
10	Loose, dark brown woodwaste of shredded wood/bark and organic silt. Trace silt and gravel and plastic sheets, wet. (REFUSE FILL).	16.6 11.0						
20	Loose, wet, black stained woodwaste of shredded wood/bark and organic silt. Some paper, plastic sheets, trace glass, cloth and wire, trace gravel and silt. (REFUSE FILL).		2 3	AS AS		Temp. 16.1 deg. C Temp. 15.7 deg. C		
		1.6 26.0						
	Loose, wet, grey silty SAND, trace shells and gravel.	-2.4	4	AS				
30	End of Borehole.	30.0						
40								
50								
60								
70								
80								

PIEZOMETER OR STANDPIPE INSTALLATION



DRAFT

DATA INPUT S June/98

DEPTH SCALE
1 inch to 10 feet

Golder Associates

LOGGED: L.W.
CHECKED: C.W.

PROJECT: 982-1069

LOCATION: Roeder Avenue, Bellingham

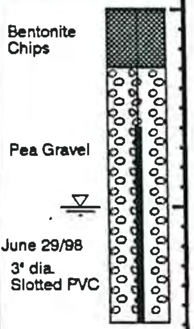
SAMPLER HAMMER, 140lb; DROP, 30in

RECORD OF BOREHOLE MW98-4

BORING DATE: June 16, 1998

SHEET 1 OF 1

DATUM: G.S.

DEPTH S FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. DEPTH (ft)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/ft.	DYNAMIC PENETRATION RESISTANCE, BLOWS/ft. SHEAR STRENGTH Cu, lb./sq.ft. nat.V - + Q - ● rem.V - ⊕ U - O	HYDRAULIC CONDUCTIVITY, k, cm/s WATER CONTENT, PERCENT Wp ⊢—O W—⊣ Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	11 inch dia. Hollow Stem Auger	Ground Surface									 Bentonite Chips Pea Gravel June 29/98 3" dia. Slotted PVC
10											
20											
30											
40											
50											
60											
70											
80											

DRAFT

DATA INPUT S. June/98

DEPTH SCALE

1 inch to 10 feet

Golder Associates

LOGGED: L.W.

CHECKED: C.W.

APPENDIX II

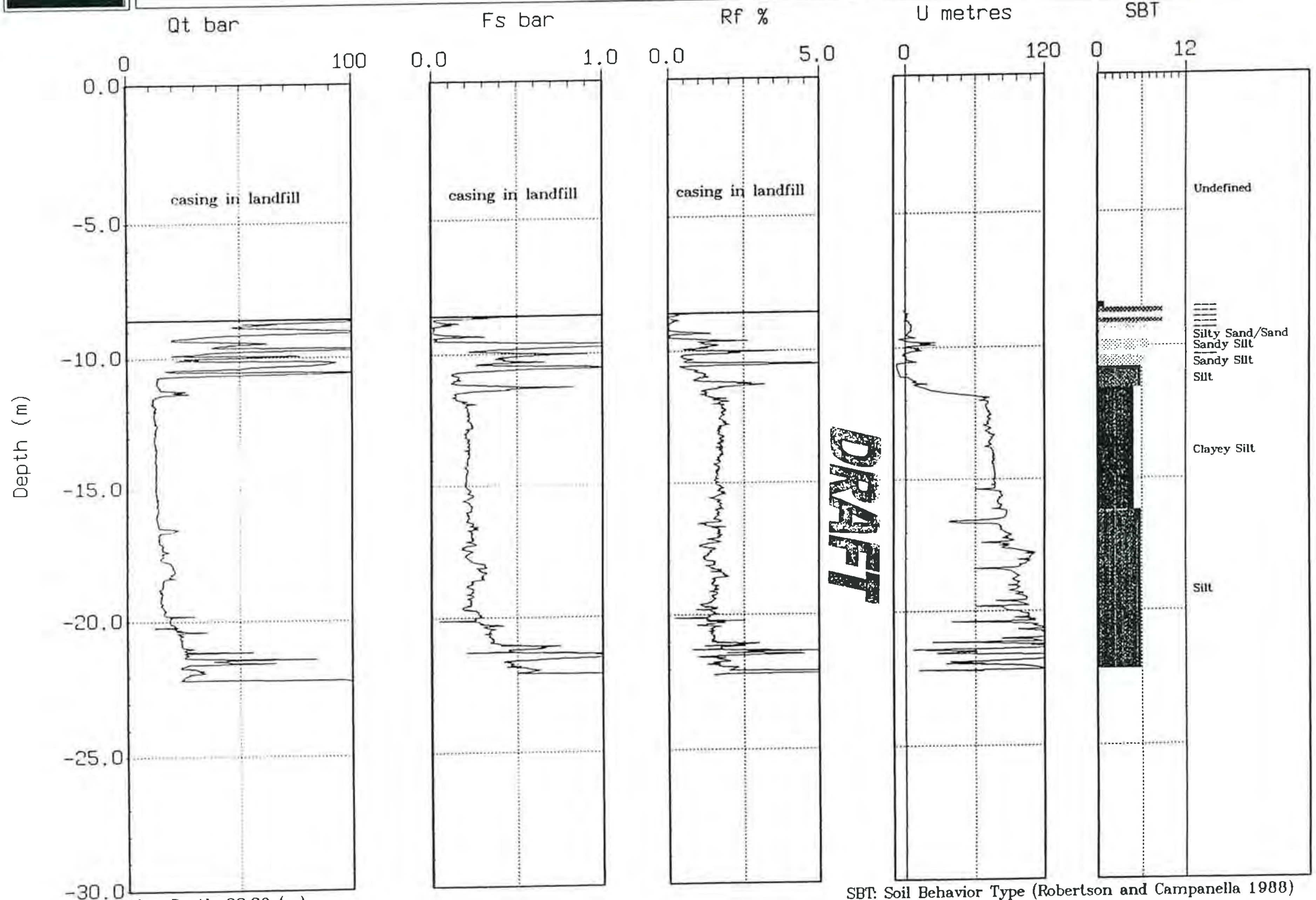
CONE PENETRATION TEST RECORDS

CONETEC

GOLDER

Site: 98-503 C[illegible]1
Location: BELLINGHAM

Cone: 10 TON A 057
Date: 06:01:98 13:55



DRAFT

Max. Depth: 22.20 (m)

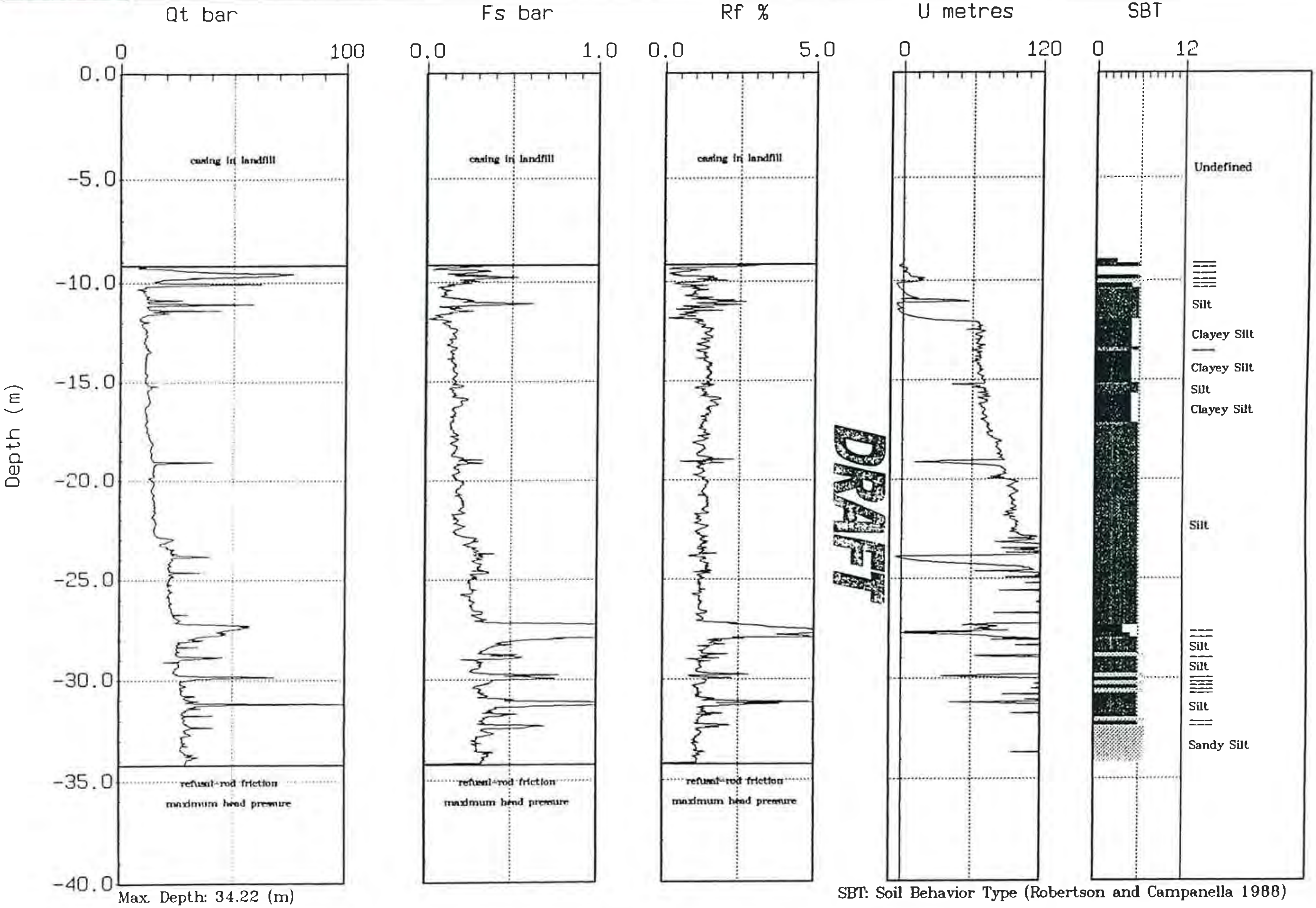
Depth Inc.: 0.02 (m)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

GOLDER

Site: 98-503 C[illegible]T-2 BT
Location: BELLINGHAM

Cone: 10 TON A 057
Date: 06:02:98 13:10



Max. Depth: 34.22 (m)

Depth Inc.: 0.02 (m)

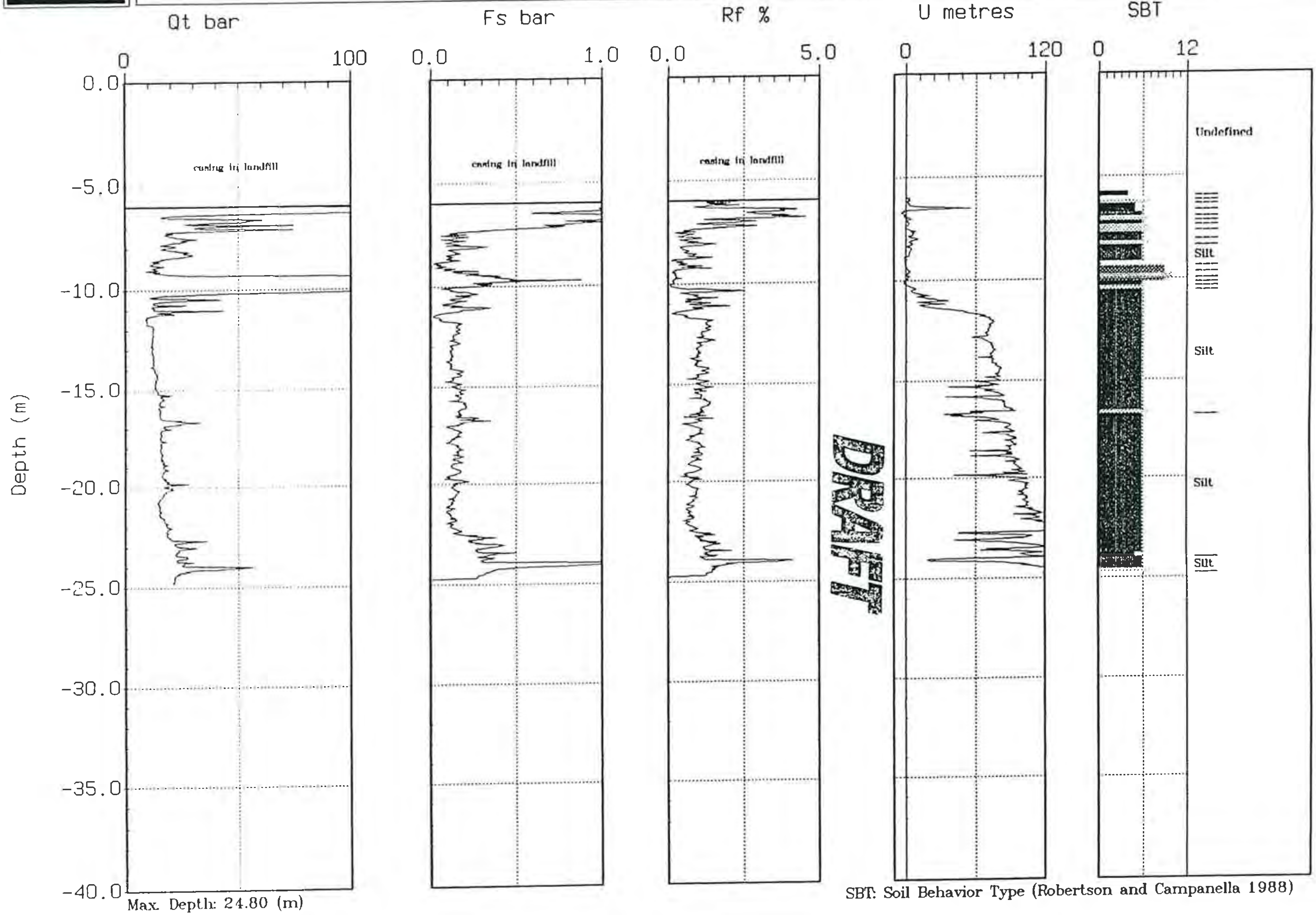
SBT: Soil Behavior Type (Robertson and Campanella 1988)

CONETEC

GOLDER

Site: 98-503 SCPT-3
Location: BELLINGHAM

Cone: 10 TON A 057
Date: 06:03:98 16:19



Max. Depth: 24.80 (m)

Depth Inc.: 0.02 (m)

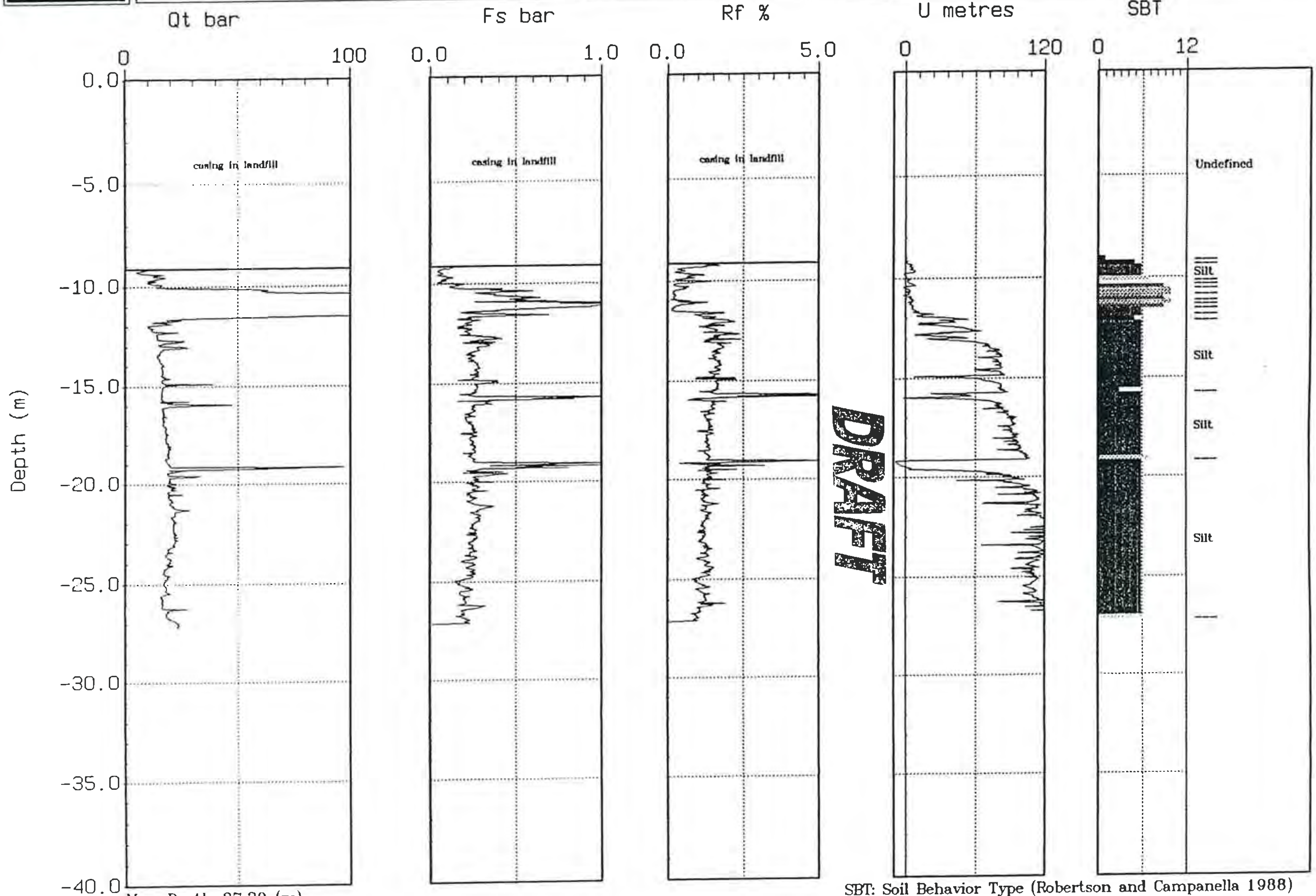
SBT: Soil Behavior Type (Robertson and Campanella 1988)

CONETEC

GOLDER

Site: 98-503 CPT-4
Location: BELLINGHAM

Cone: 10 TON A 057
Date: 06:04:98 13:47



Max. Depth: 27.20 (m)

Depth Inc.: 0.02 (m)

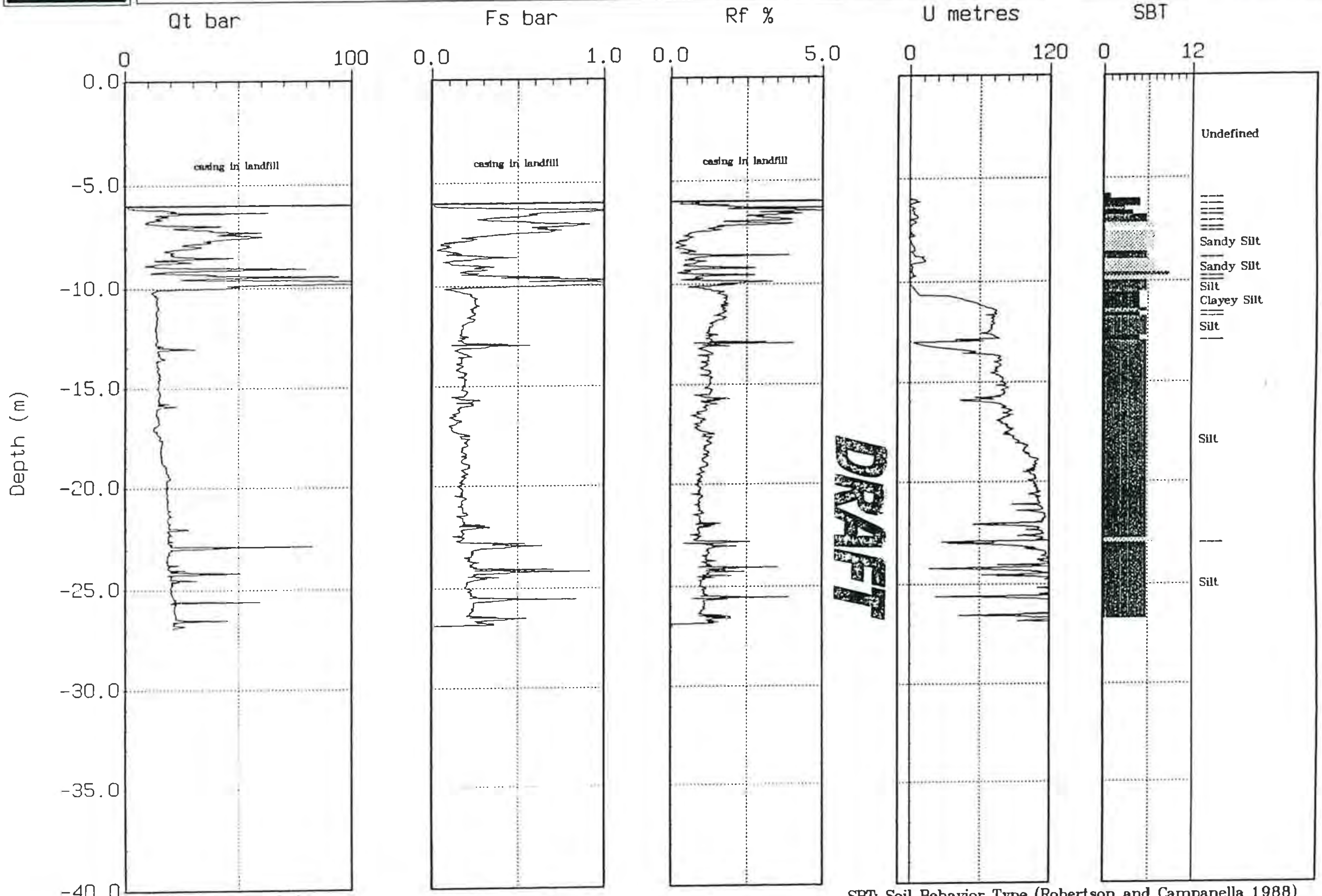
SBT: Soil Behavior Type (Robertson and Campanella 1988)

CONETEC

GOLDER

Site: 98-503 L -5
Location: BELLINGHAM

Cone: 10 TON A 057
Date: 06:05:98 08:27



DRAFT

Max. Depth: 26.95 (m)

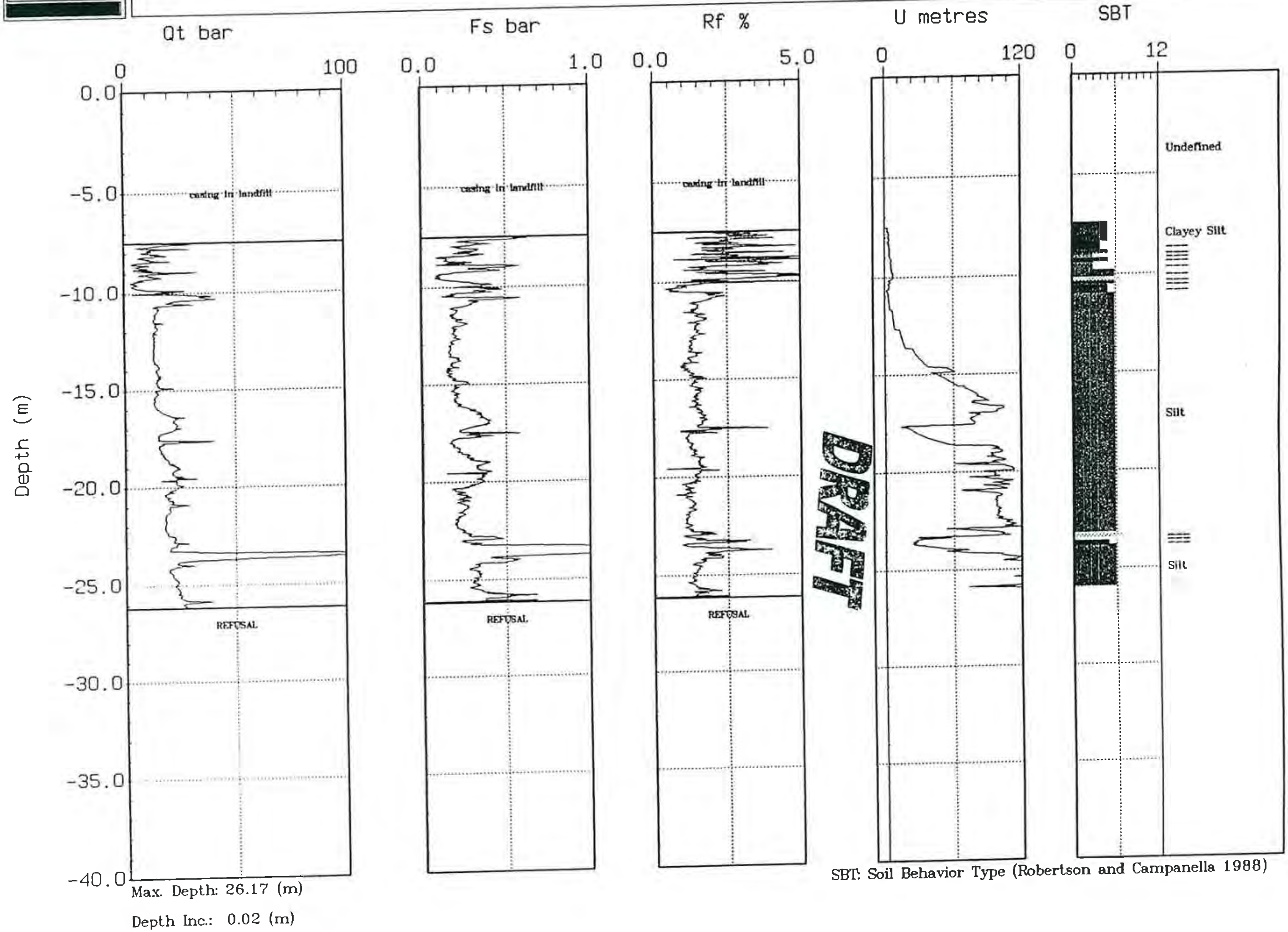
Depth Inc.: 0.02 (m)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

CONETEC **GOLDER**

Site: 98-503 CPT-6
Location: BELLINGHAM

Cone: 10 TON A 057
Date: 06:05:98 13:12



Max. Depth: 26.17 (m)
Depth Inc.: 0.02 (m)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

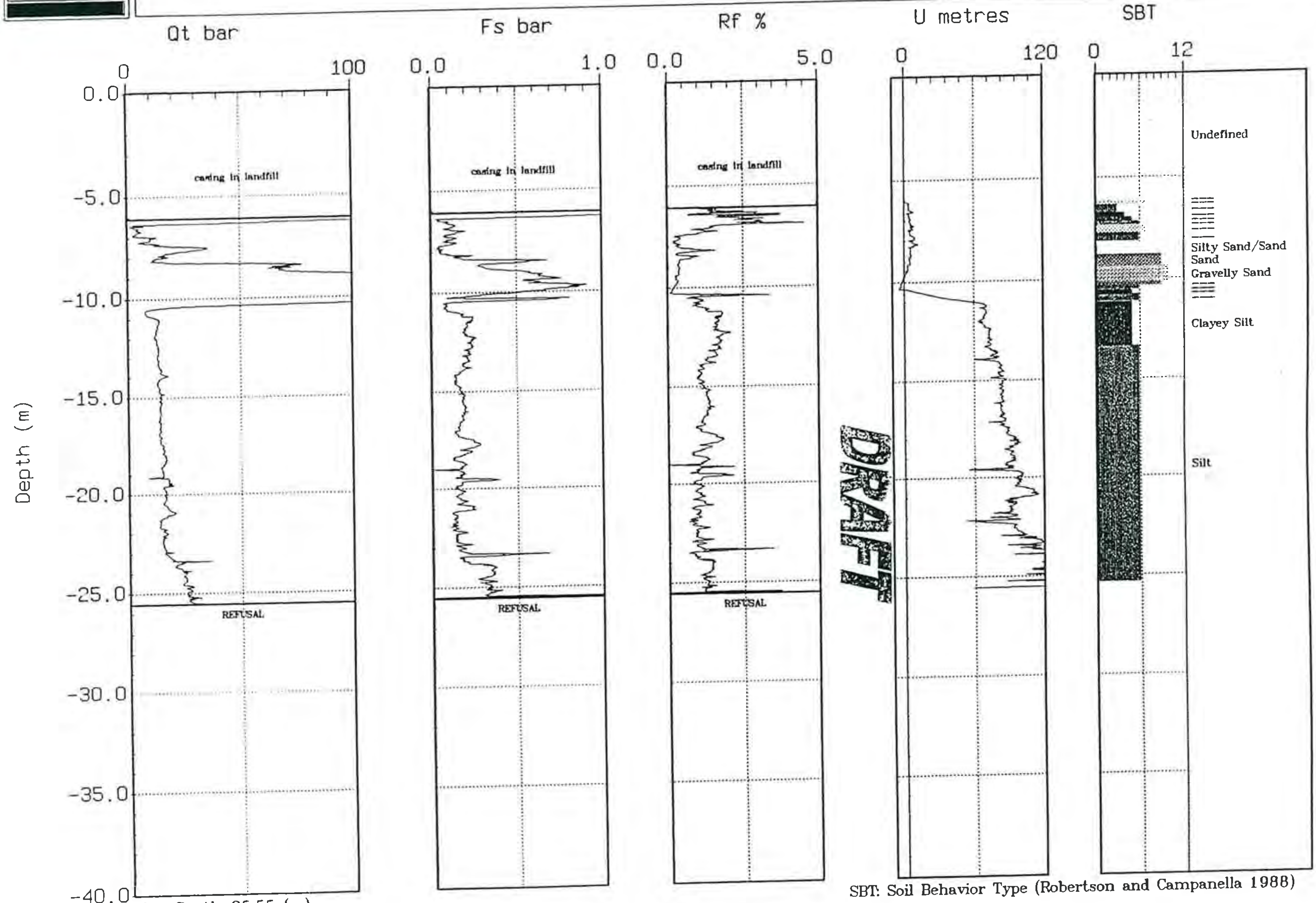
DRAFT

CONETEC

GOLDER

Site: 98-503 CPT-7
Location: BELLINGHAM

Cone: 10 TON A 057
Date: 06:08:98 11:45



Max. Depth: 25.55 (m)

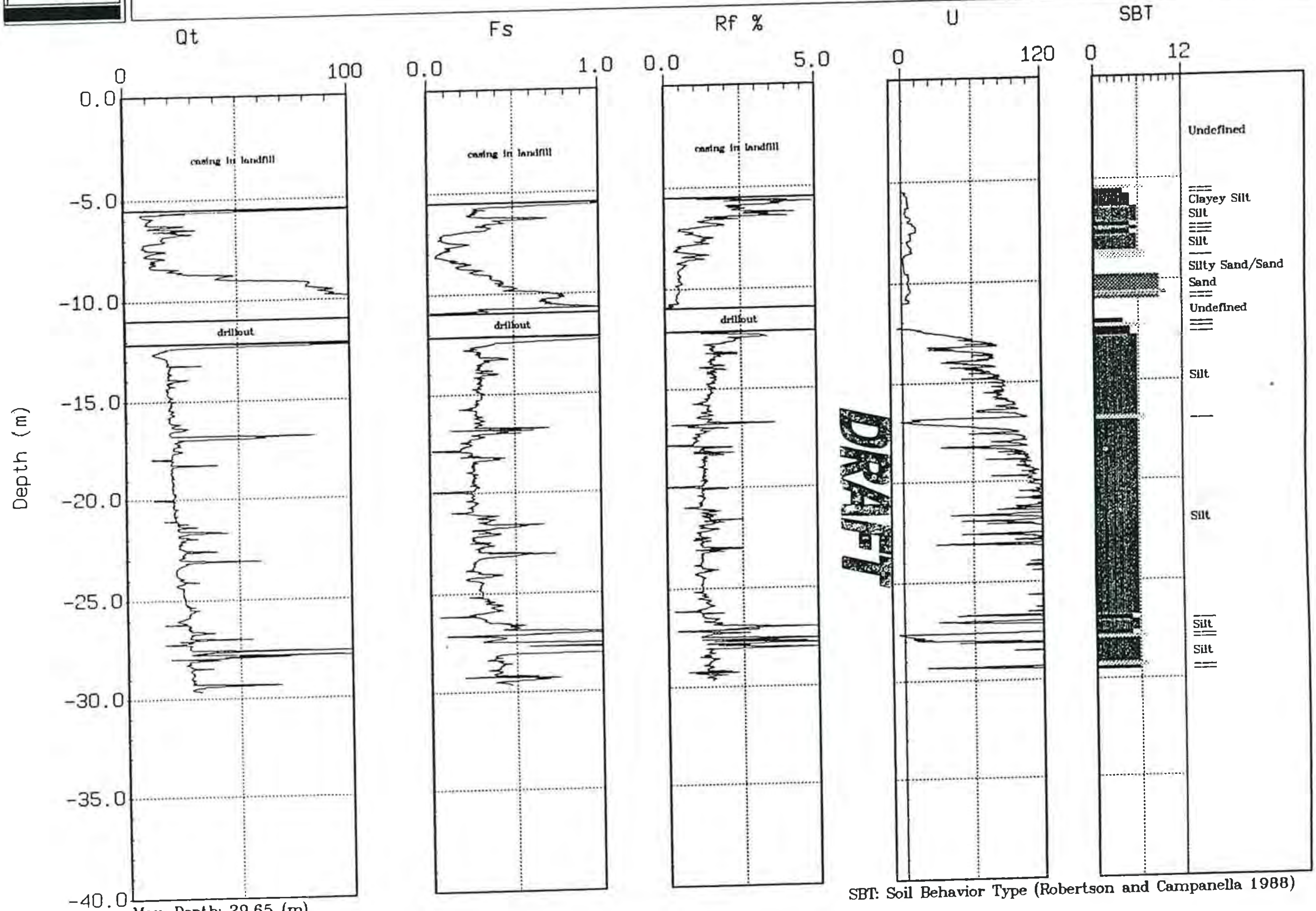
Depth Inc.: 0.02 (m)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

GOLDER

Site: 98-503 CP
Location: BELLINGHAM

Cone: 10 TON A 057
Date: 06:08:98 16:56

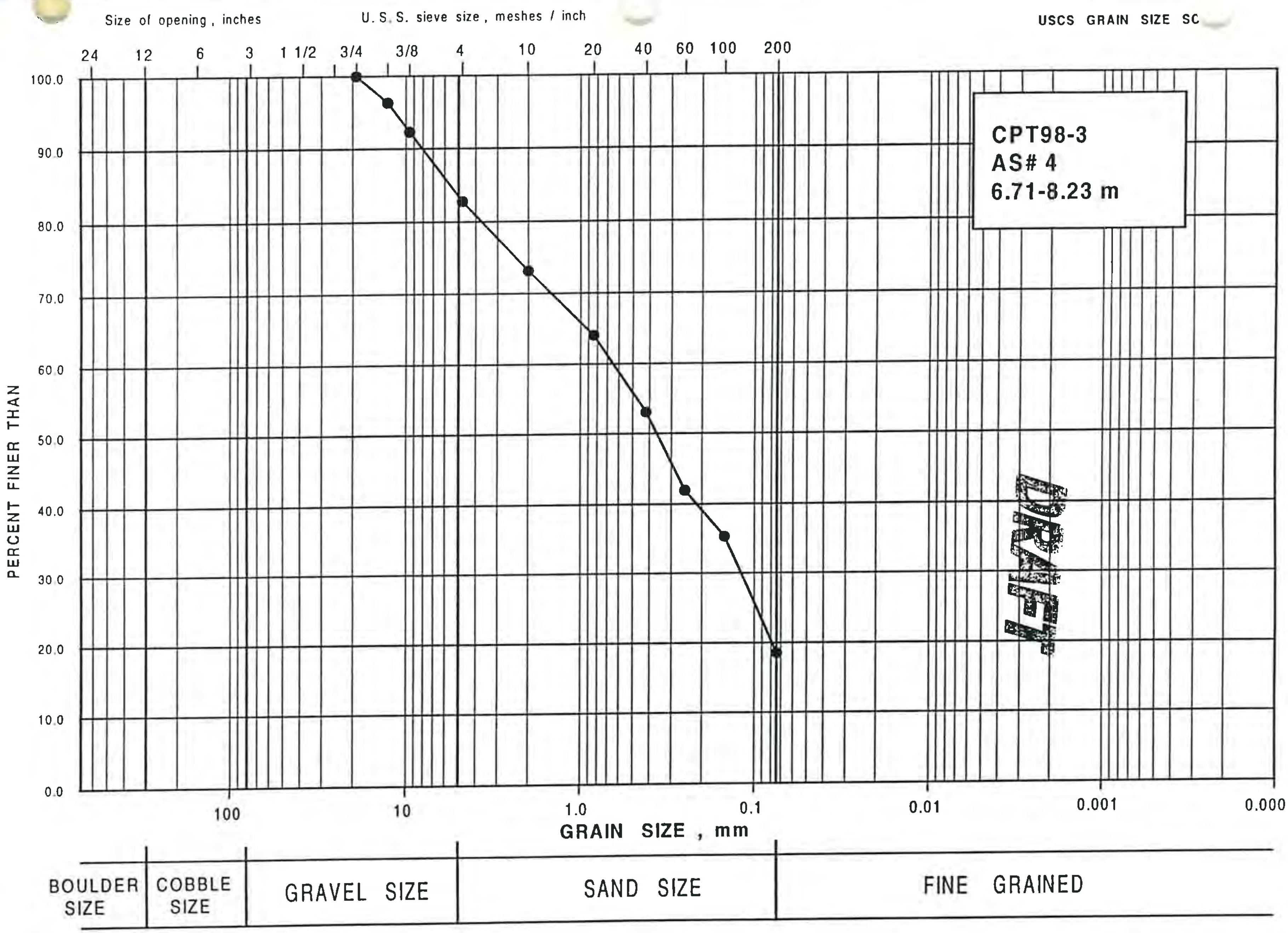


Max. Depth: 29.65 (m)
Depth Inc.: 0.02 (m)

SBT: Soil Behavior Type (Robertson and Campanella 1988)

APPENDIX III

LABORATORY TEST RESULTS

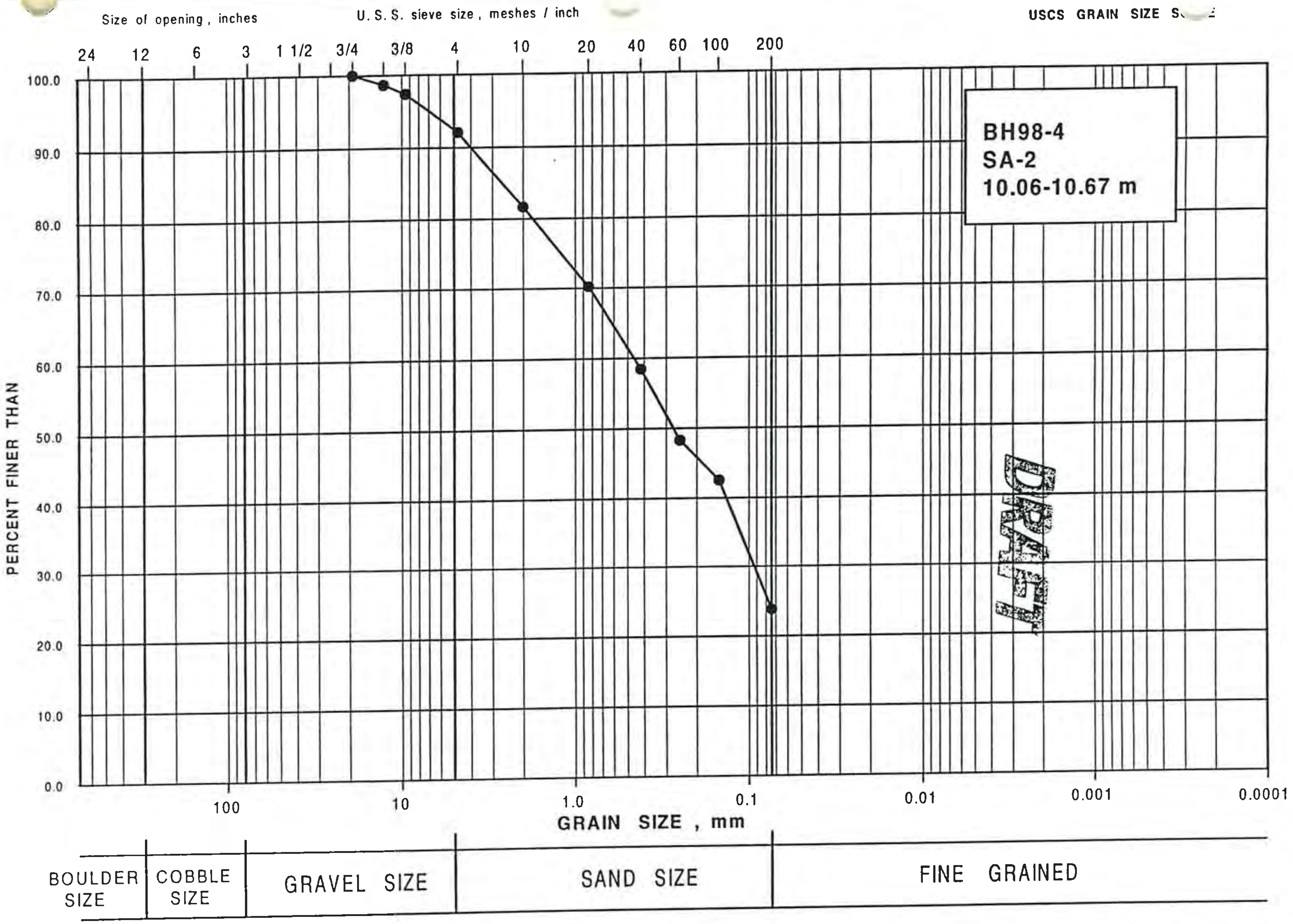


Project No. ..9821069......
Drawn ....LL..............
Reviewed ....LL..............
Date ....06/25/98.......

Golder Associates

GRAIN SIZE DISTRIBUTION

Figure

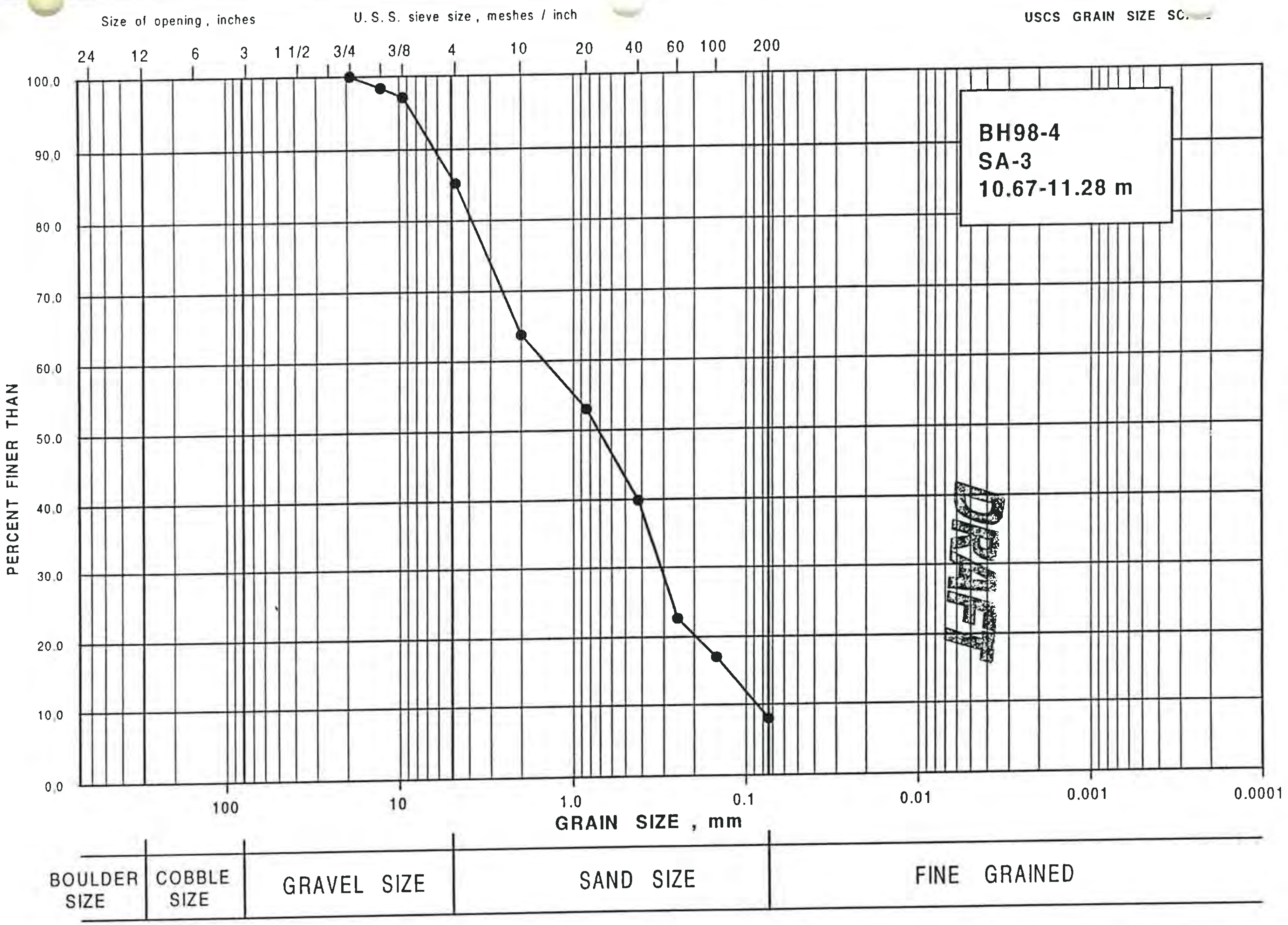


Project No. 9821069
Drawn LL
Reviewed LL
Date 06/25/98

Golder Associates

GRAIN SIZE DISTRIBUTION

Figure

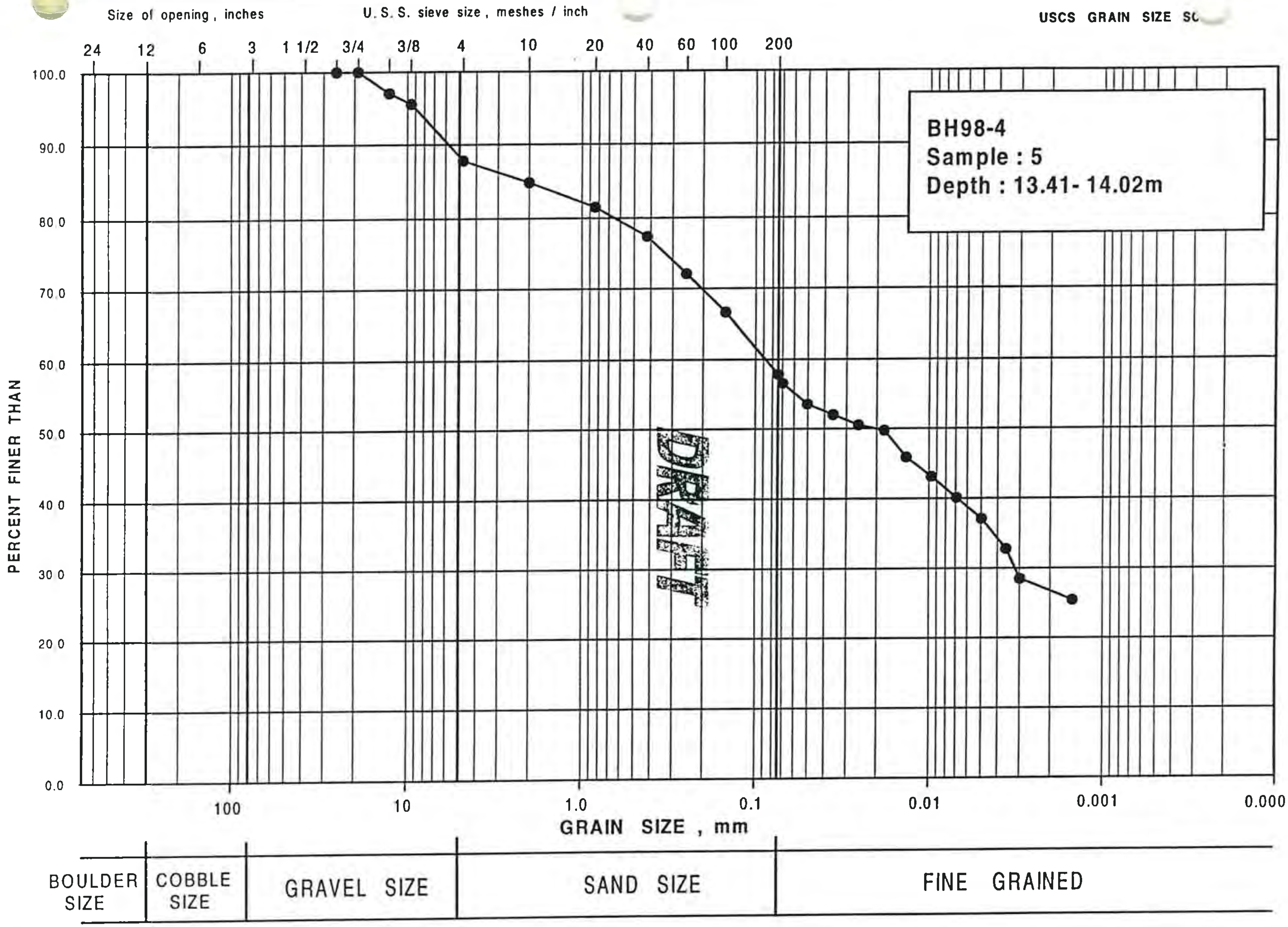


Project No. 9821069
Drawn LL
Reviewed LL
Date 06/25/98

Golder Associates

GRAIN SIZE DISTRIBUTION

Figure

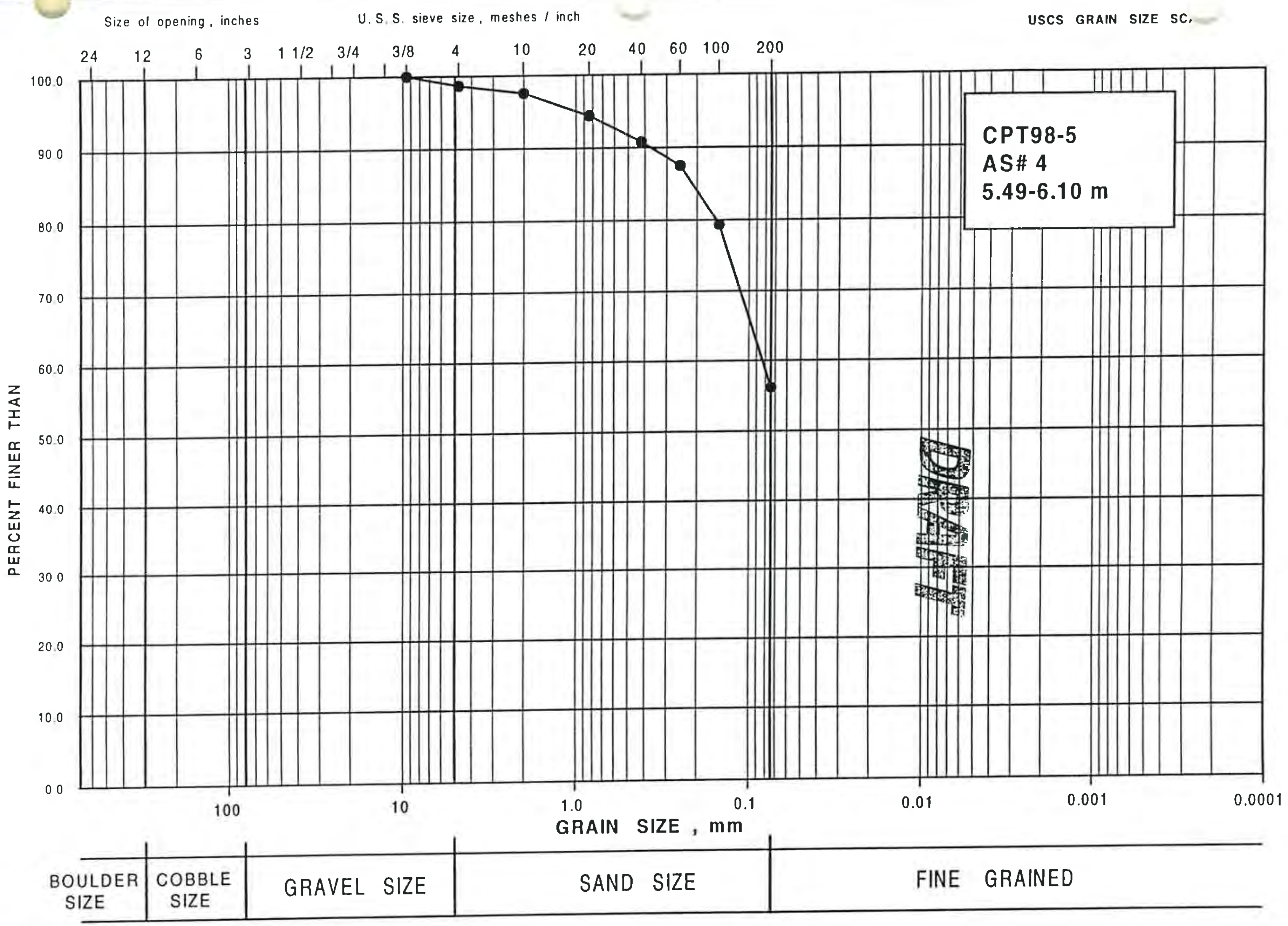


Project No. 9821069
Drawn JG
Reviewed LL
Date 06/29/98

Golder Associates

GRAIN SIZE DISTRIBUTION

Figure



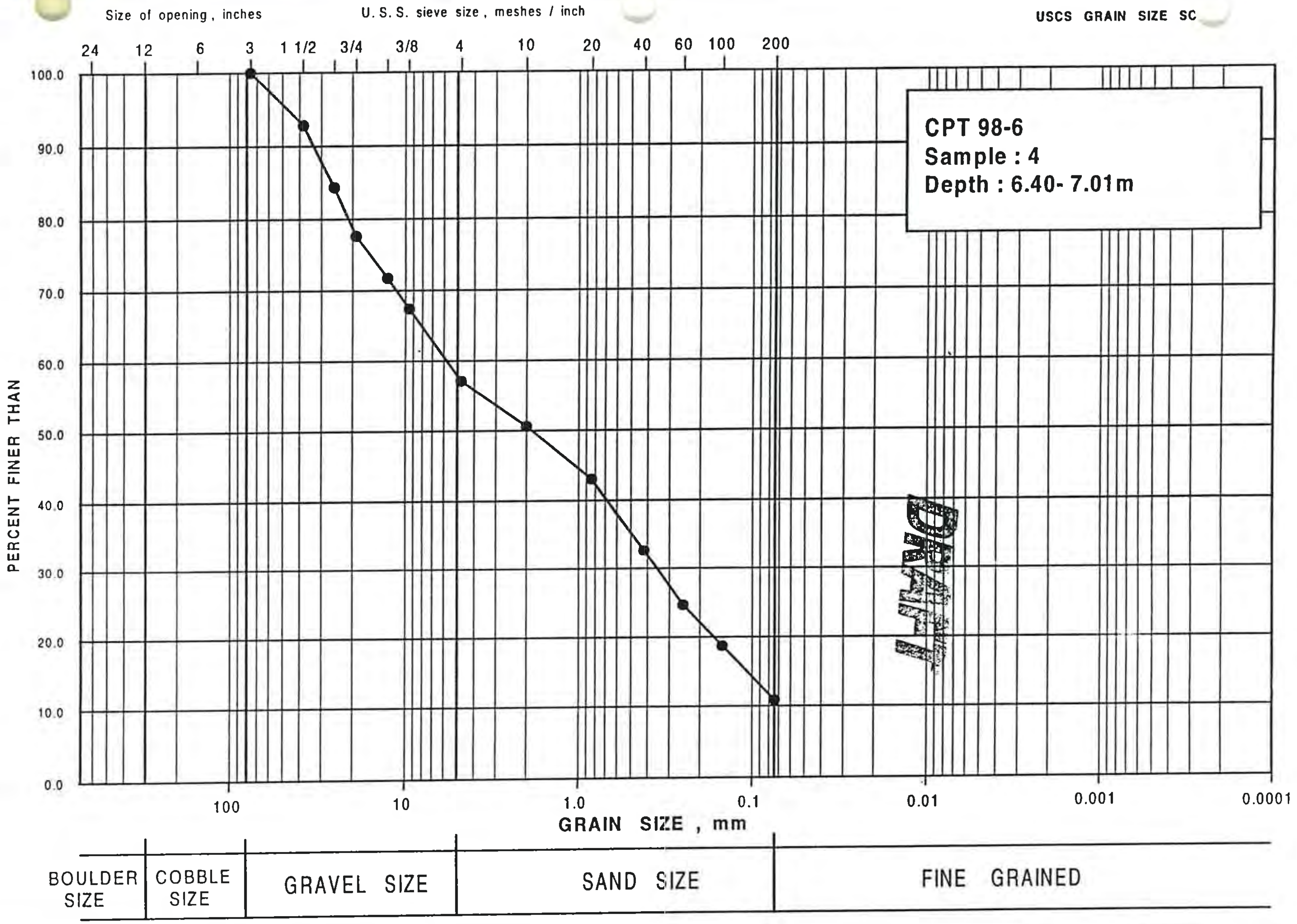
DRAFT

Project No. 9821069
Drawn LL
Reviewed LL
Date 06/25/98

Golder Associates

GRAIN SIZE DISTRIBUTION

Figure



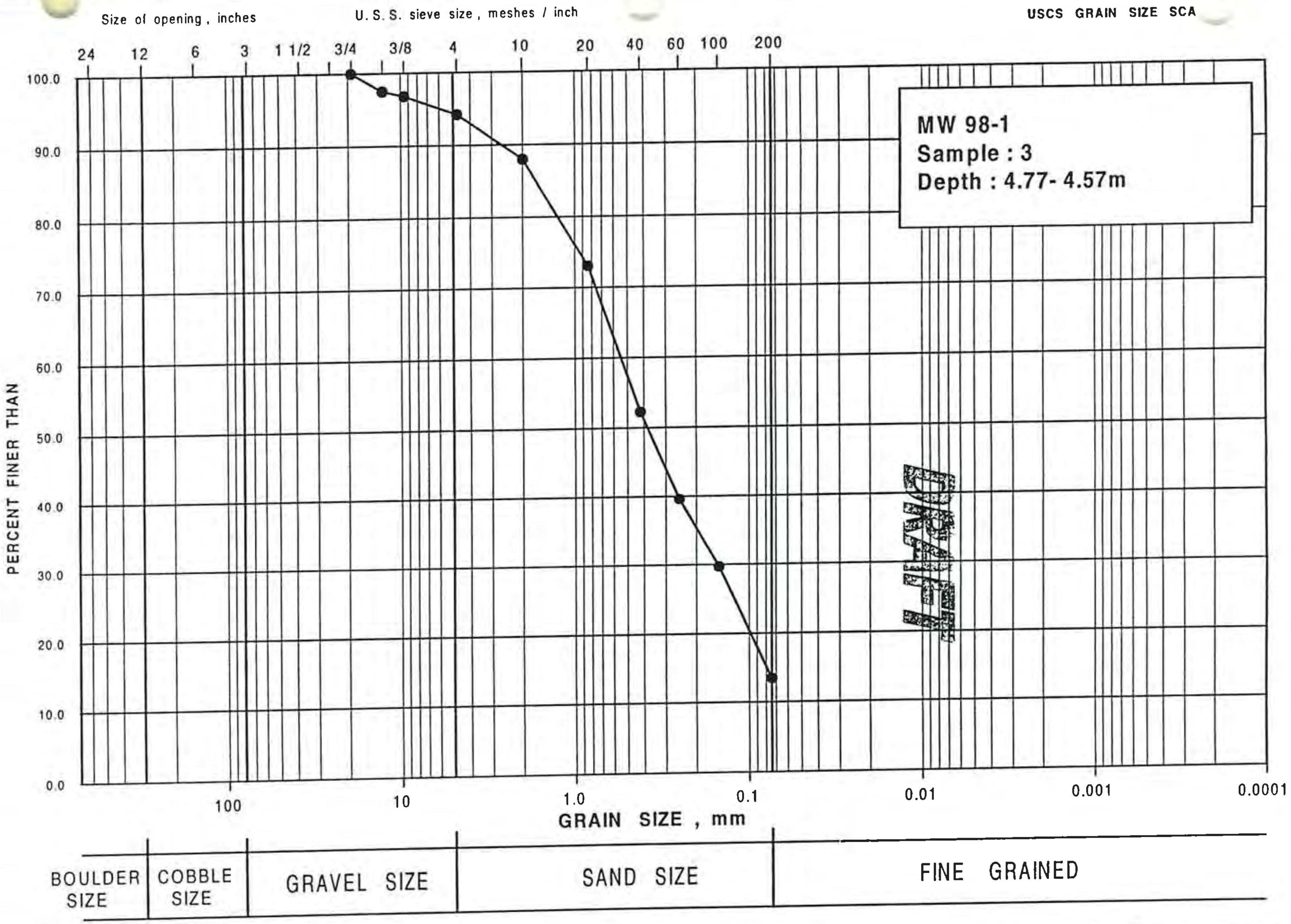
DRAFT

Project No. ..9821069......
Drawn ....JG..........
Reviewed ....LL.........
Date ....06/29/98.......

Golder Associates

GRAIN SIZE DISTRIBUTION

Figure

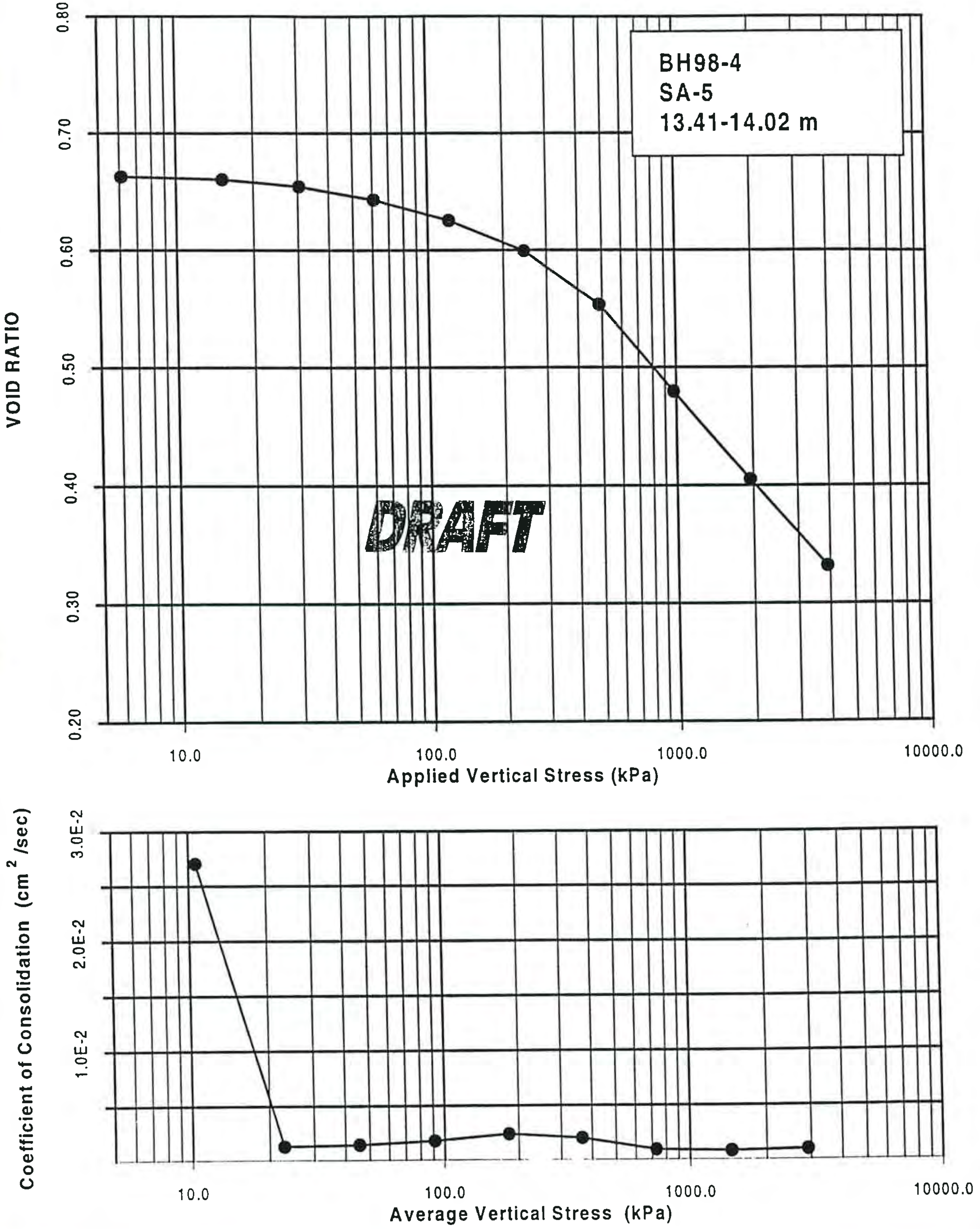


Project No. 9821069
Drawn JG
Reviewed LL
Date 06/29/98

Golder Associates

GRAIN SIZE DISTRIBUTION

Figure

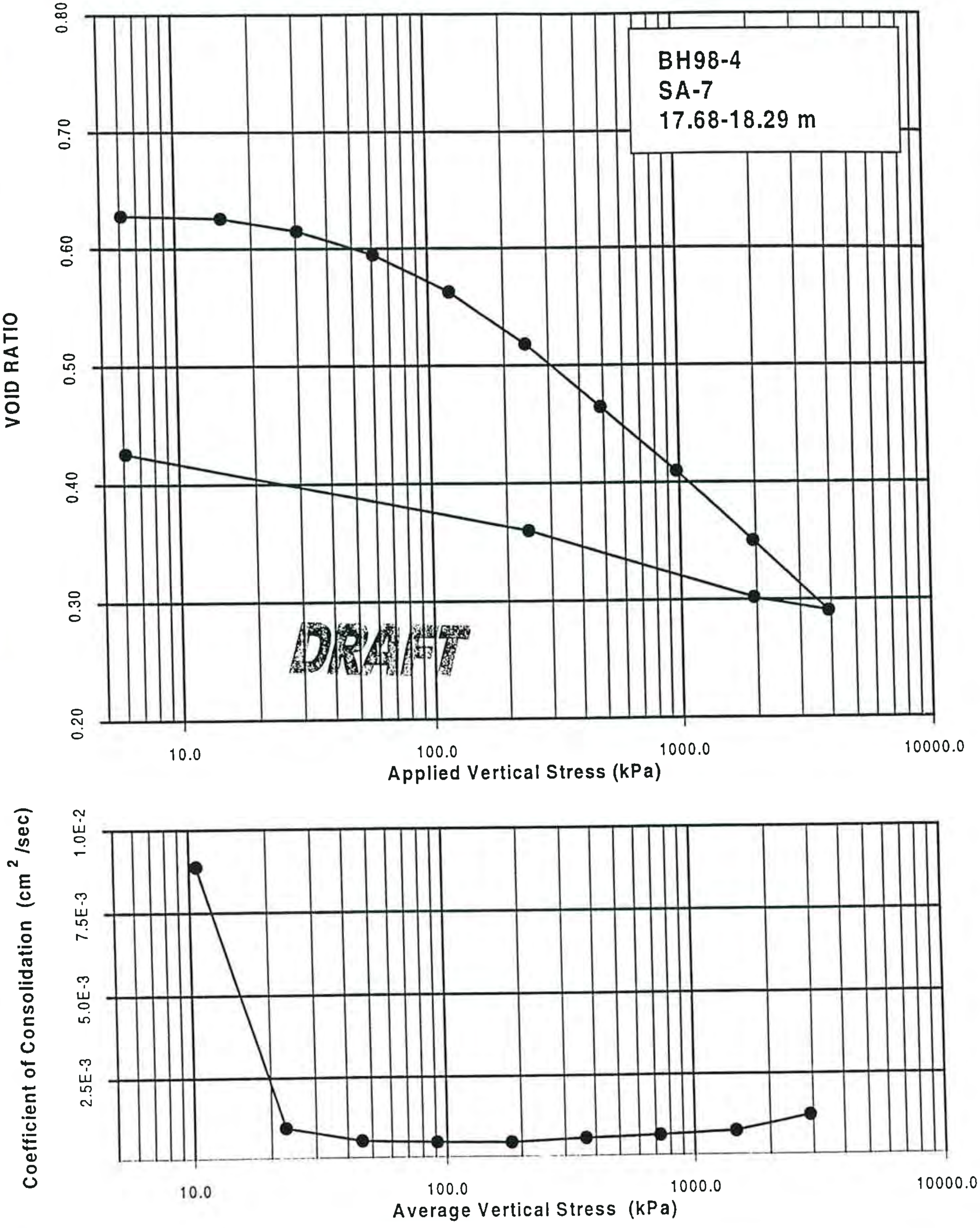


PROJECT No. 9821069 DRAWN LL REVIEWED .... DATE 06/26/98

Golder Associates

One Dimensional Consolidation Properties of Soils
ASTM D 2435-90 Method B

Figure

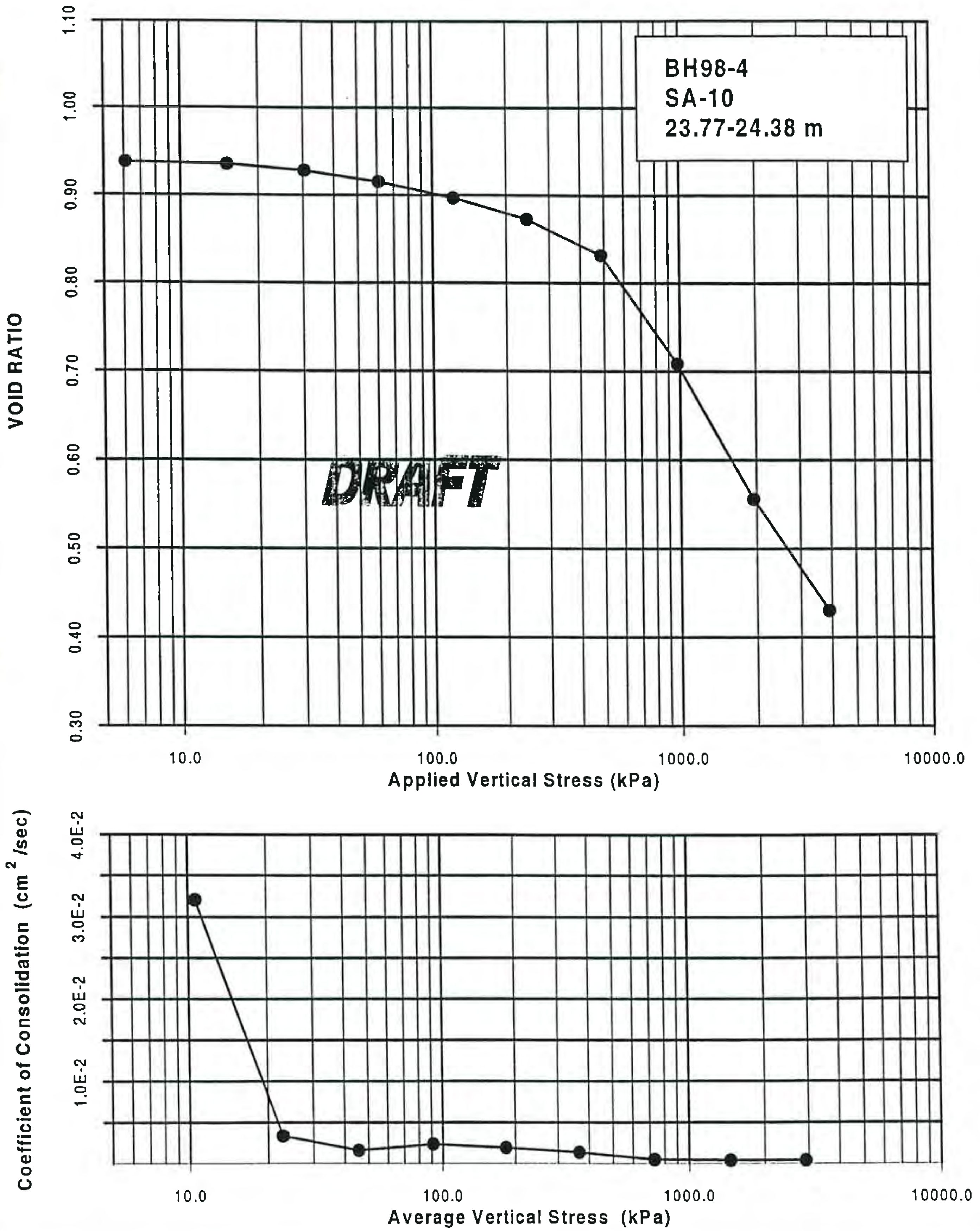


PROJECT No. 9821069 DRAWN LL REVIEWED DATE 06/26/98

Golder Associates

One Dimensional Consolidation Properties of Soils ASTM D 2435-90 Method B

Figure



PROJECT No 9821069 DRAWN LL REVIEWED DATE 06/26/98

Golder Associates

One Dimensional Consolidation Properties of Soils
ASTM D 2435-90 Method B

Figure

APPENDIX IV

UPDATED WORKPLAN

Golder Associates Ltd.

500 - 4260 Still Creek Drive
Burnaby, British Columbia, Canada V5C 6C6
Telephone (604) 298-6623
Fax (604) 298-5253

Golder Associates

July 8, 1998

E/98/1047
982-1069/9000

Sandwell Inc.
1190 Hornby Street
Vancouver, BC
V6Z 2B6

Attention: Mr. John Sherstobitoff, P.Eng.
Project Manager

**RE: UPDATE ON THE PHASE I WORK PLAN
ROEDER AVENUE SITE
GP TISSUE WAREHOUSE PROJECT
BELLINGHAM, WASHINGTON, USA**

Dear John:

As requested during our meeting of June 30, 1998, this letter provides an update on the approved Phase I Work Plan presented in our letter dated May 15, 1998. As discussed during our meeting, several work tasks have been either added or deleted from the originally approved Work Plan.

The attached Table A1 provides a detailed breakdown of the costs including disbursements associated with the changes. In Table A1, the added/deleted tasks are shown in italics and in bold. The revised total Golder cost for the Phase I Work Plan is $104,291 (versus the previous cost of $92,753). The following is a summary of our billings to date:

Invoice No. 72577, May 20, 1998	Development of Work Plan	$3,880.83
Invoice No. 22247, June 12, 1998	Development of Work Plan	$4,173.99
	Execution of Work Plan	$2,632.60

Our estimated fees for services carried out during the month of June 1998 including drilling disbursements and laboratory testing is about $47,000. The invoice for this work will be submitted shortly.

The following provides a brief description of the work associated with each of the tasks added/deleted:

Change #1: <u>Add</u> three additional auger holes to allow sampling and testing of the refuse for the expanded building area to the east. These auger holes were extended to depths of 30 to 35 ft. (Refer to Golder letter dated May 15, 1998, E/98/0771).

Cost Increase: $3,230 (See Tasks I-1-3c and I-2-4b in Table A1).

Change #2: <u>Delete</u> four bore holes along the east side of the property. This decision was taken in light of the accessibility to the existing gas monitoring wells on the eastside so that data on landfill gas migration could be collected to assess the impact of construction of a warehouse at the site.

Cost Reduction: $2,479 (See Task I-2-2b in Table A1)

[Note: Considerable difficulties were encountered; i.e. pieces of concrete and other construction debris, during drilling in the east side and hence several places had to be drilled to install the monitoring well. Therefore the cost reduction for this change in scope is not directly proportional to the cost/well stated in our original proposal].

Change #3: <u>Add</u> cost of extending bore hole BH98-5 from 80 to 160 ft. to explore depth to competent bearing strata. Verbal approval for this work was given during our meeting of June 4, 1998 (Refer to Golder facsimile dated June 8, 1998 RE: Modifications to Drilling Program).

Cost Increase: $2,237 (See Task I-1-3b in Table A1).

Change #4: <u>Add</u> time for preparation and attendance at meetings: on June 4, 1998 to review capital costs and on June 23, 1998 to review project status. Colin Wong from our office attended both these meetings held at the GP Offices in Bellingham.

Cost Increase: $1,887 (See Task I-6 in Table A1).

Change #5: <u>Add</u> cost of field inspection for installation of test piles (on June 29, 1998) monitoring of loading of the test piles and associated engineering analyses two weeks after installation of piles (As requested during our meeting of June 17, 1998 with Sandwell, Item 1.15 of the Minutes of the meeting).

Cost Increase: $6,662 (See Task I-7 in Table A1).

We trust that the above changes to the work tasks and the associated costs meet with your approval. Should you have any questions or need further details, please do not hesitate to contact the undersigned.

Yours very truly,

GOLDER ASSOCIATES LTD.

U.D. Atukorala, Ph.D., P.Eng.
Principal

T.P. Fitzell, P.Eng.
Review Principal

UDA/TPF/vee
982-1069/9000

J:\LET-98\JUL\UDA-1069.DOC

APPENDIX V

WSDOT AND CITY OF BELLINGHAM PAVEMENT SPECIFICATIONS

Golder Associates Fax

Golder Associates
4104 - 148th Avenue NE
Redmond, WA 98052
U.S.A.
Telephone (425) 883-0777
Fax (425) 882-5498

To: Upul Atukorala

Fax Number: 604-298-4104

Company: GAL - Burnaby

Date: July 9, 1998

From: Frank Shuri

e-mail: fshuri@ golder.com

Our ref: 982-1069

Voice Mail: (425) 885-7648 x2122

RE: PAVEMENT REQUIREMENTS

Total pages (including cover): 4

Hard copy to follow ☐

MESSAGE

Upul -

For low traffic pavements, WSDOT would allow 25 mm of Bituminous Surface Treatment (layers of sprayed-on asphalt and fine aggregate) over a thick layer of crushed rock surfacing (see Table 2.3). If asphalt concrete is used, the minimum requirement is 75 mm over a slightly thinner layer of crushed surfacing (see Table 2-4).

However, WSDOT explicitly defers to counties and cities when these jurisdictions have their own standards. In this case, the minimum requirement of the City of Bellingham is 2.5 inches of asphalt concrete over either of two subgrades, as shown on the attached sketch. Based on our review, it appears that this is the controlling requirement.

We can provide more detail as to specific material requirements, if needed.

Regards,

Frank

upul_fx1.doc

Comprehensive Consulting Services in Geotechnical Engineering, Environmental Remediation and Waste Management

Environmental Remediation

Waste Management

Water Resources

Landfill Siting & Design

Geophysics

Civil Engineering & Construction

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Offices in Australia, Canada, Finland, Germany, Hong Kong, Hungary, Indonesia, Italy, Sweden, United Kingdom, United States

WSDOT

Table 2.3. Flexible Pavement Layer Thicknesses for Low ESAL Levels and New or Reconstructed Pavements—BST Surfaced

BST Surfaced

Design Period ESALs	Subgrade Condition	Required SN	Layer Thicknesses,[1] mm Reliability – 75% BST[3] (Class A)	 CS[2]
< 100,000	Poor	2.53	25	455
	Average	1.93	25	340
	Good	1.45	25	280[4]
100,000-250,000	Poor	2.95	25	340
	Average	2.25	25	400
	Good	1.71	25	305
250,000-500,000	Poor	3.31	25	605
	Average	2.53	25	455
	Good	1.93	25	340

[1] Based on 1986 *AASHTO Guide for Design of Pavement Structures* for flexible pavements and the following inputs:

- $\Delta PSI = 1.7$
- $S_0 = 0.50$
- $m = 1.0$
- $a_{BST} = 0.20$ (assumes $E_{BST} = 100{,}000$ psi)
- $a_{CS} = 0.13$
- $SN = a_{BST}\ (1") + 0.13\ (CS)$
- Subgrade Condition (effective modulus)
  - Poor: $M_R = 5{,}000$ psi (35 MPa)
  - Average: $M_R = 10{,}000$ psi (70 MPa)
  - Good: $M_R = 20{,}000$ psi (140 MPa)

  (Note: Effective modulus represents the subgrade modulus adjusted for seasonal variation)

[2] GB may be substituted for a portion of CS when the required thickness of CS ≥ 210 mm. The minimum thickness of CS is 105 mm when such a substitution is made.

[3] BST Class A assumed thickness = 25 mm Bituminous Surface Treatment

[4] CS thickness increased to a total pavement structure of approximately 305 mm based on moisture and frost conditions.

Crushed Surfacing

WSDOT

Table 2.4. Flexible Pavement Layer Thicknesses for Low ESAL Levels and New or Reconstructed Pavements—ACP Surfaced

ACP Surfaced

Design Period ESALs	Subgrade Condition	Layer Thicknesses,[1] mm	
		Reliability = 75%	
		ACP Class B	CS[2]
< 100,000	Poor	75	250
	Average	75	230[3]
	Good	75	230[3]
100,000-250,000	Poor	90	290
	Average	90	215[3]
	Good	90	215[3]
250,000-500,000	Poor	105	305
	Average	105	200[3]
	Good	105	200[3]

[1] Based on 1986 *AASHTO Guide for Design of Pavement Structures* for flexible pavements and the following inputs:

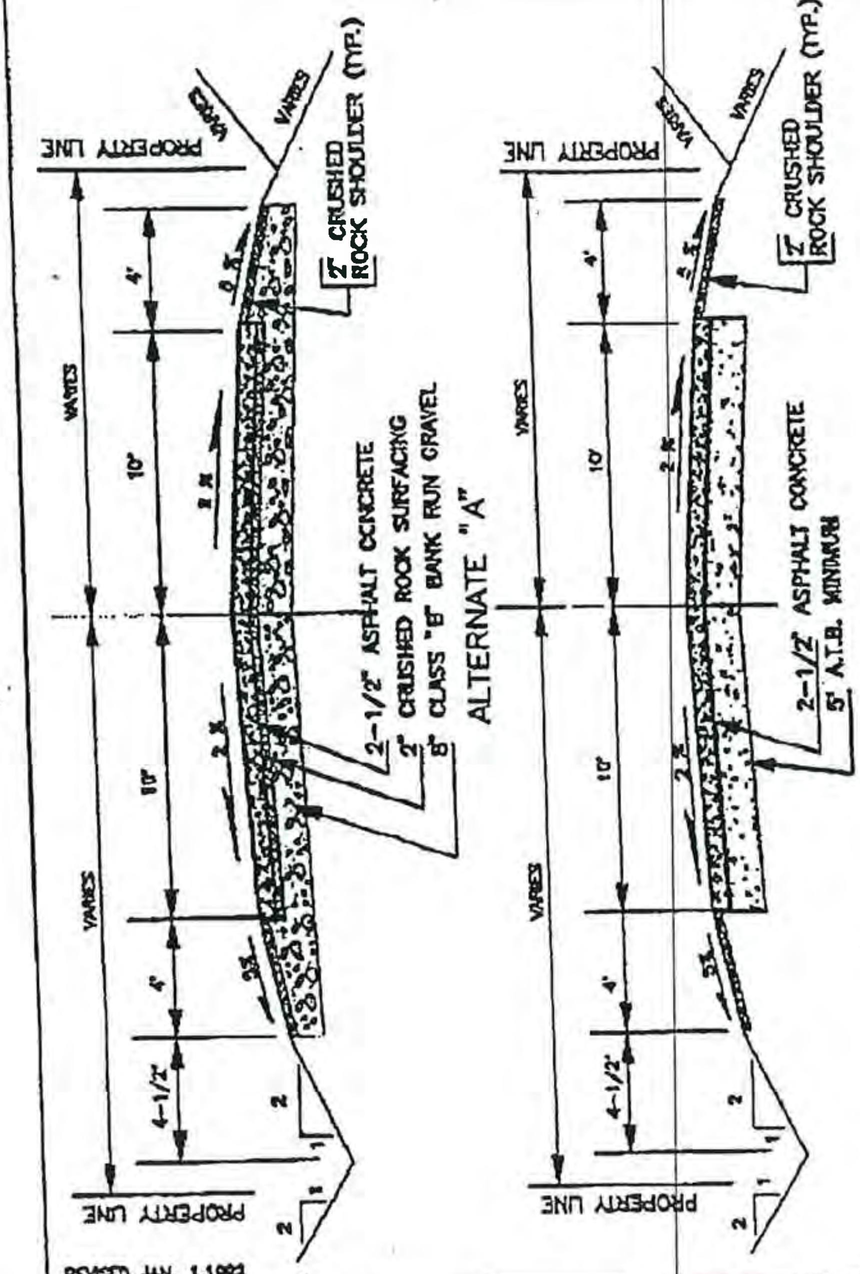
- $\Delta PSI = 1.7$
- $S_0 = 0.50$
- $m = 1.0$
- $a_{CLA} = 0.44$
- $a_{CS} = 0.13$
- Subgrade Condition (effective modulus)
  - Poor: $M_R = 5{,}000$ psi (35 MPa)
  - Average: $M_R = 10{,}000$ psi (70 MPa)
  - Good: $M_R = 20{,}000$ psi (140 MPa)

  (Note: Effective modulus represents the subgrade modulus adjusted for seasonal variation)

[2] GB may be substituted for a portion of CS when the required thickness of CS ≥ 245 mm. The minimum thickness of CS is 105 mm when such a substitution is made.

[3] CS thickness increased to a total pavement structure of 305 mm based on moisture and frost conditions.

Bellingham



NOTES: 1. ALL MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE PROVISIONS OF APPLICABLE SECTIONS OF APWA "STANDARD SPECIFICATIONS" AND SHALL CONFORM TO THE REQUIREMENTS OF THE CITY ENGINEER.

REVISED JAN. 1,1992

APPROVED
Tom Rosenberg
City Engineer
1/92
Date

CITY OF BELLINGHAM
MINIMUM STANDARD A.C.C.
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GeoEngineers

Consulting Engineers
and Geoscientists
Offices in Washington,
Oregon, and Alaska

December 7, 2000

Port of Bellingham
1801 Roeder Avenue
Bellingham, Washington 98225

Attention: Mike Stoner

Report
Subsurface Exploration and Chemical Testing
Former Army Reserve Site
Hilton and Roeder Avenues
Bellingham, Washington
File No. 0307-039-00-5130B

INTRODUCTION AND SCOPE

This report present the results of GeoEngineers, Inc.'s (GEI's) geotechnical and environmental soil sampling at the former Army Reserve site at the corner of Hilton and Roeder Avenues in Bellingham, Washington. The general location of the site is shown in the Vicinity Map, Figure 1. Our services were performed in general accordance with the "Standard Agreement for Professional Consulting Services" with the Port of Bellingham (POB) dated September 15, 2000.

We understand that the Port of Bellingham owns the site. The purpose of our study is to explore subsurface soil conditions to evaluate environmental and geotechnical conditions that could affect site development. No specific development plans have been identified for the site. However, some preliminary discussion suggest that typical site development might include a one-story, slab-on-grade, steel frame structure with a footprint similar to that shown in the Site Plan, Figure 2.

The specific scope of services that GEI completed for this project is outlined below:

1. Review existing information pertinent to the subject site provided by POB staff.
2. Excavate three test pits at the site to the depth possible with a backhoe provided by the POB.
3. Visually evaluate the conditions observed in the test pits and perform field screening on soil samples for evidence of petroleum contamination using visual, water sheen, and headspace vapor screening methods.

GeoEngineers, Inc.
600 Dupont Street
Bellingham, WA 98225
Telephone (360) 647-1510
Fax (360) 647-5044

4. Submit one soil sample from each test pit for qualitative identification of petroleum hydrocarbons by Ecology Method NWTPH-HCID, and five Model Toxics Control Act (MTCA) metals (arsenic, cadmium, chromium, lead and mercury [As, Cd, Cr, Pb, and Hg]) by EPA Methods 6010 and 7471.
5. Evaluate field observations and chemical analytical results with respect to environmental and regulatory concerns, including MTCA Method A cleanup standards. The metals will also be compared to typical background levels.
6. Provide preliminary geotechnical considerations for site development, including:
   - Suitability of existing fill for use as structural fill.
   - Compaction or other earthwork remedial measures to prepare existing fill to provide adequate foundation/slab support.
   - Discussion of foundation options.

Preliminary geotechnical considerations were forwarded in an e-mail to the POB dated September 6, 2000. Preliminary chemical analytical results were previously forwarded to the POB in our memorandum dated September 19, 2000.

SUMMARY OF PREVIOUS STUDIES

The U.S. Army Reserve conducted a "Preliminary Assessment Screening" upon lease termination. We reviewed their document, dated October 11, 1994. One 2,000-gallon underground storage tank (UST) (Tank 10) with "sand/gravel, Bunker C and water," and one 500-gallon UST (Tank 11) with "sand/gravel, diesel (heating oil) and water" were removed from the site in 1992. A reported third UST was not found. Diesel-related soil contamination was encountered during removal of Tank 11. Approximately 5 cubic yards of overexcavated contaminated soil and tank fill material were transported to Woodworth & Co. for treatment and disposal. Petroleum hydrocarbon concentrations were less than the MTCA Method A cleanup levels in chemical analytical data from the final limits of the two excavations. The approximate locations of the USTs are shown in Figure 2.

The POB has been using the subject site to stockpile excavated soils from various POB projects including the Bellweather development (formerly the Squalicum Peninsula Project). GEI completed an "Environmental Site Assessment" at the proposed Squalicum Peninsula Project dated November 24, 1998. Soil samples from the Squalicum Peninsula property were submitted for testing of petroleum hydrocarbons and Priority Pollutants including various metals. No priority pollutants were detected in any of the samples. No metals were detected at concentrations exceeding typical background concentrations of Puget Sound soils, with the exception of one sample with mercury detected at 0.105 milligrams per kilogram (mg/kg). The published background concentration is 0.07 mg/kg; the MTCA Method A cleanup level, however, is 1.0 mg/kg. We concluded that the risk of contamination greater than the MTCA Method A cleanup levels for the constituents evaluated from the Squalicum Peninsula soils was relatively low.

ThermoRetec Consulting Corporation (formerly Remediation Technologies, Inc.) is completing a Remedial Investigation and Feasibility Study (RI/FS) for the Roeder Avenue Landfill and completed a "Pre-design Testing Report for the Roeder Avenue Warehouse Project." We reviewed boring logs from two monitoring wells provided in a "Progress Memorandum for the Roeder Avenue Landfill Remedial Investigation and Feasibility Study" dated June 8, 1999 and the landfill gas monitoring section and Figure 2-1, "Sampling Locations from Pre-Design Testing" from the "Pre-design Testing Report" dated December 16, 1997. Monitoring wells MW-3(E), RMW-14 and RMW-15 are located on the Army Reserve site (see Figure 2). Chemical analytical data were not provided for soil and water from the monitoring wells. Landfill gas probes RGP-1 through RGP-4 are located to the south-southwest of the Army Reserve site. One of the gas probes (RGP-1) produced a sustained flame with 58% methane, 33% carbon dioxide and 3% oxygen under a 2 to 3 inch water column vacuum during pre-design testing.

SUBSURFACE EXPLORATION AND SOIL SAMPLING

EXPLORATION PROCEDURES

GEI completed three test pit explorations (TP-1 through TP-3) on August 28, 2000, at the approximate locations shown in Figure 2. The test pit locations were limited by the fill at the site, asphalt concrete paving and other site features. The test pit locations were identified during a site visit with Mike Stoner from the POB. Test pit TP-3 was located as close to the former UST area as possible within utility conflict considerations.

A staff engineer from our office observed the explorations on a full-time basis, maintained detailed logs, and obtained representative samples of the soils encountered for field screening and further examination in our laboratory. Soil samples were obtained from approximate 1- to 2-foot depth intervals for soil description and field screening. Field screening procedures are described in Appendix A. The soils encountered were classified visually in accordance with the classification system shown in Figure A-1. The logs of the test pits are shown in Figures A-2 and A-3.

SUBSURFACE CONDITIONS

The original beach head is at the toe of the slope east of Roeder Avenue. We did not research the original beach topography at the site. Based on our understanding of the site vicinity, soil at the subject site consists of dredge material placed in 1922, overlain by fill placed from 1922 to the Roeder Avenue grades until relatively recent times. In the late 1990s to present, the POB has been allowing fill from various sites (Squalicum Peninsula, Squalicum Harbor) on the southwestern portion of the site beyond the pavement area. This latter fill is primarily mounded above the adjacent site grades. The recent fill soils were not evaluated as part of this study.

The fill depth ranged from greater than 9 feet at TP-1 to likely 7.5 to 8 feet at TP-2 and TP-3. The fill is likely extremely variable at the site. At TP-1, the fill encountered consisted primarily of sand with gravel and clay clasts to 8 feet. Significant concrete, asphalt concrete and reinforcing steel (rebar) was encountered from 5 to 8 feet. Fill consisting of black silty sand was encountered from 8 to 9 feet where refusal was encountered due to concrete obstructions. Fill consisting of silty sand and sand with gravel was encountered in TP-2 to 3.5 feet and TP-3 to 8 feet. A layer of fine sandy clay (also assumed to be fill) overlying fine sand with clay was encountered in TP-2 to 7.5 feet. Loose fine sand with occasional wood debris, interepreted as original beach deposits, was encountered below the fill at 7.5 to 8.0 feet to the depth explored in TP-2 and TP-3 at 9 to 9.5 feet.

The ground water conditions encountered are indicated on the individual logs. Slow to rapid ground water seepage was observed in all three test pits at a depth of approximately 8 to 9 feet. The ground water conditions should be expected to fluctuate as a function of season, precipitation, tidal influence, and other factors. Perched ground water could occur within more granular fill soils overlying relatively impermeable fill soils.

ENVIRONMENTAL SOIL SAMPLING

No sheens indicative of possible petroleum hydrocarbons were observed when field screening the soil samples. We submitted one soil from at or near the water table from each test pit for chemical analysis of total MTCA metals and qualitative hydrocarbon identification. The chemical analytical results for the metals are presented in Table 1. The chemical analytical results for hydrocarbons are presented in Tables 2a and 2b. A summary of laboratory quality control, the laboratory reports and the chain-of-custody for our sampling are presented in Appendix B.

Metals either were not detected or were detected at concentrations less than the MTCA Method A cleanup levels in the three samples. The concentrations are also similar to published Puget Sound background levels. The arsenic levels detected are slightly higher than the background levels, but below the MTCA Method A cleanup level.

Gasoline- and heavy oil-range hydrocarbons were detected in sample TP-1-8' by NWTPH-HCID. Petroleum hydrocarbons were not detected in samples TP-2-6' and TP-3-9.5'. Follow-up chemical analyses were requested for quantification of BETX and petroleum hydrocarbons in sample TP-1-8'. The follow-up analyses were completed past the recommended laboratory holding time so the data should be qualified as estimated. It is our opinion, however, that the results can be considered representative. BETX were not detected in the sample. Gasoline- and diesel-range hydrocarbons were detected at concentrations less than the respective MTCA Method A cleanup levels in sample TP-1-8'. The heavy oil-range hydrocarbon concentration (210 mg/kg) in sample TP-1-8' slightly exceeded the MTCA Method A cleanup level of 200 mg/kg. The laboratory indicated that the sample chromatogram resembles those for weathered gasoline or mineral spirits and bunker C fuel.

ENVIRONMENTAL CONCLUSIONS

No metals concentrations in the three soil samples from the test pits exceeded the MTCA Method A cleanup levels. Petroleum hydrocarbons were not detected in two of the three soil samples obtained. Heavy oil-range hydrocarbons were detected at an estimated concentration slightly exceeding the MTCA Method A cleanup level in the 8-foot sample from TP-1. Test pit TP-1 is located in the northwest corner of the site. The 8-foot sample was obtained from old fill, in an area with no known sources of petroleum contamination. Random hits of petroleum hydrocarbons in old fill masses are not unusual, in our experience. Petroleum hydrocarbons have been confirmed at other sites in the immediate vicinity including the adjacent site. Therefore, we suggest that the sample results for sample TP-1-8' be evaluated within the context of the more detailed environmental analysis at adjacent sites (former Olivine site, ThermoRetec's RI/FS).

Another consideration is that the MTCA is likely to be revised in late 2000/early 2001. Currently, the proposed MTCA cleanup level for heavy oil-range hydrocarbons is 2,000 mg/kg, providing that the cleanup levels for carcinogenic components, such as polycyclic aromatic hydrocarbons (PAHs), are met.

PRELIMINARY GEOTECHNICAL EVALUATION

The subsurface conditions were evaluated with respect to development of the site for conventional one-story steel frame construction with a slab-on-grade floor. The information provided below is intended for conceptual purposes only and not for design since limited exploration was accomplished and no specific development proposal is presently being considered. A summary of our preliminary conclusions is provided below:

- No significant field evidence of contamination was observed in the three test pits. Metals were not detected at concentrations greater than MTCA Method A levels. One sample at depth contained petroleum hydrocarbon levels slightly greater than current MTCA Method A cleanup levels; but well below the expected revised cleanup levels. While this is not a large database to provide conclusions, it appears that the likelihood of significant impacts from contamination is low. Nonetheless, it would be prudent to monitor for contamination during any deeper excavations for the project.
- Fill soils are quite variable at the site. Considerable debris was encountered in the northwest corner. No sawdust (like some other sites in the project vicinity) or significant organics were encountered that would suggest long-term settlement concerns. There is always some risk of settlement to a building supported on such material. However, this is not an unusual risk for construction along this portion of the waterfront.

- Conventional site development will likely require a finished floor elevation near the existing paved parking lot elevation or maybe up to a foot above. Therefore, most of the fill soils presently mounded above street/parking lot level will need to be removed for the site development. Alternatively, if the building needed a loading dock high floor, additional fill (3–4 feet) could remain on the site with adequate reworking so that it is compacted.
- The existing fill has acted essentially as a preload, so no preload will be required unless proposed development has an unusually high floor loading.
- The site is best suited for lightly loaded flexible structures. Because of the unknown fill and potential seismic response of the site, the design should accommodate some total and differential settlement. Foundation construction procedures can be incorporated (such as continuous footings/grade beams) to reduce the risk of damage.
- Because of the variable fill conditions, it is usually desirable to overexcavate on the order of 2 feet below the footings and place structural fill to reduce risk of differential settlement. The floor slab should also be supported on at least 1 foot of structural fill compacted to 95 percent. This can be accomplished by (a) compacting at the subgrade elevation (which may not work because the fill soils are too loose) or (b) overexcavating about 1 foot of existing fill, compacting that surface to 90 percent compaction and then placing/replacing structural fill to 95 percent.
- Methane has been confirmed at the site. Provisions should be incorporated into the building and/or site preparation to allow adequate venting. Below grade structures (e.g., vaults, manholes) should have appropriate safety provisions.

LIMITATIONS

We have prepared this report for use by the Port of Bellingham. This report is not intended for use by others and the information contained herein is not applicable to other sites.

The preliminary geotechnical conclusions are presented for information and conceptual planning purposes only not for design. We recommend that a design level geotechnical engineering study be performed for the specific project.

The environmental findings and conclusions in this report are based on the above-described data. GeoEngineers has relied upon information provided by others regarding historical conditions. This report provides information regarding the targeted sampling and testing, but does not provide definitive information with regard to additional contamination, past uses, operations or incidents at the site. Additional environmental services have been performed at the site by others.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

◆

We appreciate the opportunity to provide these services to the Port of Bellingham. Please contact us if you have any questions regarding this report.

Yours very truly,

GeoEngineers, Inc.

Lisa J Bona by JRG

Lisa J. Bona
Senior Geologist

J. Robert Gordon, P.E.
Principal

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TABLES

TABLE 1
SUMMARY OF SOIL
CHEMICAL ANALYTICAL DATA - - TOTAL METALS[1]

ARMY RESERVE SITE
BELLINGHAM, WASHINGTON

Sample Identification - Depth (feet)	Date Sampled	Total Metals[2] (mg/kg)				
		Arsenic	Cadmium	Chromium	Lead	Mercury
TP-1-8'[3]	8/28/00	9.6	<0.1	8.9	16	0.02
TP-2-6'[3]	8/28/00	14	<0.1	27	5	0.03
TP-3-9.5'[3]	8/28/00	9.4	<0.1	9.5	2	<0.02
MTCA[4] Method A Cleanup Level		20.0	2.0	100.0	250.0	1.0
Average Puget Sound Soils[5]		7.0	1.0	48	47	0.07

NOTES:

[1] Chemical analysis performed by CCI Analytical Laboratories, Inc. of Everett, Washington. Laboratory reports are attached as Appendix B.

[2] Analyzed by EPA Methods 6010 and 7471.

[3] Sample also analyzed for petroleum hydrocarbons (Table 2).

[4] Model Toxics Control Act.

[5] Average Puget Sound condentrations from "Natural Background Soil Metals Concentrations in Washington State," Washington State Department of Ecology Publication #94-115. October 1994, Table 1

mg/kg = milligrams per kilogram

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TABLE 2a
SUMMARY OF SOIL FIELD SCREENING AND CHEMICAL ANALYTICAL DATA FOR PETROLEUM HYDROCARBONS[1]

ARMY RESERVE SITE
BELLINGHAM, WASHINGTON

Sample Identification - Depth (feet)	Date Sampled	Field Screening Results[2]		Gasoline-range Hydrocarbons[3] (mg/kg)	Diesel-range Hydrocarbons[3] (mg/kg)	Heavy Oil-range Hydrocarbons[3] (mg/kg)
		Headspace Vapors (ppm)	Sheen			
TP-1-8'[4]	8/28/00	140	NS	>20	<50	>100
TP-2-6'	8/28/00	<100	NS	<20	<50	<100
TP-3-9.5'	8/28/00	<100	NS	<20	<50	<100
MTCA[5] Method A Cleanup Level				100	200	200

Notes:

[1] Chemical analysis performed by CCI Analytical Laboratories, Inc. of Everett, Washington. Laboratory reports are attached as Appendix B.

[2] Field methods are described in Appendix A.

[3] Chemical analyses performed using NWTPH-HCID procedures.

[4] Sample also analyzed for follow-up quantative analyses. See table below.

[5] Model Toxics Control Act.

NS = no sheen

mg/kg = milligrams per kilogram

TABLE 2b
SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA BETX and PETROLEUM HYDROCARBONS - - TP-1-8'

ARMY RESERVE SITE
BELLINGHAM, WASHINGTON

Sample Identification - Depth (feet)	BETX[1] (mg/kg)				Gasoline-range Hydrocarbons[2] (mg/kg)	Diesel-range Hydrocarbons[3] (mg/kg)	Heavy Oil-range Hydrocarbons[3] (mg/kg)
	B	E	T	X			
TP-1-8'[4]	<0.1	<0.1	<0.1	<0.3	59	61	210
MTCA[5] Method A Cleanup Level					100	200	200

Notes:

[1] B=benzene, E=ethylbenzene, T=toluene, X=xylenes. Analyzed by EPA Method 8021.

[2] Analyzed by Ecology Method NWTPH-Gx.

[3] Analyzed by Ecology Method NWTPH-Dx.

[4] Sample was analyzed past holding time, at GeoEngineers' request. The data are quantified as estimates.

[5] Model Toxics Control Act.

mg/kg=milligrams per kilogram.

Reference Official Road Map of Western Whatcom County, Provided by Whatcom County Department of Public Works, Division of Engineering and Dated 1991.

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VICINITY MAP

FIGURE 1

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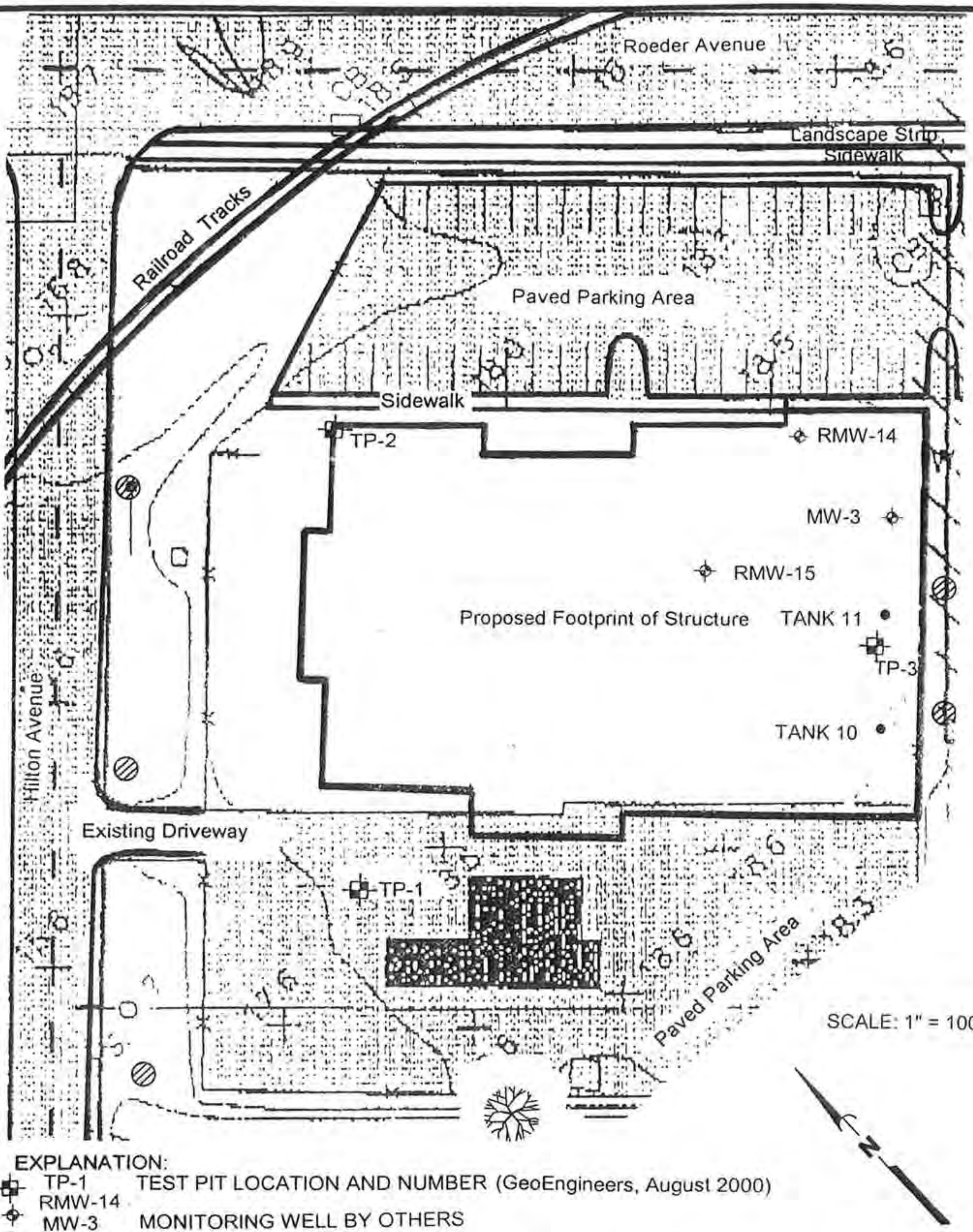

EXPLANATION:

TP-1	TEST PIT LOCATION AND NUMBER (GeoEngineers, August 2000)
RMW-14 MW-3	MONITORING WELL BY OTHERS
▨	POWER POLE
● TANK 10	APPROXIMATE LOCATION OF FORMER UNDERGROUND FUEL STORAGE TANK

Reference: "Sampling Locations for Pre-design Testing" provided by ReTec Remediation Technologies, Inc., dated 12/16/97.

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SITE PLAN

FIGURE 2

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APPENDIX A

FIELD PROCEDURES

SOIL SAMPLING

Three test pits (TP-1 through TP-3) were completed on August 28, 2000, with a rubber-tired backhoe owned and operated by the Port of Bellingham. A representative of GeoEngineers selected test pit locations in conjunction with Mike Stoner of the Port of Bellingham. Our representative obtained soil samples from the test pits for soil description and field screening. Soil samples from the test pits were obtained directly from the test pits or from the bucket of a backhoe. The test pit logs with field screening results are presented in Figures A-2 and A-3.

All soil samples obtained for chemical analysis were placed in a cooler with ice and kept cool during transport to the testing laboratory. Chain-of-custody procedures were followed during transport of soil samples.

FIELD SCREENING OF SOIL SAMPLES

Soil samples obtained from the excavation were screened for evidence of petroleum-related contamination using (1) visual examination, (2) sheen screening, and (3) headspace vapor screening using a Bacharach TLV Sniffer. The results of headspace and sheen screening are included in Table 2a of this report.

Visual screening consists of inspecting the soil for stains indicative of petroleum-related contamination. Visual screening is generally more effective when contamination is related to heavy petroleum hydrocarbons, such as motor oil or hydraulic oil, or when hydrocarbon concentrations are high. Sheen screening and headspace vapor screening are more sensitive methods that have been effective in detecting contamination at concentrations less than regulatory cleanup guidelines. However, field screening results are site-specific. The effectiveness of field screening results will vary with temperature, moisture content, organic content, soil type, and type and age of contaminant. The presence or absence of a sheen does not necessarily indicate the presence or absence of petroleum hydrocarbons.

Sheen screening involves placing soil in a pan of water and observing the water surface for signs of sheen. Sheen screening may detect both volatile and nonvolatile petroleum hydrocarbons. Sheen classifications are as follows:

No Sheen (NS)	No visible sheen on water surface.
Slight Sheen (SS)	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly.
Moderate Sheen (MS)	Light to heavy sheen, may have some color/iridescence; spread is irregular to flowing; few remaining areas of no sheen on water surface.
Heavy Sheen (HS)	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen.

Headspace vapor screening involves placing a soil sample in a plastic sample bag. Air is captured in the bag and the bag is shaken to expose the soil to the air trapped in the bag. The probe of a Bacharach TLV Sniffer is inserted in the bag and the instrument measures the concentration of combustible vapors in the air removed from the sample headspace. The Bacharach TLV Sniffer measures concentrations in parts per million (ppm) and is calibrated to hexane. The TLV is designed to quantify organic vapor concentrations in the range between 100 and 10,000 ppm.

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (FEET)	SOIL GROUP CLASSIFICATION SYMBOL	DESCRIPTION
		TEST PIT TP-1
0.0 - 1.5	SP	Gray fine to medium sand with coarse gravel, occasional stiff gray clay clasks and trace silt (dense, moist)(fill)
1.5 - 8.0	SP	Gray fine to medium sand with coarse sand and gravel and occasional clay clasts (loose, moist)(fill) Note: rebar and concrete debris below 5 feet and some asphalt concrete fragments below 6 feet.
8.0 - 9.0	SM	Black silty fine to coarse sand with fine gravel (loose to medium dense, wet)(fill)
		Test pit completed at 9.0 feet on 8/28/00 due to obstructions Slow ground water seepage observed at 9.0 feet Severe caving observed from 1.5 to 8.0 feet Disturbed soil samples obtained at 1.0, 2.0, 4.0, 6.0 and 8.0 feet Field screening: No sheen observed on samples from: 1.0, 2.0, 3.0, 4.0, 5.5, 6.0 and 8.0 feet TLV readings: <100 ppm from samples at 1.0, 2.0, 4.0 and 6.0 feet; 140 ppm at 8.0 feet
		TEST PIT TP-2
0.0 - 3.5	SP	Gray fine to medium sand with coarse sand and gravel (dense, moist)(fill) Note: 1" root zone at surface; grades to gray fine sand with medium to coarse sand, occasional gravel and occasional clay clasts
3.5 - 5.0	CL	Gray fine sandy clay with silty sand seams (stiff, moist)(fill)
5.0 - 7.5	SP - SC	Gray fine sand with clay, medium to coarse sand and occasional gravel (loose to medium dense, moist)(fill)
7.5 - 9.0	SP	Gray fine sand with clay seams and wood debris (loose to medium, dense wet)
		Test pit completed at 9.0 feet on 8/28/00 due to caving Rapid ground water seepage observed below 8.0 feet Severe caving observed from 5.0 to 9.0 feet Disturbed soil samples obtained at 1.0, 3.0, 4.0, 6.0, 8.0 and 9.0 feet Field screening: No sheen observed on samples from: 1.0, 3.0, 4.0, 6.0 and 8.0 feet TLV readings: <100 ppm from samples at 1.0, 3.0, 4.0 and 6.0 feet; 110 ppm at 9.0 feet

THE DEPTHS OF THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT

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Geo Engineers

LOG OF TEST PIT

FIGURE A-2

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (FEET)	SOIL GROUP CLASSIFICATION SYMBOL	DESCRIPTION
		TEST PIT TP-3
0.0 - 0.5	SM	Gray silty fine sand with medium to coarse sand and gravel (dense, dry to moist)(fill) Note: 1" root zone at surface
0.5 - 8.0	SP	Brown fine sand with coarse sand (dense, moist) (fill) Note: Grades with clay below 4 feet
8.0 - 9.5	SP	Gray fine sand with occasional wood debris (loose to medium dense, moist to wet)

Test pit completed at 9.5 feet on 2/23/00 due to obstructions
Rapid ground water seepage observed at 9.0 feet
Minor caving observed from 0.5 to 4.0, and 7.0 to 9.0 feet
Disturbed soil samples obtained at 1.0, 3.0, 5.0, 8.0 and 9.5 feet
Field screening:
- No sheen observed on samples from: 1.0, 3.0, 5.0, 8.0 and 9.5 feet
- TLV readings: <100 ppm from samples at 1.0, 3.0 and 5.0 feet; 2 ppm at 8.0 feet; 76 ppm at 9.0 feet

THE DEPTHS OF THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT

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LOG OF TEST PIT

FIGURE A-3

PRE-REMEDIAL DESIGN INVESTIGATION DATA REPORT
WHATCOM WATERWAY SITE CLEANUP

Prepared for

Port of Bellingham
1801 Roeder Avenue
Bellingham, Washington 98225

Prepared by

Anchor QEA, LLC
1423 Third Avenue, Suite 300
Seattle, Washington 98101

In Association with

KPFF Consulting Engineers | Coast & Harbor Engineering | Wilson Engineering
Blumen Consulting Group | BST & Associates

August 2010

PRE-REMEDIAL DESIGN INVESTIGATION DATA REPORT

WHATCOM WATERWAY SITE CLEANUP

Prepared for
Port of Bellingham
1801 Roeder Avenue
Bellingham, Washington 98225

In Coordination with
Washington Department of Natural Resources
City of Bellingham
Meridian Pacific Hwy, LLC

Prepared by
Anchor QEA, LLC
1423 Third Avenue, Suite 300
Seattle, Washington 98101

In Association with
KPFF Consulting Engineers | Coast & Harbor Engineering | Wilson Engineering
Blumen Consulting Group | BST & Associates

August 2010

WHATCOM WATERWAY PRE-REMEDIAL DESIGN INVESTIGATION PRDI DATA REPORT

The material and data in this report were prepared under the supervision and direction of the undersigned.

Thomas Wang

Thomas S. Wang, P.E.
Project Manager
Anchor QEA, LLC

John Laplante, P.E.
Geotechnical Data
Anchor QEA, LLC

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LIST OF ACRONYMS AND ABBREVIATIONS

Abbreviation	**Definition**
ADCP	Acoustic Doppler Current Profiler
ARI	Analytical Resources Inc.
ASB	Aerated Stabilization Basin
ASTM	American Society for Testing and Materials
AWAC	Acoustic Wave and Current Profiler
BSL	Bioaccumulation screening level
BST	Bellingham Shipping Terminal
CAP	Cleanup Action Plan
cm	centimeter
cm/s	centimeters per second
CSL	Cleanup Screening Levels
CSM	Conceptual Site Model
DMMP	Dredged Material Management Program
DRET	Dredge Elutriate Test
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
EPA	U.S. Environmental Protection Agency
FSEIS	Final Supplemental Environmental Impact Statement
GP	Georgia Pacific
JARPA	Joint Aquatic Resource Permit Application
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LDC	Laboratory Data Consultants, Inc.
m/s	meters per second
MET	Modified Elutriate Test
mg/kg	milligrams per kilogram
MLLW	mean lower low water
MNR	Monitored Natural Recovery
MS	matrix spike
MSD	matrix spike duplicate

Abbreviation	Definition
MTCA	Model Toxics Control Act
NAD	North American Datum
ng/kg	nanograms per kilogram
NOS	National Ocean Survey
NPDES	National Pollutant Discharge Elimination System
PDCR	Preliminary Design Concept Report
Port	Port of Bellingham
PRDE	Pre-remedial Design Evaluation
PRDI	Pre-remedial Design Investigation
PSEP	Puget Sound Estuary Protocols
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
RCW	Revised Code of Washington
RI/FS	Remedial Investigation/Feasibility Study
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SAPA	Sampling and Analysis Plan Appendix
Site	Whatcom Waterway Site
SMARM	Sediment Management Annual Review Meeting
SMS	Sediment Management Standards
SQS	Sediment Quality Standards
SPLP	Synthetic Precipitation Leaching Procedure
SRM	standard reference material
SVOC	semivolatile organic carbon
TBT	tributyl tin
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	toxicity equivalents
TOC	total organic carbon
vibracore	vibratory core sampler
VOC	volatile organic carbon
VST	vane shear testing
WAC	Washington Administrative Code

Abbreviation	**Definition**
µg/kg	micrograms per kilogram

WHATCOM WATERWAY PRE-REMEDIAL DESIGN INVESTIGATION PRDI DATA REPORT

The material and data in this report were prepared under the supervision and direction of the undersigned.

John Laplante, P.E.
Anchor QEA, LLC

1 INTRODUCTION

This Pre-remedial Design Investigation (PRDI) Data Report describes the findings of testing performed in support of the engineering design and permitting for the cleanup of the Whatcom Waterway Site (Site) in Bellingham. Figure 1 presents the site vicinity and location features. Cleanup of the Site is to be performed by the Port of Bellingham (Port) and other cooperating potentially liable persons (PLPs) under Washington State Department of Ecology (Ecology) oversight, in accordance with Consent Decree No. 07-2-02257-7. The cleanup will satisfy the cleanup requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D in the Revised Code of Washington (RCW), as administered by Ecology under the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC).

The testing described in this report was performed in accordance with the Ecology-approved PRDI Work Plan (Anchor 2008a). The PRDI Work Plan focused on filling pre-design data gaps to allow design and permitting activities to proceed. Additional information regarding the site setting, environmental conditions, and planned cleanup action is available in studies previously conducted under Ecology oversight. These previous studies include the final *Supplemental Remedial Investigation/Feasibility Study for the Whatcom Waterway Site* (RI/FS; RETEC 2006), the *Final Supplemental Environmental Impact Statement: Bellingham Bay Comprehensive Strategy, Whatcom Waterway Cleanup Site* (FSEIS; Ecology 2007a) and Exhibit B to the Consent Decree, *Cleanup Action Plan for the Whatcom Waterway Site* (CAP; Ecology 2007b).

1.1 Purpose of Report

The main state law that governs the cleanup of contaminated sites is MTCA. MTCA regulations define the process for the investigation and cleanup of contaminated sites. When contaminated sediments are involved, the cleanup standards and other procedures are also regulated by the Sediment Management Standards (SMS), Chapter 173-204 WAC. MTCA regulations specify criteria for the evaluation and conduct of a cleanup action, while SMS regulations dictate the standards for cleanup. Under both, the cleanup must protect human health and the environment, meet state environmental standards and standards in other laws that apply, and provide for monitoring to confirm compliance with site cleanup standards.

In 2007, after public notice and opportunity to comment, a Consent Decree (including a Cleanup Action Plan (CAP)) was signed by the cooperating PLPs and Ecology, and entered into the records of Whatcom County Superior Court. The CAP describes Ecology's selected cleanup action for the site, consistent with MTCA and SMS requirements. The CAP includes the following information:

- Summary of project background and current environmental conditions.
- Cleanup requirements applicable to the site, including cleanup standards and other federal, state, and local laws applicable to the cleanup action.
- Summary description of the remedial alternatives evaluated in the RI/FS.
- Rationale for selection of the proposed cleanup alternative.
- A description of the cleanup action selected by Ecology, consistent with MTCA requirements, including a description of the types, levels, and amounts of hazardous substances that will remain on site as part of the cleanup, and the measures that will be used to prevent migration and contact with those substances. Compliance monitoring and contingency action requirements, as well as institutional controls, are also described. Figure 4-6 from the CAP presents the site cleanup action and is included as Figure 2 in this PRDI Data Report.
- Description of the schedule for implementation of the cleanup action.

This PRDI Data Report presents the supplemental information collected as described in the PRDI Work Plan (Anchor 2008a) that is necessary to design the cleanup action defined in the CAP.

Under the Consent Decree requirements, the Port and the other cooperating PLPs will next develop a Preliminary Design Concept Report (PDCR) for Ecology review and approval, incorporating the findings of the PRDI. Following Ecology approval of the PDCR, a draft Engineering Design Report (EDR) will be completed and issued for public review. This PRDI Data Report presents the information collected to fill data gaps necessary to complete the PDCR and EDR.

1.2 Site Description and Background

The site includes lands that have been impacted by contaminants historically released from industrial waterfront activities, including mercury discharges from the former Georgia

Pacific's (GP) chlor-alkali plant, wood waste and degradation products from historic log rafting activities, and phenolic compounds from pulp mill wastewater discharges, as well as other industrial releases. Surface sediment contamination from other historic industrial activities, which comprise part of separate cleanup sites (the Central Waterfront Site, I&J Waterway Site, Cornwall Avenue Landfill Site, and R.G. Haley Site shown on Figure 1), overlays subsurface contamination from this site in four areas of the Waterfront.

The chlor-alkali plant discharged mercury-containing wastewater into the Whatcom Waterway during the late 1960s and 1970s. Initial environmental investigations of the site identified mercury in sediment at concentrations that exceed applicable standards, as well other contaminants from industrial releases.

The RI/FS process for the Whatcom Waterway site began in 1996 and has included two supplements to reflect new cleanup approaches necessitated by changed land use plans for portions of the Site. The most recent 2006 Supplemental RI/FS report was finalized in 2007 following public review. This document and well as a complimentary Final EIS were used by Ecology to preliminarily select a remedial alternative for the Site which was described in a CAP as an exhibit to the Consent Decree.

Under the terms of the Consent Decree, the Port and the other cooperating PLPs developed a PRDI Work Plan for Ecology review focused on filling pre-design data gaps to allow remedial design and permitting activities to move forward. Following Ecology approval of the PRDI Work Plan in June 2008, investigation activities commenced in July 2008 and were completed in May 2009.

A Conceptual Site Model (CSM) developed in the RI/FS is summarized in Section 2 of the PRDI Work Plan. The CSM reflects current site conditions and includes contaminants and sources, nature and extent of impacts, contaminant fate and transport processes, and exposure pathways and receptors. Graphical illustrations of the CSM are included on Figures 3 and 4.

1.3 Sediment Site Units

In the RI/FS, the different portions of the site were divided into different areas or "Sediment Site Units" (RETEC 2006). The sediment site units were developed based on differences in the following parameters:

- Physical Factors, including bathymetry, sediment particle size and texture, wood material distribution, wind and wave energies, and the characteristics of adjacent shorelines
- Land Use and Navigation, including upland zoning, shoreline infrastructure, navigation uses, natural resources, ongoing waterfront revitalization activities, and potential interrelationships between cleanup considerations and these factors
- Natural Resources, including the types of existing aquatic habitats within the site unit
- Contaminant distribution, including patterns of surface and subsurface contamination and relative contaminant concentrations.

Figure 1 shows the Whatcom Waterway Sediment Site Units. The site units were developed in the RI/FS and in the CAP (Ecology 2007b), and were described in the PRDI Work Plan (Anchor 2008a). Changes were anticipated for Unit 9 from the boundaries defined in the CAP. The boundary of Unit 9 was estimated at the time of the CAP based on existing data, with the intent to refine the boundary based on sampling to be conducted as part of the PRDI.

Technologies used as part of the cleanup include removal with upland disposal, treatment, reuse, containment (capping), monitored natural recovery (MNR), and institutional controls. The application of these technologies to different site units as part of the cleanup was described in the CAP.

1.4 Document Organization

This PRDI Data Report was prepared consistent with the requirements of the PRDI Work Plan (Anchor 2008a). The PRDI Data Report document is organized as follows:

- Section 1 provides the context for the current report, including a summary of the site background and history.
- Section 2 provides an overview of the PRDI components, including any deviations from the PRDI Work Plan (Anchor 2008a) and accompanying Sampling and Analysis Plan (SAP) and Quality Assurance Plan (QAPP; Anchor 2008b).

- Section 3 presents a summary of the PRDI data quality objectives and the results of data validation.
- Section 4 presents the PRDI site survey information results.
- Section 5 presents the PRDI oceanographic data collection results.
- Section 6 presents the PRDI surface sediment chemical, physical, and biological testing results.
- Section 7 presents the PRDI subsurface sediment chemical and physical testing results.
- Section 8 presents the PRDI geotechnical testing results.
- Section 9 provides a summary of next steps in the design and permitting process.
- Section 10 lists references cited in the PRDI Data Report document.
- Appendices to the report contain the sampling data and associated backup information.

2 PRE-REMEDIAL DESIGN INVESTIGATION OVERVIEW

This section provides an overview of the PRDI testing methods used. The PRDI components described below were performed to fulfill data gaps identified in Section 3 of the PRDI Work Plan and provide the necessary data to perform the remedial design.

This section summarizes the PRDI sampling design including the number and type of samples collected and a brief elaboration of the types of analyses that were conducted. Tables 1 to 6 present a summary of the PRDI components associated with each data collection method and sediment site unit. Figures 5 through 10 present the PRDI surface sediment and subsurface exploration locations. A summary of the PRDI site surveys is presented on Figure 11 and oceanographic sampling stations are shown on Figure 12.

Details of the sampling methodology are provided in Appendix A. Deviations from the PRDI Work Plan are provided in each methodology section below. Quality control measures implemented during the data collection efforts are summarized in Section 3 and also described in Appendix A. Field sample collection logs are presented in Appendix B.

2.1 Surface Sediment Sampling

Surface sediment samples were collected using Van Veen methodology. Detailed sampling procedures are described in Appendix A. Surface sediment sampling was performed at multiple locations in support of the following objectives:

- Outer Site Areas: Refine the horizontal nature and extent of contamination for two outer site areas (Units 5 and 6).
- Inner Waterway Areas: Verify continued compliance with site cleanup levels in two natural recovery areas (Units 3A and 5C) located within and adjacent to the inner waterway.
- Source Control Verification Samples: Assess current conditions adjacent to existing municipal stormwater outfall discharges at C-street and Laurel Street within the Inner Waterway.
- Cap Design Parameters: Assess surface sediment total mercury and methyl mercury composition in planned cap areas and in other site areas designated for dredging and natural recovery (see Section 2.5 for a discussion of this work).
- Supplemental Testing in Dredging Areas: Additional surface sampling was performed

in planned dredging areas of the Outer Waterway (Unit 1). These data were developed to address the following two objectives:

  - First, these data were developed to supplement data developed by others documenting current regional surface concentrations of dioxin/furans conditions throughout Bellingham Bay (SAIC, 2008; Ecology and Hart Crowser, 2009).
  - Second, these data were developed in order to document current surface concentrations of dioxin/furans within Unit 1 as necessary to provide a basis for evaluating compliance with Ecology's anti-degradation policies during dredging and residuals management during the cleanup action.
- Reference Locations: Two reference samples were collected from clean, off-site reference locations within Samish Bay for use in bioassay testing and methyl mercury testing.

Consistent with the PRDI Work Plan, no additional surface sampling was conducted in other Inner Waterway areas or in the Log Pond, as sufficient information is available to define the required capping limits in these areas. Also, no additional surface sampling was performed in Unit 7 or Unit 9, because these areas are designated for MNR, and no design/permitting data gaps were present with respect to surface sediment quality in these areas.

A total of 26 surface sediment sampling stations were collected during August 2008 from on-site areas. Additional testing was performed at off-site reference locations. Surface sediment samples collected for chemical, biological, and physical testing were collected from the site-specific 0- to 12-centimeter (cm) biologically active zone at locations presented on Figure 5. Table 1 presents a summary of the surface sediment locations and sampling scheme details including a summary of chemical, biological, and physical testing. Surface testing results are discussed in Section 6.

In addition to the above-described work, some surface samples were also collected using Van Veen sampling methodology as part of physical testing, geotechnical testing and dewatering testing. This additional work is described in Sections 2.2 and 2.4 below.

2.2 Subsurface Vibracore Sediment Sampling

Subsurface sediment sampling was performed using a vibratory core sampler (vibracore) to collect chemical and geotechnical data to fill data gaps and facilitate remedial design. Vibracore sampling was conducted during July 2008 and August 2008. Vibracore locations were selectively placed throughout the study area to supplement previous subsurface testing results and address specific objectives for each sediment site unit. Tables 2a and 2b present the sample identification, coordinates, and testing conducted on vibracore samples for the ASB and waterway areas. Figures 6 and 7 show the subsurface vibracore sampling locations.

- **ASB Bottom Samples (Unit 8):** Vibracore sampling was performed throughout the bottom of the ASB to verify the depth of contaminated sludge/sediment in these areas. Sampling of the ASB bottom was performed along five transects, with a total of 25 vibracore stations. These stations included nine "primary" stations (8-01-VC to 8-09-VC) at which both Tier 1 and Tier 2 chemical testing was performed. At a total of 16 "secondary" stations (8-10-VC to 8-25-VC), Tier 1 testing and selective Tier 2 testing was performed. Chemical sampling was focused on the sediments located at discrete intervals beneath the ASB sludges. Sampling intervals are indicated in Table 2a and are measured from the "hard bottom" contact as measured by sediment probing during vibracoring, and as measured during logging of the vibracore samples.

- **ASB Berm Samples (Unit 8):** Vibracore sampling was performed at a total of 24 vibracore stations located along the interior sloping sides of the ASB berms. Sampling stations are shown on Figure 6 and included 12 stations (8-101B-VC to 8-112B-VC) identified as "B" stations (approximately at +14 feet mean lower low water [MLLW]) and 12 stations (8-101C-VC to 8-112C-VC) identified as "C" stations (approximately at 0 feet MLLW). As with the ASB bottom samples, chemical testing was targeted to discrete sampling intervals located beneath the ASB sludges. Sampling intervals are indicated in Table 2a and are measured from the "hard bottom" contact as measured by sediment probing during vibracoring and as measured during logging of the vibracore samples. The PRDI Work Plan proposed using both hollow-stem auger and vibracore methodology along the ASB slope berm. However, due to field conditions that prohibited installation of some of the hollow-stem auger sampling locations, vibracore methodology was used to collect all of the discrete sediment samples along the ASB berms for chemical testing.

- **ASB Deep-Sand Composites (Unit 8):** Additional sampling in the ASB consisted of native sand composite sampling beneath the sloping berms. These samples were collected to verify the quality of the materials for on-site reuse. The native sand composite samples were collected from the "B" and "C" stations. Compositing from multiple cores was performed as appropriate to provide samples representative of specific berm materials. The final compositing scheme differed slightly from that identified in the PRDI Work Plan, and is listed in Table 2a.

- **ASB Sludge Testing (Unit 8):** ASB sludge samples were collected from both sediment vibracores within the ASB and from Van Veen grab samples. These sludge samples were composited to provide test samples for use in dewatering tests, and for use in elutriate testing. Elutriate testing was performed using both the Modified Elutriate Test (MET) and the Dredge Elutriate Test (DRET) methods. ASB site water was collected for use in both the dewatering pilot study and elutriate testing. The sample composite and analyses are listed in Table 2a.

- **Inner Waterway Testing (Units 2, 3, and 5C):** Vibracore sampling was performed within the Inner Waterway, including testing within sediment site units 2B, 2C, 3A, 3B, and 5C. Consistent with the PRDI Work Plan, no additional sampling was required in Unit 2A. Vibracore sampling was performed at 12 test stations within these site units to supplement previous chemical and physical testing data to facilitate remedial design in each site sediment unit. Consistent with the PRDI Work Plan, the core samples located in Units 3B and Unit 2C were tested for geotechnical parameters to assist with dredging and cap design. Samples from the cores located in planned natural recovery areas (Units 3A and 5C) were tested for physical and chemical parameters at multiple depth intervals in order to assist with sediment stability evaluations. Sampling intervals are indicated in Table 2b. Sampling intervals are indicated based on depths below the mudline.

- **Outer Waterway Testing (Units 1A and 1B):** Subsurface sediment vibracores were collected in Units 1A and 1B located in the outer Whatcom Waterway channel areas. A total of 16 subsurface sediment stations were collected in Units 1A and 1B, and used to form four composite test samples for chemical testing (Table 2b). Test locations, sample depths (0 to 4 feet below mudline), and sample compositing were performed consistent with previous testing performed as part of the Pre-remedial Design Evaluation (PRDE) investigations (Anchor 2003). The supplemental testing was performed to provide testing data for those chemicals not previously tested that are now required by Dredged Material Management Program (DMMP) protocols for open-water disposal, and to provide information useful for evaluating alternative beneficial reuse and material management options. Composite samples from Units 1A and 1B were also collected for use in bench-scale solidification testing.

- **Outer Waterway Testing (Unit 1C):** Testing was performed at eight vibracore locations within Unit 1C in order to assist with dredge prism design and material profiling for dredge material disposal and reuse evaluations. Chemical testing was performed on discrete sediment sampling intervals collected below the approximate historic waterway dredge depths in order to evaluate the dredge prism required for material removal. The chemical testing for the lower sampling intervals consisted of "Tier 1" testing and selective "Tier 2" testing (see Table 2b). The list of Tier 2 parameters was expanded from that in the PRDI Work Plan to include dioxin/furan compounds. Chemical testing was also performed in each of the eight cores for intervals above the known deepest historic dredge depth in order to collect geotechnical data for evaluating dredging properties, and to provide chemical characterization data for material disposal/reuse evaluations. One composite sample consisting of Unit 1C sediments was also developed and used for MET and DRET testing. Test protocols were the same as described for the ASB solids except that Whatcom Waterway water was used in place of ASB water.

- **Unit 5 and 6 Testing:** Subsurface sediment vibracore sampling was performed in other site areas to supplement sediment stability and cap design evaluations in Units 5 and 6. Two vibracores were sampled in Unit 5 and tested for chemical and physical parameters at depth to assist in dredge and cap design in this area; one additional vibracore was sampled for physical parameters only. Four vibracores were sampled in Unit 6 and tested for physical and geotechnical parameters to support sediment stability evaluations in this area. Supplemental chemistry sampling was performed at four locations by diver core after surface data was reviewed. This additional sampling occurred to measure chemical parameters in the shallow subsurface (to 3 feet below mudline) in order assess potential impacts from scouring, propeller wash, and anchoring. Table 2b lists the sampling scheme for these site areas.

- **Outer Site Boundary Definition:** Six vibracores were sampled along two transects as shown on Figure 7. These cores were placed to evaluate the outer extent of site-associated mercury in shallow subsurface sediments (0 to 4 feet below mudline), and thus, define the limits of Unit 9. These cores are labeled in this report as "Unit 9 cores" though most of the cores were placed beyond the updated boundary of Unit 9 as defined by the subsurface data. Chemical and physical testing in the Unit 9 cores were performed on composite samples collected from a depth interval of 0 to 4 feet from each core.

Consistent with the PRDI Work Plan, no subsurface testing was performed in Unit 7. As discussed in Section 4, the updated bathymetric survey data for this area showed that the side-slopes in the former disposal mound area were flatter than indicated in previous surveys performed at lower survey resolution.

2.3 Subsurface Hollow-Stem Auger Sampling

Subsurface sediment was collected by hollow-stem auger at selected locations to obtain geotechnical data. Hollow-stem auger sampling was also performed at other locations for collection of chemical testing data, where vibracore methods were not practical due to logistical considerations (e.g., deep samples beneath ASB berms). Mud rotary sampling was performed where hollow-stem auger sampling was not feasible (i.e., collection of subsurface samples from under-pier areas at the Bellingham Shipping Terminal [BST]). Geotechnical information was required in order to evaluate the stability of slope, cap, and shoreline areas and to support the assessment of dredgeability and materials handling properties of sediments to be removed. Selected hollow-stem auger and mud rotary samples were also submitted for chemical testing as described below.

Hollow-stem auger geotechnical borings conducted over-water by barge were performed consistent with requirements of the site-specific sampling Joint Aquatic Resource Permit Application (JARPA). The JARPA is included in Appendix C.

Locations of hollow-stem auger and mud rotary borings are shown on Figure 8. The sampling coordinates, intervals, methods, and test parameters for borings along the ASB berm and in the waterway areas are identified in Tables 3a and 3b, respectively. Key objectives for each area are described below:

- **ASB Berm Borings (Unit 8):** Supplemental geotechnical information was required along the ASB Berms to support remedial design. Twenty hollow-stem auger borings were advanced through the ASB berm at multiple locations in order to provide a representative characterization of the range of materials expected to be encountered during berm excavation, to help identify the inside berm profile, and to assess the expected surface condition on the inner berm face after excavation has been completed. Twelve hollow-stem auger borings were placed at the top of the berm using an upland drilling rig. The depths of these twelve borings were sufficient so that the borings penetrated through the berm material and the native sandy sediments to the top of the underlying glacial-marine drift layer. Eight additional borings were placed along the lower portions of the berm slope from a barge-mounted drilling rig. The depths of these other eight borings were sufficient to penetrate at least 25 feet below the anticipated ASB marina bottom elevation. As described in Section 2.2 above, vibracore sampling was used in place of hollow-stem auger sampling for some berm sampling locations to collect samples for chemical testing.

- **Inner Waterway (Units 2 and 3):** Geotechnical testing locations along the Inner Waterway included three upland geotechnical borings within the Central Waterfront Area, four upland locations within the former GP Mill Site, and eight in-water locations within Site Units 2A, 2C, and 3B. In-water subsurface sampling was performed using a barge-mounted hollow-stem auger. Both upland and in-water sampling was completed to depths that reached the underlying native material in order to characterize the stratigraphy of the inner waterway.

- **Outer Waterway BST Wharf Areas (Unit 1C):** To support waterway dredging and geotechnical evaluations, additional physical and chemical testing data were required for the area of Unit 1C located beneath the BST wharf. Testing was performed at a total of eleven sampling locations along four transects. Sampling methods were modified slightly from the PRDI Work Plan based on field conditions. Sampling was initially proposed using hollow-stem auger and sonic drilling methods for all locations. Final sampling at most locations was performed using mud rotary drilling. A diver-assisted piston core was used for two sampling locations where sample recovery was poor using the mud rotary method. One sample location, 1C-102B-HSA, was not collected by either method because of refusal due to riprap under the current dock structure.

- **Log Pond (Unit 4):** One hollow-stem auger station was completed in the northwest corner of the Log Pond adjacent to the current dock structure. This station was collected using a barge-mounted drilling rig to evaluate slope and structure stability in this area.

- **Barge Dock (Unit 6):** Two barge-mounted hollow-stem auger borings were placed within Unit 6 as part of parallel geotechnical investigations. Archived sediment samples collected from the upper three sampling intervals from these borings were submitted for chemical analysis (total solids, total organic carbon [TOC], mercury, semivolatile organic compounds [SVOCs]) to assess subsurface sediment quality in this area.

Consistent with the PRDI Work Plan, no hollow-stem auger borings were placed in other site areas where existing information or the data collected by other methods (survey data, surface sampling, vibracore sampling or vane shear testing) were sufficient to complete the design/permitting activities.

2.4 Vane Shear Testing

Vane shear testing (VST) was conducted in three site areas (Units 4, 5 and 6) to supplement other data collected by other methods and to provide additional information on the in situ strength of the sediments for evaluation of sediment capping and sediment stability. Consistent with the PRDI Work Plan, vane shear data were not collected in other site areas.

Collected sediment strength data will be compared to geotechnical index parameters and this information will be used to evaluate acceptable lift thicknesses for sediment capping, and to evaluate sediment stability. Locations of vane shear measurements and co-located surface grabs are shown on Figure 9. The sample locations, coordinates, methods and test parameters are listed in Table 4.

- **Site Units 5 and 6:** In situ sediment strength was measured in Units 5 and 6 in shallow water (less than 10 feet deep) using the VST. Where the VST was performed, co-located sediment grab samples were collected to characterize the material and to properly standardize the field VST results using laboratory tests.

- **Log Pond (Unit 4):** VST measurements were conducted at several locations and at several depths for each location in selected areas of the Log Pond where contingency actions have been planned to address cap erosion. These data supplement vibracore and hollow-stem auger information available for the Log Pond area. In addition to the VST measurements, co-located sediment grab samples were collected to physically characterize the material type to facilitate standardization of the field VST measurements.

2.5 Porewater Sampling

Sediment porewater was collected within the Inner portion of the Whatcom Waterway, and within Units 5 and 6. The porewater data were collected to evaluate groundwater/surface water interactions and to provide information for use in evaluating the impacts of cap placement and consolidation on contaminant transport. Two sampling stations were sampled in each of the above-listed site units. The sampling design is presented in Table 5 and porewater sampling locations are presented on Figure 10.

2.6 Surface Sediment Mercury Speciation

Surface sediment mercury speciation data were collected within multiple site areas (Units 1B, 1C, 2C, 5C, and 6B) and at a Samish Bay reference location to assist in cap engineering design. Objectives of the testing were defined in the PRDI Work Plan. The testing was performed to assess the site-specific ranges in patterns of mercury speciation/methylation. Mercury speciation sampling locations are listed on Figure 5. These locations were selected in coordination with Ecology during preparation of the PRDI Work Plan to provide a range of site conditions. Sampling stations included the potential cap areas within the Inner Waterway and Outer Waterway area, and additional stations were provided for comparison of site-specific speciation trends within other areas of the site. Table 1 presents the surface sediment mercury speciation sampling IDs and coordinates, the sample depth, and testing parameters.

At each selected on-site and off-site test location, surface sediment samples were collected and analyzed for total mercury and methyl mercury. These data were to be used in conjunction with geotechnical data, wind/wave modeling information, porewater sampling data, and other design parameters to assess cap design requirements.

2.7 Site Surveys

Site survey work was performed to support project remedial design activities. The work included development of horizontal and vertical controls, and updated surveys for bathymetry, topography, utilities, docks/structures, and eelgrass. The specific site survey tasks performed during the PRDI are described below.

- **Survey Control Network:** Primary horizontal and vertical control was verified, and a secondary control network was established in the field and for mapping purposes. The project datums are North American Datum (NAD) 83/98 Washington State North Zone (horizontal) and MLLW based on National Ocean Survey (NOS) Tide Station 9449211 at Bellingham, WA (tidal epoch 1983-2001).

- **Bathymetric Surveys:** Updated bathymetric surveys were conducted within the project area by Wilson Engineering, a licensed surveyor. Survey methods included both multi-beam survey methods (used for the ASB interior, portions of the Inner Waterway and Outer Waterway and the area around Site Unit 6 and Starr Rock) and single-beam survey methods (used in Units 1A/1B, portions of Site Unit 5 and Unit 9, and in the area of Whatcom Waterway upstream of the Roeder Avenue Bridge). These new survey data were compiled along with older survey information available for the areas within I&J Waterway and offshore areas of Unit 9. Figure 11 shows the sources of new and existing bathymetric survey data as used for development of the project area bathymetric map.

- **Topographic Surveys:** New topographic surveys for the project were limited to the work necessary to tie the bathymetry into the shoreline upland areas. A full topographic survey of the ASB berm was conducted to facilitate planning for berm modifications, because existing data were limited for this area. Existing upland surveys for the Central Waterfront and former GP Mill site areas were reviewed and were considered sufficient for remedial design activities in these areas. Figure 11 summarizes the sources of existing topographic survey information used for the project base map.

- **Under-Dock Surveys:** Wilson Engineering performed under-dock surveys along the southern shoreline of the Whatcom Waterway, in areas beneath the former GP Mill dock and beneath the BST wharf. The surveys were performed to evaluate the top and toe of bank, locations and elevations of bulkheads, and the nature and extent of slope armoring (including where applicable the presence and thickness of sediment overlying armor stone). The surveys above the water line were performed by a field survey crew using standard survey methods. Diver surveys were used to evaluate the nature and extent of slope armoring beneath the water line.

- **Side Scan Sonar Debris Survey:** Side scan sonar surveys were conducted by Wilson Engineering in areas of possible capping and dredging to assess potential debris or underwater structures that could impact capping or dredging. These surveys were conducted within the Whatcom Waterway, the Log Pond, and in the vicinity of Starr Rock. Sub-bottom profiling was also performed in the area of the buried wastewater lines extending from the former GP Mill Site to the ASB, though this survey method was found to be generally ineffective at identifying the buried line locations.

- **ASB Probing and "Hard Bottom" Surveys:** Multiple survey methods were used to evaluate the ASB sludge consolidation and stratification, and to verify the "hard bottom" contact located between the ASB sludges and the underlying native sands. These survey methods were used along with vibracore testing data (refer to Section 2.2) to refine the dredge prism for ASB remediation. The ASB mudline was determined using multi-beam bathymetry methods described above. Two types of lead-line measurements (standard method and plate-pole method – refer to Appendix A) were collected to supplement the multi-beam data and assess the potential thickness of unconsolidated ASB solids above/below the measured mudline. The ASB "hard bottom" was then defined using manual probing at approximately 125 grid-based test locations. The locations were established using a rectangular grid with parallel grid lines spaced approximately 100 feet apart. At each test location, a hollow-tipped pole was manually inserted into the sludge layer until a hard contact was encountered. The depth at which the pole could not be inserted further without mechanical assist was measured and used to calculate a "hard bottom" elevation for that location. Sediment recovered in the hollow-tip of the sediment probe was visually inspected to ensure that full penetration to the native sand layer was achieved.

- **Eelgrass Survey:** Intertidal and subtidal eelgrass surveys were conducted to determine the geographic extent and associated shoot densities of eelgrass beds in the project area. All areas within the project area with depths of -15 feet MLLW or shallower were surveyed for eelgrass beds. The surveys were conducted using a combination of direct visual assessment of the intertidal areas coupled with a towed camera survey of shallow subtidal areas. Follow-up dive surveys were performed to determine eelgrass shoot densities in areas where the visual assessment and towed camera surveys show the existence of eelgrass beds. Eelgrass and macroalgae distributions were classified using categories ranging from "no eelgrass" to "dense bed" (areas with greater than 50 percent coverage).

2.8 Oceanographic Data Collection

Oceanographic data were collected at both near-field and far-field portions of Bellingham Bay for use in calibration and verification of wave and current models to be used for remedial design. The data collection effort consisted of deploying moored instruments and obtaining time series data of wave height, period, and direction, and vertical profiles of current speed and direction. Evans-Hamilton, Inc. was subcontracted to perform the data collection and to conduct limited post-processing of the data.

Monitoring equipment was deployed at four stations within Bellingham Bay for a period of approximately 6 weeks. Station locations are illustrated on Figure 12, and a description of each station is provided below.

- **Station 1:** Station 1 was located in the Inner Waterway at coordinates 48 45.0822 N, 122 29.1668 W. The bottom elevation at the mooring location was -15 feet MLLW. Directional wave data were collected using a combined current meter, water level meter, and wave sensor. The instrument consisted of an Acoustic Doppler Wave and Current Profiler (AWAC) instrument mounted on a Trawl Resistant frame weighted to the bay bottom. The mount was fitted with an acoustic release recovery and location system.

- **Station 2:** Station 2 was located within the project area seaward of the ASB at coordinates 48 44.843 N, 122 29.977 W. The bottom elevation at the mooring location was -15 feet MLLW. Directional wave data were collected using a combined current meter, water level meter, and wave sensor. The instrument consisted of an AWAC instrument mounted on a Trawl Resistant frame weighted to the bay bottom. The mount was fitted with acoustic release recovery and location system.

- **Station 3:** Station 3 was located near the entrance to Outer Squalicum Harbor at coordinates 48 45.453 N, 122 30.709 W. The bottom elevation at the mooring location was -10 feet MLLW. Only current and water level data were collected at this location. The instrument consisted of a Nortek Aquadopp current profiler mounted on an open-sided frame rigged to a piling.

- **Station 4:** Station 4 was located in approximately 90 feet of water in outer Bellingham Bay to the south of Portage Island at 48 41.971 N, 122 35.239 W. A 500 kHz profiling current meter with internal pressure sensor was mounted on a Trawl Resistant frame weighted to the bay bottom. The mount was fitted with acoustic release recovery and location system.

The four instruments were deployed between March 30 and May 1, 2008 with a total deployment time of 43 days.

3 CHEMICAL AND PHYSICAL DATA QUALITY

This section provides a concise summary of project quality assurance objectives for chemical, physical, and biological testing data, and provides the concise findings of data validation activities.

3.1 Testing Labs and Methods

Chemical, physical, and biological testing was performed by Ecology-approved laboratories as presented in the PRDI Work Plan (Anchor 2008a). These included the following:

- Analytical Resources Inc. (ARI) is the Ecology-certified laboratory located in Tukwila, Washington, that conducted a majority of the chemical testing and all physical and geotechnical testing.
- Brooks Rand Labs, LLC is the Ecology-certified laboratory located in Seattle, Washington, that performed the pore-water chemical testing and the sediment methyl mercury testing.
- Analytical Perspectives LLC is located in Wilmington, North Carolina, and conducted the dioxin/furan testing for the project.
- NewFields, LLC is located in Port Gamble, Washington, and performed all of the biological testing for surface sediments.

All analyses conformed to procedures described in the approved Work Plan/SAP (Anchor 2008a), and in the referenced QAPP (Anchor 2008b). Appendix D provides the supporting quality control information and data validation reports.

Chemical, physical, and biological testing adhered to the most recent Puget Sound Estuary Protocols (PSEP) quality assurance/quality control (QA/QC) procedures (PSEP 1997b) and PSEP analysis protocols. Metals and organic compounds were analyzed according to the guidelines provided in PSEP (1997c) and PSEP (1997d), respectively. TOC was analyzed by Plumb (1981). Atterberg limits, specific gravity, consolidation, effective porosity, and shear strength were analyzed according to American Society for Testing and Materials (ASTM) methods. Grain size was analyzed according to the ASTM method with the exception of nine sediment samples analyzed by the PSEP method (1C-102A-HSA-S12, 1C-102A-HSA-S18, 1C-102A-HSA-S3, 1C-102A-HSA-S6, 1C-102A-HSA-S9, 1A-01-VC-C1, 1A-01-VC-C2, 1B-01-VC-C1, and 1B-01-VC-C2). The PSEP grain size method was used for these limited sediment samples due to laboratory error and sufficient archive sample was not available for ASTM reanalysis. The project database retains the classifications and sieve sizes provided by the laboratory which differ slightly between the two methods. Sediment biological testing was conducted in accordance with Washington SMS and PSEP guidelines (1995).

3.2 Data Quality Objectives

The project QAPP was written to ensure that data of sufficiently high quality were generated to support the design and permitting of the site cleanup action defined in the CAP (Ecology 2007). The quality of the laboratory data is assessed by precision, accuracy, representativeness, comparability, and completeness. Applicable quantitative goals for these data quality parameters are listed in Table 6. Each parameter is discussed below.

- **Precision:** Laboratory precision was measured with laboratory control sample (LCS)/ laboratory control sample duplicate (LCSD) analyses; matrix spike (MS)/ matrix spike duplicate (MSD) analyses; and replicate analyses. Generally precision goals were met and in cases where they were not, data were qualified as estimated per U.S. Environmental Protection Agency (EPA) National Functional Guidelines (EPA 1999, 2004). Field precision was evaluated by the collection of blind field duplicates. Precision goals were generally met. Data were not qualified based solely on field precision results.

- **Accuracy and Bias:** Accuracy was measured with LCSs, MS samples, and standard reference materials (SRMs). Generally accuracy goals were met and in cases where they weren't, data were qualified as estimated per National Functional Guidelines (EPA 1999, 2004). In these instances, the usability of the data was determined by the extent of the exceedance. The validation reports submitted in Appendix D specify the specific outliers and whether the bias was high or low.

- **Representativeness:** The list of analytes has been identified to provide a comprehensive assessment of the known and potential contaminants at the site.

- **Comparability:** The laboratory used common traceable calibration standards, spiking standards, and reference materials. Specific information can be found in the laboratory data packages (Appendix G).

- **Completeness:** The completeness goal of 90 percent was met.

3.3 Quality Assurance/ Quality Control Findings

The overall data QA/QC program for the PRDI evaluation followed procedures presented in detail in the PRDI Work Plan (Anchor 2008a). Measures taken to ensure data quality employed current EPA, Ecology, and ASTM protocols. Specific actions are described below.

3.3.1 Field QA/QC

Field QA/QC samples were used to evaluate the efficiency of field decontamination procedures. Table D-1 in Appendix D provides a summary of the equipment blanks, testing performed on each blank sample, and lists the detected constituents. Equipment rinse blanks were collected for each sampling method (i.e., surface and subsurface sediments) and were analyzed for the parameters specific to the type of sampling being conducted. There were no target analytes detected in any equipment rinse blanks with the exception of low levels of ammonia and low level copper in one equipment blank. These detections did not impact the data quality. The equipment blank testing results are provided in Appendix G.

Laboratory grade sand from Fischer Scientific (blank sand) was submitted for dioxin/furan testing. This sand blank was identified as 8-50-VC. Low levels of two target analytes (1,2,3,4,6,7,8-HpCDD and OCDD) were detected in this sample. The presence of these analytes was determined to be insignificant due to the relative concentrations present in field samples. The results of this analysis can be found in Appendix G.

Field duplicates were used to evaluate homogenization accuracy. A summary table of field duplicates can be found in Table D-1 in Appendix D. Relative percent differences (RPDs) were screened against 50 percent. There were a few grain size percentage retained RPD values that exceeded 50 percent, however these values were close to the reporting limit where the percent error is increased. One Atterberg limits plasticity index and one TOC result exceeded 50 percent. Overall, the field duplicate quality objectives were met.

3.3.2 Chain of Custody

Chain-of-custody forms and seals were used to track sample custody and document the proper handling and integrity of the samples. All containerized samples were shipped to the analytical laboratory after preparation according to appropriate sample handling procedures (i.e., transported at 4 degrees centigrade). All samples were transported to Analytical Resources, Inc (ARI), Brooks Rand, and NewFields by Anchor QEA personnel and relinquished under signature by both Anchor QEA and laboratory receiving staff. Most of these samples arrived within the recommended temperature of 4 ± 2°C; however, those that did not were received by the laboratory within 12 hours of collection and were determined to have not been affected by the temperature exceedance. Samples transported to Analytical Perspectives were transported by FedEx according to appropriate sample shipping procedures. All shipped samples arrived within the recommended temperature of 4 ± 2°C. Chain of custody documentation is included with the associated laboratory reports in Appendix G.

3.3.3 Laboratory QA/QC

The individual analytical methods prescribe specific quality control criteria for initial calibrations, continuing calibration verifications, internal standard area counts, and relative retention times. The laboratories followed the associated method criteria to evaluate their data and flagged any data that was outside of these control limits. These exceedances were also qualified in the validation process.

For sediment tests, PSEP action limits were used to assess the precision and accuracy of method blanks, laboratory control samples, matrix spikes, standard reference materials, and replicate samples. The control limits (data quality objectives) and frequencies of these quality control samples are listed in Table 6. Any quality control results that exceeded these criteria were qualified in the validation process.

For bioassay tests, standard QA/QC procedures were in place to ensure validity of test results and were evaluated based on SMS and PSEP (1997a) performance criteria as described previously in the PRDI Work Plan (Anchor 2008a). Standard QA/QC procedures included the use of negative controls, reference sediment samples, replication, measurement of water quality during testing, and reference toxicant tests.

3.3.4 Data Validation

All chemical and physical data submitted in this report were validated by Laboratory Data Consultants, Inc. (LDC) of Carlsbad, California. Data validations were performed at 90 percent level 3 and 10 percent level 4. LDC performed a level 4 data validation by randomly selecting 1 out every 10 sample results within an analytical method. Data validation reports are provided in Appendix D. Samples are listed with their corresponding laboratory data package and validation report number in Appendix G, Table G-1. The data validation was performed under EPA guidelines, as described in the project QAPP and the National Functional Guidelines for Data Review (EPA 1999, 2004).

Data validation verified the accuracy and precision of chemical and physical determinations performed during this investigation. Data qualifiers assigned as a result of the data validation and their definitions are shown on each of the respective analytical results tables. Data may have been qualified as biased or estimated for a particular analysis based on method or technical criteria. Data qualified with a "J" indicates that the associated numerical value is the approximate concentration of the analyte. Data qualified with a "UJ" indicates the approximate reporting limit below which the analyte was not detected. Consequently, these data qualifications are not expected to impact the data quality objectives.

All PRDI data were determined to be useable as reported from the laboratory or as qualified in this PRDI Data Report for the purposes of forthcoming remedial design, with some minor exceptions. Benzyl alcohol results were rejected in four samples from Unit 8, 2B, and non-remedial design stations due to low or no recoveries in the LCS and/or MS/MSD analyses in both the full scan and SIM SVOC analyses.

Biological test conditions and methods were in compliance with PSEP (1995), Ecology's Sampling and Analysis Plan Appendix (SAPA; Ecology 2008), and the various updates presented during the Sediment Management Annual Review Meeting (SMARM). Details of the biological testing methods and results are presented in Section 6.2.

4 SITE SURVEY INFORMATION

This section summarizes the results of site survey work performed during the PRDI activities. Site survey information throughout the project area was collected between May 2008 and February 2009. This information included bathymetric and topographic surveys, under-dock surveys, a side scan sonar survey, ASB mudline and "hard bottom" probing, and an eelgrass survey.

A summary of the type and extent of bathymetric and topographic survey information collected or utilized for the project is provided on Figure 11. The findings of the site survey work are presented in Appendix E with the exception of the eelgrass survey which is presented on Figure 13.

4.1 Bathymetry and Topography

Vertical and Horizontal control points were set on site and referenced to Washington State Plane North, NAD 83 (feet) and MLLW (feet), which are defined as project datum. Feet as used in this report are U.S. Survey Feet, defined as 1200/3937 of an International System of Units (SI) meter. Bathymetry within Whatcom Waterway, the ASB basin, and adjacent areas of Bellingham Bay was collected in May 2008. Topography of the ASB berm and top of banks along the Whatcom Waterway was also collected in May of 2008. These data are provided in Appendix E in the "Bathymetry & Topography" folder in Adobe PDF format.

The new site bathymetry was generally consistent with previous survey data collected in 1996.

- **Comparison to Older Data:** Mudline measurements were generally within approximately 1 foot of previous measurements, though differences in survey methodology prevent a direct comparison of bathymetric changes.
- **Unit 1A/1B Mudline Elevations:** The bathymetric results in Units 1A and 1B were consistent with previous survey results. Results confirmed that the current mudline elevation is well below the federally-authorized project depth (-30 feet MLLW) within these two site units.
- **Starr Rock Disposal Mound:** The bathymetric data for Starr Rock (Unit 7) identified the limits of the oblong "disposal mound" created as part of the late 1960s waterway dredging conducted by the U.S. Army Corps of Engineers and the Port. The survey

> resolution was more detailed than previous surveys and demonstrated that the side-slopes of the disposal mound are flatter than previous estimates. The steepest side-slopes were flatter than 3H:1V (horizontal:vertical), and most side-slopes were flatter than 4H:1V.

The topographic survey for the ASB berm identified an average crest elevation of 22.5 feet above MLLW. This elevation is slightly lower than previous estimates.

New upland survey information were not collected for either the Central Waterfront Site or for the former GP Mill Site as part of the PRDI surveys. Existing information for most of these areas was determined to be adequate for completion of remedial design and permitting. Existing survey data for these upland areas were used to develop an integrated site basemap for the project. The upland surveys used for the basemap included a ground topographic survey completed by David Evans and Associates in February 2008 of the Central Waterfront area and a September 2004 aerial photogrammetry survey completed by Walker and Associates for the Port. These surveys were completed in Washington State Plane North, NAD 83 (feet) and North American Vertical Datum (NAVD) 88 (feet) and were converted to MLLW (feet) for incorporation into the project basemap. The conversion from NAVD 88 (feet) to MLLW (feet) used for the project is +0.48 feet and was taken from NOAA Benchmark No. 9449211 (Bellingham, Washington). The draft project basemap is provided in Appendix E in the "Project Basemap" folder in AutoCAD format.

4.2 Under Dock Surveys

An under-dock survey was conducted for the areas beneath the BST and GP docks. The survey was conducted in two phases and was completed in February 2009. This survey effort included measurements of the mudline elevations along the waterway slopes, including locations and elevations of bulkheads or other breaks in shoreline topography/bathymetry. The extent of slope armoring and engineered fill (e.g., riprap) was surveyed by diver inspection along evenly spaced transects located under the docks and perpendicular to the dock face. The extent of sediments overlying armor stone or engineered fill was estimated using diver jet probes. The under-dock survey information was used to update the bathymetry surface for the waterway and provide a "toe-of-slope line" to show the extent of engineered fill under the docks. This survey is provided in Appendix E in the folder "Under Pier Survey" in AutoCAD format.

4.3 Side Scan Sonar

Side scan sonar imagery was collected for the project area, including Whatcom Waterway, the Log Pond area (Site Unit 4), the outside perimeter of the ASB (portions of Site Unit 5), the navigation channel (Site Units 1C, 2 and 3), the barge dock area (Site Unit 6), and the area around the Starr Rock formations (Site Unit 7). A GeoTiff image, geo-referenced to the project datum, was produced combining all of the separate side scan sonar images into one image representing the entire project area. This image is provided in Appendix E in the "Side Scan Sonar" folder.

In addition, a contact report was produced which provides the imagery, geographic position, estimated geometry, and classification for 74 contacts within the project area. This information will be used in the remedial design and construction of dredging and capping works for the project. This contact report does not identify every item that was visible in the imagery; however it provides information for contacts anticipated to be significant for dredging design and construction.

4.4 ASB Mudline and Bottom Probing

Probing measurements were performed within the ASB to identify the elevations of the "hard bottom" located beneath the ASB sludge layer. Results of vibracore sampling and probing measurements confirm that the "hard bottom" consists of the top of the native sand layer. The "hard bottom" is overlain by a thin layer of loose sand, the ASB bentonite lining, and the ASB sludges.

The elevation of the "hard bottom" was found to be generally consistent with previous measurements performed by RETEC on behalf of the Port during 2004 (RETEC 2006). The "hard bottom" measurements generally were between -14 and -16 feet MLLW, though they ranged between extremes of approximately -11 feet MLLW and -19 feet MLLW. The ASB depth probing data will be used in conjunction with ASB chemical sampling data to develop dredge prisms for remediation of the ASB. These will be presented in the Preliminary Design Concept Report and in the Engineering Design Report.

The mudline within the ASB was found to be relatively consistent using three different test methods. These included a multi-beam bathymetric survey, a standard lead-line measurement and a plate-pole lead-line measurement. Differences between these methods were generally less than 1 foot and indicated that the top of the ASB solids had generally formed a consolidated, though soft, sludge surface. Among the three mudline measurements, the shallowest mudline elevations were measured using the multi-beam survey method, and the deepest elevations were measured using the standard lead-line. The mudline contours shown on Figure 11 are based on the multi-beam survey data.

4.5 Eelgrass Survey

Figure 13 summarizes the findings of the eelgrass survey performed for the project area. Significant areas of eelgrass were noted in the following locations:

- Head of the Inner Waterway (Site Unit 3): Two localized areas of eelgrass were noted at the head of the Whatcom Waterway, adjacent to the Roeder Avenue bridge. These two areas are located within a planned monitored natural recovery area.
- Log Pond (Site Unit 4): Numerous patches of eelgrass were identified within the Log Pond. These patches ranged from sparse to patchy.
- Areas Adjacent to the ASB (Site Unit 5): Localized areas of eelgrass were identified in shallow-water areas south and west of the ASB. The density of eelgrass varied from none to dense in these areas as indicated on Figure 13.
- Barge Dock Area (Site Unit 6): Areas of eelgrass were noted south of the barge dock along the western shoreline of the BST. These beds ranged in density from sparse to dense. No eelgrass was noted adjacent to the main BST wharf.

5 OCEANOGRAPHIC DATA

Oceanographic data (waves, water levels, and currents) were collected at four stations within Bellingham Bay between March 20, 2008 and May 1, 2008. The station locations and instruments used for the data collection are described in Section 2.8 and Figure 12.

Current and water level data were collected at all four stations as 2-minute averages every 2 minutes (for a total of thirty 2-minute averages per hour). Wave time series data were collected at a sampling frequency of 2Hz at Stations 1 and 2 only. The data from each instrument were downloaded from the internal data loggers in each instrument in ASCII format. Raw data files are provided for current and water level data in Appendix F.

The wave data files were post-processed to provide hourly averages of wave parameters at Stations 1 and 2 over the deployment period. These post-processed wave data are also provided in Appendix F. A list of these data files is provided below:

- **Station 1 Current/Water Level Data**
  Bellingham Bay Station 1_Mar2008_May2008_CurrentData.txt
- **Station 1 Wave Time Series Data**
  Bellingham_Bay_ST1_AWAC1000_Waves.xls
- **Station 2 Current/Water Level Data**
  Bellingham Bay Station 2_Mar2008_May2008_CurrentData.txt
- **Station 2 Wave Time Series Data**
  Bellingham_Bay_ST2_AWAC600_Waves.xls
- **Station 3 Current/Water Level Data**
  Bellingham Bay Station 3_Mar2008_May2008_CurrentData.txt
- **Station 4 Current/Water Level Data**
  Bellingham Bay Station 4_Mar2008_May2008_CurrentData.txt

Current and water level data files consist of header information, which provides the location of the instrument and start and end time of data recording for the deployment, and 13 columns of data recorded by the instrument for each 2-minute average. Descriptions and formats for these columnar data are provided below:

- Month (MM)
- Day (DD)
- Year (YYYY)
- Hour (hh (UTC))
- Minute (mm)
- Second (ss)
- Bin Range (m) (Distance from Acoustic Doppler Current Profiler [ADCP] to center of bin)
- Current Speed (centimeters per second [cm/s])
- Current Direction Toward (Degrees True N)
- Magnitude East (cm/s)
- Magnitude West (cm/s)
- Temperature (Degrees C)
- Pressure (meter of water)

Post-processed wave data files consist of 30 columns of data which represent hourly averages of wave parameters for the 43 day deployment period for a total of 1,004 samples. Descriptions and formats for these columnar data are provided below:

- Month (MM)
- Day (DD)
- Year (YYYY)
- Hour (hh (UTC))
- Minute (mm)
- Second (ss)
- Significant wave height (m)
- Significant wave height (ft)
- Mean 1/3 wave height (m)
- Mean 1/3 wave height (ft)
- Mean 1/10 wave height (m)
- Mean 1/10 wave height (ft)
- Max wave height (m)
- Max wave height (ft)
- Mean period (s)
- Peak period (s)

- Mean zero crossing period (s)
- Peak Direction (deg from true north)
- Directional Spread (deg)
- Mean direction (deg)
- Unidirectivity index
- Mean pressure (dbar)
- Mean pressure (psi)
- Water level over instrument (m)
- Water level over instrument (ft)
- No Detects
- Bad Detects
- Current speed (wave cell) (meters per second [m/s])
- Current speed (wave cell) (deg)

Circulation data were collected throughout the monitoring period. During the test period, there were three significant storm events which were useful for calibration and verification of the wind/wave model. These storms occurred in 2008 on March 24, April 6, and April 7. Wave data recorded during these three events will be used to calibrate the wave transformation model to be utilized in the remedial design efforts. A summary of wave and circulation modeling information will be provided as part of the Engineering Design Report.

6 SURFACE SEDIMENT TESTING

This section summarizes the results of surface sediment (0 to 12 cm) chemical and biological testing performed during the PRDI. Where applicable, results from the current testing are compared to the results of previous testing reported in the Supplemental RI/FS (RETEC 2006).

Surface sediment quality at the Whatcom Waterway Site was previously measured during sampling events in 1996 and 1998, and later in follow-up sampling performed in 2002. Previous surface sediment sampling has demonstrated declining surface sediment chemical concentrations, and corresponding decreases in measurable biological effects as measured by bioassay testing. Results for previous surface sediment quality from the first two sampling events (1996 and 1998) and sediment quality data collected in 2002 are presented in the Supplemental RI/FS (RETEC 2006).

6.1 Surface Sediment Chemical and Physical Testing

Table 7 summarizes the results of surface sediment chemical and physical testing. Results include 26 on-site samples, and 2 off-site reference area samples. Sampling locations are identified on Figure 5.

6.1.1 Comparisons to Sediment Quality Standards Chemical Criteria

Chart 1 below summarizes the total mercury concentrations measured in the tested surface sediment samples (0 to 12 cm) and results of confirmational biological testing (see Section 6.2).

Chart 1
Surface Sediment Mercury and Biological Testing Results

Station ID	Total Mercury[3] (mg/kg dry weight)	SQS/CSL Biological Criteria (Pass/Fail)[1]
Inner Waterway		
2C-01-SS	0.30	Not Tested
2C-02-SS	0.40	Not Tested
2C-03-SS	0.60 (> CSL)[3]	Not Tested[3]
3A-01-SS	0.20	Pass
3A-02-SS	0.13	Pass
3A-03-SS	0.09	Pass
3A-04-SS	0.40	Pass
3A-05-SS	0.40	Pass
5C-01-SS	0.12	Pass
5C-02-SS	0.31	Pass
Outer Waterway		
1B-01-SS	0.20	Not Tested
1C-01-SS	0.30	Not Tested
Unit 5		
5B-01-SS	0.76 (> CSL)[3]	Pass[2,3]
5B-02-SS	1.1 (> CSL)[3]	Pass[3]
5B-03-SS	0.50 (>SQS)[3]	Pass[3]
5B-04-SS	0.61 (> CSL)[3]	Pass[3]
5B-05-SS	0.71 (> CSL)[3]	Pass[3]
5B-06-SS	2.64(> BSL)[3]	Not Tested[3]
5B-07-SS	0.22	Pass
Unit 6B/6C		
6B-01-SS	0.29	Pass
6B-02-SS	0.30	Pass
6B-03-SS	0.30	Pass
6B-04-SS	0.31	Pass
6B-05-SS	0.30	Pass
6C-01-SS	0.30	Pass
6C-02-SS	0.40	Pass
Reference Area		
REF-01-SS	0.1 U	Pass

Notes:
SQS – Sediment Quality Standards (0.41 mg/kg for mercury)
CSL – Cleanup Screening Levels (0.59 mg/kg for mercury)
BSL - Bioaccumulation Screening Level (1.2 mg/kg for mercury)

mg/kg – milligrams per kilogram

1 – Bioassays conducted included *E. estuarius*, *D. Excentricus*, and *N. arenaceodentata*.

2 – MIGT / MIGC = 69 percent when compared to the control. Sample 5B-01-SS passes when compared to both references. See Section 6.2 for additional discussion.

3 – Chemistry results were compared to the mercury SQS (0.41 mg/kg), the CSL (0.59 mg/kg), and the BSL (1.2 mg/kg). Confirmational bioassay testing did not show any bioassay SQS or CSL exceedances for the tested samples. Samples exceeding the chemical SQS, CSL, or BSL that were not tested for confirmational bioassays are located within planned remediation areas.

Mercury was analyzed at all 26 on-site surface sediment stations and in one off-site reference sample. Mercury was detected in all of the on-site samples, with concentrations ranging from 0.12 milligrams per kilogram (mg/kg) to 2.64 mg/kg. Mercury in the reference sample was not detected (0.1 U mg/kg). SMS exceedances for mercury were detected in seven of the 26 on-site samples. Six of the mercury SMS chemical exceedances were located within Unit 5B, and one station was located in Unit 2C (2C-03-SS). The only sample that exceeded the site-specific bioaccumulation screening level (BSL; 1.2 mg/kg) was sample 5B-06-SS. That sample was located near sampling stations that also exceeded the BSL during the 2002 sampling event.

A summary of current mercury results and adjacent historic sampling stations is shown on Figure 14. Historic data from 1996 to 2002 showed a significant reduction in mercury values, except in the vicinity of Unit 5B. This unit has been identified as a high wave energy environment with lower rates of net of sedimentation and natural recovery as compared to other areas of the site where mercury concentration reductions have been consistently observed (RETEC 2006). The current mercury concentrations in Unit 5B, which ranged from 0.5 to 2.64 mg/kg, are generally consistent with historic sampling data from 2002, when measured concentrations of mercury ranged from 0.73 to 2.55 mg/kg in the vicinity of Unit 5B. Confirmational bioassays were conducted in all of the surface sampling areas, except the one sample that exceeded the BSL (5B-06-SS). Results of bioassay testing are summarized in Section 6.2.

Surface sediment mercury concentrations in Units 6B and 6C continued to show a reduction in concentration from previous investigations. The reduction in mercury concentration is consistent with previously observed sediment quality improvement in this area (RETEC 2006). Current mercury concentrations within Units 6B and 6C are all below the Sediment Quality Standards (SQS; 0.41 mg/kg). Confirmational bioassays were also conducted to verify SMS compliance. Results of bioassay testing in this area are discussed in Section 6.2.

In addition to mercury testing, other heavy metals and tributyl tin (TBT) were analyzed at stations at the head of the waterway and adjacent to Colony Wharf in Unit 3A. None of the heavy metals exceeded SMS criteria. TBT, a common boatyard contaminant, was detected at only one station (3A-03-SS) at a concentration of 34 micrograms per kilogram (µg/kg). There is no bulk TBT SQS or Cleanup Screening Levels (CSL); however, the Puget Sound Dredged Disposal Analysis (PSDDA) screening level of 73 µg/kg is frequently used as a conservative screening-level for potential biological effects. The measured TBT concentrations were below the PSDDA screening level. As described in Section 6.2, confirmational bioassay testing was performed at this location, and no exceedances of bioassay interpretive criteria were noted.

SVOCs were also analyzed in surface sediment samples from the Inner Waterway and Outer Waterway areas. All surface sediment SVOC results were below SQS criteria, except for one exceedance of the chemical SQS for butylbenzyl phthalate at station 3A-03-SS. As described in Section 6.2, confirmational bioassay testing was performed at this location, and no exceedances of bioassay interpretive criteria were noted.

6.1.2 Results of Dioxin/Furan Testing

The cleanup of the Whatcom Waterway site is focused on the remediation of mercury contamination associated with releases from the former GP chlor-alkali plant. As described in the RI/FS (RETEC 2006) and the Consent Decree (Ecology 2007), the mercury contamination overlaps with contaminants associated with other cleanup sites (e.g., refuse-related contamination at the Cornwall Avenue Landfill site and contamination associated with former wood treating activities at the RG Haley site). Ecology is ensuring that investigation and remediation efforts in these areas of overlap are coordinated.

Dioxin/furan compounds are present in water and sediments of Puget Sound from multiple sources including historical releases and ongoing contributions from spills, stormwater, combined sewer overflows, atmospheric deposition and other sources. Along with the efforts of other regulatory and resource agencies, Ecology is working to better understand the distribution of these compounds in the environment, to develop a comprehensive strategy to reduce ongoing inputs of these compounds to the environment, and to mitigate past releases through cleanup and monitoring efforts. This work is being developed under various regulatory authorities and programs including Ecology's water quality program, the regional air pollution control programs, spill prevention and control programs, the Puget Sound Partnership, and Ecology's Toxics Cleanup Program.

There are currently no SMS numeric criteria for dioxin/furans in sediment or tissue. As part of its coordinated, multi-program strategy for control of these compounds, Ecology has stated that its long-term goal is to reduce environmental concentrations of dioxin/furans to natural background levels where possible (Ecology 2010a). For Puget Sound's urban bays, Ecology is developing a coordinated source control and remediation strategy in order to reduce ongoing contaminant inputs and to remediate and monitor existing sediment and tissue concentrations. Ecology is developing methods for defining natural background and regional background concentrations for sediments, and is pursuing development of additional background tissue data to estimate natural background concentrations and regional background concentrations of these compounds in the food chain.

Ecology's strategy for management of low-level bioaccumulatives such as dioxin/furans is expected to be implemented over the coming decades through updates to multiple state regulations. Updates to the MTCA/SMS regulations, potentially including updates to procedures for addressing low-level dioxin/furans in urban bays, are anticipated to be completed in 2011 (Ecology 2010a). The time-frame for updates to other regulatory programs varies.

Two separate studies (SAIC 2008; Ecology and Hart Crowser 2009) were recently performed to document current surface sediment concentrations of dioxins/furans within Bellingham Bay. Additional testing is in progress in coordination with the work of the Urban Waters Initiative (Ecology 2010b). Results of the two completed studies are presented on Figure 15, along with the results of PRDI testing samples analyzed as part of the current work. Locations of the Urban Waters Initiative sampling locations are shown on the figure, but analytical data from that testing event are not yet available. Results of the completed testing are similar to findings from other urban bays throughout Puget Sound, documenting higher regional background concentrations in urban bays, and lower concentrations in deep-water areas of the Puget Sound Main Basin (EPA 2008; Ecology 2010c).

Concentrations of dioxins/furans on Figure 15 are expressed as the 2,3,7,8-toxicity equivalents (TEQ) that were calculated using current mammalian toxicity equivalency factors (developed by the World Health Organization [WHO] in 2005 as published by WHO in 2006) and assuming that non-detected congeners are present at one-half of the method reporting limit. Concentrations are presented both on a dry weight basis, and on a carbon-normalized basis. Carbon normalization has been shown to be an important factor to consider when evaluating the bioaccumulation potential for dioxin/furan compounds and similar bioaccumulative compounds. Organic carbon influences bioavailability by affecting equilibrium partitioning between sediments and water, and by affecting the rates of ingestion-related contaminant uptake by benthic organisms (Burkhard 2005). In some cases where there are significant inputs of different types of organic carbon (e.g., soot-carbon along with other forms of bio-available organic carbon) carbon normalization alone does not resolve all differences in bioavailability (Weisbrod et al 2009).

Chart 2 compares the results of sampling within the Whatcom Waterway Site to results from other testing within Bellingham Bay. Dioxin/furan concentrations (expressed as TEQ) in surface sediment ranged from 1.11 ng/kg to 169 ng/kg dry weight (46 to 7,101 ng/kg TOC). The highest surface concentrations measured within the bay are those from the RG Haley site, a former pentachlorophenol wood treating operation and a known source of dioxin/furan contamination. Those concentrations are roughly ten times those measured in surface sediments within the Whatcom Waterway site. Ecology is overseeing remedial investigation and feasibility study work at the RG Haley site. The concentrations measured within Units 1 & 9 of the Whatcom Waterway site (3.21 to 14.8 ng/kg dry weight, or 140 to 628 ng/kg TOC) and those from the Boulevard Park nearshore areas (1.11 to 16.1 ng/kg dry weight, or 46 to 460 ng/kg TOC) are within the range of concentrations measured for the remainder of the urban portions of Bellingham Bay (1.5 to 21.97 ng/kg dry weight, or 65.2 to 1,022 ng/kg TOC).

Chart 2 also presents sediment data developed by EPA, Ecology and other resource agencies for the Puget Sound Main Basin and selected reference areas. Sediments from these offshore, deep-water areas and clean reference areas typically contain lower dioxin/furan concentrations than sediments from urban bays. These reference concentrations can be expressed by the concentration ranges (0.062 to 11.3 ng/kg dry weight or 8.8 to 2,319 ng/kg TOC), or using statistical values such as estimates of the true 90th percentile concentration (3.66 to 4.07 ng/kg dry weight or 249 to 283 ng/kg TOC). These concentration ranges overlap with those detected within the Whatcom Waterway site and other portions of Bellingham Bay.

Chart 2
Summary of Recent Dioxin/Furan Testing Results – Bellingham Bay and Reference Sites

	Reported Concentrations (ng/kg as TEQ; ND = ½ RL)[1]		
Sample Locations	**Minimum**	**Maximum**	**Number of Samples**
Dioxin/Furan TEQ as ng/kg sediment dry weight (ng/kg)			
Whatcom Waterway Samples (Units 1 & 9)	3.21	14.8	N = 4 (additional subsurface data)
RG Haley Nearshore Samples	80.5	169	N = 3 (additional subsurface data)
Boulevard Park Nearshore Samples	1.11	16.1	N = 3 (additional subsurface data)
Other Bellingham Bay Samples	1.5	21.97	N = 15 (90th percentile concentration estimated 14.8 to17.3 ng/kg)[2]
Puget Sound Main Basin & Reference Site Samples	0.062	11.3	N = 97 (90th percentile concentration estimated 3.66 to 4.07 ng/kg)[3]
Dioxin/Furan TEQ as ng/kg organic carbon (ng/kg TOC)[3]			
Whatcom Waterway Samples (Units 1-9)	140	628	N = 4 (additional subsurface data)
RG Haley Nearshore Samples	1,949	7,101	N = 3 (additional subsurface data)
Boulevard Park Nearshore Samples	46	460	N = 3 (additional subsurface data)
Other Bellingham Bay Samples	65.2	1,022	N = 15 (90th percentile concentration estimated 669 to787 ng/kg)[2]
Puget Sound Main Basin & Reference Site Samples	8.8	2,319	N = 97 (90th percentile concentration estimated 249 to 283 ng/kg)[3]

Notes:

1. TEQs were calculated using the 2005 WHO toxicity equivalency factors developed for mammalian receptors.
2. 90th percentile concentrations for Bellingham Bay data were calculated using ProUCL software. The range reflects 90th percentile estimates calculated assuming a gamma distribution, and also using the 95% BCA Bootstrap upper tolerance limit with 90 percent coverage.
3. Organic carbon normalization was performed using available data. Where TOC data for Bellingham Bay samples were not available, the average Bellingham Bay surface sample TOC concentration (2.3 percent) was assumed. Where measured TOC concentrations were less than 0.5% (12 Puget Sound Main Basin & reference samples) a TOC concentration of 0.5% was used for TOC normalization. Where measured TOC concentrations were more than 3.5% (1 Boulevard Park sample and 1 Puget Sound Main Basin sample) a TOC concentration of 3.5% was used for TOC normalization.
4. 90th percentile concentrations for Bellingham Bay data were calculated using ProUCL software. The range reflects outputs of 90th percentile estimates calculated assuming a gamma distribution, and also using the 95% BCA Bootstrap upper tolerance limit with 90 percent coverage. Estimates were developed using both the ND=1/2 RL and K-M substituted results. The K-M estimates are slightly lower than those calculated using ND = ½ RL assumptions.

Consistent with the findings from other urban bays in Washington, the Bellingham Bay concentrations generally exceed those measured in the offshore portions of the Puget Sound Main Basin and selected reference site areas. Repeated testing of historical sampling locations performed by Ecology as part of the recent Bellingham Bay study demonstrated substantial concentration reductions over time, attributable to natural recovery processes (Ecology and Hart Crowser 2009). Ecology has proposed additional regional studies to improve the understanding of surface concentration distributions, facilitate statistical comparisons between Bellingham and other urban bays, and evaluate potential source control and natural recovery processes for these compounds in Bellingham Bay (Ecology 2010c).

In addition to testing of sediments, tissue testing has been performed within Bellingham Bay as described in the RI/FS (RETEC 2006) and in studies performed on behalf of the DMMP (SAIC 2008). These studies document that tissue dioxin/furan concentrations in commonly consumed seafood items are very low, similar to or less than in samples of tissue collected from clean reference sites. As documented in the RI/FS, crab testing data from the early 1990s (PTI, 1991) showed that crab muscle dioxin/furan concentrations were below those in clean reference areas. Follow-up testing was recently performed on behalf of the DMMP (SAIC 2008). That testing included measurement of crab muscle tissue concentrations. Concentrations of dioxins/furans in crab muscle (0.07 to 0.11 ng/kg) were within the low end of the range (0.018 to 1.375 ng/kg) documented at clean reference sites in Washington and southern British Columbia (Chart 3).

Chart 3
Comparison of Recent Crab Tissue Testing Results from Bellingham Bay and Selected Non-Urban Sampling Locations

Sample Locations	Dungeness Crab Muscle (ng/kg wet weight as TEQ; ND = ½ RL)[1]		Number of Samples
	Minimum	Maximum	
Bellingham Bay (SAIC 2008)	0.07	0.11	N = 3
Samish Bay (Ecology 2000)	1.375	1.375	N = 1
Hat Island (Ecology 2000)	1.131	1.131	N = 1
Port Gamble (Hart Crowser 2010)	0.37	0.37	N = 1
Freshwater Bay (Malcolm Pirnie 2007)	0.018	0.044	N = 8
Dungeness Bay (Malcolm Pirnie 2007)	0.025	0.054	N = 7
Pedder Bay (SLR 2009)	0.21	0.48	N = 3

Notes:

TEQs were calculated using the 2005 WHO toxicity equivalency factors developed for mammalian receptors.

6.1.3 Mercury Speciation Data

Mercury speciation (methyl mercury) testing was conducted at selected surface sediment stations. Results of this testing are described below in section 6.3.2.

6.2 Surface Sediment Biological Testing

In order to refine the horizontal extent of capping areas at Units 5 and 6 and to evaluate current sediment quality conditions in certain other MNR areas identified by Ecology for further testing, biological testing was conducted at 20 of the on-site surface sediment stations listed in Chart 1. Consistent with the PRDI Work Plan, surface sediments (0-12 cm) for biological testing were collected between August 15 and September 15 (samples were collected on August 20, 21, and 22, 2008). Bioassay testing was performed using 22 test stations, including samples collected from Site Units 3A, 5B, 5C, 6B, and 6C, as well as samples collected from two reference stations in Samish Bay. The PRDI on-site bioassay collection stations are shown on Figure 14 along with adjacent historic sampling locations from 1996/1998 and 2002.

Sediment samples submitted for bioassay testing were archived sample splits of the test samples submitted for chemical testing. Reference samples consisted of samples REF-01-SS and REF-02-SS, which contained 94 percent fines and 98 percent fines, respectively. These two reference sediment stations were sampled consistent with previous reference sample collection locations and a more sandy reference sample was not available at the time of sampling. Test samples were compared to both reference samples due to the similarity in grain size.

Marine bioassay testing species were selected in coordination with Ecology and based on grain size, salinity, and collection season. The following tests and species were used in accordance with the PRDI Work Plan:

- 10-Day Acute Toxicity Amphipod Test (*Eohaustorius estuarius)*
- Larval Development Test (*Dendraster excentricus)*
- 20- Day Juvenile Polychaete Chronic Toxicity Test (*Neanthes arenaceodentata)*

This section provides a summary of bioassay test results. SMS biological effects criteria are presented in Table 9. The results of bioassay testing are presented in Tables 10, 11, and 12. Table 13 provides an assessment of performance criteria for control and reference samples. Table 14 presents the biological endpoint evaluation, which summarizes the samples that pass or fail when compared to SQS and CSL performance criteria. The complete biological laboratory report, chain of custody, and laboratory data are provided in Appendix H.

6.2.1 10-Day Acute Toxicity Amphipod Test

Results of the 10-day acute toxicity test using *Eohaustorius estuarius* are presented in Table 10. Bioassay testing was initiated within designated hold times for test and reference samples on October 7, 2008. Test conditions and methods were in compliance with PSEP (1995), SAPA (Ecology 2008), and the various updates presented during the SMARM in 2009. The test met SMS quality control requirements for the control and reference samples, as shown in Tables 13 and 14. Bioassay endpoint evaluations were determined using statistical testing and SMS criteria. As indicated in Table 14, all samples met SQS and CSL biological criteria.

A detailed summary of results is provided in Table 10 of the Biological Testing of Sediment for Whatcom Waterway in Appendix H (Newfields 2008).

6.2.2 Larval Development Test

Results of the larval development test using *Dendraster excentricus* are presented in Table 11. Bioassay testing was initiated within designated hold times for test and reference samples on October 10, 2008. Test conditions and methods were in compliance with PSEP (1995), SAPA (Ecology 2008), and the various updates presented during the SMARM in 2009. The test met SMS quality control requirements for the control and reference samples, as shown in Tables 13 and 14. Bioassay endpoint evaluations were determined using statistical testing and SMS criteria. As indicated in Table 14, all samples met SQS and CSL criteria. A detailed summary of results is provided in Tables 14 and 15 of the Biological Testing of Sediment for Whatcom Waterway in Appendix H (Newfields 2008).

6.2.3 20-Day Juvenile Polychaete Chronic Toxicity Test

Results of the 20- day juvenile polychaete chronic toxicity test using *Neanthes arenaceodentata* are presented in Table 12. Bioassay testing was initiated within designated hold times for test and reference samples on October 8, 2008. Test conditions and methods were in compliance with PSEP (1995), SAPA (Ecology 2008), and the various updates presented during the SMARM in 2009. The control sample met SMS quality control requirements, but growth in each of the reference samples was slightly below SMS reference criteria, as shown in Tables 13 and 14. This was due to control performance that was well above minimum growth requirements (especially in one very high replicate) and the fact that both reference samples had greater than 90 percent fines, which could have contributed to lower growth.

Because of the lower relative reference growth, the test sample growth was compared to control growth. When compared to the control sample, all samples met SMS criteria, with the exception of sample 5B-01-SS. Growth in 5B-01-SS was 69 percent of control growth, which was slightly below the SQS criteria of 70 percent. When compared to the reference growth, sample 5B-01-SS had higher growth than REF-01-SS and met SQS criteria when compared to REF-02-SS. Per discussion with Ecology, it was agreed that based on these factors, especially the high control growth, sample 5B-01-SS was determined to pass SQS criteria (Adolphson 2009).

6.2.4 Summary of Bioassay Testing

Bioassay endpoint evaluations were determined using statistical testing and SMS criteria. As indicated in Chart 1 and Table 14, all samples submitted for bioassay testing complied with current SQS and CSL interpretive criteria. A detailed summary of results is provided in Tables 10 to 15 of the Biological Testing of Sediment for Whatcom Waterway in Appendix H (Newfields 2008).

6.3 Sediment Cap Design Parameters

Two types of data were collected in surface sediments to assist in the design of sediment caps. These included testing for sediment porewater mercury concentrations, and testing for mercury speciation (total vs. methyl mercury). These data are to be used in conjunction with geotechnical data, wind/wave modeling information, and other design parameters, to evaluate potential cap design requirements.

6.3.1 Sediment Porewater Testing

Sediment porewater mercury concentration data were collected at selected locations within Unit 2C, Unit 5B, and in Units 6B/6C. Two porewater sampling locations were tested in each of these site areas. Porewater testing included total dissolved solids and dissolved mercury. In situ water quality parameters were also measured at the time of sampling and included pH, temperature, conductivity, dissolved oxygen, and oxidation-reduction potential (redox).

Results of sediment porewater testing are presented in Table 8. Sediment porewater analytical laboratory reports are included in Appendix G. All sediment porewater dissolved mercury results were reported at non-detect concentrations (less than 0.1 µg/L).

6.3.2 Surface Sediment Mercury Speciation Testing

Surface sediment methyl mercury sampling was performed at a total of six on-site sampling locations (Units 1B, 1C, 2C, 6B, and 5C) and at one off-site reference location (Samish Bay).

In situ sediment parameters were also measured directly from the Van Veen sampler and included pH, temperature, conductivity, dissolved oxygen, and redox potential.

Results of methyl mercury testing are presented in Table 7, including measured concentrations of total mercury and methyl mercury. Relative concentrations of methyl mercury (as a percentage of total mercury) were calculated and also presented in Table 7.

As measured by relative methyl mercury concentrations, no areas of elevated methyl mercury production were noted. All relative methyl mercury concentrations were less than 2 percent (range 0.18 to 1.8 percent) with a maximum percentage of 1.8 percent from the surface sediment sample in Unit 1C dredge area. The relative concentration of methyl mercury from the off-site reference area was 0.84 percent. These measured values are consistent with typical literature values, which indicate that methylmercury typically makes up less than 2 percent of total mercury in shallow surface sediments of other U.S. bays and harbors (e.g., Benoit et.al. 2005; Hollweg et.al. 2009). Surface sediment methyl mercury analytical laboratory reports are included in Appendix G.

7 SUBSURFACE SEDIMENT TESTING

This section summarizes subsurface chemical testing data collected throughout the Site. The subsurface testing was conducted using a combination of vibracore, hollow-stem auger, mud-rotary, and diver-assisted piston core sampling methods as described in Section 2.

Figures 6 and 7 present the subsurface vibracore sampling locations. Locations of sampling conducted by hollow-stem auger, mud-rotary or diver-assisted piston core sampling are shown on Figure 8. Tables 15a to 15d present a summary of the ASB subsurface sediment chemical analytical results, and Tables 16 to 19 present the summary of subsurface analytical results for areas of the Whatcom Waterway and adjacent areas. Key observations from subsurface sampling are described below.

7.1 ASB Subsurface Testing

Three types of sampling were conducted in the ASB area (Site Unit 8). These included sampling of shallow subsurface sediments beneath the ASB bottom (Section 7.1.1), sampling of shallow berm sediments beneath the ASB sludges (Section 7.1.2), and sampling of deep berm sand and native sand materials beneath the ASB berms (Section 7.1.3).

7.1.1 Sampling Beneath the ASB Bottom

Chart 4 and Tables 15a and 15b summarize the results of subsurface sediment testing that was performed at 25 locations beneath the ASB bottom. Sampling was focused on discrete (1-foot thick) sampling intervals below the ASB “hard bottom” (the contact between the ASB sludge/bentonite layer and the underlying native sands). Sample depths presented in Tables 15a and 15b are listed as in situ depths below the “hard bottom” contact.

At all 25 test locations, Tier 1 analyses for mercury, total organic carbon, and total solids were performed at three depth intervals (1 to 2, 2 to 3, and 3 to 4 feet) below the “hard bottom” contact. No exceedances of the mercury SQS were noted in any of these samples, indicating that elevated mercury concentrations were confined to the ASB sludge layer within the ASB.

Tier 2 sampling parameters were performed at selected locations. These analyses included cadmium, chromium, zinc, SVOCs, guaiacols, and dioxin/furans. No exceedances of SQS criteria were noted for any of these compounds. Guaiacols were not detected in any of the samples. Results of dioxin/furan testing are summarized in Chart 4. A total of 15 sediment samples were tested for dioxin/furans. Dioxin/furan testing was performed at each primary-grid station (8-01-VC to 8-09-VC) and deeper intervals were tested based on the upper interval dioxin/furan TEQ concentration. Dioxin/furan concentrations declined sharply with depth below the ASB "hard bottom" contact. Concentrations in the first sampling interval ranged between 0.182 and 23.1 ng/kg TEQ. Concentrations in the second interval ranged from 0.248 to 7.02 ng/kg TEQ, and were even lower (0.106 ng/kg) in the third sampling interval.

As described in Section 6.1, dioxin/furan compounds do not have numeric SMS criteria. The criteria applicable to dredge material management decisions vary depending on the destination of the generated sediments. Potentially applicable criteria for different management options may include one or more of the following, depending on the nature of the material management action:

- **DMMP Criteria for Open-Water Disposal:** The DMMP criteria for open-water disposal are undergoing re-evaluation. Under the previous DMMP Interim Guidelines, concentration limits per dredged material management unit ranged from a mean of 2.4 to 8.7 ng/kg TEQ with a maximum of 5.2 to 12.2 ng/kg TEQ, depending on the non-dispersive disposal site. Other criteria applied to dispersive sites. Recently, the DMMP has proposed updated testing and suitability criteria. The April 2010 proposal released by the DMMP for public review includes a tiered testing structure, with multiple project testing and suitability criteria. Under this proposal, bioaccumulation testing is required for sediments containing dioxin/furan concentrations greater than 10 ng/kg TEQ. The April 2010 proposal has not yet been finalized.
- **MTCA Criteria for Unrestricted Upland Reuse:** The direct contact MTCA Method B cleanup level for unrestricted reuse (e.g., residential soil) is 11 ng/kg. Additional restrictions may apply to unrestricted upland reuse of dredged materials.

- **MTCA Criteria for Restricted Upland Reuse:** The direct contact MTCA Method C cleanup level for industrial soils is 1,500 ng/kg. Additional restrictions may apply to industrial reuse of dredged materials.
- **Antidegradation Policy:** Sediment cleanup actions must comply with the SMS antidegradation policy, meaning that post-cleanup sediments exceeding background concentrations or other defined cleanup levels must be equal to or less than the concentrations existing prior to the cleanup action. Ecology seeks to reduce surface sediment concentrations through cleanup actions, point and non-point source control measures and through monitoring activities.
- **Solid Waste Disposal Facility Criteria:** Materials managed by subtitle D disposal (including reuse as daily cover and/or disposal as solid waste) must comply with applicable facility standards, including concentration limits on dioxin/furans contained in the Dangerous Waste regulations.

Chart 4

Subsurface Sediment Mercury and Dioxin/Furan Testing Results - ASB Bottom

Transect	Depth Below Hard Bottom[1]	Total Mercury (mg/kg dry wt.) and Dioxin/Furan TEQ[2] (ng/kg dry wt.)									
Transect 1		***8-01-VC***		***8-10-VC***		***8-02-VC***		***8-11-VC***		***8-03-VC***	
		Hg	D/F	Hg	D/F	Hg	D/F	Hg	D/F	Hg	D/F
	1-2 ft	0.09	23.1	0.09	4.50	0.06U	0.576	0.06U	--	0.05U	1.89
	2-3 ft	0.06U	7.02	0.07U	1.78	0.06U	--	0.06U	--	0.05U	--
	3-4 ft	0.07U	0.106	0.06U	--	0.05U	--	0.05U	--	0.05U	--
Transect 2		***8-12-VC***		***8-13-VC***		***8-14-VC***		***8-15-VC***		***8-16-VC***	
	1-2 ft	0.06U	--	0.06U	--	0.06U	--	0.05U	--	0.05U	--
	2-3 ft	0.06U	--	0.06U	--	0.06U	--	0.06U	--	0.05U	--
	3-4 ft	0.06U	--	0.06U	--	0.06U	--	0.06U	--	0.06U	--
Transect 3		***8-04-VC***		***8-17-VC***		***8-05-VC***		***8-18-VC***		***8-06-VC***	
	1-2 ft	0.05U	1.90	0.05U	--	0.05U	0.433	0.06U	--	0.05U	0.626
	2-3 ft	--	--	0.06U	--	0.06U	--	0.06U	--	0.04U	--
	3-4 ft	--	--	0.06U	--	0.04U	--	0.05U	--	0.05U	--
Transect 4		***8-19-VC***		***8-20-VC***		***8-21-VC***		***8-22-VC***		***8-23-VC***	
	1-2 ft	0.05U	--	0.05U	--	0.05U	--	0.05U	--	0.06U	--
	2-3 ft	0.05U	--	0.05U	--	0.06U	--	0.05U	--	0.05U	--
	3-4 ft	--	--	0.05U	--	0.05U	--	0.06U	--	0.05U	--
Transect 5		***8-07-VC***		***8-24-VC***		***8-08-VC***		***8-25-VC***		***8-09-VC***	
	1-2 ft	0.06	1.25	0.05U	--	0.04U	0.182	0.1	4.46	0.19	12.7
	2-3 ft	0.05U	--	0.05U	--	0.05U	--	0.05U	0.248	0.05U	0.508
	3-4 ft	0.05U	--	0.05U	--	0.04U	--	0.05U	--	0.04U	--

Notes:

Transects and station locations are presented on Figure 6.

Primary-grid stations include 8-01-VC to 8-09-VC and secondary-grid stations include 8-10-VC to 8-25-VC.

Tables 15a and 15b present the detailed results for all ASB primary and secondary-grid sampling.

Mercury data were compared to the chemical SQS (0.41 mg/kg), the CSL (0.59 mg/kg), and the BSL (1.2 mg/kg). There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.

1 – Sample intervals are presented as below the ASB solids/sand (hard bottom) interface.

2 - TEQ values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a concentration equal to ½ the detection limit (ND=1/2).

-- Sample was not submitted for chemical analysis.

7.1.2 ASB Interior Sloping Berm

Chart 5 and Table 15c summarize the results of shallow subsurface testing conducted along the ASB berm interior. Sample depths presented in Table 15c are listed as in situ depths below the "hard bottom" contact. Sampling included testing along 12 transects as shown on Figures 6 and 8, with a "B" and "C" station at each transect. The "B" stations were collected from approximately +14 feet MLLW and the "C" stations were collected from approximately 0 MLLW on the berm interior sloping surface. Sampling was focused on 1-foot intervals below the "hard bottom" contact beneath the ASB sludges.

Tier 1 testing (total mercury, total organic carbon, and total solids) was conducted at three depth intervals (1 to 2, 2 to 3, and 3 to 4 feet) below the sludge/sediment interface in each of the cores. As shown in Chart 3, mercury concentrations in all of the sampling intervals were below the SQS, with the maximum detected concentration measuring 0.27 mg/kg.

Selected subsurface samples were tested for Tier 2 analyses, including cadmium, chromium, zinc, SVOCs, guaiacols, and dioxin/furans. No exceedances of SQS criteria were noted for any of the Tier 2 compounds. Guiacols were not detected in any of the tested samples. Dioxin/furan concentrations decreased rapidly with depth. Concentrations detected in the 1 to 2 foot samples ranged from 0.24 to 23.9 ng/kg TEQ. In the 2 to 3 foot samples, the highest measured concentration was 3.93 ng/kg. These concentrations are well below background concentrations for the Puget Sound Main Basin or Puget Sound urban bays (see Chart 2).

Chart 5

Subsurface Sediment Mercury and Dioxin/Furan Testing Results - ASB Interior Sloping Berms

Transect	Depth Below Hard Bottom[1]	Total Mercury (mg/kg dry wt.) and Dioxin/Furan TEQ[2] (ng/kg dry wt.)									
North Berm		***8-109B-VC***		***8-109C-VC***		***8-110B-VC***		***8-110C-VC***		***8-111C-VC***	
		Hg	**D/F**	**Hg**	**D/F**	**Hg**	**D/F**	**Hg**	**D/F**	**Hg**	**D/F**
	1-2 ft	0.05U	1.24	0.04U	0.602	0.08	0.288	0.05U	0.459	0.05U	13.7
	2-3 ft	0.04U	--	0.05U	--	0.05U	--	0.04U	--	0.05U	3.93
	3-4 ft	0.04U	--	0.04U	--	0.04U	--	0.05U	--	0.05U	--
East Berm		***8-112B-VC***		***8-112C-VC***		***8-101B-VC***		***8-101C-VC***		***8-102C-VC***	
	1-2 ft	0.27	23.9	0.06U	1.01	0.05	1.14	0.05U	0.393	0.09	3.90
	2-3 ft	0.04U	0.455	0.05U	--	0.05U	--	0.05U	--	0.04U	--
	3-4 ft	0.04U	--	0.05U	--	0.04U	--	0.04U	--	0.05U	--
South Berm		***8-103B-VC***		***8-103C-VC***		***8-104B-VC***		***8-104C-VC***		***8-105C-VC***	
	1-2 ft	0.05U	0.240	0.17	5.27	0.05U	0.389	0.04U	0.501	0.04U	0.822
	2-3 ft	0.04U	--	0.05U	--	0.06U	--	0.05U	--	0.05U	--
	3-4 ft	0.04U	--	0.05U	--	0.06U	--	0.05U	--	0.05U	--
West Berm		***8-106B-VC***		***8-106C-VC***		***8-107B-VC***		***8-107C-VC***		***8-108C-VC***	
	1-2 ft	0.04U	0.294	0.05U	0.365	0.05U	16.8	0.05	0.290	0.04U	0.680
	2-3 ft	0.04U	--	0.05U	--	0.05U	0.280	0.05U	--	0.05U	--
	3-4 ft	0.04U	--	0.06U	--	--	--	--	--	0.04U	--

Notes:
Berm identification and station locations are presented on Figure 6.
Table 15c presents the detailed results for all ASB interior sloping berm sampling.
Mercury data were compared to the chemical SQS (0.41 mg/kg), the CSL (0.59 mg/kg), and the BSL (1.2 mg/kg). There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.
1 – Sample intervals are presented as below the ASB solids/sand (hard bottom) interface.
2 –TEQ values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a concentration equal to ½ the detection limit (ND=1/2).
-- Sample was not submitted for chemical analysis.

7.1.3 ASB Deep Sand Composites

Chart 6 and Table 15d summarize the results of chemical and physical testing for the deep sand composites collected beneath the ASB berm. These samples were collected using a combination of hollow-stem auger and vibracore sampling methods. Sample compositing was performed as described in Section 2.

The chemical analytical results for all ASB deep sand composites were below applicable SMS chemical criteria. Chemical and physical testing results are summarized in Table 15d. Chart 6 summarizes measured total mercury concentrations. All mercury results were below reported detection limits. Dioxin/furan concentrations were detected at concentrations ranging from 0.215 ng/kg TEQ (8-105C-C2) to 0.368 ng/kg TEQ (8-101BC-C2). These concentrations are well below background concentrations for the Puget Sound Main Basin or Puget Sound urban bays (see Chart 2).

Chart 6
Subsurface Sediment Mercury and Dioxin/Furan Testing Results - Composites Beneath ASB Berm

	Total Mercury (mg/kg dry wt.) and Dioxin/Furan TEQ[1] (ng/kg dry wt.)					
Transect	**Hg**	**D/F**	**Hg**	**D/F**	**Hg**	**D/F**
North Berm	***8-109C-C2***		***8-110BC-C2***		***8-111C-C2***	
	0.04U	0.355	0.05U	0.335	0.05U	0.341
East Berm	***8-112C-C2***		***8-101BC-C2***		***8-102C-C2***	
	0.05U	0.223	0.05U	0.368	0.05U	0.304
South Berm	***8-103C-C2***		***8-104BC-C2***		***8-105C-C2***	
	0.05U	0.312	0.05U	0.307	0.05U	0.215
West Berm	***8-106C-C2***		***8-107***		***8-108***	
	0.05U	0.245	--	--	--	--

Notes:
Berm identification and station locations are presented on Figures 6 and 8.
Tables 2a and 3a presents the sample composite identification and depth intervals. Those sample IDs with both a "BC" include a composite from both the "B" and "C" stations. Those sample IDs with only a "C" include a composite from only the "C" station.
Table 15d presents the detailed results for all ASB interior sloping berm sampling.
Mercury data were compared to the chemical SQS (0.41 mg/kg), the CSL (0.59 mg/kg), and the BSL (1.2 mg/kg). There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.
1 – TEQ values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a concentration equal to ½ the detection limit (ND=1/2).
-- Sample was not submitted for chemical analysis.

7.2 Inner Waterway Subsurface Testing

Subsurface sampling within the Inner Waterway was primarily focused on geotechnical analyses in proposed dredge areas. In planned monitored natural recovery areas (Units 3A and 5C) subsurface testing also included chemical testing to assist in the evaluation of sediment stability. In addition, selected samples from shallow subsurface sediments (Unit 3B) were collected for disposal profiling including Toxicity Characteristic Leaching Procedure (TCLP) and Synthetic Precipitation Leaching Procedure (SPLP) leachate testing. A composite from Unit 3B shallow sediments was also developed for MET and DRET testing. Results of disposal profiling are summarized in Section 7.7. Other subsurface testing data from inner waterway areas are summarized in Section 7.2 below.

7.2.1 Dredge and Cap Areas (Unit 3B)

Subsurface sediment testing within Unit 3B consisted of 1 station (3B-01-VC) with discrete sampling at depth intervals of 1 to 3, 4 to 6, 7 to 9, and 9 to 12 feet below mudline. One depth interval (1 to 3 feet) was analyzed for total mercury and all depth intervals were tested for physical parameters. Chemical and physical testing results and actual (in situ) sample depths are summarized in Table 16. The mercury concentration from sample 3B-01-VC (1 to 3 feet below mudline) was 0.83 mg/kg, above the CSL of 0.59mg/kg.

7.2.2 Capping Area (Unit 2C)

The design for subsurface sediment testing within Unit 2C consisted of 2 stations (2C-01-VC and 2C-02-VC) with discrete sampling at depth intervals of 1 to 3, 4 to 6, and 7 to 9 feet below mudline. All depth intervals were tested for physical parameters. Physical testing results are summarized in Table 16.

7.2.3 Head of Waterway MNR Area (Unit 3A)

Subsurface sediment testing within Unit 3A included 5 stations with discrete sampling at depth intervals of 1 to 3, 4 to 6, and 7 to 9 feet below mudline. Subsurface sediment samples in Unit 3A were analyzed for metals, TBT, and SVOCs from the 1 to 3 and 4 to 6 feet intervals. Total mercury was also tested in the 7 to 9 feet intervals.

The chemical and physical results for the Unit 3A shallow subsurface stations are presented in Table 16. Chart 7summarizes the total mercury results for both the shallow subsurface testing data and the corresponding surface sampling results. Mercury results did not exceed the chemical SQS in any of the surface samples within Unit 3A, or in any of the subsurface samples at the core location at the mouth of Whatcom Creek (3A-02). In the other subsurface samples, mercury concentrations generally increased with depth below mudline. No BSL exceedances were noted in the 1 to 3 feet sampling intervals in any core location.

Chart 7

Subsurface Sediment Mercury Testing Results - Unit 3A (Head of Waterway)

Location	Sampling Depths[1]	Total Mercury (mg/kg dry wt.)		
North Side		***3A-01***		***3A-02***
	Surface (0-12 cm)	0.20		0.13
	1-3 ft	0.21		0.30
	4-6 ft	0.56		0.12
	7-9 ft	1.5[2]		0.20
Middle			***3A-03***	
	Surface (0-12 cm)		0.09	
	1-3 ft		0.60	
	4-6 ft		3.3[2]	
	7-9 ft		6.3[2]	
South Side		***3A-04***		***3A-05***
	Surface (0-12 cm)	0.40		0.40
	1-3 ft	0.98		1.0
	4-6 ft	4.6[2]		3.9[2]
	7-9 ft	4.4[2]		1.8[2]

Notes:

🟨 Detected concentration is greater than SMS SQS screening level (0.41 mg/kg)

🟩 Detected concentration is greater than SMS CSL screening level (0.59 mg/kg)

Table 16 presents the detailed results for all Unit 3A subsurface sediment sampling.

All five surface samples were analyzed for conformational bioassays, and no exceedances of biological SQS or CSL interpretive criteria were noted.

Sample 3A-03 from 4-6 ft also resulted in a SQS exceedence for acenaphthalene, fluorene, and dibenzofuran.

Sample 3A-04 from 4-6 ft also resulted in a CSL exceedence for 2,4-dimethylphenol.

Sample 3A-05 from 4-6 ft also resulted in a CSL exceedence for 4-methylphenol.

1. Sample intervals are presented as below mudline. Surface sediment was collected from 0-12cm below mudline.
2. Measured mercury concentration in subsurface sediments exceeds both the CSL and the site-specific BSL (1.2 mg/kg) applicable to surface sediments.

Subsurface sediment sample results for other metals were all below applicable SQS chemical criteria. No other test parameters exceeded screening levels in the 1 to 3 foot sampling interval from any Unit 3A cores. In addition to heavy metals testing, bulk TBT and SVOCs were analyzed from the 1 to 3 and 4 to 6 feet intervals in Unit 3A. Bulk TBT was detected in all Unit 3A subsurface sediment samples, but at relatively low bulk TBT concentrations (concentrations ranged from 10 to 64 µg/kg, below the PSDDA screening level of 73 µg/kg). None of the SVOC concentrations exceeded applicable SQS criteria in the surface or 1 to 3 feet subsurface samples, though some exceedances were noted in deeper sediments. Detected SVOC concentrations above SQS, but below CSL criteria included acenaphthalene (47.2 mg/kg-OC), fluorene (38.5 mg/kg-OC), and dibenzofuran (27.3 mg/kg-OC) at station 3A-03-VC (4-6 feet depth). Two additional SVOCs, 4-methylphenol and 2,4-dimethylphenol, were detected above CSL criteria at concentrations of 1,000 µg/kg (3A-05-VC-4-6) and 40 µg/kg (3A-04-VC-4-6), respectively.

Results of subsurface testing in Unit 3A confirm that sediments in the natural recovery areas comply with SMS criteria in the surface sediments. No sediment quality exceedances were noted at the mouth of Whatcom Creek (core 3A-02) at any depth, and no exceedances of SQS other than mercury were noted in the 1 to 3 foot sampling intervals in any cores. None of the 1-3 foot sampling intervals contained exceedances of the mercury BSL in any cores. Deeper subsurface sediments in four of the cores contained contaminants (mercury and other compounds) at elevated concentrations, with the concentrations generally highest in the 4 to 6 foot or 7 to 9 foot sampling depths.

7.2.4 Marina Access Channel (Unit 2B)

Deeper subsurface chemical and physical testing was performed at sampling location 2B-01-VC (Figure 6). Testing in that core included physical sampling at depth intervals of 1 to 3, 4 to 6, and 7 to 9 feet below mudline. Chemical quality was tested in the depth interval of 9 to 12 feet below mudline for the DMMP suite of chemical testing. This sampling was intended to evaluate sediment quality at the depth of the proposed marina access channel. As a result of preliminary engineering design evaluations, the marina access channel location may change. The available information collected along the length of the ASB berm is sufficient to inform the subsequent engineering design. Table 16 presents the testing results. No exceedances of SMS criteria or DMMP screening levels were noted in this deep subsurface sample. Diethylphthalate was detected (80 ug/kg) above the Puget Sound LAET sediment quality value of 48 ug/kg. Dioxin/furan levels (0.34 ng/kg TEQ) were below background levels for the Puget Sound Main Basin and the urban bays.

7.2.5 Inner Waterway MNR Area (Unit 5C)

Chart 8 and Table 16 summarize the results of shallow subsurface sampling performed along the south side of the ASB (Unit 5C). That sampling included chemical and physical testing at three sampling locations. Chemical testing included mercury and SVOCs. No exceedances of SMS criteria were noted in subsurface sediment samples.

Chart 8

Subsurface Sediment Mercury Testing Results - Unit 5C (South of ASB MNR Area)

Transect	Sampling Depths[1]	Total Mercury (mg/kg dry wt.)		
		5C-01	*5C-02*	*5C-03*
North Side of Waterway	Surface (0-12 cm)[2]	0.12	--	0.31
	1-3 ft	0.04U	0.05U	0.16
	4-6 ft	0.05U	0.06U	0.05U
	7-9 ft	0.06U	0.06U	0.06U

Notes:
Table 16 presents the detailed results for all Unit 5C subsurface sediment sampling.
All Unit 5C subsurface sediment concentrations were below SQS criteria for mercury (0.41 mg/kg) and other compounds.
1. Sample intervals are presented as below mudline. Surface sediment was collected from 0-12cm below mudline.
2. Surface sediment stations are located adjacent to the associated subsurface sediment station above.
-- Sample was not submitted for chemical analysis.

7.3 Outer Waterway Subsurface Testing

Subsurface sediment testing was performed in two areas of the Outer Whatcom Waterway, including Units 1A/1B and 1C. That testing was primarily focused on collecting chemical and physical data to verify remedial dredge depths and evaluate materials handling options for dredged sediments. Subsurface sediment sampling in Unit 1C focused on chemical testing of sediment above and below the estimated known historic dredge depths and sampling of the slope areas beneath the BST wharf. Sediment sampling in Unit 1A and 1B focused on four 4-foot composites with sampling of those constituents not tested during previous dredge characterization testing performed as part of the PRDE investigations (Anchor 2003).

In addition, sediment samples from anticipated dredge intervals in Unit 1C and in Unit 1A and 1B composite samples were collected for disposal profiling including TCLP and SPLP leachate testing. One composite from Unit 1C and one composite from Unit 1A and 1B sediments were also developed for MET and DRET testing. Results of disposal profiling are provided in Section 7.7.

7.3.1 Bellingham Shipping Terminal (Unit 1C)

Subsurface sediment sampling in Unit 1C included testing at multiple depth intervals to assist with the development of dredge prisms for cleanup in this area. Subsurface sampling was performed at 8 offshore locations and at 7 stations beneath the BST wharf. Figure 16 summarizes the measured mercury concentrations for subsurface sediments collected from Unit 1C within the Outer Waterway, and Tables 17a (offshore sampling locations) and 17b (under-dock sampling locations) summarize the results of chemical and physical testing for these sampling locations.

Mercury concentrations in shallow subsurface sediment were higher than those in corresponding surface sediments. These results are consistent with historic evidence of sediment natural recovery.

Sampling of subsurface sediments was performed at multiple depth intervals to define the deepest extent of mercury contamination. The base of the mercury contamination ranged in elevation from between approximately elevations 34 feet below MLLW and 40 feet below MLLW. None of the Unit 1C subsurface sediment samples contained SMS criteria exceedances for any parameters other than mercury.

Figure 17 summarizes the results of dioxin/furan testing in subsurface samples collected from Unit 1C, as well as those collected from Units 1A and 1B. Dioxin/furan concentrations in subsurface sediments from Unit 1C were higher than corresponding surface sediment concentrations. The concentrations of dioxin/furans generally corresponded with total mercury concentrations (refer to Tables 17a and 17b) and alternated at similar elevations.

7.3.2 Outer Channel Area (Units 1A & 1B)

Subsurface testing in Units 1A and 1B included chemical testing of sample composites for constituents not previously tested during the PRDE investigations (Anchor 2003). This additional testing was required to assess material reuse and disposal options. Additional chemical testing parameters included volatile organic compounds (VOCs), guaiacols, and dioxins/furans. VOC sampling was performed on discrete cores at the time of processing rather than from homogenized composite samples to reduce the potential for volatilization during sampling.

The chemical and physical results and actual (in situ) sample depths for the Unit 1A and 1B composite subsurface sediment samples are summarized in Table 17c. VOC and guaiacol concentrations were below method reporting limits in all samples tested.

Measured subsurface dioxin/furan concentrations are shown on Figure 17. These concentrations ranged from 26.0 ng/kg TEQ (1A-01-VC-C1) to 39.8 ng/kg TEQ (1B-01-VC-C1). These concentrations were higher than the concentrations in corresponding surface samples from Unit 1B (13.4 ng/kg TEQ in surface sample 1B-01-SS). These concentrations exceed the concentration limits applied under the previous DMMP guidelines (maximum of 5.2 to 12.2 ng/kg TEQ for non-dispersive sites). These concentrations also exceed the bioaccumulation testing trigger (10 ng/kg dry weight) defined in the April 2010 proposed update to the DMMP guidelines. See Section 7.1.1. No bioaccumulation testing was performed as part of the current PRDI investigations. Therefore, additional testing, including bioaccumulation testing, would therefore be required in order to pursue management of the Unit 1A & 1B sediments under the DMMP. The Unit 1A/1B dioxin/furan concentrations are well below the MTCA Method C industrial soil cleanup levels (1,500 ng/kg; potentially applicable to controlled upland reuse of dredge materials as fill).

7.4 Unit 5B Subsurface Testing

Subsurface sediment testing was performed at three locations within Unit 5B. Both chemical and physical testing were performed at two of the sampling locations (5B-01-VC and 5B-02-

VC), with only physical testing performed at the third location (5B-03-VC). Three discrete sampling intervals (1 to 3 feet, 4 to 6 feet, and 7 to 9 feet below mudline) were chosen for chemical and physical analyses. Subsurface sediment samples in these Unit 5B cores were analyzed for mercury and SVOCs.

The chemical and physical results and actual (in situ) sample depths for Unit 5B subsurface sediment stations are summarized in Table 18. Total mercury concentrations in Unit 5B subsurface sediments are summarized in Chart 9. Mercury was not detected above the SQS in any of the subsurface samples collected from immediately adjacent to the ASB (5B-02-VC). In the offshore sampling location (5B-01-VC), elevated mercury levels (10.2 mg/kg) were measured in the 1 to 3 foot sampling interval. Mercury concentrations in deeper sampling intervals from the offshore core were below applicable SQS criteria.

Chart 9
Subsurface Sediment Mercury Testing Results - Unit 5B

5B-01-VC				
	Concentrations (mg/kg dry wt)			
Interval[1]	**Hg**	**Phenol**	**4-MP**	**2,4-DMP**
SQS	0.41	0.42	0.67	0.029
CSL	0.59	1.2	0.67	0.029
1-3 ft	10.2[2]	0.060	0.082	0.0062U
4-6 ft	0.41	0.024	0.038	0.0061U
7-9 ft	0.17	0.020U	0.015	0.0061U

5B-02-VC				
	Concentrations (mg/kg dry wt)			
Interval[1]	**Hg**	**Phenol**	**4-MP**	**2,4-DMP**
SQS	0.41	0.42	0.67	0.029
CSL	0.59	1.2	0.67	0.029
1-3 ft	0.15	0.020U	0.013	0.014
4-6 ft	0.06U	0.020U	0.020U	0.0061U
7-9 ft	0.06	--	--	--

Notes:

🟨	Detected concentration is greater than SMS SQS screening level
🟩	Detected concentration is greater than SMS CSL screening level

Table 18 presents the detailed results for all Unit 5B subsurface sediment sampling.

Constituents: Hg=mercury, 4-MP=4-methylphenol, 2,4-DMP=2,4-dimethylphenol

1. Sample intervals are depth below mudline.
2. Measured subsurface mercury concentration exceeded both the CSL and the site-specific BSL (1.2 mg/kg) applicable to surface sediments.

-- Sample was not submitted for chemical analysis.

7.5 Unit 6 Subsurface Testing

No subsurface chemical testing was proposed for Unit 6 as part of the PRDI Work Plan. However, after reviewing the results of surface sampling data (which indicated no chemical or biological exceedances in this area), limited subsurface sampling was performed in order to assess impacts of potential sediment disturbances, such as propeller wash scour. Sediment sampling was performed by diver core from the surface to 3 feet below mudline. Four diver core locations were chosen based on spatial distribution within Units 6B and 6C. Within each unit, one sample was analyzed for total mercury and the other for total mercury and SVOCs. Chart 10 summarizes the results of subsurface sampling in Unit 6, including results for total mercury and three phenolic compounds (phenol, 4-methylphenol, and 2,4-dimethylphenol). Figure 18 summaries the total mercury results by spatial location. A complete summary of chemical and physical testing data is provided in Table 18.

No exceedances of SMS chemical criteria were noted for phenolic compounds in any of the samples. Total mercury CSL exceedances occurred in the 1 to 2 and 2 to 3 foot intervals of

6B-01 and in the 2 to 3 foot interval of 6C-02, both of which are located in the outer cap area (Figure 18). Total mercury SQS exceedances were noted in both intervals of 6B-02 and only in the 1 to 2 foot interval of 6C-01 and 6C-02, with the 2 to 3 foot interval of nearshore station 6C-01 yielding no SMS exceedance.

Chart 10

Subsurface Sediment Mercury and Phenolic Testing Results - Unit 6

6B-01-DC	
Concentrations (mg/kg dry wt)	
Interval [1]	Hg
SQS	0.41
CSL	0.59
1-2 ft	0.62
2-3 ft	2.49[2]

6B-02-DC				
Concentrations (mg/kg dry wt)				
Interval [1]	Hg	Phenol	4-MP	2,4-DMP
SQS	0.41	0.42	0.67	0.029
CSL	0.59	1.2	0.67	0.029
1-2 ft	0.45	0.02 U	0.02 U	0.02 U
2-3 ft	0.52	0.02 U	0.02 U	0.02 U

6C-02-DC	
Concentrations (mg/kg dry wt)	
Interval [1]	Hg
SQS	0.41
CSL	0.59
1-2 ft	0.47
2-3 ft	0.67

6C-01-DC				
Concentrations (mg/kg dry wt)				
Interval [1]	Hg	Phenol	4-MP	2,4-DMP
SQS	0.41	0.42	0.67	0.029
CSL	0.59	1.2	0.67	0.029
1-2 ft	0.57	0.02 U	0.02 U	0.02 U
2-3 ft	0.35	0.02 U	0.02 U	0.02 U

Notes:

🟨 Detected concentration is greater than SMS SQS screening level

🟩 Detected concentration is greater than SMS CSL screening level

Table 18 presents the detailed results for all Unit 6 subsurface sediment sampling.

Constituents: Hg=mercury, 4-MP=4-methylphenol, 2,4-DMP=2,4-dimethylphenol

U = Compound analyzed, but not detected above detection limit

1. Sample interval is expressed as distance below the mudline.
2. Measured mercury concentration exceeds both the CSL and/or the site-specific BSL (1.2 mg/kg) applicable to surface sediments.

7.6 Unit 9 Subsurface Testing

Sampling of subsurface sediment quality beyond the originally estimated boundary of Unit 9 included testing of sediments from the 0-4 foot depth interval from each of 6 sampling stations. The purpose of testing within Unit 9 was to evaluate the lateral extent of elevated subsurface mercury concentrations within the site. As noted in Section 2.7, all six of the cores are described in this document as “Unit 9 cores”, though four of the six locations are beyond the updated Unit 9 boundary. Figure 19 summarizes the measured Unit 9 subsurface mercury concentrations at each of the six locations. Samples were also analyzed for TOC and total solids.

Testing results for the Unit 9 cores are summarized on Figure 19 and in Table 18. The two cores located closest to the Log Pond contained mercury concentrations in excess of the SQS. Mercury concentrations in the other four cores were less than the SQS (0.41 mg/kg). Results indicate that the elevated subsurface sediment concentrations are generally limited to the area shown previously as part of the Consent Decree. Figure 19 shows the updated boundary of site Unit 9 based on the new sampling data.

7.7 Dredge Material Leachability Testing

Selected subsurface samples (12) from Units 1A, 1B, 1C, 3B, and 8 were tested for mercury and SVOC leachability using the EPA TCLP and SPLP test procedures. These tests were performed to supplement previous TCLP data collected during 1996 adjacent to BST (RETEC 2006) and as part of the materials profiling for potential use of Canadian disposal facilities. Tests were performed in accordance with dangerous waste criteria (WAC 173-303-090, WAC 173-340-747) and approved testing methods SW1311 (TCLP) and SW1312 (SPLP).

The PRDI TCLP and SPLP testing results and actual (in situ) sample depths are summarized in Table 19. Leachability testing was performed on each Unit 1A and 1B composite sample, each collected Unit 1C “U” sample (above historic dredge), one Unit 3B composite sample, and one Unit 8 composite sample. No exceedances of state/federal TCLP test criteria were noted (WAC 173-303-090). All mercury and SVOC TCLP results were reported at non-detect concentrations. SPLP results were reported at non-detect concentrations, except samples 1A-01-VC-C1 and 1C-07-VC-U, which each had a SPLP mercury concentration of 0.0001 mg/L (at detection limit) and composite sample 8-01 which indicated concentrations of barium (0.082 mg/L), chromium (0.009 mg/L), and mercury (0.0001 mg/L). .

7.8 Elultriate and Dewatering Testing

Additional materials handling testing was conducted as part of the PRDI including MET and DRET testing of selected test composites, ASB solids dewatering testing, and solidification testing of a Unit 1A and 1B composite sample. Testing was performed in order to assess potential water quality impacts that may occur during dredging or other remedial efforts. Results are provided in Table 20.

8 GEOTECHNICAL TESTING

Geotechnical testing was performed throughout the Site as part of the PRDI testing program. These samples were obtained using a variety of sampling methods including hollow-stem auger borings, mud rotary borings, and surface grabs.

Laboratory geotechnical tests performed included Atterberg limits, grain-size analysis, moisture content, specific gravity, consolidation, and consolidated-undrained triaxial tests. Field geotechnical tests were conducted in situ, or in place, and included the standard penetration test and vane shear test. A more detailed description of these tests and sampling procedures can be found in Appendix A.

All borings were conducted and logged by a geotechnical engineer or geologist from Anchor QEA licensed in Washington State. The field logs and lab tests were used conjunctively to create boring logs showing subsurface layers of soil. All boring logs are presented in Appendix B. Geotechnical testing results are presented in Tables 21 to 26, boring stations are shown on Figure 8, and vane shear stations are shown on Figure 9. Discrete and composite samples were taken for geotechnical testing, as outlined in Section 2 and Tables 3a and 3b showing the approximate sampling depths and testing.

8.1 ASB (Unit 8)

Twenty hollow-stem auger borings were conducted within the ASB (Unit 8). Twelve of these borings were along the top of the berm, four were mid-way along the slope, and four were near the toe of the slope.

The main objective of these ASB berm borings was to provide an understanding and profile of the subsurface of the berm and underlying sediments for calculating slope stability for remediation and for determining potential materials handling of the berm material during cleanup. Some chemical testing was performed using berm samples collected from these borings, as described in Section 2 and Section 7.

Table 21a shows the actual (in situ) sample depths and test results for samples from borings 8-101A-HSA to 8-106A-HSA. Table 21b shows the actual sample depths and test results for samples from boring 8-107A-HSA to 8-112A-HSA.

8.2 Inner Waterway (Units 2 and 3)

Fifteen borings were drilled within Inner Whatcom Waterway (Units 2A, 2C, and 3B). Eight of these borings were done over the water, from a barge, to a depth of approximately 25 feet below the mudline. The other seven were completed on land near the water's edge to a depth of approximately 75 feet below ground surface. These "A" (upland borings) and "C" (over-water) borings were intended to line up with each other to provide cross sections of the wharf and bulkhead areas.

Table 22 lists test results and actual (in situ) depths for discrete samples from geotechnical testing from the Inner Waterway area.

8.3 Outer Waterway (Unit 1C)

Twelve borings were drilled within Outer Whatcom Waterway (Unit 1C). One of these borings was completed over the water, near the middle of the waterway, on a barge, to a depth of approximately 25 feet below the mudline. Four borings were advanced on land to a depth of approximately 75 feet below ground surface. The other seven of these borings were sampled through deck drains in the Bellingham Shipping Terminal wharf using mud rotary drilling. The "B" and "C" borings went to a full depth of approximately 25 and 50 feet, respectively. These "A," "B," and "C" borings were intended to line up with each other to provide cross sections of the pier area. No borings were conducted in Units 5B, and 6C, however vane shear tests were conducted in these areas.

Table 23 shows test results and actual (in situ) depths for discrete samples from geotechnical testing from the Unit 1C area.

8.4 ASB Shoulder (Unit 5)

Four vane shear tests were conducted in Unit 5B in the vicinity of the planned capping area. Physical testing was also performed in three vibracore borings placed in this area (Section 7).

Vane shear tests were conducted to depths up to two feet below mudline. Table 25 shows geotechnical test results and actual (in situ) depths for discrete samples from vane shear sampling from Unit 5.

8.5 Barge Dock Area (Unit 6)

Four vane shear tests were conducted in Unit 6. Vane shear tests were conducted to depths up to three feet. Physical testing was also performed in three vibracore borings placed in this area (Section 7).

Table 25 shows geotechnical test results and actual (in situ) depths for discrete samples from vane shear sampling from Unit 6.

8.6 Log Pond (Unit 4)

One hollow-stem auger boring and nine vane shear tests were conducted in the Log Pond (Unit 4). The hollow-stem auger was conducted from a barge and extended to a depth of 50 feet below mudline. Vane shear tests were conducted to depths up to three feet. Tables 24 and 25 shows geotechnical test results and actual (in situ) depths for discrete samples from vane shear and boring sampling from the Log Pond area.

9 NEXT STEPS

This report and the associated attachments complete the transmittal of the testing available from the PRDI testing program. The next deliverables required under the existing Consent Decree include the following:

- **Preliminary Design Concept Report (PDCR):** The PDCR will contain a preliminary definition of the dredging areas and depths, capping areas and preliminary cap design assumptions.

- **Engineering Design Report (EDR):** The EDR will provide the detailed description of the engineering design for the cleanup action, and will include an estimated schedule for completion of the cleanup. That report will also include a copy of the proposed Construction QAPP and the Compliance Monitoring and Contingency Response Plan. The EDR will be provided for public review and comment.

The cleanup action is subject to certain permit requirements as described in the Cleanup Action Plan (Ecology 2007b). Permit submittals are anticipated concurrent with completion of the EDR. Permitting will include applicable public notice provisions.

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TABLES

FIGURES

APPENDIX A
PRDI SAMPLING METHODOLOGY

APPENDIX B
PRDI SAMPLING LOGS BY METHOD

APPENDIX C THROUGH APPENDIX H ON ATTACHED DVD

Table 1
Summary of Surface Sediment Chemical and Physical Sampling

Station ID		Actual Coordinates[1]		Mudline Elevation (MLLW)[2]	Sample Method	Sampling Interval (cm)	Surface Sediment Testing				Bioassay[5]
		Easting	Northing				In-Situ Measurements	Chemical/Conventional[3]	Physical[4]	Analyses for Cap Design	
Inner Waterway											
2C	2C-01-SS	1240091.7	641595.7	-32.9	Van Veen grab	0 to 12 cm	Temp, pH, ORP	Hg, TS, TVS, TPS, TOC, SO_4, S_2	GS	MeHg	No
	2C-02-SS	1240737.3	642215.2	-30.0	Van Veen grab	0 to 12 cm	Temp, pH, ORP	Hg, TS, TVS, TPS, TOC, SO_4, S_2	GS	MeHg	No
	2C-03-SS	1241269.3	642581.3	-24.4	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	No
3A	3A-01-SS	1241690.8	643370.2	-11.1	Van Veen grab	0 to 12 cm	--	SMS Metals, SVOC, TS, TOC, bulk TBT, NH_3, S_2	GS	--	Yes
	3A-02-SS	1241864.5	643536.5	-3.9	Van Veen grab	0 to 12 cm	--	SMS Metals, SVOC, TS, TOC, bulk TBT, NH_3, S_2	GS	--	Yes
	3A-03-SS	1241826.2	643340	-3.0	Van Veen grab	0 to 12 cm	--	SMS Metals, SVOC, TS, TOC, bulk TBT, NH_3, S_2	GS	--	Yes
	3A-04-SS	1241889.7	643192.8	-14.4	Van Veen grab	0 to 12 cm	--	SMS Metals, SVOC, TS, TOC, bulk TBT, NH_3, S_2	GS	--	Yes
	3A-05-SS	1242039.9	643338.5	-11.8	Van Veen grab	0 to 12 cm	--	SMS Metals, SVOC, TS, TOC, bulk TBT, NH_3, S_2	GS	--	Yes
5C	5C-01-SS	1240354.9	642245.2	-6.2	Van Veen grab	0 to 12 cm	Temp, pH, ORP	Hg, SVOC, TS, TOC, TVS, NH_3, SO_4, S_2	GS	MeHg	Yes
	5C-02-SS	1240848.2	642702.3	-9.4	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
Outer Waterway											
1B	1B-01-SS	1238468.3	640047.7	-36.0	Van Veen grab	0 to 12 cm	Temp, pH, ORP	Hg, TS, TVS, TOC, SO_4, S_2, D/F	GS	MeHg	No
1C	1C-01-SS	1239419	640973.6	-35.7	Van Veen grab	0 to 12 cm	Temp, pH, ORP	Hg, TS, TVS, TOC, SO_4, S_2, D/F	GS	MeHg	No
Unit 5											
5B	5B-01-SS	1239367.5	642161.6	-9.1	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	5B-02-SS	1239277.0	641829.0	-11.5	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	5B-03-SS	1239430.1	641490.1	-12.5	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	5B-04-SS	1239638.6	641465.8	-17.8	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	5B-05-SS	1239479.5	641889.5	-8.9	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	5B-06-SS	1239623.8	641689.6	-8.7	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	No
	5B-07-SS	1239933.0	641797.7	-7.3	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
Unit 6											
6B	6B-01-SS	1239815.2	640576.9	-22.2	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	6B-02-SS	1239638.7	640173.7	-21.6	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	6B-03-SS	1239977.9	639927.4	-19.2	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	6B-04-SS	1240225.6	640047.0	-18.9	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	6B-05-SS	1239987.8	640276.6	-24.2	Van Veen grab	0 to 12 cm	Temp, pH, ORP	Hg, SVOC, TS, TVS, TOC, NH_3, SO_4, S_2	GS	MeHg	Yes
6C	6C-01-SS	1239966.4	640452.0	-13.8	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
	6C-02-SS	1240158.1	640234.7	-15.5	Van Veen grab	0 to 12 cm	--	Hg, SVOC, TS, TOC, NH_3, S_2	GS	--	Yes
ASB											
8	8-01-COMP	--[6]	--[6]	varies	vibracore and Van Veen grab	varies	--	See Table 2a	--	--	No
Reference Areas											
REF	REF-01-SS	1228930.6	581365.3	-57.3	Van Veen grab	0 to 12 cm	Temp, pH, ORP	Hg, TS, TVS, TPS, TOC, NH_3, SO_4, S_2	GS	MeHg	Yes
	REF-02-SS	1228731.0	581840.0	-58.3	Van Veen grab	0 to 12 cm	--	TS, TPS, TOC, NH_3, S_2	GS	--	Yes

Notes:

1. NAD 83/98 (Washington State Plane NAD 83 Lambert Conformal North Zone Grid, Per the 1998 Adjustment)
2. Mudlines were calculated using field depth measurements and tide data from Wtides (Rosario Strait, Bellingham, Washington, from merged harmonic analysis).
3. Chemical testing: Hg = Total Mercury, MeHg= Methyl Mercury, TS = Total Solids, TOC = Total Organic Carbon, TPS = Total Preserved Solids, TBT = Tributyl tin, NH_3 = ammonia, S_2 = sulfide, SO_4 = Sulfate, TVS= Total Volatile Solids , SVOC= Semi-volatile Organic Compounds, D/F=Dioxin/Furans
4. Physical testing: GS = Grain Size
5. Bioassays conducted included E. estuarius, D. Excentricus, and N. arenaceodentata.
6. A single composite was prepared from several basin vibracores and discrete surface grabs throughout the ASB for TCLP, SPLP, MET/DRET and solidification testing.

-- Not Analyzed/Applicable

Table 2a
Summary of ASB Virbracore Subsurface Sediment Chemical and Physical Sampling

Station ID	Actual Coordinates[1]		Field Estimated Mudline Elevation (MLLW)[2]	Sample Method	Penetration (feet below mudline)/ Recovery %	Sample ID	Sampling Interval (feet below apparent sludge/sand contact)	Discrete/ Composite	Tier 1 Testing[3,4]		Tier 2 Testing	Materials Handling
	Easting	Northing							Chemistry	Physical	Chemistry	
ASB Bottom Sampling - Primary-Grid												
8-01-COMP	--[6]	--[6]	--[6]	vibracore and Van Veen grab	varies	8-01-COMP	--	Composite	--	--	--	TCLP, SPLP, MET & DRET, Solidification
8-01-VC	1239482.6	642858.9	-8.6	vibracore	15 / 91%	8-01-VC-1-2	1-2 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
						8-01-VC-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	D/F	--
						8-01-VC-3-4	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	D/F	--
8-02-VC	1239789.6	643145.4	-12.1	vibracore	15 / 89%	8-02-VC-1-2	1-2 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
						8-02-VC-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
						8-02-VC-3-4	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
8-03-VC	1240050.5	643402.5	-7.8	vibracore	12 / 89%	8-03-VC-1-2	1-2 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
						8-03-VC-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
						8-03-VC-3-4	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
8-04-VC	1239653.8	642555.3	-7.8	vibracore	13 / 90%	8-04-VC-1-2	1-2 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
8-05-VC	1239968.9	642863.6	-8.6	vibracore	15 / 93%	8-05-VC-1-2	1-2 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
						8-05-VC-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
						8-05-VC-3-4	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
8-06-VC	1240262.9	643158.8	-6.7	vibracore	13 / 97%	8-06-VC-1-2	1-2 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
						8-06-VC-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
						8-06-VC-3-4	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
8-07-VC	1239853.3	642201.9	-4.1	vibracore	15 / 91%	8-07-VC-1-2	1-2 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
						8-07-VC-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
						8-07-VC-3-4	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
8-08-VC	1240185.3	642528.9	-12.8	vibracore	13 / 98%	8-08-VC-1-2	1-2 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
						8-08-VC-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
						8-08-VC-3-4	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
8-09-VC	1240519.4	642857.2	-4.3	vibracore	14 / 98%	8-09-VC-1-2	1-2 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
						8-09-VC-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	SVOCs, Cr, Cd, Zn, D/F	--
						8-09-VC-3-4	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
ASB Bottom Sampling - Secondary-Grid												
8-10-VC	1239634.8	642997.3	-10.4	vibracore	13 / 100%	8-10-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	D/F	--
						8-10-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	D/F	--
						8-10-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-11-VC	1239929.3	643246.4	-10.2	vibracore	13 / 95%	8-11-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-11-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-11-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-12-VC	1239567.4	642709.8	-6.7	vibracore	15 / 91%	8-12-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-12-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-12-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-13-VC	1239719.3	642850.1	-6.6	vibracore	15 / 91%	8-13-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-13-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-13-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-14-VC	1239878.2	643005.8	-7.1	vibracore	15 / 85%	8-14-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-14-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-14-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-15-VC	1240013.5	643158.2	-7.8	vibracore	15 / 88%	8-15-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-15-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-15-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-16-VC	1240157.3	643282.8	-7.7	vibracore	12.5 / 87%	8-16-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-16-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-16-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-17-VC	1239814.6	642710.6	-5.3	vibracore	15 / 90%	8-17-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-17-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-17-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-18-VC	1240125.1	643019.5	-6.7	vibracore	13 / 96%	8-18-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-18-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-18-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-19-VC	1239760.8	642371.7	-2.9	vibracore	15 / 89%	8-19-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-19-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
8-20-VC	1239924.1	642539.7	-5.3	vibracore	15 / 91%	8-20-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-20-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-20-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-21-VC	1240097.4	642690.8	-10.1	vibracore	15 / 82%	8-21-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-21-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-21-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-22-VC	1240242.5	642866.8	-2.4	vibracore	15 / 90%	8-22-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-22-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-22-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--

Table 2a
Summary of ASB Virbracore Subsurface Sediment Chemical and Physical Sampling

	Actual Coordinates[1]		Field Estimated Mudline Elevation (MLLW)[2]		Penetration (feet below mudline)/ Recovery %		Sampling Interval (feet below apparent sludge/sand contact)		Tier 1 Testing[3,4]		Tier 2 Testing	
Station ID	Easting	Northing		Sample Method		Sample ID		Discrete/ Composite	Chemistry	Physical	Chemistry	Materials Handling
8-23-VC	1240388.7	643009.0	-6.3	vibracore	13 / 96%	8-23-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-23-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-23-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-24-VC	1240008.4	642373.2	-5.6	vibracore	15 / 87%	8-24-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
						8-24-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-24-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-25-VC	1240366.6	642707.8	-7.8	vibracore	13 / 95%	8-25-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	D/F	--
						8-25-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	D/F	--
						8-25-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
ASB Interior Sloping Berm												
8-101B-VC	1240408.2	643276.3	14.4	vibracore	5.5 / 52%	8-101B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-101B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-101B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-101C-VC	1240320.2	643311.2	2.7	vibracore	13 / 90%	8-101C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-101C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-101C-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-101BC-C2	5.5-7.5 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--
8-102B-VC	1240602.1	643074.6	14.5	vibracore	5.0 / 50%	8-102B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-102B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-102B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-102C-VC	1240569.4	643042.3	-2.3	vibracore	13 / 87%	8-102C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-102C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-102C-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-102C-C2	5-8 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--
8-103B-VC	1240626.9	642780.3	14.3	vibracore	5.5 / 71%	8-103B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-103B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-103B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-103C-VC	1240596.0	642787.4	-5.2	vibracore	13 / 76%	8-103C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-103C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-103C-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-103C-C2	5-8 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--
8-104B-VC	1240265.4	642382.6	14.4	vibracore	7.0 / 70%	8-104B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-104B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-104B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-104C-VC	1240228.9	642426.7	-2.0	vibracore	15 / 100%	8-104C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-104C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-104C-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-104BC-C2	6-12 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--
8-105B-VC	1239992.9	642125.3	14.1	vibracore	7.0 / 59%	8-105B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-105B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-105B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-105C-VC	1239891.3	642091.2	-0.6	vibracore	15 / 100%	8-105C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-105C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-105C-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-105C-C2	5-10 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--
8-106B-VC	1239674.0	642143.0	13.8	vibracore	6.0 / 73%	8-106B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-106B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-106B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-106C-VC	1239725.0	642154.0	-2.8	vibracore	13 / 100%	8-106C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-106C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-106C-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-106C-C2	5-7.5 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--
8-107B-VC	1239543.7	642420.4	14.2	vibracore	6.0 / 66%	8-107B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-107B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	D/F	--
						8-107B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-107C-VC	1239595.3	642421.4	1.9	vibracore	13 / 82%	8-107C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-107C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
8-108B-VC	1239388.8	642763.2	14.2	vibracore	5.1 / 80%	8-108B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-108B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-108B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-108C-VC	1239419.3	642773.6	0.7	vibracore	5.8 / 90%	8-108C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-108C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
8-109B-VC	1239432.5	642964.7	13.8	vibracore	6.0 / 52%	8-109B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-109B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-109B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--

Table 2a
Summary of ASB Virbracore Subsurface Sediment Chemical and Physical Sampling

	Actual Coordinates[1]		Field Estimated Mudline Elevation (MLLW)[2]	Sample Method	Penetration (feet below mudline)/ Recovery %	Sample ID	Sampling Interval (feet below apparent sludge/sand contact)	Discrete/ Composite	Tier 1 Testing[3,4]		Tier 2 Testing	Materials Handling
Station ID	Easting	Northing							Chemistry	Physical	Chemistry	
8-109C-VC	1239462.5	642933.4	0.8	vibracore	13 / 97%	8-109C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-109C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-109C-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-109C-C2	5-6 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--
8-110B-VC	1239722.1	643238.5	14.3	vibracore	7.5 / 49%	8-110B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-110B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
8-110C-VC	1239748.3	643216.3	2.2	vibracore	13 / 85%	8-110C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-110C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-110C-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-110BC -C2	4-5 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--
8-111B-VC	1239971.6	643487.8	14.2	vibracore	5.5 / 60%	8-111B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-111B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-111B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-111C-VC	1240006.5	643456.4	1.3	vibracore	13 / 91%	8-111B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-111B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	D/F	--
						8-111B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-111C-C2	5-6 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--
8-112B-VC	1240157.3	643529.4	14.8	vibracore	4.0 / 43%	8-112B-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-112B-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-112B-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
8-112C-VC	1240136.1	643515.4	2.1	vibracore	13 / 95%	8-112C-VC-1-2	1-2 ft	D	Hg, TS, TOC	--	SVOCs, Cr, Cd, Zn, D/F	--
						8-112C-VC-2-3	2-3 ft	D	Hg, TS, TOC	--	--	--
						8-112C-VC-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
						8-112C-C2	5.5-7.5 ft	Composite[5]	DMMP Suite	GS, MC, AL, SG	--	--

Notes:

1. NAD 83/98 (Washington State Plane NAD 83 Lambert Conformal North Zone Grid, Per the 1998 Adjustment)
2. ASB mudline (top of solids) depths were estimated in the field using either leadline or plate pole. This information supplemented ASB mudline elevations measured during site surveys.
3. Chemical testing: Hg = Mercury, TS = Total Solids, TOC = Total Organic Carbon, SVOCs = semi-volatile organic compounds, Cr = Chromium, Zn = Zinc, Cd = Cadmium, D/F = Dioxin/Furans
4. Physical testing: GS = Grain Size, MC = Moisture Content, SG = Specific gravity, AL = Atterberg Limits
5. Composites beneath ASB berm were collected from "C" vibracore stations and "B" hollow-stem auger stations when sufficient sample quantity was available.
6. A single composite was prepared from several basin vibracores and discrete surface grabs throughout the ASB for TCLP, SPLP, MET/DRET and solidification testing.

-- Not Analyzed/Applicable

Table 2b
Summary of Whatcom Waterway Vibracore Subsurface Sediment Chemical and Physical Sampling

Station ID		Actual Coordinates[1]		Mudline Elevation (MLLW)[2]	Sample Method	Penetration (feet below mudline)/ Recovery %	Sample ID	Sampling Interval (feet below mudline)	Discrete/ Composite	Tier 1 Testing[3]			Tier 2 Testing
		Easting	Northing							Chemistry[4]	Physical[5]	Materials Handling[6]	Chemistry
Inner Waterway - Dredge and Cap Area													
3B	3B-01-VC	1241628.3	643102.7	-17.5	vibracore	13 / 100%	3B-01-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	TCLP, SPLP	--
							3B-01-VC-4-6	4-6 ft	D	--	GS, MC, AL, SG	--	--
							3B-01-VC-7-9	7-9 ft	D	--	GS, MC, AL, SG	--	--
							3B-01-VC-9-12	9-12 ft	D	--	GS, MC, AL, SG		--
							2A-3B-01-Comp	Varies	Composite[8]	--	--	DRET & MET Testing	--
Inner Waterway - Capping Area													
2C	2C-01-VC	1240443.1	641948.3	-30.6	vibracore	13 / 75%	2C-01-VC-1-3	1-3 ft	D	--	GS, MC, AL, SG	--	--
							2C-01-VC-4-6	4-6 ft	D	--	GS, MC, AL, SG	--	--
							2C-01-VC-7-9	7-9 ft	D	--	GS, MC, AL, SG	--	--
	2C-02-VC	1240958.0	642455.4	-30.3	vibracore	13 / 98%	2C-02-VC-1-3	1-3 ft	D	--	GS, MC, AL, SG	--	--
							2C-02-VC-4-6	4-6 ft	D	--	GS, MC, AL, SG	--	--
							2C-02-VC-7-9	7-9 ft	D	--	GS, MC, AL, SG	--	--
Inner Waterway - Head of Waterway MNR Area													
3A	3A-01-VC	1241693.1	643365.3	-12.5	vibracore	13 / 85%	3A-01-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-01-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-01-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
	3A-02-VC	1241870.4	643525.4	-5.3	vibracore	13 / 59%	3A-02-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-02-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-02-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
	3A-03-VC	1241880.1	643368.0	-7.5	vibracore	13 / 82%	3A-03-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-03-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-03-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
	3A-04-VC	1242042.7	643335.3	-11.4	vibracore	13 / 74%	3A-04-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-04-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-04-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
	3A-05-VC	1241889.6	643189.6	-14.5	vibracore	12.8 / 99%	3A-05-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-05-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC, SMS metals, bulk TBT
							3A-05-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
Inner Waterway - MNR Areas													
2B	2B-01-VC	1240127.0	642024.5	-6.2	vibracore	15 / 88%	2B-01-VC-1-3	1-3 ft	D	--	GS, MC, AL, SG	--	--
							2B-01-VC-4-6	4-6 ft	D	--	GS, MC, AL, SG	--	--
							2B-01-VC-7-9	7-9 ft	D	--	GS, MC, AL, SG	--	--
							2B-01-VC-9-12	9-12 ft	Composite[8]	DMMP Suite	GS, MC, AL, SG	--	--
5C	5C-01-VC	1240335.3	642229.8	-4.0	vibracore	13 / 93%	5C-01-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5C-01-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5C-01-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
	5C-02-VC	1240527.4	642408.1	-4.1	vibracore	13 / 91%	5C-02-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5C-02-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5C-02-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
	5C-03-VC	1240720.9	642613.8	-8.9	vibracore	13 / 98%	5C-03-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5C-03-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5C-03-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
Outer Waterway - Bellingham Shipping Terminal Area													
1C	1C-01-VC	1239124.1	640827.2	-30.7	vibracore	13 / 95%	1C-01-VC-U-0-3.4	0-3.4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	TCLP, SPLP	D/F
									Composite[8]	--	--	DRET & MET Testing	--
							1C-01-VC-L-1-2	4.4-5.4 ft	D	Hg, TS, TOC	--	--	Hg
							1C-01-VC-L-2-3	5.4-6.4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	Hg
							1C-01-VC-L-3-4	6.4-7.4 ft	D	Hg, TS, TOC	--	--	Hg, SVOCs
							1C-01-VC-L-4-5	7.4-8.4 ft	D	--	--	--	Hg, TOC, D/F
							1C-01-VC-L-5-6	8.4-9.4 ft	D	--	--	--	Hg, SVOCs, TOC, D/F
							1C-01-VC-L-6-7	9.4-10.4 ft	D	--	--	--	Hg
	1C-02-VC	1239215.9	640715.8	-37.4	vibracore	13 / 93%	1C-02-VC-L-1-2	1-2 ft	D	Hg, TS, TOC	--	--	D/F
							1C-02-VC-L-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
							1C-02-VC-L-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--
							1C-02-VC-L-4-5	4-5 ft	D	--	--	--	Hg, SVOCs, TOC, D/F
							1C-02-VC-L-5-6	5-6 ft	D	--	--	--	Hg
							1C-02-VC-L-6-7	6-7 ft	D	--	--	--	Hg
	1C-03-VC	1239343.7	641059.3	-31.6	vibracore	13 / 96%	1C-03-VC-U-0-1	0-1ft	D	Hg, TS, TOC	GS, MC, AL, SG	TCLP, SPLP	--
									Composite[8]	--	--	DRET & MET Testing	--
							1C-03-VC-L-1-2	2-3 ft	D	Hg, TS, TOC	--	--	--
							1C-03-VC-L-2-3	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOCs
							1C-03-VC-L-3-4	4-5 ft	D	Hg, TS, TOC	--	--	--
	1C-04-VC	1239446.1	640928.5	-34.9	vibracore	13 / 100%	1C-04-VC-L-1-2	1-2 ft	D	Hg, TS, TOC	--	--	--
							1C-04-VC-L-2-3	2-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOCs
							1C-04-VC-L-3-4	3-4 ft	D	Hg, TS, TOC	--	--	--

Table 2b
Summary of Whatcom Waterway Vibracore Subsurface Sediment Chemical and Physical Sampling

Station ID		Actual Coordinates[1]		Mudline Elevation (MLLW)[2]	Sample Method	Penetration (feet below mudline)/ Recovery %	Sample ID	Sampling Interval (feet below mudline)	Discrete/ Composite	Tier 1 Testing[3]			Tier 2 Testing
		Easting	Northing							Chemistry[4]	Physical[5]	Materials Handling[6]	Chemistry
1C	1C-05-VC	1239578.8	641279.1	-28.3	vibracore	13 / 100%	1C-05-VC-U-0-2.5	0-2.5 ft	D	Hg, TS, TOC	GS, MC, AL, SG	TCLP, SPLP	D/F
									Composite[8]	--	--	DRET & MET Testing	--
							1C-05-VC-L-1-2	3.5-4.5 ft	D	Hg, TS, TOC	--	--	D/F
							1C-05-VC-L-2-3	4.5-5.5 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
							1C-05-VC-L-3-4	5.5-6.5 ft	D	Hg, TS, TOC	--	--	SVOCs, D/F
							1C-05-VC-L-4-5	6.5-7.5 ft	D	--	--	--	Hg, D/F
							1C-05-VC-L-5-6	7.5-8.5 ft	D	--	--	--	Hg
	1C-06-VC	1239699.3	641143.9	-35.7	vibracore	13 / 92%	1C-06-VC-U-0-1	0-1ft	D	Hg, TS, TOC	GS, MC, AL, SG	TCLP, SPLP	--
									Composite[8]	--	--	DRET & MET Testing	--
							1C-06-VC-L-1-2	2-3 ft	D	Hg, TS, TOC	--	--	--
							1C-06-VC-L-2-3	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOCs, D/F
							1C-06-VC-L-3-4	4-5 ft	D	Hg, TS, TOC	--	--	D/F
	1C-07-VC	1239789.6	641469.4	-29.1	vibracore	13 / 82%	1C-07-VC-U	0-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	TCLP, SPLP	D/F
									Composite[8]	--	--	DRET & MET Testing	--
							1C-07-VC-L-1-2	4-5 ft	D	Hg, TS, TOC	--	--	--
							1C-07-VC-L-2-3	5-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOCs, D/F
							1C-07-VC-L-3-4	6-7 ft	D	Hg, TS, TOC	--	--	--
							1C-07-VC-L-4-5	7-8 ft	D	--	--	--	Hg, D/F
							1C-07-VC-L-5-6	8-9 ft	D	--	--	--	Hg, TS, TOC
							1C-07-VC-L-6-7	9-10 ft	D	--	--	--	Hg, SVOCs, TOC, TS, D/F
	1C-08-VC	1239901.6	641345.7	-36.3	vibracore	13 / 98%	1C-08-VC-U-0-1	0-1 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
									Composite[8]	--	--	DRET & MET Testing	--
							1C-08-VC-L-1-2	2-3 ft	D	Hg, TS, TOC	--	--	--
							1C-08-VC-L-2-3	3-4 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
							1C-08-VC-L-3-4	4-5 ft	D	--	--	--	Hg, SVOCs, TOC, TS, D/F
							1C-08-VC-L-4-5	5-6 ft	D	--	--	--	Hg
Outer Waterway - Outer Channel Area													
1A	1A-01-VC	1237751.1	639493.2	-33.1	vibracore	7 / 100%	1A-01-VC-C1	0-4 ft/each core	Composite	VOCs, Dioxins/furans, & guaiacols[9]	GS, MC, SG	TCLP, SPLP, MET/DRET, Solidification[10]	--
	1A-02-VC	1237921.1	639319.2	-32.7	vibracore	7 / 100%							
	1A-03-VC	1237955.1	639692.3	-34.2	vibracore	7 / 99%							
	1A-04-VC	1238125.1	639518.3	-30.9	vibracore	7 / 100%							
	1A-05-VC	1238073.1	639808.2	-35.1	vibracore	7 / 98%	1A-01-VC-C2	0-4 ft/each core	Composite	VOCs, Dioxins/furans, & guaiacols[9]	GS, MC, SG	TCLP, SPLP, MET/DRET, Solidification[10]	--
	1A-06-VC	1238243.1	639633.2	-31.6	vibracore	7 / 100%							
1B	1B-01-VC	1238277.2	640006.2	-34.4	vibracore	7 / 83%							
	1B-02-VC	1238447.1	639832.2	-30.5	vibracore	7 / 86%							
	1B-03-VC	1238395.1	640122.2	-33.6	vibracore	7 / 96%	1B-01-VC-C1	0-4 ft/each core	Composite	VOCs, Dioxins/furans, & guaiacols[9]	GS, MC, SG	TCLP, SPLP, MET/DRET, Solidification[10]	--
	1B-04-VC	1238565.1	639948.3	-32.2	vibracore	7 / 100%							
	1B-05-VC	1238599.1	640321.2	-33.4	vibracore	7 / 93%							
	1B-06-VC	1238762.7	640159.3	-32.3	vibracore	7 / 100%							
	1B-07-VC	1238710.9	640450.0	-33.0	vibracore	7 / 100%	1B-01-VC-C2	0-4 ft/each core	Composite	VOCs, Dioxins/furans, & guaiacols[9]	GS, MC, SG	TCLP, SPLP, MET/DRET, Solidification[10]	--
	1B-08-VC	1238880.7	640275.9	-32.5	vibracore	7 / 99%							
	1B-09-VC	1238914.7	640648.9	-32.5	vibracore	7 / 100%							
	1B-10-VC	1239084.7	640474.9	-31.0	vibracore	7 / 96%							
Unit 5 Subsurface													
5B	5B-01-VC	1239440.4	641768.6	-8.9	vibracore	13 / 69%	5B-01-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5B-01-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5B-01-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
	5B-02-VC	1239632.7	641917.2	-8.1	vibracore	13 / 100%	5B-02-VC-1-3	1-3 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5B-02-VC-4-6	4-6 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	SVOC
							5B-02-VC-7-9	7-9 ft	D	Hg, TS, TOC	GS, MC, AL, SG	--	--
	5B-03-VC	1239928.0	641841.4	-6.0	vibracore	13 / 95%	5B-02-VC-1-3	1-3 ft	D	--	GS, MC, AL, SG	--	--
							5B-02-VC-4-6	4-6 ft	D	--	GS, MC, AL, SG	--	--
							5B-02-VC-7-9	7-9 ft	D	--	GS, MC, AL, SG	--	--
Unit 6 Subsurface													
6B	6B-01-VC	1239821.5	640125.3	-23.3	vibracore	6.0 / 60%	6B-01-VC-1-3	1-3 ft	D	--	GS, MC, AL, SG	--	--
	6B-01-DC	1239863.1	640145.8	-21.9	diver core	2.6 / 100%	6B-01-DC-0-1	0 -1 ft	D	--	--	--	--
							6B-01-DC-1-2	1 - 2 ft	D	--	--	--	Hg
							6B-01-DC-2-3	2 - 2.5 ft	D	--	--	--	Hg
	6B-02-VC	1240108.6	640095.8	-24.8	vibracore	13 / 75%	6B-01-VC-1-3	1-3 ft	D	--	GS, MC, AL, SG	--	--
							6B-01-VC-4-6	4-6 ft	D	--	GS, MC, AL, SG	--	--
							6B-01-VC-7-9	7-9 ft	D	--	GS, MC, AL, SG	--	--
	6B-02-DC	1240111.5	640088.6	-24.6	diver core	3.9 / 100%	6B-02-DC-0-1	0 -1 ft	D	--	--	--	--
							6B-02-DC-1-2	1 - 2 ft	D	--	--	--	Hg, TS, TOC, SVOC
							6B-02-DC-2-3	2 - 3 ft	D	--	--	--	Hg, TS, TOC, SVOC
6C	6C-01-VC	1240075.1	640365.1	-15.5	vibracore	13 / 100%	6C-01-VC-1-3	1-3 ft	D	--	GS, MC, AL, SG	--	--
							6C-01-VC-4-6	4-6 ft	D	--	GS, MC, AL, SG	--	--
							6C-01-VC-7-9	7-9 ft	D	--	GS, MC, AL, SG	--	--
	6C-01-DC	1240076.1	640364.8	-14.5	diver core	3.4 / 100%	6C-01-DC-0-1	0 -1 ft	D	--	--	--	--
							6C-01-DC-1-2	1 - 2 ft	D	--	--	--	Hg, TS, TOC, SVOC
							6C-01-DC-2-3	2 - 3 ft	D	--	--	--	Hg, TS, TOC, SVOC
	6C-02-VC	1239828.7	640391.1	-23.5	vibracore	13 / 84%	6C-01-VC-1-3	1-3 ft	D	--	GS, MC, AL, SG	--	--
							6C-01-VC-4-6	4-6 ft	D	--	GS, MC, AL, SG	--	--
							6C-01-VC-7-9	7-9 ft	D	--	GS, MC, AL, SG	--	--
	6C-02-DC	1239830.3	640390.1	-25.2	diver core	3.5 / 100%	6C-02-DC-0-1	0 -1 ft	D	--	--	--	--
							6C-02-DC-1-2	1 - 2 ft	D	--	--	--	Hg
							6C-02-DC-2-3	2 - 3 ft	D	--	--	--	Hg

Table 2b
Summary of Whatcom Waterway Vibracore Subsurface Sediment Chemical and Physical Sampling

Station ID		Actual Coordinates[1]		Mudline Elevation (MLLW)[2]	Sample Method	Penetration (feet below mudline)/ Recovery %	Sample ID	Sampling Interval (feet below mudline)	Discrete/ Composite	Tier 1 Testing[3]			Tier 2 Testing
		Easting	Northing							Chemistry[4]	Physical[5]	Materials Handling[6]	Chemistry
Unit 9 Subsurface													
9	9-01-VC	1232481.7	643805.8	-27.1	vibracore	7 / 95%	9-01-VC-0-4	0-4 ft	Composite	Hg, TS, TOC	--	--	--
	9-02-VC	1235027.3	642986.8	-25.4	vibracore	7 / 100%	9-02-VC-0-4	0-4 ft	Composite	Hg, TS, TOC	--	--	--
	9-03-VC	1237073.2	642568.8	-19.0	vibracore	7 / 99%	9-03-VC-0-4	0-4 ft	Composite	Hg, TS, TOC	--	--	--
	9-04-VC	1236551.2	636319.5	-40.6	vibracore	7 / 100%	9-04-VC-0-4	0-4 ft	Composite	Hg, TS, TOC	--	--	--
	9-05-VC	1235804.2	635123.7	-44.9	vibracore	7 / 99%	9-05-VC-0-4	0-4 ft	Composite	Hg, TS, TOC	--	--	--
	9-06-VC	1235093.8	633748.4	-40.8	vibracore	4.7 / 87%	9-06-VC-0-4	0-4 ft	Composite	Hg, TS, TOC	--	--	--

Notes:

1. NAD 83/98 (Washington State Plane NAD 83 Lambert Conformal North Zone Grid, Per the 1998 Adjustment)
2. Mudlines were calculated using field depth measurements and tide data from Wtides (Rosario Strait, Bellingham, Washington, from merged harmonic analysis).
3. Tier 1 samples were analyzed initially.
4. Chemical testing: Hg = Mercury, TS = Total Solids, TOC = Total Organic Carbon, TBT= Tribuytltin, SVOCs = semi-volatile organic compounds, VOCs = volatile organic compounds, D/F = Dioxins/Furans
5. Physical testing: GS = Grain Size, MC = Moisture Content, SG = Specific gravity, AL = Atterberg Limits
6. Materials handling testing: MET = Modified Elutriate Test, DRET = Dredge Elutriate Test, TCLP = Toxicity Characteristic Leaching Procedure, SPLP = Synthetic Precipitation Leaching Procedure
7. A single composite was prepared from discrete samples in 3B and 2A collected by vibracore with discrete samples in 3B collected by hollowstem auger.
8. A single composite was prepared from six discrete "U" samples from the Unit 1C sediments for MET and DRET testing.
9. VOCs and TOC were sampled from discrete cores from the 0-4-foot depth interval for the Unit 1A/1B composites.
10. A single composite from Units 1A and 1B was collected for MET/DRET and solidification testing.

-- Not Analyzed/Applicable

Table 3a
Summary of ASB Geotechnical Sampling

Station ID	Boring Location	Sample Method	Bottom of Boring	Coordinates[1]		Mudline/ Surface Elevation (MLLW)[2]	Sample ID	Sample Depth Interval (feet below surface or mudline)	Chemical Testing	Physical Testing[3]
				Easting	Northing					
8-101A-HSA	Top of Berm	Hollowstem Auger	63.5 ft	1240418.9	643314.6	23.3 ft	8-101A-HSA-S1	2.5-4	--	GS, MC
							8-101A-HSA-S5	10-11.5	--	MC, SG, AL
							8-101A-HSA-S6	15-16.5	--	MC
							8-101A-HSA-S7	20-21.5	--	MC
							8-101A-HSA-S8	25-26.5	--	MC
							8-101A-HSA-S9	30-31.5	--	GS, MC
							8-101A-HSA-S10	35-36.5	--	MC, SG, AL
							8-101A-HSA-S11	40-41.5	--	GS, MC
							8-101A-HSA-S12	45-46.5	--	MC, SG, AL
							8-101A-HSA-S13	50-51.5	--	GS, MC
							8-101A-HSA-S14	55-56.5	--	MC, SG, AL
							8-101A-HSA-S15	60-63.5	--	GS, MC
8-101B-HSA	Over-Water	Hollowstem Auger	54 ft	1240344.9	643315.8	9.9 ft	8-101B-HSA-S3	5.5-7	--	GS, MC
							8-101B-HSA-S6	12.5-14	--	GS, MC
							8-101B-HSA-S7	17.5-19	--	MC, SG
							8-101B-HSA-S8	22.5-24	--	MC
							8-101B-HSA-S9	27.5-29	--	GS, MC
							8-101B-HSA-S10	32.5-34	--	MC, SG, AL
							8-101B-HSA-S11	37.5-39	--	MC
							8-101B-HSA-S14	52.5-54	--	GS, MC
							8-101BC-C2	Composite: S-8, S-9, S-10[4]	DMMP Suite	GS, MC, SG, AL
8-102A-HSA	Top of Berm	Hollowstem Auger	63.5 ft	1240675.4	643048.2	22.9 ft	8-102A-HSA-S-1	2.5-4	--	GS, MC
							8-102A-HSA-S-2	5-6.5	--	MC
							8-102A-HSA-S-4	7.5-9	--	MC, SG, AL
							8-102A-HSA-S-6	15-16.5	--	GS, MC
							8-102A-HSA-S-7	20-21.5	--	MC
							8-102A-HSA-S-8	25-26.5	--	MC
							8-102A-HSA-S-9	30-31.5	--	GS, MC
							8-102A-HSA-S-10	35-36.5	--	MC, SG, AL
							8-102A-HSA-S-11	40-41.5	--	GS, MC
							8-102A-HSA-S-12	45-46.5	--	MC, SG, AL
							8-102A-HSA-S-13	50-51.5	--	MC
							8-102A-HSA-S-14	55-56.5	--	MC, SG, AL
							8-102A-HSA-S-15	60-63.5	--	MC, SG
8-102C-HSA	Over-Water	Hollowstem Auger	46.5 ft	1240619.6	642995.7	1.1 ft	8-102C-HSA-S3	5-6.5	--	GS, MC
							8-102C-HSA-S5	10-11.5	--	MC, SG
							8-102C-HSA-S7	15-16.5	--	GS, MC
							8-102C-HSA-S8	20-21.5	--	MC, SG, AL
							8-102C-HSA-S9	25-26.5	--	MC, AL
							8-102C-HSA-S10	30-31.5	--	GS, MC
							8-102C-HSA-S12	45-46.5	--	GS, MC
8-103A-HSA	Top of Berm	Hollowstem Auger	71.5 ft	1240670.1	642755.4	22.9 ft	8-103A-HSA-S-2	2.4-4	--	MC
							8-103A-HSA-S-3	5-6.5	--	GS, MC
							8-103A-HSA-S-5	10-11.5	--	MC, SG, AL
							8-103A-HSA-S-6	15-16.5	--	GS, MC
							8-103A-HSA-S-7	20-21.5	--	MC
							8-103A-HSA-S-8	25-26.5	--	GS, MC
							8-103A-HSA-S-9	30-31.5	--	MC
							8-103A-HSA-S-10	35-36.5	--	MC, SG, AL
							8-103A-HSA-S-11	40-41.5	--	GS, MC
							8-103A-HSA-S-12	45-46.5	--	MC, SG, AL
							8-103A-HSA-S-13	50-51.5	--	MC
							8-103A-HSA-S-14	55-56.5	--	MC, SG, AL
							8-103A-HSA-S-16	62-63.5	--	MC
							8-103A-HSA-S-17	65-66.5	--	MC, SG, AL
							8-103A-HSA-S-18	70-71.5	--	GS, MC
8-104A-HSA	Top of Berm	Hollowstem Auger	51.5 ft	1240281.8	642372.4	22.6 ft	8-104A-HSA-S1	0-1.5	--	MC
							8-104A-HSA-S2	2.5-4	--	MC
							8-104A-HSA-S3	5-6.5	--	GS, MC
							8-104A-HSA-S5	10-11.5	--	MC
							8-104A-HSA-S6	15-16.5	--	GS, MC
							8-104A-HSA-S7	20-21.5	--	MC
							8-104A-HSA-S8	25-26.5	--	MC
							8-104A-HSA-S9	30-31.5	--	GS, MC
							8-104A-HSA-S10	35-36.5	--	MC, SG, AL
							8-104A-HSA-S11	40-41.5	--	GS, MC
							8-104A-HSA-S12	45-46.5	--	MC, SG, AL
							8-104A-HSA-S13	50-51.5	--	MC
8-104B-HSA	Over-Water	Hollowstem Auger	59.5 ft	1240267.0	642394.5	11.1 ft	8-104B-HSA-0-1	0-1	--	MC
							8-104B-HSA-S5	10-11.5	--	MC
							8-104B-HSA-S6	16-17.5	--	GS, MC
							8-104B-HSA-S9	31-32.5	--	GS, MC
							8-104B-HSA-S10	36-37.5	--	MC, SG, AL
							8-104B-HSA-S11	41-42.5	--	MC
							8-104B-HSA-S12	46-47.5	--	GS, MC
							8-104B-HSA-S13	51-52.5	--	MC
							8-104B-HSA-S15	58-59.5	--	GS, MC
							8-104BC-C2	Composite: S-7, S-8[4]	DMMP Suite	GS, MC, SG, AL

Table 3a
Summary of ASB Geotechnical Sampling

Station ID	Boring Location	Sample Method	Bottom of Boring	Coordinates[1]		Mudline/ Surface Elevation (MLLW)[2]	Sample ID	Sample Depth Interval (feet below surface or mudline)	Chemical Testing	Physical Testing[3]
				Easting	Northing					
8-105A-HSA	Top of Berm	Hollowstem Auger	78.5 ft	1239933.5	642035.1	22.4 ft	8-105A-HSA-S1	0-1.5	--	MC
							8-105A-HSA-S2	2.5-4	--	MC
							8-105A-HSA-S3	5-6.5	--	GS, MC
							8-105A-HSA-S5	10-11.5	--	MC
							8-105A-HSA-S7	20-21.5	--	MC
							8-105A-HSA-S8	25-26.5	--	MC
							8-105A-HSA-S9	30-31.5	--	GS, MC
							8-105A-HSA-S10	35-36.5	--	MC, SG, AL
							8-105A-HSA-S11	40-41.5	--	GS, MC
							8-105A-HSA-S12	45-46.5	--	MC, SG, AL
							8-105A-HSA-S13	50-51.5	--	MC
							8-105A-HSA-S14	55-56.5	--	MC, SG, AL
							8-105A-HSA-S15	60-61.5	--	GS, MC
							8-105A-HSA-S16	65-66.5	--	MC
							8-105A-HSA-S17	70-71.5	--	MC, SG, AL
							8-105A-HSA-S18	75-78.5	--	GS, MC, Cu Triax, Consolidatoin[5]
8-105C-HSA	Over-Water	Hollowstem Auger	52.5 ft	1239880.1	642084.2	1.8 ft	8-105C-HSA-0-1	0-1	--	MC
							8-105C-HSA-S3	5-6.5	--	GS, MC
							8-105C-HSA-S5	9-10.5	--	MC, SG, AL
							8-105C-HSA-S6	11.5-13	--	MC
							8-105C-HSA-S7	14-15.5	--	GS, MC
							8-105C-HSA-S8	19-20.5	--	MC, SG, AL
							8-105C-HSA-S9	24-25.5	--	MC
							8-105C-HSA-S10	29-30.5	--	GS, MC
							8-105C-HSA-S11	34-35.5	--	MC
							8-105C-HSA-S12	39-40.5	--	GS, MC
							8-105C-HSA-S13	44-45.5	--	MC
							8-105C-HSA-S14	49-51	--	CuTriax, Consolidation[5]
							8-105C-HSA-S15	51-52.5	--	GS, MC
8-106A-HSA	Top of Berm	Hollowstem Auger	78.5 ft	1239635.7	642125.1	23.3 ft	8-106A-HSA-S1	0-1.5	--	MC
							8-106A-HSA-S2	2.5-4	--	MC
							8-106A-HSA-S3	5-6.5	--	GS, MC
							8-106A-HSA-S5	10-11.5	--	MC
							8-106A-HSA-S6	15-16.5	--	GS, MC
							8-106A-HSA-S8	25-26.5	--	MC
							8-106A-HSA-S9	30-31.5	--	GS, MC
							8-106A-HSA-S10	35-36.5	--	MC, SG, AL
							8-106A-HSA-S11	40-41.5	--	GS, MC
							8-106A-HSA-S12	45-46.5	--	MC, SG, AL
							8-106A-HSA-S13	50-51.5	--	MC
							8-106A-HSA-14	55-56.5	--	MC, SG, AL
							8-106A-HSA-15	60-61.5	--	GS, MC
							8-106A-HSA-16	65-66.5	--	MC
							8-106A-HSA-17	70-71.5	--	MC, SG, AL
							8-106A-HSA-18	75-78.5	--	GS, MC
8-107A-HSA	Top of Berm	Hollowstem Auger	86.5 ft	1239505.6	642413.3	22.4 ft	8-107A-HSA-S1	0-1.5	--	MC
							8-107A-HSA-S2	2.5-4	--	MC
							8-107A-HSA-S3	5-6.5	--	GS, MC
							8-107A-HSA-S4	7.5-9	--	MC, SG, AL
							8-107A-HSA-S5	10-11.5	--	MC
							8-107A-HSA-S6	15-16.5	--	GS, MC
							8-107A-HSA-S7	20-21.5	--	MC
							8-107A-HSA-S8	25-26.5	--	GS, MC
							8-107A-HSA-S10	35-36.5	--	MC, SG, AL
							8-107A-HSA-S11	40-41.5	--	GS, MC
							8-107A-HSA-S12	45-46.5	--	MC, SG, AL
							8-107A-HSA-S13	50-51.5	--	MC
							8-107A-HSA-S14	55-56.5	--	MC, SG, AL
							8-107A-HSA-S15	60-61.5	--	GS, MC
							8-107A-HSA-S16	65-66.5	--	MC
							8-107A-HSA-S17	70-71.5	--	MC, SG, AL
							8-107A-HSA-S18	75-76.5	--	GS, MC
							8-107A-HSA-S19	80-81.5	--	MC
							8-107A-HSA-S20	83-86.5	--	GS, MC, AL
8-107B-HSA	Over-Water	Hollowstem Auger	71 ft	1239549.8	642428.3	9.5 ft	8-107B-HSA-0-1	0-1	--	MC, AL
							8-107B-HSA-S-6	12.5-14	--	GS, MC
							8-107B-HSA-S-8	22.5-24	--	MC, SG, AL
							8-107B-HSA-S-9	27.5-29	--	GS, MC
							8-107B-HSA-S-10	32.5-34	--	MC, SG, AL
							8-107B-HSA-S-11	37.5-39	--	MC
							8-107B-HSA-S-12	42.5-44	--	GS, MC
							8-107B-HSA-S-13	47.5-49	--	MC, SG, AL
							8-107B-HSA-S-14	52.5-54	--	GS, MC
							8-107B-HSA-S-15	57.5-59	--	MC, SG, AL
							8-107B-HSA-S-17	69.5-71	--	MC, SG, AL

Table 3a
Summary of ASB Geotechnical Sampling

Station ID	Boring Location	Sample Method	Bottom of Boring	Coordinates[1]		Mudline/ Surface Elevation (MLLW)[2]	Sample ID	Sample Depth Interval (feet below surface or mudline)	Chemical Testing	Physical Testing[3]
				Easting	Northing					
8-108A-HSA	Top of Berm	Hollowstem Auger	81.5 ft	1239351.7	642756.8	22.6 ft	8-108A-HSA-S1	0-1.5	--	MC
							8-108A-HSA-S2	2.5-4	--	MC
							8-108A-HSA-S3	5-6.5	--	GS, MC
							8-108A-HSA-S4	7.5-9	--	MC, SG, AL
							8-108A-HSA-S5	10-11.5	--	MC
							8-108A-HSA-S6	15-16.5	--	GS, MC
							8-108A-HSA-S7	20-21.5	--	MC
							8-108A-HSA-S8	25-26.5	--	MC
							8-108A-HSA-S9	30-31.5	--	GS, MC
							8-108A-HSA-S10	35-36.5	--	MC, SG, AL
							8-108A-HSA-S11	40-41.5	--	GS, MC
							8-108A-HSA-S12	45-46.5	--	MC, SG, AL
							8-108A-HSA-S13	50-51.5	--	MC
							8-108A-HSA-S14	55-56.5	--	MC, SG, AL
							8-108A-HSA-S15	60-61.5	--	GS, MC
							8-108A-HSA-S16	65-66.5	--	MC
							8-108A-HSA-S17	70-71.5	--	MC, SG, AL
							8-108A-HSA-S18	75-78.5	--	GS, MC
							8-108A-HSA-S19	80-81.5	--	MC
8-108C-HSA	Over-Water	Hollowstem Auger	50 ft	1239413.6	642775.1	-0.6 ft	8-108C-HSA-0-1	0-1	--	MC
							8-108C-HSA-S3	5-7.5	--	GS, MC
							8-108C-HSA-S5	10-11.5	--	MC, SG
							8-108C-HSA-S7	16.5-18	--	GS, MC
							8-108C-HSA-S8	21.5-23	--	MC, SG, AL
							8-108C-HSA-S9	26.5-28	--	MC
							8-108C-HSA-S10	31.5-33	--	GS, MC
							8-108C-HSA-S11	36.5-38	--	MC, SG, AL
							8-108C-HSA-S12	41.5-43	--	GS, MC
							8-108C-HSA-S14	48.5-50	--	MC, SG, AL
8-109A-HSA	Top of Berm	Hollowstem Auger	73.5 ft	1239405.0	643001.9	22.5 ft	8-109A-HSA-S1	0-1.5	--	MC
							8-109A-HSA-S2	2.5-4	--	GS, MC
							8-109A-HSA-S3	5-6.5	--	MC
							8-109A-HSA-S6	15-17.5	--	GS, MC
							8-109A-HSA-S7	20-21.5	--	MC, SG, AL
							8-109A-HSA-S8	25-26.5	--	MC
							8-109A-HSA-S9	30-31.5	--	GS, MC
							8-109A-HSA-S10	35-36.5	--	MC, SG, AL
							8-109A-HSA-S11	40-41.5	--	GS, MC
							8-109A-HSA-S12	45-46.5	--	MC, SG, AL
							8-109A-HSA-S13	50-51.5	--	MC
							8-109A-HSA-S14	55-56.5	--	MC, SG, AL
							8-109A-HSA-S15	60-61.5	--	GS, MC
							8-109A-HSA-S16	65-66.5	--	GS, MC
							8-109A-HSA-S17	70-73.5	--	MC, SG, AL
8-110A-HSA	Top of Berm	Hollowstem Auger	63.5 ft	1239687.7	643279.6	22.8 ft	8-110A-HSA-S1	0-1.5	--	MC
							8-110A-HSA-S2	2.5-4	--	MC
							8-110A-HSA-S5	10-11.5	--	MC
							8-110A-HSA-S6	15-16.5	--	GS, MC
							8-110A-HSA-S7	20-21.5	--	MC
							8-110A-HSA-S8	25-26.5	--	MC
							8-110A-HSA-S9	30-31.5	--	GS, MC
							8-110A-HSA-S10	35-36.5	--	MC, SG, AL
							8-110A-HSA-S11	40-41.5	--	GS, MC
							8-110A-HSA-S12	45-46.5	--	MC, SG, AL
							8-110A-HSA-S13	50-51.5	--	GS, MC
							8-110A-HSA-S14	55-56.5	--	MC, SG, AL
							8-110A-HSA-S15	60-63.5	--	MC, AL, CuTriax, Consolidation[5]
8-110B-HSA	Over-Water	Hollowstem Auger	53 ft	1239729.4	643232.6	7.6 ft	8-110B-HSA-S6	11.5-13	--	GS, MC
							8-110B-HSA-S8	21.5-25	--	MC, SG, AL
							8-110B-HSA-S9	26.5-28	--	GS, MC
							8-110B-HSA-S10	31.5-33	--	MC, SG, AL
							8-110B-HSA-S11	36.5-38	--	MC, SG, AL
							8-110B-HSA-S12	41.5-43	--	GS, MC
							8-110B-HSA-S13	46.5-48.5	--	MC, SG, AL, CuTriax, Consolidation[5]
							8-110B-HSA-S14	51.5-53	--	GS, MC
							8-110BC-C2	Composite: S-8, S-9, S-10[4]	DMMP Suite	GS, MC, SG, AL
8-111A-HSA	Top of Berm	Hollowstem Auger	66.5 ft	1239936.0	643520.7	22.8 ft	8-111A-HSA-S1	0-1.5	--	MC
							8-111A-HSA-S2	2.5-4	--	MC
							8-111A-HSA-S3	5-6.5	--	GS, MC
							8-111A-HSA-S5	10-11.5	--	MC, SG, AL
							8-111A-HSA-S6	15-16.5	--	GS, MC
							8-111A-HSA-S7	20-21.5	--	MC
							8-111A-HSA-S8	25-26.5	--	MC
							8-111A-HSA-S9	30-30.5	--	GS, MC
							8-111A-HSA-S10	35-36.5	--	MC, SG, AL
							8-111A-HSA-S11	40-41.5	--	GS, MC
							8-111A-HSA-S12	45-46.5	--	MC, SG, AL
							8-111A-HSA-S13	50-51.5	--	MC
							8-111A-HSA-S14	55-56.5	--	MC, SG, AL
							8-111A-HSA-S15	60-63.5	--	GS, MC
							8-111A-HSA-S16	65-66.5	--	MC, SG, AL

Table 3a
Summary of ASB Geotechnical Sampling

Station ID	Boring Location	Sample Method	Bottom of Boring	Coordinates[1]		Mudline/ Surface Elevation (MLLW)[2]	Sample ID	Sample Depth Interval (feet below surface or mudline)	Chemical Testing	Physical Testing[3]
				Easting	Northing					
8-111C-HSA	Over-Water	Hollowstem Auger	41.5 ft	1239987.3	643464.7	3.9 ft	8-111C-HSA-S3	4-5.5	--	GS, MC
							8-111C-HSA-S5	10-11.5	--	MC, SG, AL
							8-111C-HSA-S6	12.5-14	--	MC
							8-111C-HSA-S7	15-16.5	--	GS, MC
							8-111C-HSA-S8	25-26.5	--	MC, SG, AL
							8-111C-HSA-S9	30-31.5	--	GS, MC
							8-111C-HSA-S11	40-41.5	--	GS, MC, AL
8-112A-HSA	Top of Berm	Hollowstem Auger	76.5 ft	1240153.6	643581.6	23.3 ft	8-112A-HSA-S1	0-1.5	--	MC
							8-112A-HSA-S2	2.5-4	--	MC, SG, AL
							8-112A-HSA-S3	5-6.5	--	GS, MC
							8-112A-HSA-S5	10-11.5	--	MC
							8-112A-HSA-S6	15-16.5	--	GS, MC
							8-112A-HSA-S7	20-21.5	--	MC
							8-112A-HSA-S8	25-26.5	--	MC
							8-112A-HSA-S9	30-31.5	--	GS, MC
							8-112A-HSA-S10	35-36.5	--	MC, SG, AL
							8-112A-HSA-S11	40-41.5	--	GS, MC
							8-112A-HSA-S12	45-46.5	--	MC, SG, AL
							8-112A-HSA-S13	50-51.5	--	MC
							8-112A-HSA-S14	55-56.5	--	MC, SG, AL
							8-112A-HSA-S15	60-63.5	--	GS, MC
							8-112A-HSA-S16	65-66.5	--	MC
							8-112A-HSA-S17	70-71.5	--	MC, SG, AL
							8-112A-HSA-S18	75-76.5	--	GS, MC

Notes:

1. NAD 83/98 (Washington State Plane NAD 83 Lambert Conformal North Zone Grid, Per the 1998 Adjustment)
2. Mudlines were calculated using field depth measurements and tide data from Wtides (Rosario Strait, Bellingham, Washington, from merged harmonic analysis).
3. Physical testing: GS = Grain Size, MC = Moisture Content, SG = Specific gravity, AL = Atterberg Limits
4. Composites beneath ASB berm were collected from "C" vibracore stations and "B" hollow-stem auger stations when sufficient sample quantity was available.
5. Cu Triax and consolidation testing results were not available at the time of this Data Report and will be reported in the Engineering Design Repot.

-- Not Analyzed/Applicable

Table 3b
Summary of Whatcom Waterway Geotechnical Sampling

Station ID		Boring Location	Sample Method	Bottom of Boring (feet)	Actual Coordinates[1]		Mudline/ Surface Elevation (MLLW)[2]	Sample ID	Sample Depth Interval (feet below surface or mudline)	Tier 1 Chemical Testing[3]	Physical Testing[4,5]	Tier 2 Chemical Testing
					Easting	Northing						
Inner Waterway												
2A	2A-101A-HSA	Upland (Yard Area)	Hollowstem Auger	50.5 ft	1241162.8	642993.4	13.4 ft	2A-101A-HSA-S2	2.5-4	--	MC	--
								2A-101A-HSA-S3	4-5.5	--	GS, MC	--
								2A-101A-HSA-S4	7.5-9	--	MC, SG, AL	--
								2A-101A-HSA-S5	9-10.5	--	MC	--
								2A-101A-HSA-S6	14-15.5	--	GS, MC	--
								2A-101A-HSA-S7	19-20.5	--	MC	--
								2A-101A-HSA-S8	24-25.5	--	MC, AL	--
								2A-101A-HSA-S9	29-30.5	--	GS, MC	--
								2A-101A-HSA-S10	34-35.5	--	MC	--
								2A-101A-HSA-S11	39-40.5	--	MC, AL	--
								2A-101A-HSA-S13	49-50.5	--	MC	--
	2A-101C-HSA	In-Water	Hollowstem Auger	36.5 ft	1241236.0	642924.5	-19.4 ft	2A-101C-HSA-S2	3-4.5	--	GS, MC	--
								2A-101C-HSA-S4	8-9.5	--	MC, SG, AL	--
								2A-101C-HSA-S5	10.5-12	--	GS, MC	--
								2A-101C-HSA-S6	13-14.5	--	MC	--
								2A-101C-HSA-S7	18-19.5	--	MC, SG, AL	--
								2A-101C-HSA-S9	28-29.5	--	MC	--
								2A-101C-HSA-S11	35-36.5	--	MC, SG, AL	--
	2A-102A-HSA	Upland (Yard Area)	Hollowstem Auger	70.5 ft	1241468.8	642591.9	15.9 ft	2A-102A-HSA-S2	2.5-3	--	MC	--
								2A-102A-HSA-S3	5-5.5	--	GS, MC	--
								2A-102A-HSA-S4	7.5-9	--	MC, SG, AL	--
								2A-102A-HSA-S5	9-10.5	--	MC	--
								2A-102A-HSA-S6	14-15.5	--	GS, MC	--
								2A-102A-HSA-S7	19-20.5	--	MC	--
								2A-102A-HSA-S8	24-25.5	--	MC, AL	--
								2A-102A-HSA-S9	29-30.5	--	GS, MC	--
								2A-102A-HSA-S10	34-35.5	--	MC	--
								2A-102A-HSA-S11	39-40.5	--	MC, AL	--
								2A-102A-HSA-S12	44-45.5	--	GS, MC	--
								2A-102A-HSA-S13	49-50.5	--	MC	--
								2A-102A-HSA-S14	54-55.5	--	MC, SG, AL	--
								2A-102A-HSA-S15	59-60.5	--	GS, MC	--
								2A-102A-HSA-S17	69-70.5	--	MC, AL	--
	2A-102C-HSA	In-Water	Hollowstem Auger	25.5 ft	1241410.5	642714.4	-21.2 ft	2A-102C-HSA-S2	10-11.5	--	GS, MC	--
								2A-102C-HSA-S3	12.5-14	--	MC, SG, AL	--
								2A-102C-HSA-S4	15-16.5	--	MC	--
								2A-102C-HSA-S5	17.5-19	--	GS, MC	--
								2A-102C-HSA-S6	21-22.5	--	MC	--
								2A-102C-HSA-S7	26-27.5	--	MC, SG, AL	--
	2A-103A-HSA	Over-Water (Pier)	Hollowstem Auger	75.5 ft	1241234.3	642405.0	15.9 ft (on-pier)	2A-103A-HSA-S2	2.5-4	--	MC	--
								2A-103A-HSA-S3	5-6.5	--	GS, MC	--
								2A-103A-HSA-S4	8-9.5	--	MC, SG	--
								2A-103A-HSA-S5	10-11.5	--	MC	--
								2A-103A-HSA-S6	13-14.5	--	GS, MC	--
								2A-103A-HSA-S7	19-20.5	--	MC	--
								2A-103A-HSA-S8	24-25.5	--	MC, AL	--
								2A-103A-HSA-S9	29-30.5	--	GS, MC	--
								2A-103A-HSA-S10	34-35.5	--	MC	--
								2A-103A-HSA-S11	39-40.5	--	MC, AL	--
								2A-103A-HSA-S12	44-45.5	--	GS, MC	--
								2A-103A-HSA-S13	49-50.5	--	MC	--
								2A-103A-HSA-S14	54-55.5	--	MC, SG, AL	--
								2A-103A-HSA-S15	59-60.5	--	GS, MC	--
								2A-103A-HSA-S16	64-65.5	--	MC	--
								2A-103A-HSA-S18	74-75.5	--	GS, MC	--
	2A-103C-HSA	In-Water	Hollowstem Auger	31.5 ft	1241002.9	642324.7	-24.6 ft	2A-103C-HSA-S5	14.5-16	--	MC, SG, AL	--
								2A-103C-HSA-S6	19.5-21	--	GS, MC	--
								2A-103C-HSA-S7	24.5-26	--	MC, SG, AL	--
2C	2C-101C-HSA	In-Water	Hollowstem Auger	33.5 ft	1240097.4	641629.6	-32.3 ft	2C-101C-HSA-S2	10-11.5	--	GS, MC	--
								2C-101C-HSA-S3	12.5-14	--	MC	--
								2C-101C-HSA-S4	15-16.5	--	MC, SG, AL	--
								2C-101C-HSA-S5	17.5-19	--	GS, MC	--
								2C-101C-HSA-S6	22.5-24	--	MC	--
								2C-101C-HSA-S7	27.5-29	--	MC, SG, AL	--

Table 3b
Summary of Whatcom Waterway Geotechnical Sampling

Station ID		Boring Location	Sample Method	Bottom of Boring (feet)	Actual Coordinates[1]		Mudline/ Surface Elevation (MLLW)[2]	Sample ID	Sample Depth Interval (feet below surface or mudline)	Tier 1 Chemical Testing[3]	Physical Testing[4,5]	Tier 2 Chemical Testing
					Easting	Northing						
3B	3B-101A-HSA	Upland (Yard Area)	Hollowstem Auger	68.0 ft	1241354.1	643164.5	12.2 ft	3B-101A-HSA-S2	2.5-4	--	MC	--
								3B-101A-HSA-S3	4-5.5	--	GS, MC	--
								3B-101A-HSA-S4	7.5-9	--	MC, SG, AL	--
								3B-101A-HSA-S5	9-10.5	--	MC	--
								3B-101A-HSA-S6	14-15.5	--	GS, MC	--
								3B-101A-HSA-S7	19-20.5	--	MC	--
								3B-101A-HSA-S8	24-25.5	--	MC, AL	--
								3B-101A-HSA-S9	29-30.5	--	GS, MC	--
								3B-101A-HSA-S10	34-35.5	--	MC	--
								3B-101A-HSA-S11	39-40.5	--	MC, AL	--
								3B-101A-HSA-S12	44-45.5	--	GS, MC	--
								3B-101A-HSA-S14	54-55.5	--	MC, SG, AL	--
								3B-101A-HSA-S15	59-60.5	--	GS, MC	--
								3B-101A-HSA-S16	64-68	--	GS, MC	--
	3B-101C-HSA	In-Water	Hollowstem Auger	27.0 ft	1241411.7	643095.4	-15.2 ft	3B-101C-HSA-S2	2.5-4	--	MC	--
								3B-101C-HSA-S3	5-6.5	--	MC, SG, AL	--
								3B-101C-HSA-S4	7.5-9	--	GS, MC	--
								3B-101C-HSA-S5	10-11.5	--	GS, MC	--
								3B-101C-HSA-S6	15-16.5	--	MC	--
								3B-101C-HSA-S7	20-21.5	--	MC, SG, AL	--
	3B-102A-HSA	Upland (Yard Area)	Hollowstem Auger	75.5 ft	1241533.8	643348.3	11.9 ft	3B-102A-HSA-S2	2.5-4	--	MC	--
								3B-102A-HSA-S3	4-5.5	--	GS, MC	--
								3B-102A-HSA-S4	7.5-9	--	MC, SG, AL	--
								3B-102A-HSA-S5	9-10.5	--	MC	--
								3B-102A-HSA-S6	14-15.5	--	GS, MC	--
								3B-102A-HSA-S7	19-20.5	--	MC	--
								3B-102A-HSA-S8	24-25.5	--	MC, AL	--
								3B-102A-HSA-S9	29-30.5	--	GS, MC	--
								3B-102A-HSA-S10	34-35.5	--	MC	--
								3B-102A-HSA-S11	39-40.5	--	MC, AL	--
								3B-102A-HSA-S12	44-45.5	--	GS, MC	--
								3B-102A-HSA-S13	49-50.5	--	MC	--
								3B-102A-HSA-S14	54-55.5	--	MC, SG, AL	--
								3B-102A-HSA-S15	59-60.5	--	GS, MC	--
								3B-102A-HSA-S16	64-65.5	--	MC	--
								3B-102A-HSA-S17	69-71		CuTriax, Consolidation[6]	--
								3B-102A-HSA-S18	74-75.5	--	MC, AL	--
	3B-102C-HSA	In-Water	Hollowstem Auger	34.5 ft	1241641.2	643237.2	-12.9 ft	3B-102C-HSA-S2	10-11.5	--	GS, MC	--
								3B-102C-HSA-S3	12.5-14	--	MC	--
								3B-102C-HSA-S4	15-16.5	--	MC, SG, AL	--
								3B-102C-HSA-S5	17.5-19	--	GS, MC	--
								3B-102C-HSA-S6	22.5-24	--	MC	--
								3B-102C-HSA-S7	27.5-29	--	MC, SG, AL	--
								3B-102C-HSA-S8	32.5-34.5	--	CuTriax, Consolidation[6]	--
	3B-103A-HSA	Over-Water (Pier)	Hollowstem Auger	39.0 ft	1241907.3	642988.8	12.6 ft (on-pier)	3B-103A-HSA-S2	2.5-3	--	MC	--
								3B-103A-HSA-S3	4-5.5	--	GS, MC	--
								3B-103A-HSA-S4	7.5-9	--	MC, SG, AL	--
								3B-103A-HSA-S5	9-10.5	--	MC	--
								3B-103A-HSA-S6	14-15.5	--	GS, MC	--
								3B-103A-HSA-S7	19-20.5	--	MC	--
								3B-103A-HSA-S8	24-25.5	--	MC, AL	--
								3B-103A-HSA-S9	29-30.5	--	GS, MC	--
								3B-103A-HSA-S10	34-35.5	--	MC	--
	3B-103C-HSA	In-Water	Hollowstem Auger	25.0 ft	1241802.0	643097.1	-12.4 ft	3B-103C-HSA-S2	5-6.5	--	MC, SG, AL	--
								3B-103C-HSA-S3	7.5-9	--	GS, MC	--
								3B-103C-HSA-S4	10-11.5	--	MC	--
								3B-103C-HSA-S5	12.5-14	--	GS, MC	--
								3B-103C-HSA-S6	17.5-19	--	MC	--
								3B-103C-HSA-S7	22.5-24	--	MC, SG, AL	--
	3B-104A-HSA	Upland (Yard Area)	Hollowstem Auger	75.5 ft	1241697.6	642882.5	15.2 ft	3B-104A-HSA-S2	2.5-4	--	MC	--
								3B-104A-HSA-S3	6-7.5	--	GS, MC	--
								3B-104A-HSA-S4	7.5-9	--	MC, SG, AL	--
								3B-104A-HSA-S5	9-10.5	--	MC	--
								3B-104A-HSA-S6	14-15.5	--	GS, MC	--
								3B-104A-HSA-S7	19-20.5	--	MC	--
								3B-104A-HSA-S8	24-25.5	--	MC, AL	--
								3B-104A-HSA-S9	29-30.5	--	GS, MC	--
								3B-104A-HSA-S10	34-35.5	--	MC	--
								3B-104A-HSA-S11	39-40.5	--	MC, AL	--
								3B-104A-HSA-S12	44-45.5	--	GS, MC	--
								3B-104A-HSA-S13	49-50.5	--	MC	--
								3B-104A-HSA-S14	54-55.5	--	MC, SG, AL	--
								3B-104A-HSA-S15	59-60.5	--	GS, MC	--
								3B-104A-HSA-S16	64-65.5	--	MC	--
								3B-104A-HSA-S17	69-71	--	MC, AL, CuTriax, Consolidation[6]	--
								3B-104A-HSA-S18	74-75.5	--	GS, MC	--
	3B-104C-HSA	In-Water	Hollowstem Auger	35.0 ft	1241613.8	642922.5	-16.5 ft	3B-104C-HSA-S2	10.5-12	--	GS, MC	--
								3B-104C-HSA-S3	13-14.5	--	MC	--
								3B-104C-HSA-S4	15.5-17	--	MC, SG, AL	--
								3B-104C-HSA-S5	18-19.5	--	GS, MC	--
								3B-104C-HSA-S6	23-24.5	--	MC	--
								3B-104C-HSA-S8	28-29.5	--	MC, SG, AL, CuTriax, Consolidation[6]	--

Table 3b
Summary of Whatcom Waterway Geotechnical Sampling

Station ID		Boring Location	Sample Method	Bottom of Boring (feet)	Actual Coordinates[1]		Mudline/ Surface Elevation (MLLW)[2]	Sample ID	Sample Depth Interval (feet below surface or mudline)	Tier 1 Chemical Testing[3]	Physical Testing[4,5]	Tier 2 Chemical Testing
					Easting	Northing						
Outer Waterway												
1C	1C-101B-HSA	Over-Water (Wharf)	Diver-Assisted Piston Core	3.0 ft	1239757.3	640958.2	-5.8 ft	1C-101B-HSA-S1A	0-1.4	Hg, TS, TOC	--	SVOCs, D/F
								1C-101B-HSA-S2A	1.4-2.0	Hg, TS, TOC	--	SVOCs, D/F
		Over-Water (Pier)	Mud Rotary	48.8 ft	1239757.3	640958.2	-5.8 ft	1C-101B-HSA-S1	9.3-10.8	Hg, TS, TOC	--	--
								1C-101B-HSA-S2	11.8-13.3	Hg	--	--
								1C-101B-HSA-S3	14.3-15.8	Hg, TS, TOC	GS, MC	--
								1C-101B-HSA-S4	16.8-18.3	Hg, TS, TOC	--	--
								1C-101B-HSA-S5	21.8-23.3	--	MC, SG	--
								1C-101B-HSA-S6	26.8-28.3	--	GS, MC	--
								1C-101B-HSA-S7	31.8-33.3	--	MC	--
								1C-101B-HSA-S8	36.8-38.3	--	MC, SG, AL	--
	1C-101C-HSA	Over-Water (Pier)	Diver-Assisted Piston Core	1.5 ft	1239713.6	641001.7	-23.8 ft	1C-101C-HSA-S1A	0-1.2	Hg, TS, TOC	--	SVOCs, D/F
		Over-Water (Pier)	Mud Rotary	34.5 ft	1239713.6	641001.7	-23.8 ft	1C-101C-HSA-S1	5-6.5	Hg, TS, TOC	--	--
								1C-101C-HSA-S2	7.5-9	Hg, TS, TOC	--	--
								1C-101C-HSA-S3	10-11.5	Hg, TS, TOC	--	--
								1C-101C-HSA-S4	12.5-14	Hg, TS, TOC	--	--
								1C-101C-HSA-S5	17.5-19	--	GS, MC	--
								1C-101C-HSA-S6	22.5-24	--	MC	--
	1C-102A-HSA	Upland (Warehouse)	Hollowstem Auger	75.5 ft	1239862.4	641043.6	15.5 ft	1C-102A-HSA-S2	1.5-3	--	MC	--
								1C-102A-HSA-S3	4.5-6	--	GS, MC	--
								1C-102A-HSA-S4	6.5-8	--	MC, SG	--
								1C-102A-HSA-S5	9-10.5	--	MC	--
								1C-102A-HSA-S6	14-15.5	--	GS, MC	--
								1C-102A-HSA-S7	19-20.5	--	MC	--
								1C-102A-HSA-S8	24-25.5	--	MC, AL	--
								1C-102A-HSA-S9	29-30.5	--	GS, MC	--
								1C-102A-HSA-S10	34-35.5	--	MC	--
								1C-102A-HSA-S11	39-41.5	--	MC, AL	--
								1C-102A-HSA-S12	44-45.5	--	GS, MC	--
								1C-102A-HSA-S13	49-50.5	--	MC	--
								1C-102A-HSA-S14	54-55.5	--	MC, SG, AL	--
								1C-102A-HSA-S15	59-60.5	--	MC	--
								1C-102A-HSA-S16	64-65.5	--	MC, AL	--
								1C-102A-HSA-S17	67-69	--	MC, AL, CuTriax, Consolidation[6]	--
								1C-102A-HSA-S18	69.5-70.5	--	GS, MC	--
								1C-102A-HSA-S19	74-75.5	--	MC	--
	1C-102C-HSA	Over-Water (Pier)	Mud Rotary	36.1 ft	1239821.9	641092.6	-16.9 ft	1C-102C-HSA-S1	0-4.1	Hg, TS, TOC	--	SVOCs, D/F
								1C-102C-HSA-S2	5.1-6.6	Hg, TS, TOC	--	--
								1C-102C-HSA-S3	10.1-11.6	Hg, TS, TOC	--	SVOCs, D/F
								1C-102C-HSA-S4	12.6-14.1	Hg, TS, TOC	--	SVOCs, D/F
								1C-102C-HSA-S5	17.6-19.1	--	MC	--
								1C-102C-HSA-S6	22.6-24.1	--	GS, MC	--
								1C-102C-HSA-S7	27.6-29.1	--	MC	--
								1C-102C-HSA-S8	32.6-34.6	--	CUTriax, Consolidation[6]	--
								1C-102C-HSA-S9	34.6-36.1	--	GS, MC, SG	--
	1C-103A-HSA	Upland (Warehouse)	Hollowstem Auger	75.5 ft	1240073.7	641213.5	16.5 ft	1C-103A-HSA-S2	1.5-3	--	MC	--
								1C-103A-HSA-S3	4-5.5	--	GS, MC	--
								1C-103A-HSA-S4	6.5-8	--	MC, SG	--
								1C-103A-HSA-S5	9-10.5	--	MC	--
								1C-103A-HSA-S6	14-15.5	--	GS, MC	--
								1C-103A-HSA-S7	19-20.5	--	MC	--
								1C-103A-HSA-S8	24-25.5	--	GS, MC	--
								1C-103A-HSA-S9	29-30.5	--	MC, AL	--
								1C-103A-HSA-S10	34-35.5	--	MC	--
								1C-103A-HSA-S11	39-40.5	--	MC	--
								1C-103A-HSA-S12	44-45.5	--	GS, MC	--
								1C-103A-HSA-S13	49-50.5	--	MC	--
								1C-103A-HSA-S14	54-55.5	--	MC, SG, AL	--
								1C-103A-HSA-S15	59-60.5	--	GS, MC	--
								1C-103A-HSA-S16	64-65.5	--	MC, AL	--
								1C-103A-HSA-S18	74-75.5	--	MC, AL	--
	1C-103B-HSA	Over-Water (Pier)	Mud Rotary	54.0 ft	1240010.9	641251.6	-7.1 ft	1C-103B-HSA-S1	0-3.5	Hg	--	D/F
								1C-103B-HSA-S2	4.5-6	Hg, TS, TOC	--	--
								1C-103B-HSA-S3	7-8.5	Hg, TS, TOC	--	--
								1C-103B-HSA-S4	9.5-11	Hg, TS, TOC	MC, SG, AL	--
								1C-103B-HSA-S5	14.5-16	--	GS, MC	--
								1C-103B-HSA-S6	19.5-21	--	MC	--
								1C-103B-HSA-S7	24.5-26	--	MC	--
								1C-103B-HSA-S8	29.5-31	--	MC, AL	--
								1C-103B-HSA-S10	39.5-41	--	GS, MC	--
								1C-103B-HSA-S11	44.5-46	--	MC, SG, AL	--
								1C-103B-HSA-S12	49.5-51.5	--	CuTriax, Consolidation[6]	--
								1C-103B-HSA-S13	51.5-53	--	MC	--

Table 3b
Summary of Whatcom Waterway Geotechnical Sampling

Station ID		Boring Location	Sample Method	Bottom of Boring (feet)	Actual Coordinates[1]		Mudline/ Surface Elevation (MLLW)[2]	Sample ID	Sample Depth Interval (feet below surface or mudline)	Tier 1 Chemical Testing[3]	Physical Testing[4,5]	Tier 2 Chemical Testing
					Easting	Northing						
1C	1C-103C-HSA	Over-Water (Pier)	Mud Rotary	36.5 ft	1240013.5	641273.3	-22.8 ft	1C-103C-HSA-S1	0-1.5	Hg	--	D/F
								1C-103C-HSA-S2	2.5-4	Hg, TS, TOC	--	--
								1C-103C-HSA-S3	5-6.5	Hg, TS, TOC	--	--
								1C-103C-HSA-S4	7.5-9	Hg, TS, TOC	--	--
								1C-103C-HSA-S5	10-11.5	--	MC	--
								1C-103C-HSA-S7	20-21.5	--	MC, SG	--
								1C-103C-HSA-S8	25-26.5	--	MC, AL	--
								1C-103C-HSA-S9	30-31.5	--	GS, MC	--
								1C-103C-HSA-S10	37.5-39	--	MC, AL	--
	1C-104A-HSA	Upland (Warehouse)	Hollowstem Auger	81.0 ft	1240188.9	641336.0	16.1 ft	1C-104A-HSA-S2	1.5-3	--	MC	--
								1C-104A-HSA-S3	4-5.5	--	GS, MC	--
								1C-104A-HSA-S4	6.5-8	--	MC, SG	--
								1C-104A-HSA-S5	11.5-13	--	MC	--
								1C-104A-HSA-S6	14-15.5	--	GS, MC	--
								1C-104A-HSA-S7	19-20.5	--	MC	--
								1C-104A-HSA-S8	24-25.5	--	MC, AL	--
								1C-104A-HSA-S9	29-30.5	--	GS, MC	--
								1C-104A-HSA-S10	34-35.5	--	MC	--
								1C-104A-HSA-S11	39-40.5	--	MC, AL	--
								1C-104A-HSA-S12	44-45.5	--	GS, MC	--
								1C-104A-HSA-S13	49-50.5	--	MC	--
								1C-104A-HSA-S14	54-55.5	--	MC, SG, AL	--
								1C-104A-HSA-S15	59-60.5	--	MC	--
								1C-104A-HSA-S16	64-65.5	--	MC, AL	--
								1C-104A-HSA-S17	69-70.5	--	GS, MC	--
								1C-104A-HSA-S18	79-81	--	GS, MC, Cu Triax, Consolidation[6]	--
	1C-104B-HSA	Over-Water (Pier)	Hollowstem Auger	49.1 ft	1240143.2	641377.6	-6.9 ft	1C-104B-HSA-S1	0-3.6	Hg, TS, TOC	--	SVOCs, D/F
								1C-104B-HSA-S2	4.6-6.1	Hg, TS, TOC	--	SVOCs, D/F
								1C-104B-HSA-S4	12.1-13.6	Hg, TS, TOC	--	SVOCs, D/F
								1C-104B-HSA-S5	17.1-18.6	--	MC	--
								1C-104B-HSA-S6	22.1-23.6	--	GS, MC	--
								1C-104B-HSA-S7	27.1-28.6	--	MC, SG	--
								1C-104B-HSA-S8	32.1-33.6	--	MC, AL	--
								1C-104B-HSA-S9	37.1-38.6	--	GS, MC	--
								1C-104B-HSA-S10	42.1-43.6	--	MC, SG	--
	1C-104C-HSA	Over-Water (Wharf)	Hollowstem Auger	32.0 ft	1240124.1	641394.9	-20.5 ft	1C-104C-HSA-S1	0-5	Hg, TS, TOC	--	SVOCs, D/F
								1C-104C-HSA-S2	6-7.5	Hg	--	--
								1C-104C-HSA-S3	8.5-10	Hg, TS, TOC	--	--
								1C-104C-HSA-S4	11-12.5	Hg, TS, TOC	--	--
								1C-104C-HSA-S5	13.5-15	--	GS, MC	--
								1C-104C-HSA-S6	18.5-20	--	MC	--
								1C-104C-HSA-S7	23.5-25	--	MC, SG, AL	--
								1C-104C-HSA-S9	30.5-32	--	GS, MC	--
	1C-105A-HSA	Upland (Warehouse)	Hollowstem Auger	75.5 ft	1240257.6	641264.8	17.3 ft	1C-105A-HSA-S2	1.5-3	--	MC	--
								1C-105A-HSA-S3	4-5.5	--	GS, MC	--
								1C-105A-HSA-S4	6.5-8	--	MC, SG	--
								1C-105A-HSA-S5	9-10.5	--	MC	--
								1C-105A-HSA-S6	14-15.5	--	GS, MC	--
								1C-105A-HSA-S7	19-20.5	--	MC	--
								1C-105A-HSA-S8	24-25.5	--	MC, AL	--
								1C-105A-HSA-S9	29-30.5	--	GS, MC	--
								1C-105A-HSA-S10	34-35.5	--	MC	--
								1C-105A-HSA-S11	39-40.5	--	MC, AL	--
								1C-105A-HSA-S12	44-45.5	--	GS, MC	--
								1C-105A-HSA-S13	49-50.5	--	MC	--
								1C-105A-HSA-S14	54-55.5	--	GS, MC, AL	--
								1C-105A-HSA-S15	59-60.5	--	MC	--
								1C-105A-HSA-S17	69-70.5	--	MC, AL	--
								1C-105A-HSA-S18	74-75.5	--	GS, MC	--
	1C-106C-HSA	In-Water	Hollowstem Auger	35.5 ft	1239958.8	641525.6	-28.2 ft	1C-106C-HSA-S2	10.5-12	--	MC	--
								1C-106C-HSA-S3	13-14.5	--	GS, MC	--
								1C-106C-HSA-S4	15.5-17	--	MC, SG, AL	--
								1C-106C-HSA-S5	18-19.5	--	GS, MC	--
								1C-106C-HSA-S6	23.5-25	--	MC	--
								1C-106C-HSA-S7	28.5-30	--	MC, SG, AL	--
Log Pond												
4	4-101B-HSA	In-Water	Hollowstem Auger	52.5 ft	1240259.2	641414.6	-6.8 ft	4-101B-HSA-S2	3.5-5	--	MC	--
								4-101B-HSA-S3	6-7.5	--	GS, MC	--
								4-101B-HSA-S4	8.5-10	--	MC, SG	--
								4-101B-HSA-S5	11-12.5	--	MC	--
								4-101B-HSA-S6	16-17.5	--	GS, MC	--
								4-101B-HSA-S7	21-22.5	--	MC	--
								4-101B-HSA-S8	26-27.5	--	MC,AL	--
								4-101B-HSA-S9	31-32.5	--	GS, MC	--
								4-101B-HSA-S10	36-37.5	--	MC	--
								4-101B-HSA-S11	41-42.5	--	MC, SG, AL	--
								4-101B-HSA-S12	46-48	--	CuTriax, Consolidation[6]	--
								4-101B-HSA-S13	51-52.5	--	MC	--

Notes:

1. NAD 83/98 (Washington State Plane NAD 83 Lambert Conformal North Zone Grid, Per the 1998 Adjustment)
2. Mudlines were calculated using field depth measurements and tide data from Wtides (Rosario Strait, Bellingham, Washington, from merged harmonic analysis).
3. Chemical testing: Hg = Mercury, TS = Total Solids, TOC = Total Organic Carbon, SVOCs = semi-volatile organic compounds, D/F = Dioxin/Furans
4. Physical testing: GS = Grain Size, MC = Moisture Content, SG = Specific gravity, AL = Atterberg Limits
5. Blowcounts were documented at each depth and are presented on the boring logs in Appendix B.
6. Cu Triax and consolidation testing results were not available at the time of this Data Report and will be reported in the Engineering Design Repot.

-- Not Analyzed/Applicable

Table 4
Summary of Vane Shear Testing

Station ID		Sample ID	Actual Coordinates[1]		Mudline Elevation (MLLW)[2]	Vane Shear Measurement Depth (feet)[3]	Vane Diameter (mm)	Confirmatory Sample Method	Confirmatory Sampling Depth (feet)[4]	Physical Testing[5]
			Easting	Northing						
Log Pond										
4	4-01-VS	4-01-VS	1240231.3	641370.8	-1.3	0-1, 1-2	25.4	trowel	0-0.5	GS, MC, AL
	4-02-VS	4-02-VS	1240315.9	641278.4	-0.2	0-1	25.4	trowel	0-0.5	GS, MC, AL
	4-03-VS	4-03-VS	1240408.1	641207.5	0.6	0-1, 1-2, 2-3	25.4	trowel	0-0.5	GS, MC, AL
	4-04-VS	4-04-VS	1240491.6	641254.9	0.7	0-1, 1-2, 2-3	25.4	trowel	0-0.5	GS, MC, AL
	4-05-VS	4-05-VS	1240582.5	641320.2	0.6	0-1, 1-2, 2-3	25.4	trowel	0-0.5	GS, MC, AL
	4-06-VS	4-06-VS	1240714.8	641439.4	0.0	0-1, 1-2, 2-3	25.4	trowel	0-0.5	GS, MC, AL
	4-07-VS	4-07-VS	1240707.6	641587.0	-1.8	0-1, 1-2, 2-3	25.4	trowel	0-0.5	GS, MC
	4-08-VS	4-08-VS	1240730.3	641708.8	-1.0	0-1, 1-2, 2-2.75	25.4	trowel	0-0.5	GS, MC, AL
	4-09-VS	4-09-VS	1240882.5	641897.9	-1.1	0-1, 1-2, 2-3	25.4	trowel	0-0.5	GS, MC, AL
Unit 5 and 6										
5B	5B-01-VS	5B-01-VS	1239419.0	641889.5	-9.2	0-1, 1-2	25.4	Van Veen grab	0-1	GS, MC, AL
	5B-02-VS	5B-02-VS	1239549.4	642018.2	-7.7	0-1, 1-1.75	20	Van Veen grab	0-1	GS, MC, AL
	5B-03-VS	5B-03-VS	1239518.0	641644.7	-9.1	0-1, 1-1.5	25.4/16	Van Veen grab	0-1	GS, MC, AL
	5B-04-VS	5B-04-VS	1239698.2	641749.4	-7.9	0-1, 1-1.5	20	Van Veen grab	0-1	GS, MC, AL
6C	6C-01-VS	6C-01-VS	1240079.3	640435.6	-8.7	0-1, 1-1.5	16	Van Veen grab	0-1	GS, MC, AL
	6C-02-VS	6C-02-VS	1240090.8	640473.5	-4.2	0-1, 1-1.5	20	Van Veen grab	0-1	GS, MC, AL
	6C-03-VS	6C-03-VS	1240201.5	640269.8	-5.7	0-1, 1-2, 2-3	20	Van Veen grab	0-1	GS, MC, AL
	6C-04-VS	6C-04-VS	1240255.4	640334.0	-3.6	0-1	20	Van Veen grab	0-1	GS, MC, AL

Notes:

Sediment Van Veen surface grabs were co-located with vane shear (VST) locations to facilitate standardization of the field vane shear measurements.

1. NAD 83/98 (Washington State Plane NAD 83 Lambert Conformal North Zone Grid, Per the 1998 Adjustment)
2. Mudlines were calculated using field depth measurements and tide data from Wtides (Rosario Strait, Bellingham, Washington, from merged harmonic analysis).
3. Both peak and residual VST strength were measured at each interval
4. Sample depth refers to surface grabs, not to the VST test depth.
5. Physical testing: GS = Grain Size, MC = Moisture Content, AL = Atterberg Limits

Table 5
Summary of Sediment Porewater Sampling

Station ID		Sample ID	Actual Coordinates[1]		Mudline Elevation (MLLW)[2]	Sample Method[4]	Sampling Depth	Chemical Testing[3]	In-Situ Measurement
			Easting	Northing					
Inner Waterway									
2C	2C-01-PW	2C-01-PW	1240416.6	641910.3	-30.8	Mini-Piezometer	1-foot below Mudline	Dissolved Hg, TSS	pH, temp, cond, DO, ORP
	2C-02-PW	2C-02-PW	1241273.2	642762.4	-25.1	Mini-Piezometer	1-foot below Mudline	Dissolved Hg, TSS	pH, temp, cond, DO, ORP
Unit 5 and 6									
5B	5B-01-PW	5B-01-PW	1239416.4	641914.7	-8.7	Mini-Piezometer	1-foot below Mudline	Dissolved Hg, TSS	pH, temp, cond, DO, ORP
	5B-02-PW	5B-02-PW	1239627.8	641657.3	-8.7	Mini-Piezometer	1-foot below Mudline	Dissolved Hg, TSS	pH, temp, cond, DO, ORP
6B	6B-01-PW	6B-01-PW	1239911.1	640106.0	-21.7	Mini-Piezometer	1-foot below Mudline	Dissolved Hg, TSS	pH, temp, cond, DO, ORP
6C	6C-01-PW	6C-01-PW	1240085.5	640340.9	-15.9	Mini-Piezometer	1-foot below Mudline	Dissolved Hg, TSS	pH, temp, cond, DO, ORP

Notes:

1. NAD 83/98 (Washington State Plane NAD 83 Lambert Conformal North Zone Grid, Per the 1998 Adjustment)
2. Mudlines were calculated using field depth measurements and tide data from Wtides (Rosario Strait, Bellingham, Washington, from merged harmonic analysis).
3. Chemical testing and Insitu measurements: ORP= Oxidation Reduction Potential, Hg = Total Mercury, TSS = Total Suspended Solids, Cond= conductivity, DO= Dissolved Oxygen
4. Porewater was field filtered at the time of sample collection.

Table 6
Summary of Data Quality Objectives and Quality Control

	Data Quality Objectives			Laboratory Quality Control								
Analysis Type	**Precision**	**Accuracy**	**Completeness**	**Initial Calibration**	**Ongoing Calibration**	**Standard Reference Material[f]**	**Replicates**	**Matrix Spikes**	**LCS/Blank Spike**	**Matrix Spike Duplicates**	**Method Blanks**	**Surrogate Spikes**
Grain size	+/- 20% RPD	NA	95%	Each batch [a]	NA	NA	1 per 20 samples	NA	NA	NA	NA	NA
Total solids	+/- 20% RPD	NA	95%	Each batch [b]	NA	NA	1 per 20 samples	NA	NA	NA	NA	NA
Total volatile solids	+/- 20% RPD	NA	95%	Each batch [b]	NA	NA	1 per 20 samples	NA	NA	NA	NA	NA
Total organic carbon	+/- 20% RPD	75-125% R	95%	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
Total sulfides	+/- 20% RPD	75-125% R	95%	Each batch [b]	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
Ammonia	+/- 20% RPD	75-125% R	95%	Each batch [b]	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
Metals	+/- 20% RPD	75-125% R	95%	Daily	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
Tributyltin	+/- 35% RPD	50-150% R	95%	As needed [c]	Every 12 hours	1 per 20 samples	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Dioxin/Furans	+/- 35% RPD	50-150% R	95%	As needed [c]	Every 12 hours	1 per 20 samples	NA	NA[d]	Na[d]	NA[d]	1 per 20 samples	Every sample
Semivolatile organics	+/- 35% RPD	50-150% R	95%	As needed [c]	Every 12 hours	1 per 20 samples	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Pesticides/Polychlorinated biphenyls[e]	+/- 35% RPD	50-150% R	95%	As needed [c]	1 per 10 samples	1 per 20 samples	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Volatile organics	+/- 35% RPD	70-150% R	95%	As needed [c]	Every 12 hours	1 per 20 samples	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample

Notes:

1 = Data quality objectives are presented for both solid phase and water testing.
RPD = Relative percent difference
R = Recovery
b = Initial calibration verification and calibration blank must be analyzed at the beginning of each batch.
c = Initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.
d = Isotope dilution required per method
e = Pesticides/PCB will have all detects confirmed via second column confirmation. The second column must be of a dissimilar stationary phase from the primary column and meet all method requirements for acceptance.
f = When a standard reference material is available.
NA = Not applicable.
LCS = Laboratory control sample

Table 7
Surface Sediment Chemical and Physical Testing Results

			Location ID:	1B-01-SS	1C-01-SS	2C-01-SS	2C-02-SS	2C-03-SS	3A-01-SS	3A-02-SS	3A-03-SS	3A-04-SS	3A-05-SS	5B-01-SS	5B-02-SS	5B-03-SS	5B-04-SS
			Sample ID:	1B-01-SS	1C-01-SS	2C-01-SS	2C-02-SS	2C-03-SS	3A-01-SS	3A-02-SS	3A-03-SS	3A-04-SS	3A-05-SS	5B-01-SS	5B-02-SS	5B-03-SS	5B-04-SS
			Sample Date:	8/20/08	8/20/08	8/20/08	8/20/08	8/21/08	8/21/08	8/22/08	8/22/08	8/22/08	8/22/08	8/21/08	8/21/08	8/21/08	8/21/08
			Sample Depth:	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
Grain Size (pct)																	
Total Gravel	--	--	--	--	--	--	--	0.1	0.4	0.2	0.2	--	0.3	0.1	2.4	1.6	0.6
Total Sand	--	--	--	0.7	1.5	2.4	3.9	6.4	45.9	76.4	78.8	7.1	5.4	51.7	30.3	31.5	9.7
Total Silt	--	--	--	62.8	80	62.8	59.8	60.1	37	10.3	9.5	60.6	56.7	35.3	39	41.2	55.4
Total Clay	--	--	--	36.4	18.5	34.9	36.1	33.3	16.8	13	11.7	32.4	37.6	12.9	28.2	25.9	34.4
Total Fines (Silt + Clay)	--	--	--	99.2	98.5	97.7	95.9	93.4	53.8	23.3	21.2	93	94.3	48.2	67.2	67.1	89.8
Total Grain Size	--	--	--	99.9	100	100.1	99.8	99.9	100.1	99.9	100.2	100.1	100	100	99.9	100.2	100.1
Conventional Parameters																	
Ammonia (mg-N/kg)	--	--	--	--	--	--	--	24.6	41.4	8.82 J	7.56 J	21.3 J	70.6 J	17	16.5	11.3	13.8
Sulfate (mg/kg)	--	--	--	2,510 J	3,840 J	2,590 J	3,020 J	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	--	--	--	904	4,040 J	2,560 J	2,550	2,120	4,130 J	786	652	2,720	2,590	1,310 J	758 J	783	2,220
Total organic carbon (pct)	--	--	--	2.15	2.37	2.54	3.04	3.72	4.82	1.69	0.816	3.91	4.4	3.37	4.21	2.42	3.31
Total solids (pct)	--	--	--	36.9	26.5	34.8	36.4	41.4	34.1	66.1	69.7	41.6	37.4	41.6	41.8	45.4	37.7
Total Solids (preserved) (pct)	--	--	--	36.6	25.8	34.4	36.5	40.8	32.7	65.5	70.7	41.3	36.2	40.5	42.9	46.5	37.9
Total volatile solids (pct)	--	--	--	6.7	7.8	7.6	8.1	--	--	--	--	--	--	--	--	--	--
Metals (mg/kg)																	
Antimony	--	--	--	--	--	--	--	--	10 UJ	7 UJ	7 UJ	10 UJ	10 UJ	--	--	--	--
Arsenic	57	93	--	--	--	--	--	--	10 U	7 U	7 U	10	10 U	--	--	--	--
Cadmium	5.1	6.7	--	--	--	--	--	--	0.8	0.4	0.4	1.6	1.5	--	--	--	--
Chromium	260	270	--	--	--	--	--	--	47 J	30.6	31.9	70	71	--	--	--	--
Copper	390	390	--	--	--	--	--	--	49.6	23.1	23.2	75.3	76.4	--	--	--	--
Lead	450	530	--	--	--	--	--	--	37	25	22	45	49	--	--	--	--
Mercury	0.41	0.59	--	0.2	0.3	0.3	0.4	0.6	0.2	0.13	0.09	0.4	0.4	0.76	1.1	0.5	0.61
Nickel	--	--	--	--	--	--	--	--	48	28	27	85	86	--	--	--	--
Selenium	--	--	--	--	--	--	--	--	0.5 U	0.3 U	0.3 U	0.6	0.6	--	--	--	--
Silver	6.1	6.1	--	--	--	--	--	--	0.8 U	0.4 U	0.4 U	0.7 U	0.8 U	--	--	--	--
Zinc	410	960	--	--	--	--	--	--	155	118	96	195	214	--	--	--	--
Methyl mercury	--	--	--	0.0027	0.0055	0.0023	0.0030	--	--	--	--	--	--	--	--	--	--
Methyl mercury (pct of total mercury)	--	--	--	1.3	1.8	0.75	0.74	--	--	--	--	--	--	--	--	--	--
Butyltins (µg/kg)																	
Tributyltin (ion)	--	--	--	--	--	--	--	--	3.8 UJ	3.2 U	34	3.8 U	3.8 U	--	--	--	--
Aromatic Hydrocarbons (mg/kg-OC)																	
Total LPAH	370	780	--	--	--	--	--	10.9	8.6	33.3	32.8	11.1	3.7	2.7	3.9	8.0	3.6
Naphthalene	99	170	--	--	--	--	--	1.2	0.6	1.2 U	2.5 U	0.69	0.45 U	0.65	0.76	0.91	0.51 J
Acenaphthylene	66	66	--	--	--	--	--	0.4 J	0.41 U	1.2 U	2.5 U	0.54	0.45 U	0.59 U	0.48 U	0.79 U	0.6 U
Acenaphthene	16	57	--	--	--	--	--	1.1	0.66	1.4	3.3	0.56	0.45 U	0.59 U	0.24 J	0.5 J	0.6 U
Fluorene	23	79	--	--	--	--	--	1.2	0.87	2.3	3.4	0.9	0.45 U	0.33 J	0.43 J	0.95	0.36 J
Phenanthrene	100	480	--	--	--	--	--	5.1	4.4	17.8	20.8	6.1	2.5	1.2	1.7	3.9	1.9
Anthracene	220	1,200	--	--	--	--	--	1.9	2.1	11.8	5.3	2.3	1.2	0.47 J	0.74	1.7	0.79
2-Methylnaphthalene	38	64	--	--	--	--	--	0.97	0.46	1.2 U	2.5 U	0.51	0.45 U	0.42 J	0.38 J	0.62 J	0.36 J
Total HPAH	960	5,300	--	--	--	--	--	47.4	50.4	161	196	79.8	31.5	14.9	17.6	45.4	26.3
Fluoranthene	160	1,200	--	--	--	--	--	8.3	10.4	41.4	44.1	15.3	5.7	2.8	2.9	7.4	6.7
Pyrene	1,000	1,400	--	--	--	--	--	10.5	9.1	26.6	33.1	13	4.6	2.9	3.6	11.2	5.4
Benzo(a)anthracene	110	270	--	--	--	--	--	4.3	4.6	13.0	17.2	6.9	2.7	1.3	1.7	4.1	2.6
Chrysene	110	460	--	--	--	--	--	7.0	7.7	17.8	24.5	11.8	5.2	2.3	2.4	7.0	3.6
Benzo(b)fluoranthene	--	--	--	--	--	--	--	4.6	4.8	21.9	27	13.3	4.8	1.5	1.6	4.6	2.6
Benzo(k)fluoranthene	--	--	--	--	--	--	--	5.1	5.4	17.2	18.4	8.7	3.2	1.3	1.9	4.1	1.9
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	--	--	9.7	10.2	39.1	45.4	22.0	8.0	2.8	3.5	8.7	4.5
Benzo(a)pyrene	99	210	--	--	--	--	--	3.8	4.4	14.2	18.4	6.7	2.7	1.2	1.5	3.4	1.6
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	--	--	1.5	1.8	3.2	5.0	1.5	0.73	0.71	0.83	1.6	0.85
Dibenzo(a,h)anthracene	12	33	--	--	--	--	--	0.83 J	0.41 J	2.5 J	4.5	1.3	1.3	0.26	0.48	0.33	0.22
Benzo(g,h,i)perylene	31	78	--	--	--	--	--	1.5	1.9	2.9	4.2	1.3	0.59	0.65	0.81	1.6	0.79
Chlorinated Benzenes (mg/kg-OC)																	
1,2-Dichlorobenzene	2.3	2.3	--	--	--	--	--	0.16 U	0.37 U	0.36 U	0.75 U	0.15 U	0.14 U	0.18 U	0.14 U	0.25 U	0.18 U
1,4-Dichlorobenzene	3.1	9	--	--	--	--	--	0.16 U	0.37 U	0.36 U	0.75 U	0.15 U	0.14 U	0.18 U	0.14 U	0.25 U	0.18 U
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	--	--	0.16 U	0.37 U	0.36 U	0.75 U	0.15 U	0.14 U	0.18 U	0.14 U	0.25 U	0.18 U
Hexachlorobenzene	0.38	2.3	--	--	--	--	--	0.16 U	0.37 U	0.36 U	0.75 U	0.15 U	0.14 U	0.18 U	0.14 U	0.25 U	0.18 U
Phthalates (mg/kg-OC)																	
Dimethyl phthalate	53	53	--	--	--	--	--	0.32 J	0.41 U	1.2 U	2.5 U	0.51 U	0.45 U	0.59 U	0.48 U	0.79 U	0.6 U
Diethyl phthalate	61	110	--	--	--	--	--	0.54 U	0.41 U	1.2 U	2.5 U	0.51 U	0.45 U	0.59 U	0.48 U	0.79 U	0.6 U
Di-n-butyl phthalate	220	1,700	--	--	--	--	--	0.54 U	0.87	1.2 U	2.5 U	0.51 U	0.45 U	0.59 U	0.48 U	0.79 U	0.6 U

Table 7
Surface Sediment Chemical and Physical Testing Results

			Location ID:	1B-01-SS	1C-01-SS	2C-01-SS	2C-02-SS	2C-03-SS	3A-01-SS	3A-02-SS	3A-03-SS	3A-04-SS	3A-05-SS	5B-01-SS	5B-02-SS	5B-03-SS	5B-04-SS
			Sample ID:	1B-01-SS	1C-01-SS	2C-01-SS	2C-02-SS	2C-03-SS	3A-01-SS	3A-02-SS	3A-03-SS	3A-04-SS	3A-05-SS	5B-01-SS	5B-02-SS	5B-03-SS	5B-04-SS
			Sample Date:	8/20/08	8/20/08	8/20/08	8/20/08	8/21/08	8/21/08	8/22/08	8/22/08	8/22/08	8/22/08	8/21/08	8/21/08	8/21/08	8/21/08
			Sample Depth:	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
Butylbenzyl phthalate	4.9	64	--	--	--	--	--	0.4 U	**1.6**	**3**	**8.2**	**2.1**	**1.8**	0.45 U	0.36 U	0.62 U	0.45 U
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	--	--	**5.11**	**13.9**	**22.5**	**19.6**	**10.2**	**4.09**	**0.74**	**0.71**	**1.2**	**1.1**
Di-n-octyl phthalate	58	4,500	--	--	--	--	--	0.54 U	**0.81**	1.2 U	2.5 U	0.51 U	0.45 U	0.59 U	0.48 U	0.79 U	0.6 U
Miscellaneous (mg/kg-OC)																	
Dibenzofuran	15	58	--	--	--	--	--	**1.2**	**0.66**	**1.3**	**2.7**	**0.69**	0.45 U	**0.36 J**	**0.38 J**	**0.91**	**0.39 J**
Hexachlorobutadiene	3.9	6.2	--	--	--	--	--	0.16 U	0.37 U	0.36 U	0.75 U	0.15 U	0.14 U	0.18 U	0.14 U	0.25 U	0.18 U
N-Nitrosodiphenylamine	11	11	--	--	--	--	--	0.16 UJ	0.37 UJ	0.36 UJ	0.75 UJ	0.15 UJ	0.14 UJ	0.18 UJ	0.14 UJ	0.25 UJ	0.18 UJ
Ionizable Organic Compounds (µg/kg)																	
Phenol	420	1,200	420	--	--	--	--	**89**	**14 J**	20 U	20 U	**120**	**41**	**24**	20 U	19 U	20 U
2-Methylphenol (o-Cresol)	63	63	63	--	--	--	--	6.1 U	18 UJ	6 UJ	6.1 UJ	6 UJ	6.1 UJ	6.1 U	6.1 U	6.1 U	6.1 U
4-Methylphenol (p-Cresol)	670	670	670	--	--	--	--	**160**	**44**	20 U	20 U	**32**	20 U	**48**	**64**	**22**	**28**
2,4-Dimethylphenol	29	29	29	--	--	--	--	6.1 UJ	18 UJ	6 UJ	6.1 UJ	6 UJ	6.1 UJ	6.1 UJ	6.1 UJ	6.1 UJ	6.1 UJ
Pentachlorophenol	360	690	140	--	--	--	--	31 U	93 U	**110 J**	31 U	**33**	**39**	31 U	31 U	31 U	30 U
Benzyl alcohol	57	73	57	--	--	--	--	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	19 UJ	20 UJ
Benzoic acid	650	650	650	--	--	--	--	200 U	200 U	200 UJ	200 UJ	200 UJ	200 UJ	200 U	200 U	190 U	200 U
Aromatic Hydrocarbons (ug/kg)																	
Total LPAH	--	--	5,200	--	--	--	--	**406**	**413**	**562**	**268**	**436**	**162**	**91**	**161**	**193**	**119**
Naphthalene	--	--	2,100	--	--	--	--	**43**	**29**	20 U	20 U	**27**	20 U	**22**	**32**	**22**	**17 J**
Acenaphthylene	--	--	560	--	--	--	--	**15 J**	20 U	20 U	20 U	**21**	20 U	20 U	20 U	19 U	20 U
Acenaphthene	--	--	500	--	--	--	--	**40**	**32**	**23**	**27**	**22**	20 U	20 U	**10 J**	**12 J**	20 U
Fluorene	--	--	540	--	--	--	--	**46**	**42**	**39**	**28**	**35**	20 U	**11 J**	**18 J**	**23**	**12 J**
Phenanthrene	--	--	1,500	--	--	--	--	**190**	**210**	**300**	**170**	**240**	**110**	**42**	**70**	**95**	**64**
Anthracene	--	--	960	--	--	--	--	**72**	**100**	**200**	**43**	**91**	**52**	**16 J**	**31**	**41**	**26**
2-Methylnaphthalene	--	--	670	--	--	--	--	**36**	**22**	20 U	20 U	**20**	20 U	**14 J**	**16 J**	**15 J**	**12 J**
Total HPAH	--	--	12,000	--	--	--	--	**1,762**	**2,430**	**2,715**	**1,602**	**3,122**	**1,386**	**502**	**743**	**1,097**	**871**
Fluoranthene	--	--	1,700	--	--	--	--	**310**	**500**	**700**	**360**	**600**	**250**	**93**	**120**	**180**	**220**
Pyrene	--	--	2,600	--	--	--	--	**390**	**440**	**450**	**270**	**510**	**200**	**97**	**150**	**270**	**180**
Benzo(a)anthracene	--	--	1,300	--	--	--	--	**160**	**220**	**220**	**140**	**270**	**120**	**45**	**73**	**100**	**87**
Chrysene	--	--	1,400	--	--	--	--	**260**	**370**	**300**	**200**	**460**	**230**	**76**	**100**	**170**	**120**
Benzo(b)fluoranthene	--	--	--	--	--	--	--	**170**	**230**	**370**	**220**	**520**	**210**	**52**	**66**	**110**	**86**
Benzo(k)fluoranthene	--	--	--	--	--	--	--	**190**	**260**	**290**	**150**	**340**	**140**	**43**	**80**	**100**	**64**
Benzo(a)pyrene	--	--	1,600	--	--	--	--	**140**	**210**	**240**	**150**	**260**	**120**	**41**	**65**	**82**	**53**
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	--	--	**57**	**87**	**54**	**41**	**59**	**32**	**24**	**35**	**39**	**28**
Dibenzo(a,h)anthracene	--	--	230	--	--	--	--	**31 J**	**20 J**	**42 J**	**37**	**51**	**58**	**8.6**	**20**	**8**	**7.3**
Benzo(g,h,i)perylene	--	--	670	--	--	--	--	**54**	**93**	**49**	**34**	**52**	**26**	**22**	**34**	**38**	**26**
Chlorinated Benzenes (ug/kg)																	
1,2-Dichlorobenzene	--	--	35	--	--	--	--	6.1 U	18 U	6 U	6.1 U	6 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U
1,4-Dichlorobenzene	--	--	110	--	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
1,2,4-Trichlorobenzene	--	--	31	--	--	--	--	6.1 U	18 U	6 U	6.1 U	6 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U
Hexachlorobenzene	--	--	22	--	--	--	--	6.1 U	18 U	6 U	6.1 U	6 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U
Phthalates (ug/kg)																	
Dimethyl phthalate	--	--	71	--	--	--	--	**12 J**	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
Diethyl phthalate	--	--	48	--	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
Di-n-butyl phthalate	--	--	1,400	--	--	--	--	20 U	**42**	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
Butylbenzyl phthalate	--	--	63	--	--	--	--	15 U	**76**	**50**	**67**	**81**	**79**	15 U	15 U	15 U	15 U
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	--	--	**190**	**670**	**380**	**160**	**400**	**180**	**25**	**30**	**28**	**35**
Di-n-octyl phthalate	--	--	420	--	--	--	--	20 U	**39**	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
Miscellaneous (ug/kg)																	
Dibenzofuran	--	--	540	--	--	--	--	**46**	**32**	**22**	**22**	**27**	20 U	**12 J**	**16 J**	**22**	**13 J**
Hexachlorobutadiene	--	--	11	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	28	--	--	--	--	6.1 UJ	18 UJ	6 UJ	6.1 UJ	6 UJ	6.1 UJ	6.1 UJ	6.1 UJ	6.1 UJ	6.1 UJ
Dioxin Furans (ng/kg)																	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**0.434 J**	**0.478 J**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**2.48 J**	**2.18 J**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**8.76**	**7.98**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**17.3**	**19.5**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**9.37**	**9.77**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**307**	**391**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	**2,200**	**3,230**	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	**10.4**	**7.96**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**1.44 J**	**1.43 J**	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**2.54**	**3.16**	--	--	--	--	--	--	--	--	--	--	--	--

Table 7
Surface Sediment Chemical and Physical Testing Results

	Location ID:			1B-01-SS	1C-01-SS	2C-01-SS	2C-02-SS	2C-03-SS	3A-01-SS	3A-02-SS	3A-03-SS	3A-04-SS	3A-05-SS	5B-01-SS	5B-02-SS	5B-03-SS	5B-04-SS
	Sample ID:			1B-01-SS	1C-01-SS	2C-01-SS	2C-02-SS	2C-03-SS	3A-01-SS	3A-02-SS	3A-03-SS	3A-04-SS	3A-05-SS	5B-01-SS	5B-02-SS	5B-03-SS	5B-04-SS
	Sample Date:			8/20/08	8/20/08	8/20/08	8/20/08	8/21/08	8/21/08	8/22/08	8/22/08	8/22/08	8/22/08	8/21/08	8/21/08	8/21/08	8/21/08
	Sample Depth:			0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**3.86**	**4.91**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**1.65 J**	**2.07 J**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	**1.28 J**	**1.75 J**	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**2.35 J**	**2.88**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	**42.9**	**54.9**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	**2.76**	**3.29**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	**158**	**176**	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHOI) ND=0	--	--	--	**13.5**	**14.8**	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	**13.5**	**14.8**	--	--	--	--	--	--	--	--	--	--	--	--
Guaiacols (µg/kg)																	
2-Methoxyphenol (Guaiacol)	--	--	--	--	--	--	--	20 UJ	20 UJ	20 U	20 U	20 U	20 U	20 UJ	20 UJ	19 UJ	20 UJ
3,4,5-Trichloroguaiacol	--	--	--	--	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
4,5,6-Trichloroguaiacol	--	--	--	--	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
4,5-Dichloroguaiacol	--	--	--	--	--	--	--	20 U	20 U	20 UJ	20 UJ	20 UJ	20 UJ	20 U	20 U	19 U	20 U
Tetrachloroguaiacol	--	--	--	--	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
Semi-Volatile Organics (µg/kg)																	
1,3-Dichlorobenzene	--	--	170	--	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
1-Methylnaphthalene	--	--	--	--	--	--	--	**15 J**	**14 J**	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U
Hexachloroethane	--	--	--	--	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	19 U	20 U

Table 7
Surface Sediment Chemical and Physical Testing Results

			Location ID:	5B-05-SS	5B-06-SS	5B-07-SS	5C-01-SS	5C-02-SS	6B-01-SS	6B-02-SS	6B-03-SS	6B-04-SS	6B-05-SS	6C-01-SS	6C-02-SS	REF-01-SS	REF-02-SS
			Sample ID:	5B-05-SS	5B-06-SS	5B-07-SS	5C-01-SS	5C-02-SS	6B-01-SS	6B-02-SS	6B-03-SS	6B-04-SS	6B-05-SS	6C-01-SS	6C-02-SS	REF-01-SS	REF-02-SS
			Sample Date:	8/21/08	8/21/08	8/21/08	8/20/08	8/21/08	8/22/08	8/22/08	8/22/08	8/22/08	8/20/08	8/22/08	8/22/08	8/20/08	8/20/08
			Sample Depth:	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
Grain Size (pct)																	
Total Gravel	--	--	--	7.2	2.4	0.1	--	29.2	0.7	--	1.1	--	--	0.6	0.5	--	--
Total Sand	--	--	--	58.2	70.2	80.7	83.7	44.5	2.5	1.2	2	3.1	3.6	47.5	34.4	6.6	2.2
Total Silt	--	--	--	20.1	16.4	13.8	9.3	16.4	56.1	53.5	55.2	56.4	59	25.7	39.8	63.7	67.9
Total Clay	--	--	--	14.6	11	5.3	7	10	40.7	45.3	41.7	40.5	37.5	26	25.4	29.9	30
Total Fines (Silt + Clay)	--	--	--	34.7	27.4	19.1	16.3	26.4	96.8	98.8	96.9	96.9	96.5	51.7	65.2	93.6	97.9
Total Grain Size	--	--	--	100.1	100	99.9	100	100.1	100	100	100	100	100.1	99.8	100.1	100.2	100.1
Conventional Parameters																	
Ammonia (mg-N/kg)	--	--	--	6.72	9.02	4.94	4.15	7.97	16.9 J	22.3 J	16.6 J	16.9 J	33	10.9 J	9.66 J	25.4	11.4
Sulfate (mg/kg)	--	--	--	--	--	--	503 J	--	--	--	--	--	1,870 J	--	--	2,170 J	--
Sulfide (mg/kg)	--	--	--	631	512	323	121	623 J	2,950	2,540	1,960	2,680	2,530 J	1,160	990	413	486
Total organic carbon (pct)	--	--	--	3.64	4.73	2.24	2.39	2.84	2.30	2.21	3.06	2.98	2.65	2.58	2.26	2.15	2.60
Total solids (pct)	--	--	--	47.4	52.1	67.1	73.5	62.4	37.6	38.1	34.8	37.6	36.8	49.2	50.1	36.3	34.7
Total Solids (preserved) (pct)	--	--	--	49.4	52	66	72.4	64.1	36.6	37.1	35.6	36.8	36.1	49.4	51.2	33.1	34.4
Total volatile solids (pct)	--	--	--	--	--	--	1.97	--	--	--	--	--	7.52	--	--	6.89	--
Metals (mg/kg)																	
Antimony	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	57	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	5.1	6.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	260	270	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	390	390	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	450	530	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.41	0.59	--	0.71	2.64	0.22	0.12	0.31	0.29	0.3	0.3	0.31	0.3	0.3	0.4	0.1 U	--
Nickel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	6.1	6.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	410	960	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl mercury	--	--	--	--	--	--	0.00039	--	--	--	--	--	0.0027	--	--	0.00042	--
Methyl mercury (pct of total mercury)	--	--	--	--	--	--	0.32	--	--	--	--	--	0.90	--	--	0.42	--
Butyltins (µg/kg)																	
Tributyltin (ion)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aromatic Hydrocarbons (mg/kg-OC)																	
Total LPAH	370	780	--	2.2	2.1	2.8	1.1	12.2	10.6	1.2	2.6	8.0	54.9	19.1	7.5	--	--
Naphthalene	99	170	--	0.38 J	0.32 J	0.49 J	0.84 U	1.2	0.87 U	0.9 U	0.65 U	0.77	2.2	1.9	1.6	--	--
Acenaphthylene	66	66	--	0.55 U	0.42 U	0.89 U	0.84 U	0.7 U	0.87 U	0.9 U	0.65 U	0.67 U	1.1	0.85	0.88 U	--	--
Acenaphthene	16	57	--	0.55 U	0.42 U	0.89 U	0.84 U	0.39 J	0.87 U	0.9 U	0.65 U	0.67 U	1.9	1.1	0.88 U	--	--
Fluorene	23	79	--	0.55 U	0.23 J	0.89 U	0.84 U	0.95	1.3	0.9 U	0.65 U	0.87	3.3	1.8 J	0.88 U	--	--
Phenanthrene	100	480	--	1.3	0.95	1.4	1.1	3.0	6.1	1.2	1.9	4.4	41.5	9.7 J	4.4	--	--
Anthracene	220	1,200	--	0.55	0.57	0.89 J	0.84 U	6.7	3.2	0.9 U	0.69	2.0	4.9	3.8 J	1.5	--	--
2-Methylnaphthalene	38	64	--	0.55 U	0.23 J	0.89 U	0.84 U	0.92	0.87 U	0.9 U	0.65 U	0.67 U	1.8	0.81	0.88 U	--	--
Total HPAH	960	5,300	--	21.3	14.6	22.2	13.9	39.5	87.0	12.5	16.7	59.5	142	121 J	44.7	--	--
Fluoranthene	160	1,200	--	4.4	3.0	3.7	3.2	4.6	22.6	2.9	3.3	9.4	52.8	24 J	8.4	--	--
Pyrene	1,000	1,400	--	4.4	3.0	3.9	2.8	7.0	16.5	1.9	2.5	6.7	36.2	22.5 J	7.5	--	--
Benzo(a)anthracene	110	270	--	1.9	1.2	2.1	1.0	3.4	9.6	1.3	1.8	5.4	9.1	12.4 J	4.0	--	--
Chrysene	110	460	--	2.4	2.3	3.4	2.0	8.8	13.0	2.1	2.9	23.2	17.0	22.1 J	7.5	--	--
Benzo(b)fluoranthene	--	--	--	1.8	1.2	2.1	1.0	4.9	10.0	1.9	2.3	5.4	10.6	14.3 J	5.8	--	--
Benzo(k)fluoranthene	--	--	--	2.5	1.7	3.0	1.6	3.5	6.1	0.95	1.6	3.7	6.8	10.5 J	3.9	--	--
Total Benzofluoranthenes (b, j, k)	230	450	--	4.3	2.9	5.1	2.6	8.5	16.1	2.9	3.9	9.1	17.4	24.8 J	9.7	--	--
Benzo(a)pyrene	99	210	--	2.0	1.1	1.9	0.96	3.5	5.7	1.0	1.5	3.4	5.3	8.1 J	3.8	--	--
Indeno(1,2,3-c,d)pyrene	34	88	--	0.93	0.57	0.8 J	0.63 J	1.5	1.1	0.9 U	0.65 U	0.81	2.1	2.5 J	1.0	--	--
Dibenzo(a,h)anthracene	12	33	--	0.17 U	0.13 U	0.49 J	0.26 U	0.56 J	1.6 J	0.45 J	0.78 J	0.94 J	0.53	2.6 J	1.8 J	--	--
Benzo(g,h,i)perylene	31	78	--	0.93	0.55	0.8 J	0.71 J	1.6	0.91	0.9 U	0.65 U	0.67	2.1	2.2 J	0.97	--	--
Chlorinated Benzenes (mg/kg-OC)																	
1,2-Dichlorobenzene	2.3	2.3	--	0.17 U	0.13 U	0.27 U	0.26 U	0.21 U	0.27 U	0.27 U	0.2 U	0.2 U	0.23 U	0.24 U	0.27 U	--	--
1,4-Dichlorobenzene	3.1	9	--	0.17 U	0.13 U	0.27 U	0.26 U	0.21 U	0.27 U	0.27 U	0.2 U	0.2 U	0.23 U	0.24 U	0.27 U	--	--
1,2,4-Trichlorobenzene	0.81	1.8	--	0.17 U	0.13 U	0.27 U	0.26 U	0.21 U	0.27 U	0.27 U	0.2 U	0.2 U	0.23 U	0.24 U	0.27 U	--	--
Hexachlorobenzene	0.38	2.3	--	0.17 U	0.13	0.27 U	0.26 U	0.21 U	0.27 U	0.27 U	0.2 U	0.2 U	0.23 U	0.24 U	0.27 U	--	--
Phthalates (mg/kg-OC)																	
Dimethyl phthalate	53	53	--	0.55 U	0.42 U	0.89 U	0.84 U	0.7 U	0.87 U	0.9 U	0.65 U	0.67 U	0.75 U	0.78 U	0.88 U	--	--
Diethyl phthalate	61	110	--	0.55 U	0.42 U	0.89 U	0.84 U	0.7 U	0.87 U	0.9 U	0.65 U	0.67 U	0.75 U	0.78 U	0.88 U	--	--
Di-n-butyl phthalate	220	1,700	--	0.55 U	0.42 U	0.89 U	0.84 U	0.7 U	0.87 U	0.9 U	0.65 U	0.67 U	0.75 U	0.78 U	0.88 U	--	--

Table 7
Surface Sediment Chemical and Physical Testing Results

	Location ID:			5B-05-SS	5B-06-SS	5B-07-SS	5C-01-SS	5C-02-SS	6B-01-SS	6B-02-SS	6B-03-SS	6B-04-SS	6B-05-SS	6C-01-SS	6C-02-SS	REF-01-SS	REF-02-SS
	Sample ID:			5B-05-SS	5B-06-SS	5B-07-SS	5C-01-SS	5C-02-SS	6B-01-SS	6B-02-SS	6B-03-SS	6B-04-SS	6B-05-SS	6C-01-SS	6C-02-SS	REF-01-SS	REF-02-SS
	Sample Date:			8/21/08	8/21/08	8/21/08	8/20/08	8/21/08	8/22/08	8/22/08	8/22/08	8/22/08	8/20/08	8/22/08	8/22/08	8/20/08	8/20/08
	Sample Depth:			0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm
Analyte	SMS SQS	SMS CSL	PS LAET														
Butylbenzyl phthalate	4.9	64	--	0.41 U	0.32 U	0.67 U	0.67 U	0.53 U	**0.91**	0.68 U	0.49 U	**0.54**	0.57 U	**0.81**	0.66 U	--	--
Bis(2-ethylhexyl) phthalate	47	78	--	**0.38 J**	**0.68**	**1.4**	**1.9**	**5.63**	0.87 U	0.9 U	0.65 U	**1.1**	**0.98**	0.78 U	**1.3**	--	--
Di-n-octyl phthalate	58	4,500	--	0.55 U	0.42 U	0.89 U	0.84 U	0.7 U	0.87 U	0.9 U	0.65 U	0.67 U	0.75 U	0.78 U	0.88 U	--	--
Miscellaneous (mg/kg-OC)																	
Dibenzofuran	15	58	--	0.55 U	**0.23 J**	0.89 U	0.84 U	**0.77**	**1**	0.9 U	0.65 U	**0.7**	**4.53**	**1.4 J**	0.88 U	--	--
Hexachlorobutadiene	3.9	6.2	--	0.17 U	0.13 U	0.27 U	0.26 U	0.21 U	0.27 U	0.27 U	0.2 U	0.2 U	0.23 U	0.24 U	0.27 U	--	--
N-Nitrosodiphenylamine	11	11	--	0.17 UJ	0.13 UJ	0.27 UJ	0.26 UJ	0.21 UJ	0.27 U	0.27 U	0.2 U	**0.22**	0.23 UJ	**0.39**	**0.38**	--	--
Ionizable Organic Compounds (µg/kg)																	
Phenol	420	1,200	420	**51**	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	**30**	--	--
2-Methylphenol (o-Cresol)	63	63	63	6.1 U	6.2 U	6.1 U	6.2 U	6 U	6.1 U	6 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	--	--
4-Methylphenol (p-Cresol)	670	670	670	**23**	**96**	**14 J**	**16 J**	**56**	**26**	20 U	20 U	**24**	**28**	**43**	**54**	--	--
2,4-Dimethylphenol	29	29	29	6.1 UJ	6.2 UJ	6.1 UJ	6.2 UJ	6 UJ	6.1 UJ	6 UJ	6.1 UJ	6.1 UJ	6.1 UJ	6.1 UJ	6.1 UJ	--	--
Pentachlorophenol	360	690	140	30 U	31 U	31 U	31 U	30 U	**34**	30 U	**56**	**86**	31 U	**40**	**32**	--	--
Benzyl alcohol	57	73	57	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	--	--
Benzoic acid	650	650	650	200 U	200 U	200 U	200 U	200 U	200 UJ	200 UJ	200 UJ	200 UJ	200 U	200 UJ	200 UJ	--	--
Aromatic Hydrocarbons (ug/kg)																	
Total LPAH	--	--	5,200	**83**	**98**	**63**	**27**	**346**	**244**	**26**	**78**	**239**	**1,453**	**493**	**170**	--	--
Naphthalene	--	--	2,100	**14 J**	**15 J**	**11 J**	20 U	**33**	20 U	20 U	20 U	**23**	**58**	**49**	**36**	--	--
Acenaphthylene	--	--	560	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	**28**	**22**	20 U	--	--
Acenaphthene	--	--	500	20 U	20 U	20 U	20 U	**11 J**	20 U	20 U	20 U	20 U	**50**	**28**	20 U	--	--
Fluorene	--	--	540	20 U	**11 J**	20 U	20 U	**27**	**31**	20 U	20 U	**26**	**87**	**47 J**	20 U	--	--
Phenanthrene	--	--	1,500	**49**	**45**	**32**	**27**	**85**	**140**	**26**	**57**	**130**	**1,100**	**250 J**	**100**	--	--
Anthracene	--	--	960	**20**	**27**	**20 J**	20 U	**190**	**73**	20 U	**21**	**60**	**130**	**97 J**	**34**	--	--
2-Methylnaphthalene	--	--	670	20 U	**11 J**	20 U	20 U	**26**	20 U	20 U	20 U	20 U	**48**	**21**	20 U	--	--
Total HPAH	--	--	12,000	**772**	**696**	**494**	**333**	**1,122**	**2,004**	**276**	**510**	**1,772**	**3,776**	**3,129 J**	**1,008**	--	--
Fluoranthene	--	--	1,700	**160**	**140**	**82**	**77**	**130**	**520**	**65**	**100**	**280**	**1,400**	**620 J**	**190**	--	--
Pyrene	--	--	2,600	**160**	**140**	**87**	**66**	**200**	**380**	**41**	**75**	**200**	**960**	**580 J**	**170**	--	--
Benzo(a)anthracene	--	--	1,300	**68**	**58**	**47**	**25**	**96**	**220**	**29**	**56**	**160**	**240**	**320 J**	**90**	--	--
Chrysene	--	--	1,400	**89**	**110**	**76**	**48**	**250**	**300**	**46**	**90**	**690**	**450**	**570 J**	**170**	--	--
Benzo(b)fluoranthene	--	--	--	**66**	**59**	**46**	**24**	**140**	**230**	**42**	**69**	**160**	**280**	**370 J**	**130**	--	--
Benzo(k)fluoranthene	--	--	--	**90**	**82**	**67**	**38**	**100**	**140**	**21**	**50**	**110**	**180**	**270 J**	**88**	--	--
Benzo(a)pyrene	--	--	1,600	**71**	**54**	**42**	**23**	**100**	**130**	**22**	**46**	**100**	**140**	**210 J**	**85**	--	--
Indeno(1,2,3-c,d)pyrene	--	--	600	**34**	**27**	**18 J**	**15 J**	**44**	**26**	20 U	20 U	**24**	**56**	**65 J**	**23**	--	--
Dibenzo(a,h)anthracene	--	--	230	6.1 U	6.2 U	**11 J**	6.2 U	**16 J**	**37 J**	**10 J**	**24 J**	**28 J**	**14**	**66 J**	**40 J**	--	--
Benzo(g,h,i)perylene	--	--	670	**34**	**26**	**18 J**	**17 J**	**46**	**21**	20 U	20 U	**20**	**56**	**58 J**	**22**	--	--
Chlorinated Benzenes (ug/kg)																	
1,2-Dichlorobenzene	--	--	35	6.1 U	6.2 U	6.1 U	6.2 U	6 U	6.1 U	6 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	--	--
1,4-Dichlorobenzene	--	--	110	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--
1,2,4-Trichlorobenzene	--	--	31	6.1 U	6.2 U	6.1 U	6.2 U	6 U	6.1 U	6 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	--	--
Hexachlorobenzene	--	--	22	6.1 U	**6.2**	6.1 U	6.2 U	6 U	6.1 U	6 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	--	--
Phthalates (ug/kg)																	
Dimethyl phthalate	--	--	71	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--
Diethyl phthalate	--	--	48	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--
Di-n-butyl phthalate	--	--	1,400	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--
Butylbenzyl phthalate	--	--	63	15 U	15 U	15 U	16 U	15 U	**21**	15 U	15 U	**16**	15 U	**21**	15 U	--	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	**14 J**	**32**	**32**	**46**	**160**	20 U	20 U	20 U	**34**	**26**	20 U	**29**	--	--
Di-n-octyl phthalate	--	--	420	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--
Miscellaneous (ug/kg)																	
Dibenzofuran	--	--	540	20 U	**11 J**	20 U	20 U	**22**	**23**	20 U	20 U	**21**	**120**	**36 J**	20 U	--	--
Hexachlorobutadiene	--	--	11	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	28	6.1 UJ	6.2 UJ	6.1 UJ	6.2 UJ	6 UJ	6.1 U	6 U	6.1 U	6.7 U	6.1 UJ	10 U	8.5 U	--	--
Dioxin Furans (ng/kg)																	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 7
Surface Sediment Chemical and Physical Testing Results

			Location ID:	5B-05-SS	5B-06-SS	5B-07-SS	5C-01-SS	5C-02-SS	6B-01-SS	6B-02-SS	6B-03-SS	6B-04-SS	6B-05-SS	6C-01-SS	6C-02-SS	REF-01-SS	REF-02-SS
			Sample ID:	5B-05-SS	5B-06-SS	5B-07-SS	5C-01-SS	5C-02-SS	6B-01-SS	6B-02-SS	6B-03-SS	6B-04-SS	6B-05-SS	6C-01-SS	6C-02-SS	REF-01-SS	REF-02-SS
			Sample Date:	8/21/08	8/21/08	8/21/08	8/20/08	8/21/08	8/22/08	8/22/08	8/22/08	8/22/08	8/20/08	8/22/08	8/22/08	8/20/08	8/20/08
			Sample Depth:	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm	0 - 12 cm
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	5	--	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHOI) ND=0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Guaiacols (µg/kg)																	
2-Methoxyphenol (Guaiacol)	--	--	--	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 U	20 U	20 U	20 U	20 UJ	20 U	20 U	--	--
3,4,5-Trichloroguaiacol	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--
4,5,6-Trichloroguaiacol	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--
4,5-Dichloroguaiacol	--	--	--	20 U	20 U	20 U	20 U	20 U	20 UJ	20 UJ	20 UJ	20 UJ	20 U	20 UJ	20 UJ	--	--
Tetrachloroguaiacol	--	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--
Semi-Volatile Organics (µg/kg)																	
1,3-Dichlorobenzene	--	--	170	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--
1-Methylnaphthalene	--	--	--	20 U	20 U	20 U	20 U	**10 J**	20 U	20 U	20 U	20 U	**21**	20 U	20 U	--	--
Hexachloroethane	--	--	--	20 U	20 U	20 U	20 UJ	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--

Notes:

🟨	Detected concentration is greater than lowest SMS Sediment Quality Standards (SQS)	µg/kg = micrograms per kilogram
🟩	Detected concentration is greater than lowest SMS Cleanup Screening Level (CSL)	mg/kg = milligrams per kilogram
🟦	Detected concentration is greater than 1988 Puget Sound Estuary Program LAET screening level	mg/kg-OC = milligrams per kilogram organic carbon normalized

Bold = Detected result

pct = percent

The site specific Bioaccumulaltion Screening Level (BSL) for mercury is 1.2 mg/kg. (Supplemental RI Report, RETEC 2006)

J = Estimated value

There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene

Benzo(j)fluoranthene is included in the total of benzo(b&k)fluoranthenes

Totals are calculated for LPAH and HPAH as the sum of all detected results. If all are undetcted results, the highest reporting limit value is reported as the sum.

Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a "0" (ND=0) and assigned a concentration equal to ½ the detection limit (ND=1/2).

-- Sample was not submitted for chemical analysis.

Non-organic carbon normalized samples with TOC results outside of the 0.5-3.5% range were screened against the 1988 Puget Sound Estuary Program LAET

Sample depth is reported as below mudline.

Table 8
Sediment Porewater Testing Results

	Location ID:	2C-01-PW	2C-02-PW	5B-01-PW	5B-02-PW	6B-01-PW	6C-01-PW
	Sample ID:	2C-01-PW	2C-02-PW	5B-01-PW	5B-02-PW	6B-01-PW	6C-01-PW
	Sample Date:	8/18/08	8/19/08	8/18/08	8/18/08	8/19/08	8/19/08
Analyte	Sample Depth (ft):	1	1	1	1	1	1
Conventional Parameters (mg/l)							
Total Suspended Solids	mg/l	**1.3**	4 U	**2.2**	1.1 U	1.1 U	**1.4**
Metals (ug/l)							
Mercury (dissolved)	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Notes:

Bold = Detected result

Sample depth is reported as below mudline.

U = Compound analyzed, but not detected above detection limit

µg/l = micrograms per liter

mg/L = milligrams per liter

Table 9
SMS Biological Effects Criteria

Biological Test	SQS Biological Criteria	CSL Biological Criteria
Amphipod	The test sediment has a significantly higher (t-test, p = 0.05) mean mortality than the reference sediment, and the test sediment mean mortality exceeds 25 percent (M_T>25%)	The test sediment has a significantly higher (t-test, p = 0.05) mean mortality than the reference sediment, and the test sediment mean mortality is more than 30 percent greater (M_T-M_C > 30%) than the reference sediment mean mortality
Larval	The test sediment has a mean survivorship of normal larvae that is significantly less (t-test, p = 0.05) than the mean normal survivorship in the reference sediment, and the mean normal survivorship as a percentage of the negative control is less than 85%	The test sediment has a mean survivorship of normal larvae that is significantly less (t-test, p = 0.05) than the mean normal survivorship in the reference sediment, and the mean normal survivorship as a percentage of the negative control is less than 70%
Juvenile Polychaete	The mean individual growth rate in the test sediment is less than 70 percent of the mean individual growth rate in the reference sediment (MIG_T/MIG_R < 0.70), and the test sediment biomass is significantly different (t-test, p = 0.05) from the reference se	The mean individual growth rate in the test sediment is less than 50 percent of the mean individual growth rate in the reference sediment (MIG_T/MIG_R < 0.50), and the test sediment biomass is significantly different (t-test, p = 0.05) from the reference se

Notes:
Source: Ecology 2008

Table 10
Biological Test Results for the 10-day Acute Toxicity Test - *E. estuarius*

Treatment	Mean Percentage Survival	SD
Control	100	0.0
REF-01-SS	92	6.7
REF-02-SS	100	0.0
3A-01-SS	88	8.4
3A-02-SS	97	4.5
3A-03-SS	98	2.7
3A-04-SS	94	4.2
3A-05-SS	87	9.1
5B-01-SS	92	5.7
5B-02-SS	93	5.7
5B-03-SS	85	7.9
5B-04-SS	89	5.5
5B-05-SS	96	4.2
5B-07-SS	98	2.7
5C-01-SS	96	4.2
5C-02-SS	87	7.6
6B-01-SS	79	7.4
6B-02-SS	84.5	3.7
6B-03-SS	90	7.9
6B-04-SS	88	8.4
6B-05-SS	89	5.5
6C-01-SS	93	4.5
6C-02-SS	94	4.2

Table 11
Biological Test Results for the Larval Development Test - *D. excentricus*

Treatment	Survival (%)	SD
Control	91.6	8.7
REF-01-SS	92.7	7.5
REF-02-SS	91.8	6.6
3A-01-SS	87.1	10.4
3A-02-SS	90.7	7.4
3A-03-SS	96.3	4.4
3A-04-SS	98.8	2.1
3A-05-SS	91.6	6.8
5B-01-SS	99.3	1.5
5B-02-SS	94.8	5.3
5B-03-SS	94.8	6.3
5B-04-SS	94.8	3.9
5B-05-SS	94.9	4.8
5B-07-SS	89.2	5.0
5C-01-SS	92.3	7.7
5C-02-SS	88.9	6.5
6B-01-SS	89.7	5.9
6B-02-SS	96.2	4.2
6B-03-SS	100.0	0.0
6B-04-SS	94.8	7.7
6B-05-SS	94.5	7.1
6C-01-SS	97.9	3.0
6C-02-SS	97.3	4.8

Table 12
Biological Test Results for the 20-day Chronic Toxicity Test - *N. arenaceodentata*

Treatment	Survival (%)	Mean Individual Growth Rate (mg/ind/day)
Control	100	0.875 *
REF-01-SS	100	0.601
REF-02-SS	100	0.642
3A-01-SS	96	0.815
3A-02-SS	100	0.756
3A-03-SS	100	0.876
3A-04-SS	100	0.644
3A-05-SS	100	0.661
5B-01-SS	100	0.603
5B-02-SS	100	0.659
5B-03-SS	100	0.740
5B-04-SS	100	0.682
5B-05-SS	100	0.770
5B-07-SS	100	0.872
5C-01-SS	100	0.779
5C-02-SS	100	0.639
6B-01-SS	96	0.731
6B-02-SS	100	0.712
6B-03-SS	100	0.934
6B-04-SS	100	0.765
6B-05-SS	100	0.827
6C-01-SS	96	0.745
6C-02-SS	96	0.672

Notes:
* - High variability was observed

Table 13
Reference and Control Bioassay Performance Standards

Biological Test	Control Criteria	Pass/Fail?	Reference Criteria	Pass/Fail?
Amphipod (*E. estuarius*)	$M_C < 10\%$	*Pass* ($M_C = 0\%$)	$M_R < 25\%$	*REF-01 - Pass* ($M_R = 8\%$) *REF-02 - Pass* ($M_R = 0\%$)
Larval (*D. excentricus*)	$N_C/I \geq 0.70$	*Pass* ($N_C = 91.6\%$)	$N_R/N_C \geq 0.65$	*REF-01 - Pass (>100%)* *REF-02 - Pass (>100%)*
Juvenile Polychaete *(N. arenaceodentata)*	$M_C < 10\%$ and $MIG \geq 0.38$ mg	*Pass (0.875 mg/ind/d)*	MIG_R and $MIG_C < 0.80$	*REF-01 - Fail (69%) ** *REF-02 - Fail (73%) **

Notes:
M = mortalilty, MIG = mean individual growth rate, N = normal counts, I = initial count
Subscripts: C = negative control, R = reference sediment
* - Control performance was well above minimum growth requirements, resulting in lower relative reference performance.

Table 14
Biological Testing Endpoint Evaluation

Station	Statistically Different?			Exceeds SQS Effect Criteria (Yes/No)			Exceeds CSL Effect Criteria (Yes/No)			SQS/CSL Biological Criteria (Pass/Fail)
	Control	REF-01-SS	REF-02-SS	Control	REF-01-SS	REF-02-SS	Control	REF-01-SS	REF-02-SS	
Amphipod				M_T > 25%			M_T - M_R >30%			
3A-01-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
3A-02-SS	NA	No	No	NA	No	No	NA	No	No	Pass
3A-03-SS	NA	No	No	NA	No	No	NA	No	No	Pass
3A-04-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
3A-05-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
5B-01-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
5B-02-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
5B-03-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
5B-04-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
5B-05-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
5B-07-SS	NA	No	No	NA	No	No	NA	No	No	Pass
5C-01-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
5C-02-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
6B-01-SS	NA	Yes	Yes	NA	No	No	NA	No	No	Pass
6B-02-SS	NA	Yes	Yes	NA	No	No	NA	No	No	Pass
6B-03-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
6B-04-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
6B-05-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
6C-01-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
6C-02-SS	NA	No	Yes	NA	No	No	NA	No	No	Pass
Larval				$(N_T/N_R)<0.85$			$(N_T/N_R)<0.70$			
3A-01-SS	NA	No	No	NA	No	No	NA	No	No	Pass
3A-02-SS	NA	No	No	NA	No	No	NA	No	No	Pass
3A-03-SS	NA	No	No	NA	No	No	NA	No	No	Pass
3A-04-SS	NA	No	No	NA	No	No	NA	No	No	Pass
3A-05-SS	NA	No	No	NA	No	No	NA	No	No	Pass
5B-01-SS	NA	No	No	NA	No	No	NA	No	No	Pass
5B-02-SS	NA	No	No	NA	No	No	NA	No	No	Pass
5B-03-SS	NA	No	No	NA	No	No	NA	No	No	Pass
5B-04-SS	NA	No	No	NA	No	No	NA	No	No	Pass
5B-05-SS	NA	No	No	NA	No	No	NA	No	No	Pass
5B-07-SS	NA	No	No	NA	No	No	NA	No	No	Pass
5C-01-SS	NA	No	No	NA	No	No	NA	No	No	Pass
5C-02-SS	NA	No	No	NA	No	No	NA	No	No	Pass
6B-01-SS	NA	No	No	NA	No	No	NA	No	No	Pass
6B-02-SS	NA	No	No	NA	No	No	NA	No	No	Pass
6B-03-SS	NA	No	No	NA	No	No	NA	No	No	Pass
6B-04-SS	NA	No	No	NA	No	No	NA	No	No	Pass
6B-05-SS	NA	No	No	NA	No	No	NA	No	No	Pass
6C-01-SS	NA	No	No	NA	No	No	NA	No	No	Pass
6C-02-SS	NA	No	No	NA	No	No	NA	No	No	Pass

Table 14
Biological Testing Endpoint Evaluation

Station	Statistically Different?			Exceeds SQS Effect Criteria (Yes/No)			Exceeds CSL Effect Criteria (Yes/No)			SQS/CSL Biological Criteria (Pass/Fail)
	Control	REF-01-SS	REF-02-SS	Control	REF-01-SS	REF-02-SS	Control	REF-01-SS	REF-02-SS	
Juvenile Polychaete				*$MIG_T/MIG_R < 0.70$*			*$MIG_T/MIG_R < 0.50$*			
3A-01-SS	No	No	No	No	No	No	No	No	No	Pass
3A-02-SS	No	No	No	No	No	No	No	No	No	Pass
3A-03-SS	No	No	No	No	No	No	No	No	No	Pass
3A-04-SS	Yes	No	No	No	No	No	No	No	No	Pass
3A-05-SS	Yes	No	No	No	No	No	No	No	No	Pass
5B-01-SS	Yes	No	No	Yes	No	No	No	No	No	Pass*
5B-02-SS	No	No	No	No	No	No	No	No	No	Pass
5B-03-SS	No	No	No	No	No	No	No	No	No	Pass
5B-04-SS	No	No	No	No	No	No	No	No	No	Pass
5B-05-SS	No	No	No	No	No	No	No	No	No	Pass
5B-07-SS	No	No	No	No	No	No	No	No	No	Pass
5C-01-SS	No	No	No	No	No	No	No	No	No	Pass
5C-02-SS	Yes	No	No	No	No	No	No	No	No	Pass
6B-01-SS	No	No	No	No	No	No	No	No	No	Pass
6B-02-SS	No	No	No	No	No	No	No	No	No	Pass
6B-03-SS	No	No	No	No	No	No	No	No	No	Pass
6B-04-SS	No	No	No	No	No	No	No	No	No	Pass
6B-05-SS	No	No	No	No	No	No	No	No	No	Pass
6C-01-SS	No	No	No	No	No	No	No	No	No	Pass
6C-02-SS	No	No	No	No	No	No	No	No	No	Pass

Notes:
M = mortalilty, N = normal counts, MIG = mean individual growth rate
Subscripts: R = reference sediment, T = test sediment, C = negative control
* - MIG_T / MIG_C = 69% when compared to the control. Sample 5B-01-SS passes when compared to both references. See text for additional discussion.

Table 15a
Subsurface Sediment Chemical Testing Results - ASB Primary-Grid

			Location ID:	**8-01-VC**	**8-01-VC**	**8-01-VC**	**8-02-VC**	**8-02-VC**	**8-02-VC**	**8-03-VC**	**8-03-VC**	**8-03-VC**	**8-04-VC**	**8-05-VC**	**8-05-VC**
			Sample ID:	**8-01-VC-1-2**	**8-01-VC-2-3**	**8-01-VC-3-4**	**8-02-VC-1-2**	**8-02-VC-2-3**	**8-02-VC-3-4**	**8-03-VC-1-2**	**8-03-VC-2-3**	**8-03-VC-3-4**	**8-04-VC-1-2**	**8-05-VC-1-2**	**8-05-VC-2-3**
			Sample Date:	**8/5/2008**	**8/5/2008**	**8/5/2008**	**8/5/2008**	**8/5/2008**	**8/5/2008**	**8/6/2008**	**8/6/2008**	**8/6/2008**	**8/6/2008**	**7/28/2008**	**7/28/2008**
			In-Situ Depth^1 (ft):	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**1-2**	**2-3**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**												
Grain Size (pct)															
Total Gravel	--	--	--	--	**0.3**	--	--	**0.1**	--	**2.7**	**4.4**	**1.3**	**1.2**	**0.3**	**5**
Total Sand	--	--	--	**35.2**	**20**	**19.8**	**8.1**	**26.1**	**35.8**	**87.4**	**83.5**	**90.7**	**91.8**	**61.1**	**78.9**
Total Silt	--	--	--	**48.7**	**58**	**59.6**	**54.9**	**56.7**	**47.2**	**10**	**12**	**8.1**	**7**	**31.2**	**16.1**
Total Clay	--	--	--	**15.9**	**21.5**	**20.5**	**12.3**	**17.1**	**16.9**	--	--	--	--	**7.5**	--
Total Fines (Silt + Clay)	--	--	--	**64.6**	**79.5**	**80.1**	**67.2**	**73.8**	**64.1**	**10**	**12**	**8.1**	**7**	**38.7**	**16.1**
Total Grain Size	--	--	--	**99.8**	**99.8**	**99.9**	**75.3**	**100**	**99.9**	**100.1**	**99.9**	**100.1**	**100**	**100.1**	**100**
Physical Parameters															
Atterberg Classification	--	--	--	**CL**	**CH**	**CL**	**CL**	**CL**	**CL**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**
Specific gravity (su)	--	--	--	**2.68**	**2.73**	**2.7**	**2.73**	**2.73**	**2.65**	**2.71**	**2.67**	**2.69**	**2.69**	**2.71**	**2.69**
Liquid Limit (pct)	--	--	--	**46.8**	**58.1**	**47.9**	**28.1**	**39.4**	**35.5**	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	**23.2**	**25**	**22.2**	**21.5**	**22.1**	**19**	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	**23.6**	**33.1**	**25.8**	**6.6**	**17.3**	**16.6**	--	--	--	--	--	--
Moisture (water) Content (pct)	--	--	--	**50.41**	**51.53**	**47.81**	**35.37**	**37.93**	**33.69**	**18.97**	**21.94**	**20.86**	**26.32**	**26.78**	**29.73**
Conventional Parameters															
Total organic carbon (pct)	--	--	--	**1.80**	**1.23**	**0.86**	**0.74**	**0.82**	**0.74**	**0.72**	**2.54**	**3.76**	**1.65**	**0.38 J**	**0.72 J**
Total solids (pct)	--	--	--	**65.4 J**	**66.5 J**	**67.7 J**	**73.6 J**	**72 J**	**74.8 J**	**83.4**	**74.4**	**84.9**	**78.4**	**82.5**	**77.9**
Metals (mg/kg)															
Cadmium	5.1	6.7	--	**0.7**	--	--	**0.6**	--	--	**0.4**	--	--	**0.3**	0.2 U	--
Chromium	260	270	--	**47.6 J**	--	--	**36.8 J**	--	--	**18.4 J**	--	--	**23.3 J**	**26.1**	--
Mercury	0.41	0.59	--	**0.09**	0.06 U	0.07 U	0.06 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U
Zinc	410	960	--	**53**	--	--	**43**	--	--	**25**	--	--	**26**	**32**	--
Aromatic Hydrocarbons (mg/kg-OC)															
Total LPAH	370	780	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	**0.61**	5.3 U	--
Naphthalene	99	170	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Acenaphthylene	66	66	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Acenaphthene	16	57	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Fluorene	23	79	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Phenanthrene	100	480	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	**0.61 J**	5.3 U	--
Anthracene	220	1,200	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
2-Methylnaphthalene	38	64	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Total HPAH	960	5,300	--	**1.3**	--	--	2.7 U	--	--	2.8 U	--	--	**1.8**	5.3 U	--
Fluoranthene	160	1,200	--	**0.61 J**	--	--	2.7 U	--	--	2.8 U	--	--	**0.85 J**	5.3 U	--
Pyrene	1,000	1,400	--	**0.67 J**	--	--	2.7 U	--	--	2.8 U	--	--	**0.97 J**	5.3 U	--
Benzo(a)anthracene	110	270	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Chrysene	110	460	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Benzo(b)fluoranthene	--	--	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Benzo(k)fluoranthene	--	--	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Total Benzofluoranthenes (b, j, k)	230	450	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Benzo(a)pyrene	99	210	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Indeno(1,2,3-c,d)pyrene	34	88	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Dibenzo(a,h)anthracene	12	33	--	0.34 U	--	--	0.83 U	--	--	0.81 U	--	--	0.37 U	1.6 U	--
Benzo(g,h,i)perylene	31	78	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--

Table 15a
Subsurface Sediment Chemical Testing Results - ASB Primary-Grid

			Location ID:	**8-01-VC**	**8-01-VC**	**8-01-VC**	**8-02-VC**	**8-02-VC**	**8-02-VC**	**8-03-VC**	**8-03-VC**	**8-03-VC**	**8-04-VC**	**8-05-VC**	**8-05-VC**
			Sample ID:	**8-01-VC-1-2**	**8-01-VC-2-3**	**8-01-VC-3-4**	**8-02-VC-1-2**	**8-02-VC-2-3**	**8-02-VC-3-4**	**8-03-VC-1-2**	**8-03-VC-2-3**	**8-03-VC-3-4**	**8-04-VC-1-2**	**8-05-VC-1-2**	**8-05-VC-2-3**
			Sample Date:	**8/5/2008**	**8/5/2008**	**8/5/2008**	**8/5/2008**	**8/5/2008**	**8/5/2008**	**8/6/2008**	**8/6/2008**	**8/6/2008**	**8/6/2008**	**7/28/2008**	**7/28/2008**
			In-Situ Depth[1] (ft):	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**1-2**	**2-3**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**												
Chlorinated Benzenes (mg/kg-OC)															
1,2-Dichlorobenzene	2.3	2.3	--	0.34 U	--	--	0.83 U	--	--	0.81 U	--	--	0.37 U	1.6 UJ	--
1,4-Dichlorobenzene	3.1	9	--	0.34 U	--	--	0.83 U	--	--	0.81 U	--	--	0.37 U	1.6 U	--
1,2,4-Trichlorobenzene	0.81	1.8	--	0.34 U	--	--	0.83 U	--	--	0.81 U	--	--	0.37 U	1.6 U	--
Hexachlorobenzene	0.38	2.3	--	0.34 U	--	--	0.83 U	--	--	0.81 U	--	--	0.37 U	1.6 U	--
Phthalates (mg/kg-OC)															
Dimethyl phthalate	53	53	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Diethyl phthalate	61	110	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Di-n-butyl phthalate	220	1,700	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	**5.9**	--
Butylbenzyl phthalate	4.9	64	--	0.83 U	--	--	2 U	--	--	2.1 U	--	--	0.91 U	4 UJ	--
Bis(2-ethylhexyl) phthalate	47	78	--	1.1 U	--	--	**1.9 J**	--	--	**4.3**	--	--	1.2 U	5.3 U	--
Di-n-octyl phthalate	58	4,500	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Miscellaneous (mg/kg-OC)															
Dibenzofuran	15	58	--	1.1 U	--	--	2.7 U	--	--	2.8 U	--	--	1.2 U	5.3 U	--
Hexachlorobutadiene	3.9	6.2	--	0.34 UJ	--	--	0.83 UJ	--	--	0.81 U	--	--	0.37 U	1.6 UJ	--
N-Nitrosodiphenylamine	11	11	--	0.34 U	--	--	0.83 U	--	--	0.81 U	--	--	0.37 U	1.6 UJ	--
Ionizable Organic Compounds (ug/kg)															
Phenol	420	1,200	420	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
2-Methylphenol (o-Cresol)	63	63	63	6.1 U	--	--	6.1 U	--	--	5.8 U	--	--	6.1 U	6 UJ	--
4-Methylphenol (p-Cresol)	670	670	670	**25**	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
2,4-Dimethylphenol	29	29	29	6.1 UJ	--	--	6.1 UJ	--	--	5.8 UJ	--	--	6.1 UJ	6 UJ	--
Pentachlorophenol	360	690	140	30 U	--	--	30 U	--	--	29 U	--	--	30 U	30 U	--
Benzyl alcohol	57	73	57	20 U	--	--	20 U	--	--	20 U	--	--	20 U	30 UJ	--
Benzoic acid	650	650	650	200 U	--	--	200 U	--	--	200 U	--	--	200 U	200 U	--
Aromatic Hydrocarbons (ug/kg)															
Total LPAH	--	--	5,200	20 U	--	--	20 U	--	--	20 U	--	--	**10**	20 U	--
Naphthalene	--	--	2,100	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Acenaphthylene	--	--	560	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Acenaphthene	--	--	500	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Fluorene	--	--	540	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Phenanthrene	--	--	1,500	20 U	--	--	20 U	--	--	20 U	--	--	**10 J**	20 U	--
Anthracene	--	--	960	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
2-Methylnaphthalene	--	--	670	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Total HPAH	--	--	12,000	**23**	--	--	20 U	--	--	20 U	--	--	**30**	20 U	--
Fluoranthene	--	--	1,700	**11 J**	--	--	20 U	--	--	20 U	--	--	**14 J**	20 U	--
Pyrene	--	--	2,600	**12 J**	--	--	20 U	--	--	20 U	--	--	**16 J**	20 U	--
Benzo(a)anthracene	--	--	1,300	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Chrysene	--	--	1,400	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Benzo(b)fluoranthene	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Benzo(k)fluoranthene	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Benzo(a)pyrene	--	--	1,600	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Indeno(1,2,3-c,d)pyrene	--	--	600	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Dibenzo(a,h)anthracene	--	--	230	6.1 U	--	--	6.1 U	--	--	5.8 U	--	--	6.1 U	6 U	--
Benzo(g,h,i)perylene	--	--	670	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Chlorinated Benzenes (ug/kg)															
1,2-Dichlorobenzene	--	--	35	6.1 U	--	--	6.1 U	--	--	5.8 U	--	--	6.1 U	6 UJ	--
1,4-Dichlorobenzene	--	--	110	6.1 U	--	--	6.1 U	--	--	5.8 U	--	--	6.1 U	6 U	--
1,2,4-Trichlorobenzene	--	--	31	6.1 U	--	--	6.1 U	--	--	5.8 U	--	--	6.1 U	6 U	--
Hexachlorobenzene	--	--	22	6.1 U	--	--	6.1 U	--	--	5.8 U	--	--	6.1 U	6 U	--
Miscellaneous (ug/kg)															
Dibenzofuran	--	--	540	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Hexachlorobutadiene	--	--	11	6.1 UJ	--	--	6.1 UJ	--	--	5.8 U	--	--	6.1 U	6 UJ	--
N-Nitrosodiphenylamine	--	--	28	6.1 U	--	--	6.1 U	--	--	5.8 U	--	--	6.1 U	6 UJ	--
Phthalates (ug/kg)															
Dimethyl phthalate	--	--	71	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Diethyl phthalate	--	--	48	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Di-n-butyl phthalate	--	--	1,400	20 U	--	--	20 U	--	--	20 U	--	--	20 U	**22**	--
Butylbenzyl phthalate	--	--	63	15 U	--	--	15 U	--	--	15 U	--	--	15 U	15 UJ	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	20 U	--	--	**14 J**	--	--	**31**	--	--	20 U	20 U	--
Di-n-octyl phthalate	--	--	420	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--

Table 15a
Subsurface Sediment Chemical Testing Results - ASB Primary-Grid

	Location ID:			8-01-VC	8-01-VC	8-01-VC	8-02-VC	8-02-VC	8-02-VC	8-03-VC	8-03-VC	8-03-VC	8-04-VC	8-05-VC	8-05-VC
	Sample ID:			8-01-VC-1-2	8-01-VC-2-3	8-01-VC-3-4	8-02-VC-1-2	8-02-VC-2-3	8-02-VC-3-4	8-03-VC-1-2	8-03-VC-2-3	8-03-VC-3-4	8-04-VC-1-2	8-05-VC-1-2	8-05-VC-2-3
	Sample Date:			8/5/2008	8/5/2008	8/5/2008	8/5/2008	8/5/2008	8/5/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	7/28/2008	7/28/2008
	In-Situ Depth[1] (ft):			1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	1-2	2-3
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**												
Dioxin Furans (ng/kg)															
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**1.48**	**0.449 J**	0.0497 U	0.34 U	--	--	0.163 U	--	--	0.141 U	0.107 U	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**5.17**	**1.56 J**	0.0488 U	0.261 U	--	--	0.0762 U	--	--	**0.314 J**	0.384 U	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**10.8**	**3.22**	0.0879 U	1.18 U	--	--	**0.537 J**	--	--	0.161 U	0.463 U	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**25.5**	**7.78**	0.0976 U	1.23 U	--	--	**2.12 J**	--	--	**2.7**	0.584 U	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**17.8**	**5**	0.0984 U	1.2 U	--	--	**0.697 J**	--	--	**1.19 J**	0.554 U	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**194**	**57.4**	**0.889 J**	**1.83 J**	--	--	**54.5**	--	--	**34.6**	**1.03 J**	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	**211**	**62.5**	**7.01**	**9.85**	--	--	**550**	--	--	**304**	**5.54**	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	**61.5**	**20.1**	0.0373 U	0.285 U	--	--	**2.3**	--	--	**3.32**	0.176 U	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**3.45**	**1.01 J**	0.158 U	0.177 U	--	--	0.111 U	--	--	0.174 U	0.353 U	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**5.25**	**1.68 J**	0.144 U	0.134 U	--	--	**0.497 J**	--	--	**0.412 J**	0.347 U	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**2.81**	**0.682 J**	0.0256 U	0.173 U	--	--	**0.846 J**	--	--	**0.52 J**	0.129 U	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**2.83**	**0.754 J**	0.0238 U	0.172 U	--	--	**0.346 J**	--	--	0.261 U	0.124 U	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	**1.48 J**	0.0672 U	0.0329 U	0.188 U	--	--	**0.297 J**	--	--	0.314 U	0.162 U	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**3.64**	**1.06 J**	0.0256 U	0.173 U	--	--	**0.675 J**	--	--	**0.434 J**	0.14 U	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	**6.78**	**1.92 J**	0.0316 U	0.123 U	--	--	**11.3**	--	--	**8.79**	0.0993 U	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	**1.61 J**	**0.296 J**	0.0425 U	0.142 U	--	--	**0.904 J**	--	--	**0.707 J**	0.13 U	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	**4.12 J**	**1.1 J**	0.312 U	0.452 U	--	--	**31.3**	--	--	**23.7**	0.282 U	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**618 J**	**177 J**	**1.05 J**	**4.26 J**	--	--	**12.3 J**	--	--	**57.9**	**2.93 J**	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**723**	**216 J**	**1.08 J**	**4.41 J**	--	--	**12.7 J**	--	--	**52.9 J**	**3.17**	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**1120**	**332 J**	**2.22 J**	**5.36 J**	--	--	**29.1**	--	--	**65.4**	0.532 U	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**334**	**97.8**	**2.12**	**3.73**	--	--	**121**	--	--	**75.6**	**2.1**	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	**201**	**62.3**	**0.429 J**	0.285 U	--	--	**7.17 J**	--	--	**11.1 J**	**0.153**	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	**54**	**17 J**	**0.0791 J**	0.154 U	--	--	**4.05 J**	--	--	**3.57 J**	0.35 U	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	**35.3**	**9.37 J**	0.0267 U	0.176 U	--	--	**20.2 J**	--	--	**12.4**	0.138 U	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	**15.9**	**4.55**	**0.102 J**	0.131 U	--	--	**38.8**	--	--	**31.1**	**0.238**	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	**23.1**	**7.02**	**0.0110**	**0.0213**	--	--	**1.77**	--	--	**1.79**	**0.0120**	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	**23.1**	**7.02**	**0.106**	**0.576**	--	--	**1.89**	--	--	**1.90**	**0.433**	--
Guaiacols (ug/kg)															
2-Methoxyphenol (Guaiacol)	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
3,4,5-Trichloroguaiacol	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
4,5-Dichloroguaiacol	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
4,5,6-Trichloroguaiacol	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Tetrachloroguaiacol	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Semi-Volatile Organics (ug/kg)															
1,3-Dichlorobenzene	--	--	170	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
1-Methylnaphthalene	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--
Hexachloroethane	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	20 U	20 U	--

Table 15a
Subsurface Sediment Chemical Testing Results - ASB Primary-Grid

			Location ID:	**8-05-VC**	**8-06-VC**	**8-06-VC**	**8-06-VC**	**8-07-VC**	**8-07-VC**	**8-07-VC**	**8-08-VC**	**8-08-VC**	**8-08-VC**	**8-09-VC**	**8-09-VC**	**8-09-VC**
			Sample ID:	**8-05-VC-3-4**	**8-06-VC-1-2**	**8-06-VC-2-3**	**8-06-VC-3-4**	**8-07-VC-1-2**	**8-07-VC-2-3**	**8-07-VC-3-4**	**8-08-VC-1-2**	**8-08-VC-2-3**	**8-08-VC-3-4**	**8-09-VC-1-2**	**8-09-VC-2-3**	**8-09-VC-3-4**
			Sample Date:	**7/28/2008**	**8/7/2008**	**8/7/2008**	**8/7/2008**	**7/28/2008**	**7/28/2008**	**7/28/2008**	**8/8/2008**	**8/8/2008**	**8/8/2008**	**8/5/2008**	**8/5/2008**	**8/5/2008**
			In-Situ Depth[1] (ft):	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Grain Size (pct)																
Total Gravel	--	--	--	**1**	**0.4**	**0.9**	**0.6**	**2.1**	**1.6**	**1.2**	**0.5**	**0.2**	--	**0.5**	--	**0.1**
Total Sand	--	--	--	**83.7**	**85.2**	**93.6**	**92.5**	**72.3**	**75**	**83.1**	**90.4**	**91.4**	**89.7**	**74.1**	**71.3**	**75.4**
Total Silt	--	--	--	**15.4**	**8.9**	**5.5**	**7.1**	**25.6**	**23.3**	**15.7**	**9.2**	**8.4**	**10.3**	**21.4**	**23.3**	**20.8**
Total Clay	--	--	--	--	**5.5**	--	--	--	--	--	--	--	--	**4.2**	**5.4**	**3.8**
Total Fines (Silt + Clay)	--	--	--	**15.4**	**14.4**	**5.5**	**7.1**	**25.6**	**23.3**	**15.7**	**9.2**	**8.4**	**10.3**	**25.6**	**28.7**	**24.6**
Total Grain Size	--	--	--	**100.1**	**100**	**100**	**100.2**	**100**	**99.9**	**100**	**100.1**	**100**	**100**	**100.2**	**100**	**100.1**
Physical Parameters																
Atterberg Classification	--	--	--	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**
Specific gravity (su)	--	--	--	**2.7**	**2.69**	**2.72**	**2.73**	**2.67**	**2.72**	**2.7**	**2.71**	**2.73**	**2.71**	**2.66**	**2.71**	**2.72**
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	--	--	--	**23.79**	**18.13**	**21.1**	**21.82**	**30.58**	**21.12**	**18.77**	**22.25**	**21.94**	**19.94**	**34.85**	**24.6**	**22.36**
Conventional Parameters																
Total organic carbon (pct)	--	--	--	**0.60 J**	**0.50**	**0.23**	**0.14**	**1.19 J**	**0.489 J**	**0.498 J**	**0.55**	**0.52**	**0.48**	**2.17**	**0.50**	**0.54**
Total solids (pct)	--	--	--	**81.1**	**83.8**	**83.2**	**81**	**77.7**	**82.4**	**83.2**	**81.8**	**82.6**	**82.8**	**70.9 J**	**80.5 J**	**80.8 J**
Metals (mg/kg)																
Cadmium	5.1	6.7	--	--	**0.5**	--	--	**0.4**	--	--	**0.3**	--	--	**0.5**	**0.4**	--
Chromium	260	270	--	--	**17.6**	--	--	**23.8**	--	--	**19.4**	--	--	**25.8 J**	**21.9 J**	--
Mercury	0.41	0.59	--	0.04 U	0.05 UJ	0.04 U	0.05 U	**0.06**	0.05 U	0.05 U	0.04 U	0.05 U	0.04 U	**0.19**	0.05 U	0.04 U
Zinc	410	960	--	--	**22**	--	--	**30**	--	--	**27**	--	--	**35**	**26**	--
Aromatic Hydrocarbons (mg/kg-OC)																
Total LPAH	370	780	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**1.9**	4 U	--
Naphthalene	99	170	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**0.69 J**	4 U	--
Acenaphthylene	66	66	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Acenaphthene	16	57	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Fluorene	23	79	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Phenanthrene	100	480	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**1.2**	4 U	--
Anthracene	220	1,200	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
2-Methylnaphthalene	38	64	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Total HPAH	960	5,300	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**5.6**	4 U	--
Fluoranthene	160	1,200	--	--	4 UJ	--	--	1.7 U	--	--	3.4 UJ	--	--	**1.8**	4 U	--
Pyrene	1,000	1,400	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**2.2**	4 U	--
Benzo(a)anthracene	110	270	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**0.46 J**	4 U	--
Chrysene	110	460	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**0.60 J**	4 U	--
Benzo(b)fluoranthene	--	--	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**0.55 J**	4 U	--
Benzo(k)fluoranthene	--	--	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**0.55**	4 U	--
Benzo(a)pyrene	99	210	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Dibenzo(a,h)anthracene	12	33	--	--	1.2 U	--	--	0.5 U	--	--	1.1 U	--	--	0.28 U	1.2 U	--
Benzo(g,h,i)perylene	31	78	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--

Table 15a
Subsurface Sediment Chemical Testing Results - ASB Primary-Grid

			Location ID:	8-05-VC	8-06-VC	8-06-VC	8-06-VC	8-07-VC	8-07-VC	8-07-VC	8-08-VC	8-08-VC	8-08-VC	8-09-VC	8-09-VC	8-09-VC
			Sample ID:	**8-05-VC-3-4**	**8-06-VC-1-2**	**8-06-VC-2-3**	**8-06-VC-3-4**	**8-07-VC-1-2**	**8-07-VC-2-3**	**8-07-VC-3-4**	**8-08-VC-1-2**	**8-08-VC-2-3**	**8-08-VC-3-4**	**8-09-VC-1-2**	**8-09-VC-2-3**	**8-09-VC-3-4**
			Sample Date:	**7/28/2008**	**8/7/2008**	**8/7/2008**	**8/7/2008**	**7/28/2008**	**7/28/2008**	**7/28/2008**	**8/8/2008**	**8/8/2008**	**8/8/2008**	**8/5/2008**	**8/5/2008**	**8/5/2008**
			In-Situ Depth^1 (ft):	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Chlorinated Benzenes (mg/kg-OC)																
1,2-Dichlorobenzene	2.3	2.3	--	--	1.2 U	--	--	0.5 UJ	--	--	1.1 U	--	--	0.28 U	1.2 U	--
1,4-Dichlorobenzene	3.1	9	--	--	1.2 U	--	--	0.5 U	--	--	1.1 U	--	--	0.28 U	1.2 U	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	1.2 U	--	--	0.5 U	--	--	1.1 U	--	--	0.28 U	1.2 U	--
Hexachlorobenzene	0.38	2.3	--	--	1.2 U	--	--	0.5 U	--	--	1.1 U	--	--	0.28 U	1.2 U	--
Phthalates (mg/kg-OC)																
Dimethyl phthalate	53	53	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Diethyl phthalate	61	110	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Di-n-butyl phthalate	220	1,700	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Butylbenzyl phthalate	4.9	64	--	--	3 U	--	--	1.3 UJ	--	--	2.7 U	--	--	**0.83**	3 U	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	**1.4**	4 U	--
Di-n-octyl phthalate	58	4,500	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Miscellaneous (mg/kg-OC)																
Dibenzofuran	15	58	--	--	4 U	--	--	1.7 U	--	--	3.4 U	--	--	0.92 U	4 U	--
Hexachlorobutadiene	3.9	6.2	--	--	1.2 U	--	--	0.5 UJ	--	--	1.1 U	--	--	0.28 UJ	1.2 UJ	--
N-Nitrosodiphenylamine	11	11	--	--	1.2 UJ	--	--	0.5 UJ	--	--	1.1 UJ	--	--	0.28 U	1.2 U	--
Ionizable Organic Compounds (ug/kg)																
Phenol	420	1,200	420	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
2-Methylphenol (o-Cresol)	63	63	63	--	5.8 UJ	--	--	6 UJ	--	--	6 UJ	--	--	6.1 U	6.1 U	--
4-Methylphenol (p-Cresol)	670	670	670	--	20 U	--	--	20 U	--	--	19 U	--	--	**22**	20 U	--
2,4-Dimethylphenol	29	29	29	--	5.8 UJ	--	--	6 UJ	--	--	6 UJ	--	--	6.1 UJ	6.1 UJ	--
Pentachlorophenol	360	690	140	--	29 U	--	--	30 U	--	--	30 U	--	--	30 U	30 U	--
Benzyl alcohol	57	73	57	--	20 UJ	--	--	30 UJ	--	--	19 UJ	--	--	20 U	20 U	--
Benzoic acid	650	650	650	--	200 U	--	--	200 U	--	--	190 U	--	--	200 U	200 U	--
Aromatic Hydrocarbons (ug/kg)																
Total LPAH	--	--	5,200	--	20 U	--	--	20 U	--	--	19 U	--	--	**41**	20 U	--
Naphthalene	--	--	2,100	--	20 U	--	--	20 U	--	--	19 U	--	--	**15 J**	20 U	--
Acenaphthylene	--	--	560	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Acenaphthene	--	--	500	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Fluorene	--	--	540	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Phenanthrene	--	--	1,500	--	20 U	--	--	20 U	--	--	19 U	--	--	**26**	20 U	--
Anthracene	--	--	960	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
2-Methylnaphthalene	--	--	670	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Total HPAH	--	--	12,000	--	20 U	--	--	20 U	--	--	19 U	--	--	**122**	20 U	--
Fluoranthene	--	--	1,700	--	20 UJ	--	--	20 U	--	--	19 UJ	--	--	**40**	20 U	--
Pyrene	--	--	2,600	--	20 U	--	--	20 U	--	--	19 U	--	--	**47**	20 U	--
Benzo(a)anthracene	--	--	1,300	--	20 U	--	--	20 U	--	--	19 U	--	--	**10 J**	20 U	--
Chrysene	--	--	1,400	--	20 U	--	--	20 U	--	--	19 U	--	--	**13 J**	20 U	--
Benzo(b)fluoranthene	--	--	--	--	20 U	--	--	20 U	--	--	19 U	--	--	**12 J**	20 U	--
Benzo(k)fluoranthene	--	--	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	20 U	--	--	20 U	--	--	19 U	--	--	**12**	20 U	--
Benzo(a)pyrene	--	--	1,600	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Dibenzo(a,h)anthracene	--	--	230	--	5.8 U	--	--	6 U	--	--	6 U	--	--	6.1 U	6.1 U	--
Benzo(g,h,i)perylene	--	--	670	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Chlorinated Benzenes (ug/kg)																
1,2-Dichlorobenzene	--	--	35	--	5.8 U	--	--	6 UJ	--	--	6 U	--	--	6.1 U	6.1 U	--
1,4-Dichlorobenzene	--	--	110	--	5.8 U	--	--	6 U	--	--	6 U	--	--	6.1 U	6.1 U	--
1,2,4-Trichlorobenzene	--	--	31	--	5.8 U	--	--	6 U	--	--	6 U	--	--	6.1 U	6.1 U	--
Hexachlorobenzene	--	--	22	--	5.8 U	--	--	6 U	--	--	6 U	--	--	6.1 U	6.1 U	--
Miscellaneous (ug/kg)																
Dibenzofuran	--	--	540	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Hexachlorobutadiene	--	--	11	--	5.8 U	--	--	6 UJ	--	--	6 U	--	--	6.1 UJ	6.1 UJ	--
N-Nitrosodiphenylamine	--	--	28	--	5.8 UJ	--	--	6 UJ	--	--	6 UJ	--	--	6.1 U	6.1 U	--
Phthalates (ug/kg)																
Dimethyl phthalate	--	--	71	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Diethyl phthalate	--	--	48	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Di-n-butyl phthalate	--	--	1,400	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Butylbenzyl phthalate	--	--	63	--	15 U	--	--	15 UJ	--	--	15 U	--	--	**18**	15 U	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	20 U	--	--	20 U	--	--	19 U	--	--	**30**	20 U	--
Di-n-octyl phthalate	--	--	420	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--

Table 15a
Subsurface Sediment Chemical Testing Results - ASB Primary-Grid

			Location ID:	8-05-VC	8-06-VC	8-06-VC	8-06-VC	8-07-VC	8-07-VC	8-07-VC	8-08-VC	8-08-VC	8-08-VC	8-09-VC	8-09-VC	8-09-VC
			Sample ID:	8-05-VC-3-4	8-06-VC-1-2	8-06-VC-2-3	8-06-VC-3-4	8-07-VC-1-2	8-07-VC-2-3	8-07-VC-3-4	8-08-VC-1-2	8-08-VC-2-3	8-08-VC-3-4	8-09-VC-1-2	8-09-VC-2-3	8-09-VC-3-4
			Sample Date:	7/28/2008	8/7/2008	8/7/2008	8/7/2008	7/28/2008	7/28/2008	7/28/2008	8/8/2008	8/8/2008	8/8/2008	8/5/2008	8/5/2008	8/5/2008
			In-Situ Depth^1 (ft):	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Dioxin Furans (ng/kg)																
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	0.51 U	--	--	0.135 U	--	--	0.0762 U	--	--	**0.868**	0.399 U	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	0.4 U	--	--	0.18 U	--	--	0.135 U	--	--	0.391 U	0.328 U	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	0.272 U	--	--	**0.791 J**	--	--	0.148 U	--	--	**1.48 J**	0.293 U	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	0.262 U	--	--	**1.64 J**	--	--	0.141 U	--	--	**12.4**	0.318 U	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	0.252 U	--	--	**0.98 J**	--	--	0.154 U	--	--	**3.08**	0.31 U	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**1.12 J**	--	--	**25.6**	--	--	**1.05 J**	--	--	**405**	**1.72 J**	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	**3.78 J**	--	--	**263**	--	--	**8.01**	--	--	**6380**	**15.5**	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	0.305 U	--	--	**1.5**	--	--	**0.0836 J**	--	--	**9.09**	0.135 U	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	0.274 U	--	--	0.222 U	--	--	0.14 U	--	--	**1.56 J**	0.229 U	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	0.228 U	--	--	**0.335 J**	--	--	0.138 U	--	--	**3.48**	0.184 U	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	0.334 U	--	--	**0.483 J**	--	--	0.0452 U	--	--	**5.61**	0.165 U	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	0.301 U	--	--	0.0898 U	--	--	0.0434 U	--	--	**2.06 J**	0.161 U	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	0.316 U	--	--	0.116 U	--	--	0.0502 U	--	--	**2.04 J**	0.215 U	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	0.324 U	--	--	**0.483 J**	--	--	0.0464 U	--	--	**3.31**	0.176 U	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	0.231 U	--	--	**4.77**	--	--	0.0783 U	--	--	**60.5**	0.226 U	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	0.245 U	--	--	0.34 U	--	--	0.0946 U	--	--	**3.45**	0.281 U	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	0.565 U	--	--	**12.2**	--	--	0.458 U	--	--	**115**	0.891 U	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**3.29 J**	--	--	**32.5**	--	--	**3.07 J**	--	--	**27**	**1.3**	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**3.84**	--	--	**33.8**	--	--	**3.61 J**	--	--	**26.8**	**1.49 J**	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**3.39**	--	--	**44.8**	--	--	**3.26 J**	--	--	**109 J**	**2.51 J**	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**2.02**	--	--	**53.9**	--	--	**2.32**	--	--	**1110**	**4.79**	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	0.305 U	--	--	**6.49 J**	--	--	**0.191 J**	--	--	**29.5 J**	**0.523 J**	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	0.25 U	--	--	**2.35 J**	--	--	0.139 U	--	--	**24.6**	0.205 U	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	0.318 U	--	--	**8.37 J**	--	--	**0.293**	--	--	**104**	**0.367**	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	0.238 U	--	--	**15.7**	--	--	**0.48 J**	--	--	**192**	**0.612**	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	**0.0123**	--	--	**1.07**	--	--	**0.0213**	--	--	**12.5**	**0.0219**	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	**0.626**	--	--	**1.25**	--	--	**0.182**	--	--	**12.7**	**0.508**	--
Guaiacols (ug/kg)																
2-Methoxyphenol (Guaiacol)	--	--	--	--	20 UJ	--	--	20 U	--	--	19 UJ	--	--	20 U	20 U	--
3,4,5-Trichloroguaiacol	--	--	--	--	20 UJ	--	--	20 U	--	--	19 UJ	--	--	20 U	20 U	--
4,5-Dichloroguaiacol	--	--	--	--	20 UJ	--	--	20 U	--	--	19 UJ	--	--	20 U	20 U	--
4,5,6-Trichloroguaiacol	--	--	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Tetrachloroguaiacol	--	--	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Semi-Volatile Organics (ug/kg)																
1,3-Dichlorobenzene	--	--	170	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
1-Methylnaphthalene	--	--	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--
Hexachloroethane	--	--	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U	20 U	--

Notes:

🟨	Detected concentration is greater than SMS SQS screening level
🟩	Detected concentration is greater than SMS CSL screening level
🟦	Detected concentration is greater than 1988 Puget Sound Estuary Program LAET screening level

There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.

The site specific Bioaccumulaltion Screening Level (BSL) for mercury is 1.2 mg/kg. (Supplemental RI Report, RETEC 2006)

1. Sample depth is reported as below ASB solids/sand (hard bottom) interface.

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs.

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene.

Benzo(j)fluoranthene is included in the total of benzo(b&k)fluoranthenes.

Totals are calculated for LPAH and HPAH as the sum of all detected results. If all are undetcted results, the highest reporting limit value is reported as the sum.

Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a "0" (ND=0) and assigned a concentration equal to half the detection limit (ND=1/2).

-- Sample was not submitted for chemical analysis.

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

mg/kg-OC = milligrams per kilogram organic carbon normalized

ng/kg = nanogram per kilogram

pct = percent

Non-organic carbon normalized samples with TOC results outside of the 0.5-3.5% range were screened against the 1988 Puget Sound Estuary Program LAET

Table 15b
Subsurface Sediment Chemical Testing Results - ASB Secondary-Grid

		Location ID:	8-10-VC	8-10-VC	8-10-VC	8-11-VC	8-11-VC	8-11-VC	8-12-VC	8-12-VC	8-12-VC	8-13-VC	8-13-VC	8-13-VC
		Sample ID:	8-10-VC-1-2	8-10-VC-2-3	8-10-VC-3-4	8-11-VC-1-2	8-11-VC-2-3	8-11-VC-3-4	8-12-VC-1-2	8-12-VC-2-3	8-12-VC-3-4	8-13-VC-1-2	8-13-VC-2-3	8-13-VC-3-4
		Sample Date:	8/6/2008	8/6/2008	8/6/2008	8/7/2008	8/7/2008	8/7/2008	8/6/2008	8/6/2008	8/6/2008	8/5/2008	8/5/2008	8/5/2008
		In-Situ Depth^1 (ft):	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4
Analyte	SMS SQS	SMS CSL												
Conventional Parameters (pct)														
Total organic carbon	--	--	**1.09**	**0.842**	**0.747**	**1.00**	**0.568**	**0.563**	**1.14**	**0.819**	**0.976**	**0.88**	**0.828**	**0.629**
Total solids	--	--	**69.8**	**73.4**	**70.5**	**78**	**79.1**	**78.4**	**71.8**	**62.6**	**72.9**	**73.3 J**	**73.9 J**	**72.7 J**
Metals (mg/kg)														
Mercury	0.41	0.59	**0.09**	0.07 U	0.06 U	0.06 UJ	0.06 UJ	0.05 UJ	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
Dioxin Furans (ng/kg)														
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.431 J**	**0.135 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**0.472 J**	**0.274 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**1.18 J**	**0.759 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**4.33**	**1.8 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**1.6 J**	**0.942 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**90.7**	**31.1**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**892**	**267**	--	--	--	--	--	--	--	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**7.56**	**2.47**	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.427 J**	0.0509 U	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**1.03 J**	**0.394 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**1.49 J**	**0.728 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.623 J**	**0.413 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**0.487 J**	0.0662 U	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**1.04 J**	**0.391 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**23.7**	**9.93**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	**1.24 J**	**0.564 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	**58.8**	**22.3**	--	--	--	--	--	--	--	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**43.8 J**	**43.2 J**	--	--	--	--	--	--	--	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**52.7 J**	**48.7 J**	--	--	--	--	--	--	--	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**78.4**	**60.9 J**	--	--	--	--	--	--	--	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**215**	**69.9**	--	--	--	--	--	--	--	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	**20.7 J**	**7.79 J**	--	--	--	--	--	--	--	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	**10.5 J**	**3.89 J**	--	--	--	--	--	--	--	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	**32.5**	**10.8 J**	--	--	--	--	--	--	--	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	**83.8**	**30 J**	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	**4.50**	**1.78**	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	**4.50**	**1.78**	--	--	--	--	--	--	--	--	--	--

Table 15b
Subsurface Sediment Chemical Testing Results - ASB Secondary-Grid

	Location ID:		8-14-VC	8-14-VC	8-14-VC	8-15-VC	8-15-VC	8-15-VC	8-16-VC	8-16-VC	8-16-VC	8-17-VC	8-17-VC	8-17-VC
	Sample ID:		8-14-VC-1-2	8-14-VC-2-3	8-14-VC-3-4	8-15-VC-1-2	8-15-VC-2-3	8-15-VC-3-4	8-16-VC-1-2	8-16-VC-2-3	8-16-VC-3-4	8-17-VC-1-2	8-17-VC-2-3	8-17-VC-3-4
	Sample Date:		7/29/2008	7/29/2008	7/29/2008	8/7/2008	8/7/2008	8/7/2008	8/5/2008	8/5/2008	8/5/2008	8/8/2008	8/8/2008	8/8/2008
	In-Situ Depth^1 (ft):		1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4
Analyte	**SMS SQS**	**SMS CSL**												
Conventional Parameters (pct)														
Total organic carbon	--	--	**0.461**	**0.52**	**0.617**	**0.551**	**0.445**	**0.482**	**0.52**	**0.653**	**0.252**	**0.436**	**0.521**	**0.644**
Total solids	--	--	**73.9**	**74.3**	**73.1**	**75.4**	**74.9**	**77.5**	**80.6 J**	**80.4 J**	**81.4 J**	**80.1**	**79.2**	**78**
Metals (mg/kg)														
Mercury	0.41	0.59	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.05 U	0.05 U	0.06 U	0.05 U	0.06 U	0.06 U
Dioxin Furans (ng/kg)														
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 15b
Subsurface Sediment Chemical Testing Results - ASB Secondary-Grid

		Location ID:	8-18-VC	8-18-VC	8-18-VC	8-19-VC	8-19-VC	8-20-VC	8-20-VC	8-20-VC	8-21-VC	8-21-VC	8-21-VC
		Sample ID:	8-18-VC-1-2	8-18-VC-2-3	8-18-VC-3-4	8-19-VC-1-2	8-19-VC-2-3	8-20-VC-1-2	8-20-VC-2-3	8-20-VC-3-4	8-21-VC-1-2	8-21-VC-2-3	8-21-VC-3-4
		Sample Date:	7/28/2008	7/28/2008	7/28/2008	7/28/2008	7/28/2008	8/8/2008	8/8/2008	8/8/2008	7/28/2008	7/28/2008	7/28/2008
		In-Situ Depth[1] (ft):	1-2	2-3	3-4	1-2	2-3	1-2	2-3	3-4	1-2	2-3	3-4
Analyte	**SMS SQS**	**SMS CSL**											
Conventional Parameters (pct)													
Total organic carbon	--	--	**0.359 J**	**0.298 J**	**0.359 J**	**2.81 J**	**0.63 J**	**0.668**	**0.564**	**0.459**	**0.256 J**	**0.257 J**	**0.255 J**
Total solids	--	--	**75.6**	**79.5**	**80.6**	**78.5**	**77.2**	**82**	**82.9**	**83.7**	**84.9**	**81.7**	**81.7**
Metals (mg/kg)													
Mercury	0.41	0.59	0.06 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U
Dioxin Furans (ng/kg)													
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 15b
Subsurface Sediment Chemical Testing Results - ASB Secondary-Grid

		Location ID:	**8-22-VC**	**8-22-VC**	**8-22-VC**	**8-23-VC**	**8-23-VC**	**8-23-VC**	**8-24-VC**	**8-24-VC**	**8-24-VC**	**8-25-VC**	**8-25-VC**	**8-25-VC**
		Sample ID:	**8-22-VC-1-2**	**8-22-VC-2-3**	**8-22-VC-3-4**	**8-23-VC-1-2**	**8-23-VC-2-3**	**8-23-VC-3-4**	**8-24-VC-1-2**	**8-24-VC-2-3**	**8-24-VC-3-4**	**8-25-VC-1-2**	**8-25-VC-2-3**	**8-25-VC-3-4**
		Sample Date:	**8/7/2008**	**8/7/2008**	**8/7/2008**	**8/7/2008**	**8/7/2008**	**8/7/2008**	**8/8/2008**	**8/8/2008**	**8/8/2008**	**8/7/2008**	**8/7/2008**	**8/7/2008**
		In-Situ Depth^1 (ft):	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**
Analyte	**SMS SQS**	**SMS CSL**												
Conventional Parameters (pct)														
Total organic carbon	--	--	**0.482**	**0.472**	**0.59**	**0.428**	**0.443**	**0.491**	**0.593**	**0.495**	**0.753**	**1.09**	**0.807**	**0.522**
Total solids	--	--	**84.1**	**82.9**	**80.9**	**80.6**	**80.3**	**79.6**	**82.9**	**82.4**	**81.6**	**80.8**	**82.7**	**82.5**
Metals (mg/kg)														
Mercury	0.41	0.59	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U	0.05 U	**0.1 J**	0.05 UJ	0.05 UJ
Dioxin Furans (ng/kg)														
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	--	--	--	--	**0.243 J**	0.037 U	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	--	--	--	--	**0.346 J**	0.309 U	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	**0.42 J**	0.0809 U	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	**4.58**	0.0882 U	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	**1.02 J**	0.0921 U	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	--	--	--	--	**125**	**2.15 J**	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	--	--	--	--	--	--	--	**1840**	**23.4**	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	--	--	--	--	**2.54**	**0.0922 J**	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	**0.442 J**	0.104 U	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	**1.41 J**	0.0883 U	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	**1.98 J**	0.0281 U	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	**0.809 J**	0.0269 U	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	**0.73 J**	0.0371 U	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	**1.2 J**	0.0274 U	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	**27.4**	**0.31 J**	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	**1.15 J**	0.0577 U	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	--	--	--	--	--	--	--	**71.5**	**0.587 J**	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	--	--	--	--	**9.11 J**	**1.7 J**	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	--	--	--	--	**11.3 J**	**1.94 J**	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	**34.9**	**3.05 J**	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	--	--	--	--	**324**	**6.23**	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	--	--	--	--	**10.4 J**	**0.219 J**	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	**12.7 J**	**0.244 J**	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	**42.1**	**0.632 J**	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	**106 J**	**1.16**	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	--	--	--	--	--	--	--	**4.46**	**0.0410**	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	--	--	--	--	--	--	--	**4.46**	**0.248**	--

Notes:

🟨 Detected concentration is greater than SMS SQS screening level

🟩 Detected concentration is greater than SMS CSL screening level

1. Sample depth is reported as below ASB solids/sand (hardbottom) interface.

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization’s toxic equivalency factors for mammals. Undetected congeners were assigned a "0" (ND=0) and assigned a concentration equal to ½ the detection limit (ND=1/2).

-- Sample was not submitted for chemical analysis.

mg/kg = milligrams per kilogram

ng/kg = nanogram per kilogram

pct = percent

There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.

The site specific Bioaccumulaltion Screening Level (BSL) for mercury is 1.2 mg/kg. (Supplemental RI Report, RETEC 2006)

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-101B-VC	8-101B-VC	8-101B-VC	8-101C-VC	8-101C-VC	8-101C-VC	8-102B-VC	8-102B-VC	8-102B-VC	8-102C-VC	8-102C-VC	8-102C-VC	8-103B-VC	8-103B-VC
			Sample ID:	8-101B-VC-1-2	8-101B-VC-2-3	8-101B-VC-3-4	8-101C-VC-1-2	8-101C-VC-2-3	8-101C-VC-3-4	8-102B-VC-1-2	8-102B-VC-2-3	8-102B-VC-3-4	8-102C-VC-1-2	8-102C-VC-2-3	8-102C-VC-3-4	8-103B-VC-1-2	8-103B-VC-2-3
			Sample Date:	7/30/2008	7/30/2008	7/30/2008	7/29/2008	7/29/2008	7/29/2008	7/30/2008	7/30/2008	7/30/2008	7/29/2008	7/29/2008	7/29/2008	7/31/2008	7/31/2008
			In-Situ Depth[1] (ft):	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3
Analyte	SMS SQS	SMS CSL	PS LAET														
Conventional Parameters (pct)																	
Total organic carbon	--	--	--	**0.4**	**0.109**	**0.108**	**0.937**	**0.391**	**0.321**	**0.457**	**0.273**	**0.208**	**1.07**	**0.635**	**0.635**	**0.269**	**0.117**
Total solids	--	--	--	**92.8**	**91.6**	**89.4**	**83.5**	**93.2**	**86.8**	**93.2**	**88.7**	**90.8**	**85**	**81.7**	**81.2**	**96.4 J**	**96.3 J**
Metals (mg/kg)																	
Cadmium	5.1	6.7	--	0.2 U	--	--	**0.3**	--	--	**0.4**	--	--	**0.3**	--	--	0.2 U	--
Chromium	260	270	--	**18.6**	--	--	**19.2**	--	--	**33**	--	--	**23.6**	--	--	**22.6**	--
Mercury	0.41	0.59	--	0.04 U	0.04 U	0.05 U	0.05 U	0.05 U	0.04 U	**0.09**	0.04 U	0.05 U	**0.05**	0.05 U	0.04 U	0.05 U	0.04 U
Zinc	410	960	--	**46**	--	--	**27**	--	--	**78**	--	--	**31**	--	--	**38**	--
Aromatic Hydrocarbons (mg/kg-OC)																	
Total LPAH	370	780	--	**5.3**	--	--	2 U	--	--	4.4 U	--	--	**3.0**	--	--	**4.5**	--
Naphthalene	99	170	--	**2.5 J**	--	--	2 U	--	--	4.4 U	--	--	**1.0 J**	--	--	7.1 U	--
Acenaphthylene	66	66	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Acenaphthene	16	57	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Fluorene	23	79	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Phenanthrene	100	480	--	**2.8 J**	--	--	2 U	--	--	4.4 U	--	--	**2.0**	--	--	**4.5 J**	--
Anthracene	220	1,200	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
2-Methylnaphthalene	38	64	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Total HPAH	960	5,300	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	**6.7**	--	--	7.1 U	--
Fluoranthene	160	1,200	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	**2.6**	--	--	7.1 U	--
Pyrene	1,000	1,400	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	**2.2**	--	--	7.1 U	--
Benzo(a)anthracene	110	270	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Chrysene	110	460	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	**0.93 J**	--	--	7.1 U	--
Benzo(b)fluoranthene	--	--	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Benzo(k)fluoranthene	--	--	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Total Benzofluoranthenes (b, j, k)	230	450	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Benzo(a)pyrene	99	210	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	**1 J**	--	--	7.1 U	--
Indeno(1,2,3-c,d)pyrene	34	88	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Dibenzo(a,h)anthracene	12	33	--	1.5 U	--	--	0.66 U	--	--	1.3 U	--	--	0.56 U	--	--	2.2 U	--
Benzo(g,h,i)perylene	31	78	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Chlorinated Benzenes (mg/kg-OC)																	
1,2-Dichlorobenzene	2.3	2.3	--	1.5 U	--	--	0.66 U	--	--	1.3 U	--	--	0.56 U	--	--	2.2 U	--
1,4-Dichlorobenzene	3.1	9	--	1.5 U	--	--	0.66 U	--	--	1.3 U	--	--	0.56 U	--	--	2.2 U	--
1,2,4-Trichlorobenzene	0.81	1.8	--	1.5 U	--	--	0.66 U	--	--	1.3 U	--	--	0.56 U	--	--	2.2 U	--
Hexachlorobenzene	0.38	2.3	--	1.5 U	--	--	0.66 U	--	--	1.3 U	--	--	0.56 U	--	--	2.2 U	--
Phthalates (mg/kg-OC)																	
Dimethyl phthalate	53	53	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Diethyl phthalate	61	110	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Di-n-butyl phthalate	220	1,700	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Butylbenzyl phthalate	4.9	64	--	3.8 U	--	--	1.7 U	--	--	3.3 U	--	--	1.4 U	--	--	5.6 U	--
Bis(2-ethylhexyl) phthalate	47	78	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Di-n-octyl phthalate	58	4,500	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Miscellaneous (mg/kg-OC)																	
Dibenzofuran	15	58	--	4.8 U	--	--	2 U	--	--	4.4 U	--	--	1.8 U	--	--	7.1 U	--
Hexachlorobutadiene	3.9	6.2	--	1.5 UJ	--	--	0.66 UJ	--	--	1.3 UJ	--	--	0.56 UJ	--	--	2.2 UJ	--
N-Nitrosodiphenylamine	11	11	--	1.5 UJ	--	--	0.66 UJ	--	--	1.3 UJ	--	--	0.56 UJ	--	--	2.2 UJ	--
Ionizable Organic Compounds (ug/kg)																	
Phenol	420	1,200	420	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
2-Methylphenol (o-Cresol)	63	63	63	6 UJ	--	--	6.2 UJ	--	--	6 UJ	--	--	6 UJ	--	--	6 UJ	--
4-Methylphenol (p-Cresol)	670	670	670	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
2,4-Dimethylphenol	29	29	29	6 UJ	--	--	6.2 UJ	--	--	6 UJ	--	--	6 UJ	--	--	6 UJ	--
Pentachlorophenol	360	690	140	30 U	--	--	31 U	--	--	30 U	--	--	30 U	--	--	30 U	--
Benzyl alcohol	57	73	57	30 UJ	--	--	31 UJ	--	--	30 UJ	--	--	30 UJ	--	--	30 UJ	--
Benzoic acid	650	650	650	190 U	--	--	190 U	--	--	200 U	--	--	190 U	--	--	190 U	--

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-101B-VC	8-101B-VC	8-101B-VC	8-101C-VC	8-101C-VC	8-101C-VC	8-102B-VC	8-102B-VC	8-102B-VC	8-102C-VC	8-102C-VC	8-102C-VC	8-103B-VC	8-103B-VC
			Sample ID:	8-101B-VC-1-2	8-101B-VC-2-3	8-101B-VC-3-4	8-101C-VC-1-2	8-101C-VC-2-3	8-101C-VC-3-4	8-102B-VC-1-2	8-102B-VC-2-3	8-102B-VC-3-4	8-102C-VC-1-2	8-102C-VC-2-3	8-102C-VC-3-4	8-103B-VC-1-2	8-103B-VC-2-3
			Sample Date:	7/30/2008	7/30/2008	7/30/2008	7/29/2008	7/29/2008	7/29/2008	7/30/2008	7/30/2008	7/30/2008	7/29/2008	7/29/2008	7/29/2008	7/31/2008	7/31/2008
			In-Situ Depth^1 (ft):	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3
Analyte	SMS SQS	SMS CSL	PS LAET														
Aromatic Hydrocarbons (ug/kg)																	
Total LPAH	--	--	5,200	**21**	--	--	19 U	--	--	20 U	--	--	**32**	--	--	**12**	--
Naphthalene	--	--	2,100	**10 J**	--	--	19 U	--	--	20 U	--	--	**11 J**	--	--	19 U	--
Acenaphthylene	--	--	560	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Acenaphthene	--	--	500	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Fluorene	--	--	540	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Phenanthrene	--	--	1,500	**11 J**	--	--	19 U	--	--	20 U	--	--	**21**	--	--	**12 J**	--
Anthracene	--	--	960	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
2-Methylnaphthalene	--	--	670	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Total HPAH	--	--	12,000	19 U	--	--	19 U	--	--	20 U	--	--	**73**	--	--	19 U	--
Fluoranthene	--	--	1,700	19 U	--	--	19 U	--	--	20 U	--	--	**28**	--	--	19 U	--
Pyrene	--	--	2,600	19 U	--	--	19 U	--	--	20 U	--	--	**24**	--	--	19 U	--
Benzo(a)anthracene	--	--	1,300	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Chrysene	--	--	1,400	19 U	--	--	19 U	--	--	20 U	--	--	**10 J**	--	--	19 U	--
Benzo(b)fluoranthene	--	--	--	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Benzo(k)fluoranthene	--	--	--	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Benzo(a)pyrene	--	--	1,600	19 U	--	--	19 U	--	--	20 U	--	--	**11 J**	--	--	19 U	--
Indeno(1,2,3-c,d)pyrene	--	--	600	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Dibenzo(a,h)anthracene	--	--	230	6 U	--	--	6.2 U	--	--	6 U	--	--	6 U	--	--	6 U	--
Benzo(g,h,i)perylene	--	--	670	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Chlorinated Benzenes (ug/kg)																	
1,2-Dichlorobenzene	--	--	35	6 U	--	--	6.2 U	--	--	6 U	--	--	6 U	--	--	6 U	--
1,4-Dichlorobenzene	--	--	110	6 U	--	--	6.2 U	--	--	6 U	--	--	6 U	--	--	6 U	--
1,2,4-Trichlorobenzene	--	--	31	6 U	--	--	6.2 U	--	--	6 U	--	--	6 U	--	--	6 U	--
Hexachlorobenzene	--	--	22	6 U	--	--	6.2 U	--	--	6 U	--	--	6 U	--	--	6 U	--
Miscellaneous (ug/kg)																	
Dibenzofuran	--	--	540	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Hexachlorobutadiene	--	--	11	6 UJ	--	--	6.2 UJ	--	--	6 UJ	--	--	6 UJ	--	--	6 UJ	--
N-Nitrosodiphenylamine	--	--	28	6 UJ	--	--	6.2 UJ	--	--	6 UJ	--	--	6 UJ	--	--	6 UJ	--
Phthalates (ug/kg)																	
Dimethyl phthalate	--	--	71	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Diethyl phthalate	--	--	48	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Di-n-butyl phthalate	--	--	1,400	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Butylbenzyl phthalate	--	--	63	15 U	--	--	16 U	--	--	15 U	--	--	15 U	--	--	15 U	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Di-n-octyl phthalate	--	--	420	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Dioxin Furans (ng/kg)																	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	0.393 U	--	--	0.265 U	--	--	**0.178 J**	--	--	**0.398 J**	--	--	**0.0637 J**	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	0.804 U	--	--	0.32 U	--	--	**1 J**	--	--	**0.293 J**	--	--	0.111 U	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**0.801 J**	--	--	0.233 U	--	--	**3.27**	--	--	**0.569 J**	--	--	0.0907 U	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**1.13 J**	--	--	0.286 U	--	--	**5.04**	--	--	**3.83**	--	--	**0.308 J**	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**0.766 J**	--	--	0.29 U	--	--	**3.49**	--	--	**1.19 J**	--	--	0.0874 U	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**8.01**	--	--	**1.07 J**	--	--	**32.6**	--	--	**113**	--	--	**2.05 J**	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	**16.6**	--	--	**3.33 J**	--	--	**46.4**	--	--	**1,510**	--	--	**6.84**	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	**0.587**	--	--	**0.0963 J**	--	--	**3.92**	--	--	**1.07**	--	--	**0.289 J**	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	0.246 U	--	--	0.102 U	--	--	**0.44 J**	--	--	**0.385 J**	--	--	0.0748 U	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	0.239 U	--	--	0.0901 U	--	--	**0.588 J**	--	--	**1.19 J**	--	--	0.0572 U	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	0.416 U	--	--	0.114 U	--	--	**0.385 J**	--	--	**1.68 J**	--	--	0.0412 U	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	0.389 U	--	--	0.106 U	--	--	**0.348 J**	--	--	**0.673 J**	--	--	0.0393 U	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	0.497 U	--	--	0.126 U	--	--	0.0836 U	--	--	**0.711 J**	--	--	0.047 U	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	0.454 U	--	--	0.108 U	--	--	**0.444 J**	--	--	**0.995 J**	--	--	0.0422 U	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	**0.321 J**	--	--	0.0674 U	--	--	**1.85 J**	--	--	**16.9**	--	--	**1.02 J**	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	0.318 U	--	--	0.0824 U	--	--	0.0298 U	--	--	**0.995 J**	--	--	0.122 U	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	1.41 U	--	--	0.0748 U	--	--	**1.68 J**	--	--	**38.8**	--	--	**0.611 J**	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**40.4 J**	--	--	**4.42**	--	--	**182 J**	--	--	**10.2 J**	--	--	**3.79 J**	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**43.3 J**	--	--	**3.98 J**	--	--	**185**	--	--	**6.82 J**	--	--	**3.2 J**	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**47**	--	--	**4.15 J**	--	--	**196**	--	--	**32.3**	--	--	**4.14 J**	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**13.2**	--	--	**1.91**	--	--	**52.7**	--	--	**281**	--	--	**3.7**	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	**3.78 J**	--	--	**0.611 J**	--	--	**18.6 J**	--	--	**10.3 J**	--	--	**1.62 J**	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	0.243 U	--	--	**0.234 J**	--	--	**6.38**	--	--	**8.05 J**	--	--	**1.46 J**	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	**0.898 J**	--	--	**0.559**	--	--	**6.09 J**	--	--	**33.5**	--	--	**2.57**	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	**0.969**	--	--	0.074 U	--	--	**5.13**	--	--	**58**	--	--	**2.71**	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	**0.417**	--	--	**0.0213**	--	--	**3.42**	--	--	**3.90**	--	--	**0.156**	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	**1.14**	--	--	**0.393**	--	--	**3.42**	--	--	**3.90**	--	--	**0.240**	--

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-101B-VC	8-101B-VC	8-101B-VC	8-101C-VC	8-101C-VC	8-101C-VC	8-102B-VC	8-102B-VC	8-102B-VC	8-102C-VC	8-102C-VC	8-102C-VC	8-103B-VC	8-103B-VC
			Sample ID:	8-101B-VC-1-2	8-101B-VC-2-3	8-101B-VC-3-4	8-101C-VC-1-2	8-101C-VC-2-3	8-101C-VC-3-4	8-102B-VC-1-2	8-102B-VC-2-3	8-102B-VC-3-4	8-102C-VC-1-2	8-102C-VC-2-3	8-102C-VC-3-4	8-103B-VC-1-2	8-103B-VC-2-3
			Sample Date:	7/30/2008	7/30/2008	7/30/2008	7/29/2008	7/29/2008	7/29/2008	7/30/2008	7/30/2008	7/30/2008	7/29/2008	7/29/2008	7/29/2008	7/31/2008	7/31/2008
			In-Situ Depth[1] (ft):	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
Guaiacols (ug/kg)																	
2-Methoxyphenol (Guaiacol)	--	--	--	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
3,4,5-Trichloroguaiacol	--	--	--	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
4,5-Dichloroguaiacol	--	--	--	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
4,5,6-Trichloroguaiacol	--	--	--	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Tetrachloroguaiacol	--	--	--	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Semi-Volatile Organics (ug/kg)																	
1,3-Dichlorobenzene	--	--	170	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
1-Methylnaphthalene	--	--	--	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--
Hexachloroethane	--	--	--	19 U	--	--	19 U	--	--	20 U	--	--	19 U	--	--	19 U	--

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	**8-103B-VC**	**8-103C-VC**	**8-103C-VC**	**8-103C-VC**	**8-104B-VC**	**8-104B-VC**	**8-104B-VC**	**8-104C-VC**	**8-104C-VC**	**8-104C-VC**	**8-105B-VC**	**8-105B-VC**	**8-105B-VC**	**8-105C-VC**
			Sample ID:	**8-103B-VC-3-4**	**8-103C-VC-1-2**	**8-103C-VC-2-3**	**8-103C-VC-3-4**	**8-104B-VC-1-2**	**8-104B-VC-2-3**	**8-104B-VC-3-4**	**8-104C-VC-1-2**	**8-104C-VC-2-3**	**8-104C-VC-3-4**	**8-105B-VC-1-2**	**8-105B-VC-2-3**	**8-105B-VC-3-4**	**8-105C-VC-1-2**
			Sample Date:	**7/31/2008**	**7/29/2008**	**7/29/2008**	**7/29/2008**	**7/31/2008**	**7/31/2008**	**7/31/2008**	**8/4/2008**	**8/4/2008**	**8/4/2008**	**7/31/2008**	**7/31/2008**	**7/31/2008**	**8/4/2008**
			In-Situ Depth^1 (ft):	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
Conventional Parameters (pct)																	
Total organic carbon	--	--	--	**0.169**	**3.78**	**0.637**	**0.421**	**0.238**	**0.225**	**0.139**	**1.13**	**1.34**	**1.11**	**0.134**	**0.162**	**0.139**	**0.53**
Total solids	--	--	--	**96.5 J**	**77.8**	**83.6**	**84.6**	**96.9 J**	**97.1 J**	**96.7 J**	**78.2**	**79.8**	**72.9**	**96.4 J**	**96.1 J**	**96.1 J**	**85.1**
Metals (mg/kg)																	
Cadmium	5.1	6.7	--	--	**0.4**	--	--	0.2 U	--	--	**0.3**	--	--	0.2 U	--	--	0.2 U
Chromium	260	270	--	--	**22.8**	--	--	**18**	--	--	**17.4**	--	--	**21**	--	--	**10.9**
Mercury	0.41	0.59	--	0.04 U	**0.17**	0.05 U	0.05 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U
Zinc	410	960	--	--	**33**	--	--	**36**	--	--	**25**	--	--	**37**	--	--	**19**
Aromatic Hydrocarbons (mg/kg-OC)																	
Total LPAH	370	780	--	--	**1.2**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Naphthalene	99	170	--	--	**0.61**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Acenaphthylene	66	66	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Acenaphthene	16	57	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Fluorene	23	79	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Phenanthrene	100	480	--	--	**0.56**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Anthracene	220	1,200	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
2-Methylnaphthalene	38	64	--	--	**0.37 J**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Total HPAH	960	5,300	--	--	**3.6**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Fluoranthene	160	1,200	--	--	**1.2**	--	--	8.4 U	--	--	1.8 UJ	--	--	14 U	--	--	3.8 UJ
Pyrene	1,000	1,400	--	--	**1.1**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Benzo(a)anthracene	110	270	--	--	**0.32 J**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Chrysene	110	460	--	--	**0.37 J**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Benzo(b)fluoranthene	--	--	--	--	**0.29 J**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Benzo(k)fluoranthene	--	--	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Total Benzofluoranthenes (b, j, k)	230	450	--	--	**0.29**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Benzo(a)pyrene	99	210	--	--	**0.29 J**	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Indeno(1,2,3-c,d)pyrene	34	88	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Dibenzo(a,h)anthracene	12	33	--	--	0.16 U	--	--	2.6 U	--	--	0.55 UJ	--	--	4.6 U	--	--	1.2 U
Benzo(g,h,i)perylene	31	78	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Chlorinated Benzenes (mg/kg-OC)																	
1,2-Dichlorobenzene	2.3	2.3	--	--	0.16 U	--	--	2.6 U	--	--	0.55 U	--	--	4.6 U	--	--	1.2 U
1,4-Dichlorobenzene	3.1	9	--	--	0.16 U	--	--	2.6 U	--	--	0.55 U	--	--	4.6 U	--	--	1.2 U
1,2,4-Trichlorobenzene	0.81	1.8	--	--	0.16 U	--	--	2.6 U	--	--	0.55 U	--	--	4.6 U	--	--	1.2 U
Hexachlorobenzene	0.38	2.3	--	--	0.16 U	--	--	2.6 U	--	--	0.55 U	--	--	4.6 U	--	--	1.2 U
Phthalates (mg/kg-OC)																	
Dimethyl phthalate	53	53	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Diethyl phthalate	61	110	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Di-n-butyl phthalate	220	1,700	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Butylbenzyl phthalate	4.9	64	--	--	0.4 U	--	--	6.3 U	--	--	1.4 U	--	--	11 U	--	--	2.8 U
Bis(2-ethylhexyl) phthalate	47	78	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Di-n-octyl phthalate	58	4,500	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Miscellaneous (mg/kg-OC)																	
Dibenzofuran	15	58	--	--	0.53 U	--	--	8.4 U	--	--	1.8 U	--	--	14 U	--	--	3.8 U
Hexachlorobutadiene	3.9	6.2	--	--	0.16 UJ	--	--	2.6 UJ	--	--	0.55 U	--	--	4.6 UJ	--	--	1.2 U
N-Nitrosodiphenylamine	11	11	--	--	0.16 UJ	--	--	2.6 UJ	--	--	0.55 UJ	--	--	4.6 UJ	--	--	1.2 UJ
Ionizable Organic Compounds (ug/kg)																	
Phenol	420	1,200	420	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
2-Methylphenol (o-Cresol)	63	63	63	--	6 UJ	--	--	6.1 UJ	--	--	6.2 UJ	--	--	6.1 UJ	--	--	6.1 UJ
4-Methylphenol (p-Cresol)	670	670	670	--	**64**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
2,4-Dimethylphenol	29	29	29	--	6 UJ	--	--	6.1 UJ	--	--	6.2 UJ	--	--	6.1 UJ	--	--	6.1 UJ
Pentachlorophenol	360	690	140	--	30 U	--	--	30 U	--	--	31 U	--	--	30 U	--	--	31 U
Benzyl alcohol	57	73	57	--	30 UJ	--	--	30 UJ	--	--	20 UJ	--	--	30 UJ	--	--	20 UJ
Benzoic acid	650	650	650	--	200 U	--	--	200 U	--	--	200 U	--	--	190 U	--	--	200 U

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

Analyte			Location ID:	8-103B-VC	8-103C-VC	8-103C-VC	8-103C-VC	8-104B-VC	8-104B-VC	8-104B-VC	8-104C-VC	8-104C-VC	8-104C-VC	8-105B-VC	8-105B-VC	8-105B-VC	8-105C-VC
			Sample ID:	8-103B-VC-3-4	8-103C-VC-1-2	8-103C-VC-2-3	8-103C-VC-3-4	8-104B-VC-1-2	8-104B-VC-2-3	8-104B-VC-3-4	8-104C-VC-1-2	8-104C-VC-2-3	8-104C-VC-3-4	8-105B-VC-1-2	8-105B-VC-2-3	8-105B-VC-3-4	8-105C-VC-1-2
			Sample Date:	7/31/2008	7/29/2008	7/29/2008	7/29/2008	7/31/2008	7/31/2008	7/31/2008	8/4/2008	8/4/2008	8/4/2008	7/31/2008	7/31/2008	7/31/2008	8/4/2008
			In-Situ Depth^1 (ft):	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2
	SMS SQS	SMS CSL	PS LAET														
Aromatic Hydrocarbons (ug/kg)																	
Total LPAH	--	--	5,200	--	**44**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Naphthalene	--	--	2,100	--	**23**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Acenaphthylene	--	--	560	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Acenaphthene	--	--	500	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Fluorene	--	--	540	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Phenanthrene	--	--	1,500	--	**21**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Anthracene	--	--	960	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
2-Methylnaphthalene	--	--	670	--	**14 J**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Total HPAH	--	--	12,000	--	**138**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Fluoranthene	--	--	1,700	--	**47**	--	--	20 U	--	--	20 UJ	--	--	19 U	--	--	20 UJ
Pyrene	--	--	2,600	--	**43**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Benzo(a)anthracene	--	--	1,300	--	**12 J**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Chrysene	--	--	1,400	--	**14 J**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Benzo(b)fluoranthene	--	--	--	--	**11 J**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Benzo(k)fluoranthene	--	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	**11**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Benzo(a)pyrene	--	--	1,600	--	**11 J**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Indeno(1,2,3-c,d)pyrene	--	--	600	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Dibenzo(a,h)anthracene	--	--	230	--	6 U	--	--	6.1 U	--	--	6.2 UJ	--	--	6.1 U	--	--	6.1 U
Benzo(g,h,i)perylene	--	--	670	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Chlorinated Benzenes (ug/kg)																	
1,2-Dichlorobenzene	--	--	35	--	6 U	--	--	6.1 U	--	--	6.2 U	--	--	6.1 U	--	--	6.1 U
1,4-Dichlorobenzene	--	--	110	--	6 U	--	--	6.1 U	--	--	6.2 U	--	--	6.1 U	--	--	6.1 U
1,2,4-Trichlorobenzene	--	--	31	--	6 U	--	--	6.1 U	--	--	6.2 U	--	--	6.1 U	--	--	6.1 U
Hexachlorobenzene	--	--	22	--	6 U	--	--	6.1 U	--	--	6.2 U	--	--	6.1 U	--	--	6.1 U
Miscellaneous (ug/kg)																	
Dibenzofuran	--	--	540	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Hexachlorobutadiene	--	--	11	--	6 UJ	--	--	6.1 UJ	--	--	6.2 U	--	--	6.1 UJ	--	--	6.1 U
N-Nitrosodiphenylamine	--	--	28	--	6 UJ	--	--	6.1 UJ	--	--	6.2 UJ	--	--	6.1 UJ	--	--	6.1 UJ
Phthalates (ug/kg)																	
Dimethyl phthalate	--	--	71	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Diethyl phthalate	--	--	48	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Di-n-butyl phthalate	--	--	1,400	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Butylbenzyl phthalate	--	--	63	--	15 U	--	--	15 U	--	--	16 U	--	--	15 U	--	--	15 U
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Di-n-octyl phthalate	--	--	420	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Dioxin Furans (ng/kg)																	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**0.284 J**	--	--	0.0741 U	--	--	0.157 U	--	--	0.23 U	--	--	0.329 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**0.536 J**	--	--	0.123 U	--	--	0.161 U	--	--	0.179 U	--	--	0.241 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**0.581 J**	--	--	0.0989 U	--	--	**0.452 J**	--	--	0.195 U	--	--	**0.756 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**5.26**	--	--	**0.781 J**	--	--	**0.643 J**	--	--	**0.253 J**	--	--	**1.01 J**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**1.52 J**	--	--	**0.501 J**	--	--	**0.498 J**	--	--	0.187 U	--	--	**0.63 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**149**	--	--	**4.86**	--	--	**4.06**	--	--	**1.51 J**	--	--	**10.1**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	**2,510**	--	--	**9.61**	--	--	**6.34**	--	--	**7.86**	--	--	**57.9**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**3.33**	--	--	**0.431 J**	--	--	**1.07**	--	--	**0.113 J**	--	--	**1.01**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**0.572 J**	--	--	0.0864 U	--	--	0.103 U	--	--	0.234 U	--	--	0.159 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**1.6 J**	--	--	0.0781 U	--	--	0.0927 U	--	--	0.188 U	--	--	0.142 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1.77 J**	--	--	0.0458 U	--	--	0.0824 U	--	--	0.0589 U	--	--	0.0891 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1.1 J**	--	--	0.0474 U	--	--	0.079 U	--	--	0.0586 U	--	--	0.0889 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**0.59 J**	--	--	0.0519 U	--	--	0.0888 U	--	--	0.062	--	--	0.0968 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1.24 J**	--	--	**0.236 J**	--	--	0.0868 U	--	--	0.0682	--	--	**0.254 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**15.6**	--	--	**1.8 J**	--	--	0.0679 U	--	--	**0.731 J**	--	--	**1.34 J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**0.917 J**	--	--	0.147 U	--	--	0.0879 U	--	--	0.09 U	--	--	0.235 U
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	**20.6**	--	--	**1.24 J**	--	--	0.224 U	--	--	**0.536 J**	--	--	**2.41 J**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**7.97 J**	--	--	**12.7 J**	--	--	**26.9**	--	--	**1.25**	--	--	**28.7 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**10.2**	--	--	**14**	--	--	**26.8**	--	--	**1.16**	--	--	**30.3**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**65.1 J**	--	--	**18.8 J**	--	--	**28.7 J**	--	--	**2.28**	--	--	**35.2**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**470**	--	--	**7.93**	--	--	**7.03**	--	--	**2.93**	--	--	**18.7**
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**12 J**	--	--	**2.38 J**	--	--	**3.3 J**	--	--	**0.l97**	--	--	**2.58 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**11 J**	--	--	**1.21 J**	--	--	**1.11 J**	--	--	**0.368**	--	--	**0.737 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**35.4 J**	--	--	**4.04 J**	--	--	**0.553**	--	--	**1.39**	--	--	**2.38 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**41.4 J**	--	--	**4.84**	--	--	**0.593**	--	--	**1.85**	--	--	**3.95**
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	**5.27**	--	--	**0.265**	--	--	**0.309**	--	--	**0.0615**	--	--	**0.498**
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	**5.27**	--	--	**0.389**	--	--	**0.501**	--	--	**0.330**	--	--	**0.822**

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-103B-VC	8-103C-VC	8-103C-VC	8-103C-VC	8-104B-VC	8-104B-VC	8-104B-VC	8-104C-VC	8-104C-VC	8-104C-VC	8-105B-VC	8-105B-VC	8-105B-VC	8-105C-VC
			Sample ID:	8-103B-VC-3-4	8-103C-VC-1-2	8-103C-VC-2-3	8-103C-VC-3-4	8-104B-VC-1-2	8-104B-VC-2-3	8-104B-VC-3-4	8-104C-VC-1-2	8-104C-VC-2-3	8-104C-VC-3-4	8-105B-VC-1-2	8-105B-VC-2-3	8-105B-VC-3-4	8-105C-VC-1-2
			Sample Date:	7/31/2008	7/29/2008	7/29/2008	7/29/2008	7/31/2008	7/31/2008	7/31/2008	8/4/2008	8/4/2008	8/4/2008	7/31/2008	7/31/2008	7/31/2008	8/4/2008
			In-Situ Depth[1] (ft):	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
Guaiacols (ug/kg)																	
2-Methoxyphenol (Guaiacol)	--	--	--	--	20 U	--	--	20 U	--	--	20 UJ	--	--	19 U	--	--	20 UJ
3,4,5-Trichloroguaiacol	--	--	--	--	20 U	--	--	20 U	--	--	20 UJ	--	--	19 U	--	--	20 UJ
4,5-Dichloroguaiacol	--	--	--	--	20 U	--	--	20 U	--	--	20 UJ	--	--	19 U	--	--	20 UJ
4,5,6-Trichloroguaiacol	--	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Tetrachloroguaiacol	--	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Semi-Volatile Organics (ug/kg)																	
1,3-Dichlorobenzene	--	--	170	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
1-Methylnaphthalene	--	--	--	--	**11 J**	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U
Hexachloroethane	--	--	--	--	20 U	--	--	20 U	--	--	20 U	--	--	19 U	--	--	20 U

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	**8-105C-VC**	**8-105C-VC**	**8-106B-VC**	**8-106B-VC**	**8-106B-VC**	**8-106C-VC**	**8-106C-VC**	**8-106C-VC**	**8-107B-VC**	**8-107B-VC**	**8-107B-VC**	**8-107C-VC**	**8-107C-VC**	**8-108B-VC**
			Sample ID:	**8-105C-VC-2-3**	**8-105C-VC-3-4**	**8-106B-VC-1-2**	**8-106B-VC-2-3**	**8-106B-VC-3-4**	**8-106C-VC-1-2**	**8-106C-VC-2-3**	**8-106C-VC-3-4**	**8-107B-VC-1-2**	**8-107B-VC-2-3**	**8-107B-VC-3-4**	**8-107C-VC-1-2**	**8-107C-VC-2-3**	**8-108B-VC-1-2**
			Sample Date:	**8/4/2008**	**8/4/2008**	**8/1/2008**	**8/1/2008**	**8/1/2008**	**8/4/2008**	**8/4/2008**	**8/4/2008**	**8/1/2008**	**8/1/2008**	**8/1/2008**	**8/4/2008**	**8/4/2008**	**8/1/2008**
			In-Situ Depth^1 (ft):	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**1-2**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
Conventional Parameters (pct)																	
Total organic carbon	--	--	--	**0.919**	**0.597**	**0.215 J**	**0.141 J**	**0.121 J**	**1.26**	**0.566**	**0.505**	**0.986 J**	**0.151 J**	**0.179 J**	**1.69**	**2.11**	**1.25 J**
Total solids	--	--	--	**80.9**	**80.1**	**95.8**	**95.6**	**96.3**	**83.9**	**73.4**	**81.2**	**93.9**	**96.2**	**96**	**81.7**	**85.3**	**95.7**
Metals (mg/kg)																	
Cadmium	5.1	6.7	--	--	--	0.2 U	--	--	0.2 U	--	--	0.2 U	--	--	**0.4**	--	0.2 U
Chromium	260	270	--	--	--	**13.5**	--	--	**17.9**	--	--	**19.2**	--	--	**15**	--	**17.7**
Mercury	0.41	0.59	--	0.06 U	0.06 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U	0.06 U	**0.05**	0.04 U	0.04 U	**0.05**	0.05 U	0.04 U
Zinc	410	960	--	--	--	**37**	--	--	**25**	--	--	**43**	--	--	**22**	--	**37**
Aromatic Hydrocarbons (mg/kg-OC)																	
Total LPAH	370	780	--	--	--	8.8 U	--	--	1.6 U	--	--	**8.9**	--	--	**6.0**	--	**1.8**
Naphthalene	99	170	--	--	--	8.8 U	--	--	1.6 U	--	--	**3.7**	--	--	**0.65 J**	--	1.5 U
Acenaphthylene	66	66	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**0.83 J**	--	1.5 U
Acenaphthene	16	57	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	1.2 U	--	1.5 U
Fluorene	23	79	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	1.2 U	--	1.5 U
Phenanthrene	100	480	--	--	--	8.8 U	--	--	1.6 U	--	--	**5.2**	--	--	**3.1**	--	**1.8**
Anthracene	220	1,200	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**1.4**	--	1.5 U
2-Methylnaphthalene	38	64	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	1.2 U	--	1.5 U
Total HPAH	960	5,300	--	--	--	8.8 U	--	--	1.6 U	--	--	**9.1**	--	--	**27.8**	--	**3.3**
Fluoranthene	160	1,200	--	--	--	8.8 U	--	--	1.6 UJ	--	--	**5.2**	--	--	**5 J**	--	**1.9**
Pyrene	1,000	1,400	--	--	--	8.8 U	--	--	1.6 U	--	--	**3.9**	--	--	**7.1**	--	**1.4 J**
Benzo(a)anthracene	110	270	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**3.1**	--	1.5 U
Chrysene	110	460	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**3.3**	--	1.5 U
Benzo(b)fluoranthene	--	--	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**1.7**	--	1.5 U
Benzo(k)fluoranthene	--	--	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**2.2**	--	1.5 U
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**3.9**	--	1.5 U
Benzo(a)pyrene	99	210	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**3.1**	--	1.5 U
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**0.95 J**	--	1.5 U
Dibenzo(a,h)anthracene	12	33	--	--	--	2.8 U	--	--	0.47 U	--	--	0.61 U	--	--	0.36 U	--	0.47 U
Benzo(g,h,i)perylene	31	78	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	**1.3**	--	1.5 U
Chlorinated Benzenes (mg/kg-OC)																	
1,2-Dichlorobenzene	2.3	2.3	--	--	--	2.8 U	--	--	0.47 U	--	--	0.61 U	--	--	0.36 U	--	0.47 UJ
1,4-Dichlorobenzene	3.1	9	--	--	--	2.8 U	--	--	0.47 U	--	--	0.61 U	--	--	0.36 U	--	0.47 U
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	2.8 U	--	--	0.47 U	--	--	0.61 U	--	--	0.36 U	--	0.47 U
Hexachlorobenzene	0.38	2.3	--	--	--	2.8 U	--	--	0.47 U	--	--	0.61 U	--	--	0.36 U	--	0.47 U
Phthalates (mg/kg-OC)																	
Dimethyl phthalate	53	53	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	1.2 U	--	1.5 U
Diethyl phthalate	61	110	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	1.2 U	--	1.5 U
Di-n-butyl phthalate	220	1,700	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	1.2 U	--	1.5 U
Butylbenzyl phthalate	4.9	64	--	--	--	7 U	--	--	1.2 U	--	--	1.5 U	--	--	0.89 U	--	1.2 UJ
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	1.2 U	--	1.5 U
Di-n-octyl phthalate	58	4,500	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	1.2 U	--	1.5 U
Miscellaneous (mg/kg-OC)																	
Dibenzofuran	15	58	--	--	--	8.8 U	--	--	1.6 U	--	--	3.5 U	--	--	1.2 U	--	1.5 U
Hexachlorobutadiene	3.9	6.2	--	--	--	2.8 UJ	--	--	0.47 U	--	--	0.61 UJ	--	--	0.36 U	--	0.47 UJ
N-Nitrosodiphenylamine	11	11	--	--	--	2.8 UJ	--	--	0.47 UJ	--	--	0.61 UJ	--	--	0.36 UJ	--	0.47 UJ
Ionizable Organic Compounds (ug/kg)																	
Phenol	420	1,200	420	--	--	19 UJ	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
2-Methylphenol (o-Cresol)	63	63	63	--	--	6 UJ	--	--	5.9 UJ	--	--	6 UJ	--	--	6 UJ	--	5.9 U
4-Methylphenol (p-Cresol)	670	670	670	--	--	19 U	--	--	20 U	--	--	**23 J**	--	--	**20**	--	19 U
2,4-Dimethylphenol	29	29	29	--	--	6 UJ	--	--	5.9 UJ	--	--	6 UJ	--	--	6 UJ	--	5.9 UJ
Pentachlorophenol	360	690	140	--	--	30 U	--	--	30 U	--	--	30 U	--	--	30 U	--	30 U
Benzyl alcohol	57	73	57	--	--	30 UJ	--	--	20 UJ	--	--	30 UJ	--	--	20 UJ	--	19 UJ
Benzoic acid	650	650	650	--	--	190 UJ	--	--	200 U	--	--	350 U	--	--	200 UJ	--	190 U

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-105C-VC	8-105C-VC	8-106B-VC	8-106B-VC	8-106B-VC	8-106C-VC	8-106C-VC	8-106C-VC	8-107B-VC	8-107B-VC	8-107B-VC	8-107C-VC	8-107C-VC	8-108B-VC
			Sample ID:	8-105C-VC-2-3	8-105C-VC-3-4	8-106B-VC-1-2	8-106B-VC-2-3	8-106B-VC-3-4	8-106C-VC-1-2	8-106C-VC-2-3	8-106C-VC-3-4	8-107B-VC-1-2	8-107B-VC-2-3	8-107B-VC-3-4	8-107C-VC-1-2	8-107C-VC-2-3	8-108B-VC-1-2
			Sample Date:	8/4/2008	8/4/2008	8/1/2008	8/1/2008	8/1/2008	8/4/2008	8/4/2008	8/4/2008	8/1/2008	8/1/2008	8/1/2008	8/4/2008	8/4/2008	8/1/2008
			In-Situ Depth^1 (ft):	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	1-2
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**														
Aromatic Hydrocarbons (ug/kg)																	
Total LPAH	--	--	5,200	--	--	19 U	--	--	20 U	--	--	**87**	--	--	**101**	--	**22**
Naphthalene	--	--	2,100	--	--	19 U	--	--	20 U	--	--	**36**	--	--	**11 J**	--	19 U
Acenaphthylene	--	--	560	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**14 J**	--	19 U
Acenaphthene	--	--	500	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Fluorene	--	--	540	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Phenanthrene	--	--	1,500	--	--	19 U	--	--	20 U	--	--	**51**	--	--	**52**	--	**22**
Anthracene	--	--	960	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**24**	--	19 U
2-Methylnaphthalene	--	--	670	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Total HPAH	--	--	12,000	--	--	19 U	--	--	20 U	--	--	**89**	--	--	**471**	--	**41**
Fluoranthene	--	--	1,700	--	--	19 U	--	--	20 UJ	--	--	**51**	--	--	**85 J**	--	**24**
Pyrene	--	--	2,600	--	--	19 U	--	--	20 U	--	--	**38**	--	--	**120**	--	**17 J**
Benzo(a)anthracene	--	--	1,300	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**53**	--	19 U
Chrysene	--	--	1,400	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**55**	--	19 U
Benzo(b)fluoranthene	--	--	--	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**29**	--	19 U
Benzo(k)fluoranthene	--	--	--	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**38**	--	19 U
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**67**	--	19 U
Benzo(a)pyrene	--	--	1,600	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**53**	--	19 U
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**16 J**	--	19 U
Dibenzo(a,h)anthracene	--	--	230	--	--	6 U	--	--	5.9 U	--	--	6 U	--	--	6 U	--	5.9 U
Benzo(g,h,i)perylene	--	--	670	--	--	19 U	--	--	20 U	--	--	35 U	--	--	**22**	--	19 U
Chlorinated Benzenes (ug/kg)																	
1,2-Dichlorobenzene	--	--	35	--	--	6 U	--	--	5.9 U	--	--	6 U	--	--	6 U	--	5.9 UJ
1,4-Dichlorobenzene	--	--	110	--	--	6 U	--	--	5.9 U	--	--	6 U	--	--	6 U	--	5.9 U
1,2,4-Trichlorobenzene	--	--	31	--	--	6 U	--	--	5.9 U	--	--	6 U	--	--	6 U	--	5.9 U
Hexachlorobenzene	--	--	22	--	--	6 U	--	--	5.9 U	--	--	6 U	--	--	6 U	--	5.9 U
Miscellaneous (ug/kg)																	
Dibenzofuran	--	--	540	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Hexachlorobutadiene	--	--	11	--	--	6 UJ	--	--	5.9 U	--	--	6 UJ	--	--	6 U	--	5.9 UJ
N-Nitrosodiphenylamine	--	--	28	--	--	6 UJ	--	--	5.9 UJ	--	--	6 UJ	--	--	6 UJ	--	5.9 UJ
Phthalates (ug/kg)																	
Dimethyl phthalate	--	--	71	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Diethyl phthalate	--	--	48	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Di-n-butyl phthalate	--	--	1,400	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Butylbenzyl phthalate	--	--	63	--	--	15 U	--	--	15 U	--	--	15 U	--	--	15 U	--	15 UJ
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Di-n-octyl phthalate	--	--	420	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Dioxin Furans (ng/kg)																	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	0.133 U	--	--	0.184 U	--	--	**1.18**	0.0825 U	--	0.119 U	--	**0.4 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	0.157 U	--	--	0.266 U	--	--	**4.54**	0.269 U	--	0.183 U	--	**1.09 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	0.304 U	--	--	**0.245 J**	--	--	**13.7**	0.201 U	--	0.21 U	--	**3.32**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	**0.407 J**	--	--	0.367 U	--	--	**25.4**	0.225 U	--	**0.246 J**	--	**7.03**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	0.284 U	--	--	0.371 U	--	--	**18.4**	0.212 U	--	0.213 U	--	**4.8**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	**1.71 J**	--	--	**1.47 J**	--	--	**186**	**1.68 J**	--	**1.49 J**	--	**56.1**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	--	**6.97**	--	--	**3.44 J**	--	--	**219**	**8.64**	--	**3.88 J**	--	**73**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	**0.149 J**	--	--	**0.304 J**	--	--	**13.4**	0.02 U	--	**0.551**	--	**3.77**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	0.0896 U	--	--	0.1 U	--	--	**2.45**	0.15 U	--	0.0861 U	--	**0.575 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	0.0765 U	--	--	0.085 U	--	--	**3.31**	0.132 U	--	0.0721 U	--	**0.809 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	0.106 U	--	--	0.0771 U	--	--	**2.4 J**	0.105 U	--	0.0437 U	--	**0.709 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	0.0982 U	--	--	0.0775 U	--	--	**2.26 J**	0.101 U	--	0.0417 U	--	**0.664 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	0.126 U	--	--	0.0853 U	--	--	**1.01 J**	0.133 U	--	0.0481 U	--	**0.283 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	0.11 U	--	--	0.081 U	--	--	**3.01**	0.102 U	--	0.0454 U	--	**0.861 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	**0.952 J**	--	--	0.181 U	--	--	**13.4**	**0.764 J**	--	0.0631 U	--	**6.05**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	0.147 U	--	--	0.205 U	--	--	**1.08 J**	0.0764 U	--	0.0751 U	--	**0.333 J**
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	--	**0.568 J**	--	--	0.176 U	--	--	**8.79**	0.434 U	--	0.116 U	--	**3.66 J**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	**1.95 J**	--	--	**8.3 J**	--	--	**655 J**	**0.37 J**	--	**11.4 J**	--	**150 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	**1.22**	--	--	**7.77 J**	--	--	**751 J**	**0.472 J**	--	**9.06 J**	--	**190**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	**3.01**	--	--	**9.14 J**	--	--	**1,000**	**1.43 J**	--	**8.26 J**	--	**269**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	**3.44**	--	--	**2.64**	--	--	**299**	**3.86**	--	**2.51**	--	**88.7**
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	**0.371 J**	--	--	**0.943 J**	--	--	**87.9 J**	**0.0722**	--	**4.63 J**	--	**19.8 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	**0.381**	--	--	0.0924 U	--	--	**37.6 J**	**0.183**	--	**1.17 J**	--	**8.83 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	**2.01**	--	--	**0.408 J**	--	--	**35.1 J**	**1.09 J**	--	**0.607 J**	--	**13.9 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	**2.43**	--	--	**0.585**	--	--	**33.6**	**1.71**	--	**0.469**	--	**15.8**
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	--	**0.0845**	--	--	**0.0706**	--	--	**16.8**	**0.0270**	--	**0.0958**	--	**4.54**
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	--	**0.294**	--	--	**0.365**	--	--	**16.8**	**0.280**	--	**0.290**	--	**4.54**

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-105C-VC	8-105C-VC	8-106B-VC	8-106B-VC	8-106B-VC	8-106C-VC	8-106C-VC	8-106C-VC	8-107B-VC	8-107B-VC	8-107B-VC	8-107C-VC	8-107C-VC	8-108B-VC
			Sample ID:	8-105C-VC-2-3	8-105C-VC-3-4	8-106B-VC-1-2	8-106B-VC-2-3	8-106B-VC-3-4	8-106C-VC-1-2	8-106C-VC-2-3	8-106C-VC-3-4	8-107B-VC-1-2	8-107B-VC-2-3	8-107B-VC-3-4	8-107C-VC-1-2	8-107C-VC-2-3	8-108B-VC-1-2
			Sample Date:	8/4/2008	8/4/2008	8/1/2008	8/1/2008	8/1/2008	8/4/2008	8/4/2008	8/4/2008	8/1/2008	8/1/2008	8/1/2008	8/4/2008	8/4/2008	8/1/2008
			In-Situ Depth^1 (ft):	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	1-2
Analyte	SMS SQS	SMS CSL	PS LAET														
Guaiacols (ug/kg)																	
2-Methoxyphenol (Guaiacol)	--	--	--	--	--	19 UJ	--	--	20 UJ	--	--	35 U	--	--	20 UJ	--	19 U
3,4,5-Trichloroguaiacol	--	--	--	--	--	19 U	--	--	20 UJ	--	--	35 U	--	--	20 UJ	--	19 U
4,5-Dichloroguaiacol	--	--	--	--	--	19 UJ	--	--	20 UJ	--	--	35 U	--	--	20 UJ	--	19 U
4,5,6-Trichloroguaiacol	--	--	--	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Tetrachloroguaiacol	--	--	--	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Semi-Volatile Organics (ug/kg)																	
1,3-Dichlorobenzene	--	--	170	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
1-Methylnaphthalene	--	--	--	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U
Hexachloroethane	--	--	--	--	--	19 U	--	--	20 U	--	--	35 U	--	--	20 U	--	19 U

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-108B-VC	8-108B-VC	8-108C-VC	8-108C-VC	8-109B-VC	8-109B-VC	8-109B-VC	8-109C-VC	8-109C-VC	8-109C-VC	8-110B-VC	8-110B-VC	8-110C-VC	8-110C-VC
			Sample ID:	8-108B-VC-2-3	8-108B-VC-3-4	8-108C-VC-1-2	8-108C-VC-2-3	8-109B-VC-1-2	8-109B-VC-2-3	8-109B-VC-3-4	8-109C-VC-1-2	8-109C-VC-2-3	8-109C-VC-3-4	8-110B-VC-1-2	8-110B-VC-2-3	8-110C-VC-1-2	8-110C-VC-2-3
			Sample Date:	8/1/2008	8/1/2008	8/1/2008	8/1/2008	7/30/2008	7/30/2008	7/30/2008	8/1/2008	8/1/2008	8/1/2008	7/31/2008	7/31/2008	7/29/2008	7/29/2008
			In-Situ Depth^1 (ft):	2-3	3-4	1-2	2-3	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	1-2	2-3
Analyte	SMS SQS	SMS CSL	PS LAET														
Conventional Parameters (pct)																	
Total organic carbon	--	--	--	**0.236 J**	**0.188 J**	**0.239**	**0.72**	**0.151**	**0.137**	**0.113**	**0.26**	**0.519**	**0.5**	**0.127**	**0.145**	**0.986**	**0.61**
Total solids	--	--	--	**95.5**	**95.2**	**89.9 J**	**86.4 J**	**91**	**94.3**	**93.8**	**90.4 J**	**91.2 J**	**85.7 J**	**96.9 J**	**96.4 J**	**85.5**	**84.8**
Metals (mg/kg)																	
Cadmium	5.1	6.7	--	--	--	0.2 U	--	0.2 U	--	--	**0.3**	--	--	0.2 U	--	**0.3**	--
Chromium	260	270	--	--	--	**23.6 J**	--	**17.8**	--	--	**20.7 J**	--	--	**20.7**	--	**16.3**	--
Mercury	0.41	0.59	--	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.05 U	0.04 U	0.05 U	0.04 U
Zinc	410	960	--	--	--	**36**	--	**36**	--	--	**24**	--	--	**37**	--	**25**	--
Aromatic Hydrocarbons (mg/kg-OC)																	
Total LPAH	370	780	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Naphthalene	99	170	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Acenaphthylene	66	66	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Acenaphthene	16	57	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Fluorene	23	79	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Phenanthrene	100	480	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Anthracene	220	1,200	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
2-Methylnaphthalene	38	64	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Total HPAH	960	5,300	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Fluoranthene	160	1,200	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Pyrene	1,000	1,400	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Benzo(a)anthracene	110	270	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Chrysene	110	460	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Benzo(b)fluoranthene	--	--	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Benzo(k)fluoranthene	--	--	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Benzo(a)pyrene	99	210	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	8.4 U	--	13 U	--	--	7.3 UJ	--	--	16 U	--	1.9 U	--
Dibenzo(a,h)anthracene	12	33	--	--	--	2.6 U	--	4 U	--	--	2.3 U	--	--	4.8 U	--	0.62 U	--
Benzo(g,h,i)perylene	31	78	--	--	--	8.4 U	--	13 U	--	--	7.3 UJ	--	--	16 U	--	1.9 U	--
Chlorinated Benzenes (mg/kg-OC)																	
1,2-Dichlorobenzene	2.3	2.3	--	--	--	2.6 U	--	4 U	--	--	2.3 U	--	--	4.8 U	--	0.62 U	--
1,4-Dichlorobenzene	3.1	9	--	--	--	2.6 U	--	4 U	--	--	2.3 U	--	--	4.8 U	--	0.62 U	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	2.6 U	--	4 U	--	--	2.3 U	--	--	4.8 U	--	0.62 U	--
Hexachlorobenzene	0.38	2.3	--	--	--	2.6 U	--	4 U	--	--	2.3 U	--	--	4.8 U	--	0.62 U	--
Phthalates (mg/kg-OC)																	
Dimethyl phthalate	53	53	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Diethyl phthalate	61	110	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Di-n-butyl phthalate	220	1,700	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Butylbenzyl phthalate	4.9	64	--	--	--	6.3 U	--	9.9 U	--	--	5.8 U	--	--	12 U	--	1.5 U	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Di-n-octyl phthalate	58	4,500	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Miscellaneous (mg/kg-OC)																	
Dibenzofuran	15	58	--	--	--	8.4 U	--	13 U	--	--	7.3 U	--	--	16 U	--	1.9 U	--
Hexachlorobutadiene	3.9	6.2	--	--	--	2.6 UJ	--	4 UJ	--	--	2.3 UJ	--	--	4.8 UJ	--	0.62 UJ	--
N-Nitrosodiphenylamine	11	11	--	--	--	2.6 U	--	4 UJ	--	--	2.3 U	--	--	4.8 UJ	--	0.62 UJ	--
Ionizable Organic Compounds (ug/kg)																	
Phenol	420	1,200	420	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
2-Methylphenol (o-Cresol)	63	63	63	--	--	6.1 U	--	6 UJ	--	--	6 U	--	--	6.1 UJ	--	6.1 UJ	--
4-Methylphenol (p-Cresol)	670	670	670	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
2,4-Dimethylphenol	29	29	29	--	--	6.1 UJ	--	6 UJ	--	--	6 UJ	--	--	6.1 UJ	--	6.1 UJ	--
Pentachlorophenol	360	690	140	--	--	30 U	--	30 U	--	--	30 U	--	--	30 U	--	30 U	--
Benzyl alcohol	57	73	57	--	--	20 U	--	30 UJ	--	--	19 UJ	--	--	30 UJ	--	30 UJ	--
Benzoic acid	650	650	650	--	--	200 U	--	190 U	--	--	190 U	--	--	200 U	--	190 U	--

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-108B-VC	8-108B-VC	8-108C-VC	8-108C-VC	8-109B-VC	8-109B-VC	8-109B-VC	8-109C-VC	8-109C-VC	8-109C-VC	8-110B-VC	8-110B-VC	8-110C-VC	8-110C-VC
			Sample ID:	8-108B-VC-2-3	8-108B-VC-3-4	8-108C-VC-1-2	8-108C-VC-2-3	8-109B-VC-1-2	8-109B-VC-2-3	8-109B-VC-3-4	8-109C-VC-1-2	8-109C-VC-2-3	8-109C-VC-3-4	8-110B-VC-1-2	8-110B-VC-2-3	8-110C-VC-1-2	8-110C-VC-2-3
			Sample Date:	8/1/2008	8/1/2008	8/1/2008	8/1/2008	7/30/2008	7/30/2008	7/30/2008	8/1/2008	8/1/2008	8/1/2008	7/31/2008	7/31/2008	7/29/2008	7/29/2008
			In-Situ Depth^1 (ft):	2-3	3-4	1-2	2-3	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	1-2	2-3
Analyte	SMS SQS	SMS CSL	PS LAET														
Aromatic Hydrocarbons (ug/kg)																	
Total LPAH	--	--	5,200	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Naphthalene	--	--	2,100	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Acenaphthylene	--	--	560	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Acenaphthene	--	--	500	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Fluorene	--	--	540	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Phenanthrene	--	--	1,500	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Anthracene	--	--	960	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
2-Methylnaphthalene	--	--	670	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Total HPAH	--	--	12,000	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Fluoranthene	--	--	1,700	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Pyrene	--	--	2,600	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Benzo(a)anthracene	--	--	1,300	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Chrysene	--	--	1,400	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Benzo(b)fluoranthene	--	--	--	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Benzo(k)fluoranthene	--	--	--	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Benzo(a)pyrene	--	--	1,600	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	20 U	--	19 U	--	--	19 UJ	--	--	20 U	--	19 U	--
Dibenzo(a,h)anthracene	--	--	230	--	--	6.1 U	--	6 U	--	--	6 U	--	--	6.1 U	--	6.1 U	--
Benzo(g,h,i)perylene	--	--	670	--	--	20 U	--	19 U	--	--	19 UJ	--	--	20 U	--	19 U	--
Chlorinated Benzenes (ug/kg)																	
1,2-Dichlorobenzene	--	--	35	--	--	6.1 U	--	6 U	--	--	6 U	--	--	6.1 U	--	6.1 U	--
1,4-Dichlorobenzene	--	--	110	--	--	6.1 U	--	6 U	--	--	6 U	--	--	6.1 U	--	6.1 U	--
1,2,4-Trichlorobenzene	--	--	31	--	--	6.1 U	--	6 U	--	--	6 U	--	--	6.1 U	--	6.1 U	--
Hexachlorobenzene	--	--	22	--	--	6.1 U	--	6 U	--	--	6 U	--	--	6.1 U	--	6.1 U	--
Miscellaneous (ug/kg)																	
Dibenzofuran	--	--	540	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Hexachlorobutadiene	--	--	11	--	--	6.1 UJ	--	6 UJ	--	--	6 UJ	--	--	6.1 UJ	--	6.1 UJ	--
N-Nitrosodiphenylamine	--	--	28	--	--	6.1 U	--	6 UJ	--	--	6 U	--	--	6.1 UJ	--	6.1 UJ	--
Phthalates (ug/kg)																	
Dimethyl phthalate	--	--	71	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Diethyl phthalate	--	--	48	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Di-n-butyl phthalate	--	--	1,400	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Butylbenzyl phthalate	--	--	63	--	--	15 U	--	15 U	--	--	15 U	--	--	15 U	--	15 U	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Di-n-octyl phthalate	--	--	420	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Dioxin Furans (ng/kg)																	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	0.303 U	--	0.199 U	--	--	0.155 U	--	--	0.137 U	--	0.255 U	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	0.289 U	--	0.539 U	--	--	0.236 U	--	--	0.175 U	--	0.339 U	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	0.209 U	--	**1.4 J**	--	--	**0.584 J**	--	--	**0.284 J**	--	0.158 U	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	**0.511 J**	--	**2.21 J**	--	--	**0.881 J**	--	--	**0.251 J**	--	**0.362 J**	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	0.234 U	--	**1.46 J**	--	--	**0.516 J**	--	--	0.233 U	--	0.174 U	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	**7.98**	--	**14**	--	--	**5.06**	--	--	**1.48 J**	--	**3.11**	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	--	**74.5**	--	**25.8**	--	--	**13.6**	--	--	**2.56 J**	--	**13.4**	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	**1.25**	--	**0.862**	--	--	**0.898**	--	--	**0.179 J**	--	**0.239 J**	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	0.204 U	--	0.299 U	--	--	0.16 U	--	--	0.146 U	--	0.127 U	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	0.164 U	--	0.286 U	--	--	0.129 U	--	--	0.136 U	--	0.118 U	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	0.145 U	--	0.316 U	--	--	0.155 U	--	--	0.0498 U	--	0.0832 U	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	0.148 U	--	0.334 U	--	--	0.163 U	--	--	0.0473 U	--	0.0829 U	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	0.178 U	--	0.357 U	--	--	0.183 U	--	--	0.0583 U	--	0.0987 U	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	0.158 U	--	0.349 U	--	--	0.161 U	--	--	0.0491 U	--	0.0852 U	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	**2.09 J**	--	**1.24 J**	--	--	**0.808 J**	--	--	0.0533 U	--	**1.15 J**	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	0.356 U	--	0.325 U	--	--	0.219 U	--	--	0.0697 U	--	0.281 U	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	--	**5.69**	--	**0.901 J**	--	--	**0.872 J**	--	--	0.206 U	--	**1.6 J**	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	**2.38 J**	--	**70.3 J**	--	--	**19.3 J**	--	--	**11.6 J**	--	**7.21 J**	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	**1.99 J**	--	**74.1**	--	--	**21**	--	--	**11.5**	--	**6.51 J**	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	**4.54**	--	**88.5 J**	--	--	**26.3 J**	--	--	**9.87 J**	--	**9.65 J**	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	**16.9**	--	**23.7**	--	--	**9.51**	--	--	**2.68**	--	**7.59**	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	**2.21 J**	--	**6 J**	--	--	**2.74 J**	--	--	**0.63 J**	--	**1.37 J**	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	**0.678 J**	--	**2.59 J**	--	--	0.143 U	--	--	**0.324 J**	--	**0.705 J**	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	**3.01 J**	--	**3.31**	--	--	**1.45 J**	--	--	**0.605 J**	--	**1.03 J**	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	**6.85**	--	**3.31**	--	--	**1.87**	--	--	**0.689**	--	**2.79**	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	--	**0.301**	--	**0.754**	--	--	**0.351**	--	--	**0.0870**	--	**0.107**	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	--	**0.680**	--	**1.24**	--	--	**0.602**	--	--	**0.288**	--	**0.459**	--

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-108B-VC	8-108B-VC	8-108C-VC	8-108C-VC	8-109B-VC	8-109B-VC	8-109B-VC	8-109C-VC	8-109C-VC	8-109C-VC	8-110B-VC	8-110B-VC	8-110C-VC	8-110C-VC
			Sample ID:	8-108B-VC-2-3	8-108B-VC-3-4	8-108C-VC-1-2	8-108C-VC-2-3	8-109B-VC-1-2	8-109B-VC-2-3	8-109B-VC-3-4	8-109C-VC-1-2	8-109C-VC-2-3	8-109C-VC-3-4	8-110B-VC-1-2	8-110B-VC-2-3	8-110C-VC-1-2	8-110C-VC-2-3
			Sample Date:	8/1/2008	8/1/2008	8/1/2008	8/1/2008	7/30/2008	7/30/2008	7/30/2008	8/1/2008	8/1/2008	8/1/2008	7/31/2008	7/31/2008	7/29/2008	7/29/2008
			In-Situ Depth^1 (ft):	2-3	3-4	1-2	2-3	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	1-2	2-3
Analyte	SMS SQS	SMS CSL	PS LAET														
Guaiacols (ug/kg)																	
2-Methoxyphenol (Guaiacol)	--	--	--	--	--	20 U	--	19 U	--	--	**(19 U) R**	--	--	20 U	--	19 U	--
3,4,5-Trichloroguaiacol	--	--	--	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
4,5-Dichloroguaiacol	--	--	--	--	--	20 U	--	19 U	--	--	19 UJ	--	--	20 U	--	19 U	--
4,5,6-Trichloroguaiacol	--	--	--	--	--	20 U	--	19 U	--	--	19 UJ	--	--	20 U	--	19 U	--
Tetrachloroguaiacol	--	--	--	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Semi-Volatile Organics (ug/kg)																	
1,3-Dichlorobenzene	--	--	170	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
1-Methylnaphthalene	--	--	--	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--
Hexachloroethane	--	--	--	--	--	20 U	--	19 U	--	--	19 U	--	--	20 U	--	19 U	--

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

	Location ID:			**8-110C-VC**	**8-111B-VC**	**8-111B-VC**	**8-111B-VC**	**8-111C-VC**	**8-111C-VC**	**8-111C-VC**	**8-112B-VC**	**8-112B-VC**	**8-112B-VC**	**8-112C-VC**	**8-112C-VC**	**8-112C-VC**
	Sample ID:			**8-110C-VC-3-4**	**8-111B-VC-1-2**	**8-111B-VC-2-3**	**8-111B-VC-3-4**	**8-111C-VC-1-2**	**8-111C-VC-2-3**	**8-111C-VC-3-4**	**8-112B-VC-1-2**	**8-112B-VC-2-3**	**8-112B-VC-3-4**	**8-112C-VC-1-2**	**8-112C-VC-2-3**	**8-112C-VC-3-4**
	Sample Date:			**7/29/2008**	**7/31/2008**	**7/31/2008**	**7/31/2008**	**8/1/2008**	**8/1/2008**	**8/1/2008**	**7/31/2008**	**7/31/2008**	**7/31/2008**	**7/30/2008**	**7/30/2008**	**7/30/2008**
	In-Situ Depth[1] (ft):			**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Conventional Parameters (pct)																
Total organic carbon	--	--	--	**0.592**	**0.28**	**0.216**	**0.195**	**5.5 J**	**3.06**	**0.562**	**1.51**	**0.13**	**0.131**	**1.3**	**0.776**	**0.801**
Total solids	--	--	--	**83.5**	**95.2 J**	**95.8 J**	**95.7 J**	**74.3**	**84.9 J**	**84.7 J**	**95.9 J**	**97 J**	**96.9 J**	**82.4**	**84.9**	**80.8**
Metals (mg/kg)																
Cadmium	5.1	6.7	--	--	0.2 U	--	--	**0.4**	--	--	**0.2**	0.2 U	--	**0.4**	--	--
Chromium	260	270	--	--	**16.2**	--	--	**29**	--	--	**25.3**	**15.3**	--	**16.3**	--	--
Mercury	0.41	0.59	--	0.05 U	0.05 U	0.05 U	0.05 U	**0.08**	0.05 U	0.04 U	**0.27**	0.04 U	0.04 U	0.06 U	0.05 U	0.05 U
Zinc	410	960	--	--	**32**	--	--	**52**	--	--	**41**	**35**	--	**24**	--	--
Aromatic Hydrocarbons (mg/kg-OC)																
Total LPAH	370	780	--	--	**15.7**	--	--	**3.6**	--	--	**25.7**	15 U	--	**1.4**	--	--
Naphthalene	99	170	--	--	**6.4 J**	--	--	**1**	--	--	**8.6**	15 U	--	**1.4 J**	--	--
Acenaphthylene	66	66	--	--	6.8 U	--	--	0.36 U	--	--	**1.5**	15 U	--	1.5 U	--	--
Acenaphthene	16	57	--	--	6.8 U	--	--	**0.49**	--	--	1.3 U	15 U	--	1.5 U	--	--
Fluorene	23	79	--	--	6.8 U	--	--	**0.42**	--	--	**0.73 J**	15 U	--	1.5 U	--	--
Phenanthrene	100	480	--	--	**9.3**	--	--	**1.4**	--	--	**13.2**	15 U	--	1.5 U	--	--
Anthracene	220	1,200	--	--	6.8 U	--	--	**0.33 J**	--	--	**1.7**	15 U	--	1.5 U	--	--
2-Methylnaphthalene	38	64	--	--	6.8 U	--	--	**0.69**	--	--	**0.73 J**	15 U	--	1.5 U	--	--
Total HPAH	960	5,300	--	--	**19.1**	--	--	**4.9**	--	--	**60.8**	15 U	--	1.5 U	--	--
Fluoranthene	160	1,200	--	--	**12**	--	--	**1.6**	--	--	**19.2**	15 U	--	1.5 U	--	--
Pyrene	1,000	1,400	--	--	**7.1**	--	--	**1.4**	--	--	**15.2**	15 U	--	1.5 U	--	--
Benzo(a)anthracene	110	270	--	--	6.8 U	--	--	**0.4**	--	--	**2.8**	15 U	--	1.5 U	--	--
Chrysene	110	460	--	--	6.8 U	--	--	**0.49**	--	--	**3.8**	15 U	--	1.5 U	--	--
Benzo(b)fluoranthene	--	--	--	--	6.8 U	--	--	**0.33 J**	--	--	**4.4**	15 U	--	1.5 U	--	--
Benzo(k)fluoranthene	--	--	--	--	6.8 U	--	--	**0.33 J**	--	--	**4.4**	15 U	--	1.5 U	--	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	6.8 U	--	--	**0.66 J**	--	--	**8.8**	15 U	--	1.5 U	--	--
Benzo(a)pyrene	99	210	--	--	6.8 U	--	--	**0.36**	--	--	**3.8**	15 U	--	1.5 U	--	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	6.8 U	--	--	0.36 U	--	--	**2.6**	15 U	--	1.5 U	--	--
Dibenzo(a,h)anthracene	12	33	--	--	2.2 U	--	--	0.11 U	--	--	0.4 U	4.6 U	--	0.46 U	--	--
Benzo(g,h,i)perylene	31	78	--	--	6.8 U	--	--	0.36 U	--	--	**4.6**	15 U	--	1.5 U	--	--
Chlorinated Benzenes (mg/kg-OC)																
1,2-Dichlorobenzene	2.3	2.3	--	--	2.2 U	--	--	0.11 UJ	--	--	0.4 U	4.6 U	--	0.46 U	--	--
1,4-Dichlorobenzene	3.1	9	--	--	2.2 U	--	--	0.11 U	--	--	0.4 U	4.6 U	--	0.46 U	--	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	2.2 U	--	--	0.11 U	--	--	0.4 U	4.6 U	--	0.46 U	--	--
Hexachlorobenzene	0.38	2.3	--	--	2.2 U	--	--	0.11 U	--	--	0.4 U	4.6 U	--	0.46 U	--	--
Phthalates (mg/kg-OC)																
Dimethyl phthalate	53	53	--	--	6.8 U	--	--	0.36 U	--	--	1.3 U	15 U	--	1.5 U	--	--
Diethyl phthalate	61	110	--	--	6.8 U	--	--	0.36 U	--	--	1.3 U	15 U	--	1.5 U	--	--
Di-n-butyl phthalate	220	1,700	--	--	6.8 U	--	--	0.36 U	--	--	1.3 U	15 U	--	1.5 U	--	--
Butylbenzyl phthalate	4.9	64	--	--	5.4 U	--	--	0.27 UJ	--	--	0.99 U	12 U	--	1.2 U	--	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	6.8 U	--	--	**0.55**	--	--	1.3 U	15 U	--	1.5 U	--	--
Di-n-octyl phthalate	58	4,500	--	--	6.8 U	--	--	0.36 U	--	--	1.3 U	15 U	--	1.5 U	--	--
Miscellaneous (mg/kg-OC)																
Dibenzofuran	15	58	--	--	6.8 U	--	--	**0.38**	--	--	**2.4**	15 U	--	1.5 U	--	--
Hexachlorobutadiene	3.9	6.2	--	--	2.2 UJ	--	--	0.11 UJ	--	--	0.4 UJ	4.6 UJ	--	0.46 UJ	--	--
N-Nitrosodiphenylamine	11	11	--	--	2.2 UJ	--	--	0.11 UJ	--	--	0.4 UJ	4.6 UJ	--	0.46 UJ	--	--
Ionizable Organic Compounds (ug/kg)																
Phenol	420	1,200	420	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
2-Methylphenol (o-Cresol)	63	63	63	--	6.2 UJ	--	--	**8.3 J**	--	--	6.1 UJ	6 UJ	--	6 UJ	--	--
4-Methylphenol (p-Cresol)	670	670	670	--	19 U	--	--	**19 J**	--	--	**52**	19 U	--	**13 J**	--	--
2,4-Dimethylphenol	29	29	29	--	6.2 UJ	--	--	6 UJ	--	--	6.1 UJ	6 UJ	--	6 UJ	--	--
Pentachlorophenol	360	690	140	--	31 U	--	--	30 U	--	--	30 U	30 U	--	30 U	--	--
Benzyl alcohol	57	73	57	--	31 UJ	--	--	30 UJ	--	--	30 UJ	30 UJ	--	30 UJ	--	--
Benzoic acid	650	650	650	--	190 U	--	--	200 U	--	--	190 U	190 U	--	190 U	--	--

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	**8-110C-VC**	**8-111B-VC**	**8-111B-VC**	**8-111B-VC**	**8-111C-VC**	**8-111C-VC**	**8-111C-VC**	**8-112B-VC**	**8-112B-VC**	**8-112B-VC**	**8-112C-VC**	**8-112C-VC**	**8-112C-VC**
			Sample ID:	**8-110C-VC-3-4**	**8-111B-VC-1-2**	**8-111B-VC-2-3**	**8-111B-VC-3-4**	**8-111C-VC-1-2**	**8-111C-VC-2-3**	**8-111C-VC-3-4**	**8-112B-VC-1-2**	**8-112B-VC-2-3**	**8-112B-VC-3-4**	**8-112C-VC-1-2**	**8-112C-VC-2-3**	**8-112C-VC-3-4**
			Sample Date:	**7/29/2008**	**7/31/2008**	**7/31/2008**	**7/31/2008**	**8/1/2008**	**8/1/2008**	**8/1/2008**	**7/31/2008**	**7/31/2008**	**7/31/2008**	**7/30/2008**	**7/30/2008**	**7/30/2008**
			In-Situ Depth^1 (ft):	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**	**1-2**	**2-3**	**3-4**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Aromatic Hydrocarbons (ug/kg)																
Total LPAH	--	--	5,200	--	**44**	--	--	**200**	--	--	**389**	19 U	--	**18**	--	--
Naphthalene	--	--	2,100	--	**18 J**	--	--	**57**	--	--	**130**	19 U	--	**18 J**	--	--
Acenaphthylene	--	--	560	--	19 U	--	--	20 U	--	--	**22**	19 U	--	19 U	--	--
Acenaphthene	--	--	500	--	19 U	--	--	**27**	--	--	19 U	19 U	--	19 U	--	--
Fluorene	--	--	540	--	19 U	--	--	**23**	--	--	**11 J**	19 U	--	19 U	--	--
Phenanthrene	--	--	1,500	--	**26**	--	--	**75**	--	--	**200**	19 U	--	19 U	--	--
Anthracene	--	--	960	--	19 U	--	--	**18 J**	--	--	**26**	19 U	--	19 U	--	--
2-Methylnaphthalene	--	--	670	--	19 U	--	--	**38**	--	--	**11 J**	19 U	--	19 U	--	--
Total HPAH	--	--	12,000	--	**53**	--	--	**269**	--	--	**918**	19 U	--	19 U	--	--
Fluoranthene	--	--	1,700	--	**33**	--	--	**89**	--	--	**290**	19 U	--	19 U	--	--
Pyrene	--	--	2,600	--	**20**	--	--	**75**	--	--	**230**	19 U	--	19 U	--	--
Benzo(a)anthracene	--	--	1,300	--	19 U	--	--	**22**	--	--	**42**	19 U	--	19 U	--	--
Chrysene	--	--	1,400	--	19 U	--	--	**27**	--	--	**58**	19 U	--	19 U	--	--
Benzo(b)fluoranthene	--	--	--	--	19 U	--	--	**18 J**	--	--	**66**	19 U	--	19 U	--	--
Benzo(k)fluoranthene	--	--	--	--	19 U	--	--	**18 J**	--	--	**66**	19 U	--	19 U	--	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	19 U	--	--	**36 J**	--	--	**132**	19 U	--	19 U	--	--
Benzo(a)pyrene	--	--	1,600	--	19 U	--	--	**20**	--	--	**57**	19 U	--	19 U	--	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	19 U	--	--	20 U	--	--	**40**	19 U	--	19 U	--	--
Dibenzo(a,h)anthracene	--	--	230	--	6.2 U	--	--	6 U	--	--	6.1 U	6 U	--	6 U	--	--
Benzo(g,h,i)perylene	--	--	670	--	19 U	--	--	20 U	--	--	**69**	19 U	--	19 U	--	--
Chlorinated Benzenes (ug/kg)																
1,2-Dichlorobenzene	--	--	35	--	6.2 U	--	--	6 UJ	--	--	6.1 U	6 U	--	6 U	--	--
1,4-Dichlorobenzene	--	--	110	--	6.2 U	--	--	6 U	--	--	6.1 U	6 U	--	6 U	--	--
1,2,4-Trichlorobenzene	--	--	31	--	6.2 U	--	--	6 U	--	--	6.1 U	6 U	--	6 U	--	--
Hexachlorobenzene	--	--	22	--	6.2 U	--	--	6 U	--	--	6.1 U	6 U	--	6 U	--	--
Miscellaneous (ug/kg)																
Dibenzofuran	--	--	540	--	19 U	--	--	**21**	--	--	**36**	19 U	--	19 U	--	--
Hexachlorobutadiene	--	--	11	--	6.2 UJ	--	--	6 UJ	--	--	6.1 UJ	6 UJ	--	6 UJ	--	--
N-Nitrosodiphenylamine	--	--	28	--	6.2 UJ	--	--	6 UJ	--	--	6.1 UJ	6 UJ	--	6 UJ	--	--
Phthalates (ug/kg)																
Dimethyl phthalate	--	--	71	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
Diethyl phthalate	--	--	48	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
Di-n-butyl phthalate	--	--	1,400	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
Butylbenzyl phthalate	--	--	63	--	15 U	--	--	15 UJ	--	--	15 U	15 U	--	15 U	--	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	19 U	--	--	**30**	--	--	19 U	19 U	--	19 U	--	--
Di-n-octyl phthalate	--	--	420	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
Dioxin Furans (ng/kg)																
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**0.102 J**	--	--	**0.642**	**0.176 J**	--	**0.949**	0.298 U	--	0.328 U	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**0.804 J**	--	--	**1.95 J**	**0.595 J**	--	**6.81**	0.328 U	--	0.532 U	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**2.81**	--	--	**2.42**	**0.773 J**	--	**24.9**	0.277 U	--	**1.01 J**	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**3.14**	--	--	**14.8**	**4.36**	--	**39.9**	**0.293 J**	--	**1.23 J**	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**2.5**	--	--	**5.34**	**1.43 J**	--	**30.9**	0.285 U	--	**1.11 J**	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**20**	--	--	**353**	**92.2**	--	**311**	**1.76 J**	--	**9.16**	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	**20.5**	--	--	**3,260**	**828**	--	**325**	**2.97 J**	--	**9.43**	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**0.742**	--	--	**3.14**	**1.65**	--	**14.4**	**0.308 J**	--	**0.76**	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	0.0933 U	--	--	**0.919 J**	**0.255 J**	--	**3.03**	0.149 U	--	0.213 U	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	0.0789 U	--	--	**3.73**	**1.16 J**	--	**4.06**	0.13 U	--	0.183 U	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**0.274 J**	--	--	**4.82**	**1.11 J**	--	**1.58 J**	0.0602 U	--	0.175 U	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	0.0597 U	--	--	**2.64**	**0.662 J**	--	**1.78 J**	0.0571 U	--	0.181 U	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	0.0662 U	--	--	**1.45 J**	**0.303 J**	--	**0.716 J**	0.0729 U	--	0.216 U	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	0.0581 U	--	--	**4.9**	**1.47 J**	--	**1.96 J**	0.0563 U	--	0.186 U	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**0.832 J**	--	--	**131**	**40**	--	**2.69**	0.0932 U	--	0.417 U	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	0.0501 U	--	--	**6.72**	**1.88 J**	--	**0.547 J**	0.107 U	--	0.583 U	--	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	**0.647 J**	--	--	**410**	**126**	--	**3.1 J**	0.235 U	--	**0.839 J**	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**179**	--	--	**35.7 J**	**15.5 J**	--	**1390**	**6.96 J**	--	**57.1 J**	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**193**	--	--	**40.9**	**20.5 J**	--	**1670**	**9.1**	--	**54.8**	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**166**	--	--	**171**	**55.5 J**	--	**2280**	**10.7 J**	--	**65.7 J**	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**31.7**	--	--	**1,080**	**292**	--	**496**	**3.28**	--	**14.6**	--	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**5.96 J**	--	--	**37.4 J**	**14.4 J**	--	**120 J**	**0.897 J**	--	**2.87 J**	--	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**2.28 J**	--	--	**43.3**	**17.2 J**	--	**46.8 J**	**0.086 J**	--	**0.25 J**	--	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**2.67 J**	--	--	**148**	**41.9 J**	--	**19.8 J**	**0.225**	--	**0.402**	--	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**2.36**	--	--	**480**	**159**	--	**6.89**	**0.218 J**	--	0.488 U	--	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	**2.07**	--	--	**13.7**	**3.93**	--	**23.9**	**0.0786**	--	**0.506**	--	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	**2.09**	--	--	**13.7**	**3.93**	--	**23.9**	**0.455**	--	**1.01**	--	--

Table 15c
Subsurface Sediment Chemical Testing Results - ASB Interior Sloping Berm

			Location ID:	8-110C-VC	8-111B-VC	8-111B-VC	8-111B-VC	8-111C-VC	8-111C-VC	8-111C-VC	8-112B-VC	8-112B-VC	8-112B-VC	8-112C-VC	8-112C-VC	8-112C-VC
			Sample ID:	8-110C-VC-3-4	8-111B-VC-1-2	8-111B-VC-2-3	8-111B-VC-3-4	8-111C-VC-1-2	8-111C-VC-2-3	8-111C-VC-3-4	8-112B-VC-1-2	8-112B-VC-2-3	8-112B-VC-3-4	8-112C-VC-1-2	8-112C-VC-2-3	8-112C-VC-3-4
			Sample Date:	7/29/2008	7/31/2008	7/31/2008	7/31/2008	8/1/2008	8/1/2008	8/1/2008	7/31/2008	7/31/2008	7/31/2008	7/30/2008	7/30/2008	7/30/2008
			In-Situ Depth[1] (ft):	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4	1-2	2-3	3-4
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Guaiacols (ug/kg)																
2-Methoxyphenol (Guaiacol)	--	--	--	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
3,4,5-Trichloroguaiacol	--	--	--	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
4,5-Dichloroguaiacol	--	--	--	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
4,5,6-Trichloroguaiacol	--	--	--	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
Tetrachloroguaiacol	--	--	--	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
Semi-Volatile Organics (ug/kg)																
1,3-Dichlorobenzene	--	--	170	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--
1-Methylnaphthalene	--	--	--	--	19 U	--	--	**45**	--	--	19 U	19 U	--	19 U	--	--
Hexachloroethane	--	--	--	--	19 U	--	--	20 U	--	--	19 U	19 U	--	19 U	--	--

Notes:

🟨	Detected concentration is greater than SMS SQS screening level
🟩	Detected concentration is greater than SMS CSL screening level
🟦	Detected concentration is greater than 1988 Puget Sound Estuary Program LAET screening level

1. Sample depth is reported as below ASB solids/sand (hardbottom) interface.

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

R= Rejected analytical result due to low or no recoveries in the LCS and/or MS/MSD analyses in both the full scan and SIM SVOC analyses.

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene

Benzo(j)fluoranthene is included in the total of benzo(b&k)fluoranthenes

Totals are calculated for LPAH and HPAH as the sum of all detected results. If all are undetcted results, the highest reporting limit value is reported as the sum.

Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a "0" (ND=0) and assigned a concentration equal to ½ the detection limit (ND=1/2).

Total xylene is the sum of o-, m-, p- isomers

-- Sample was not submitted for chemical analysis.

μg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

mg/kg-OC = milligrams per kilogram organic carbon normalized

ng/kg = nanogram per kilogram

pct = percent

Non-organic carbon normalized samples with TOC results outside of the 0.5-3.5% range were screened against the 1988 Puget Sound Estuary Program LAET

There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.

The site specific Bioaccumulaltion Screening Level (BSL) for mercury is 1.2 mg/kg. (Supplemental RI Report, RETEC 2006)

Table 15d

Subsurface Sediment Chemical Testing Results - Composites Beneath ASB Berm

			Transect ID:	8-101	8-102	8-103	8-104	8-105	8-106	8-109	8-110	8-111	8-112
			Sample ID:	8-101BC-C2	8-102C-C2	8-103C-C2	8-104BC-C2	8-105C-C2	8-106C-C2	8-109C-C2	8-110BC-C2	8-111C-C2	8-112C-C2
			Sample Date:	7/29/08	7/29/08	7/29/08	8/4/08	8/4/08	8/4/08	8/1/08	7/29/08	8/1/08	7/30/08
			In-Situ Depth (ft):	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Analyte	SMS SQS	SMS CSL	PS LAET										
Grain Size (pct)													
Total Gravel	--	--	--	**0.7**	**0.1**	**0.4**	**1.7**	--	--	--	**1.0**	**1.6**	--
Total Sand	--	--	--	**78.8**	**86.4**	**86.5**	**80.6**	**68.5**	**84.8**	**85.5**	**53.8**	**88.3**	**80**
Total Silt	--	--	--	**20.5**	**13.5**	**13.1**	**12.5**	**24**	**10.5**	**14.4**	**35**	**10.1**	**15.5**
Total Clay	--	--	--	--	--	--	**5.1**	**7.6**	**4.6**	--	**10.2**	--	**4.5**
Total Fines (Silt + Clay)	--	--	--	**20.5**	**13.5**	**13.1**	**17.6**	**31.6**	**15.1**	**14.4**	**45.2**	**10.1**	**20**
Total Grain Size	--	--	--	**100**	**100**	**100**	**99.9**	**100.1**	**99.9**	**99.9**	**100**	**100**	**100**
Physical Parameters													
Atterberg Classification	--	--	--	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**
Specific gravity (su)	--	--	--	**2.72**	**2.73**	**2.71**	**2.71**	**2.73**	**2.7**	**2.67**	**2.65**	**2.63**	**2.73**
Moisture (water) Content (pct)	--	--	--	**24.63**	**25.13**	**19.88**	**19.44**	**25.09**	**28.2**	**24.91**	**44.68**	**26.15**	**22.21**
Conventional Parameters													
Ammonia (mg-N/kg)	--	--	--	**46.2**	**72.7**	**73.1**	**181 J**	**9.27 J**	**116 J**	**18**	**18.9**	**290**	**24.3**
Sulfide (mg/kg)	--	--	--	1.18 U	--	**4.66**	1.11 U	**5.27**	**22.4**	**20.7**	--	**1.98**	1.28 U
Total organic carbon (pct)	--	--	--	**0.387**	**0.611**	**0.363**	**0.431**	**0.587**	**1.23**	**0.575**	**0.505**	**0.763**	**0.489**
Total solids (pct)	--	--	--	**79.3**	**80.3**	**81**	**83.6**	**78**	**80.2**	**83.4 J**	**78**	**80.5 J**	**81.6**
Total Solids (preserved) (pct)	--	--	--	**76.8**	--	**78.9**	**81.6**	**76.7**	**75.2**	**75.1**	--	**78.1**	**76.7**
Total volatile solids (pct)	--	--	--	**1.1**	**1.35**	**1.83**	**1.22**	**1.39**	**2.24**	**1.38 J**	**1.65**	**1.76 J**	**1.11**
Metals (mg/kg)													
Antimony	--	--	--	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	7 UJ	6 UJ	6 U
Arsenic	57	93	--	6 U	6 U	6 U	6 U	6 U	6 U	6 U	7 U	6 U	6 U
Cadmium	5.1	6.7	--	**0.3**	**0.2**	**0.3**	**0.3**	**0.5**	**0.3**	**0.3**	**0.6**	0.2 U	**0.3**
Chromium	260	270	--	**20.9**	**18.2**	**17.5**	**16**	**21.6**	**23.4**	**21**	**31.2**	**17.6**	**18.9**
Copper	390	390	--	**8.1**	**8.9**	**9**	**8.2 J**	**11.9 J**	**15.3 J**	**7.8**	**16.9**	**7.7**	**7.8**
Lead	450	530	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	2 U	2 U
Mercury	0.41	0.59	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U
Nickel	--	--	--	**15**	**14**	**14**	**13**	**17**	**16**	**14**	**24**	**14**	**13**
Selenium	--	--	--	**0.3**	**0.4**	0.6 U	**0.2**	**0.3**	**0.3**	**0.3**	0.7 U	**0.3**	0.2 U
Silver	6.1	6.1	--	0.4 U	0.4 U	0.3 U	0.4 U	0.3 U	0.4 U	0.4 U	0.4 U	0.4 U	0.3 U
Zinc	410	960	--	**22**	**22**	**21**	**22**	**28**	**24**	**25**	**37**	**23**	**23**
Butyltins (ug/kg)													
Butyltin (ion)	--	--	--	3.4 U	3.7 U	3.4 U	4 U	3.5 U	3.6 U	3.5 U	3.6 U	3.5 U	3.5 U
Dibutyltin (ion)	--	--	--	4.9 U	5.2 U	4.8 U	5.7 U	4.9 U	5.1 U	4.9 U	5 U	5 U	5 U
Tributyltin (ion)	--	--	--	3.2 U	3.5 U	3.2 U	3.8 U	3.3 U	3.4 U	3.3 U	3.4 U	3.3 U	3.3 U
PCB Aroclors (mg/kg-OC)													
Aroclor 1016	--	--	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U
Aroclor 1221	--	--	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U
Aroclor 1232	--	--	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U
Aroclor 1242	--	--	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U
Aroclor 1248	--	--	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U
Aroclor 1254	--	--	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U
Aroclor 1260	--	--	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U
Aroclor 1262	--	--	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U
Aroclor 1268	--	--	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U
Total PCB	12	65	--	2.5 U	1.6 U	2.6 U	2.3 U	1.7 U	0.8 U	1.7 U	1.9 U	1.3 U	2 U

Table 15d
Subsurface Sediment Chemical Testing Results - Composites Beneath ASB Berm

			Transect ID:	**8-101**	**8-102**	**8-103**	**8-104**	**8-105**	**8-106**	**8-109**	**8-110**	**8-111**	**8-112**
			Sample ID:	**8-101BC-C2**	**8-102C-C2**	**8-103C-C2**	**8-104BC-C2**	**8-105C-C2**	**8-106C-C2**	**8-109C-C2**	**8-110BC-C2**	**8-111C-C2**	**8-112C-C2**
			Sample Date:	**7/29/08**	**7/29/08**	**7/29/08**	**8/4/08**	**8/4/08**	**8/4/08**	**8/1/08**	**7/29/08**	**8/1/08**	**7/30/08**
			In-Situ Depth (ft):	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**	**Composite**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Aromatic Hydrocarbons (mg/kg-OC)													
Total LPAH	370	780	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	**2.0**	2.6 U	4.1 U
Naphthalene	99	170	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	**2.0 J**	2.6 U	4.1 U
Acenaphthylene	66	66	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Acenaphthene	16	57	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Fluorene	23	79	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Phenanthrene	100	480	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Anthracene	220	1,200	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
2-Methylnaphthalene	38	64	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Total HPAH	960	5,300	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Fluoranthene	160	1,200	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Pyrene	1,000	1,400	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Benzo(a)anthracene	110	270	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Chrysene	110	460	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Benzo(b)fluoranthene	--	--	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Benzo(k)fluoranthene	--	--	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Total Benzofluoranthenes (b, j, k)	230	450	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Benzo(a)pyrene	99	210	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Indeno(1,2,3-c,d)pyrene	34	88	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Dibenzo(a,h)anthracene	12	33	--	1.6 UJ	0.97 UJ	1.6 UJ	1.4 UJ	1 UJ	0.5 UJ	1 UJ	1.2 UJ	0.8 UJ	1.2 UJ
Benzo(g,h,i)perylene	31	78	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4.0 U	2.6 U	4.1 U
Chlorinated Benzenes (mg/kg-OC)													
1,2-Dichlorobenzene	2.3	2.3	--	1.6 UJ	0.97 UJ	1.6 UJ	1.4 U	1 U	0.5 U	1 U	1.2 UJ	0.8 U	1.2 UJ
1,4-Dichlorobenzene	3.1	9	--	1.6 U	0.97 U	1.6 U	1.4 U	1 U	0.5 U	1 U	1.2 U	0.8 U	1.2 U
1,2,4-Trichlorobenzene	0.81	1.8	--	1.6 U	0.97 U	1.6 U	1.4 U	1 U	0.5 U	1 U	1.2 U	0.8 U	1.2 U
Hexachlorobenzene	0.38	2.3	--	1.6 U	0.97 U	1.6 U	1.4 U	1 U	0.5 U	1 U	1.2 U	0.8 U	1.2 U
Phthalates (mg/kg-OC)													
Dimethyl phthalate	53	53	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4 U	2.6 U	4.1 U
Diethyl phthalate	61	110	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4 U	2.6 U	4.1 U
Di-n-butyl phthalate	220	1,700	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4 U	2.6 U	4.1 U
Butylbenzyl phthalate	4.9	64	--	3.9 U	2.5 U	3.9 U	3.5 U	2.6 U	1.2 U	2.6 U	3 U	2 U	2.9 U
Bis(2-ethylhexyl) phthalate	47	78	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	**2.6 J**	2.6 U	4.1 U
Di-n-octyl phthalate	58	4,500	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4 U	2.6 U	4.1 U
Miscellaneous (mg/kg-OC)													
Dibenzofuran	15	58	--	4.9 U	3.3 U	5.2 U	4.6 U	3.2 U	1.5 U	3.3 U	4 U	2.6 U	4.1 U
Hexachlorobutadiene	3.9	6.2	--	1.6 U	0.97 U	1.6 U	1.4 U	1 U	0.5 U	1 U	1.2 U	0.8 U	1.2 U
N-Nitrosodiphenylamine	11	11	--	1.6 UJ	0.97 UJ	1.6 UJ	1.4 U	1 U	0.5 U	1 U	1.2 UJ	0.8 U	1.2 UJ
Ionizable Organic Compounds (ug/kg)													
Phenol	420	1,200	420	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
2-Methylphenol (o-Cresol)	63	63	63	6.1 U	5.9 U	5.8 U	5.9 UJ	6 U	6.1 U	6 U	6 U	6.1 U	5.8 U
4-Methylphenol (p-Cresol)	670	670	670	19 U	20 U	19 U	20 U	19 U	19 U	19 U	**21**	20 U	20 U
2,4-Dimethylphenol	29	29	29	6.1 UJ	5.9 UJ	5.8 UJ	5.9 U	6 U	6.1 U	6 U	6 UJ	6.1 U	5.8 UJ
Pentachlorophenol	360	690	140	31 U	29 U	29 U	30 U	30 U	31 U	30 U	30 U	30 U	29 U
Benzyl alcohol	57	73	57	19 UJ	20 UJ	**(29 U) R**	20 UJ	19 UJ	19 UJ	19 UJ	20 UJ	19 UJ	20 UJ
Benzoic acid	650	650	650	190 U	200 U	190 U	200 U	190 U	190 U	190 U	200 U	200 U	200 U

Table 15d
Subsurface Sediment Chemical Testing Results - Composites Beneath ASB Berm

			Transect ID:	8-101	8-102	8-103	8-104	8-105	8-106	8-109	8-110	8-111	8-112
			Sample ID:	8-101BC-C2	8-102C-C2	8-103C-C2	8-104BC-C2	8-105C-C2	8-106C-C2	8-109C-C2	8-110BC-C2	8-111C-C2	8-112C-C2
			Sample Date:	7/29/08	7/29/08	7/29/08	8/4/08	8/4/08	8/4/08	8/1/08	7/29/08	8/1/08	7/30/08
			In-Situ Depth (ft):	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
PCB Aroclors (ug/kg)													
Aroclor 1016	--	--	--	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Aroclor 1221	--	--	--	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Aroclor 1232	--	--	--	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Aroclor 1242	--	--	--	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Aroclor 1248	--	--	--	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Aroclor 1254	--	--	--	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Aroclor 1260	--	--	--	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Aroclor 1262	--	--	--	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Aroclor 1268	--	--	--	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Total PCB	--	--	130	9.7 U	9.6 U	9.5 U	9.8 U	9.7 U	9.8 U	9.7 U	9.7 U	9.7 U	9.7 U
Aromatic Hydrocarbons (ug/kg)													
Total LPAH	--	--	5,200	19 U	20 U	19 U	20 U	19 U	19 U	19 U	**10**	20 U	20 U
Naphthalene	--	--	2,100	19 U	20 U	19 U	20 U	19 U	19 U	19 U	**10 J**	20 U	20 U
Acenaphthylene	--	--	560	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Acenaphthene	--	--	500	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Fluorene	--	--	540	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Phenanthrene	--	--	1,500	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Anthracene	--	--	960	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
2-Methylnaphthalene	--	--	670	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Total HPAH	--	--	12,000	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Fluoranthene	--	--	1,700	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Pyrene	--	--	2,600	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Benzo(a)anthracene	--	--	1,300	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Chrysene	--	--	1,400	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Benzo(b)fluoranthene	--	--	--	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Benzo(k)fluoranthene	--	--	--	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Total Benzofluoranthenes (b, j, k)	--	--	3,200	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Benzo(a)pyrene	--	--	1,600	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Indeno(1,2,3-c,d)pyrene	--	--	600	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Dibenzo(a,h)anthracene	--	--	230	6.1 UJ	5.9 UJ	5.8 UJ	5.9 UJ	6 UJ	6.1 UJ	6 UJ	6 UJ	6.1 UJ	5.8 UJ
Benzo(g,h,i)perylene	--	--	670	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Chlorinated Benzenes (ug/kg)													
1,2-Dichlorobenzene	--	--	35	6.1 UJ	5.9 UJ	5.8 UJ	5.9 U	6 U	6.1 U	6 U	6 UJ	6.1 U	5.8 UJ
1,4-Dichlorobenzene	--	--	110	6.1 U	5.9 U	5.8 U	5.9 U	6 U	6.1 U	6 U	6 U	6.1 U	5.8 U
1,2,4-Trichlorobenzene	--	--	31	6.1 U	5.9 U	5.8 U	5.9 U	6 U	6.1 U	6 U	6 U	6.1 U	5.8 U
Hexachlorobenzene	--	--	22	6.1 U	5.9 U	5.8 U	5.9 U	6 U	6.1 U	6 U	6 U	6.1 U	5.8 U
Miscellaneous (ug/kg)													
Dibenzofuran	--	--	540	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Hexachlorobutadiene	--	--	11	6.1 U	5.9 U	5.8 U	5.9 U	6 U	6.1 U	6 U	6 U	6.1 U	5.8 U
N-Nitrosodiphenylamine	--	--	28	6.1 UJ	5.9 UJ	5.8 UJ	5.9 U	6 U	6.1 U	6 U	6 UJ	6.1 U	5.8 UJ
Phthalates (ug/kg)													
Dimethyl phthalate	--	--	71	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Diethyl phthalate	--	--	48	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Di-n-butyl phthalate	--	--	1,400	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Butylbenzyl phthalate	--	--	63	15 U	15 U	14 U	15 U	15 U	15 U	15 U	15 U	15 U	14 U
Bis(2-ethylhexyl) phthalate	--	--	1,300	19 U	20 U	19 U	20 U	19 U	19 U	19 U	**13 J**	20 U	20 U
Di-n-octyl phthalate	--	--	420	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U

Table 15d
Subsurface Sediment Chemical Testing Results - Composites Beneath ASB Berm

			Transect ID:	8-101	8-102	8-103	8-104	8-105	8-106	8-109	8-110	8-111	8-112
			Sample ID:	8-101BC-C2	8-102C-C2	8-103C-C2	8-104BC-C2	8-105C-C2	8-106C-C2	8-109C-C2	8-110BC-C2	8-111C-C2	8-112C-C2
			Sample Date:	7/29/08	7/29/08	7/29/08	8/4/08	8/4/08	8/4/08	8/1/08	7/29/08	8/1/08	7/30/08
			In-Situ Depth (ft):	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Dioxin Furans (ng/kg)													
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	0.243 U	0.159 U	0.151 U	0.116 U	0.107 U	0.128 U	0.164 U	0.134 U	0.0592 U	0.168 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	0.273 U	0.268 U	0.319 U	0.231 U	0.177 U	0.196 U	0.29 U	0.287 U	0.304 U	0.126 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	0.196 U	0.194 U	0.178 U	0.197 U	0.177 U	0.179 U	0.234 U	0.227 U	**0.267 J**	0.199 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	0.226 U	0.212 U	0.187 U	0.224 U	0.194 U	0.196 U	0.259 U	0.231 U	**0.356 J**	0.207 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	0.223 U	0.222 U	0.197 U	0.222 U	0.194 U	0.188 U	0.263 U	0.234 U	**0.243 J**	0.212 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**2 J**	**0.258 J**	**0.605 J**	**2.28**	**0.381 J**	**0.296 J**	0.22 U	**1.81 J**	**2 J**	**0.494 J**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	**11.3**	**2.16 J**	**2.22 J**	**2.76 J**	**3.5 J**	**2.12 J**	**1.12 J**	**7.56**	**3.55 J**	**2.09 J**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	**0.16 J**	0.104 U	0.1 U	**0.29 J**	0.0618 U	0.104 U	0.117 U	**0.186 J**	**0.157 J**	0.065 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	0.14 U	0.165 U	0.132 U	0.164 U	0.156 U	0.191 U	0.378 U	0.163 U	0.12 U	0.129 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	0.135 U	0.142 U	0.116 U	0.158 U	0.137 U	0.173 U	0.344 U	0.147 U	0.111 U	0.122 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	0.0512 U	0.115 U	0.0805 U	0.0959 U	0.0607 U	0.0766 U	0.114 U	0.111 U	0.0744 U	0.0678 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	0.0515 U	0.115 U	0.0763 U	0.0891 U	0.0586 U	0.0731 U	0.11 U	0.116 U	0.0703 U	0.066 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	0.0732 U	0.162 U	0.105 U	0.141 U	0.0783 U	0.101 U	0.153 U	0.158 U	0.0964 U	0.0905 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	0.0517 U	0.121 U	0.0813 U	0.104 U	0.0594 U	0.0783 U	0.116 U	0.115 U	0.0769 U	0.0698 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	**0.318 J**	0.0754 U	0.0852 U	0.0916 U	0.0734 U	0.082 U	0.12 U	0.118 U	0.11 U	0.0763 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	0.159 U	0.114 U	0.116 U	0.141 U	0.0945 U	0.105 U	0.161 U	0.182 U	0.169 U	0.106 U
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	**0.667 J**	0.395 U	0.399 U	0.443 U	0.259 U	0.255 U	0.54 U	0.388 U	0.376 U	0.317 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**6.39 J**	0.159 U	**3.91 J**	**9.85 J**	**0.369**	**0.495 J**	**0.255**	**8.2 J**	**13.4 J**	**1.65 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**5.96**	0.268 U	**5.47**	**11.6**	0.177 U	0.196 U	0.29 U	**10**	**13.7**	**1.83 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**6.69**	0.209 U	**5.69 J**	**15.5 J**	**0.475 J**	**0.673 J**	**0.407**	**15.4 J**	**15.5 J**	**2.04**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**4.28**	**0.663 J**	**1.14**	**3.93**	**0.915**	**0.72**	**0.259 J**	**3.7**	**3.52**	**1.04**
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	**0.408 J**	0.104 U	0.1 U	**0.74**	**0.108**	**0.116**	**0.135 J**	**0.608 J**	**1.05 J**	0.065 U
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	0.138 U	0.153 U	0.124 U	0.161 U	0.146 U	0.182 U	0.361 U	0.155 U	0.116 U	0.126 U
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	**0.372 J**	0.127 U	0.085 U	0.105 U	0.0637 U	0.0814 U	0.122 U	0.124 U	0.0787 U	0.0729 U
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	**1**	0.0932 U	0.0996 U	0.114 U	0.0834 U	**0.176**	0.139 U	0.147 U	**0.285**	0.09 U
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	**0.0428**	**0.00323**	**0.00672**	**0.0526**	**0.00486**	**0.00360**	**0.00034**	**0.0390**	**0.123**	**0.00557**
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	**0.368**	**0.304**	**0.312**	**0.307**	**0.215**	**0.245**	**0.355**	**0.335**	**0.341**	**0.223**
Guaiacols (ug/kg)													
2-Methoxyphenol (Guaiacol)	--	--	--	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
3,4,5-Trichloroguaiacol	--	--	--	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
4,5-Dichloroguaiacol	--	--	--	19 U	20 U	19 UJ	20 U	19 U	19 U	19 U	20 U	20 U	20 U
4,5,6-Trichloroguaiacol	--	--	--	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Tetrachloroguaiacol	--	--	--	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Pesticides (ug/kg)													
4,4'-DDD (p,p'-DDD)	--	--	16	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U
4,4'-DDE (p,p'-DDE)	--	--	9	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U
4,4'-DDT (p,p'-DDT)	--	--	6	1.9 UJ	1.9 UJ	1.9 UJ	1.9 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 UJ
Total DDT	--	--	--	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U
Aldrin	--	--	--	0.96 U	0.96 U	0.96 U	0.97 U	0.96 U	0.97 U	0.98 U	0.98 U	0.98 U	0.97 U
alpha-Chlordane (cis-Chlordane)	--	--	--	0.96 U	0.96 U	0.96 U	0.97 U	0.96 U	0.97 U	0.98 U	0.98 U	0.98 U	0.97 U
beta-Chlordane (trans-Chlordane)	--	--	--	0.96 U	0.96 U	0.96 U	0.97 UJ	0.96 UJ	0.97 UJ	0.98 U	0.98 U	0.98 U	0.97 U
cis-Nonachlor	--	--	--	1.9 U	--	--	1.9 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U
Dieldrin	--	--	--	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U
gamma-BHC (Lindane)	--	--	--	0.96 U	0.96 U	0.96 U	0.97 U	0.96 U	0.97 U	0.98 U	0.98 U	0.98 U	0.97 U
Heptachlor	--	--	--	0.96 U	0.96 U	0.96 U	0.97 U	0.96 U	0.97 U	0.98 U	0.98 U	0.98 U	0.97 U
Oxychlordane	--	--	--	1.9 U	--	--	1.9 U	1.9 U	1.9 U	2 UJ	2 UJ	2 UJ	1.9 U
trans-Nonachlor	--	--	--	1.9 U	--	--	1.9 U	1.9 U	1.9 U	2 UJ	2 UJ	2 UJ	1.9 U

Table 15d
Subsurface Sediment Chemical Testing Results - Composites Beneath ASB Berm

			Transect ID:	8-101	8-102	8-103	8-104	8-105	8-106	8-109	8-110	8-111	8-112
			Sample ID:	8-101BC-C2	8-102C-C2	8-103C-C2	8-104BC-C2	8-105C-C2	8-106C-C2	8-109C-C2	8-110BC-C2	8-111C-C2	8-112C-C2
			Sample Date:	7/29/08	7/29/08	7/29/08	8/4/08	8/4/08	8/4/08	8/1/08	7/29/08	8/1/08	7/30/08
			In-Situ Depth (ft):	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Semi-Volatile Organics (ug/kg)													
1,3-Dichlorobenzene	--	--	--	--	20 U	--	--	--	--	--	20 U	--	--
1-Methylnaphthalene	--	--	--	19 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U	20 U	20 U
Hexachloroethane	--	--	--	19 U	20 U	19 UJ	20 U	19 U	19 U	19 UJ	20 U	20 U	20 U
Volatile Organics (ug/kg)													
1,2,3-Trichlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	4.8 U
1,3-Dichlorobenzene	--	--	170	1 U	--	1 U	0.9 U	0.9 U	1 UJ	0.9 U	--	1 U	1 U
Ethylbenzene	--	--	10	1 U	--	1 U	0.9 U	0.9 U	1 UJ	0.9 U	--	1 U	1 U
m,p-Xylene	--	--	--	1 U	--	1 U	0.9 U	0.9 U	1 UJ	0.9 U	--	1 U	1 U
o-Xylene	--	--	--	1 U	--	1 U	0.9 U	0.9 U	1 UJ	0.9 U	--	1 U	1 U
Total Xylene	--	--	40	1 U	--	1 U	0.9 U	0.9 U	1 UJ	0.9 U	--	1 U	1 U
Tetrachloroethene	--	--	57	1 U	--	1 U	0.9 U	0.9 U	1 UJ	0.9 U	--	1 U	1 U
Trichloroethene	--	--	--	1 U	--	1 U	0.9 U	0.9 U	1 UJ	0.9 U	--	1 U	1 U

Notes:

🟨 Detected concentration is greater than SMS SQS screening level

🟩 Detected concentration is greater than SMS CSL screening level

🟦 Detected concentration is greater than 1988 Puget Sound Estuary Program LAET screening level

There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.

The site specific Bioaccumulaltion Screening Level (BSL) for mercury is 1.2 mg/kg. (Supplemental RI Report, RETEC 2006)

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

R= Rejected analytical result due to low or no recoveries in the LCS and/or MS/MSD analyses in both the full scan and SIM SVOC analyses.

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene

Benzo(j)fluoranthene is included in the total of benzo(b&k)fluoranthenes

Totals are calculated for LPAH and HPAH as the sum of all detected results. If all are undetcted results, the highest reporting limit value is reported as the sum.

Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization’s toxic equivalency factors for mammals. Undetected congeners were assigned a "0" (ND=0) and assigned a concentration equal to ½ the detection limit (ND=1/2).

Total xylene is the sum of o-, m-, p- isomers

-- Sample was not submitted for chemical analysis.

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

mg/kg-OC = milligrams per kilogram organic carbon normalized

ng/kg = nanogram per kilogram

pct = percent

Non-organic carbon normalized samples with TOC results outside of the 0.5-3.5% range were screened against the 1988 Puget Sound Estuary Program LAET

Table 16
Subsurface Sediment Chemical Testing Results - Inner Waterway Areas

			Location ID:	2B-01-VC	2B-01-VC	2B-01-VC	2B-01-VC	2C-01-VC	2C-01-VC	2C-01-VC	2C-02-VC	2C-02-VC	2C-02-VC	3A-01-VC	3A-01-VC	3A-01-VC
			Sample ID:	2B-01-VC-1-3	2B-01-VC-4-6	2B-01-VC-7-9	2B-01-VC-9-12^2	2C-01-VC-1-3	2C-01-VC-4-6	2C-01-VC-7-9	2C-02-VC-1-3	2C-02-VC-4-6	2C-02-VC-7-9	3A-01-VC-1-3	3A-01-VC-4-6	3A-01-VC-7-9
			Sample Date:	7/24/08	7/24/08	7/24/08	7/24/08	7/21/08	7/21/08	7/21/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08
			In-situ Depth^1 (ft):	1-3	4-6	7-9	9-12^2	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Grain Size (pct)																
Total Gravel	--	--	--	**2.4**	**6.2**	**0.5**	**1.4**	--	**1.5**	**2.9**	--	**1.9**	--	**0.8**	--	**1.3**
Total Sand	--	--	--	**83.5**	**71.9**	**64.3**	**82.9**	**7.4**	**7.1**	**10.8**	**5.5**	**38.5**	**3.6**	**55.5**	**30.7**	**55.4**
Total Silt	--	--	--	**10.4**	**16.2**	**27.8**	**6.8**	**53.8**	**52.4**	**44.8**	**55.5**	**39.7**	**59.2**	**34.3**	**40.3**	**28.1**
Total Clay	--	--	--	**3.9**	**5.5**	**7.4**	**8.9**	**38.7**	**39.1**	**41.5**	**39**	**19.7**	**37.2**	**9.4**	**29**	**15.3**
Total Fines (Silt + Clay)	--	--	--	**14.3**	**21.7**	**35.2**	**15.7**	**92.5**	**91.5**	**86.3**	**94.5**	**59.4**	**96.4**	**43.7**	**69.3**	**43.4**
Total Grain Size	--	--	--	**100.2**	**99.8**	**100**	**100**	**99.9**	**100.1**	**100**	**100**	**99.8**	**100**	**100**	**100**	**100.1**
Physical Parameters																
Atterberg Classification	--	--	--	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**CH**	**CH**	**MH**	**MH**	**ML**	**CL**	**ML**	**MH**	**ML**
Specific gravity (su)	--	--	--	**2.69**	**2.7**	**2.7**	**2.68**	**2.67**	**2.54**	**2.65**	**2.52**	**2.64**	**2.45**	**2.57**	**2.54**	**2.51**
Liquid Limit (pct)	--	--	--	--	--	--	--	**100**	**116**	**79.2**	**95.8**	**42.8**	**34.5**	**44.9**	**48.2**	**48.6**
Plastic Limit (pct)	--	--	--	--	--	--	--	**35.6**	**43.6**	**41.9**	**42.7**	**27.4**	**17**	**38.1**	**42.4**	**34**
Plasticity Index (pct)	--	--	--	--	--	--	--	**64.7**	**72.7**	**37.2**	**53.1**	**15.5**	**17.5**	**6.9**	**48.2**	**14.7**
Moisture (water) Content (pct)	--	--	--	**26.04**	**27.47**	**24.14**	**20.36**	**126.5**	**133.7**	**116.1**	**136.2**	**91.01**	**33.58**	**95.11**	**101.5**	**79.99**
Conventional Parameters																
Ammonia (mg-N/kg)	--	--	--	--	--	--	**5.97**	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	--	--	--	--	--	--	**4.59 J**	--	--	--	--	--	--	--	--	--
Total organic carbon (pct)	--	--	--	--	--	--	**0.644**	--	--	--	--	--	--	**6.67**	**3.81**	**5.11**
Total solids (pct)	--	--	--	--	--	--	**82.4**	--	--	--	--	--	--	**55.5**	**48.9**	**54.4**
Total Solids (preserved) (pct)	--	--	--	--	--	--	**84.9**	--	--	--	--	--	--	--	--	--
Total volatile solids (pct)	--	--	--	--	--	--	**1.53**	--	--	--	--	--	--	--	--	--
Metals (mg/kg)																
Antimony	--	--	--	--	--	--	6 UJ	--	--	--	--	--	--	--	--	--
Arsenic	57	93	--	--	--	--	6 U	--	--	--	--	--	--	9 U	**10**	--
Cadmium	5.1	6.7	--	--	--	--	**0.3**	--	--	--	--	--	--	**0.7**	**1.4**	--
Chromium	260	270	--	--	--	--	**17.4**	--	--	--	--	--	--	**51.6**	**75**	--
Copper	390	390	--	--	--	--	**8.4**	--	--	--	--	--	--	**47.7**	**118**	--
Lead	450	530	--	--	--	--	2 U	--	--	--	--	--	--	**40**	**68**	--
Mercury	0.41	0.59	--	--	--	--	0.06 U	--	--	--	--	--	--	**0.21 J**	**0.56 J**	**1.48**
Nickel	--	--	--	--	--	--	**13**	--	--	--	--	--	--	--	--	--
Selenium	--	--	--	--	--	--	0.6 U	--	--	--	--	--	--	--	--	--
Silver	6.1	6.1	--	--	--	--	0.3 U	--	--	--	--	--	--	0.6 U	**2.1**	--
Zinc	410	960	--	--	--	--	**22**	--	--	--	--	--	--	**158**	**222**	--
Butyltins (ug/kg)																
Butyltin (ion)	--	--	--	--	--	--	--	--	--	--	--	--	--	**4.2**	**4.4**	--
Dibutyltin (ion)	--	--	--	--	--	--	--	--	--	--	--	--	--	**24**	**12**	--
Tributyltin (ion)	--	--	--	--	--	--	3.3 U	--	--	--	--	--	--	**10**	**64**	--
Aromatic Hydrocarbons (mg/kg-OC)																
Total LPAH	370	780	--	--	--	--	3 U	--	--	--	--	--	--	**3.06**	**2.47**	--
Naphthalene	99	170	--	--	--	--	3 UJ	--	--	--	--	--	--	0.3 U	0.52 U	--
Acenaphthylene	66	66	--	--	--	--	3 U	--	--	--	--	--	--	0.3 U	0.52 U	--
Acenaphthene	16	57	--	--	--	--	3 UJ	--	--	--	--	--	--	0.3 U	0.52 U	--
Fluorene	23	79	--	--	--	--	3 U	--	--	--	--	--	--	**0.18 J**	0.52 U	--
Phenanthrene	100	480	--	--	--	--	3 U	--	--	--	--	--	--	**2.4**	**2**	--
Anthracene	220	1,200	--	--	--	--	3 U	--	--	--	--	--	--	**0.48**	**0.47 J**	--
2-Methylnaphthalene	38	64	--	--	--	--	3 UJ	--	--	--	--	--	--	0.3 U	0.52 U	--
Total HPAH	960	5,300	--	--	--	--	3 U	--	--	--	--	--	--	**19.5**	**18.6**	--
Fluoranthene	160	1,200	--	--	--	--	3 U	--	--	--	--	--	--	**5.0**	**4.2**	--
Pyrene	1,000	1,400	--	--	--	--	3 U	--	--	--	--	--	--	**3.5**	**3.2**	--
Benzo(a)anthracene	110	270	--	--	--	--	3 U	--	--	--	--	--	--	**1.7**	**1.6**	--
Chrysene	110	460	--	--	--	--	3 U	--	--	--	--	--	--	**2.4**	**2.1**	--
Benzo(b)fluoranthene	--	--	--	--	--	--	3 U	--	--	--	--	--	--	**2.1**	**2.2**	--
Benzo(k)fluoranthene	--	--	--	--	--	--	3 U	--	--	--	--	--	--	**1.7**	**1.2**	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	--	3 U	--	--	--	--	--	--	**3.8**	**3.4**	--
Benzo(a)pyrene	99	210	--	--	--	--	3 U	--	--	--	--	--	--	**1.5**	**1.5**	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	--	3 UJ	--	--	--	--	--	--	**0.61**	**0.71**	--
Dibenzo(a,h)anthracene	12	33	--	--	--	--	0.93 UJ	--	--	--	--	--	--	**0.58**	**1.4**	--
Benzo(g,h,i)perylene	31	78	--	--	--	--	3 UJ	--	--	--	--	--	--	**0.58**	**0.55**	--

Table 16
Subsurface Sediment Chemical Testing Results - Inner Waterway Areas

			Location ID:	2B-01-VC	2B-01-VC	2B-01-VC	2B-01-VC	2C-01-VC	2C-01-VC	2C-01-VC	2C-02-VC	2C-02-VC	2C-02-VC	3A-01-VC	3A-01-VC	3A-01-VC
			Sample ID:	**2B-01-VC-1-3**	**2B-01-VC-4-6**	**2B-01-VC-7-9**	**2B-01-VC-9-12[2]**	**2C-01-VC-1-3**	**2C-01-VC-4-6**	**2C-01-VC-7-9**	**2C-02-VC-1-3**	**2C-02-VC-4-6**	**2C-02-VC-7-9**	**3A-01-VC-1-3**	**3A-01-VC-4-6**	**3A-01-VC-7-9**
			Sample Date:	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/18/08**	**7/18/08**	**7/18/08**	**7/18/08**	**7/18/08**	**7/18/08**
			In-situ Depth[1] (ft):	**1-3**	**4-6**	**7-9**	**9-12[2]**	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Chlorinated Benzenes (mg/kg-OC)																
1,2-Dichlorobenzene	2.3	2.3	--	--	--	--	0.93 UJ	--	--	--	--	--	--	0.27 U	0.16 U	--
1,4-Dichlorobenzene	3.1	9	--	--	--	--	0.93 U	--	--	--	--	--	--	0.27 U	0.16 U	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	--	0.93 U	--	--	--	--	--	--	0.27 U	0.16 U	--
Hexachlorobenzene	0.38	2.3	--	--	--	--	0.93 U	--	--	--	--	--	--	0.27 U	0.16 U	--
Phthalates (mg/kg-OC)																
Dimethyl phthalate	53	53	--	--	--	--	3 U	--	--	--	--	--	--	0.3 U	0.52 U	--
Diethyl phthalate	61	110	--	--	--	--	**12**	--	--	--	--	--	--	0.3 U	**0.68**	--
Di-n-butyl phthalate	220	1,700	--	--	--	--	3 U	--	--	--	--	--	--	0.3 U	0.52 U	--
Butylbenzyl phthalate	4.9	64	--	--	--	--	2.3 U	--	--	--	--	--	--	**1.2**	**3.4**	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	--	3 U	--	--	--	--	--	--	**3.8**	**4.2**	--
Di-n-octyl phthalate	58	4,500	--	--	--	--	3 U	--	--	--	--	--	--	0.3 U	0.52 U	--
Miscellaneous (mg/kg-OC)																
Dibenzofuran	15	58	--	--	--	--	3 U	--	--	--	--	--	--	0.3 U	0.52 U	--
Hexachlorobutadiene	3.9	6.2	--	--	--	--	0.93 U	--	--	--	--	--	--	0.27 U	0.16 U	--
N-Nitrosodiphenylamine	11	11	--	--	--	--	3 UJ	--	--	--	--	--	--	0.27 UJ	0.16 UJ	--
Ionizable Organic Compounds (ug/kg)																
Phenol	420	1,200	420	--	--	--	19 UJ	--	--	--	--	--	--	**93**	20 U	--
2-Methylphenol (o-Cresol)	63	63	63	--	--	--	6 U	--	--	--	--	--	--	18 U	**9**	--
4-Methylphenol (p-Cresol)	670	670	670	--	--	--	19 U	--	--	--	--	--	--	**16 J**	20 U	--
2,4-Dimethylphenol	29	29	29	--	--	--	6 UJ	--	--	--	--	--	--	18 UJ	6 UJ	--
Pentachlorophenol	360	690	140	--	--	--	30 U	--	--	--	--	--	--	91 UJ	**50 J**	--
Benzyl alcohol	57	73	57	--	--	--	**(30 U) R**	--	--	--	--	--	--	20 UJ	20 UJ	--
Benzoic acid	650	650	650	--	--	--	190 U	--	--	--	--	--	--	200 U	200 U	--
Aromatic Hydrocarbons (ug/kg)																
Total LPAH	--	--	5,200	--	--	--	19 U	--	--	--	--	--	--	**204**	**93**	--
Naphthalene	--	--	2,100	--	--	--	19 UJ	--	--	--	--	--	--	20 U	20 U	--
Acenaphthylene	--	--	560	--	--	--	19 U	--	--	--	--	--	--	20 U	20 U	--
Acenaphthene	--	--	500	--	--	--	19 UJ	--	--	--	--	--	--	20 U	20 U	--
Fluorene	--	--	540	--	--	--	19 U	--	--	--	--	--	--	**12 J**	20 U	--
Phenanthrene	--	--	1,500	--	--	--	19 U	--	--	--	--	--	--	**160**	**75**	--
Anthracene	--	--	960	--	--	--	19 U	--	--	--	--	--	--	**32**	**18 J**	--
2-Methylnaphthalene	--	--	670	--	--	--	19 UJ	--	--	--	--	--	--	20 U	20 U	--
Total HPAH	--	--	12,000	--	--	--	19 U	--	--	--	--	--	--	**1,297**	**710**	--
Fluoranthene	--	--	1,700	--	--	--	19 U	--	--	--	--	--	--	**330**	**160**	--
Pyrene	--	--	2,600	--	--	--	19 U	--	--	--	--	--	--	**230**	**120**	--
Benzo(a)anthracene	--	--	1,300	--	--	--	19 U	--	--	--	--	--	--	**110**	**61**	--
Chrysene	--	--	1,400	--	--	--	19 U	--	--	--	--	--	--	**160**	**80**	--
Benzo(b)fluoranthene	--	--	--	--	--	--	19 U	--	--	--	--	--	--	**140**	**84**	--
Benzo(k)fluoranthene	--	--	--	--	--	--	19 U	--	--	--	--	--	--	**110**	**47**	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	--	19 U	--	--	--	--	--	--	**250**	**131**	--
Benzo(a)pyrene	--	--	1,600	--	--	--	19 U	--	--	--	--	--	--	**98**	**58**	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	--	19 UJ	--	--	--	--	--	--	**41**	**27**	--
Dibenzo(a,h)anthracene	--	--	230	--	--	--	6 UJ	--	--	--	--	--	--	**39**	**52**	--
Benzo(g,h,i)perylene	--	--	670	--	--	--	19 UJ	--	--	--	--	--	--	**39**	**21**	--
Chlorinated Benzenes (ug/kg)																
1,2-Dichlorobenzene	--	--	35	--	--	--	6 UJ	--	--	--	--	--	--	18 U	6 U	--
1,4-Dichlorobenzene	--	--	110	--	--	--	6 U	--	--	--	--	--	--	18 U	6 U	--
1,2,4-Trichlorobenzene	--	--	31	--	--	--	6 U	--	--	--	--	--	--	18 U	6 U	--
Hexachlorobenzene	--	--	22	--	--	--	6 U	--	--	--	--	--	--	18 U	6 U	--
Miscellaneous (ug/kg)																
Dibenzofuran	--	--	540	--	--	--	19 U	--	--	--	--	--	--	20 U	20 U	--
Hexachlorobutadiene	--	--	11	--	--	--	6 U	--	--	--	--	--	--	18 U	6 U	--
N-Nitrosodiphenylamine	--	--	28	--	--	--	19 UJ	--	--	--	--	--	--	18 UJ	6 UJ	--

Table 16
Subsurface Sediment Chemical Testing Results - Inner Waterway Areas

	Location ID:			**2B-01-VC**	**2B-01-VC**	**2B-01-VC**	**2B-01-VC**	**2C-01-VC**	**2C-01-VC**	**2C-01-VC**	**2C-02-VC**	**2C-02-VC**	**2C-02-VC**	**3A-01-VC**	**3A-01-VC**	**3A-01-VC**
	Sample ID:			**2B-01-VC-1-3**	**2B-01-VC-4-6**	**2B-01-VC-7-9**	**2B-01-VC-9-12^2**	**2C-01-VC-1-3**	**2C-01-VC-4-6**	**2C-01-VC-7-9**	**2C-02-VC-1-3**	**2C-02-VC-4-6**	**2C-02-VC-7-9**	**3A-01-VC-1-3**	**3A-01-VC-4-6**	**3A-01-VC-7-9**
	Sample Date:			**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/18/08**	**7/18/08**	**7/18/08**	**7/18/08**	**7/18/08**	**7/18/08**
	In-situ Depth^1 (ft):			**1-3**	**4-6**	**7-9**	**9-12^2**	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Phthalates (ug/kg)																
Dimethyl phthalate	--	--	71	--	--	--	19 U	--	--	--	--	--	--	20 U	20 U	--
Diethyl phthalate	--	--	48	--	--	--	**80**	--	--	--	--	--	--	20 U	**26**	--
Di-n-butyl phthalate	--	--	1,400	--	--	--	19 U	--	--	--	--	--	--	20 U	20 U	--
Butylbenzyl phthalate	--	--	63	--	--	--	15 U	--	--	--	--	--	--	**80**	**130**	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	--	19 U	--	--	--	--	--	--	**250**	**160**	--
Di-n-octyl phthalate	--	--	420	--	--	--	19 U	--	--	--	--	--	--	20 U	20 U	--
Semi-Volatile Organics (ug/kg)																
1,3-Dichlorobenzene	--	--	170	--	--	--	19 U	--	--	--	--	--	--	20 U	20 U	--
1-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	20 U	20 U	--
Hexachloroethane	--	--	--	--	--	--	19 UJ	--	--	--	--	--	--	20 U	20 U	--

Table 16
Subsurface Sediment Chemical Testing Results - Inner Waterway Areas

			Location ID:	3A-02-VC	3A-02-VC	3A-02-VC	3A-03-VC	3A-03-VC	3A-03-VC	3A-04-VC	3A-04-VC	3A-04-VC	3A-05-VC	3A-05-VC	3A-05-VC
			Sample ID:	3A-02-VC-1-3	3A-02-VC-4-6	3A-02-VC-7-9	3A-03-VC-1-3	3A-03-VC-4-6	3A-03-VC-7-9	3A-04-VC-1-3	3A-04-VC-4-6	3A-04-VC-7-9	3A-05-VC-1-3	3A-05-VC-4-6	3A-05-VC-7-9
			Sample Date:	7/18/08	7/18/08	7/18/08	7/25/08	7/25/08	7/25/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08
			In-situ Depth[1] (ft):	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**												
Grain Size (pct)															
Total Gravel	--	--	--	2.2	12.2	59.7	1.2	--	0.4	0.2	--	0.4	--	0.1	3.6
Total Sand	--	--	--	56.9	80.8	35.1	49.3	44.4	36.1	7.6	18.2	20.6	10.6	15.1	20.2
Total Silt	--	--	--	26.1	3.6	3.3	31.4	42.4	51.9	57.9	62.5	64.5	55.1	56.9	48.8
Total Clay	--	--	--	14.8	3.4	2.1	18.2	13.1	11.7	34.3	19.3	14.4	34.3	27.9	27.1
Total Fines (Silt + Clay)	--	--	--	40.9	7.0	5.4	49.6	55.5	63.6	92.2	81.8	78.9	89.4	84.8	75.9
Total Grain Size	--	--	--	100	100	100.2	100.1	99.9	100.1	100	100	99.9	100	100	99.7
Physical Parameters															
Atterberg Classification	--	--	--	MH	Non-Plastic	Non-Plastic	MH	Non-Plastic	MH	MH	MH	MH	CH	MH	MH
Specific gravity (su)	--	--	--	2.45	2.5	2.63	2.43	2.46	2.42	2.58	2.5	2.45	2.57	2.44	2.58
Liquid Limit (pct)	--	--	--	51.2	--	--	60.8	--	81.2	103	173	89.9	103	87.4	58.5
Plastic Limit (pct)	--	--	--	45.5	--	--	40.1	--	74.9	44.3	62.9	76.8	40.9	65.3	35.6
Plasticity Index (pct)	--	--	--	5.8	--	--	20.7	--	6.3	58.8	110	13.2	62.1	22.1	22.9
Moisture (water) Content (pct)	--	--	--	201	25.85	25.49	156.7	138	155.5	126.8	204.1	196.5	127.9	172.9	88.13
Conventional Parameters															
Ammonia (mg-N/kg)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total organic carbon (pct)	--	--	--	6.43	1.24	4.02	4.19	8.05	22.3	4.13	8.16	7.41	4.63	7.12	5.28
Total solids (pct)	--	--	--	34.6	76.9	74.8	40.1	41.9	37.5	42.3	34.4	34.5	43.8	37.4	51.1
Total Solids (preserved) (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total volatile solids (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals (mg/kg)															
Antimony	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	57	93	--	10 U	6 U	--	10 U	10	--	10	10 U	--	10	20	--
Cadmium	5.1	6.7	--	0.9	0.2 U	--	1.3	2.5	--	2	4.1	--	1.9	3.8	--
Chromium	260	270	--	55	36.3	--	71	132	--	89	173	--	91	175	--
Copper	390	390	--	55.5	19.1	--	71.6	97.7	--	94.5	132	--	85.2	122	--
Lead	450	530	--	70	108	--	76	279	--	123	357	--	85	271	--
Mercury	0.41	0.59	--	0.3 J	0.12 J	0.2	0.6 J	3.3 J	6.3	0.98 J	4.6 J	4.4	1.0	3.9	1.8
Nickel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	6.1	6.1	--	0.8 U	0.4 U	--	2.1	1	--	1.2	1.5	--	1.4	1.1	--
Zinc	410	960	--	247	68	--	228	272	--	248	366	--	221	318	--
Butyltins (ug/kg)															
Butyltin (ion)	--	--	--	3.9 U	3.6 U	--	3.9 U	3.9 U	--	3.8 U	3.8 U	--	3.7 UJ	4 U	--
Dibutyltin (ion)	--	--	--	5.5 U	5.1 U	--	5.5 U	5.5 U	--	8.2	5.4 U	--	10	10	--
Tributyltin (ion)	--	--	--	3.7 U	3.4 U	--	28	26	--	48	45	--	60 J	34	--
Aromatic Hydrocarbons (mg/kg-OC)															
Total LPAH	370	780	--	2.04	12.7	--	28.5	348	--	2.2	20.1	--	1.8	13.6	--
Naphthalene	99	170	--	0.31 U	1 J	--	1.1 J	96.9	--	0.31 J	1.2	--	0.32 J	2.3	--
Acenaphthylene	66	66	--	0.31 U	1.6 U	--	1.1 J	0.36	--	0.48 U	2.08 U	--	0.43 U	1.7 U	--
Acenaphthene	16	57	--	0.31 U	1.7	--	1.9	47.2	--	0.48 U	2.2	--	0.43 U	0.98 J	--
Fluorene	23	79	--	0.19 J	1.5 J	--	2.2	38.5	--	0.48 U	2.1	--	0.43 U	1.2 J	--
Phenanthrene	100	480	--	1.2	3.9	--	15.8	59.6	--	1.2	11.8	--	0.99	7.2	--
Anthracene	220	1,200	--	0.65	4.6	--	6.4	106	--	0.7	2.8	--	0.45	2.0	--
2-Methylnaphthalene	38	64	--	0.31 U	1.6 U	--	1.4 U	28.6	--	0.48 U	1.6 J	--	0.43 U	1.2 J	--
Total HPAH	960	5,300	--	21.3	108	--	171	111	--	19.1	66.2	--	15	42.0	--
Fluoranthene	160	1,200	--	5.9	36.3	--	33.4	39.8	--	3.4	22.1	--	2.8	12.2	--
Pyrene	1,000	1,400	--	4.0	24.2	--	33.4	24.8	--	3.2	15.9	--	2.8	8.9	--
Benzo(a)anthracene	110	270	--	1.7	11.3	--	15.8	6.3	--	1.8	5.9	--	1.4	3.7	--
Chrysene	110	460	--	2.2	11.3	--	22.9	14.9	--	2.9	8.7	--	2.1	5.5	--
Benzo(b)fluoranthene	--	--	--	1.7	6.9	--	22.9	9.3	--	2.3	5.3	--	1.9	3.4	--
Benzo(k)fluoranthene	--	--	--	2.5	9.7	--	16.5	4.8	--	2	4.9	--	1.3	3.9	--
Total Benzofluoranthenes (b, j, k)	230	450	--	4.2	16.6	--	39.4	14.2	--	4.3	10.2	--	3.2	7.3	--
Benzo(a)pyrene	99	210	--	1.6	5.6	--	15.3	5.2	--	1.6	3.4	--	1.3	2.5	--
Indeno(1,2,3-c,d)pyrene	34	88	--	0.54	1 J	--	4.53	2.5	--	0.61	2.08 U	--	0.58	0.94 J	--
Dibenzo(a,h)anthracene	12	33	--	0.65	1.1 J	--	2.1	0.53	--	0.73	0.21 UJ	--	0.35	0.22 J	--
Benzo(g,h,i)perylene	31	78	--	0.48	1.1 J	--	4.5	3.1 J	--	0.56	2.08 U	--	0.45	0.84 J	--

Table 16
Subsurface Sediment Chemical Testing Results - Inner Waterway Areas

			Location ID:	3A-02-VC	3A-02-VC	3A-02-VC	3A-03-VC	3A-03-VC	3A-03-VC	3A-04-VC	3A-04-VC	3A-04-VC	3A-05-VC	3A-05-VC	3A-05-VC
			Sample ID:	3A-02-VC-1-3	3A-02-VC-4-6	3A-02-VC-7-9	3A-03-VC-1-3	3A-03-VC-4-6	3A-03-VC-7-9	3A-04-VC-1-3	3A-04-VC-4-6	3A-04-VC-7-9	3A-05-VC-1-3	3A-05-VC-4-6	3A-05-VC-7-9
			Sample Date:	7/18/08	7/18/08	7/18/08	7/25/08	7/25/08	7/25/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08
			In-situ Depth[1] (ft):	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**												
Chlorinated Benzenes (mg/kg-OC)															
1,2-Dichlorobenzene	2.3	2.3	--	0.095 U	0.5 U	--	0.74 U	0.37 U	--	0.15 U	0.21 U	--	0.13 U	0.15 U	--
1,4-Dichlorobenzene	3.1	9	--	0.095 U	0.5 U	--	0.74 U	0.37 U	--	0.15 U	0.21 U	--	0.13 U	0.15 U	--
1,2,4-Trichlorobenzene	0.81	1.8	--	0.095 U	0.5 U	--	0.74 UJ	0.37 UJ	--	0.15 U	0.21 U	--	0.13 U	0.15 U	--
Hexachlorobenzene	0.38	2.3	--	0.095 U	0.5 U	--	0.74 U	0.37 U	--	0.15 U	0.21 U	--	0.13 U	0.15 U	--
Phthalates (mg/kg-OC)															
Dimethyl phthalate	53	53	--	**0.68**	1.6 U	--	1.4 U	0.25 U	--	0.48 U	2.08 U	--	0.43 U	1.69 U	--
Diethyl phthalate	61	110	--	**0.3 J**	1.6 U	--	1.4 U	0.25 U	--	**0.53**	**2.2**	--	0.43 U	**1.8**	--
Di-n-butyl phthalate	220	1,700	--	**0.58**	1.6 U	--	**2.4**	**0.47**	--	0.48 U	2.08 U	--	0.43 U	1.69 U	--
Butylbenzyl phthalate	4.9	64	--	**2.3**	**2.2 J**	--	1.8 U	**1.37**	--	**3.2**	**4.7**	--	**1.3**	**4.8**	--
Bis(2-ethylhexyl) phthalate	47	78	--	**5.9**	**6.5**	--	**23.9**	**12.42**	--	**4.4**	**11.3**	--	**3.0**	**13.1**	--
Di-n-octyl phthalate	58	4,500	--	0.31 U	1.6 U	--	1.4 U	0.25 U	--	0.48 U	2.08 U	--	0.43 U	1.69 U	--
Miscellaneous (mg/kg-OC)															
Dibenzofuran	15	58	--	0.31 U	**1.1 J**	--	**1.2 J**	**27.3**	--	0.48 U	**1.4 J**	--	0.43 U	**1.1 J**	--
Hexachlorobutadiene	3.9	6.2	--	0.095 U	0.5 U	--	0.74 U	0.37 U	--	0.15 U	0.21 U	--	0.13 U	0.15 U	--
N-Nitrosodiphenylamine	11	11	--	0.095 UJ	**0.97 J**	--	0.74 UJ	**3.11 J**	--	0.15 UJ	**2.1 J**	--	0.13 U	**1.54 J**	--
Ionizable Organic Compounds (ug/kg)															
Phenol	420	1,200	420	**220**	20 U	--	**72**	**44**	--	20 U	170 U	--	**69**	120 U	--
2-Methylphenol (o-Cresol)	63	63	63	6.1 U	6.2 UJ	--	31 U	30 U	--	6.2 U	17 U	--	6 U	11 U	--
4-Methylphenol (p-Cresol)	670	670	670	**39**	20 U	--	**44 J**	**420**	--	**32**	**490**	--	**23**	**1,000**	--
2,4-Dimethylphenol	29	29	29	6.1 UJ	6.2 UJ	--	31 UJ	30 UJ	--	6.2 UJ	**40 J**	--	6 UJ	11 UJ	--
Pentachlorophenol	360	690	140	**37 J**	31 UJ	--	150 UJ	150 UJ	--	31 UJ	83 UJ	--	30 UJ	**85 J**	--
Benzyl alcohol	57	73	57	92 U	93 U	--	59 UJ	20 UJ	--	20 UJ	250 U	--	20 UJ	170 U	--
Benzoic acid	650	650	650	200 U	200 U	--	590 U	200 U	--	200 U	1700 U	--	200 U	1,200 U	--
Aromatic Hydrocarbons (ug/kg)															
Total LPAH	--	--	5,200	**131**	**158**	--	**1,191**	**28,029**	--	**91**	**1,640**	--	**82**	**962**	--
Naphthalene	--	--	2,100	20 U	**13 J**	--	**44 J**	**7,800**	--	**13 J**	**100 J**	--	**15 J**	**160**	--
Acenaphthylene	--	--	560	20 U	20 U	--	**44 J**	**29**	--	20 U	170 U	--	20 U	120 U	--
Acenaphthene	--	--	500	20 U	**21**	--	**79**	**3,800**	--	20 U	**180**	--	20 U	**70 J**	--
Fluorene	--	--	540	**12 J**	**19 J**	--	**94**	**3,100**	--	20 U	**170**	--	20 U	**82 J**	--
Phenanthrene	--	--	1,500	**77**	**48**	--	**660**	**4,800**	--	**49**	**960**	--	**46**	**510**	--
Anthracene	--	--	960	**42**	**57**	--	**270**	**8,500**	--	**29**	**230**	--	**21**	**140**	--
2-Methylnaphthalene	--	--	670	20 U	20 U	--	59 U	**2,300**	--	20 U	**130 J**	--	20 U	**84 J**	--
Total HPAH	--	--	12,000	**1,368**	**1,346**	--	**7,179**	**8,963**	--	**788**	**5,400**	--	**697**	**2,993**	--
Fluoranthene	--	--	1,700	**380**	**450**	--	**1,400**	**3,200**	--	**140**	**1,800**	--	**130**	**870**	--
Pyrene	--	--	2,600	**260**	**300**	--	**1,400**	**2,000**	--	**130**	**1,300**	--	**130**	**630**	--
Benzo(a)anthracene	--	--	1,300	**110**	**140**	--	**660**	**510**	--	**76**	**480**	--	**66**	**260**	--
Chrysene	--	--	1,400	**140**	**140**	--	**960**	**1,200**	--	**120**	**710**	--	**99**	**390**	--
Benzo(b)fluoranthene	--	--	--	**110**	**85**	--	**960**	**750**	--	**94**	**430**	--	**89**	**240**	--
Benzo(k)fluoranthene	--	--	--	**160**	**120**	--	**690**	**390**	--	**83**	**400**	--	**61**	**280**	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	**270**	**205**	--	**1,650**	**1,140**	--	**177**	**830**	--	**150**	**520**	--
Benzo(a)pyrene	--	--	1,600	**100**	**70**	--	**640**	**420**	--	**67**	**280**	--	**58**	**180**	--
Indeno(1,2,3-c,d)pyrene	--	--	600	**35**	**13 J**	--	**190**	**200 J**	--	**25**	170 U	--	**27**	**67 J**	--
Dibenzo(a,h)anthracene	--	--	230	**42**	**14 J**	--	**89**	**43**	--	**30**	17 UJ	--	**16**	**16 J**	--
Benzo(g,h,i)perylene	--	--	670	**31**	**14 J**	--	**190**	**250 J**	--	**23**	170 U	--	**21**	**60 J**	--
Chlorinated Benzenes (ug/kg)															
1,2-Dichlorobenzene	--	--	35	6.1 U	6.2 U	--	31 U	30 U	--	6.2 U	17 U	--	6 U	11 U	--
1,4-Dichlorobenzene	--	--	110	6.1 U	6.2 U	--	31 U	20 U	--	6.2 U	17 U	--	6 U	11 U	--
1,2,4-Trichlorobenzene	--	--	31	6.1 U	6.2 U	--	31 UJ	30 UJ	--	6.2 U	17 U	--	6 U	11 U	--
Hexachlorobenzene	--	--	22	6.1 U	6.2 U	--	31 U	30 U	--	6.2 U	17 U	--	6 U	11 U	--
Miscellaneous (ug/kg)															
Dibenzofuran	--	--	540	20 U	**14 J**	--	**50 J**	**2,200**	--	20 U	**110 J**	--	20 U	**75 J**	--
Hexachlorobutadiene	--	--	11	6.1 U	6.2 U	--	31 U		--	6.2 U	17 U	--	6 U	11 U	--
N-Nitrosodiphenylamine	--	--	28	6.1 UJ	**12 J**	--	31 UJ	**250 J**	--	6.2 UJ	**170 J**	--	6 U	**110 J**	--

Table 16
Subsurface Sediment Chemical Testing Results - Inner Waterway Areas

			Location ID:	3A-02-VC	3A-02-VC	3A-02-VC	3A-03-VC	3A-03-VC	3A-03-VC	3A-04-VC	3A-04-VC	3A-04-VC	3A-05-VC	3A-05-VC	3A-05-VC
			Sample ID:	3A-02-VC-1-3	3A-02-VC-4-6	3A-02-VC-7-9	3A-03-VC-1-3	3A-03-VC-4-6	3A-03-VC-7-9	3A-04-VC-1-3	3A-04-VC-4-6	3A-04-VC-7-9	3A-05-VC-1-3	3A-05-VC-4-6	3A-05-VC-7-9
			Sample Date:	7/18/08	7/18/08	7/18/08	7/25/08	7/25/08	7/25/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08
			In-situ Depth^1 (ft):	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**												
Phthalates (ug/kg)															
Dimethyl phthalate	--	--	71	**44**	20 U	--	59 U	20 U	--	20 U	170 U	--	20 U	120 U	--
Diethyl phthalate	--	--	48	**19 J**	20 U	--	59 U	20 U	--	**22**	**180**	--	20 U	**130**	--
Di-n-butyl phthalate	--	--	1,400	**37**	20 U	--	**100**	38 U	--	20 U	170 U	--	20 U	120 U	--
Butylbenzyl phthalate	--	--	63	**150**	**27 J**	--	77 U	**110**	--	**130**	**380**	--	**59**	**340**	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	**380**	**80**	--	**1,000**	**1,000**	--	**180**	**920**	--	**140**	**930**	--
Di-n-octyl phthalate	--	--	420	20 U	20 U	--	59 U	20 U	--	20 U	170 U	--	20 U	120 U	--
Semi-Volatile Organics (ug/kg)															
1,3-Dichlorobenzene	--	--	170	20 U	20 U	--	59 U	20 U	--	20 U	170 U	--	20 U	120 U	--
1-Methylnaphthalene	--	--	--	20 U	20 U	--	59 U	**1,300**	--	20 U	170 U	--	20 U	120 U	--
Hexachloroethane	--	--	--	20 U	20 U	--	59 U	20 U	--	20 U	170 U	--	20 U	120 U	--

Table 16
Subsurface Sediment Chemical Testing Results - Inner Waterway Areas

Analyte			**Location ID:**	**3B-01-VC**	**3B-01-VC**	**3B-01-VC**	**3B-01-VC**	**5C-01-VC**	**5C-01-VC**	**5C-01-VC**	**5C-02-VC**	**5C-02-VC**	**5C-02-VC**	**5C-03-VC**	**5C-03-VC**	**5C-03-VC**
			Sample ID:	**3B-01-VC-1-3**	**3B-01-VC-4-6**	**3B-01-VC-7-9**	**3B-01-VC-9-12**	**5C-01-VC-1-3**	**5C-01-VC-4-6**	**5C-01-VC-7-9**	**5C-02-VC-1-3**	**5C-02-VC-4-6**	**5C-02-VC-7-9**	**5C-03-VC-1-3**	**5C-03-VC-4-6**	**5C-03-VC-7-9**
			Sample Date:	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**
			In-situ Depth^1 (ft):	**1-3**	**4-6**	**7-9**	**9-12**	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**
	SMS SQS	**SMS CSL**	**PS LAET**													
Grain Size (pct)																
Total Gravel	--	--	--	--	**0.6**	**0.9**	**6.8**	**8.9**	**0.5**	**0.2**	**6.7**	**1.2**	**0.1**	**9.1**	**0.1**	**0.8**
Total Sand	--	--	--	**25**	**34.6**	**17**	**27.3**	**81.2**	**81.9**	**88.3**	**84.3**	**92.8**	**93.6**	**75.6**	**66.6**	**69.9**
Total Silt	--	--	--	**43.2**	**38.2**	**43.5**	**39.3**	**6.2**	**9.6**	**4.6**	**2.8**	**6**	**6.2**	**7.9**	**23.4**	**21**
Total Clay	--	--	--	**31.8**	**26.5**	**38.4**	**26.6**	**1.4**	**7.8**	**7.2**	**6.1**	--	--	**7.2**	**9.8**	**8.4**
Total Fines (Silt + Clay)	--	--	--	**75**	**64.7**	**81.9**	**65.9**	**7.6**	**17.4**	**11.8**	**8.9**	**6**	**6.2**	**15.1**	**33.2**	**29.4**
Total Grain Size	--	--	--	**100**	**99.9**	**99.8**	**100**	**97.7**	**99.8**	**100.3**	**99.9**	**100**	**99.9**	**99.8**	**99.9**	**100.1**
Physical Parameters																
Atterberg Classification	--	--	--	**CH**	**CL**	**CL**	**CL**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**
Specific gravity (su)	--	--	--	**2.65**	**2.78**	**2.74**	**2.75**	**2.76**	**2.71**	**2.7**	**2.69**	**2.7**	**2.7**	**2.7**	**2.69**	**2.71**
Liquid Limit (pct)	--	--	--	**88.4**	**38.1**	**34.6**	**28**	--	--	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	**33.5**	**18.8**	**15.2**	**15.7**	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	**55**	**19.2**	**19.4**	**12.4**	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	--	--	--	**112.9**	**48.23**	**30.32**	**23.36**	**19.01**	**21.78**	**18.02**	**19.11**	**21.93**	**16.54**	**28.12**	**28.29**	**23.15**
Conventional Parameters																
Ammonia (mg-N/kg)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total organic carbon (pct)	--	--	--	**4.47**	--	--	--	**1.84**	**0.558**	**1.4**	**0.638**	**0.472**	**0.291**	**2.38**	**0.781**	**0.402**
Total solids (pct)	--	--	--	**47.8**	--	--	--	**80.1**	**82.5**	**84.9**	**83.5**	**86.1**	**85.2**	**78.8**	**79.4**	**81.9**
Total Solids (preserved) (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total volatile solids (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals (mg/kg)																
Antimony	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	57	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	5.1	6.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	260	270	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	390	390	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	450	530	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.41	0.59	--	**0.83**	--	--	--	0.04 U	0.05 U	0.06 U	0.05 U	0.06 U	0.06 U	**0.16**	0.05 U	0.06 U
Nickel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	6.1	6.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	410	960	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyltins (ug/kg)																
Butyltin (ion)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibutyltin (ion)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tributyltin (ion)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aromatic Hydrocarbons (mg/kg-OC)																
Total LPAH	370	780	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**4.1**	2.4 U	--
Naphthalene	99	170	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**0.8**	2.4 U	--
Acenaphthylene	66	66	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	0.8 U	2.4 U	--
Acenaphthene	16	57	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**0.55 J**	2.4 U	--
Fluorene	23	79	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**0.5 J**	2.4 U	--
Phenanthrene	100	480	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**1.5**	2.4 U	--
Anthracene	220	1,200	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**0.76 J**	2.4 U	--
2-Methylnaphthalene	38	64	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	0.8 U	2.4 U	--
Total HPAH	960	5,300	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**25.1**	2.4 U	--
Fluoranthene	160	1,200	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**6.7**	2.4 U	--
Pyrene	1,000	1,400	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**5.9**	2.4 U	--
Benzo(a)anthracene	110	270	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**2.3**	2.4 U	--
Chrysene	110	460	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**3.2**	2.4 U	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**2.4**	2.4 U	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**1.6**	2.4 U	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**4.0**	2.4 U	--
Benzo(a)pyrene	99	210	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**1.5**	2.4 U	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**0.76 J**	2.4 U	--
Dibenzo(a,h)anthracene	12	33	--	--	--	--	--	0.33 U	1.1 U	--	0.94 U	1.3 U	--	0.25 U	0.79 U	--
Benzo(g,h,i)perylene	31	78	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**0.76 J**	2.4 U	--

Table 16
Subsurface Sediment Chemical Testing Results - Inner Waterway Areas

			Location ID:	**3B-01-VC**	**3B-01-VC**	**3B-01-VC**	**3B-01-VC**	**5C-01-VC**	**5C-01-VC**	**5C-01-VC**	**5C-02-VC**	**5C-02-VC**	**5C-02-VC**	**5C-03-VC**	**5C-03-VC**	**5C-03-VC**
			Sample ID:	**3B-01-VC-1-3**	**3B-01-VC-4-6**	**3B-01-VC-7-9**	**3B-01-VC-9-12**	**5C-01-VC-1-3**	**5C-01-VC-4-6**	**5C-01-VC-7-9**	**5C-02-VC-1-3**	**5C-02-VC-4-6**	**5C-02-VC-7-9**	**5C-03-VC-1-3**	**5C-03-VC-4-6**	**5C-03-VC-7-9**
			Sample Date:	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**
			In-situ Depth^1 (ft):	**1-3**	**4-6**	**7-9**	**9-12**	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Chlorinated Benzenes (mg/kg-OC)																
1,2-Dichlorobenzene	2.3	2.3	--	--	--	--	--	0.33 UJ	1.1 UJ	--	0.94 UJ	1.3 UJ	--	0.25 UJ	0.79 UJ	--
1,4-Dichlorobenzene	3.1	9	--	--	--	--	--	0.33 U	1.1 U	--	0.94 U	1.3 U	--	0.25 U	0.79 U	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	--	--	0.33 U	1.1 U	--	0.94 U	1.3 U	--	0.25 U	0.79 U	--
Hexachlorobenzene	0.38	2.3	--	--	--	--	--	0.33 U	1.1 U	--	0.94 U	1.3 U	--	0.25 U	0.79 U	--
Phthalates (mg/kg-OC)																
Dimethyl phthalate	53	53	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	0.8 U	2.4 U	--
Diethyl phthalate	61	110	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	0.8 U	2.4 U	--
Di-n-butyl phthalate	220	1,700	--	--	--	--	--	1.1 U	3.6 U	--	**2.7 J**	4.2 U	--	0.8 U	2.4 U	--
Butylbenzyl phthalate	4.9	64	--	--	--	--	--	0.82 UJ	2.7 UJ	--	2.4 UJ	3.2 UJ	--	0.63 UJ	2 UJ	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**2.7**	2.4 U	--
Di-n-octyl phthalate	58	4,500	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	0.8 U	2.4 U	--
Miscellaneous (mg/kg-OC)																
Dibenzofuran	15	58	--	--	--	--	--	1.1 U	3.6 U	--	3.1 U	4.2 U	--	**0.46 J**	2.4 U	--
Hexachlorobutadiene	3.9	6.2	--	--	--	--	--	0.33 UJ	1.1 UJ	--	0.94 UJ	1.3 UJ	--	0.25 UJ	0.79 UJ	--
N-Nitrosodiphenylamine	11	11	--	--	--	--	--	0.33 UJ	1.1 UJ	--	0.94 UJ	1.3 UJ	--	0.25 UJ	0.79 UJ	--
Ionizable Organic Compounds (ug/kg)																
Phenol	420	1,200	420	--	--	--	--	20 U	20 U	--	20 U	20 U	--	19 U	19 U	--
2-Methylphenol (o-Cresol)	63	63	63	--	--	--	--	6.1 UJ	5.9 UJ	--	6 UJ	6.1 UJ	--	6 UJ	6.2 UJ	--
4-Methylphenol (p-Cresol)	670	670	670	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**33**	19 U	--
2,4-Dimethylphenol	29	29	29	--	--	--	--	6.1 UJ	5.9 UJ	--	6 UJ	6.1 UJ	--	6 UJ	6.2 UJ	--
Pentachlorophenol	360	690	140	--	--	--	--	30 U	29 U	--	30 U	30 U	--	30 U	31 U	--
Benzyl alcohol	57	73	57	--	--	--	--	20 UJ	29 UJ	--	30 UJ	30 UJ	--	30 UJ	31 UJ	--
Benzoic acid	650	650	650	--	--	--	--	200 U	200 U	--	200 U	200 U	--	190 U	190 U	--
Aromatic Hydrocarbons (ug/kg)																
Total LPAH	--	--	5,200	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**97**	19 U	--
Naphthalene	--	--	2,100	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**19**	19 U	--
Acenaphthylene	--	--	560	--	--	--	--	20 U	20 U	--	20 U	20 U	--	19 U	19 U	--
Acenaphthene	--	--	500	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**13 J**	19 U	--
Fluorene	--	--	540	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**12 J**	19 U	--
Phenanthrene	--	--	1,500	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**35**	19 U	--
Anthracene	--	--	960	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**18 J**	19 U	--
2-Methylnaphthalene	--	--	670	--	--	--	--	20 U	20 U	--	20 U	20 U	--	19 U	19 U	--
Total HPAH	--	--	12,000	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**595**	19 U	--
Fluoranthene	--	--	1,700	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**160**	19 U	--
Pyrene	--	--	2,600	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**140**	19 U	--
Benzo(a)anthracene	--	--	1,300	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**54**	19 U	--
Chrysene	--	--	1,400	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**77**	19 U	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**56**	19 U	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**37**	19 U	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**93**	19 U	--
Benzo(a)pyrene	--	--	1,600	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**35**	19 U	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**18 J**	19 U	--
Dibenzo(a,h)anthracene	--	--	230	--	--	--	--	6.1 U	5.9 U	--	6 U	6.1 U	--	6 U	6.2 U	--
Benzo(g,h,i)perylene	--	--	670	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**18 J**	19 U	--
Chlorinated Benzenes (ug/kg)																
1,2-Dichlorobenzene	--	--	35	--	--	--	--	6.1 UJ	5.9 UJ	--	6 UJ	6.1 UJ	--	6 UJ	6.2 UJ	--
1,4-Dichlorobenzene	--	--	110	--	--	--	--	6.1 U	5.9 U	--	6 U	6.1 U	--	6 U	6.2 U	--
1,2,4-Trichlorobenzene	--	--	31	--	--	--	--	6.1 U	5.9 U	--	6 U	6.1 U	--	6 U	6.2 U	--
Hexachlorobenzene	--	--	22	--	--	--	--	6.1 U	5.9 U	--	6 U	6.1 U	--	6 U	6.2 U	--
Miscellaneous (ug/kg)																
Dibenzofuran	--	--	540	--	--	--	--	20 U	20 U	--	20 U	20 U	--	**11 J**	19 U	--
Hexachlorobutadiene	--	--	11	--	--	--	--	6.1 UJ	5.9 UJ	--	6 UJ	6.1 UJ	--	6 UJ	6.2 UJ	--
N-Nitrosodiphenylamine	--	--	28	--	--	--	--	6.1 UJ	5.9 UJ	--	6 UJ	6.1 UJ	--	6 UJ	6.2 UJ	--

Table 16
Subsurface Sediment Chemical Testing Results - Inner Waterway Areas

			Location ID:	3B-01-VC	3B-01-VC	3B-01-VC	3B-01-VC	5C-01-VC	5C-01-VC	5C-01-VC	5C-02-VC	5C-02-VC	5C-02-VC	5C-03-VC	5C-03-VC	5C-03-VC
			Sample ID:	3B-01-VC-1-3	3B-01-VC-4-6	3B-01-VC-7-9	3B-01-VC-9-12	5C-01-VC-1-3	5C-01-VC-4-6	5C-01-VC-7-9	5C-02-VC-1-3	5C-02-VC-4-6	5C-02-VC-7-9	5C-03-VC-1-3	5C-03-VC-4-6	5C-03-VC-7-9
			Sample Date:	7/21/08	7/21/08	7/21/08	7/21/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08
			In-situ Depth[1] (ft):	1-3	4-6	7-9	9-12	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**													
Phthalates (ug/kg)																
Dimethyl phthalate	--	--	71	--	--	--	--	20 U	20 U	--	20 U	20 U	--	19 U	19 U	--
Diethyl phthalate	--	--	48	--	--	--	--	20 U	20 U	--	20 U	20 U	--	19 U	19 U	--
Di-n-butyl phthalate	--	--	1,400	--	--	--	--	20 U	20 U	--	**17 J**	20 U	--	19 U	19 U	--
Butylbenzyl phthalate	--	--	63	--	--	--	--	15 UJ	15 UJ	--	15 UJ	15 UJ	--	15 UJ	16 UJ	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	--	--	20 U	20 U	--	20 U	20 U	--	🟦 **65**	19 U	--
Di-n-octyl phthalate	--	--	420	--	--	--	--	20 U	20 U	--	20 U	20 U	--	19 U	19 U	--
Semi-Volatile Organics (ug/kg)																
1,3-Dichlorobenzene	--	--	170	--	--	--	--	20 U	20 U	--	20 U	20 U	--	19 U	19 U	--
1-Methylnaphthalene	--	--	--	--	--	--	--	20 U	20 U	--	20 U	20 U	--	19 U	19 U	--
Hexachloroethane	--	--	--	--	--	--	--	20 U	20 U	--	20 U	20 U	--	19 U	19 U	--

Notes:

🟨	Detected concentration is greater than SMS SQS screening level
🟩	Detected concentration is greater than SMS CSL screening level
🟦	Detected concentration is greater than 1988 Puget Sound Estuary Program LAET screening level

ng/kg = nanogram per kilogram
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
mg/kg-OC = milligrams per kilogram organic carbon normalized
pct = percent

1. Sample depth is reported as below mudline.

2. Sample 2B-01-VC-9-12 was tested for the full DMMP suite. Results for pesticides and PCBs were all reported at non-detect concentrations and the dioxin/furan TEQ (U=1/2) was calculated at 0.34 ng/kg.

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

The site specific Bioaccumulaltion Screening Level (BSL) for mercury is 1.2 mg/kg. (Supplemental RI Report, RETEC 2006)

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene

Benzo(j)fluoranthene is included in the total of benzo(b&k)fluoranthenes

Totals are calculated for LPAH and HPAH as the sum of all detected results. If all are undetcted results, the highest reporting limit value is reported as the sum.

Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a "0" (ND=0) and assigned a concentration equal to ½ the detection limit (ND=1/2).

-- Sample was not submitted for chemical analysis.

Non-organic carbon normalized samples with TOC results outside of the 0.5-3.5% range were screened against the 2003 Freshwater LAET

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

			Location ID:	**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-02-VC**	**1C-02-VC**	**1C-02-VC**	**1C-02-VC**
			Sample ID:	**1C-01-VC-U-0-3.4**	**1C-01-VC-L-1-2**	**1C-01-VC-L-2-3**	**1C-01-VC-L-3-4**	**1C-01-VC-L-4-5**	**1C-01-VC-L-5-6**	**1C-01-VC-L-6-7**	**1C-02-VC-L-1-2**	**1C-02-VC-L-2-3**	**1C-02-VC-L-3-4**	**1C-02-VC-L-4-5**
			Sample Date:	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**
			In-situ Depth[1] (ft):	**0-3.4**	**4.4-5.4**	**5.4-6.4**	**6.4-7.4**	**7.4-8.4**	**8.4-9.4**	**9.4-10.4**	**1-2**	**2-3**	**3-4**	**4-5**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Grain Size (pct)														
Total Gravel	--	--	--		--	--	**1.6**	--	--	--	--	--	--	--
Total Sand	--	--	--		**2.9**	--	**3**	--	--	--	--	--	**8.4**	--
Total Silt	--	--	--		**54.7**	--	**52.7**	--	--	--	--	--	**53.1**	--
Total Clay	--	--	--		**42.4**	--	**42.6**	--	--	--	--	--	**38.5**	--
Total Fines (Silt + Clay)	--	--	--		**97.1**	--	**95.3**	--	--	--	--	--	**91.6**	--
Total Grain Size	--	--	--		**100**	--	**99.9**	--	--	--	--	--	**100**	--
Physical Parameters														
Atterberg Classification	--	--	--		**CH**	--	**CH**	--	--	--	--	--	**CH**	--
Specific gravity (su)	--	--	--		**2.68**	--	**2.65**	--	--	--	--	--	**2.71**	--
Liquid Limit (pct)	--	--	--		**90.3**	--	**103**	--	--	--	--	--	**64.2**	--
Plastic Limit (pct)	--	--	--		**35.3**	--	**36.8**	--	--	--	--	--	**27.1**	--
Plasticity Index (pct)	--	--	--		**55**	--	**66.3**	--	--	--	--	--	**37.1**	--
Moisture (water) Content (pct)	--	--	--		**108**	--	**109.3**	--	--	--	--	--	**74.08**	--
Conventional Parameters (pct)														
Total organic carbon	--	--	--		**2.48**	**3.45**	**2.18**	**1.96**	--	**0.798**	--	**1.73**	**1.15**	**1.13**	**0.672**
Total solids	--	--	--		**47.4**	**47.4**	**48.1**	**52.9**	--	**62.9**	--	**51.3**	**57.7**	**62.5**	**69.8**
Metals (mg/kg)														
Mercury	0.41	0.59	--		**1.73**	**0.57/ 0.6 J**	**0.09 U/ 0.2 J**	**0.78 / 0.37**	**0.26 J**	0.07 UJ	0.07 UJ	**0.93**	**0.41**	**0.75**	0.06 UJ
Aromatic Hydrocarbons (mg/kg-OC)														
Total LPAH	370	780	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Naphthalene	99	170	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Acenaphthylene	66	66	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Acenaphthene	16	57	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Fluorene	23	79	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Phenanthrene	100	480	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Anthracene	220	1,200	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
2-Methylnaphthalene	38	64	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Total HPAH	960	5,300	--		--	--	--	**1.5**	--	2.4 U	--	--	--	--	2.8 U
Fluoranthene	160	1,200	--		--	--	--	**0.87 J**	--	2.4 U	--	--	--	--	2.8 U
Pyrene	1000	1,400	--		--	--	--	**0.66 J**	--	2.4 U	--	--	--	--	2.8 U
Benzo(a)anthracene	110	270	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Chrysene	110	460	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Benzo(b)fluoranthene	--	--	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Benzo(k)fluoranthene	--	--	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Total Benzofluoranthenes (b, j, k)	230	450	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Benzo(a)pyrene	99	210	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Indeno(1,2,3-c,d)pyrene	34	88	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Dibenzo(a,h)anthracene	12	33	--		--	--	--	0.31 U	--	0.76 U	--	--	--	--	0.86 U
Benzo(g,h,i)perylene	31	78	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Chlorinated Benzenes (mg/kg-OC)														
1,2-Dichlorobenzene	2.3	2.3	--		--	--	--	0.31 U	--	0.76 U	--	--	--	--	0.86 U
1,4-Dichlorobenzene	3.1	9	--		--	--	--	0.31 U	--	0.76 U	--	--	--	--	0.86 U
1,2,4-Trichlorobenzene	0.81	1.8	--		--	--	--	0.31 U	--	0.76 UJ	--	--	--	--	0.86 UJ
Hexachlorobenzene	0.38	2.3	--		--	--	--	0.31 U	--	0.76 U	--	--	--	--	0.86 U
Phthalates (mg/kg-OC)														
Dimethyl phthalate	53	53	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Diethyl phthalate	61	110	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Di-n-butyl phthalate	220	1,700	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Butylbenzyl phthalate	4.9	64	--		--	--	--	0.77 U	--	1.9 U	--	--	--	--	2.2 U
Bis(2-ethylhexyl) phthalate	47	78	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Di-n-octyl phthalate	58	4,500	--		--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

	Location ID:			**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-01-VC**	**1C-02-VC**	**1C-02-VC**	**1C-02-VC**	**1C-02-VC**
	Sample ID:			**1C-01-VC-U-0-3.4**	**1C-01-VC-L-1-2**	**1C-01-VC-L-2-3**	**1C-01-VC-L-3-4**	**1C-01-VC-L-4-5**	**1C-01-VC-L-5-6**	**1C-01-VC-L-6-7**	**1C-02-VC-L-1-2**	**1C-02-VC-L-2-3**	**1C-02-VC-L-3-4**	**1C-02-VC-L-4-5**
	Sample Date:			**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**
	In-situ Depth^1 (ft):			**0-3.4**	**4.4-5.4**	**5.4-6.4**	**6.4-7.4**	**7.4-8.4**	**8.4-9.4**	**9.4-10.4**	**1-2**	**2-3**	**3-4**	**4-5**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Miscellaneous (mg/kg-OC)														
Dibenzofuran	15	58	--	--	--	--	0.97 U	--	2.4 U	--	--	--	--	2.8 U
Hexachlorobutadiene	3.9	6.2	--	--	--	--	0.31 U	--	0.76 U	--	--	--	--	0.86 U
N-Nitrosodiphenylamine	11	11	--	--	--	--	0.31 UJ	--	0.76 UJ	--	--	--	--	0.86 UJ
Ionizable Organic Compounds (ug/kg)														
Phenol	420	1,200	420	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
2-Methylphenol (o-Cresol)	63	63	63	--	--	--	6 U	6 U	6.1 U	--	--	--	--	5.8 U
4-Methylphenol (p-Cresol)	670	670	670	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
2,4-Dimethylphenol	29	29	29	--	--	--	6 UJ	6 UJ	6.1 UJ	--	--	--	--	5.8 UJ
Pentachlorophenol	360	690	140	--	--	--	30 UJ	30 UJ	30 UJ	--	--	--	--	**54 J**
Benzyl alcohol	57	73	57	--	--	--	19 UJ	20 UJ	19 UJ	--	--	--	--	19 UJ
Benzoic acid	650	650	650	--	--	--	190 U	200 U	190 U	--	--	--	--	190 U
Aromatic Hydrocarbons (ug/kg)														
Total LPAH	--	--	5,200	--	--	--	19 U	**13**	19 U	--	--	--	--	19 U
Naphthalene	--	--	2,100	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Acenaphthylene	--	--	560	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Acenaphthene	--	--	500	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Fluorene	--	--	540	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Phenanthrene	--	--	1,500	--	--	--	19 U	**13 J**	19 U	--	--	--	--	19 U
Anthracene	--	--	960	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
2-Methylnaphthalene	--	--	670	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Total HPAH	--	--	12,000	--	--	--	**30**	**64**	19 U	--	--	--	--	19 U
Fluoranthene	--	--	1,700	--	--	--	**17 J**	**23**	19 U	--	--	--	--	19 U
Pyrene	--	--	2,600	--	--	--	**13 J**	**19 J**	19 U	--	--	--	--	19 U
Benzo(a)anthracene	--	--	1,300	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Chrysene	--	--	1,400	--	--	--	19 U	**11 J**	19 U	--	--	--	--	19 U
Benzo(b)fluoranthene	--	--	--	--	--	--	19 U	**11 J**	19 U	--	--	--	--	19 U
Benzo(k)fluoranthene	--	--	--	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	--	19 U	**11**	19 U	--	--	--	--	19 U
Benzo(a)pyrene	--	--	1,600	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Dibenzo(a,h)anthracene	--	--	230	--	--	--	6 U	6 U	6.1 U	--	--	--	--	5.8 U
Benzo(g,h,i)perylene	--	--	670	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Chlorinated Benzenes (ug/kg)														
1,2-Dichlorobenzene	--	--	35	--	--	--	6 U	6 U	6.1 U	--	--	--	--	5.8 U
1,4-Dichlorobenzene	--	--	110	--	--	--	6 U	6 U	6.1 U	--	--	--	--	5.8 U
1,2,4-Trichlorobenzene	--	--	31	--	--	--	6 U	6 U	6.1 UJ	--	--	--	--	5.8 UJ
Hexachlorobenzene	--	--	22	--	--	--	6 U	6 U	6.1 U	--	--	--	--	5.8 U
Miscellaneous (ug/kg)														
Dibenzofuran	--	--	540	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Hexachlorobutadiene	--	--	11	--	--	--	6 U	6 U	6.1 U	--	--	--	--	5.8 U
N-Nitrosodiphenylamine	--	--	28	--	--	--	6 UJ	6 UJ	6.1 UJ	--	--	--	--	5.8 UJ
Phthalates (ug/kg)														
Dimethyl phthalate	--	--	71	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Diethyl phthalate	--	--	48	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Di-n-butyl phthalate	--	--	1,400	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Butylbenzyl phthalate	--	--	63	--	--	--	15 U	15 U	15 U	--	--	--	--	15 U
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Di-n-octyl phthalate	--	--	420	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

			Location ID:	1C-01-VC	1C-01-VC	1C-01-VC	1C-01-VC	1C-01-VC	1C-01-VC	1C-01-VC	1C-02-VC	1C-02-VC	1C-02-VC	1C-02-VC
			Sample ID:	1C-01-VC-U-0-3.4	1C-01-VC-L-1-2	1C-01-VC-L-2-3	1C-01-VC-L-3-4	1C-01-VC-L-4-5	1C-01-VC-L-5-6	1C-01-VC-L-6-7	1C-02-VC-L-1-2	1C-02-VC-L-2-3	1C-02-VC-L-3-4	1C-02-VC-L-4-5
			Sample Date:	7/21/08	7/21/08	7/21/08	7/21/08	7/21/08	7/21/08	7/21/08	7/21/08	7/21/08	7/21/08	7/21/08
			In-situ Depth^1 (ft):	0-3.4	4.4-5.4	5.4-6.4	6.4-7.4	7.4-8.4	8.4-9.4	9.4-10.4	1-2	2-3	3-4	4-5
Analyte	SMS SQS	SMS CSL	PS LAET											
Dioxin Furans (ng/kg)														
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**1.22**	--	--	--	**0.439 J**	0.0808 U	--	**0.852**	--	--	0.0632 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**4.44**	--	--	--	**1.4 J**	0.13 U	--	**4**	--	--	0.0822 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**12.1**	--	--	--	**2.18 J**	0.0802 U	--	**13.7**	--	--	0.084 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**47.2**	--	--	--	**17.3**	0.0902 U	--	**31.5**	--	--	0.0929 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**17.3**	--	--	--	**4.36**	0.0868 U	--	**15.5**	--	--	0.0957 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**957**	--	--	--	**400**	**1.38 J**	--	**512**	--	--	**1.01 J**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	**10,100**	--	--	--	**3740**	**15.3**	--	**3,920**	--	--	**11.7**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	**22.1**	--	--	--	**2.01**	**0.05 J**	--	**13.4**	--	--	0.0268 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**5.73**	--	--	--	**0.935 J**	0.0722 U	--	**4.28**	--	--	0.0596 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**9.77**	--	--	--	**3.19**	0.068 U	--	**5.82**	--	--	0.055 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**15.3**	--	--	--	**4.6**	0.0358 U	--	**14.1**	--	--	0.0268 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**4.68 J**	--	--	--	**2.17 J**	0.0337 U	--	**4.88**	--	--	0.0255 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	**4.6**	--	--	--	**1.03 J**	0.0487 U	--	**2.81**	--	--	0.0347 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**8.32**	--	--	--	**4**	0.0339 U	--	**4.65**	--	--	0.0262 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	**281**	--	--	--	**221**	0.0637 U	--	**280**	--	--	0.0256 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	**13.1**	--	--	--	**8.2**	0.0881 U	--	**8.74**	--	--	0.0362 U
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	**930**	--	--	--	**796**	**0.65 J**	--	**516**	--	--	0.141 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**531 J**	--	--	--	**32.8 J**	**0.422 J**	--	**586 J**	--	--	**0.498 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**557 J**	--	--	--	**38.7 J**	**0.0879 J**	--	**638**	--	--	**0.227 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**920 J**	--	--	--	**116 J**	**1.15 J**	--	**886**	--	--	**1.06 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**2,070**	--	--	--	**900**	**3.44**	--	**1,030**	--	--	**2.61**
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	**102**	--	--	--	**34.4 J**	**0.568 J**	--	**70.4 J**	--	--	**0.376 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	**79.3**	--	--	--	**39.6 J**	**0.197 J**	--	**48.8 J**	--	--	**0.163 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	**305 J**	--	--	--	**183 J**	**0.146 J**	--	**155 J**	--	--	**0.137 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	**1,110**	--	--	--	**908**	**0.754**	--	**697 J**	--	--	**0.228**
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	**37.7**	--	--	--	**14.2**	**0.024**	--	**26.1**	--	--	**0.014**
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	**37.7**	--	--	--	**14.2**	**0.161**	--	**26.1**	--	--	**0.116**
Semi-Volatile Organics (ug/kg)														
1,3-Dichlorobenzene	--	--	170	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
1-Methylnaphthalene	--	--	--	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U
Hexachloroethane	--	--	--	--	--	--	19 U	20 U	19 U	--	--	--	--	19 U

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

			Location ID:	1C-02-VC	1C-02-VC	1C-03-VC	1C-03-VC	1C-03-VC	1C-03-VC	1C-04-VC	1C-04-VC	1C-04-VC	1C-05-VC	1C-05-VC
			Sample ID:	1C-02-VC-L-5-6	1C-02-VC-L-6-7	1C-03-VC-U-0-1	1C-03-VC-L-1-2	1C-03-VC-L-2-3	1C-03-VC-L-3-4	1C-04-VC-L-1-2	1C-04-VC-L-2-3	1C-04-VC-L-3-4	1C-05-VC-U-0-2.5	1C-05-VC-L-1-2
			Sample Date:	7/21/08	7/21/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08
			In-situ Depth^1 (ft):	5-6	6-7	0-1	2-3	3-4	4-5	1-2	2-3	3-4	0-2.5	3.5-4.5
Analyte	SMS SQS	SMS CSL	PS LAET											
Grain Size (pct)														
Total Gravel	--	--	--	--	--	**0.2**	--	**0.3**	--	--	**0.3**	--	**0.2**	--
Total Sand	--	--	--	--	--	**1.2**	--	**79.4**	--	--	**80.7**	--	**13.3**	--
Total Silt	--	--	--	--	--	**60.1**	--	**14.6**	--	--	**13.5**	--	**49.2**	--
Total Clay	--	--	--	--	--	**38.5**	--	**5.6**	--	--	**5.5**	--	**37.3**	--
Total Fines (Silt + Clay)	--	--	--	--	--	**98.6**	--	**20.2**	--	--	**19**	--	**86.5**	--
Total Grain Size	--	--	--	--	--	**100**	--	**99.9**	--	--	**100**	--	**100**	--
Physical Parameters														
Atterberg Classification	--	--	--	--	--	**CH**	--	**Non-Plastic**	--	--	**Non-Plastic**	--	**CH**	--
Specific gravity (su)	--	--	--	--	--	**2.76**	--	**2.62**	--	--	**2.72**	--	**2.66**	--
Liquid Limit (pct)	--	--	--	--	--	**86.3**	--	--	--	--	--	--	**85.3**	--
Plastic Limit (pct)	--	--	--	--	--	**35.3**	--	--	--	--	--	--	**35.3**	--
Plasticity Index (pct)	--	--	--	--	--	**51**	--	--	--	--	--	--	**50**	--
Moisture (water) Content (pct)	--	--	--	--	--	**136.7**	--	**76.13**	--	--	**21.71**	--	**112.7**	--
Conventional Parameters (pct)														
Total organic carbon	--	--	--	--	--	**2.74**	**2.28**	**3.19**	**0.728**	**1.19**	**0.607**	**0.517**	**2.66**	**3.84**
Total solids	--	--	--	--	--	**43.4**	**50.2**	**56.1**	**77.8**	**75.8**	**80.2**	**79.7**	**46.1**	**50.3**
Metals (mg/kg)														
Mercury	0.41	0.59	--	0.06 UJ	0.05 UJ	**0.4**	**2.08**	**0.32**	**0.06**	**0.46**	**0.07**	0.06 U	**1.8**	**23**
Aromatic Hydrocarbons (mg/kg-OC)														
Total LPAH	370	780	--	--	--	--	--	**2.66**	--	--	3.1 U	--	--	--
Naphthalene	99	170	--	--	--	--	--	**0.41 J**	--	--	3.1 U	--	--	--
Acenaphthylene	66	66	--	--	--	--	--	0.63 U	--	--	3.1 U	--	--	--
Acenaphthene	16	57	--	--	--	--	--	0.63 U	--	--	3.1 U	--	--	--
Fluorene	23	79	--	--	--	--	--	**0.34 J**	--	--	3.1 U	--	--	--
Phenanthrene	100	480	--	--	--	--	--	**1.5**	--	--	3.1 U	--	--	--
Anthracene	220	1,200	--	--	--	--	--	**0.41 J**	--	--	3.1 U	--	--	--
2-Methylnaphthalene	38	64	--	--	--	--	--	0.63 U	--	--	3.1 U	--	--	--
Total HPAH	960	5,300	--	--	--	--	--	**6.64**	--	--	**3.4**	--	--	--
Fluoranthene	160	1,200	--	--	--	--	--	**2.1**	--	--	3.1 U	--	--	--
Pyrene	1000	1,400	--	--	--	--	--	**1.6**	--	--	**1.6 J**	--	--	--
Benzo(a)anthracene	110	270	--	--	--	--	--	**0.56 J**	--	--	3.1 U	--	--	--
Chrysene	110	460	--	--	--	--	--	**0.75**	--	--	**1.8 J**	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	**0.47 J**	--	--	3.1 U	--	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	**0.41 J**	--	--	3.1 U	--	--	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	--	--	**0.88 J**	--	--	3.1 U	--	--	--
Benzo(a)pyrene	99	210	--	--	--	--	--	**0.41 J**	--	--	3.1 U	--	--	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	--	--	0.63 U	--	--	3.1 U	--	--	--
Dibenzo(a,h)anthracene	12	33	--	--	--	--	--	0.18 UJ	--	--	1 U	--	--	--
Benzo(g,h,i)perylene	31	78	--	--	--	--	--	**0.34 J**	--	--	3.1 U	--	--	--
Chlorinated Benzenes (mg/kg-OC)														
1,2-Dichlorobenzene	2.3	2.3	--	--	--	--	--	0.18 U	--	--	1 U	--	--	--
1,4-Dichlorobenzene	3.1	9	--	--	--	--	--	0.18 U	--	--	1 U	--	--	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	--	--	0.18 U	--	--	1 U	--	--	--
Hexachlorobenzene	0.38	2.3	--	--	--	--	--	0.18 U	--	--	1 U	--	--	--
Phthalates (mg/kg-OC)														
Dimethyl phthalate	53	53	--	--	--	--	--	0.63 U	--	--	3.1 U	--	--	--
Diethyl phthalate	61	110	--	--	--	--	--	0.63 U	--	--	**2.8 J**	--	--	--
Di-n-butyl phthalate	220	1,700	--	--	--	--	--	0.63 U	--	--	3.1 U	--	--	--
Butylbenzyl phthalate	4.9	64	--	--	--	--	--	0.47 U	--	--	2.5 U	--	--	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	--	--	0.63 U	--	--	3.1 U	--	--	--
Di-n-octyl phthalate	58	4,500	--	--	--	--	--	0.63 U	--	--	3.1 U	--	--	--

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

Analyte	Location ID:			1C-02-VC	1C-02-VC	1C-03-VC	1C-03-VC	1C-03-VC	1C-03-VC	1C-04-VC	1C-04-VC	1C-04-VC	1C-05-VC	1C-05-VC
	Sample ID:			1C-02-VC-L-5-6	1C-02-VC-L-6-7	1C-03-VC-U-0-1	1C-03-VC-L-1-2	1C-03-VC-L-2-3	1C-03-VC-L-3-4	1C-04-VC-L-1-2	1C-04-VC-L-2-3	1C-04-VC-L-3-4	1C-05-VC-U-0-2.5	1C-05-VC-L-1-2
	Sample Date:			7/21/08	7/21/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08
	In-situ Depth^1 (ft):			5-6	6-7	0-1	2-3	3-4	4-5	1-2	2-3	3-4	0-2.5	3.5-4.5
	SMS SQS	SMS CSL	PS LAET											
Miscellaneous (mg/kg-OC)														
Dibenzofuran	15	58	--	--	--	--	--	0.63 U	--	--	3.1 U	--	--	--
Hexachlorobutadiene	3.9	6.2	--	--	--	--	--	0.18 U	--	--	1 U	--	--	--
N-Nitrosodiphenylamine	11	11	--	--	--	--	--	0.44 UJ	--	--	1 UJ	--	--	--
Ionizable Organic Compounds (ug/kg)														
Phenol	420	1,200	420	--	--	--	--	20 U	--	--	19 UJ	--	--	--
2-Methylphenol (o-Cresol)	63	63	63	--	--	--	--	5.9 U	--	--	6.1 U	--	--	--
4-Methylphenol (p-Cresol)	670	670	670	--	--	--	--	**26**	--	--	19 U	--	--	--
2,4-Dimethylphenol	29	29	29	--	--	--	--	5.9 UJ	--	--	6.1 UJ	--	--	--
Pentachlorophenol	360	690	140	--	--	--	--	30 UJ	--	--	30 UJ	--	--	--
Benzyl alcohol	57	73	57	--	--	--	--	20 UJ	--	--	19 UJ	--	--	--
Benzoic acid	650	650	650	--	--	--	--	200 U	--	--	190 U	--	--	--
Aromatic Hydrocarbons (ug/kg)														
Total LPAH	--	--	5,200	--	--	--	--	**84**	--	--	19 U	--	--	--
Naphthalene	--	--	2,100	--	--	--	--	**13 J**	--	--	19 U	--	--	--
Acenaphthylene	--	--	560	--	--	--	--	20 U	--	--	19 U	--	--	--
Acenaphthene	--	--	500	--	--	--	--	20 U	--	--	19 U	--	--	--
Fluorene	--	--	540	--	--	--	--	**11 J**	--	--	19 U	--	--	--
Phenanthrene	--	--	1,500	--	--	--	--	**47**	--	--	19 U	--	--	--
Anthracene	--	--	960	--	--	--	--	**13 J**	--	--	19 U	--	--	--
2-Methylnaphthalene	--	--	670	--	--	--	--	20 U	--	--	19 U	--	--	--
Total HPAH	--	--	12,000	--	--	--	--	**213**	--	--	**21**	--	--	--
Fluoranthene	--	--	1,700	--	--	--	--	**68**	--	--	19 U	--	--	--
Pyrene	--	--	2,600	--	--	--	--	**51**	--	--	**9.8 J**	--	--	--
Benzo(a)anthracene	--	--	1,300	--	--	--	--	**18 J**	--	--	19 U	--	--	--
Chrysene	--	--	1,400	--	--	--	--	**24**	--	--	**11 J**	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	**15 J**	--	--	19 U	--	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	**13 J**	--	--	19 U	--	--	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	--	--	**28 J**	--	--	19 U	--	--	--
Benzo(a)pyrene	--	--	1,600	--	--	--	--	**13 J**	--	--	19 U	--	--	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	--	--	20 U	--	--	19 U	--	--	--
Dibenzo(a,h)anthracene	--	--	230	--	--	--	--	5.9 UJ	--	--	6.1 U	--	--	--
Benzo(g,h,i)perylene	--	--	670	--	--	--	--	**11 J**	--	--	19 U	--	--	--
Chlorinated Benzenes (ug/kg)														
1,2-Dichlorobenzene	--	--	35	--	--	--	--	5.9 U	--	--	6.1 U	--	--	--
1,4-Dichlorobenzene	--	--	110	--	--	--	--	5.9 U	--	--	6.1 U	--	--	--
1,2,4-Trichlorobenzene	--	--	31	--	--	--	--	5.9 U	--	--	6.1 U	--	--	--
Hexachlorobenzene	--	--	22	--	--	--	--	5.9 U	--	--	6.1 U	--	--	--
Miscellaneous (ug/kg)														
Dibenzofuran	--	--	540	--	--	--	--	20 U	--	--	19 U	--	--	--
Hexachlorobutadiene	--	--	11	--	--	--	--	5.9 U	--	--	6.1 U	--	--	--
N-Nitrosodiphenylamine	--	--	28	--	--	--	--	14 UJ	--	--	6.1 UJ	--	--	--
Phthalates (ug/kg)														
Dimethyl phthalate	--	--	71	--	--	--	--	20 U	--	--	19 U	--	--	--
Diethyl phthalate	--	--	48	--	--	--	--	20 U	--	--	**17 J**	--	--	--
Di-n-butyl phthalate	--	--	1,400	--	--	--	--	20 U	--	--	19 U	--	--	--
Butylbenzyl phthalate	--	--	63	--	--	--	--	15 U	--	--	15 U	--	--	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	--	--	20 U	--	--	19 U	--	--	--
Di-n-octyl phthalate	--	--	420	--	--	--	--	20 U	--	--	19 U	--	--	--

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

			Location ID:	**1C-02-VC**	**1C-02-VC**	**1C-03-VC**	**1C-03-VC**	**1C-03-VC**	**1C-03-VC**	**1C-04-VC**	**1C-04-VC**	**1C-04-VC**	**1C-05-VC**	**1C-05-VC**
			Sample ID:	**1C-02-VC-L-5-6**	**1C-02-VC-L-6-7**	**1C-03-VC-U-0-1**	**1C-03-VC-L-1-2**	**1C-03-VC-L-2-3**	**1C-03-VC-L-3-4**	**1C-04-VC-L-1-2**	**1C-04-VC-L-2-3**	**1C-04-VC-L-3-4**	**1C-05-VC-U-0-2.5**	**1C-05-VC-L-1-2**
			Sample Date:	**7/21/08**	**7/21/08**	**7/22/08**	**7/22/08**	**7/22/08**	**7/22/08**	**7/22/08**	**7/22/08**	**7/22/08**	**7/22/08**	**7/22/08**
			In-situ Depth^1 (ft):	**5-6**	**6-7**	**0-1**	**2-3**	**3-4**	**4-5**	**1-2**	**2-3**	**3-4**	**0-2.5**	**3.5-4.5**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Dioxin Furans (ng/kg)														
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**1.5**	**5.48**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**6.8**	**6.09**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**23.4**	**10.6**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**56.5**	**145**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**27.8**	**29.1**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**964**	**3,520**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**7,490**	**35,600**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**29.3**	**39.8**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**6.26**	**51.2**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**9.67**	**76.3**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**14.2**	**147**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**5.47**	**35.3**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**4.33**	**38.2**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**7.51**	**31.7**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**139**	**715**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**8.52**	**54.2**
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**443**	**2,270**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**1,030**	**93 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**1,130**	**117 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**1,670 J**	**675 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	--	--	--	--	--	**2,020**	**6,860**
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**128**	**189**
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**80.1**	**398**
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**210**	**1,260**
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	--	--	--	--	--	**516**	**2,870**
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	--	--	--	--	--	--	--	--	**41.7**	**138**
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	--	--	--	--	--	--	--	--	**41.7**	**138**
Semi-Volatile Organics (ug/kg)														
1,3-Dichlorobenzene	--	--	170	--	--	--	--	20 U	--	--	19 UJ	--	--	--
1-Methylnaphthalene	--	--	--	--	--	--	--	20 U	--	--	19 U	--	--	--
Hexachloroethane	--	--	--	--	--	--	--	20 U	--	--	19 UJ	--	--	--

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

			Location ID:	1C-05-VC	1C-05-VC	1C-05-VC	1C-05-VC	1C-06-VC	1C-06-VC	1C-06-VC	1C-06-VC	1C-07-VC	1C-07-VC	1C-07-VC
			Sample ID:	1C-05-VC-L-2-3	1C-05-VC-L-3-4	1C-05-VC-L-4-5	1C-05-VC-L-5-6	1C-06-VC-U	1C-06-VC-L-1-2	1C-06-VC-L-2-3	1C-06-VC-L-3-4	1C-07-VC-U	1C-07-VC-L-1-2	1C-07-VC-L-2-3
			Sample Date:	7/22/08	7/22/08	7/22/08	7/22/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08
			In-situ Depth[1] (ft):	4.5-5.5	5.5-6.5	6.5-7.5	7.5-8.5	0-1	2-3	3-4	4-5	0-3	4-5	5-6
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Grain Size (pct)														
Total Gravel	--	--	--	**0.1**	--	--	--	--	--	--	--	**0.3**	--	**0.3**
Total Sand	--	--	--	**31.5**	--	--	--	**1.6**	--	**10.1**	--	**7.5**	--	**4.3**
Total Silt	--	--	--	**41.4**	--	--	--	**60.2**	--	**62**	--	**55.2**	--	**48.9**
Total Clay	--	--	--	**26.9**	--	--	--	**38.3**	--	**27.9**	--	**36.9**	--	**46.6**
Total Fines (Silt + Clay)	--	--	--	**68.3**	--	--	--	**98.5**	--	**89.9**	--	**92.1**	--	**95.5**
Total Grain Size	--	--	--	**99.9**	--	--	--	**100.1**	--	**100**	--	**99.9**	--	**100.1**
Physical Parameters														
Atterberg Classification	--	--	--	**CH**	--	--	--	**CH**	--	**CH**	--	**CH**	--	**CH**
Specific gravity (su)	--	--	--	**2.67**	--	--	--	**2.66**	--	**2.71**	--	**2.59**	--	**2.6**
Liquid Limit (pct)	--	--	--	**67.8**	--	--	--	**89.6**	--	**51.3**	--	**102**	--	**97.5**
Plastic Limit (pct)	--	--	--	**30.5**	--	--	--	**34.2**	--	**22.6**	--	**36.6**	--	**38.1**
Plasticity Index (pct)	--	--	--	**37.4**	--	--	--	**55.4**	--	**28.7**	--	**65.5**	--	**59.4**
Moisture (water) Content (pct)	--	--	--	**88.55**	--	--	--	**130.2**	--	**47.41**	--	**126.1**	--	**95.93**
Conventional Parameters (pct)														
Total organic carbon	--	--	--	**2.89**	**1.15**	--	--	**2.34**	**3.2**	**0.988**	**0.371**	**3.47**	**3.52**	**3.67**
Total solids	--	--	--	**51.5**	**77**	--	--	**42.1**	**52.1**	**67.1**	**80.9**	**45.8**	**49.1**	**50.5**
Metals (mg/kg)														
Mercury	0.41	0.59	--	**5.32**	**0.28**	0.05 UJ	0.06 UJ	**0.4**	**1.47**	**0.08**	0.05 U	**6.3**	**0.7**	**0.46**
Aromatic Hydrocarbons (mg/kg-OC)														
Total LPAH	370	780	--	--	**1.4**	--	--	--	--	**12.6**	--	--	--	**6.6**
Naphthalene	99	170	--	--	1.7 U	--	--	--	--	**2.1**	--	--	--	**1.8**
Acenaphthylene	66	66	--	--	1.7 U	--	--	--	--	2 U	--	--	--	**0.44 J**
Acenaphthene	16	57	--	--	1.7 U	--	--	--	--	**1.1 J**	--	--	--	**0.44 J**
Fluorene	23	79	--	--	1.7 U	--	--	--	--	**2**	--	--	--	**0.46 J**
Phenanthrene	100	480	--	--	**1.4 J**	--	--	--	--	**5.8**	--	--	--	**2.7**
Anthracene	220	1,200	--	--	1.7 U	--	--	--	--	**1.6 J**	--	--	--	**0.76**
2-Methylnaphthalene	38	64	--	--	1.7 U	--	--	--	--	2 U	--	--	--	**0.74**
Total HPAH	960	5,300	--	--	**7.5**	--	--	--	--	**22.9**	--	--	--	**15.5**
Fluoranthene	160	1,200	--	--	**3.3**	--	--	--	--	**7.4**	--	--	--	**3.8**
Pyrene	1000	1,400	--	--	**2.3**	--	--	--	--	**5.5**	--	--	--	**3.5**
Benzo(a)anthracene	110	270	--	--	**0.87 J**	--	--	--	--	**1.9 J**	--	--	--	**1.4**
Chrysene	110	460	--	--	**1 J**	--	--	--	--	**2.4**	--	--	--	**1.8**
Benzo(b)fluoranthene	--	--	--	--	1.7 U	--	--	--	--	**1.8 J**	--	--	--	**1.2**
Benzo(k)fluoranthene	--	--	--	--	1.7 U	--	--	--	--	**1.3 J**	--	--	--	**1.1**
Total Benzofluoranthenes (b, j, k)	230	450	--	--	1.7 U	--	--	--	--	**3.1 J**	--	--	--	**2.3**
Benzo(a)pyrene	99	210	--	--	1.7 U	--	--	--	--	**1.3 J**	--	--	--	**1.3**
Indeno(1,2,3-c,d)pyrene	34	88	--	--	1.7 U	--	--	--	--	2 U	--	--	--	**0.6**
Dibenzo(a,h)anthracene	12	33	--	--	0.51 U	--	--	--	--	0.61 U	--	--	--	0.49 UJ
Benzo(g,h,i)perylene	31	78	--	--	1.7 U	--	--	--	--	**1.3 J**	--	--	--	**0.74**
Chlorinated Benzenes (mg/kg-OC)														
1,2-Dichlorobenzene	2.3	2.3	--	--	0.51 U	--	--	--	--	0.61 U	--	--	--	0.49 U
1,4-Dichlorobenzene	3.1	9	--	--	0.51 U	--	--	--	--	0.61 U	--	--	--	0.49 U
1,2,4-Trichlorobenzene	0.81	1.8	--	--	0.51 U	--	--	--	--	0.61 UJ	--	--	--	0.49 UJ
Hexachlorobenzene	0.38	2.3	--	--	0.51 U	--	--	--	--	0.61 U	--	--	--	0.49 U
Phthalates (mg/kg-OC)														
Dimethyl phthalate	53	53	--	--	1.7 U	--	--	--	--	2 U	--	--	--	0.54 U
Diethyl phthalate	61	110	--	--	1.7 U	--	--	--	--	2 U	--	--	--	0.54 U
Di-n-butyl phthalate	220	1,700	--	--	1.7 U	--	--	--	--	2 U	--	--	--	0.54 U
Butylbenzyl phthalate	4.9	64	--	--	1.3 U	--	--	--	--	1.5 U	--	--	--	1.3 U
Bis(2-ethylhexyl) phthalate	47	78	--	--	**1.4 J**	--	--	--	--	2 U	--	--	--	**0.65**
Di-n-octyl phthalate	58	4,500	--	--	1.7 U	--	--	--	--	2 U	--	--	--	0.54 U

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

			Location ID:	**1C-05-VC**	**1C-05-VC**	**1C-05-VC**	**1C-05-VC**	**1C-06-VC**	**1C-06-VC**	**1C-06-VC**	**1C-06-VC**	**1C-07-VC**	**1C-07-VC**	**1C-07-VC**
			Sample ID:	**1C-05-VC-L-2-3**	**1C-05-VC-L-3-4**	**1C-05-VC-L-4-5**	**1C-05-VC-L-5-6**	**1C-06-VC-U**	**1C-06-VC-L-1-2**	**1C-06-VC-L-2-3**	**1C-06-VC-L-3-4**	**1C-07-VC-U**	**1C-07-VC-L-1-2**	**1C-07-VC-L-2-3**
			Sample Date:	**7/22/08**	**7/22/08**	**7/22/08**	**7/22/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**
			In-situ Depth^1 (ft):	**4.5-5.5**	**5.5-6.5**	**6.5-7.5**	**7.5-8.5**	**0-1**	**2-3**	**3-4**	**4-5**	**0-3**	**4-5**	**5-6**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Miscellaneous (mg/kg-OC)														
Dibenzofuran	15	58	--	--	1.7 U	--	--	--	--	**1.3 J**	--	--	--	**0.49 J**
Hexachlorobutadiene	3.9	6.2	--	--	0.51 U	--	--	--	--	0.61 U	--	--	--	0.49 UJ
N-Nitrosodiphenylamine	11	11	--	--	0.51 UJ	--	--	--	--	0.61 UJ	--	--	--	0.49 UJ
Ionizable Organic Compounds (ug/kg)														
Phenol	420	1,200	420	--	19 U	--	--	--	--	20 U	--	--	--	20 U
2-Methylphenol (o-Cresol)	63	63	63	--	5.9 U	--	--	--	--	6 U	--	--	--	18 U
4-Methylphenol (p-Cresol)	670	670	670	--	19 U	--	--	--	--	**35**	--	--	--	**86**
2,4-Dimethylphenol	29	29	29	--	5.9 UJ	--	--	--	--	6 UJ	--	--	--	18 UJ
Pentachlorophenol	360	690	140	--	29 UJ	--	--	--	--	30 UJ	--	--	--	91 UJ
Benzyl alcohol	57	73	57	--	19 UJ	--	--	--	--	20 UJ	--	--	--	20 UJ
Benzoic acid	650	650	650	--	190 U	--	--	--	--	200 U	--	--	--	200 U
Aromatic Hydrocarbons (ug/kg)														
Total LPAH	--	--	5,200	--	**16**	--	--	--	--	**125**	--	--	--	**243**
Naphthalene	--	--	2,100	--	19 U	--	--	--	--	**21**	--	--	--	**67**
Acenaphthylene	--	--	560	--	19 U	--	--	--	--	20 U	--	--	--	**16 J**
Acenaphthene	--	--	500	--	19 U	--	--	--	--	**11 J**	--	--	--	**16 J**
Fluorene	--	--	540	--	19 U	--	--	--	--	**20**	--	--	--	**17 J**
Phenanthrene	--	--	1,500	--	**16 J**	--	--	--	--	**57**	--	--	--	**99**
Anthracene	--	--	960	--	19 U	--	--	--	--	**16 J**	--	--	--	**28**
2-Methylnaphthalene	--	--	670	--	19 U	--	--	--	--	20 U	--	--	--	**27**
Total HPAH	--	--	12,000	--	**86**	--	--	--	--	**227**	--	--	--	**570**
Fluoranthene	--	--	1,700	--	**38**	--	--	--	--	**73**	--	--	--	**140**
Pyrene	--	--	2,600	--	**26**	--	--	--	--	**54**	--	--	--	**130**
Benzo(a)anthracene	--	--	1,300	--	**10 J**	--	--	--	--	**19 J**	--	--	--	**52**
Chrysene	--	--	1,400	--	**12 J**	--	--	--	--	**24**	--	--	--	**66**
Benzo(b)fluoranthene	--	--	--	--	19 U	--	--	--	--	**18 J**	--	--	--	**44**
Benzo(k)fluoranthene	--	--	--	--	19 U	--	--	--	--	**13 J**	--	--	--	**40**
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	19 U	--	--	--	--	**31 J**	--	--	--	**84**
Benzo(a)pyrene	--	--	1,600	--	19 U	--	--	--	--	**13 J**	--	--	--	**49**
Indeno(1,2,3-c,d)pyrene	--	--	600	--	19 U	--	--	--	--	20 U	--	--	--	**22**
Dibenzo(a,h)anthracene	--	--	230	--	5.9 U	--	--	--	--	6 U	--	--	--	18 UJ
Benzo(g,h,i)perylene	--	--	670	--	19 U	--	--	--	--	**13 J**	--	--	--	**27**
Chlorinated Benzenes (ug/kg)														
1,2-Dichlorobenzene	--	--	35	--	5.9 U	--	--	--	--	6 U	--	--	--	18 U
1,4-Dichlorobenzene	--	--	110	--	5.9 U	--	--	--	--	6 U	--	--	--	18 U
1,2,4-Trichlorobenzene	--	--	31	--	5.9 U	--	--	--	--	6 UJ	--	--	--	18 UJ
Hexachlorobenzene	--	--	22	--	5.9 U	--	--	--	--	6 U	--	--	--	18 U
Miscellaneous (ug/kg)														
Dibenzofuran	--	--	540	--	19 U	--	--	--	--	**13 J**	--	--	--	**18 J**
Hexachlorobutadiene	--	--	11	--	5.9 U	--	--	--	--	6 U	--	--	--	18 UJ
N-Nitrosodiphenylamine	--	--	28	--	5.9 UJ	--	--	--	--	6 UJ	--	--	--	18 UJ
Phthalates (ug/kg)														
Dimethyl phthalate	--	--	71	--	19 U	--	--	--	--	20 U	--	--	--	20 U
Diethyl phthalate	--	--	48	--	19 U	--	--	--	--	20 U	--	--	--	20 U
Di-n-butyl phthalate	--	--	1,400	--	19 U	--	--	--	--	20 U	--	--	--	20 U
Butylbenzyl phthalate	--	--	63	--	15 U	--	--	--	--	15 U	--	--	--	46 U
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	**16 J**	--	--	--	--	20 U	--	--	--	**24**
Di-n-octyl phthalate	--	--	420	--	19 U	--	--	--	--	20 U	--	--	--	20 U

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

	Location ID:			1C-05-VC	1C-05-VC	1C-05-VC	1C-05-VC	1C-06-VC	1C-06-VC	1C-06-VC	1C-06-VC	1C-07-VC	1C-07-VC	1C-07-VC
	Sample ID:			1C-05-VC-L-2-3	1C-05-VC-L-3-4	1C-05-VC-L-4-5	1C-05-VC-L-5-6	1C-06-VC-U	1C-06-VC-L-1-2	1C-06-VC-L-2-3	1C-06-VC-L-3-4	1C-07-VC-U	1C-07-VC-L-1-2	1C-07-VC-L-2-3
	Sample Date:			7/22/08	7/22/08	7/22/08	7/22/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08
	In-situ Depth^1 (ft):			4.5-5.5	5.5-6.5	6.5-7.5	7.5-8.5	0-1	2-3	3-4	4-5	0-3	4-5	5-6
Analyte	SMS SQS	SMS CSL	PS LAET											
Dioxin Furans (ng/kg)														
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**0.161 J**	0.0641 U	--	--	--	0.0752 U	0.0624 U	**2.17**	--	**2.1 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**0.401 J**	0.372 U	--	--	--	0.119 U	0.0814 U	**6.27**	--	**6.34 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**0.794 J**	0.119 U	--	--	--	**0.343 J**	0.0687 U	**11.4**	--	**6.89 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**7.07**	0.132 U	--	--	--	**1.2 J**	0.0734 U	**94.4**	--	**63**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**1.86 J**	0.129 U	--	--	--	**0.592 J**	0.0758 U	**24.1**	--	**15.2 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**166**	0.146 U	--	--	--	**18**	**0.335 J**	**2,160**	--	**1,510**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	**1,720**	**3.49 J**	--	--	--	**153**	**2.91 J**	**22,600**	--	**14,400**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**1.2**	0.0251 U	--	--	--	**0.65 J**	**0.0485 J**	**24.1**	--	**8.47**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**1.07 J**	0.169 U	--	--	--	**0.266 J**	0.177 U	**15.3**	--	**3.89 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**1.97 J**	0.148 U	--	--	--	**0.41 J**	0.161 U	**28.8**	--	**16.5 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**3.98**	0.0611 U	--	--	--	**0.452 J**	0.0808 U	**48.6**	--	**15.8 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1.42 J**	0.0588 U	--	--	--	0.0758 U	0.0755 U	**15.2**	--	**8.01 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1.16 J**	0.0767 U	--	--	--	0.104 U	0.1 U	**13.5**	--	**3.42 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1.92 J**	0.0599 U	--	--	--	**0.246 J**	0.0716 U	**20.9**	--	**16.2 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**54.3**	0.0252 U	--	--	--	**5.02**	0.0378 U	**720**	--	**666**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**3.22**	0.0341 U	--	--	--	0.0798 U	0.0529 U	**34.3**	--	**29.4**
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	**171**	0.112 U	--	--	--	**13.4**	0.163 U	**2,310**	--	**2,140**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**10.2 J**	**0.151**	--	--	--	**36.3**	**0.532 J**	**263 J**	--	**140 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**11.3 J**	0.372 U	--	--	--	**34.1 J**	**0.536 J**	**307 J**	--	**148**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**45.1 J**	**0.0903**	--	--	--	**46 J**	**0.723 J**	**757 J**	--	**448 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**354**	**0.659 J**	--	--	--	**38.1**	**0.836**	**4,580**	--	**3,600**
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**9.46 J**	0.0251 U	--	--	--	**8.03 J**	**0.522 J**	**166**	--	**183 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**14.9 J**	0.158 U	--	--	--	**4.07 J**	0.169 U	**226**	--	**196 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**72.6 J**	0.0636 U	--	--	--	**6.75 J**	0.0813 U	**863**	--	**623 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**230 J**	**0.148**	--	--	--	**18.9**	**0.166**	**2,830**	--	**2,640**
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	**5.93**	**0.001**	--	--	--	**0.759**	**0.009**	**79.4**	--	**54.2**
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	**5.93**	**0.278**	--	--	--	**0.866**	**0.136**	**79.4**	--	**54.2**
Semi-Volatile Organics (ug/kg)														
1,3-Dichlorobenzene	--	--	170	--	19 U	--	--	--	--	20 U	--	--	--	20 U
1-Methylnaphthalene	--	--	--	--	19 U	--	--	--	--	20 U	--	--	--	**20**
Hexachloroethane	--	--	--	--	19 U	--	--	--	--	20 U	--	--	--	20 U

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

			Location ID:	1C-07-VC	1C-07-VC	1C-07-VC	1C-07-VC	1C-08-VC	1C-08-VC	1C-08-VC	1C-08-VC	1C-08-VC
			Sample ID:	1C-07-VC-L-3-4	1C-07-VC-L-4-5	1C-07-VC-L-5-6	1C-07-VC-L-6-7	1C-08-VC-U	1C-08-VC-L-1-2	1C-08-VC-L-2-3	1C-08-VC-L-3-4	1C-08-VC-L-4-5
			Sample Date:	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08
			In-situ Depth[1] (ft):	6-7	7-8	8-9	9-10	0-1	2-3	3-4	4-5	5-6
Analyte	SMS SQS	SMS CSL	PS LAET									
Grain Size (pct)												
Total Gravel	--	--	--	--	--	--	--	--	--	--	--	--
Total Sand	--	--	--	--	--	--	--	**4.7**	--	**7.1**	--	--
Total Silt	--	--	--	--	--	--	--	**54.4**	--	**54.4**	--	--
Total Clay	--	--	--	--	--	--	--	**41**	--	**38.4**	--	--
Total Fines (Silt + Clay)	--	--	--	--	--	--	--	**95.4**	--	**92.8**	--	--
Total Grain Size	--	--	--	--	--	--	--	**100.1**	--	**99.9**	--	--
Physical Parameters												
Atterberg Classification	--	--	--	--	--	--	--	**CH**	--	**CH**	--	--
Specific gravity (su)	--	--	--	--	--	--	--	**2.64**	--	**2.58**	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	**89**	--	**104**	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	**33.5**	--	**40.7**	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	**55.5**	--	**63.4**	--	--
Moisture (water) Content (pct)	--	--	--	--	--	--	--	**132.8**	--	**104.2**	--	--
Conventional Parameters (pct)												
Total organic carbon	--	--	--	**4.31**	--	**2.64**	**3.04**	**2.17**	**3.67**	**3.94**	**1.21**	--
Total solids	--	--	--	**52.8**	--	**49.6**	**49.9**	**42**	**52.6**	**49.5**	**73.5**	--
Metals (mg/kg)												
Mercury	0.41	0.59	--	**0.55**	**0.56 J**	**0.44**	**0.36**	**0.65**	**1.99**	**0.67**	**0.09**	0.04 UJ
Aromatic Hydrocarbons (mg/kg-OC)												
Total LPAH	370	780	--	--	--	--	**1.4**	--	--	--	**5.6**	--
Naphthalene	99	170	--	--	--	--	**0.69**	--	--	--	**1.7**	--
Acenaphthylene	66	66	--	--	--	--	0.63 U	--	--	--	1.6 U	--
Acenaphthene	16	57	--	--	--	--	0.63 U	--	--	--	1.6 U	--
Fluorene	23	79	--	--	--	--	0.63 U	--	--	--	1.6 U	--
Phenanthrene	100	480	--	--	--	--	**0.72**	--	--	--	**2.9**	--
Anthracene	220	1,200	--	--	--	--	0.63 U	--	--	--	**0.99 J**	--
2-Methylnaphthalene	38	64	--	--	--	--	0.63 U	--	--	--	1.6 U	--
Total HPAH	960	5,300	--	--	--	--	**5.1**	--	--	--	**16.8**	--
Fluoranthene	160	1,200	--	--	--	--	**1.2**	--	--	--	**5**	--
Pyrene	1000	1,400	--	--	--	--	**1.1**	--	--	--	**4**	--
Benzo(a)anthracene	110	270	--	--	--	--	**0.39 J**	--	--	--	**1.3 J**	--
Chrysene	110	460	--	--	--	--	**0.49 J**	--	--	--	**1.7**	--
Benzo(b)fluoranthene	--	--	--	--	--	--	**0.49 J**	--	--	--	**1.6 J**	--
Benzo(k)fluoranthene	--	--	--	--	--	--	**0.33 J**	--	--	--	**0.91 J**	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	--	**0.82 J**	--	--	--	**2.5 J**	--
Benzo(a)pyrene	99	210	--	--	--	--	**0.53 J**	--	--	--	**1.2 J**	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	--	0.63 U	--	--	--	1.6 U	--
Dibenzo(a,h)anthracene	12	33	--	--	--	--	**0.2**	--	--	--	0.49 U	--
Benzo(g,h,i)perylene	31	78	--	--	--	--	**0.39 J**	--	--	--	**1.1 J**	--
Chlorinated Benzenes (mg/kg-OC)												
1,2-Dichlorobenzene	2.3	2.3	--	--	--	--	0.2 U	--	--	--	0.49 U	--
1,4-Dichlorobenzene	3.1	9	--	--	--	--	0.2 U	--	--	--	0.49 U	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	--	0.2 UJ	--	--	--	0.49 UJ	--
Hexachlorobenzene	0.38	2.3	--	--	--	--	0.2 U	--	--	--	0.49 U	--
Phthalates (mg/kg-OC)												
Dimethyl phthalate	53	53	--	--	--	--	0.63 U	--	--	--	1.6 U	--
Diethyl phthalate	61	110	--	--	--	--	0.63 U	--	--	--	**3.7**	--
Di-n-butyl phthalate	220	1,700	--	--	--	--	0.63 U	--	--	--	1.6 U	--
Butylbenzyl phthalate	4.9	64	--	--	--	--	0.49 U	--	--	--	1.2 U	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	--	0.63 U	--	--	--	1.6 U	--
Di-n-octyl phthalate	58	4,500	--	--	--	--	0.63 U	--	--	--	1.6 U	--

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

	Location ID:			1C-07-VC	1C-07-VC	1C-07-VC	1C-07-VC	1C-08-VC	1C-08-VC	1C-08-VC	1C-08-VC	1C-08-VC
	Sample ID:			1C-07-VC-L-3-4	1C-07-VC-L-4-5	1C-07-VC-L-5-6	1C-07-VC-L-6-7	1C-08-VC-U	1C-08-VC-L-1-2	1C-08-VC-L-2-3	1C-08-VC-L-3-4	1C-08-VC-L-4-5
	Sample Date:			7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08
	In-situ Depth^1 (ft):			6-7	7-8	8-9	9-10	0-1	2-3	3-4	4-5	5-6
Analyte	SMS SQS	SMS CSL	PS LAET									
Miscellaneous (mg/kg-OC)												
Dibenzofuran	15	58	--	--	--	--	0.63 U	--	--	--	1.6 U	--
Hexachlorobutadiene	3.9	6.2	--	--	--	--	0.2 U	--	--	--	0.49 U	--
N-Nitrosodiphenylamine	11	11	--	--	--	--	0.2 UJ	--	--	--	0.49 UJ	--
Ionizable Organic Compounds (ug/kg)												
Phenol	420	1,200	420	--	--	--	19 U	--	--	--	19 U	--
2-Methylphenol (o-Cresol)	63	63	63	--	--	--	6.1 U	--	--	--	5.9 U	--
4-Methylphenol (p-Cresol)	670	670	670	--	--	--	19 U	--	--	--	19 U	--
2,4-Dimethylphenol	29	29	29	--	--	--	6.1 UJ	--	--	--	5.9 UJ	--
Pentachlorophenol	360	690	140	--	--	--	30 UJ	--	--	--	29 UJ	--
Benzyl alcohol	57	73	57	--	--	--	19 UJ	--	--	--	19 UJ	--
Benzoic acid	650	650	650	--	--	--	190 U	--	--	--	190 U	--
Aromatic Hydrocarbons (ug/kg)												
Total LPAH	--	--	5,200	--	--	--	**43**	--	--	--	**68**	--
Naphthalene	--	--	2,100	--	--	--	**21**	--	--	--	**21**	--
Acenaphthylene	--	--	560	--	--	--	19 U	--	--	--	19 U	--
Acenaphthene	--	--	500	--	--	--	19 U	--	--	--	19 U	--
Fluorene	--	--	540	--	--	--	19 U	--	--	--	19 U	--
Phenanthrene	--	--	1,500	--	--	--	**22**	--	--	--	**35**	--
Anthracene	--	--	960	--	--	--	19 U	--	--	--	**12 J**	--
2-Methylnaphthalene	--	--	670	--	--	--	19 U	--	--	--	19 U	--
Total HPAH	--	--	12,000	--	--	--	**156**	--	--	--	**203**	--
Fluoranthene	--	--	1,700	--	--	--	**37**	--	--	--	**60**	--
Pyrene	--	--	2,600	--	--	--	**33**	--	--	--	**49**	--
Benzo(a)anthracene	--	--	1,300	--	--	--	**12 J**	--	--	--	**16 J**	--
Chrysene	--	--	1,400	--	--	--	**15 J**	--	--	--	**20**	--
Benzo(b)fluoranthene	--	--	--	--	--	--	**15 J**	--	--	--	**19 J**	--
Benzo(k)fluoranthene	--	--	--	--	--	--	**10 J**	--	--	--	**11 J**	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	--	**25 J**	--	--	--	**30 J**	--
Benzo(a)pyrene	--	--	1,600	--	--	--	**16 J**	--	--	--	**15 J**	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	--	19 U	--	--	--	19 U	--
Dibenzo(a,h)anthracene	--	--	230	--	--	--	**6.1**	--	--	--	5.9 U	--
Benzo(g,h,i)perylene	--	--	670	--	--	--	**12 J**	--	--	--	**13 J**	--
Chlorinated Benzenes (ug/kg)												
1,2-Dichlorobenzene	--	--	35	--	--	--	6.1 U	--	--	--	5.9 U	--
1,4-Dichlorobenzene	--	--	110	--	--	--	6.1 U	--	--	--	5.9 U	--
1,2,4-Trichlorobenzene	--	--	31	--	--	--	6.1 UJ	--	--	--	5.9 UJ	--
Hexachlorobenzene	--	--	22	--	--	--	6.1 U	--	--	--	5.9 U	--
Miscellaneous (ug/kg)												
Dibenzofuran	--	--	540	--	--	--	19 U	--	--	--	19 U	--
Hexachlorobutadiene	--	--	11	--	--	--	6.1 U	--	--	--	5.9 U	--
N-Nitrosodiphenylamine	--	--	28	--	--	--	6.1 UJ	--	--	--	5.9 UJ	--
Phthalates (ug/kg)												
Dimethyl phthalate	--	--	71	--	--	--	19 U	--	--	--	19 U	--
Diethyl phthalate	--	--	48	--	--	--	19 U	--	--	--	**45**	--
Di-n-butyl phthalate	--	--	1,400	--	--	--	19 U	--	--	--	19 U	--
Butylbenzyl phthalate	--	--	63	--	--	--	15 U	--	--	--	15 U	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	--	19 U	--	--	--	19 U	--
Di-n-octyl phthalate	--	--	420	--	--	--	19 U	--	--	--	19 U	--

Table 17a
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C

			Location ID:	**1C-07-VC**	**1C-07-VC**	**1C-07-VC**	**1C-07-VC**	**1C-08-VC**	**1C-08-VC**	**1C-08-VC**	**1C-08-VC**	**1C-08-VC**
			Sample ID:	**1C-07-VC-L-3-4**	**1C-07-VC-L-4-5**	**1C-07-VC-L-5-6**	**1C-07-VC-L-6-7**	**1C-08-VC-U**	**1C-08-VC-L-1-2**	**1C-08-VC-L-2-3**	**1C-08-VC-L-3-4**	**1C-08-VC-L-4-5**
			Sample Date:	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**
			In-situ Depth^1 (ft):	**6-7**	**7-8**	**8-9**	**9-10**	**0-1**	**2-3**	**3-4**	**4-5**	**5-6**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**									
Dioxin Furans (ng/kg)												
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**0.897**	--	**0.322 J**	--	--	--	**0.116 J**	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**1.43 J**	--	**0.636 J**	--	--	--	0.0696 U	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**0.969 J**	--	**0.589 J**	--	--	--	0.106 U	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**1.62 J**	--	**0.787 J**	--	--	--	0.11 U	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**1.23 J**	--	**0.494 J**	--	--	--	0.108 U	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**8.13**	--	**4.03**	--	--	--	**1.29 J**	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	**30.4**	--	**15.3**	--	--	--	**9.29**	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**5.33**	--	**2.14**	--	--	--	**0.574**	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**2.33 J**	--	**0.915 J**	--	--	--	**0.28 J**	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**2.57**	--	**0.958 J**	--	--	--	**0.258 J**	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1.03 J**	--	**0.58 J**	--	--	--	0.0599 U	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1.04 J**	--	**0.488 J**	--	--	--	0.0572 U	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**0.252 J**	--	0.0458 U	--	--	--	0.0833 U	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1 J**	--	**0.442 J**	--	--	--	0.0611 U	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**2.24 J**	--	**0.998 J**	--	--	--	**0.359 J**	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	0.068 U	--	0.0715 U	--	--	--	0.26 U	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	**2.33 J**	--	0.218 U	--	--	--	0.225 U	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**78.6 J**	--	**35.3 J**	--	--	--	**8.35 J**	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**54.4 J**	--	**26.8 J**	--	--	--	**5.97 J**	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**46.6**	--	**25.2 J**	--	--	--	**4.21 J**	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**15.9**	--	**7.4**	--	--	--	**2.64**	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**99.7 J**	--	**36.9 J**	--	--	--	**10 J**	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**29.1 J**	--	**11.2 J**	--	--	--	**3.28 J**	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**9.31 J**	--	**4.16 J**	--	--	--	**1.1 J**	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**5.05**	--	**1.51 J**	--	--	--	**0.564 J**	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	**4.53**	--	**1.88**	--	--	--	**0.278**	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	**4.53**	--	**1.88**	--	--	--	**0.344**	--
Semi-Volatile Organics (ug/kg)												
1,3-Dichlorobenzene	--	--	170	--	--	--	19 U	--	--	--	19 U	--
1-Methylnaphthalene	--	--	--	--	--	--	19 U	--	--	--	19 U	--
Hexachloroethane	--	--	--	--	--	--	19 U	--	--	--	19 U	--

Notes:

🟨	Detected concentration is greater than SMS SQS screening level
🟩	Detected concentration is greater than SMS CSL screening level
🟦	Detected concentration is greater than 2003 Freshwater LAET screening level

1. Sample depth is reported as below mudline.

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

The site specific Bioaccumulaltion Screening Level (BSL) for mercury is 1.2 mg/kg. (Supplemental RI Report, RETEC 2006)

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene

Benzo(j)fluoranthene is included in the total of benzo(b&k)fluoranthenes

Totals are calculated for LPAH and HPAH as the sum of all detected results. If all are undetcted results, the highest reporting limit value is reported as the sum.

Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a "0" (ND=0) and assigned a concentration equal to ½ the detection limit (ND=1/2).

-- Sample was not submitted for chemical analysis.

Non-organic carbon normalized samples with TOC results outside of the 0.5-3.5% range were screened against the 2003 Freshwater LAET

There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ng/kg = nanogram per kilogram
pct = percent
mg/kg-OC = milligrams per kilogram organic carbon normalized

Table 17b
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C BST

			Location ID:	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101C-HSA**	**1C-101C-HSA**	**1C-101C-HSA**	**1C-101C-HSA**
			Sample ID:	**1C-101B-HSA-S1A**	**1C-101B-HSA-S2A**	**1C-101B-HSA-S1**	**1C-101B-HSA-S2**	**1C-101B-HSA-S3**	**1C-101B-HSA-S4**	**1C-101C-HSA-S1A**	**1C-101C-HSA-S1**	**1C-101C-HSA-S2**	**1C-101C-HSA-S3**
			Sample Date:	**1/22/09**	**1/22/09**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**1/22/09**	**10/16/08**	**10/16/08**	**10/16/08**
			In-situ Depth^1 (ft):	**0 - 1.4 ft**	**1.4 - 2.0 ft**	**9.3 - 10.8 ft**	**11.8 - 13.3 ft**	**14.3 - 15.8 ft**	**16.8 - 18.3 ft**	**0 - 1.2 ft**	**5 - 6.5 ft**	**7.5 - 9 ft**	**10 - 11.5 ft**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Conventional Parameters (pct)													
Total organic carbon	--	--	--	**1.33**	**4.02**	**1.77**	--	**0.284**	**0.32**	**1.88**	**0.36**	**0.277**	**0.214**
Total solids	--	--	--	**69.7**	**56.8**	**69.8**	--	**81.4**	**84.4**	**56.9**	**82.9**	**103.3**	**81.6**
Metals (mg/kg)													
Mercury	0.41	0.59	--	**0.6**	**3.24**	**0.32**	**0.41**	0.05 U	0.05 U	**0.11**	0.04 U	0.05 U	0.04 U
Aromatic Hydrocarbons (mg/kg-OC)													
Total LPAH	370	780	--	**29.1**	**2.5**	--	--	--	--	**1.1**	--	--	--
Naphthalene	99	170	--	**2.3**	0.5 U	--	--	--	--	1 U	--	--	--
Acenaphthylene	66	66	--	**1.4 J**	0.5 U	--	--	--	--	1 U	--	--	--
Acenaphthene	16	57	--	**0.98 J**	0.5 U	--	--	--	--	1 U	--	--	--
Fluorene	23	79	--	**1.9**	**0.27 J**	--	--	--	--	1 U	--	--	--
Phenanthrene	100	480	--	**10.5**	**0.92**	--	--	--	--	**1.1**	--	--	--
Anthracene	220	1,200	--	**12**	**1.3**	--	--	--	--	1 U	--	--	--
2-Methylnaphthalene	38	64	--	**0.74 J**	0.5 U	--	--	--	--	1 U	--	--	--
Total HPAH	960	5,300	--	**357**	**51.9**	--	--	--	--	**9.8**	--	--	--
Fluoranthene	160	1,200	--	**36.8**	**20.4**	--	--	--	--	**1.8**	--	--	--
Pyrene	1,000	1,400	--	**105**	**12.9**	--	--	--	--	**2**	--	--	--
Benzo(a)anthracene	110	270	--	**45.1**	**4.5**	--	--	--	--	**0.96 J**	--	--	--
Chrysene	110	460	--	**70.7**	**5.5**	--	--	--	--	**1.3**	--	--	--
Benzo(b)fluoranthene	--	--	--	**35.3**	**1.8**	--	--	--	--	**1.1**	--	--	--
Benzo(k)fluoranthene	--	--	--	**24.8**	**2.5**	--	--	--	--	**0.85 J**	--	--	--
Total Benzofluoranthenes (b, j, k)	230	450	--	**60.1**	**4.3**	--	--	--	--	**1.95**	--	--	--
Benzo(a)pyrene	99	210	--	**22.6**	**1.6**	--	--	--	--	**1.1**	--	--	--
Indeno(1,2,3-c,d)pyrene	34	88	--	**6.4**	**0.52**	--	--	--	--	1 U	--	--	--
Dibenzo(a,h)anthracene	12	33	--	**4.7**	**1.8**	--	--	--	--	0.32 U	--	--	--
Benzo(g,h,i)perylene	31	78	--	**5.2**	**0.42 J**	--	--	--	--	**0.64 J**	--	--	--
Chlorinated Benzenes (mg/kg-OC)													
1,2-Dichlorobenzene	2.3	2.3	--	0.47 U	0.15 U	--	--	--	--	0.32 U	--	--	--
1,4-Dichlorobenzene	3.1	9	--	0.47 U	0.15 U	--	--	--	--	0.32 U	--	--	--
1,2,4-Trichlorobenzene	0.81	1.8	--	0.47 U	0.15 U	--	--	--	--	0.32 U	--	--	--
Hexachlorobenzene	0.38	2.3	--	0.47 U	0.15 U	--	--	--	--	0.32 U	--	--	--
Phthalates (mg/kg-OC)													
Dimethyl phthalate	53	53	--	1.4 U	0.5 U	--	--	--	--	1 U	--	--	--
Diethyl phthalate	61	110	--	1.4 U	0.5 U	--	--	--	--	1 U	--	--	--
Di-n-butyl phthalate	220	1,700	--	1.4 U	0.5 U	--	--	--	--	1 U	--	--	--
Butylbenzyl phthalate	4.9	64	--	1.1 U	0.37 U	--	--	--	--	0.8 U	--	--	--
Bis(2-ethylhexyl) phthalate	47	78	--	**1.3 J**	0.5 U	--	--	--	--	1 U	--	--	--
Di-n-octyl phthalate	58	4,500	--	1.4 U	0.5 U	--	--	--	--	1 U	--	--	--
Miscellaneous (mg/kg-OC)													
Dibenzofuran	15	58	--	**2.1**	**0.25 J**	--	--	--	--	1 U	--	--	--
Hexachlorobutadiene	3.9	6.2	--	0.47 U	0.15 U	--	--	--	--	0.32 U	--	--	--
N-Nitrosodiphenylamine	11	11	--	0.47 U	0.15 U	--	--	--	--	0.32 U	--	--	--
Ionizable Organic Compounds (ug/kg)													
Phenol	420	1,200	420	19 U	20 U	--	--	--	--	19 U	--	--	--
2-Methylphenol (o-Cresol)	63	63	63	6.2 U	6.1 U	--	--	--	--	6.1 U	--	--	--
4-Methylphenol (p-Cresol)	670	670	670	19 U	20 U	--	--	--	--	19 U	--	--	--
2,4-Dimethylphenol	29	29	29	6.2 U	6.1 U	--	--	--	--	**7.3**	--	--	--
Pentachlorophenol	360	690	140	**490**	**60**	--	--	--	--	30 U	--	--	--
Benzyl alcohol	57	73	57	**(31 U) R**	30 U	--	--	--	--	30 U	--	--	--
Benzoic acid	650	650	650	190 U	200 U	--	--	--	--	190 U	--	--	--

Table 17b
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C BST

			Location ID:	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101C-HSA**	**1C-101C-HSA**	**1C-101C-HSA**	**1C-101C-HSA**
			Sample ID:	**1C-101B-HSA-S1A**	**1C-101B-HSA-S2A**	**1C-101B-HSA-S1**	**1C-101B-HSA-S2**	**1C-101B-HSA-S3**	**1C-101B-HSA-S4**	**1C-101C-HSA-S1A**	**1C-101C-HSA-S1**	**1C-101C-HSA-S2**	**1C-101C-HSA-S3**
			Sample Date:	**1/22/09**	**1/22/09**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**1/22/09**	**10/16/08**	**10/16/08**	**10/16/08**
			In-situ Depth^1 (ft):	**0 - 1.4 ft**	**1.4 - 2.0 ft**	**9.3 - 10.8 ft**	**11.8 - 13.3 ft**	**14.3 - 15.8 ft**	**16.8 - 18.3 ft**	**0 - 1.2 ft**	**5 - 6.5 ft**	**7.5 - 9 ft**	**10 - 11.5 ft**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Aromatic Hydrocarbons (ug/kg)													
Total LPAH	--	--	5,200	**387**	**101**	--	--	--	--	**20**	--	--	--
Naphthalene	--	--	2,100	**30**	20 U	--	--	--	--	19 U	--	--	--
Acenaphthylene	--	--	560	**19 J**	20 U	--	--	--	--	19 U	--	--	--
Acenaphthene	--	--	500	**13 J**	20 U	--	--	--	--	19 U	--	--	--
Fluorene	--	--	540	**25**	**11 J**	--	--	--	--	19 U	--	--	--
Phenanthrene	--	--	1,500	**140**	**37**	--	--	--	--	**20**	--	--	--
Anthracene	--	--	960	**160**	**53**	--	--	--	--	19 U	--	--	--
2-Methylnaphthalene	--	--	670	**9.9 J**	20 U	--	--	--	--	19 U	--	--	--
Total HPAH	--	--	12,000	**4,746**	**2,088**	--	--	--	--	**181**	--	--	--
Fluoranthene	--	--	1,700	**490**	**820**	--	--	--	--	**33**	--	--	--
Pyrene	--	--	2,600	**1,400**	**520**	--	--	--	--	**38**	--	--	--
Benzo(a)anthracene	--	--	1,300	**600**	**180**	--	--	--	--	**18 J**	--	--	--
Chrysene	--	--	1,400	**940**	**220**	--	--	--	--	**24**	--	--	--
Benzo(b)fluoranthene	--	--	--	**470**	**73**	--	--	--	--	**20**	--	--	--
Benzo(k)fluoranthene	--	--	--	**330**	**99**	--	--	--	--	**16 J**	--	--	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	**800**	**172**	--	--	--	--	**36**	--	--	--
Benzo(a)pyrene	--	--	1,600	**300**	**65**	--	--	--	--	**20**	--	--	--
Indeno(1,2,3-c,d)pyrene	--	--	600	**85**	**21**	--	--	--	--	19 U	--	--	--
Dibenzo(a,h)anthracene	--	--	230	**62**	**73**	--	--	--	--	6.1 U	--	--	--
Benzo(g,h,i)perylene	--	--	670	**69**	**17 J**	--	--	--	--	**12 J**	--	--	--
Chlorinated Benzenes (ug/kg)													
1,2-Dichlorobenzene	--	--	35	6.2 U	6.1 U	--	--	--	--	6.1 U	--	--	--
1,4-Dichlorobenzene	--	--	110	6.2 U	6.1 U	--	--	--	--	6.1 U	--	--	--
1,2,4-Trichlorobenzene	--	--	31	6.2 U	6.1 U	--	--	--	--	6.1 U	--	--	--
Hexachlorobenzene	--	--	22	6.2 U	6.1 U	--	--	--	--	6.1 U	--	--	--
Miscellaneous (ug/kg)													
Dibenzofuran	--	--	540	**28**	**10 J**	--	--	--	--	19 U	--	--	--
Hexachlorobutadiene	--	--	11	6.2 U	6.1 U	--	--	--	--	6.1 U	--	--	--
N-Nitrosodiphenylamine	--	--	28	6.2 U	6.1 U	--	--	--	--	6.1 U	--	--	--
Phthalates (ug/kg)													
Dimethyl phthalate	--	--	71	19 U	20 U	--	--	--	--	19 U	--	--	--
Diethyl phthalate	--	--	48	19 U	20 U	--	--	--	--	19 U	--	--	--
Di-n-butyl phthalate	--	--	1,400	19 U	20 U	--	--	--	--	19 U	--	--	--
Butylbenzyl phthalate	--	--	63	15 U	15 U	--	--	--	--	15 U	--	--	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	**17 J**	20 U	--	--	--	--	19 U	--	--	--
Di-n-octyl phthalate	--	--	420	19 U	20 U	--	--	--	--	19 U	--	--	--

Table 17b
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C BST

	Location ID:			**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101C-HSA**	**1C-101C-HSA**	**1C-101C-HSA**	**1C-101C-HSA**
	Sample ID:			**1C-101B-HSA-S1A**	**1C-101B-HSA-S2A**	**1C-101B-HSA-S1**	**1C-101B-HSA-S2**	**1C-101B-HSA-S3**	**1C-101B-HSA-S4**	**1C-101C-HSA-S1A**	**1C-101C-HSA-S1**	**1C-101C-HSA-S2**	**1C-101C-HSA-S3**
	Sample Date:			**1/22/09**	**1/22/09**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**1/22/09**	**10/16/08**	**10/16/08**	**10/16/08**
	In-situ Depth[1] (ft):			**0 - 1.4 ft**	**1.4 - 2.0 ft**	**9.3 - 10.8 ft**	**11.8 - 13.3 ft**	**14.3 - 15.8 ft**	**16.8 - 18.3 ft**	**0 - 1.2 ft**	**5 - 6.5 ft**	**7.5 - 9 ft**	**10 - 11.5 ft**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Dioxin Furans (ng/kg)													
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**0.496**	**1.82**	--	--	--	--	**0.193 J**	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**4.51**	**7.2**	--	--	--	--	**0.471 J**	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**11.6**	**17.5**	--	--	--	--	**0.721 J**	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**183**	**125**	--	--	--	--	**0.627 J**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**23.8**	**39**	--	--	--	--	**0.483 J**	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**4,490**	**3,400**	--	--	--	--	**6.46**	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	**50,900**	**32,600**	--	--	--	--	**42.4**	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	**5.32**	**25.1**	--	--	--	--	**1.05**	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**5.34**	**12.9**	--	--	--	--	**0.449 J**	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**15**	**24.9**	--	--	--	--	**0.448 J**	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**32.3**	**45.7**	--	--	--	--	**0.258 J**	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**10.7**	**14**	--	--	--	--	**0.262 J**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	**11.9**	**13.9**	--	--	--	--	0.428 U	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**23.4**	**20.2**	--	--	--	--	**0.244 J**	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	**492**	**435**	--	--	--	--	**0.771 J**	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	**23.4**	**22.5**	--	--	--	--	0.134 U	--	--	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	**1,670**	**1,220**	--	--	--	--	**1.06 J**	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**104 J**	**381 J**	--	--	--	--	**31 J**	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**135**	**427 J**	--	--	--	--	**21 J**	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**773 J**	**1,110**	--	--	--	--	**17.9**	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**8,420**	**7,900**	--	--	--	--	**15.1**	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	**31.2 J**	**111**	--	--	--	--	**18.3 J**	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	**111**	**171 J**	--	--	--	--	**5.55 J**	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	**835 J**	**704 J**	--	--	--	--	**2.48 J**	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	**2,000**	**1,580**	--	--	--	--	**1.78 J**	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	**106**	**95.6**	--	--	--	--	**1.26**	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	**106**	**95.6**	--	--	--	--	**1.28**	--	--	--
Semi-Volatile Organics (ug/kg)													
1,3-Dichlorobenzene	--	--	170	19 U	20 U	--	--	--	--	19 U	--	--	--
1-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	--	--	--	19 U	20 U	--	--	--	--	19 U	--	--	--

Table 17b
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C BST

			Location ID:	1C-101C-HSA	1C-102C-HSA	1C-102C-HSA	1C-102C-HSA	1C-102C-HSA	1C-103B-HSA	1C-103B-HSA	1C-103B-HSA	1C-103B-HSA	1C-103C-HSA
			Sample ID:	1C-101C-HSA-S4	1C-102C-HSA-S1	1C-102C-HSA-S2	1C-102C-HSA-S3	1C-102C-HSA-S4	1C-103B-HSA-S1	1C-103B-HSA-S2	1C-103B-HSA-S3	1C-103B-HSA-S4	1C-103C-HSA-S1
			Sample Date:	10/16/08	10/13/08	10/13/08	10/13/08	10/13/08	10/15/08	10/15/08	10/15/08	10/15/08	10/13/08
			In-situ Depth^1 (ft):	12.5 - 14 ft	0 - 4.1 ft	5.1 - 6.6 ft	10.1 - 11.6 ft	12.6 - 14.1 ft	0 - 3.5 ft	4.5 - 6 ft	7 - 8.5 ft	9.5 - 11 ft	0 - 1.5 ft
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Conventional Parameters (pct)													
Total organic carbon	--	--	--	**0.429**	**1.65**	**2.51**	**3.4**	**0.421**	--	**3.4**	**0.805**	**0.433**	--
Total solids	--	--	--	**74.8**	**54.3**	**47.5**	**55.3**	**80.1**	--	**71.3**	**72.6**	**83.9**	--
Metals (mg/kg)													
Mercury	0.41	0.59	--	0.05 U	**0.95**	**0.68**	**0.69**	**0.07**	**0.23**	**0.36**	**0.21**	0.04 U	**0.23**
Aromatic Hydrocarbons (mg/kg-OC)													
Total LPAH	370	780	--	--	**15.0**	--	**7.8**	**18**	--	--	--	--	--
Naphthalene	99	170	--	--	**1.1 J**	--	**0.76**	**18**	--	--	--	--	--
Acenaphthylene	66	66	--	--	**0.85 J**	--	**0.35 J**	4.8 U	--	--	--	--	--
Acenaphthene	16	57	--	--	**0.85 J**	--	**0.38 J**	4.8 U	--	--	--	--	--
Fluorene	23	79	--	--	**1.6**	--	**0.85**	4.8 U	--	--	--	--	--
Phenanthrene	100	480	--	--	**6.7**	--	**3.5**	4.8 U	--	--	--	--	--
Anthracene	220	1,200	--	--	**3.9**	--	**1.9**	4.8 U	--	--	--	--	--
2-Methylnaphthalene	38	64	--	--	1.2 U	--	0.59 U	4.8 U	--	--	--	--	--
Total HPAH	960	5,300	--	--	**108**	--	**34.8**	4.8 U	--	--	--	--	--
Fluoranthene	160	1,200	--	--	**9.7**	--	**4.7**	4.8 U	--	--	--	--	--
Pyrene	1,000	1,400	--	--	**26.1**	--	**5.6**	4.8 U	--	--	--	--	--
Benzo(a)anthracene	110	270	--	--	**9.7**	--	**3.8**	4.8 U	--	--	--	--	--
Chrysene	110	460	--	--	**17**	--	**7.1**	4.8 U	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	**10.3**	--	**3.5**	4.8 U	--	--	--	--	--
Benzo(k)fluoranthene	--	--	--	--	**8.5**	--	**2.7**	4.8 U	--	--	--	--	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	**18.8**	--	**6.2**	4.8 U	--	--	--	--	--
Benzo(a)pyrene	99	210	--	--	**8.5**	--	**2.8**	4.8 U	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	**3.2**	--	**1.2**	4.8 U	--	--	--	--	--
Dibenzo(a,h)anthracene	12	33	--	--	**11.5**	--	**2.1**	1.4 U	--	--	--	--	--
Benzo(g,h,i)perylene	31	78	--	--	**3.6**	--	**1.3**	4.8 U	--	--	--	--	--
Chlorinated Benzenes (mg/kg-OC)													
1,2-Dichlorobenzene	2.3	2.3	--	--	0.61 U	--	0.17 U	1.4 U	--	--	--	--	--
1,4-Dichlorobenzene	3.1	9	--	--	0.61 U	--	0.17 U	1.4 U	--	--	--	--	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	0.61 U	--	0.17 U	1.4 U	--	--	--	--	--
Hexachlorobenzene	0.38	2.3	--	--	0.61 U	--	0.17 U	1.4 U	--	--	--	--	--
Phthalates (mg/kg-OC)													
Dimethyl phthalate	53	53	--	--	1.2 U	--	0.59 U	4.8 U	--	--	--	--	--
Diethyl phthalate	61	110	--	--	1.2 U	--	**0.62**	4.8 U	--	--	--	--	--
Di-n-butyl phthalate	220	1,700	--	--	1.2 U	--	0.59 U	4.8 U	--	--	--	--	--
Butylbenzyl phthalate	4.9	64	--	--	1.5 U	--	0.44 U	3.6 U	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	1.2 U	--	0.59 U	4.8 U	--	--	--	--	--
Di-n-octyl phthalate	58	4,500	--	--	1.2 U	--	0.59 U	4.8 U	--	--	--	--	--
Miscellaneous (mg/kg-OC)													
Dibenzofuran	15	58	--	--	**0.85 J**	--	**0.47 J**	4.8 U	--	--	--	--	--
Hexachlorobutadiene	3.9	6.2	--	--	0.61 U	--	0.17 U	1.4 U	--	--	--	--	--
N-Nitrosodiphenylamine	11	11	--	--	0.61 U	--	0.17 U	1.4 U	--	--	--	--	--
Ionizable Organic Compounds (ug/kg)													
Phenol	420	1,200	420	--	20 U	--	20 U	20 U	--	--	--	--	--
2-Methylphenol (o-Cresol)	63	63	63	--	10 U	--	5.9 U	6 U	--	--	--	--	--
4-Methylphenol (p-Cresol)	670	670	670	--	**13 J**	--	20 U	20 U	--	--	--	--	--
2,4-Dimethylphenol	29	29	29	--	10 U	--	5.9 U	**8.3**	--	--	--	--	--
Pentachlorophenol	360	690	140	--	**54**	--	29 U	30 U	--	--	--	--	--
Benzyl alcohol	57	73	57	--	50 U	--	29 U	30 U	--	--	--	--	--
Benzoic acid	650	650	650	--	200 U	--	200 U	200 U	--	--	--	--	--

Table 17b
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C BST

	Location ID:			**1C-101C-HSA**	**1C-102C-HSA**	**1C-102C-HSA**	**1C-102C-HSA**	**1C-102C-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103C-HSA**
	Sample ID:			**1C-101C-HSA-S4**	**1C-102C-HSA-S1**	**1C-102C-HSA-S2**	**1C-102C-HSA-S3**	**1C-102C-HSA-S4**	**1C-103B-HSA-S1**	**1C-103B-HSA-S2**	**1C-103B-HSA-S3**	**1C-103B-HSA-S4**	**1C-103C-HSA-S1**
	Sample Date:			**10/16/08**	**10/13/08**	**10/13/08**	**10/13/08**	**10/13/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/13/08**
	In-situ Depth^1 (ft):			**12.5 - 14 ft**	**0 - 4.1 ft**	**5.1 - 6.6 ft**	**10.1 - 11.6 ft**	**12.6 - 14.1 ft**	**0 - 3.5 ft**	**4.5 - 6 ft**	**7 - 8.5 ft**	**9.5 - 11 ft**	**0 - 1.5 ft**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Aromatic Hydrocarbons (ug/kg)													
Total LPAH	--	--	5,200	--	**248**	--	**264**	**76**	--	--	--	--	--
Naphthalene	--	--	2,100	--	**18 J**	--	**26**	**76**	--	--	--	--	--
Acenaphthylene	--	--	560	--	**14 J**	--	**12 J**	20 U	--	--	--	--	--
Acenaphthene	--	--	500	--	**14 J**	--	**13 J**	20 U	--	--	--	--	--
Fluorene	--	--	540	--	**27**	--	**29**	20 U	--	--	--	--	--
Phenanthrene	--	--	1,500	--	**110**	--	**120**	20 U	--	--	--	--	--
Anthracene	--	--	960	--	**65**	--	**64**	20 U	--	--	--	--	--
2-Methylnaphthalene	--	--	670	--	20 U	--	20 U	20 U	--	--	--	--	--
Total HPAH	--	--	12,000	--	**1,782**	--	**1,184**	20 U	--	--	--	--	--
Fluoranthene	--	--	1,700	--	**160**	--	**160**	20 U	--	--	--	--	--
Pyrene	--	--	2,600	--	**430**	--	**190**	20 U	--	--	--	--	--
Benzo(a)anthracene	--	--	1,300	--	**160**	--	**130**	20 U	--	--	--	--	--
Chrysene	--	--	1,400	--	**280**	--	**240**	20 U	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	**170**	--	**120**	20 U	--	--	--	--	--
Benzo(k)fluoranthene	--	--	--	--	**140**	--	**93**	20 U	--	--	--	--	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	**310**	--	**213**	20 U	--	--	--	--	--
Benzo(a)pyrene	--	--	1,600	--	**140**	--	**96**	20 U	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	**53**	--	**40**	20 U	--	--	--	--	--
Dibenzo(a,h)anthracene	--	--	230	--	**190**	--	**71**	6 U	--	--	--	--	--
Benzo(g,h,i)perylene	--	--	670	--	**59**	--	**44**	20 U	--	--	--	--	--
Chlorinated Benzenes (ug/kg)													
1,2-Dichlorobenzene	--	--	35	--	10 U	--	5.9 U	6 U	--	--	--	--	--
1,4-Dichlorobenzene	--	--	110	--	10 U	--	5.9 U	6 U	--	--	--	--	--
1,2,4-Trichlorobenzene	--	--	31	--	10 U	--	5.9 U	6 U	--	--	--	--	--
Hexachlorobenzene	--	--	22	--	10 U	--	5.9 U	6 U	--	--	--	--	--
Miscellaneous (ug/kg)													
Dibenzofuran	--	--	540	--	**14 J**	--	**16 J**	20 U	--	--	--	--	--
Hexachlorobutadiene	--	--	11	--	10 U	--	5.9 U	6 U	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	28	--	10 U	--	5.9 U	6 U	--	--	--	--	--
Phthalates (ug/kg)													
Dimethyl phthalate	--	--	71	--	20 U	--	20 U	20 U	--	--	--	--	--
Diethyl phthalate	--	--	48	--	20 U	--	**21**	20 U	--	--	--	--	--
Di-n-butyl phthalate	--	--	1,400	--	20 U	--	20 U	20 U	--	--	--	--	--
Butylbenzyl phthalate	--	--	63	--	25 U	--	15 U	15 U	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	20 U	--	20 U	20 U	--	--	--	--	--
Di-n-octyl phthalate	--	--	420	--	20 U	--	20 U	20 U	--	--	--	--	--

Table 17b
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C BST

			Location ID:	1C-101C-HSA	1C-102C-HSA	1C-102C-HSA	1C-102C-HSA	1C-102C-HSA	1C-103B-HSA	1C-103B-HSA	1C-103B-HSA	1C-103B-HSA	1C-103C-HSA
			Sample ID:	1C-101C-HSA-S4	1C-102C-HSA-S1	1C-102C-HSA-S2	1C-102C-HSA-S3	1C-102C-HSA-S4	1C-103B-HSA-S1	1C-103B-HSA-S2	1C-103B-HSA-S3	1C-103B-HSA-S4	1C-103C-HSA-S1
			Sample Date:	10/16/08	10/13/08	10/13/08	10/13/08	10/13/08	10/15/08	10/15/08	10/15/08	10/15/08	10/13/08
			In-situ Depth[1] (ft):	12.5 - 14 ft	0 - 4.1 ft	5.1 - 6.6 ft	10.1 - 11.6 ft	12.6 - 14.1 ft	0 - 3.5 ft	4.5 - 6 ft	7 - 8.5 ft	9.5 - 11 ft	0 - 1.5 ft
Analyte	SMS SQS	SMS CSL	PS LAET										
Dioxin Furans (ng/kg)													
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	1.12	--	0.902	0.0541 U	0.142 J	--	--	--	0.226 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	2.88	--	2.47	0.0614 U	0.956 J	--	--	--	1.3 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	2.9	--	2.44	0.0705 U	2.86	--	--	--	3.01
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	16.3	--	15.3	0.0805 U	26	--	--	--	24
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	4.6	--	4.6	0.0805 U	4.91	--	--	--	5.06
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	250	--	248	0.614 J	590	--	--	--	481
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	2400	--	1,900	5.62	5,530	--	--	--	4,010
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	6.26	--	5.6	0.0494 J	1.74	--	--	--	2.27
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	2.88	--	2.52	0.145 U	1.47 J	--	--	--	1.3 J
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	4.31	--	4.18	0.133 U	2.99	--	--	--	3.3
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	3.85	--	4.16	0.0772 U	4.66	--	--	--	3.76
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	2.43 J	--	2.52	0.0677 U	1.82 J	--	--	--	1.79 J
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	1.23 J	--	1.38 J	0.104 U	2.02 J	--	--	--	1.46 J
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	3.58	--	3.67	0.0784 U	3.41	--	--	--	3.7
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	58.6	--	418	0.0698 U	58.9	--	--	--	76.8
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	2.33 J	--	3.93	0.0926 U	3.08	--	--	--	3.05
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	93.6	--	337	0.255 U	140	--	--	--	164
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	215 J	--	86.7 J	0.53 J	18.5 J	--	--	--	38 J
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	132 J	--	79.1	0.503 J	22.5 J	--	--	--	43.6 J
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	150 J	--	139	0.624 J	185	--	--	--	187
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	528	--	540	1.43	1,930	--	--	--	1,540
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	105 J	--	93.2 J	0.916 J	11.5 J	--	--	--	22.3 J
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	47.2 J	--	48	0.613 J	27.2	--	--	--	34.5 J
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	92.2	--	135 J	0.487 J	114	--	--	--	118 J
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	184	--	779	0.5	215 J	--	--	--	255
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	13.4	--	16.0	0.013	15.0	--	--	--	13.9
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	13.4	--	16.0	0.121	15.0	--	--	--	13.9
Semi-Volatile Organics (ug/kg)													
1,3-Dichlorobenzene	--	--	170	--	20 U	--	20 U	20 U	--	--	--	--	--
1-Methylnaphthalene	--	--	--	--	20 U	--	20 U	20 U	--	--	--	--	--
Hexachloroethane	--	--	--	--	20 U	--	20 U	20 U	--	--	--	--	--

Table 17b
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C BST

			Location ID:	1C-103C-HSA	1C-103C-HSA	1C-103C-HSA	1C-104B-HSA	1C-104B-HSA	1C-104B-HSA	1C-104C-HSA	1C-104C-HSA	1C-104C-HSA	1C-104C-HSA
			Sample ID:	1C-103C-HSA-S2	1C-103C-HSA-S3	1C-103C-HSA-S4	1C-104B-HSA-S1	1C-104B-HSA-S2	1C-104B-HSA-S4	1C-104C-HSA-S1	1C-104C-HSA-S2	1C-104C-HSA-S3	1C-104C-HSA-S4
			Sample Date:	10/13/08	10/13/08	10/13/08	10/14/08	10/14/08	10/14/08	10/14/08	10/14/08	10/14/08	10/14/08
			In-situ Depth^1 (ft):	2.5 - 4 ft	5 - 6.5 ft	7.5 - 9 ft	0 - 3.6 ft	4.6 - 6.1 ft	12.1 - 13.6 ft	0 - 5 ft	6 - 7.5 ft	8.5 - 10 ft	11 - 12.5 ft
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Conventional Parameters (pct)													
Total organic carbon	--	--	--	**1.77**	**1.93**	**2.26**	**1.6**	**2.26**	**1.55**	**1.61**	--	**0.207**	**0.325**
Total solids	--	--	--	**77.7**	**72.1**	**74**	**71.5**	**65**	**63.4**	**66.8**	--	**83.7**	**73.7**
Metals (mg/kg)													
Mercury	0.41	0.59	--	**0.18**	**0.08**	**0.13**	**6.5**	**0.6**	**0.17**	**0.19**	**0.06**	0.05 U	0.05 U
Aromatic Hydrocarbons (mg/kg-OC)													
Total LPAH	370	780	--	--	--	--	**28.5**	**40.1**	**4.7**	1.2 U	--	--	--
Naphthalene	99	170	--	--	--	--	**1.8**	**5.3**	**0.84 J**	1.2 U	--	--	--
Acenaphthylene	66	66	--	--	--	--	**1.5**	**0.84 J**	1.2 U	1.2 U	--	--	--
Acenaphthene	16	57	--	--	--	--	**2.6**	**7.5**	1.2 U	1.2 U	--	--	--
Fluorene	23	79	--	--	--	--	**1.9**	**4.3**	1.2 U	1.2 U	--	--	--
Phenanthrene	100	480	--	--	--	--	**6.3**	**13.7**	**3.0**	1.2 U	--	--	--
Anthracene	220	1,200	--	--	--	--	**14.4**	**8.4**	**0.84 J**	1.2 U	--	--	--
2-Methylnaphthalene	38	64	--	--	--	--	**0.94 J**	**2.6**	1.2 U	1.2 U	--	--	--
Total HPAH	960	5,300	--	--	--	--	**252**	**122**	**17.3**	**4.2**	--	--	--
Fluoranthene	160	1,200	--	--	--	--	**46.9**	**37.2**	**3.7**	**0.93 J**	--	--	--
Pyrene	1,000	1,400	--	--	--	--	**62.5**	**31.4**	**4.1**	**1.4**	--	--	--
Benzo(a)anthracene	110	270	--	--	--	--	**26.9**	**13.7**	**1.7**	1.2 U	--	--	--
Chrysene	110	460	--	--	--	--	**51.3**	**19.5**	**1.9**	**0.81 J**	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	**22.5**	**4.9**	**1.2 J**	1.2 U	--	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	**16.3**	**6.2**	**1.3**	1.2 U	--	--	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	--	**38.8**	**11.1**	**2.5**	1.2 U	--	--	--
Benzo(a)pyrene	99	210	--	--	--	--	**15.6**	**5.3**	**1.5**	1.2 U	--	--	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	--	**4.4**	**1.5**	**0.71 J**	1.2 U	--	--	--
Dibenzo(a,h)anthracene	12	33	--	--	--	--	**1.9**	**0.71**	**0.4**	**1.1**	--	--	--
Benzo(g,h,i)perylene	31	78	--	--	--	--	**3.8**	**1.6**	**0.77 J**	1.2 U	--	--	--
Chlorinated Benzenes (mg/kg-OC)													
1,2-Dichlorobenzene	2.3	2.3	--	--	--	--	0.36 U	0.26 U	0.4 U	0.38 U	--	--	--
1,4-Dichlorobenzene	3.1	9	--	--	--	--	**0.39**	0.26 U	0.4 U	0.38 U	--	--	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	--	**0.5**	0.26 U	0.4 U	0.38 U	--	--	--
Hexachlorobenzene	0.38	2.3	--	--	--	--	**0.43**	**0.75**	0.4 U	0.38 U	--	--	--
Phthalates (mg/kg-OC)													
Dimethyl phthalate	53	53	--	--	--	--	1.3 U	0.88 U	1.2 U	1.2 U	--	--	--
Diethyl phthalate	61	110	--	--	--	--	1.3 U	0.88 U	1.2 U	1.2 U	--	--	--
Di-n-butyl phthalate	220	1,700	--	--	--	--	1.3 U	0.88 U	1.2 U	1.2 U	--	--	--
Butylbenzyl phthalate	4.9	64	--	--	--	--	0.88 U	0.66 U	0.97 U	0.93 U	--	--	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	--	**0.88 J**	0.88 U	1.2 U	1.2 U	--	--	--
Di-n-octyl phthalate	58	4,500	--	--	--	--	1.3 U	0.88 U	1.2 U	1.2 U	--	--	--
Miscellaneous (mg/kg-OC)													
Dibenzofuran	15	58	--	--	--	--	**1.6**	**3**	1.2 U	1.2 U	--	--	--
Hexachlorobutadiene	3.9	6.2	--	--	--	--	0.36 U	0.26 U	0.4 U	0.38 U	--	--	--
N-Nitrosodiphenylamine	11	11	--	--	--	--	0.36 U	**0.49**	0.4 U	0.38 U	--	--	--
Ionizable Organic Compounds (ug/kg)													
Phenol	420	1,200	420	--	--	--	20 U	20 U	19 U	19 U	--	--	--
2-Methylphenol (o-Cresol)	63	63	63	--	--	--	5.7 U	5.8 U	6.2 U	6.1 U	--	--	--
4-Methylphenol (p-Cresol)	670	670	670	--	--	--	**51**	**170**	19 U	19 U	--	--	--
2,4-Dimethylphenol	29	29	29	--	--	--	5.7 U	5.8 U	6.2 U	6.1 U	--	--	--
Pentachlorophenol	360	690	140	--	--	--	**30**	29 U	31 U	31 U	--	--	--
Benzyl alcohol	57	73	57	--	--	--	28 U	29 U	31 U	31 U	--	--	--
Benzoic acid	650	650	650	--	--	--	200 U	200 U	190 U	190 U	--	--	--

Table 17b
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C BST

	Location ID:			**1C-103C-HSA**	**1C-103C-HSA**	**1C-103C-HSA**	**1C-104B-HSA**	**1C-104B-HSA**	**1C-104B-HSA**	**1C-104C-HSA**	**1C-104C-HSA**	**1C-104C-HSA**	**1C-104C-HSA**
	Sample ID:			**1C-103C-HSA-S2**	**1C-103C-HSA-S3**	**1C-103C-HSA-S4**	**1C-104B-HSA-S1**	**1C-104B-HSA-S2**	**1C-104B-HSA-S4**	**1C-104C-HSA-S1**	**1C-104C-HSA-S2**	**1C-104C-HSA-S3**	**1C-104C-HSA-S4**
	Sample Date:			**10/13/08**	**10/13/08**	**10/13/08**	**10/14/08**	**10/14/08**	**10/14/08**	**10/14/08**	**10/14/08**	**10/14/08**	**10/14/08**
	In-situ Depth^1 (ft):			**2.5 - 4 ft**	**5 - 6.5 ft**	**7.5 - 9 ft**	**0 - 3.6 ft**	**4.6 - 6.1 ft**	**12.1 - 13.6 ft**	**0 - 5 ft**	**6 - 7.5 ft**	**8.5 - 10 ft**	**11 - 12.5 ft**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**										
Aromatic Hydrocarbons (ug/kg)													
Total LPAH	--	--	5,200	--	--	--	**455**	**906**	**72**	19 U	--	--	--
Naphthalene	--	--	2,100	--	--	--	**28**	**120**	**13 J**	19 U	--	--	--
Acenaphthylene	--	--	560	--	--	--	**24**	**19 J**	19 U	19 U	--	--	--
Acenaphthene	--	--	500	--	--	--	**42**	**170**	19 U	19 U	--	--	--
Fluorene	--	--	540	--	--	--	**31**	**97**	19 U	19 U	--	--	--
Phenanthrene	--	--	1,500	--	--	--	**100**	**310**	**46**	19 U	--	--	--
Anthracene	--	--	960	--	--	--	**230**	**190**	**13 J**	19 U	--	--	--
2-Methylnaphthalene	--	--	670	--	--	--	**15 J**	**59**	19 U	19 U	--	--	--
Total HPAH	--	--	12,000	--	--	--	**4,031**	**2,756**	**267**	**68**	--	--	--
Fluoranthene	--	--	1,700	--	--	--	**750**	**840**	**57**	**15 J**	--	--	--
Pyrene	--	--	2,600	--	--	--	**1,000**	**710**	**64**	**23**	--	--	--
Benzo(a)anthracene	--	--	1,300	--	--	--	**430**	**310**	**26**	19 U	--	--	--
Chrysene	--	--	1,400	--	--	--	**820**	**440**	**29**	**13 J**	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	**360**	**110**	**19 J**	19 U	--	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	**260**	**140**	**20**	19 U	--	--	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	--	**620**	**250**	**39**	19 U	--	--	--
Benzo(a)pyrene	--	--	1,600	--	--	--	**250**	**120**	**23**	19 U	--	--	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	--	**70**	**34**	**11 J**	19 U	--	--	--
Dibenzo(a,h)anthracene	--	--	230	--	--	--	**31**	**16**	**6.2**	**17**	--	--	--
Benzo(g,h,i)perylene	--	--	670	--	--	--	**60**	**36**	**12 J**	19 U	--	--	--
Chlorinated Benzenes (ug/kg)													
1,2-Dichlorobenzene	--	--	35	--	--	--	5.7 U	5.8 U	6.2 U	6.1 U	--	--	--
1,4-Dichlorobenzene	--	--	110	--	--	--	**6.3**	5.8 U	6.2 U	6.1 U	--	--	--
1,2,4-Trichlorobenzene	--	--	31	--	--	--	**8**	5.8 U	6.2 U	6.1 U	--	--	--
Hexachlorobenzene	--	--	22	--	--	--	**6.8**	**17**	6.2 U	6.1 U	--	--	--
Miscellaneous (ug/kg)													
Dibenzofuran	--	--	540	--	--	--	**25**	**67**	19 U	19 U	--	--	--
Hexachlorobutadiene	--	--	11	--	--	--	5.7 U	5.8 U	6.2 U	6.1 U	--	--	--
N-Nitrosodiphenylamine	--	--	28	--	--	--	5.7 U	**11**	6.2 U	6.1 U	--	--	--
Phthalates (ug/kg)													
Dimethyl phthalate	--	--	71	--	--	--	20 U	20 U	19 U	19 U	--	--	--
Diethyl phthalate	--	--	48	--	--	--	20 U	20 U	19 U	19 U	--	--	--
Di-n-butyl phthalate	--	--	1,400	--	--	--	20 U	20 U	19 U	19 U	--	--	--
Butylbenzyl phthalate	--	--	63	--	--	--	14 U	15 U	15 U	15 U	--	--	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	--	**14 J**	20 U	19 U	19 U	--	--	--
Di-n-octyl phthalate	--	--	420	--	--	--	20 U	20 U	19 U	19 U	--	--	--

Table 17b
Subsurface Sediment Chemical Testing Results - Outer Waterway-Unit 1C BST

	Location ID:			1C-103C-HSA	1C-103C-HSA	1C-103C-HSA	1C-104B-HSA	1C-104B-HSA	1C-104B-HSA	1C-104C-HSA	1C-104C-HSA	1C-104C-HSA	1C-104C-HSA
	Sample ID:			1C-103C-HSA-S2	1C-103C-HSA-S3	1C-103C-HSA-S4	1C-104B-HSA-S1	1C-104B-HSA-S2	1C-104B-HSA-S4	1C-104C-HSA-S1	1C-104C-HSA-S2	1C-104C-HSA-S3	1C-104C-HSA-S4
	Sample Date:			10/13/08	10/13/08	10/13/08	10/14/08	10/14/08	10/14/08	10/14/08	10/14/08	10/14/08	10/14/08
	In-situ Depth[1] (ft):			2.5 - 4 ft	5 - 6.5 ft	7.5 - 9 ft	0 - 3.6 ft	4.6 - 6.1 ft	12.1 - 13.6 ft	0 - 5 ft	6 - 7.5 ft	8.5 - 10 ft	11 - 12.5 ft
Analyte	SMS SQS	SMS CSL	PS LAET										
Dioxin Furans (ng/kg)													
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	**0.529**	**0.655**	**0.31 J**	**0.195 J**	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	**1.8 J**	**2.29 J**	**1.54 J**	**0.738 J**	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	**4.72**	**4.57**	**1.93 J**	**1.71 J**	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	**53.5**	**28.5**	**1.99 J**	**11.2**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	**9.88**	**7.2**	**1.46 J**	**2.72**	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	**1,530**	**607**	**8.33**	**304**	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	--	--	**14,700**	**5,670**	**27.3**	**2,750**	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	**19.5**	**6.64**	**1.39**	**2.39**	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	**15.5**	**3.45**	**0.694 J**	**1.15 J**	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	**17.7**	**9.19**	**0.814 J**	**1.65 J**	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	**28.9**	**11.5**	**0.526 J**	**2.22 J**	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	**7.34**	**4.86**	**0.382 J**	**0.891 J**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	**6.49**	**2.28 J**	0.0849 U	**0.763 J**	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	**8.66**	**8.5**	**0.436 J**	**1.28 J**	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	**193**	**259**	**1.55 J**	**24.1**	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	**11.5**	**9.63**	0.0987 U	**1.65 J**	--	--	--
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	--	--	--	--	--	--	**622**	**593**	**2.43 J**	**88**	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	**36 J**	**86.1 J**	**109 J**	**38.6 J**	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	**42.8 J**	**64**	**97 J**	**37.9 J**	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	**272**	**171**	**56.6**	**113 J**	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	**3,290**	**1,420**	**15.7**	**813**	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	**73.8 J**	**67.4 J**	**26.8 J**	**24.7**	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	**105 J**	**99**	**9.18 J**	**14.8 J**	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	**281**	**284**	**4.38 J**	**37.7**	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	**703**	**847**	**3.79 J**	**92.1 J**	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=0	--	--	--	--	--	--	**43.9**	**23.8**	**3.03**	**7.93**	--	--	--
Total Dioxin/Furan TEQ (WHO) ND=1/2	--	--	--	--	--	--	**43.9**	**23.8**	**3.04**	**7.93**	--	--	--
Semi-Volatile Organics (ug/kg)													
1,3-Dichlorobenzene	--	--	170	--	--	--	20 U	20 U	19 U	19 U	--	--	--
1-Methylnaphthalene	--	--	--	--	--	--	20 U	**40**	19 U	19 U	--	--	--
Hexachloroethane	--	--	--	--	--	--	20 U	20 U	19 U	19 U	--	--	--

Notes:

🟨 Detected concentration is greater than SMS SQS screening level

🟩 Detected concentration is greater than SMS CSL screening level

🟦 Detected concentration is greater than 1988 Puget Sound Estuary Program LAET screening level

1. Sample depth is reported as below mudline.

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene

Benzo(j)fluoranthene is included in the total of benzo(b&k)fluoranthenes

Totals are calculated for LPAH and HPAH as the sum of all detected results. If all are undetcted results, the highest reporting limit value is reported as the sum.

Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a "0" (ND=0) and assigned a concentration equal to ½ the detection limit (ND=1/2).

-- Sample was not submitted for chemical analysis.

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

mg/kg-OC = milligrams per kilogram organic carbon normalized

ng/kg = nanogram per kilogram

pct = percent

Non-organic carbon normalized samples with TOC results outside of the 0.5-3.5% range were screened against the 1988 Puget Sound Estuary Program LAET

The site specific Bioaccumulaltion Screening Level (BSL) for mercury is 1.2 mg/kg. (Supplemental RI Report, RETEC 2006)

There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.

Table 17c
Subsurface Sediment Chemical Testing Results - Outer Waterway-Units 1A/1B

	Location ID:	**1A-01-VC**	**1A-01-VC**	**1A-05-VC**	**1A-01-VC**	**1B-03-VC**	**1B-01-VC**	**1B-07-VC**	**1B-01-VC**
	Sample ID:	**1A-01-VC**	**1A-01-VC-C1**	**1A-05-VC**	**1A-01-VC-C2**	**1B-03-VC**	**1B-01-VC-C1**	**1B-07-VC**	**1B-01-VC-C2**
	Sample Date:	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**
	In-situ Depth^1 (ft):	**0-4**	**Composite**	**0-4**	**Composite**	**0-4**	**Composite**	**0-4**	**Composite**
Analyte									
Grain Size (pct)									
Total Gravel		--	**0.1**	--	**0.1**	--	--	--	**0.2**
Total Sand		--	**3.6**	--	**2.5**	--	**3.6**	--	**3.6**
Total Silt		--	**48.8**	--	**50.9**	--	**49**	--	**48.5**
Total Clay		--	**47.5**	--	**46.4**	--	**47.5**	--	**47.6**
Total Fines (Silt + Clay)		--	**96.3**	--	**97.3**	--	**96.5**	--	**96.1**
Total Grain Size		--	**100**	--	**99.9**	--	**100.1**	--	**99.9**
Physical Parameters									
Specific gravity (su)		--	**2.64**	--	**2.66**	--	**2.65**	--	**2.65**
Liquid Limit (pct)		--	**94.6**	--	**98**	--	**95.5**	--	**94.3**
Plastic Limit (pct)		--	**37.6**	--	**38.6**	--	**35.7**	--	**34.9**
Plasticity Index (pct)		--	**57**	--	**59.4**	--	**59.8**	--	**59.4**
Moisture (water) Content (pct)		--	**117.7**	--	**125.3**	--	**122.6**	--	**120.1**
Chlorinated Benzenes (ug/kg)									
1,2-Dichlorobenzene		1.7 U	--	1.8 U	--	1.6 U	--	1.7 U	--
1,4-Dichlorobenzene		1.7 U	--	1.8 U	--	1.6 U	--	1.7 U	--
1,2,4-Trichlorobenzene		8.6 U	--	9 U	--	8.2 U	--	8.7 U	--
Hexachlorobenzene		--	--	--	--	--	--	--	--
Dioxin Furans (ng/kg)									
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		--	**1.2**	--	**1.21**	--	**1.35**	--	**1.22**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		--	**5.41**	--	**7.87**	--	**5.73**	--	**6.29**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		--	**19**	--	**32.3**	--	**20.1**	--	**25.3**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		--	**33.1**	--	**47.2**	--	**43.6**	--	**43.4**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		--	**18.8**	--	**29**	--	**20.5**	--	**23.5**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		--	**483**	--	**589**	--	**1,180**	--	**627**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		--	**3,510**	--	**3,390**	--	**12,400**	--	**4,400**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		--	**22**	--	**32.3**	--	**22**	--	**23.4**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		--	**3.79**	--	**4.51**	--	**5.23**	--	**4.42**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		--	**5.23**	--	**6.44**	--	**7.38**	--	**6.57**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		--	**7.34**	--	**7.42**	--	**11.4**	--	**9.37**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		--	**3.06**	--	**3.41**	--	**4.34**	--	**3.73**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		--	**2.18 J**	--	**2.28 J**	--	**3.36**	--	**2.66**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		--	**3.83**	--	**4.47**	--	**5.6**	--	**5.04**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		--	**73.3**	--	**68.6**	--	**145**	--	**96.4**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		--	**4.06**	--	**4.27**	--	**7.93**	--	**5.85**
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)		--	**255**	--	**230**	--	**855**	--	**337**
Total Tetrachlorodibenzo-p-dioxin (TCDD)		--	**978 J**	--	**1650**	--	**941 J**	--	**1210**
Total Pentachlorodibenzo-p-dioxin (PeCDD)		--	**1,040**	--	**1,770 J**	--	**1,030 J**	--	**1,390 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)		--	**1,390**	--	**2,280**	--	**1,380**	--	**1,770**

Table 17c
Subsurface Sediment Chemical Testing Results - Outer Waterway-Units 1A/1B

	Location ID:	**1A-01-VC**	**1A-01-VC**	**1A-05-VC**	**1A-01-VC**	**1B-03-VC**	**1B-01-VC**	**1B-07-VC**	**1B-01-VC**
	Sample ID:	**1A-01-VC**	**1A-01-VC-C1**	**1A-05-VC**	**1A-01-VC-C2**	**1B-03-VC**	**1B-01-VC-C1**	**1B-07-VC**	**1B-01-VC-C2**
	Sample Date:	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**
	In-situ Depth^1 (ft):	**0-4**	**Composite**	**0-4**	**Composite**	**0-4**	**Composite**	**0-4**	**Composite**
Analyte									
Total Heptachlorodibenzo-p-dioxin (HpCDD)		--	**917**	--	**1,090**	--	**2,210**	--	**1,240**
Total Tetrachlorodibenzofuran (TCDF)		--	**101**	--	**148 J**	--	**104 J**	--	**117**
Total Pentachlorodibenzofuran (PeCDF)		--	**47.2 J**	--	**58.5 J**	--	**60.2 J**	--	**60 J**
Total Hexachlorodibenzofuran (HxCDF)		--	**107 J**	--	**110 J**	--	**168**	--	**140 J**
Total Heptachlorodibenzofuran (HpCDF)		--	**298**	--	**270**	--	**620**	--	**390**
Total Dioxin/Furan TEQ (WHO) ND=0		--	**26.0**	--	**34.7**	--	**39.8**	--	**32.0**
Total Dioxin/Furan TEQ (WHO) ND=1/2		--	**26.0**	--	**34.7**	--	**39.8**	--	**32.0**
Guaiacols (ug/kg)									
2-Methoxyphenol (Guaiacol)		--	20 U	--	20 U	--	20 U	--	20 UJ
3,4-Dichloroguaiacol		--	20 U	--	20 U	--	20 U	--	20 U
3,4,5-Trichloroguaiacol		--	20 U	--	20 U	--	20 U	--	20 UJ
3,4,6-Trichloroguaiacol		--	20 U	--	20 U	--	20 U	--	20 U
4,5-Dichloroguaiacol		--	20 U	--	20 U	--	20 U	--	20 UJ
4,5,6-Trichloroguaiacol		--	20 U	--	20 U	--	20 U	--	20 U
4,6-Dichloroguaiacol		--	20 U	--	20 U	--	20 U	--	20 U
Tetrachloroguaiacol		--	20 U	--	20 U	--	20 U	--	20 UJ
Volatile Organics (ug/kg)									
1,3-Dichlorobenzene		1.7 U	--	1.8 U	--	1.6 U	--	1.7 U	--
Ethylbenzene		1.7 U	--	1.8 U	--	1.6 U	--	1.7 U	--
m,p-Xylene		1.7 U	--	1.8 U	--	1.6 U	--	1.7 U	--
o-Xylene		1.7 U	--	1.8 U	--	1.6 U	--	1.7 U	--
Total Xylene		1.7 U	--	1.8 U	--	1.6 U	--	1.7 U	--
Tetrachloroethene		1.7 U	--	1.8 U	--	1.6 U	--	1.7 U	--
Trichloroethene		1.7 U	--	1.8 U	--	1.6 U	--	1.7 U	--

Notes:

1. Sample depth is reported as below mudline.

Bold = Detected result

VOCs were sampled from discrete core samples (not from homogenized composite).

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a "0" (ND=0) and assigned a concentration equal to ½ the detection limit (ND=1/2).

Total xylene is the sum of o-, m-, p- isomers

-- Sample was not submitted for chemical analysis.

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

mg/kg-OC = milligrams per kilogram organic carbon normalized

ng/kg = nanogram per kilogram

pct = percent

There are no numeric SMS criteria for dioxin/furans, see 6.1.2. See 7.1.1 for potentially applicable dredge material management criteria.

Table 18
Subsurface Sediment Chemical Testing Results - Unit 5, 6 and 9

			Location ID:	5B-01-VC	5B-01-VC	5B-01-VC	5B-02-VC	5B-02-VC	5B-02-VC	5B-03-VC	5B-03-VC	5B-03-VC	6B-01-VC	6B-01-DC
			Sample ID:	5B-01-VC-1-3	5B-01-VC-4-6	5B-01-VC-7-9	5B-02-VC-1-3	5B-02-VC-4-6	5B-02-VC-7-9	5B-03-VC-1-3	5B-03-VC-4-6	5B-03-VC-7-9	6B-01-VC-1-3	6B-01-DC-1-2
			Sample Date:	7/25/08	7/25/08	7/25/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/18/08	4/30/2009
			In-situ Depth^1 (ft):	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9	1-3	1-2
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Grain Size (pct)														
Total Gravel	--	--	--	**14.6**	**0.9**	**0.2**	**5.7**	**0.9**	**2**	**5.8**	**0.6**	**0.1**	**1.1**	--
Total Sand	--	--	--	**35.4**	**21.6**	**3**	**66.2**	**82.4**	**70**	**87.2**	**75.2**	**72.6**	**10.7**	--
Total Silt	--	--	--	**33**	**31.4**	**50.3**	**15.6**	**11.5**	**20.2**	**4.3**	**19.6**	**20**	**49.7**	--
Total Clay	--	--	--	**16.7**	**45.9**	**46.6**	**12.4**	**5.1**	**7.7**	**3**	**4.6**	**7.3**	**38.6**	--
Total Fines (Silt + Clay)	--	--	--	**49.7**	**77.3**	**96.9**	**28**	**16.6**	**27.9**	**7.3**	**24.2**	**27.3**	**88.3**	--
Total Grain Size	--	--	--	**99.7**	**99.8**	**100.1**	**99.9**	**99.9**	**99.9**	**100.3**	**100**	**100**	**100.1**	--
Physical Parameters														
Atterberg Classification	--	--	--	**Non-Plastic**	**MH**	**MH**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**Non-Plastic**	**MH**	--
Specific gravity (su)	--	--	--	**2.12**	**2.29**	**2.68**	**2.44**	**2.76**	**2.7**	**2.72**	**2.71**	**2.76**	**2.49**	--
Liquid Limit (pct)	--	--	--	--	**58.7**	**66.1**	--	--	--	--	--	--	**75.8**	--
Plastic Limit (pct)	--	--	--	--	**37.7**	**32.7**	--	--	--	--	--	--	**39.6**	--
Plasticity Index (pct)	--	--	--	--	**21**	**33.4**	--	--	--	--	--	--	**36.2**	--
Moisture (water) Content (pct)	--	--	--	**188.6**	**123.5**	**101.2**	**83.43**	**28.88**	**37.44**	**25**	**32.21**	**29.4**	**159.4**	
Conventional Parameters (pct)														
Total organic carbon	--	--	--	**10.4**	**4.04**	**2.27**	**6.33**	**1.21**	**0.796**	--	--	--	--	--
Total solids	--	--	--	**34.3**	**42.2**	**49.8**	**60.8**	**76.9**	**75.7**	--	--	--	--	--
Metals (mg/kg)														
Mercury	0.41	0.59		**10.2**	**0.41**	**0.17**	**0.15**	0.06 U	**0.06**	--	--	--	--	**0.62**
Aromatic Hydrocarbons (mg/kg-OC)														
Total LPAH	370	780	--	**0.91**	**1.7**	**2.4**	**0.19**	1.7 U	--	--	--	--	--	--
Naphthalene	99	170	--	**0.13 J**	**0.87**	**0.88**	0.32 U	1.7 U	--	--	--	--	--	--
Acenaphthylene	66	66	--	0.19 U	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Acenaphthene	16	57	--	0.19 U	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Fluorene	23	79	--	**0.11 J**	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Phenanthrene	100	480	--	**0.46**	**0.87**	**1.5**	**0.19 J**	1.7 U	--	--	--	--	--	--
Anthracene	220	1,200	--	**0.21**	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
2-Methylnaphthalene	38	64	--	**0.11 J**	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Total HPAH	960	5,300	--	**4.6**	**5.7**	**9.3**	**0.76**	1.7 U	--	--	--	--	--	--
Fluoranthene	160	1,200	--	**1.4**	**0.89**	**2.1**	**0.32**	1.7 U	--	--	--	--	--	--
Pyrene	1,000	1,400	--	**0.96**	**1.4**	**2.1**	**0.27 J**	1.7 U	--	--	--	--	--	--
Benzo(a)anthracene	110	270	--	**0.5**	**0.52**	**1.0**	0.32 U	1.7 U	--	--	--	--	--	--
Chrysene	110	460	--	**0.64**	**0.67**	**1.1**	**0.17 J**	1.7 U	--	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	**0.35**	**0.54**	**0.75 J**	0.32 U	1.7 U	--	--	--	--	--	--
Benzo(k)fluoranthene	--	--	--	**0.41**	**0.64**	**1.1**	0.32 U	1.7 U	--	--	--	--	--	--
Total Benzofluoranthenes (b, j, k)	230	450	--	**0.76**	**1.2**	**1.9**	0.32 U	1.7 U	--	--	--	--	--	--
Benzo(a)pyrene	99	210	--	**0.33**	**0.69**	**1.1**	0.32 U	1.7 U	--	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene	34	88	--	0.19 U	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Dibenzo(a,h)anthracene	12	33	--	0.06 U	0.15 U	0.27 U	0.096 U	0.5 U	--	--	--	--	--	--
Benzo(g,h,i)perylene	31	78	--	0.19 U	**0.3 J**	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Chlorinated Benzenes (mg/kg-OC)														
1,2-Dichlorobenzene	2.3	2.3	--	0.06 U	0.15 U	0.27 UJ	0.096 UJ	0.5 UJ	--	--	--	--	--	--
1,4-Dichlorobenzene	3.1	9	--	0.06 U	0.15 U	0.27 U	0.096 U	0.5 U	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.81	1.8	--	0.06 UJ	0.15 UJ	0.27 U	0.096 U	0.5 U	--	--	--	--	--	--
Hexachlorobenzene	0.38	2.3	--	**0.095**	0.15 U	0.27 U	0.096 U	0.5 U	--	--	--	--	--	--

Table 18
Subsurface Sediment Chemical Testing Results - Unit 5, 6 and 9

	Location ID:			5B-01-VC	5B-01-VC	5B-01-VC	5B-02-VC	5B-02-VC	5B-02-VC	5B-03-VC	5B-03-VC	5B-03-VC	6B-01-VC	6B-01-DC
	Sample ID:			5B-01-VC-1-3	5B-01-VC-4-6	5B-01-VC-7-9	5B-02-VC-1-3	5B-02-VC-4-6	5B-02-VC-7-9	5B-03-VC-1-3	5B-03-VC-4-6	5B-03-VC-7-9	6B-01-VC-1-3	6B-01-DC-1-2
	Sample Date:			7/25/08	7/25/08	7/25/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/18/08	4/30/2009
	In-situ Depth^1 (ft):			1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9	1-3	1-2
Analyte	SMS SQS	SMS CSL	PS LAET											
Phthalates (mg/kg-OC)														
Dimethyl phthalate	53	53	--	0.19 U	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Diethyl phthalate	61	110	--	0.19 U	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Di-n-butyl phthalate	220	1,700	--	0.19 U	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Butylbenzyl phthalate	4.9	64	--	**0.36**	0.37 U	0.66 UJ	**0.33 J**	1.2 UJ	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	47	78	--	**0.52**	0.5 U	0.88 U	0.32 U	**0.91 J**	--	--	--	--	--	--
Di-n-octyl phthalate	58	4,500	--	0.19 U	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Miscellaneous (mg/kg-OC)														
Dibenzofuran	15	58	--	0.19 U	0.5 U	0.88 U	0.32 U	1.7 U	--	--	--	--	--	--
Hexachlorobutadiene	3.9	6.2	--	0.06 U	0.15 U	0.27 UJ	0.096 UJ	0.5 UJ	--	--	--	--	--	--
N-Nitrosodiphenylamine	11	11	--	**0.15 J**	0.15 UJ	0.27 UJ	0.096 UJ	0.5 UJ	--	--	--	--	--	--
Ionizable Organic Compounds (ug/kg)														
Phenol	420	1,200	420	**60**	**24**	20 U	20 U	20 U	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	63	63	63	6.2 U	6.1 U	6.1 UJ	**7.4 J**	6.1 UJ	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	670	670	670	**82**	**38**	**15 J**	**13 J**	20 U	--	--	--	--	--	--
2,4-Dimethylphenol	29	29	29	6.2 UJ	6.1 UJ	6.1 UJ	**14 J**	6.1 UJ	--	--	--	--	--	--
Pentachlorophenol	360	690	140	**31 J**	30 UJ	31 U	31 U	30 U	--	--	--	--	--	--
Benzyl alcohol	57	73	57	20 UJ	20 UJ	31 UJ	**47 J**	30 UJ	--	--	--	--	--	--
Benzoic acid	650	650	650	200 U	200 U	200 U	200 U	200 U	--	--	--	--	--	--
Aromatic Hydrocarbons (ug/kg)														
Total LPAH	--	--	5,200	**95**	**70**	**53**	**12**	20 U	--	--	--	--	--	--
Naphthalene	--	--	2,100	**14 J**	**35**	**20**	20 U	20 U	--	--	--	--	--	--
Acenaphthylene	--	--	560	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Acenaphthene	--	--	500	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Fluorene	--	--	540	**11 J**	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Phenanthrene	--	--	1,500	**48**	**35**	**33**	**12 J**	20 U	--	--	--	--	--	--
Anthracene	--	--	960	**22**	20 U	20 U	20 U	20 U	--	--	--	--	--	--
2-Methylnaphthalene	--	--	670	**11 J**	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Total HPAH	--	--	12,000	**482**	**229**	**212**	**48**	20 U	--	--	--	--	--	--
Fluoranthene	--	--	1,700	**150**	**36**	**48**	**20**	20 U	--	--	--	--	--	--
Pyrene	--	--	2,600	**100**	**57**	**48**	**17 J**	20 U	--	--	--	--	--	--
Benzo(a)anthracene	--	--	1,300	**52**	**21**	**23**	20 U	20 U	--	--	--	--	--	--
Chrysene	--	--	1,400	**67**	**27**	**25**	**11 J**	20 U	--	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	**36**	**22**	**17 J**	20 U	20 U	--	--	--	--	--	--
Benzo(k)fluoranthene	--	--	--	**43**	**26**	**26**	20 U	20 U	--	--	--	--	--	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	**79**	**48**	**43**	20 U	20 U	--	--	--	--	--	--
Benzo(a)pyrene	--	--	1,600	**34**	**28**	**25**	20 U	20 U	--	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene	--	--	600	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Dibenzo(a,h)anthracene	--	--	230	6.2 U	6.1 U	6.1 U	6.1 U	6.1 U	--	--	--	--	--	--
Benzo(g,h,i)perylene	--	--	670	20 U	**12 J**	20 U	20 U	20 U	--	--	--	--	--	--
Chlorinated Benzenes (ug/kg)														
1,2-Dichlorobenzene	--	--	35	6.2 U	6.1 U	6.1 UJ	6.1 UJ	6.1 UJ	--	--	--	--	--	--
1,4-Dichlorobenzene	--	--	110	6.2 U	6.1 U	6.1 U	6.1 U	6.1 U	--	--	--	--	--	--
1,2,4-Trichlorobenzene	--	--	31	6.2 UJ	6.1 UJ	6.1 U	6.1 U	6.1 U	--	--	--	--	--	--
Hexachlorobenzene	--	--	22	**9.9**	6.1 U	6.1 U	6.1 U	6.1 U	--	--	--	--	--	--
Miscellaneous (ug/kg)														
Dibenzofuran	--	--	540	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Hexachlorobutadiene	--	--	11	6.2 U	6.1 U	6.1 UJ	6.1 UJ	6.1 UJ	--	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	28	**16 J**	6.1 UJ	6.1 UJ	6.1 UJ	6.1 UJ	--	--	--	--	--	--

Table 18
Subsurface Sediment Chemical Testing Results - Unit 5, 6 and 9

			Location ID:	**5B-01-VC**	**5B-01-VC**	**5B-01-VC**	**5B-02-VC**	**5B-02-VC**	**5B-02-VC**	**5B-03-VC**	**5B-03-VC**	**5B-03-VC**	**6B-01-VC**	**6B-01-DC**
			Sample ID:	**5B-01-VC-1-3**	**5B-01-VC-4-6**	**5B-01-VC-7-9**	**5B-02-VC-1-3**	**5B-02-VC-4-6**	**5B-02-VC-7-9**	**5B-03-VC-1-3**	**5B-03-VC-4-6**	**5B-03-VC-7-9**	**6B-01-VC-1-3**	**6B-01-DC-1-2**
			Sample Date:	**7/25/08**	**7/25/08**	**7/25/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/18/08**	**4/30/2009**
			In-situ Depth^1 (ft):	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**	**1-3**	**4-6**	**7-9**	**1-3**	**1-2**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Phthalates (ug/kg)														
Dimethyl phthalate	--	--	71	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Diethyl phthalate	--	--	48	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Di-n-butyl phthalate	--	--	1,400	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Butylbenzyl phthalate	--	--	63	**37**	15 U	15 UJ	**21 J**	15 UJ	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	**54**	20 U	20 U	20 U	**11 J**	--	--	--	--	--	--
Di-n-octyl phthalate	--	--	420	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Semi-Volatile Organics (ug/kg)														
1,3-Dichlorobenzene	--	--	170	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
1-Methylnaphthalene	--	--	--	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--
Hexachloroethane	--	--	--	20 U	20 U	20 U	20 U	20 U	--	--	--	--	--	--

Table 18
Subsurface Sediment Chemical Testing Results - Unit 5, 6 and 9

			Location ID:	**6B-01-DC**	**6B-02-VC**	**6B-02-VC**	**6B-02-VC**	**6B-02-DC**	**6B-02-DC**	**6C-01-VC**	**6C-01-VC**	**6C-01-VC**	**6C-01-DC**	**6C-01-DC**
			Sample ID:	**6B-01-DC-2-3**	**6B-02-VC-1-3**	**6B-02-VC-4-6**	**6B-02-VC-7-9**	**6B-02-DC-1-2**	**6B-02-DC-2-3**	**6C-01-VC-1-3**	**6C-01-VC-4-6**	**6C-01-VC-7-9**	**6C-01-DC-1-2**	**6C-01-DC-2-3**
			Sample Date:	**4/30/2009**	**7/25/08**	**7/25/08**	**7/25/08**	**4/30/2009**	**4/30/2009**	**7/23/08**	**7/23/08**	**7/23/08**	**4/30/2009**	**4/30/2009**
			In-situ Depth^1 (ft):	**2-3**	**1-3**	**4-6**	**7-9**	**1-2**	**2-3**	**1-3**	**4-6**	**7-9**	**1-2**	**2-3**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Grain Size (pct)														
Total Gravel	--	--	--	--	--	**0.5**	--	--	--	**0.8**	**5.7**	**1**	--	--
Total Sand	--	--	--	--	**2.7**	**2.5**	**2.7**	--	--	**40.3**	**78.9**	**80.2**	--	--
Total Silt	--	--	--	--	**57.2**	**51.4**	**55.3**	--	--	**38.7**	**10.1**	**14.3**	--	--
Total Clay	--	--	--	--	**40.2**	**45.6**	**41.8**	--	--	**20.2**	**5.3**	**4.4**	--	--
Total Fines (Silt + Clay)	--	--	--	--	**97.4**	**97**	**97.1**	--	--	**58.9**	**15.4**	**18.7**	--	--
Total Grain Size	--	--	--	--	**100.1**	**100**	**99.8**	--	--	**100**	**100**	**99.9**	--	--
Physical Parameters														
Atterberg Classification	--	--	--	--	**MH**	**MH**	**MH**	--	--	**CH**	**Non-Plastic**	**Non-Plastic**	--	--
Specific gravity (su)	--	--	--	--	**2.69**	**2.66**	**2.64**	--	--	**2.65**	**2.73**	**2.73**	--	--
Liquid Limit (pct)	--	--	--	--	**69.9**	**72.4**	**69.1**	--	--	**59.1**	--	--	--	--
Plastic Limit (pct)	--	--	--	--	**38.5**	**36.5**	**36.1**	--	--	**28.1**	--	--	--	--
Plasticity Index (pct)	--	--	--	--	**31.4**	**35.9**	**33**	--	--	**31**	--	--	--	--
Moisture (water) Content (pct)	--	--	--		**130**	**119.6**	**108**			**71.71**	**24.02**	**19.25**	--	--
Conventional Parameters (pct)														
Total organic carbon	--	--	--	--	--	--	--	**3.34**	**3.01**	--	--	--	**3.7**	**3.17**
Total solids	--	--	--	--	--	--	--	**42.2**	**42.8**	--	--	--	**44.9**	**49.4**
Metals (mg/kg)														
Mercury	0.41	0.59		**2.49**	--	--	--	**0.45**	**0.52**	--	--	--	**0.57**	**0.35**
Aromatic Hydrocarbons (mg/kg-OC)														
Total LPAH	370	780	--	--	--	--	--	**0.69**	**0.37**	--	--	--	**0.97**	0.63 U
Naphthalene	99	170	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Acenaphthylene	66	66	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Acenaphthene	16	57	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Fluorene	23	79	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Phenanthrene	100	480	--	--	--	--	--	**0.69**	**0.37 J**	--	--	--	**0.65**	0.63 U
Anthracene	220	1,200	--	--	--	--	--	0.60 U	0.66 U	--	--	--	**0.32 J**	0.63 U
2-Methylnaphthalene	38	64	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Total HPAH	960	5,300	--	--	--	--	--	**5.3**	**3.4**	--	--	--	**10.2**	**1.5**
Fluoranthene	160	1,200	--	--	--	--	--	**1.1**	**0.73**	--	--	--	**1.8**	**0.44 J**
Pyrene	1,000	1,400	--	--	--	--	--	**1.4**	**0.90**	--	--	--	**2.3**	**0.66**
Benzo(a)anthracene	110	270	--	--	--	--	--	**0.54 J**	**0.40 J**	--	--	--	**0.86**	0.63 U
Chrysene	110	460	--	--	--	--	--	**0.84**	**0.60 J**	--	--	--	**2.0**	**0.35 J**
Benzo(b)fluoranthene	--	--	--	--	--	--	--	**0.54 J**	**0.40 J**	--	--	--	**1.1**	0.63 U
Benzo(k)fluoranthene	--	--	--	--	--	--	--	**0.42 J**	**0.37 J**	--	--	--	**0.84**	0.63 U
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	--	--	**0.96 J**	**0.76 J**	--	--	--	**1.9**	0.63 U
Benzo(a)pyrene	99	210	--	--	--	--	--	**0.42 J**	0.66 U	--	--	--	**0.70**	0.63 U
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	--	--	0.60 U	0.66 U	--	--	--	**0.32 J**	0.63 U
Dibenzo(a,h)anthracene	12	33	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Benzo(g,h,i)perylene	31	78	--	--	--	--	--	0.60 U	0.66 U	--	--	--	**0.30 J**	0.63 U
Chlorinated Benzenes (mg/kg-OC)														
1,2-Dichlorobenzene	2.3	2.3	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
1,4-Dichlorobenzene	3.1	9	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Hexachlorobenzene	0.38	2.3	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U

Table 18
Subsurface Sediment Chemical Testing Results - Unit 5, 6 and 9

	Location ID:			6B-01-DC	6B-02-VC	6B-02-VC	6B-02-VC	6B-02-DC	6B-02-DC	6C-01-VC	6C-01-VC	6C-01-VC	6C-01-DC	6C-01-DC
	Sample ID:			6B-01-DC-2-3	6B-02-VC-1-3	6B-02-VC-4-6	6B-02-VC-7-9	6B-02-DC-1-2	6B-02-DC-2-3	6C-01-VC-1-3	6C-01-VC-4-6	6C-01-VC-7-9	6C-01-DC-1-2	6C-01-DC-2-3
	Sample Date:			4/30/2009	7/25/08	7/25/08	7/25/08	4/30/2009	4/30/2009	7/23/08	7/23/08	7/23/08	4/30/2009	4/30/2009
	In-situ Depth[1] (ft):			2-3	1-3	4-6	7-9	1-2	2-3	1-3	4-6	7-9	1-2	2-3
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Phthalates (mg/kg-OC)														
Dimethyl phthalate	53	53	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Diethyl phthalate	61	110	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Di-n-butyl phthalate	220	1,700	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Butylbenzyl phthalate	4.9	64	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	--	--	**0.36 J**	0.66 U	--	--	--	0.54 U	0.63 U
Di-n-octyl phthalate	58	4,500	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Miscellaneous (mg/kg-OC)														
Dibenzofuran	15	58	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Hexachlorobutadiene	3.9	6.2	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
N-Nitrosodiphenylamine	11	11	--	--	--	--	--	0.60 U	0.66 U	--	--	--	0.54 U	0.63 U
Ionizable Organic Compounds (ug/kg)														
Phenol	420	1,200	420	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
2-Methylphenol (o-Cresol)	63	63	63	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
4-Methylphenol (p-Cresol)	670	670	670	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
2,4-Dimethylphenol	29	29	29	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Pentachlorophenol	360	690	140	--	--	--	--	99 U	100 U	--	--	--	98 U	98 U
Benzyl alcohol	57	73	57	--	--	--	--	20 U	**(20 U) R**	--	--	--	20 U	20 U
Benzoic acid	650	650	650	--	--	--	--	200 U	200 UJ	--	--	--	200 U	200 U
Aromatic Hydrocarbons (ug/kg)														
Total LPAH	--	--	5,200	--	--	--	--	**23**	**11**	--	--	--	**36**	20 U
Naphthalene	--	--	2,100	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Acenaphthylene	--	--	560	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Acenaphthene	--	--	500	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Fluorene	--	--	540	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Phenanthrene	--	--	1,500	--	--	--	--	**23**	**11 J**	--	--	--	**24**	20 U
Anthracene	--	--	960	--	--	--	--	20 U	20 U	--	--	--	**12 J**	20 U
2-Methylnaphthalene	--	--	670	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Total HPAH	--	--	12,000	--	--	--	--	**176**	**102**	--	--	--	**377**	**46**
Fluoranthene	--	--	1,700	--	--	--	--	**38**	**22**	--	--	--	**66**	**14 J**
Pyrene	--	--	2,600	--	--	--	--	**46**	**27**	--	--	--	**86**	**21**
Benzo(a)anthracene	--	--	1,300	--	--	--	--	**18 J**	**12 J**	--	--	--	**32**	20 U
Chrysene	--	--	1,400	--	--	--	--	**28**	**18 J**	--	--	--	**74**	**11 J**
Benzo(b)fluoranthene	--	--	--	--	--	--	--	**18 J**	**12 J**	--	--	--	**39**	20 U
Benzo(k)fluoranthene	--	--	--	--	--	--	--	**14 J**	**11 J**	--	--	--	**31**	20 U
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	--	--	**32 J**	**23 J**	--	--	--	**70**	20 U
Benzo(a)pyrene	--	--	1,600	--	--	--	--	**14 J**	20 U	--	--	--	**26**	20 U
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	--	--	20 U	20 U	--	--	--	**12 J**	20 U
Dibenzo(a,h)anthracene	--	--	230	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Benzo(g,h,i)perylene	--	--	670	--	--	--	--	20 U	20 U	--	--	--	**11 J**	20 U
Chlorinated Benzenes (ug/kg)														
1,2-Dichlorobenzene	--	--	35	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
1,4-Dichlorobenzene	--	--	110	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
1,2,4-Trichlorobenzene	--	--	31	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Hexachlorobenzene	--	--	22	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Miscellaneous (ug/kg)														
Dibenzofuran	--	--	540	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Hexachlorobutadiene	--	--	11	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
N-Nitrosodiphenylamine	--	--	28	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U

Table 18
Subsurface Sediment Chemical Testing Results - Unit 5, 6 and 9

			Location ID:	**6B-01-DC**	**6B-02-VC**	**6B-02-VC**	**6B-02-VC**	**6B-02-DC**	**6B-02-DC**	**6C-01-VC**	**6C-01-VC**	**6C-01-VC**	**6C-01-DC**	**6C-01-DC**
			Sample ID:	**6B-01-DC-2-3**	**6B-02-VC-1-3**	**6B-02-VC-4-6**	**6B-02-VC-7-9**	**6B-02-DC-1-2**	**6B-02-DC-2-3**	**6C-01-VC-1-3**	**6C-01-VC-4-6**	**6C-01-VC-7-9**	**6C-01-DC-1-2**	**6C-01-DC-2-3**
			Sample Date:	**4/30/2009**	**7/25/08**	**7/25/08**	**7/25/08**	**4/30/2009**	**4/30/2009**	**7/23/08**	**7/23/08**	**7/23/08**	**4/30/2009**	**4/30/2009**
			In-situ Depth^1 (ft):	**2-3**	**1-3**	**4-6**	**7-9**	**1-2**	**2-3**	**1-3**	**4-6**	**7-9**	**1-2**	**2-3**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Phthalates (ug/kg)														
Dimethyl phthalate	--	--	71	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Diethyl phthalate	--	--	48	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Di-n-butyl phthalate	--	--	1,400	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Butylbenzyl phthalate	--	--	63	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	--	--	**12 J**	20 U	--	--	--	20 U	20 U
Di-n-octyl phthalate	--	--	420	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Semi-Volatile Organics (ug/kg)														
1,3-Dichlorobenzene	--	--	170	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
1-Methylnaphthalene	--	--	--	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U
Hexachloroethane	--	--	--	--	--	--	--	20 U	20 U	--	--	--	20 U	20 U

Table 18
Subsurface Sediment Chemical Testing Results - Unit 5, 6 and 9

			Location ID:	6C-02-VC	6C-02-VC	6C-02-VC	6C-02-DC	6C-02-DC	9-01-VC	9-02-VC	9-03-VC	9-04-VC	9-05-VC	9-06-VC
			Sample ID:	6C-02-VC-1-3	6C-02-VC-4-6	6C-02-VC-7-9	6C-02-DC-1-2	6C-02-DC-2-3	9-01-VC-0-4	9-02-VC-0-4	9-03-VC-0-4	9-04-VC-0-4	9-05-VC-0-4	9-06-VC-0-4
			Sample Date:	7/23/08	7/23/08	7/23/08	4/30/2009	4/30/2009	7/16/08	7/16/08	7/15/08	7/16/08	7/16/08	7/16/08
			In-situ Depth^1 (ft):	1-3	4-6	7-9	1-2	2-3	0-4	0-4	0-4	0-4	0-4	0-4
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Grain Size (pct)														
Total Gravel	--	--	--	--	--	0.2	--	--	--	--	--	--	--	--
Total Sand	--	--	--	2.7	3.9	15.9	--	--	--	--	--	--	--	--
Total Silt	--	--	--	56.8	52.9	52.9	--	--	--	--	--	--	--	--
Total Clay	--	--	--	40.4	43.2	31	--	--	--	--	--	--	--	--
Total Fines (Silt + Clay)	--	--	--	97.2	96.1	83.9	--	--	--	--	--	--	--	--
Total Grain Size	--	--	--	99.9	100	100	--	--	--	--	--	--	--	--
Physical Parameters														
Atterberg Classification	--	--	--	CH	MH	CH	--	--	--	--	--	--	--	--
Specific gravity (su)	--	--	--	2.69	2.65	2.67	--	--	--	--	--	--	--	--
Liquid Limit (pct)	--	--	--	100	97.2	65.1	--	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	41	41.5	31.7	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	59.3	55.7	33.4	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	--	--	--	164.5	104	85.31	--	--	--	--	--	--	--	--
Conventional Parameters (pct)														
Total organic carbon	--	--	--	--	--	--		--	1.12	0.738	1.86	1.68	2.51	1.99
Total solids	--	--	--	--	--	--		--	54.9	54.3	52.5	43	43.3	75.7
Metals (mg/kg)														
Mercury	0.41	0.59		--	--	--	0.47	0.67	0.22	0.37	1.26	0.79	0.4	0.07
Aromatic Hydrocarbons (mg/kg-OC)														
Total LPAH	370	780	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	99	170	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	66	66	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	16	57	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	23	79	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	100	480	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	220	1,200	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	38	64	--	--	--	--	--	--	--	--	--	--	--	--
Total HPAH	960	5,300	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	160	1,200	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	1,000	1,400	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	110	270	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	110	460	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Benzofluoranthenes (b, j, k)	230	450	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	99	210	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene	34	88	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	12	33	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	31	78	--	--	--	--	--	--	--	--	--	--	--	--
Chlorinated Benzenes (mg/kg-OC)														
1,2-Dichlorobenzene	2.3	2.3	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3.1	9	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.81	1.8	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	0.38	2.3	--	--	--	--	--	--	--	--	--	--	--	--

Table 18
Subsurface Sediment Chemical Testing Results - Unit 5, 6 and 9

			Location ID:	**6C-02-VC**	**6C-02-VC**	**6C-02-VC**	**6C-02-DC**	**6C-02-DC**	**9-01-VC**	**9-02-VC**	**9-03-VC**	**9-04-VC**	**9-05-VC**	**9-06-VC**
			Sample ID:	**6C-02-VC-1-3**	**6C-02-VC-4-6**	**6C-02-VC-7-9**	**6C-02-DC-1-2**	**6C-02-DC-2-3**	**9-01-VC-0-4**	**9-02-VC-0-4**	**9-03-VC-0-4**	**9-04-VC-0-4**	**9-05-VC-0-4**	**9-06-VC-0-4**
			Sample Date:	**7/23/08**	**7/23/08**	**7/23/08**	**4/30/2009**	**4/30/2009**	**7/16/08**	**7/16/08**	**7/15/08**	**7/16/08**	**7/16/08**	**7/16/08**
			In-situ Depth^1 (ft):	**1-3**	**4-6**	**7-9**	**1-2**	**2-3**	**0-4**	**0-4**	**0-4**	**0-4**	**0-4**	**0-4**
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Phthalates (mg/kg-OC)														
Dimethyl phthalate	53	53	--	--	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	61	110	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	220	1,700	--	--	--	--	--	--	--	--	--	--	--	--
Butylbenzyl phthalate	4.9	64	--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	47	78	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	58	4,500	--	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous (mg/kg-OC)														
Dibenzofuran	15	58	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	3.9	6.2	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	11	11	--	--	--	--	--	--	--	--	--	--	--	--
Ionizable Organic Compounds (ug/kg)														
Phenol	420	1,200	420	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	63	63	63	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	670	670	670	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	29	29	29	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	360	690	140	--	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	57	73	57	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	650	650	650	--	--	--	--	--	--	--	--	--	--	--
Aromatic Hydrocarbons (ug/kg)														
Total LPAH	--	--	5,200	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	--	--	2,100	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	--	--	560	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	--	--	500	--	--	--	--	--	--	--	--	--	--	--
Fluorene	--	--	540	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	--	--	1,500	--	--	--	--	--	--	--	--	--	--	--
Anthracene	--	--	960	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	--	--	670	--	--	--	--	--	--	--	--	--	--	--
Total HPAH	--	--	12,000	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	--	--	1,700	--	--	--	--	--	--	--	--	--	--	--
Pyrene	--	--	2,600	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	--	--	1,300	--	--	--	--	--	--	--	--	--	--	--
Chrysene	--	--	1,400	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Benzofluoranthenes (b, j, k)	--	--	3,200	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	--	--	1,600	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene	--	--	600	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	--	--	230	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	--	--	670	--	--	--	--	--	--	--	--	--	--	--
Chlorinated Benzenes (ug/kg)														
1,2-Dichlorobenzene	--	--	35	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	--	--	110	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	--	--	31	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	--	--	22	--	--	--	--	--	--	--	--	--	--	--
Miscellaneous (ug/kg)														
Dibenzofuran	--	--	540	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	--	--	11	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	28	--	--	--	--	--	--	--	--	--	--	--

Table 18
Subsurface Sediment Chemical Testing Results - Unit 5, 6 and 9

	Location ID:			6C-02-VC	6C-02-VC	6C-02-VC	6C-02-DC	6C-02-DC	9-01-VC	9-02-VC	9-03-VC	9-04-VC	9-05-VC	9-06-VC
	Sample ID:			6C-02-VC-1-3	6C-02-VC-4-6	6C-02-VC-7-9	6C-02-DC-1-2	6C-02-DC-2-3	9-01-VC-0-4	9-02-VC-0-4	9-03-VC-0-4	9-04-VC-0-4	9-05-VC-0-4	9-06-VC-0-4
	Sample Date:			7/23/08	7/23/08	7/23/08	4/30/2009	4/30/2009	7/16/08	7/16/08	7/15/08	7/16/08	7/16/08	7/16/08
	In-situ Depth[1] (ft):			1-3	4-6	7-9	1-2	2-3	0-4	0-4	0-4	0-4	0-4	0-4
Analyte	**SMS SQS**	**SMS CSL**	**PS LAET**											
Phthalates (ug/kg)														
Dimethyl phthalate	--	--	71	--	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	--	--	48	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	--	--	1,400	--	--	--	--	--	--	--	--	--	--	--
Butylbenzyl phthalate	--	--	63	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	--	--	1,300	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	--	--	420	--	--	--	--	--	--	--	--	--	--	--
Semi-Volatile Organics (ug/kg)														
1,3-Dichlorobenzene	--	--	170	--	--	--	--	--	--	--	--	--	--	--
1-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

🟨 Detected concentration is greater than SMS SQS screening level

🟩 Detected concentration is greater than SMS CSL screening level

🟦 Detected concentration is greater than 1988 Puget Sound Estuary Program LAET screening level

1. Sample depth is reported as below mudline.

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

R= Rejected analytical result due to low or no recoveries in the LCS and/or MS/MSD analyses in both the full scan and SIM SVOC analyses.

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene

Benzo(j)fluoranthene is included in the total of benzo(b&k)fluoranthenes

Totals are calculated for LPAH and HPAH as the sum of all detected results. If all are undetcted results, the highest reporting limit value is reported as the sum.

-- Sample was not submitted for chemical analysis.

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

mg/kg-OC = milligrams per kilogram organic carbon normalized

pct = percent

Non-organic carbon normalized samples with TOC results outside of the 0.5-3.5% range were screened against the 1988 Puget Sound Estuary Program LAET

The site specific Bioaccumulaltion Screening Level (BSL) for mercury is 1.2 mg/kg. (Supplemental RI Report, RETEC 2006)

Table 19
Subsurface Sediment Leachability Testing Results

Location ID:	1A-01-VC	1A-01-VC	1B-01-VC	1B-01-VC	1C-01-VC	1C-03-VC	1C-05-VC	1C-06-VC	1C-07-VC	1C-08-VC	3B-01-VC	8-01-COMP
Sample ID:	**1A-01-VC-C1**	**1A-01-VC-C2**	**1B-01-VC-C1**	**1B-01-VC-C2**	**1C-01-VC-U-0-3.4**	**1C-03-VC-U-0-1**	**1C-05-VC-U-0-2.5**	**1C-06-VC-U**	**1C-07-VC-U**	**1C-08-VC-U**	**3B-01-VC-1-3**	**8-01-COMP**
Sample Date:	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/21/08**	**7/22/08**	**7/22/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/21/08**	**1/21/09**
In-situ Depth[1] (ft):	**0-4**	**0-4**	**0-4**	**0-4**	**0-3.4**	**0-1**	**0-2.5**	**0-1**	**0-3**	**0-1**	**1-3**	**varies**
TCLP (mg/l)												
Arsenic	--	--	--	--	--	--	--	--	--	--	--	0.2 U
Barium	--	--	--	--	--	--	--	--	--	--	--	0.19 U
Cadmium	--	--	--	--	--	--	--	--	--	--	--	0.01 U
Chromium	--	--	--	--	--	--	--	--	--	--	--	0.02 U
Lead	--	--	--	--	--	--	--	--	--	--	--	0.1 U
Mercury	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 UP
Selenium	--	--	--	--	--	--	--	--	--	--	--	0.2 U
Silver	--	--	--	--	--	--	--	--	--	--	--	0.02 U
TCLP (ug/l)												
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
1-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
2-Methylphenol (o-Cresol)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
4-Methylphenol (p-Cresol)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzoic acid	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	--
Benzyl alcohol	50 U	50 U	50 U	50 U	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	--
Bis(2-ethylhexyl) phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Butylbenzyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Dibenzo(a,h)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Diethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Di-n-butyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Di-n-octyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Hexachloroethane	10 U	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	--
Indeno(1,2,3-c,d)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--

Table 19
Subsurface Sediment Leachability Testing Results

Location ID:	**1A-01-VC**	**1A-01-VC**	**1B-01-VC**	**1B-01-VC**	**1C-01-VC**	**1C-03-VC**	**1C-05-VC**	**1C-06-VC**	**1C-07-VC**	**1C-08-VC**	**3B-01-VC**	**8-01-COMP**
Sample ID:	**1A-01-VC-C1**	**1A-01-VC-C2**	**1B-01-VC-C1**	**1B-01-VC-C2**	**1C-01-VC-U-0-3.4**	**1C-03-VC-U-0-1**	**1C-05-VC-U-0-2.5**	**1C-06-VC-U**	**1C-07-VC-U**	**1C-08-VC-U**	**3B-01-VC-1-3**	**8-01-COMP**
Sample Date:	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/21/08**	**7/22/08**	**7/22/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/21/08**	**1/21/09**
In-situ Depth[1] (ft):	**0-4**	**0-4**	**0-4**	**0-4**	**0-3.4**	**0-1**	**0-2.5**	**0-1**	**0-3**	**0-1**	**1-3**	**varies**
N-Nitrosodiphenylamine	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	--
Pentachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	--
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Phenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
SPLP (mg/l)												
Arsenic	--	--	--	--	--	--	--	--	--	--	--	0.05 U
Barium	--	--	--	--	--	--	--	--	--	--	--	**0.082**
Cadmium	--	--	--	--	--	--	--	--	--	--	--	0.002 U
Chromium	--	--	--	--	--	--	--	--	--	--	--	**0.009**
Lead	--	--	--	--	--	--	--	--	--	--	--	0.02 U
Mercury	**0.0001**	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	**0.0001**	0.0001 U	0.0001 U	**0.0001 J**
Selenium	--	--	--	--	--	--	--	--	--	--	--	0.05 U
Silver	--	--	--	--	--	--	--	--	--	--	--	0.003 U
SPLP (ug/l)												
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
1-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
2-Methylphenol (o-Cresol)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
4-Methylphenol (p-Cresol)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Benzoic acid	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 UJ	100 U	--
Benzyl alcohol	50 U	50 U	50 U	50 U	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	--
Bis(2-ethylhexyl) phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Butylbenzyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Dibenzo(a,h)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Diethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Di-n-butyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Di-n-octyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--

Table 19
Subsurface Sediment Leachability Testing Results

Location ID:	**1A-01-VC**	**1A-01-VC**	**1B-01-VC**	**1B-01-VC**	**1C-01-VC**	**1C-03-VC**	**1C-05-VC**	**1C-06-VC**	**1C-07-VC**	**1C-08-VC**	**3B-01-VC**	**8-01-COMP**
Sample ID:	**1A-01-VC-C1**	**1A-01-VC-C2**	**1B-01-VC-C1**	**1B-01-VC-C2**	**1C-01-VC-U-0-3.4**	**1C-03-VC-U-0-1**	**1C-05-VC-U-0-2.5**	**1C-06-VC-U**	**1C-07-VC-U**	**1C-08-VC-U**	**3B-01-VC-1-3**	**8-01-COMP**
Sample Date:	**7/17/08**	**7/17/08**	**7/17/08**	**7/17/08**	**7/21/08**	**7/22/08**	**7/22/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/21/08**	**1/21/09**
In-situ Depth[1] (ft):	**0-4**	**0-4**	**0-4**	**0-4**	**0-3.4**	**0-1**	**0-2.5**	**0-1**	**0-3**	**0-1**	**1-3**	**varies**
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Indeno(1,2,3-c,d)pyrene	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	--
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
N-Nitrosodiphenylamine	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	--
Pentachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	--
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Phenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--

Notes:

1. Sample depth is reported as below mudline.

Bold = Detected result

Sample ID 8-01-COMP is an ASB composite sample homogenized from both ASB core processing and grab collection.

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

P = Professional judgement. Data considered usable; however, hold-times were exceeded.

mg/l = milligrams per liter, ug/l = micrograms per liter

TCLP = Toxicity Characteristic Leaching Procedure

SPLP = Synthetic Precipitation Leaching Procedure

-- Sample was not submitted for chemical analysis.

Table 20
Subsurface Sediment Composite Elutriate Testing Results

	Site Area	Unit 1A/1B - Outer Waterway				Unit 1C - Outer Waterway BST			
	Sample ID:	1A-1B-01-COMP	1A-1B-01-COMP	1A-1B-01-COMP	1A-1B-01-COMP	1C-01-VC-U-COMP	1C-01-VC-U-COMP	1C-01-VC-U-COMP	1C-01-VC-U-COMP
	Sample Date:	2/4/2009	2/4/2009	2/4/2009	2/4/2009	2/17/2009	2/17/2009	2/18/2009	2/18/2009
	Testing Method:	DRET	DRET	MET	MET	DRET	DRET	MET	MET
Analyte	Sample Type:	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Ammonia		**0.636**	**0.671**	**3.27**	**3**	**0.727**	**0.733**	**4.93**	**4.74**
Conventionals (mg/L)									
Total Suspended Solids		--	**188**	--	**5.2**	--	**185**	--	**4.6**
Metals dissolved (µg/L)									
Antimony		**0.8**	--	**2**	--	**0.8**	--	**3.7**	--
Arsenic		1.0 U	--	**6**	--	**2**	--	**3**	--
Cadmium		0.5 U	--	1.0 U	--	0.5 U	--	0.5 U	--
Chromium		1.0 U	--	5.0 U	--	1.0 U	--	**6**	--
Copper		**3**	--	**3**	--	**3**	--	**8**	--
Lead		2.0 U	--	5.0 U	--	2.0 U	--	2.0 U	--
Mercury		0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--
Nickel		**5**	--	**6**	--	**12**	--	**13**	--
Selenium		**6**	--	**14**	--	**10**	--	**8**	--
Silver		0.5 U	--	1.0 U	--	0.5 U	--	0.5 U	--
Zinc		10 U	--	20 U	--	10 U	--	**10**	--
Metals total (µg/L)									
Antimony		--	**0.7**	--	**2**	--	**0.7**	--	**4**
Arsenic		--	**3**	--	**5**	--	**2**	--	**3**
Cadmium		--	0.5 U	--	1.0 U	--	0.5 U	--	0.5 U
Chromium		--	**11**	--	5.0 U	--	**12**	--	**2**
Copper		--	**10**	--	**3**	--	**12**	--	**4**
Lead		--	2.0 U	--	5.0 U	--	**3**	--	2.0 U
Mercury		--	**0.11**	--	0.1 U	--	**0.11**	--	0.1 U
Nickel		--	**19**	--	**5**	--	**21**	--	**6**
Selenium		--	**7**	--	**13**	--	**6**	--	**9**
Silver		--	0.5 U	--	1.0 U	--	0.5 U	--	0.5 U
Zinc		--	**20**	--	20 U	--	**20**	--	10 U
Aromatic Hydrocarbons (µg/L)									
1-Methylnaphthalene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Methylnaphthalene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthylene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Anthracene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(a)anthracene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(a)pyrene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(b)fluoranthene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(g,h,i)perylene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(k)fluoranthene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chrysene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenzo(a,h)anthracene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenzofuran		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dimethyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table 20
Subsurface Sediment Composite Elutriate Testing Results

	Site Area	Unit 1A/1B - Outer Waterway				Unit 1C - Outer Waterway BST			
	Sample ID:	**1A-1B-01-COMP**	**1A-1B-01-COMP**	**1A-1B-01-COMP**	**1A-1B-01-COMP**	**1C-01-VC-U-COMP**	**1C-01-VC-U-COMP**	**1C-01-VC-U-COMP**	**1C-01-VC-U-COMP**
	Sample Date:	**2/4/2009**	**2/4/2009**	**2/4/2009**	**2/4/2009**	**2/17/2009**	**2/17/2009**	**2/18/2009**	**2/18/2009**
	Testing Method:	**DRET**	**DRET**	**MET**	**MET**	**DRET**	**DRET**	**MET**	**MET**
Analyte	**Sample Type:**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Fluoranthene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluorene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Indeno(1,2,3-c,d)pyrene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Naphthalene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Phenanthrene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pyrene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Semi-Volatiles (µg/L)									
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	1.0 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	1.0 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	1.0 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	1.0 U
2,4-Dimethylphenol		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Methoxyphenol (Guaiacol)		2.0 U	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Methylphenol (o-Cresol)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
3,4,5-Trichloroguaiacol		7.5 U	7.5 U	7.5 U	7.5 U	1.0 U	1.0 U	1.0 U	1.0 U
4,5,6-Trichloroguaiacol		5.0 U	5.0 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4,5-Dichloroguaiacol		5.0 U	5.0 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methylphenol (p-Cresol)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzoic acid		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl alcohol		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bis(2-ethylhexyl) phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**24**	1.0 U	1.0 U
Butylbenzyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Diethyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-butyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-octyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Hexachlorobenzene		1.0 U	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	1.0 U
Hexachloroethane		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
N-Nitrosodiphenylamine		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pentachlorophenol		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Phenol		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroguaiacol		7.5 U	7.5 U	7.5 U	7.5 U	1.0 U	1.0 U	1.0 U	1.0 U

Table 20
Subsurface Sediment Composite Elutriate Testing Results

	Site Area	Unit 2A/3B - Inner Waterway				Unit 8 - ASB Solids					
	Sample ID:	2A-3B-01-COMP	2A-3B-01-COMP	2A-3B-01-COMP	2A-3B-01-COMP	8-01-COMP	8-01-COMP	8-01-COMP	8-01-COMP	ASB WATER	WHATCOM WATERWAY SITE WATER
	Sample Date:	2/10/2009	2/10/2009	2/6/2009	2/6/2009	2/13/2009	2/13/2009	2/11/2009	2/11/2009	1/8/2009	1/16/2009
	Testing Method:	DRET	DRET	MET	MET	DRET	DRET	MET	MET	Site Water	Site Water
Analyte	Sample Type:	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Total
Ammonia		3.74	3.75	33.4	31.3	60	62.2	354	360	0.892 J	0.082 J
Conventionals (mg/L)											
Total Suspended Solids		--	158	--	14.1	--	1950	--	3450	3.2 J	12.4 J
Metals dissolved (µg/L)											
Antimony		0.9	--	2	--	0.6	--	1	--	0.2	0.5 U
Arsenic		1.9	--	4	--	1.6	--	3.1	--	0.8	1.0 U
Cadmium		0.5 U	--	1.0 U	--	0.2 U	--	0.2 U	--	0.2 U	0.5 U
Chromium		1.0 U	--	2.0 U	--	8.3	--	39.7	--	1	1
Copper		2	--	3	--	1.5	--	1.9	--	1	3
Lead		2.0 U	--	5.0 U	--	1.0 U	--	1	--	1.0 U	2.0 U
Mercury		0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 UP	0.1 UP
Nickel		5	--	6	--	5.3	--	22.1	--	1.6	4
Selenium		7	--	11	--	0.5 U	--	0.9	--	0.7	5
Silver		0.5 U	--	1.0 U	--	0.2 U	--	0.2 U	--	0.2 U	0.5 U
Zinc		10 U	--	20 U	--	9	--	11	--	4 U	10 U
Metals total (µg/L)											
Antimony		--	1	--	2	--	2.2	--	4.1	0.2	0.5 U
Arsenic		--	2	--	3	--	20.9	--	32.1	0.9	2
Cadmium		--	0.5 U	--	1.0 U	--	35	--	60.8	0.2 U	0.5 U
Chromium		--	12	--	3	--	577	--	1,220	2.1	2
Copper		--	13	--	5	--	196	--	353	1.6	3
Lead		--	11	--	5.0 U	--	98	--	146	1.0 U	2.0 U
Mercury		--	0.13	--	0.1 U	--	10.3	--	28	0.1 UP	0.1 UP
Nickel		--	17	--	8	--	78.1	--	147	1.9	4
Selenium		--	8	--	10	--	3.5	--	7	0.7	6
Silver		--	0.5 U	--	1.0 U	--	1.7	--	2.4	0.2 U	0.5 U
Zinc		--	30	--	20 U	--	1,370	--	2,600	8	10 U
Aromatic Hydrocarbons (µg/L)											
1-Methylnaphthalene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
2-Methylnaphthalene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Acenaphthene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Acenaphthylene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Anthracene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Benzo(a)anthracene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Benzo(a)pyrene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Benzo(b)fluoranthene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Benzo(g,h,i)perylene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Benzo(k)fluoranthene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Chrysene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Dibenzo(a,h)anthracene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Dibenzofuran		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Dimethyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP

Table 20
Subsurface Sediment Composite Elutriate Testing Results

	Site Area	**Unit 2A/3B - Inner Waterway**				**Unit 8 - ASB Solids**					
	Sample ID:	**2A-3B-01-COMP**	**2A-3B-01-COMP**	**2A-3B-01-COMP**	**2A-3B-01-COMP**	**8-01-COMP**	**8-01-COMP**	**8-01-COMP**	**8-01-COMP**	**ASB WATER**	**WHATCOM WATERWAY SITE WATER**
	Sample Date:	**2/10/2009**	**2/10/2009**	**2/6/2009**	**2/6/2009**	**2/13/2009**	**2/13/2009**	**2/11/2009**	**2/11/2009**	**1/8/2009**	**1/16/2009**
	Testing Method:	**DRET**	**DRET**	**MET**	**MET**	**DRET**	**DRET**	**MET**	**MET**	**Site Water**	**Site Water**
Analyte	**Sample Type:**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Total**	**Total**
Fluoranthene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**2.3**	1.0 U	1.0 U	1.0 UP	1.4 UP
Fluorene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Indeno(1,2,3-c,d)pyrene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Naphthalene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**4.4**	**2.2**	**4.3**	1.0 UP	1.4 UP
Phenanthrene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**2.3**	1.0 U	1.0 U	1.0 UP	1.4 UP
Pyrene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.4**	1.0 U	1.0 U	1.0 UP	1.4 UP
Semi-Volatiles (µg/L)											
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	1.0 U	1.0 UP	1.4 UP
1,2-Dichlorobenzene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
1,3-Dichlorobenzene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
1,4-Dichlorobenzene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
2,4-Dimethylphenol		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
2-Methoxyphenol (Guaiacol)		1.0 U	1.0 U	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
2-Methylphenol (o-Cresol)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
3,4,5-Trichloroguaiacol		1.0 U	1.0 U	7.5 U	7.5 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
4,5,6-Trichloroguaiacol		1.0 U	1.0 U	5.0 U	5.0 U	1.0 U	1.0 U	2.4 U	2.3 U	1.0 UP	1.4 UP
4,5-Dichloroguaiacol		1.0 U	1.0 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
4-Methylphenol (p-Cresol)		1.0 U	1.0 U	1.0 U	1.0 U	**1.1**	**20**	**130**	**140**	1.0 UP	1.4 UP
Benzoic acid		10 U	10 U	10 U	10 U	10 U	10 U	**19**	**22**	10 UP	1.4 UP
Benzyl alcohol		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UP	6.8 UP
Bis(2-ethylhexyl) phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.0**	1.0 U	**160**	**2.5 J**	1.4 UP
Butylbenzyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Diethyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Di-n-butyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Di-n-octyl phthalate		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Hexachlorobenzene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Hexachlorobutadiene		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Hexachloroethane		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
N-Nitrosodiphenylamine		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UP	1.4 UP
Pentachlorophenol		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UP	6.8 UP
Phenol		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**9.8**	**270**	**300**	1.0 UP	1.4 UP
Tetrachloroguaiacol		1.0 U	1.0 U	7.5 U	7.5 U	1.0 U	**1.1**	**1 .0**	**1.8**	1.0 UP	1.4 UP

Notes:
*- Samples exceeded holding times
Bold = Detected result
-- Sample was not submitted for chemical analysis.
J = Estimated value
U = Compound analyzed, but not detected above detection limit
P = Professional judgement. Data considered usable; however, hold-times were exceeded.
µg/L = micrograms per liter
mg/L = milligrams per liter

Table 21a
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101A-HSA	8-101B-HSA	8-101B-HSA
Sample ID:	8-101A-HSA-S1	8-101A-HSA-S5	8-101A-HSA-S6	8-101A-HSA-S7	8-101A-HSA-S8	8-101A-HSA-S9	8-101A-HSA-S10	8-101A-HSA-S11	8-101A-HSA-S12	8-101A-HSA-S13	8-101A-HSA-S14	8-101A-HSA-S15	8-101B-HSA-S3	8-101B-HSA-S6
Sample Date:	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/23/08	7/23/08	7/23/08	7/24/08	7/24/08
In-Situ Depth[1] (ft):	2.5 - 4 ft	10 - 11.5 ft	15 - 16.5 ft	20 - 21.5 ft	25 - 26.5 ft	30 - 31.5 ft	35 - 36.5 ft	40 - 41.5 ft	45 - 46.5 ft	50 - 51.5 ft	55 - 56.5 ft	60 - 63.5 ft	5.5 - 7 ft	12.5 - 14 ft
Physical Parameters														
Atterberg Classification	--	Non-Plastic	--	--	--	--	Non-Plastic	--	CL	--	CL	--	--	--
Specific gravity (su)	--	2.64	--	--	--	--	2.71	--	2.76	--	2.78	--	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	36.6	--	29.3	--	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	14.4	--	13.6	--	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	22.1	--	15.7	--	--	--
Moisture (water) Content (pct)	4.18	31.4	17.69	15.25	22.23	30.14	23.98	18.73	28.25	21.41	21.14	21.2	95.82	28.49
Grain Size (pct)														
Gravel	17.7	--	--	--	--	1.2	--	0.3	--	1.3	--	2.9	3.61	0.1
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	16.5	--	--	--	--	2.4	--	1.1	--	1.6	--	1.7	6.52	0.9
Sand, Fine	35.2	--	--	--	--	56.4	--	76.7	--	18.7	--	16.6	19.11	67.5
Sand, Medium	26.9	--	--	--	--	24.8	--	12.9	--	5.5	--	5.2	10.55	7
Silt, Coarse	--	--	--	--	--	--	--	--	--	5	--	5.1	4.06	1.6
Silt, Fine	--	--	--	--	--	--	--	--	--	8.6	--	8.8	10.16	1.6
Silt, Medium	--	--	--	--	--	--	--	--	--	7.1	--	8.1	8.13	1.6
Silt, Very Coarse	3.8	--	--	--	--	15.2	--	9	--	12.5	--	11.5	5.34	16.7
Silt, Very Fine	--	--	--	--	--	--	--	--	--	8.5	--	8.1	13.21	1.6
Clay	--	--	--	--	--	--	--	--	--	31.2	--	32.3	19.3	1.6
Total Gravel	17.7	--	--	--	--	1.2	--	0.3	--	1.3	--	2.9	3.61	0.1
Total Sand	78.6	--	--	--	--	83.6	--	90.7	--	25.8	--	23.5	36.18	75.4
Total Silt	3.8	--	--	--	--	15.2	--	9	--	41.7	--	41.6	40.9	23.1
Total Clay	--	--	--	--	--	--	--	--	--	31.2	--	32.3	19.3	1.6
Total Fines (Silt + Clay)	3.8	--	--	--	--	15.2	--	9	--	72.9	--	73.9	60.2	24.7
Total Grain Size	100.1	--	--	--	--	100	--	100	--	100	--	100.3	99.99	100.2
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	--	--	23.4	--	24.2	0	1.6
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	--	--	7.8	--	8.1	19.3	0.1 U
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	--	--	8.5	--	8.1	13.21	1.6
Percent retained 7 micron sieve	--	--	--	--	--	--	--	--	--	4.3	--	5.1	6.1	0.1 U
Percent retained 9 micron sieve	--	--	--	--	--	--	--	--	--	4.3	--	3.7	4.06	1.6
Percent retained 13 micron sieve	--	--	--	--	--	--	--	--	--	7.1	--	8.1	8.13	1.6
Percent retained 22 micron sieve	--	--	--	--	--	--	--	--	--	5	--	5.1	4.06	1.6
Percent retained 32 micron sieve	3.8	--	--	--	--	15.2	--	9	--	12.5	--	11.5	5.34	16.7
Percent retained 75 micron sieve	6.1	--	--	--	--	19.1	--	22.5	--	8.2	--	7.8	8.32	29.2
Percent retained 150 micron sieve	12.6	--	--	--	--	16.7	--	26.2	--	5.6	--	4.7	5.13	31.2
Percent retained 250 micron sieve	16.5	--	--	--	--	20.6	--	28	--	4.9	--	4.1	5.66	7.1
Percent retained 425 micron sieve	13.8	--	--	--	--	15.9	--	9.8	--	3.2	--	2.9	5.36	3.5
Percent retained 850 micron sieve	13.1	--	--	--	--	8.9	--	3.1	--	2.3	--	2.3	5.19	3.5
Percent retained 2000 micron sieve	16.5	--	--	--	--	2.4	--	1.1	--	1.6	--	1.7	6.52	0.9
Percent retained 4750 micron sieve	16.5	--	--	--	--	1	--	0.3	--	1.3	--	2.9	1.94	0.1
Percent retained 9500 micron sieve	1.2	--	--	--	--	0.2	--	0.1 U	--	0.1 U	--	0.1 U	1.67	--
Percent retained 12500 micron sieve	0.1 U	--	--	--	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 19000 micron sieve	0.1 U	--	--	--	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 25K micron sieve	0.1 U	--	--	--	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 37.5K micron sieve	0.1 U	--	--	--	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 50K micron sieve	0.1 U	--	--	--	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 75K micron sieve	0.1 U	--	--	--	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--

Table 21a
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-101B-HSA	8-101B-HSA	8-101B-HSA	8-101B-HSA	8-101B-HSA	8-101B-HSA	8-102A-HSA	8-102A-HSA	8-102A-HSA	8-102A-HSA	8-102A-HSA	8-102A-HSA	8-102A-HSA
Sample ID:	8-101B-HSA-S7	8-101B-HSA-S8	8-101B-HSA-S9	8-101B-HSA-S10	8-101B-HSA-S11	8-101B-HSA-S14	8-102A-HSA-S-1	8-102A-HSA-S-2	8-102A-HSA-S-4	8-102A-HSA-S-6	8-102A-HSA-S-7	8-102A-HSA-S-8	8-102A-HSA-S-9
Sample Date:	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08
In-Situ Depth^1 (ft):	17.5 - 19 ft	22.5 - 24 ft	27.5 - 29 ft	32.5 - 34 ft	37.5 - 39 ft	52.5 - 54 ft	2.5 - 4 ft	5 - 6.5 ft	7.5 - 9 ft	15 - 16.5 ft	20 - 21.5 ft	25 - 26.5 ft	30 - 31.5 ft
Physical Parameters													
Atterberg Classification	--	--	--	CL	--	--	--	--	Non-Plastic	--	--	--	--
Specific gravity (su)	2.71	--	--	2.79	--	--	--	--	2.79	--	--	--	--
Liquid Limit (pct)	--	--	--	32.2	--	--	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	13.9	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	18.3	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	24.54	17.98	24.74	21.65	20.83	24.74	2.61	2.79	3.4	7.8	27.12	28.42	24.6
Grain Size (pct)													
Gravel	--	--	3.7	--	--	--	8.1	--	--	30.8	--	--	4.1
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	0.9	--	--	--	11.6	--	--	6.9	--	--	4.6
Sand, Fine	--	--	5	--	--	19.3	44.2	--	--	23.7	--	--	55.5
Sand, Medium	--	--	0.4	--	--	6.3	30.5	--	--	32.9	--	--	22.1
Silt, Coarse	--	--	7.2	--	--	3.4	--	--	--	--	--	--	--
Silt, Fine	--	--	8.7	--	--	10.2	--	--	--	--	--	--	--
Silt, Medium	--	--	8.7	--	--	8.5	--	--	--	--	--	--	--
Silt, Very Coarse	--	--	27.8	--	--	18.2	5.5	--	--	5.6	--	--	13.5
Silt, Very Fine	--	--	8.7	--	--	6.8	--	--	--	--	--	--	--
Clay	--	--	28.9	--	--	27.3	--	--	--	--	--	--	--
Total Gravel	--	--	3.7	--	--	--	8.1	--	--	30.8	--	--	4.1
Total Sand	--	--	6.3	--	--	25.6	86.3	--	--	63.5	--	--	82.2
Total Silt	--	--	61.1	--	--	47.1	5.5	--	--	5.6	--	--	13.5
Total Clay	--	--	28.9	--	--	27.3	--	--	--	--	--	--	--
Total Fines (Silt + Clay)	--	--	90	--	--	74.4	5.5	--	--	5.6	--	--	13.5
Total Grain Size	--	--	100	--	--	100	99.9	--	--	99.9	--	--	99.8
Percent passing < 1.3 micron sieve	--	--	21.7	--	--	17.9	--	--	--	--	--	--	0.1 U
Percent retained 1.3 micron sieve	--	--	7.2	--	--	9.4	--	--	--	--	--	--	0.1 U
Percent retained 3.2 micron sieve	--	--	8.7	--	--	6.8	--	--	--	--	--	--	0.1 U
Percent retained 7 micron sieve	--	--	2.9	--	--	5.1	--	--	--	--	--	--	0.1 U
Percent retained 9 micron sieve	--	--	5.8	--	--	5.1	--	--	--	--	--	--	0.1 U
Percent retained 13 micron sieve	--	--	8.7	--	--	8.5	--	--	--	--	--	--	0.1 U
Percent retained 22 micron sieve	--	--	7.2	--	--	3.4	--	--	--	--	--	--	0.1 U
Percent retained 32 micron sieve	--	--	27.8	--	--	18.2	5.5	--	--	5.6	--	--	13.5
Percent retained 75 micron sieve	--	--	3.3	--	--	8.5	7.2	--	--	3.8	--	--	18
Percent retained 150 micron sieve	--	--	0.9	--	--	5.6	15.4	--	--	5.6	--	--	24.1
Percent retained 250 micron sieve	--	--	0.8	--	--	5.2	21.6	--	--	14.3	--	--	13.4
Percent retained 425 micron sieve	--	--	0.3	--	--	3.6	18.4	--	--	20.4	--	--	12.4
Percent retained 850 micron sieve	--	--	0.1	--	--	2.7	12.1	--	--	12.5	--	--	9.7
Percent retained 2000 micron sieve	--	--	0.9	--	--	--	11.6	--	--	6.9	--	--	4.6
Percent retained 4750 micron sieve	--	--	3.7	--	--	--	8.1	--	--	25.9	--	--	1.4
Percent retained 9500 micron sieve	--	--	--	--	--	--	0.1 U	--	--	4.9	--	--	2.7
Percent retained 12500 micron sieve	--	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 19000 micron sieve	--	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 25K micron sieve	--	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 37.5K micron sieve	--	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 50K micron sieve	--	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 75K micron sieve	--	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U

Table 21a
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-102A-HSA	8-102A-HSA	8-102A-HSA	8-102A-HSA	8-102A-HSA	8-102A-HSA	8-102C-HSA	8-102C-HSA	8-102C-HSA	8-102C-HSA	8-102C-HSA	8-102C-HSA	8-102C-HSA
Sample ID:	8-102A-HSA-S-10	8-102A-HSA-S-11	8-102A-HSA-S-12	8-102A-HSA-S-13	8-102A-HSA-S-14	8-102A-HSA-S-15	8-102C-HSA-S3	8-102C-HSA-S5	8-102C-HSA-S7	8-102C-HSA-S8	8-102C-HSA-S9	8-102C-HSA-S10	8-102C-HSA-S12
Sample Date:	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/22/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08	7/23/08
In-Situ Depth[1] (ft):	35 - 36.5 ft	40 - 41.5 ft	45 - 46.5 ft	50 - 51.5 ft	55 - 56.5 ft	60 - 63.5 ft	5 - 6.5 ft	10 - 11.5 ft	15 - 16.5 ft	20 - 21.5 ft	25 - 26.5 ft	30 - 31.5 ft	45 - 46.5 ft
Physical Parameters													
Atterberg Classification	Non-Plastic	--	Non-Plastic	--	CL	--	--	--	--	CL	CL	--	--
Specific gravity (su)	2.72	--	2.76	--	2.78	2.79	--	2.71	--	2.78	--	--	--
Liquid Limit (pct)	--	--	--	--	46.7	--	--	--	--	27	46.4	--	--
Plastic Limit (pct)	--	--	--	--	17	--	--	--	--	11.5	18.2	--	--
Plasticity Index (pct)	--	--	--	--	29.6	--	--	--	--	15.4	28.2	--	--
Moisture (water) Content (pct)	33.96	24.97	20.51	25.38	31.63	22.41	24.69	25.12	21.92	26.2	30.94	33.59	21.53
Grain Size (pct)													
Gravel	--	--	--	--	--	--	1.8	--	1.6	--	--	--	7.4
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	1.8	--	--	--	--	3.3	--	1.6	--	--	0.1	1.6
Sand, Fine	--	75.7	--	--	--	--	64.6	--	77.9	--	--	4.6	16.5
Sand, Medium	--	10.4	--	--	--	--	14	--	1.3	--	--	0.6	4.2
Silt, Coarse	--	--	--	--	--	--	--	--	--	--	--	5.5	4.2
Silt, Fine	--	--	--	--	--	--	1.4	--	--	--	--	13.4	9.8
Silt, Medium	--	--	--	--	--	--	1.5	--	--	--	--	8.7	6.3
Silt, Very Coarse	--	12.2	--	--	--	--	10.4	--	17.6	--	--	8.8	11.8
Silt, Very Fine	--	--	--	--	--	--	0.7	--	--	--	--	11.8	7.7
Clay	--	--	--	--	--	--	1.2	--	--	--	--	46.5	30.2
Total Gravel	--	--	--	--	--	--	1.8	--	1.6	--	--	--	7.4
Total Sand	--	87.9	--	--	--	--	81.9	--	80.8	--	--	5.3	22.3
Total Silt	--	12.2	--	--	--	--	14	--	17.6	--	--	48.2	39.8
Total Clay	--	--	--	--	--	--	1.2	--	--	--	--	46.5	30.2
Total Fines (Silt + Clay)	--	12.2	--	--	--	--	15.2	--	17.6	--	--	94.7	70
Total Grain Size	--	100.1	--	--	--	--	98.9	--	100	--	--	100	99.7
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	0.5	--	--	--	--	33.9	22.5
Percent retained 1.3 micron sieve	--	--	--	--	--	--	0.7	--	--	--	--	12.6	7.7
Percent retained 3.2 micron sieve	--	--	--	--	--	--	0.7	--	--	--	--	11.8	7.7
Percent retained 7 micron sieve	--	--	--	--	--	--	0.7	--	--	--	--	6.3	4.9
Percent retained 9 micron sieve	--	--	--	--	--	--	0.7	--	--	--	--	7.1	4.9
Percent retained 13 micron sieve	--	--	--	--	--	--	1.5	--	--	--	--	8.7	6.3
Percent retained 22 micron sieve	--	--	--	--	--	--	0.1 U	--	--	--	--	5.5	4.2
Percent retained 32 micron sieve	--	12.2	--	--	--	--	10.4	--	17.6	--	--	8.8	11.8
Percent retained 75 micron sieve	--	39.3	--	--	--	--	24.3	--	52.6	--	--	2.6	7.9
Percent retained 150 micron sieve	--	22.7	--	--	--	--	26.4	--	21	--	--	1.4	4.8
Percent retained 250 micron sieve	--	13.7	--	--	--	--	13.9	--	4.3	--	--	0.6	3.8
Percent retained 425 micron sieve	--	6.3	--	--	--	--	8.3	--	0.8	--	--	0.3	2.4
Percent retained 850 micron sieve	--	4.1	--	--	--	--	5.7	--	0.5	--	--	0.3	1.8
Percent retained 2000 micron sieve	--	1.8	--	--	--	--	3.3	--	1.6	--	--	0.1	1.6
Percent retained 4750 micron sieve	--	0.1 U	--	--	--	--	1.8	--	1.6	--	--	--	2.8
Percent retained 9500 micron sieve	--	0.1 U	--	--	--	--	--	--	--	--	--	--	4.6
Percent retained 12500 micron sieve	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 19000 micron sieve	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 25K micron sieve	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 37.5K micron sieve	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 50K micron sieve	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 75K micron sieve	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--

Table 21a
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**	**8-103A-HSA**
Sample ID:	**8-103A-HSA-S-2**	**8-103A-HSA-S-3**	**8-103A-HSA-S-5**	**8-103A-HSA-S-6**	**8-103A-HSA-S-7**	**8-103A-HSA-S-8**	**8-103A-HSA-S-9**	**8-103A-HSA-S-10**	**8-103A-HSA-S-11**	**8-103A-HSA-S-12**	**8-103A-HSA-S-13**	**8-103A-HSA S14**	**8-103A-HSA S16**
Sample Date:	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**	**7/21/08**
In-Situ Depth^1 (ft):	**2.4 - 4 ft**	**5 - 6.5 ft**	**10 - 11.5 ft**	**15 - 16.5 ft**	**20 - 21.5 ft**	**25 - 26.5 ft**	**30 - 31.5 ft**	**35 - 36.5 ft**	**40 - 41.5 ft**	**45 - 46.5 ft**	**50 - 51.5 ft**	**55 - 56.5 ft**	**62 - 63.5 ft**
Physical Parameters													
Atterberg Classification	--	--	**Non-Plastic**	--	--	--	--	**Non-Plastic**	--	**Non-Plastic**	--	**CH**	--
Specific gravity (su)	--	--	**2.78**	--	--	--	--	**2.71**	--	**2.7**	--	**2.77**	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	**50.5**	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	**19.7**	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	--	**30.9**	--
Moisture (water) Content (pct)	**1.84**	**2.21**	**3.14**	**3.77**	**8.12**	**19.18**	**38.02**	**19.59**	**22.11**	**23.13**	**21.69**	**26.78**	**32.96**
Grain Size (pct)													
Gravel	--	**14**	--	**1.5**	--	**22.2**	--	--	--	--	--	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	**22**	--	**8.7**	--	**4.6**	--	--	**1.3**	--	--	--	--
Sand, Fine	--	**25.9**	--	**50**	--	**36.5**	--	--	**54**	--	--	--	--
Sand, Medium	--	**33**	--	**36.2**	--	**21.7**	--	--	**25.2**	--	--	--	--
Silt, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Fine	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Medium	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Coarse	--	**5.1**	--	**3.5**	--	**15**	--	--	**19.5**	--	--	--	--
Silt, Very Fine	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Gravel	--	**14**	--	**1.5**	--	**22.2**	--	--	--	--	--	--	--
Total Sand	--	**80.9**	--	**94.9**	--	**62.8**	--	--	**80.5**	--	--	--	--
Total Silt	--	**5.1**	--	**3.5**	--	**15**	--	--	**19.5**	--	--	--	--
Total Clay	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Fines (Silt + Clay)	--	**5.1**	--	**3.5**	--	**15**	--	--	**19.5**	--	--	--	--
Total Grain Size	--	**100**	--	**99.9**	--	**100**	--	--	**100**	--	--	--	--
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 7 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 9 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 13 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 22 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 32 micron sieve	--	**5.1**	--	**3.5**	--	**15**	--	--	**19.5**	--	--	--	--
Percent retained 75 micron sieve	--	**4.5**	--	**7.5**	--	**14.8**	--	--	**19.4**	--	--	--	--
Percent retained 150 micron sieve	--	**7.6**	--	**17.2**	--	**8.7**	--	--	**11.4**	--	--	--	--
Percent retained 250 micron sieve	--	**13.8**	--	**25.3**	--	**13**	--	--	**23.2**	--	--	--	--
Percent retained 425 micron sieve	--	**15.8**	--	**21.3**	--	**13.3**	--	--	**17.9**	--	--	--	--
Percent retained 850 micron sieve	--	**17.2**	--	**14.9**	--	**8.4**	--	--	**7.3**	--	--	--	--
Percent retained 2000 micron sieve	--	**22**	--	**8.7**	--	**4.6**	--	--	**1.3**	--	--	--	--
Percent retained 4750 micron sieve	--	**14**	--	**1.5**	--	**2.7**	--	--	0.1 U	--	--	--	--
Percent retained 9500 micron sieve	--	0.1 U	--	0.1 U	--	**1.5**	--	--	0.1 U	--	--	--	--
Percent retained 12500 micron sieve	--	0.1 U	--	0.1 U	--	**7.5**	--	--	0.1 U	--	--	--	--
Percent retained 19000 micron sieve	--	0.1 U	--	0.1 U	--	**10.5**	--	--	0.1 U	--	--	--	--
Percent retained 25K micron sieve	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--
Percent retained 37.5K micron sieve	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--
Percent retained 50K micron sieve	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--
Percent retained 75K micron sieve	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--

Table 21a
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-103A-HSA	8-103A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA	8-104A-HSA
Sample ID:	8-103A-HSA S17	8-103A-HSA S18	8-104A-HSA-S1	8-104A-HSA-S2	8-104A-HSA-S3	8-104A-HSA-S5	8-104A-HSA-S6	8-104A-HSA-S7	8-104A-HSA-S8	8-104A-HSA-S9	8-104A-HSA-S10	8-104A-HSA-S11	8-104A-HSA-S12	8-104A-HSA-S13
Sample Date:	7/21/08	7/21/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08
In-Situ Depth[1] (ft):	65 - 66.5 ft	70 - 71.5 ft	0 - 1.5 ft	2.5 - 4 ft	5 - 6.5 ft	10 - 11.5 ft	15 - 16.5 ft	20 - 21.5 ft	25 - 26.5 ft	30 - 31.5 ft	35 - 36.5 ft	40 - 41.5 ft	45 - 46.5 ft	50 - 51.5 ft
Physical Parameters														
Atterberg Classification	CH	--	--	--	--	--	--	--	--	--	Non-Plastic	--	Non-Plastic	--
Specific gravity (su)	2.8	--	--	--	--	--	--	--	--	--	2.71	--	2.75	--
Liquid Limit (pct)	51.6	--	--	--	--	--	--	--	--	--	--	--	--	--
Plastic Limit (pct)	20.8	--	--	--	--	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	30.7	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	34.93	30.19	1.95	2.73	2.68	3.64	4.85	7.32	27.47	18.26	20.43	23.62	20.11	25.52
Grain Size (pct)														
Gravel	--	--	--	--	14.1	--	2.8	--	--	7.3	--	0.7	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	0.2	--	--	16.5	--	15.3	--	--	10.2	--	1.9	--	--
Sand, Fine	--	4.6	--	--	31.5	--	31.2	--	--	39.4	--	53.5	--	--
Sand, Medium	--	0.6	--	--	32.7	--	44.8	--	--	37.1	--	26.4	--	--
Silt, Coarse	--	2.9	--	--	--	--	--	--	--	--	--	1.1	--	--
Silt, Fine	--	10.3	--	--	--	--	--	--	--	--	--	1.2	--	--
Silt, Medium	--	2.3	--	--	--	--	--	--	--	--	--	0.6	--	--
Silt, Very Coarse	--	25.5	--	--	5.3	--	5.8	--	--	6	--	8.3	--	--
Silt, Very Fine	--	10.8	--	--	--	--	--	--	--	--	--	--	--	--
Clay	--	42.8	--	--	--	--	--	--	--	--	--	6.3	--	--
Total Gravel	--	--	--	--	14.1	--	2.8	--	--	7.3	--	0.7	--	--
Total Sand	--	5.4	--	--	80.7	--	91.3	--	--	86.7	--	81.8	--	--
Total Silt	--	51.8	--	--	5.3	--	5.8	--	--	6	--	11.2	--	--
Total Clay	--	42.8	--	--	--	--	--	--	--	--	--	6.3	--	--
Total Fines (Silt + Clay)	--	94.6	--	--	5.3	--	5.8	--	--	6	--	17.5	--	--
Total Grain Size	--	100	--	--	100.1	--	99.9	--	--	100	--	100	--	--
Percent passing < 1.3 micron sieve	--	32	--	--	--	--	--	--	--	--	--	4.6	--	--
Percent retained 1.3 micron sieve	--	10.8	--	--	--	--	--	--	--	--	--	1.7	--	--
Percent retained 3.2 micron sieve	--	10.8	--	--	--	--	--	--	--	--	--	0.1 U	--	--
Percent retained 7 micron sieve	--	5.7	--	--	--	--	--	--	--	--	--	0.6	--	--
Percent retained 9 micron sieve	--	4.6	--	--	--	--	--	--	--	--	--	0.6	--	--
Percent retained 13 micron sieve	--	2.3	--	--	--	--	--	--	--	--	--	0.6	--	--
Percent retained 22 micron sieve	--	2.9	--	--	--	--	--	--	--	--	--	1.1	--	--
Percent retained 32 micron sieve	--	25.5	--	--	5.3	--	5.8	--	--	6	--	8.3	--	--
Percent retained 75 micron sieve	--	3.2	--	--	5.5	--	4.3	--	--	10.4	--	15.7	--	--
Percent retained 150 micron sieve	--	0.9	--	--	10	--	8.9	--	--	11.8	--	15.8	--	--
Percent retained 250 micron sieve	--	0.5	--	--	16	--	18	--	--	17.2	--	22	--	--
Percent retained 425 micron sieve	--	0.3	--	--	17.2	--	22.5	--	--	20.1	--	18	--	--
Percent retained 850 micron sieve	--	0.3	--	--	15.5	--	22.3	--	--	17	--	8.4	--	--
Percent retained 2000 micron sieve	--	0.2	--	--	16.5	--	15.3	--	--	10.2	--	1.9	--	--
Percent retained 4750 micron sieve	--	0.1 U	--	--	13.1	--	2.8	--	--	7.3	--	0.7	--	--
Percent retained 9500 micron sieve	--	0.1 U	--	--	1	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--
Percent retained 12500 micron sieve	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--
Percent retained 19000 micron sieve	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--
Percent retained 25K micron sieve	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--
Percent retained 37.5K micron sieve	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--
Percent retained 50K micron sieve	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--
Percent retained 75K micron sieve	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--

Table 21a
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-104B-HSA	8-104B-HSA	8-104B-HSA	8-104B-HSA	8-104B-HSA	8-104B-HSA	8-104B-HSA	8-104B-HSA	8-104B-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA
Sample ID:	8-104B-HSA-0-1	8-104B-HSA-S5	8-104B-HSA-S6	8-104B-HSA-S9	8-104B-HSA-S10	8-104B-HSA-S11	8-104B-HSA-S12	8-104B-HSA-S13	8-104B-HSA-S15	8-105A-HSA-S1	8-105A-HSA-S2	8-105A-HSA-S3	8-105A-HSA-S5	8-105A-HSA-S7
Sample Date:	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/31/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08
In-Situ Depth^1 (ft):	0 - 1 ft	10 - 11.5 ft	16 - 17.5 ft	31 - 32.5 ft	36 - 37.5 ft	41 - 42.5 ft	46 - 47.5 ft	51 - 52.5 ft	58 - 59.5 ft	0 - 1.5 ft	2.5 - 4 ft	5 - 6.5 ft	10 - 11.5 ft	20 - 21.5 ft
Physical Parameters														
Atterberg Classification	--	--	--	--	Non-Plastic	--	--	--	--	--	--	--	--	--
Specific gravity (su)	--	--	--	--	2.77	--	--	--	--	--	--	--	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	357.2	17.14	20.74	20.65	25.81	29.56	37.3	31.87	25.8	2.44	1.0	1.68	4.55	4.5
Grain Size (pct)														
Gravel	--	--	0.4	0.3	--	--	--	--	--	--	--	8.5	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	1.6	0.3	--	--	--	--	0.1	--	--	19.1	--	--
Sand, Fine	--	--	63	84.3	--	--	6.6	--	14.3	--	--	34.7	--	--
Sand, Medium	--	--	15.8	2.9	--	--	0.2	--	0.7	--	--	33.7	--	--
Silt, Coarse	--	--	0.7	--	--	--	7.7	--	5.7	--	--	--	--	--
Silt, Fine	--	--	0.7	0.8	--	--	10.8	--	9.8	--	--	--	--	--
Silt, Medium	--	--	0.7	1.5	--	--	9.3	--	8.9	--	--	--	--	--
Silt, Very Coarse	--	--	11.9	7.7	--	--	24.2	--	15.1	--	--	4	--	--
Silt, Very Fine	--	--	0.7	0.8	--	--	9.3	--	9.7	--	--	--	--	--
Clay	--	--	4.4	1.5	--	--	31.7	--	35.6	--	--	--	--	--
Total Gravel	--	--	0.4	0.3	--	--	--	--	--	--	--	8.5	--	--
Total Sand	--	--	80.4	87.5	--	--	6.8	--	15.1	--	--	87.5	--	--
Total Silt	--	--	14.7	10.8	--	--	61.3	--	49.2	--	--	4	--	--
Total Clay	--	--	4.4	1.5	--	--	31.7	--	35.6	--	--	--	--	--
Total Fines (Silt + Clay)	--	--	19.1	12.3	--	--	93	--	84.8	--	--	4	--	--
Total Grain Size	--	--	99.9	100.1	--	--	99.8	--	99.9	--	--	100	--	--
Percent passing < 1.3 micron sieve	--	--	2.9	1.5	--	--	23.2	--	25.9	--	--	--	--	--
Percent retained 1.3 micron sieve	--	--	1.5	0.1 U	--	--	8.5	--	9.7	--	--	--	--	--
Percent retained 3.2 micron sieve	--	--	0.7	0.8	--	--	9.3	--	9.7	--	--	--	--	--
Percent retained 7 micron sieve	--	--	0.7	0.8	--	--	6.2	--	4.9	--	--	--	--	--
Percent retained 9 micron sieve	--	--	0.1 U	0.1 U	--	--	4.6	--	4.9	--	--	--	--	--
Percent retained 13 micron sieve	--	--	0.7	1.5	--	--	9.3	--	8.9	--	--	--	--	--
Percent retained 22 micron sieve	--	--	0.7	0.1 U	--	--	7.7	--	5.7	--	--	--	--	--
Percent retained 32 micron sieve	--	--	11.9	7.7	--	--	24.2	--	15.1	--	--	4	--	--
Percent retained 75 micron sieve	--	--	18.8	42.6	--	--	4.8	--	9.2	--	--	4.6	--	--
Percent retained 150 micron sieve	--	--	19.4	32.8	--	--	1.2	--	3.8	--	--	11.5	--	--
Percent retained 250 micron sieve	--	--	24.8	8.9	--	--	0.6	--	1.3	--	--	18.6	--	--
Percent retained 425 micron sieve	--	--	11.6	2	--	--	0.2	--	0.5	--	--	17.3	--	--
Percent retained 850 micron sieve	--	--	4.2	0.9	--	--	0.1 U	--	0.2	--	--	16.4	--	--
Percent retained 2000 micron sieve	--	--	1.6	0.3	--	--	0.1 U	--	0.1	--	--	19.1	--	--
Percent retained 4750 micron sieve	--	--	0.4	0.3	--	--	0.1 U	--	0.1 U	--	--	8.5	--	--
Percent retained 9500 micron sieve	--	--	0.1 U	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 12500 micron sieve	--	--	0.1 U	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 19000 micron sieve	--	--	0.1 U	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 25K micron sieve	--	--	0.1 U	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 37.5K micron sieve	--	--	0.1 U	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 50K micron sieve	--	--	0.1 U	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 75K micron sieve	--	--	0.1 U	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--

Table 21a
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105A-HSA	8-105C-HSA	8-105C-HSA
Sample ID:	8-105A-HSA-S8	8-105A-HSA-S9	8-105A-HSA-S10	8-105A-HSA-S11	8-105A-HSA-S12	8-105A-HSA-S13	8-105A-HSA-S14	8-105A-HSA-S15	8-105A-HSA-S16	8-105A-HSA-S17	8-105A-HSA-S18	8-105C-HSA-0-1	8-105C-HSA-S3
Sample Date:	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08
In-Situ Depth[1] (ft):	25 - 26.5 ft	30 - 31.5 ft	35 - 36.5 ft	40 - 41.5 ft	45 - 46.5 ft	50 - 51.5 ft	55 - 56.5 ft	60 - 61.5 ft	65 - 66.5 ft	70 - 71.5 ft	75 - 78.5 ft	0 - 1 ft	5 - 6.5 ft
Physical Parameters													
Atterberg Classification	--	--	Non-Plastic	--	Non-Plastic	--	Non-Plastic	--	--	CL	--	--	--
Specific gravity (su)	--	--	2.76	--	2.75	--	2.73	--	--	2.73	--	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	33.4	--	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	17.7	--	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	15.7	--	--	--
Moisture (water) Content (pct)	8.5	21.78	22.69	19.35	21.78	24.55	23.05	20.4	33.62	23.41	35.83	250	24.41
Grain Size (pct)													
Gravel	--	5.2	--	1.1	--	--	--	0.8	--	--	--	--	0.4
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	3.9	--	1.9	--	--	--	1	--	--	--	--	3
Sand, Fine	--	64.7	--	64.1	--	--	--	84.2	--	--	11.6	--	67
Sand, Medium	--	20.4	--	18.2	--	--	--	4	--	--	0.6	--	19
Silt, Coarse	--	--	--	--	--	--	--	--	--	--	4	--	--
Silt, Fine	--	--	--	--	--	--	--	--	--	--	12	--	--
Silt, Medium	--	--	--	--	--	--	--	--	--	--	7.2	--	--
Silt, Very Coarse	--	5.8	--	14.7	--	--	--	10	--	--	14	--	10.6
Silt, Very Fine	--	--	--	--	--	--	--	--	--	--	8.8	--	--
Clay	--	--	--	--	--	--	--	--	--	--	41.6	--	--
Total Gravel	--	5.2	--	1.1	--	--	--	0.8	--	--	--	--	0.4
Total Sand	--	89	--	84.2	--	--	--	89.2	--	--	12.2	--	89
Total Silt	--	5.8	--	14.7	--	--	--	10	--	--	46	--	10.6
Total Clay	--	--	--	--	--	--	--	--	--	--	41.6	--	--
Total Fines (Silt + Clay)	--	5.8	--	14.7	--	--	--	10	--	--	87.6	--	10.6
Total Grain Size	--	100	--	100	--	--	--	100	--	--	99.8	--	100
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	--	--	--	32	--	--
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	--	--	--	9.6	--	--
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	--	--	--	8.8	--	--
Percent retained 7 micron sieve	--	--	--	--	--	--	--	--	--	--	5.6	--	--
Percent retained 9 micron sieve	--	--	--	--	--	--	--	--	--	--	6.4	--	--
Percent retained 13 micron sieve	--	--	--	--	--	--	--	--	--	--	7.2	--	--
Percent retained 22 micron sieve	--	--	--	--	--	--	--	--	--	--	4	--	--
Percent retained 32 micron sieve	--	5.8	--	14.7	--	--	--	10	--	--	14	--	10.6
Percent retained 75 micron sieve	--	11.2	--	16	--	--	--	31.8	--	--	7.6	--	16.1
Percent retained 150 micron sieve	--	24.7	--	22.7	--	--	--	43.4	--	--	2.9	--	22.1
Percent retained 250 micron sieve	--	28.8	--	25.4	--	--	--	9	--	--	1.1	--	28.8
Percent retained 425 micron sieve	--	14.3	--	13.5	--	--	--	2.6	--	--	0.4	--	13.4
Percent retained 850 micron sieve	--	6.1	--	4.7	--	--	--	1.4	--	--	0.2	--	5.6
Percent retained 2000 micron sieve	--	3.9	--	1.9	--	--	--	1	--	--	0.1 U	--	3
Percent retained 4750 micron sieve	--	1.9	--	0.8	--	--	--	0.8	--	--	0.1 U	--	0.2
Percent retained 9500 micron sieve	--	0.3	--	0.3	--	--	--	0.1 U	--	--	0.1 U	--	0.2
Percent retained 12500 micron sieve	--	3	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	0.1 U
Percent retained 19000 micron sieve	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	0.1 U
Percent retained 25K micron sieve	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	0.1 U
Percent retained 37.5K micron sieve	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	0.1 U
Percent retained 50K micron sieve	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	0.1 U
Percent retained 75K micron sieve	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	0.1 U

Table 21a
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-105C-HSA	8-105C-HSA	8-105C-HSA	8-105C-HSA	8-105C-HSA	8-105C-HSA	8-105C-HSA	8-105C-HSA	8-105C-HSA	8-105C-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA
Sample ID:	8-105C-HSA-S5	8-105C-HSA-S6	8-105C-HSA-S7	8-105C-HSA-S8	8-105C-HSA-S9	8-105C-HSA-S10	8-105C-HSA-S11	8-105C-HSA-S12	8-105C-HSA-S13	8-105C-HSA-S15	8-106A-HSA-S1	8-106A-HSA-S2	8-106A-HSA-S3
Sample Date:	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/30/08	7/29/08	7/29/08	7/29/08
In-Situ Depth[1] (ft):	9 - 10.5 ft	11.5 - 13 ft	14 - 15.5 ft	19 - 20.5 ft	24 - 25.5 ft	29 - 30.5 ft	34 - 35.5 ft	39 - 40.5 ft	44 - 45.5 ft	51 - 52.5 ft	0 - 1.5 ft	2.5 - 4 ft	5 - 6.5 ft
Physical Parameters													
Atterberg Classification	Non-Plastic	--	--	Non-Plastic	--	--	--	--	--	--	--	--	--
Specific gravity (su)	2.72	--	--	2.73	--	--	--	--	--	--	--	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	28.49	26.1	19.13	20.93	18.64	21.21	19.22	31.29	37.97	29.6	3.01	2.87	3.31
Grain Size (pct)													
Gravel	--	--	1.4	--	--	0.2	--	--	--	--	--	--	14.3
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	2.1	--	--	1.3	--	--	--	0.3	--	--	26.2
Sand, Fine	--	--	65.6	--	--	85.5	--	5	--	4.7	--	--	18.9
Sand, Medium	--	--	15.9	--	--	6.1	--	0.6	--	0.9	--	--	32.5
Silt, Coarse	--	--	--	--	--	--	--	1.5	--	7	--	--	--
Silt, Fine	--	--	--	--	--	--	--	8.7	--	11	--	--	--
Silt, Medium	--	--	--	--	--	--	--	2.2	--	9.4	--	--	--
Silt, Very Coarse	--	--	14.8	--	--	6.9	--	2.7	--	2.5	--	--	8.2
Silt, Very Fine	--	--	--	--	--	--	--	8.7	--	12.5	--	--	--
Clay	--	--	--	--	--	--	--	70.6	--	51.6	--	--	--
Total Gravel	--	--	1.4	--	--	0.2	--	--	--	--	--	--	14.3
Total Sand	--	--	83.6	--	--	92.9	--	5.6	--	5.9	--	--	77.6
Total Silt	--	--	14.8	--	--	6.9	--	23.8	--	42.4	--	--	8.2
Total Clay	--	--	--	--	--	--	--	70.6	--	51.6	--	--	--
Total Fines (Silt + Clay)	--	--	14.8	--	--	6.9	--	94.4	--	94	--	--	8.2
Total Grain Size	--	--	99.8	--	--	100	--	100	--	99.9	--	--	100.1
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	61.1	--	39.9	--	--	--
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	9.5	--	11.7	--	--	--
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	8.7	--	12.5	--	--	--
Percent retained 7 micron sieve	--	--	--	--	--	--	--	5.8	--	4.7	--	--	--
Percent retained 9 micron sieve	--	--	--	--	--	--	--	2.9	--	6.3	--	--	--
Percent retained 13 micron sieve	--	--	--	--	--	--	--	2.2	--	9.4	--	--	--
Percent retained 22 micron sieve	--	--	--	--	--	--	--	1.5	--	7	--	--	--
Percent retained 32 micron sieve	--	--	14.8	--	--	6.9	--	2.7	--	2.5	--	--	8.2
Percent retained 75 micron sieve	--	--	17.2	--	--	45.6	--	3.4	--	2.3	--	--	3.5
Percent retained 150 micron sieve	--	--	23.5	--	--	28.8	--	0.9	--	1.6	--	--	5.3
Percent retained 250 micron sieve	--	--	24.9	--	--	11.1	--	0.7	--	0.8	--	--	10.1
Percent retained 425 micron sieve	--	--	12.1	--	--	4.3	--	0.5	--	0.5	--	--	13.5
Percent retained 850 micron sieve	--	--	3.8	--	--	1.8	--	0.1	--	0.4	--	--	19
Percent retained 2000 micron sieve	--	--	2.1	--	--	1.3	--	0.1 U	--	0.3	--	--	26.2
Percent retained 4750 micron sieve	--	--	1	--	--	0.2	--	0.1 U	--	0.1 U	--	--	6
Percent retained 9500 micron sieve	--	--	0.4	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--	8.3
Percent retained 12500 micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--	--
Percent retained 19000 micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--	--
Percent retained 25K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--	--
Percent retained 37.5K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--	--
Percent retained 50K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--	--
Percent retained 75K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--	--

Table 21a
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA	8-106A-HSA
Sample ID:	**8-106A-HSA-S5**	**8-106A-HSA-S6**	**8-106A-HSA-S8**	**8-106A-HSA-S9**	**8-106A-HSA-S10**	**8-106A-HSA-S11**	**8-106A-HSA-S12**	**8-106A-HSA-S13**	**8-106A-HSA-S14**	**8-106A-HSA-S15**	**8-106A-HSA-S16**	**8-106A-HSA-S17**	**8-106A-HSA-S18**
Sample Date:	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/30/08**	**7/30/08**	**7/30/08**	**7/30/08**	**7/30/08**
In-Situ Depth^{1} (ft):	**10 - 11.5 ft**	**15 - 16.5 ft**	**25 - 26.5 ft**	**30 - 31.5 ft**	**35 - 36.5 ft**	**40 - 41.5 ft**	**45 - 46.5 ft**	**50 - 51.5 ft**	**55 - 56.5 ft**	**60 - 61.5 ft**	**65 - 66.5 ft**	**70 - 71.5 ft**	**75 - 78.5 ft**
Physical Parameters													
Atterberg Classification	--	--	--	--	**Non-Plastic**	--	**Non-Plastic**	--	**Non-Plastic**	--	--	**CL**	--
Specific gravity (su)	--	--	--	--	**2.73**	--	**2.6**	--	**2.72**	--	--	**2.76**	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	**37.6**	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	**19.6**	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	--	**18**	--
Moisture (water) Content (pct)	**4.16**	**3.8**	**9.25**	**68.96**	**29.67**	**38.99**	**22.25**	**21.22**	**21.19**	**28.93**	**17.75**	**23.59**	**27.87**
Grain Size (pct)													
Gravel	--	**11.1**	--	**15.3**	--	**0.1**	--	--	--	**1.3**	--	--	--
Gravel, Coarse	--	--	--	**20.7**	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	**18.6**	--	**7.4**	--	**0.3**	--	--	--	**0.4**	--	--	**0.1**
Sand, Fine	--	**27.9**	--	**24.8**	--	**48.1**	--	--	--	**85.6**	--	--	**10**
Sand, Medium	--	**38**	--	**14.4**	--	**1.8**	--	--	--	**2**	--	--	**0.8**
Silt, Coarse	--	--	--	**0.9**	--	**6.2**	--	--	--	**0.8**	--	--	**4.7**
Silt, Fine	--	--	--	**2.7**	--	**5.4**	--	--	--	**1.6**	--	--	**10.2**
Silt, Medium	--	--	--	**2.7**	--	**3.9**	--	--	--	--	--	--	**7.8**
Silt, Very Coarse	--	**4.3**	--	**4.3**	--	**13.1**	--	--	--	**6.8**	--	--	**14**
Silt, Very Fine	--	--	--	**2.7**	--	**6.2**	--	--	--	--	--	--	**9.4**
Clay	--	--	--	**4.1**	--	**14.7**	--	--	--	**1.6**	--	--	**43.1**
Total Gravel	--	**11.1**	--	**36**	--	**0.1**	--	--	--	**1.3**	--	--	--
Total Sand	--	**84.5**	--	**46.6**	--	**50.2**	--	--	--	**88**	--	--	**10.9**
Total Silt	--	**4.3**	--	**13.3**	--	**34.8**	--	--	--	**9.2**	--	--	**46.1**
Total Clay	--	--	--	**4.1**	--	**14.7**	--	--	--	**1.6**	--	--	**43.1**
Total Fines (Silt + Clay)	--	**4.3**	--	**17.4**	--	**49.5**	--	--	--	**10.8**	--	--	**89.2**
Total Grain Size	--	**99.9**	--	**100**	--	**99.8**	--	--	--	**100.1**	--	--	**100.1**
Percent passing < 1.3 micron sieve	--	--	--	**3.2**	--	**13.2**	--	--	--	**1.6**	--	--	**32.1**
Percent retained 1.3 micron sieve	--	--	--	**0.9**	--	**1.5**	--	--	--	0.1 U	--	--	**11**
Percent retained 3.2 micron sieve	--	--	--	**2.7**	--	**6.2**	--	--	--	0.1 U	--	--	**9.4**
Percent retained 7 micron sieve	--	--	--	**1.8**	--	**1.5**	--	--	--	**0.8**	--	--	**5.5**
Percent retained 9 micron sieve	--	--	--	**0.9**	--	**3.9**	--	--	--	**0.8**	--	--	**4.7**
Percent retained 13 micron sieve	--	--	--	**2.7**	--	**3.9**	--	--	--	0.1 U	--	--	**7.8**
Percent retained 22 micron sieve	--	--	--	**0.9**	--	**6.2**	--	--	--	**0.8**	--	--	**4.7**
Percent retained 32 micron sieve	--	**4.3**	--	**4.3**	--	**13.1**	--	--	--	**6.8**	--	--	**14**
Percent retained 75 micron sieve	--	**4.4**	--	**7.9**	--	**28.6**	--	--	--	**29.9**	--	--	**6.3**
Percent retained 150 micron sieve	--	**8.6**	--	**7.4**	--	**14.7**	--	--	--	**45.5**	--	--	**2.5**
Percent retained 250 micron sieve	--	**14.9**	--	**9.5**	--	**4.8**	--	--	--	**10.2**	--	--	**1.2**
Percent retained 425 micron sieve	--	**18.5**	--	**8**	--	**1.1**	--	--	--	**1.6**	--	--	**0.6**
Percent retained 850 micron sieve	--	**19.5**	--	**6.4**	--	**0.7**	--	--	--	**0.4**	--	--	**0.2**
Percent retained 2000 micron sieve	--	**18.6**	--	**7.4**	--	**0.3**	--	--	--	**0.4**	--	--	**0.1**
Percent retained 4750 micron sieve	--	**11.1**	--	**4**	--	**0.1**	--	--	--	**0.3**	--	--	0.1 U
Percent retained 9500 micron sieve	--	--	--	**5.7**	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 12500 micron sieve	--	--	--	**4.8**	--	--	--	--	--	**1**	--	--	0.1 U
Percent retained 19000 micron sieve	--	--	--	**0.8**	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 25K micron sieve	--	--	--	**20.7**	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 37.5K micron sieve	--	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 50K micron sieve	--	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 75K micron sieve	--	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U

Notes:

1. Sample depth is reported as below mudline.

Bold = Detected result

U = Compound analyzed, but not detected above detection limit

pct = percent

su = standard units

-- Sample was not submitted for chemical analysis.

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-107A-HSA	8-107A-HSA	8-107A-HSA	8-107A-HSA	8-107A-HSA	8-107A-HSA	8-107A-HSA	8-107A-HSA	8-107A-HSA	8-107A-HSA	8-107A-HSA	8-107A-HSA
Sample ID:	8-107A-HSA-S1	8-107A-HSA-S2	8-107A-HSA-S3	8-107A-HSA-S4	8-107A-HSA-S5	8-107A-HSA-S6	8-107A-HSA-S7	8-107A-HSA-S8	8-107A-HSA-S10	8-107A-HSA-S11	8-107A-HSA-S12	8-107A-HSA-S13
Sample Date:	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08
In-Situ Depth[1] (ft):	0 - 1.5 ft	2.5 - 4 ft	5 - 6.5 ft	7.5 - 9 ft	10 - 11.5 ft	15 - 16.5 ft	20 - 21.5 ft	25 - 26.5 ft	35 - 36.5 ft	40 - 41.5 ft	45 - 46.5 ft	50 - 51.5 ft
Physical Parameters												
Atterberg Classification	--	--	--	**Non-Plastic**	--	--	--	--	**Non-Plastic**	--	**CL**	--
Specific gravity (su)	--	--	--	**2.78**	--	--	--	--	**2.68**	--	**2.72**	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	**34.4**	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	**23.4**	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	**11.1**	--
Moisture (water) Content (pct)	**2.02**	**2.26**	**2.95**	**3.43**	**4.41**	**5.17**	**26.87**	**18.54**	**30.9**	**31.57**	**39.28**	**39.46**
Grain Size (pct)												
Gravel	--	--	**0.7**	--	--	**4.4**	--	**43.1**	--	**1.8**	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	**15.7**	--	--	**12.8**	--	**8.9**	--	**0.7**	--	--
Sand, Fine	--	--	**32.4**	--	--	**41.8**	--	**25.4**	--	**54.1**	--	--
Sand, Medium	--	--	**47.6**	--	--	**35.8**	--	**18.2**	--	**6.1**	--	--
Silt, Coarse	--	--	--	--	--	--	--	--	--	**2.9**	--	--
Silt, Fine	--	--	--	--	--	--	--	--	--	**4**	--	--
Silt, Medium	--	--	--	--	--	--	--	--	--	**3.5**	--	--
Silt, Very Coarse	--	--	**3.5**	--	--	**5.2**	--	**4.3**	--	**13.6**	--	--
Silt, Very Fine	--	--	--	--	--	--	--	--	--	**1.2**	--	--
Clay	--	--	--	--	--	--	--	--	--	**12.1**	--	--
Total Gravel	--	--	**0.7**	--	--	**4.4**	--	**43.1**	--	**1.8**	--	--
Total Sand	--	--	**95.7**	--	--	**90.4**	--	**52.5**	--	**60.9**	--	--
Total Silt	--	--	**3.5**	--	--	**5.2**	--	**4.3**	--	**25.2**	--	--
Total Clay	--	--	--	--	--	--	--	--	--	**12.1**	--	--
Total Fines (Silt + Clay)	--	--	**3.5**	--	--	**5.2**	--	**4.3**	--	**37.3**	--	--
Total Grain Size	--	--	**99.9**	--	--	**100**	--	**99.9**	--	**100**	--	--
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	--	--	**6.9**	--	--
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	--	--	**5.2**	--	--
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	--	--	**1.2**	--	--
Percent retained 7 micron sieve	--	--	--	--	--	--	--	--	--	**1.7**	--	--
Percent retained 9 micron sieve	--	--	--	--	--	--	--	--	--	**2.3**	--	--
Percent retained 13 micron sieve	--	--	--	--	--	--	--	--	--	**3.5**	--	--
Percent retained 22 micron sieve	--	--	--	--	--	--	--	--	--	**2.9**	--	--
Percent retained 32 micron sieve	--	--	**3.5**	--	--	**5.2**	--	**4.3**	--	**13.6**	--	--
Percent retained 75 micron sieve	--	--	**3.3**	--	--	**6.6**	--	**5.4**	--	**31.4**	--	--
Percent retained 150 micron sieve	--	--	**8.5**	--	--	**13.8**	--	**9**	--	**14.6**	--	--
Percent retained 250 micron sieve	--	--	**20.6**	--	--	**21.4**	--	**11**	--	**8.1**	--	--
Percent retained 425 micron sieve	--	--	**26.5**	--	--	**20.1**	--	**9.8**	--	**4.5**	--	--
Percent retained 850 micron sieve	--	--	**21.1**	--	--	**15.7**	--	**8.4**	--	**1.6**	--	--
Percent retained 2000 micron sieve	--	--	**15.7**	--	--	**12.8**	--	**8.9**	--	**0.7**	--	--
Percent retained 4750 micron sieve	--	--	**0.7**	--	--	**4.4**	--	**9.7**	--	**0.1**	--	--
Percent retained 9500 micron sieve	--	--	0.1 U	--	--	0.1 U	--	**8.9**	--	**0.4**	--	--
Percent retained 12500 micron sieve	--	--	0.1 U	--	--	0.1 U	--	**20.1**	--	**1.3**	--	--
Percent retained 19000 micron sieve	--	--	0.1 U	--	--	0.1 U	--	**4.4**	--	0.1 U	--	--
Percent retained 25K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 37.5K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 50K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 75K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	**8-107A-HSA**	**8-107A-HSA**	**8-107A-HSA**	**8-107A-HSA**	**8-107A-HSA**	**8-107A-HSA**	**8-107A-HSA**	**8-107B-HSA**	**8-107B-HSA**	**8-107B-HSA**	**8-107B-HSA**	**8-107B-HSA**
Sample ID:	**8-107A-HSA-S14**	**8-107A-HSA-S15**	**8-107A-HSA-S16**	**8-107A-HSA-S17**	**8-107A-HSA-S18**	**8-107A-HSA-S19**	**8-107A-HSA-S20**	**8-107B-HSA-0-1**	**8-107B-HSA-S-6**	**8-107B-HSA-S-8**	**8-107B-HSA-S-9**	**8-107B-HSA-S-10**
Sample Date:	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**	**7/29/08**
In-Situ Depth[1] (ft):	**55 - 56.5 ft**	**60 - 61.5 ft**	**65 - 66.5 ft**	**70 - 71.5 ft**	**75 - 76.5 ft**	**80 - 81.5 ft**	**83 - 86.5 ft**	**0 - 1 ft**	**12.5 - 14 ft**	**22.5 - 24 ft**	**27.5 - 29 ft**	**32.5 - 34 ft**
Physical Parameters												
Atterberg Classification	**Non-Plastic**	--	--	**CL**	--	--	**CL**	**Non-Plastic**	--	**CL**	--	**Non-Plastic**
Specific gravity (su)	**2.72**	--	--	**2.8**	--	--	--	--	--	**2.68**	--	**2.7**
Liquid Limit (pct)	--	--	--	**32.7**	--	--	**36.4**	--	--	**45.4**	--	--
Plastic Limit (pct)	--	--	--	**17**	--	--	**15.3**	--	--	**26**	--	--
Plasticity Index (pct)	--	--	--	**15.7**	--	--	**21.2**	--	--	**19.4**	--	--
Moisture (water) Content (pct)	**25.68**	**22.17**	**28.01**	**28.57**	**22.73**	**25.29**	**22.83**	**74.02**	**26.92**	**38.73**	**38**	**24.68**
Grain Size (pct)												
Gravel	--	**0.2**	--	--	**1.1**	--	**3.7**	--	**2.6**	--	**1.7**	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	**0.6**	--	--	**1.3**	--	**0.8**	--	**2.8**	--	**0.6**	--
Sand, Fine	--	**64.2**	--	--	**10**	--	**15**	--	**63.7**	--	**23.9**	--
Sand, Medium	--	**3**	--	--	**2.3**	--	**2.5**	--	**21.3**	--	**1.3**	--
Silt, Coarse	--	--	--	--	**4.6**	--	**5.2**	--	--	--	**6.1**	--
Silt, Fine	--	--	--	--	**11.4**	--	**10.5**	--	--	--	**7.6**	--
Silt, Medium	--	--	--	--	**8.4**	--	**6**	--	--	--	**7.6**	--
Silt, Very Coarse	--	**32**	--	--	**10.2**	--	**17.3**	--	**9.4**	--	**26.8**	--
Silt, Very Fine	--	--	--	--	**10.6**	--	**8.9**	--	--	--	**6.1**	--
Clay	--	--	--	--	**40.3**	--	**29.9**	--	--	--	**18.3**	--
Total Gravel	--	**0.2**	--	--	**1.1**	--	**3.7**	--	**2.6**	--	**1.7**	--
Total Sand	--	**67.8**	--	--	**13.6**	--	**18.3**	--	**87.8**	--	**25.8**	--
Total Silt	--	**32**	--	--	**45.2**	--	**47.9**	--	**9.4**	--	**54.2**	--
Total Clay	--	--	--	--	**40.3**	--	**29.9**	--	--	--	**18.3**	--
Total Fines (Silt + Clay)	--	**32**	--	--	**85.5**	--	**77.8**	--	**9.4**	--	**72.5**	--
Total Grain Size	--	**100**	--	--	**100.2**	--	**99.8**	--	**99.8**	--	**100**	--
Percent passing < 1.3 micron sieve	--	--	--	--	**30.4**	--	**22.4**	--	--	--	**16**	--
Percent retained 1.3 micron sieve	--	--	--	--	**9.9**	--	**7.5**	--	--	--	**2.3**	--
Percent retained 3.2 micron sieve	--	--	--	--	**10.6**	--	**8.9**	--	--	--	**6.1**	--
Percent retained 7 micron sieve	--	--	--	--	**6.1**	--	**4.5**	--	--	--	**3**	--
Percent retained 9 micron sieve	--	--	--	--	**5.3**	--	**6**	--	--	--	**4.6**	--
Percent retained 13 micron sieve	--	--	--	--	**8.4**	--	**6**	--	--	--	**7.6**	--
Percent retained 22 micron sieve	--	--	--	--	**4.6**	--	**5.2**	--	--	--	**6.1**	--
Percent retained 32 micron sieve	--	**32**	--	--	**10.2**	--	**17.3**	--	**9.4**	--	**26.8**	--
Percent retained 75 micron sieve	--	**33.8**	--	--	**5.1**	--	**9.5**	--	**10.5**	--	**18**	--
Percent retained 150 micron sieve	--	**22.5**	--	--	**2.7**	--	**3.4**	--	**23.4**	--	**4.5**	--
Percent retained 250 micron sieve	--	**7.9**	--	--	**2.2**	--	**2.1**	--	**29.8**	--	**1.4**	--
Percent retained 425 micron sieve	--	**1.8**	--	--	**1.3**	--	**1.4**	--	**15.2**	--	**0.7**	--
Percent retained 850 micron sieve	--	**1.2**	--	--	**1**	--	**1.1**	--	**6.1**	--	**0.6**	--
Percent retained 2000 micron sieve	--	**0.6**	--	--	**1.3**	--	**0.8**	--	**2.8**	--	**0.6**	--
Percent retained 4750 micron sieve	--	**0.2**	--	--	**1.1**	--	**0.3**	--	**2.6**	--	**0.4**	--
Percent retained 9500 micron sieve	--	--	--	--	--	--	**3.4**	--	--	--	**1.3**	--
Percent retained 12500 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 19000 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 25K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 37.5K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 50K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 75K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-107B-HSA	8-107B-HSA	8-107B-HSA	8-107B-HSA	8-107B-HSA	8-107B-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA
Sample ID:	8-107B-HSA-S-11	8-107B-HSA-S-12	8-107B-HSA-S-13	8-107B-HSA-S-14	8-107B-HSA-S-15	8-107B-HSA-S-17	8-108A-HSA-S1	8-108A-HSA-S2	8-108A-HSA-S3	8-108A-HSA-S4	8-108A-HSA-S5	8-108A-HSA-S6
Sample Date:	7/29/08	7/29/08	7/29/08	7/29/08	7/29/08	7/29/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08
In-Situ Depth[1] (ft):	37.5 - 39 ft	42.5 - 44 ft	47.5 - 49 ft	52.5 - 54 ft	57.5 - 59 ft	69.5 - 71 ft	0 - 1.5 ft	2.5 - 4 ft	5 - 6.5 ft	7.5 - 9 ft	10 - 11.5 ft	15 - 16.5 ft
Physical Parameters												
Atterberg Classification	--	--	CL	--	CL	CL	--	--	--	Non-Plastic	--	--
Specific gravity (su)	--	--	2.74	--	2.78	2.8	--	--	--	2.8	--	--
Liquid Limit (pct)	--	--	43.8	--	42.9	40.1	--	--	--	--	--	--
Plastic Limit (pct)	--	--	19.5	--	16	16.1	--	--	--	--	--	--
Plasticity Index (pct)	--	--	24.3	--	26.9	24	--	--	--	--	--	--
Moisture (water) Content (pct)	23.17	23.4	28.02	30.64	27.24	25.63	1.79	2.89	2.24	2.17	4.01	4.14
Grain Size (pct)												
Gravel	--	--	--	0.2	--	--	--	--	8.4	--	--	2
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	0.6	--	--	--	--	--	--	16.1	--	--	13
Sand, Fine	--	85.6	--	10.5	--	--	--	--	31.7	--	--	40.1
Sand, Medium	--	2.8	--	0.9	--	--	--	--	37	--	--	39.8
Silt, Coarse	--	--	--	7.8	--	--	--	--	--	--	--	--
Silt, Fine	--	--	--	10.1	--	--	--	--	--	--	--	--
Silt, Medium	--	--	--	8.6	--	--	--	--	--	--	--	--
Silt, Very Coarse	--	11	--	21.6	--	--	--	--	6.8	--	--	5.1
Silt, Very Fine	--	--	--	9.3	--	--	--	--	--	--	--	--
Clay	--	--	--	31.1	--	--	--	--	--	--	--	--
Total Gravel	--	--	--	0.2	--	--	--	--	8.4	--	--	2
Total Sand	--	89	--	11.4	--	--	--	--	84.8	--	--	92.9
Total Silt	--	11	--	57.4	--	--	--	--	6.8	--	--	5.1
Total Clay	--	--	--	31.1	--	--	--	--	--	--	--	--
Total Fines (Silt + Clay)	--	11	--	88.5	--	--	--	--	6.8	--	--	5.1
Total Grain Size	--	100	--	100.1	--	--	--	--	100	--	--	100
Percent passing < 1.3 micron sieve	--	--	--	23.3	--	--	--	--	--	--	--	--
Percent retained 1.3 micron sieve	--	--	--	7.8	--	--	--	--	--	--	--	--
Percent retained 3.2 micron sieve	--	--	--	9.3	--	--	--	--	--	--	--	--
Percent retained 7 micron sieve	--	--	--	5.4	--	--	--	--	--	--	--	--
Percent retained 9 micron sieve	--	--	--	4.7	--	--	--	--	--	--	--	--
Percent retained 13 micron sieve	--	--	--	8.6	--	--	--	--	--	--	--	--
Percent retained 22 micron sieve	--	--	--	7.8	--	--	--	--	--	--	--	--
Percent retained 32 micron sieve	--	11	--	21.6	--	--	--	--	6.8	--	--	5.1
Percent retained 75 micron sieve	--	26.6	--	6	--	--	--	--	5.6	--	--	6.3
Percent retained 150 micron sieve	--	47.3	--	2.9	--	--	--	--	10.1	--	--	13.2
Percent retained 250 micron sieve	--	11.7	--	1.6	--	--	--	--	16	--	--	20.6
Percent retained 425 micron sieve	--	1.5	--	0.6	--	--	--	--	18	--	--	20.8
Percent retained 850 micron sieve	--	1.3	--	0.3	--	--	--	--	19	--	--	19
Percent retained 2000 micron sieve	--	0.6	--	0.1 U	--	--	--	--	16.1	--	--	13
Percent retained 4750 micron sieve	--	--	--	0.2	--	--	--	--	8.4	--	--	2
Percent retained 9500 micron sieve	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 12500 micron sieve	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 19000 micron sieve	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 25K micron sieve	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 37.5K micron sieve	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 50K micron sieve	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U
Percent retained 75K micron sieve	--	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA	8-108A-HSA
Sample ID:	8-108A-HSA-S7	8-108A-HSA-S8	8-108A-HSA-S9	8-108A-HSA-S10	8-108A-HSA-S11	8-108A-HSA-S12	8-108A-HSA-S13	8-108A-HSA-S14	8-108A-HSA-S15	8-108A-HSA-S16	8-108A-HSA-S17	8-108A-HSA-S18	8-108A-HSA-S19
Sample Date:	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08
In-Situ Depth[1] (ft):	20 - 21.5 ft	25 - 26.5 ft	30 - 31.5 ft	35 - 36.5 ft	40 - 41.5 ft	45 - 46.5 ft	50 - 51.5 ft	55 - 56.5 ft	60 - 61.5 ft	65 - 66.5 ft	70 - 71.5 ft	75 - 78.5 ft	80 - 81.5 ft
Physical Parameters													
Atterberg Classification	--	--	--	Non-Plastic	--	Non-Plastic	--	Non-Plastic	--	--	CL	--	--
Specific gravity (su)	--	--	--	2.75	--	2.72	--	2.78	--	--	2.78	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	38.4	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	14.3	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	24.1	--	--
Moisture (water) Content (pct)	5.43	1.61	14.43	21.85	34.56	38.89	37.85	26.22	24.32	22.49	22.04	26.12	25.83
Grain Size (pct)													
Gravel	--	--	56	--	--	--	--	--	5.9	--	--	2.5	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	7.4	--	0.1	--	--	--	11.7	--	--	1.1	--
Sand, Fine	--	--	17.8	--	54.7	--	--	--	36.2	--	--	9.2	--
Sand, Medium	--	--	13	--	1.3	--	--	--	38.3	--	--	2.6	--
Silt, Coarse	--	--	--	--	2.6	--	--	--	--	--	--	5.5	--
Silt, Fine	--	--	--	--	2.1	--	--	--	--	--	--	9.6	--
Silt, Medium	--	--	--	--	5.2	--	--	--	--	--	--	9.7	--
Silt, Very Coarse	--	--	5.7	--	17.1	--	--	--	7.9	--	--	14.2	--
Silt, Very Fine	--	--	--	--	3.6	--	--	--	--	--	--	9	--
Clay	--	--	--	--	13.4	--	--	--	--	--	--	36.6	--
Total Gravel	--	--	56	--	--	--	--	--	5.9	--	--	2.5	--
Total Sand	--	--	38.2	--	56.1	--	--	--	86.2	--	--	12.9	--
Total Silt	--	--	5.7	--	30.6	--	--	--	7.9	--	--	48	--
Total Clay	--	--	--	--	13.4	--	--	--	--	--	--	36.6	--
Total Fines (Silt + Clay)	--	--	5.7	--	44	--	--	--	7.9	--	--	84.6	--
Total Grain Size	--	--	99.9	--	100.1	--	--	--	100	--	--	100	--
Percent passing < 1.3 micron sieve	--	--	--	--	9.3	--	--	--	--	--	--	27.6	--
Percent retained 1.3 micron sieve	--	--	--	--	4.1	--	--	--	--	--	--	9	--
Percent retained 3.2 micron sieve	--	--	--	--	3.6	--	--	--	--	--	--	9	--
Percent retained 7 micron sieve	--	--	--	--	2.1	--	--	--	--	--	--	5.5	--
Percent retained 9 micron sieve	--	--	--	--	0.1 U	--	--	--	--	--	--	4.1	--
Percent retained 13 micron sieve	--	--	--	--	5.2	--	--	--	--	--	--	9.7	--
Percent retained 22 micron sieve	--	--	--	--	2.6	--	--	--	--	--	--	5.5	--
Percent retained 32 micron sieve	--	--	5.7	--	17.1	--	--	--	7.9	--	--	14.2	--
Percent retained 75 micron sieve	--	--	6.4	--	45.3	--	--	--	3.6	--	--	4.4	--
Percent retained 150 micron sieve	--	--	5.2	--	7.7	--	--	--	11.6	--	--	2.6	--
Percent retained 250 micron sieve	--	--	6.2	--	1.7	--	--	--	21	--	--	2.2	--
Percent retained 425 micron sieve	--	--	7.3	--	0.8	--	--	--	23.3	--	--	1.4	--
Percent retained 850 micron sieve	--	--	5.7	--	0.5	--	--	--	15	--	--	1.2	--
Percent retained 2000 micron sieve	--	--	7.4	--	0.1	--	--	--	11.7	--	--	1.1	--
Percent retained 4750 micron sieve	--	--	10.7	--	0.1 U	--	--	--	3.6	--	--	2.5	--
Percent retained 9500 micron sieve	--	--	13	--	0.1 U	--	--	--	2.3	--	--	0.1 U	--
Percent retained 12500 micron sieve	--	--	18.8	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--
Percent retained 19000 micron sieve	--	--	13.5	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--
Percent retained 25K micron sieve	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--
Percent retained 37.5K micron sieve	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--
Percent retained 50K micron sieve	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--
Percent retained 75K micron sieve	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-108C-HSA	8-108C-HSA	8-108C-HSA	8-108C-HSA	8-108C-HSA	8-108C-HSA	8-108C-HSA	8-108C-HSA	8-108C-HSA	8-108C-HSA	8-109A-HSA	8-109A-HSA
Sample ID:	8-108C-HSA-0-1	8-108C-HSA-S3	8-108C-HSA-S5	8-108C-HSA-S7	8-108C-HSA-S8	8-108C-HSA-S9	8-108C-HSA-S10	8-108C-HSA-S11	8-108C-HSA-S12	8-108C-HSA-S14	8-109A-HSA-S1	8-109A-HSA-S2
Sample Date:	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/28/08	7/25/08	7/25/08
In-Situ Depth[1] (ft):	0 - 1 ft	5 - 7.5 ft	10 - 11.5 ft	16.5 - 18 ft	21.5 - 23 ft	26.5 - 28 ft	31.5 - 33 ft	36.5 - 38 ft	41.5 - 43 ft	48.5 - 50 ft	0 - 1.5 ft	2.5 - 4 ft
Physical Parameters												
Atterberg Classification	--	--	--	--	CH	--	--	CL	--	CL	--	--
Specific gravity (su)	--	--	2.71	--	2.72	--	--	2.73	--	2.78	--	--
Liquid Limit (pct)	--	--	--	--	56.1	--	--	35.2	--	34.6	--	--
Plastic Limit (pct)	--	--	--	--	19.4	--	--	12.8	--	12.7	--	--
Plasticity Index (pct)	--	--	--	--	36.7	--	--	22.5	--	21.9	--	--
Moisture (water) Content (pct)	265	22.22	28.33	25.26	46.51	32.4	17.94	34.46	30.81	19.66	2.1	2.48
Grain Size (pct)												
Gravel	--	3.9	--	--	--	--	2.7	--	--	--	--	10.4
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	4.5	--	0.1	--	--	8.5	--	--	--	--	30
Sand, Fine	--	54.9	--	73.4	--	--	36.7	--	7.4	--	--	19
Sand, Medium	--	30.8	--	5.7	--	--	17.2	--	0.3	--	--	33.6
Silt, Coarse	--	0.5	--	1.9	--	--	3.5	--	1.7	--	--	--
Silt, Fine	--	1	--	0.6	--	--	3	--	11.7	--	--	--
Silt, Medium	--	0.9	--	1.3	--	--	3	--	3.9	--	--	--
Silt, Very Coarse	--	0.4	--	9.5	--	--	17.5	--	24.8	--	--	6.9
Silt, Very Fine	--	0.9	--	3.1	--	--	3	--	10.6	--	--	--
Clay	--	2.3	--	4.4	--	--	5	--	39.5	--	--	--
Total Gravel	--	3.9	--	--	--	--	2.7	--	--	--	--	10.4
Total Sand	--	90.2	--	79.2	--	--	62.4	--	7.7	--	--	82.6
Total Silt	--	3.7	--	16.4	--	--	30	--	52.7	--	--	6.9
Total Clay	--	2.3	--	4.4	--	--	5	--	39.5	--	--	--
Total Fines (Silt + Clay)	--	6	--	20.8	--	--	35	--	92.2	--	--	6.9
Total Grain Size	--	100.1	--	100	--	--	100.1	--	99.9	--	--	99.9
Percent passing < 1.3 micron sieve	--	1.4	--	3.8	--	--	4.5	--	29.5	--	--	--
Percent retained 1.3 micron sieve	--	0.9	--	0.6	--	--	0.5	--	10	--	--	--
Percent retained 3.2 micron sieve	--	0.9	--	3.1	--	--	3	--	10.6	--	--	--
Percent retained 7 micron sieve	--	0.5	--	0.6	--	--	2	--	5.6	--	--	--
Percent retained 9 micron sieve	--	0.5	--	0.1 U	--	--	1	--	6.1	--	--	--
Percent retained 13 micron sieve	--	0.9	--	1.3	--	--	3	--	3.9	--	--	--
Percent retained 22 micron sieve	--	0.5	--	1.9	--	--	3.5	--	1.7	--	--	--
Percent retained 32 micron sieve	--	0.4	--	9.5	--	--	17.5	--	24.8	--	--	6.9
Percent retained 75 micron sieve	--	5.6	--	35.3	--	--	14.6	--	5.2	--	--	3.3
Percent retained 150 micron sieve	--	19.6	--	20.6	--	--	11.6	--	1.6	--	--	5.3
Percent retained 250 micron sieve	--	29.7	--	17.5	--	--	10.5	--	0.6	--	--	10.4
Percent retained 425 micron sieve	--	20.4	--	5	--	--	7.5	--	0.2	--	--	14.3
Percent retained 850 micron sieve	--	10.4	--	0.7	--	--	9.7	--	0.1	--	--	19.3
Percent retained 2000 micron sieve	--	4.5	--	0.1	--	--	8.5	--	0.1 U	--	--	30
Percent retained 4750 micron sieve	--	3.9	--	0.1 U	--	--	2.7	--	0.1 U	--	--	7.2
Percent retained 9500 micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	3.2
Percent retained 12500 micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--
Percent retained 19000 micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--
Percent retained 25K micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--
Percent retained 37.5K micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--
Percent retained 50K micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--
Percent retained 75K micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-109A-HSA	8-109A-HSA	8-109A-HSA	8-109A-HSA	8-109A-HSA	8-109A-HSA	8-109A-HSA	8-109A-HSA	8-109A-HSA	8-109A-HSA	8-109A-HSA	8-109A-HSA
Sample ID:	8-109A-HSA-S3	8-109A-HSA-S6	8-109A-HSA-S7	8-109A-HSA-S8	8-109A-HSA-S9	8-109A-HSA-S10	8-109A-HSA-S11	8-109A-HSA-S12	8-109A-HSA-S13	8-109A-HSA-S14	8-109A-HSA-S15	8-109A-HSA-S16
Sample Date:	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08
In-Situ Depth[1] (ft):	5 - 6.5 ft	15 - 17.5 ft	20 - 21.5 ft	25 - 26.5 ft	30 - 31.5 ft	35 - 36.5 ft	40 - 41.5 ft	45 - 46.5 ft	50 - 51.5 ft	55 - 56.5 ft	60 - 61.5 ft	65 - 66.5 ft
Physical Parameters												
Atterberg Classification	--	--	Non-Plastic	--	--	Non-Plastic	--	CL	--	CL	--	--
Specific gravity (su)	--	--	3.32	--	--	2.79	--	2.72	--	2.75	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	44.9	--	30.8	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	23.5	--	13.4	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	21.4	--	17.4	--	--
Moisture (water) Content (pct)	3.05	4.7	19.74	14.72	18.34	32.77	32.75	38.47	26.8	10.81	31.97	39.8
Grain Size (pct)												
Gravel	--	3.4	--	--	10.1	--	0.1	--	--	--	0.3	--
Gravel, Coarse	--	--	--	--	17	--	--	--	--	--	--	--
Sand, Coarse	--	10.9	--	--	5.5	--	0.7	--	--	--	0.7	--
Sand, Fine	--	47.7	--	--	33	--	38.1	--	--	--	1.4	0.9
Sand, Medium	--	33.7	--	--	24.6	--	7.5	--	--	--	1.7	0.1
Silt, Coarse	--	--	--	--	--	--	5.6	--	--	--	5.4	--
Silt, Fine	--	--	--	--	--	--	4.4	--	--	--	10.8	14
Silt, Medium	--	--	--	--	--	--	3.7	--	--	--	8.5	4.7
Silt, Very Coarse	--	4.2	--	--	9.9	--	13.8	--	--	--	3.2	1.2
Silt, Very Fine	--	--	--	--	--	--	3.1	--	--	--	9.3	11.6
Clay	--	--	--	--	--	--	23.1	--	--	--	58.8	67.5
Total Gravel	--	3.4	--	--	27.1	--	0.1	--	--	--	0.3	--
Total Sand	--	92.3	--	--	63.1	--	46.3	--	--	--	3.8	1
Total Silt	--	4.2	--	--	9.9	--	30.6	--	--	--	37.2	31.5
Total Clay	--	--	--	--	--	--	23.1	--	--	--	58.8	67.5
Total Fines (Silt + Clay)	--	4.2	--	--	9.9	--	53.7	--	--	--	96	99
Total Grain Size	--	99.9	--	--	100.1	--	100.1	--	--	--	100.1	100
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	15	--	--	--	46.4	54.3
Percent retained 1.3 micron sieve	--	--	--	--	--	--	8.1	--	--	--	12.4	13.2
Percent retained 3.2 micron sieve	--	--	--	--	--	--	3.1	--	--	--	9.3	11.6
Percent retained 7 micron sieve	--	--	--	--	--	--	2.5	--	--	--	4.6	6.2
Percent retained 9 micron sieve	--	--	--	--	--	--	1.9	--	--	--	6.2	7.8
Percent retained 13 micron sieve	--	--	--	--	--	--	3.7	--	--	--	8.5	4.7
Percent retained 22 micron sieve	--	--	--	--	--	--	5.6	--	--	--	5.4	0.1 U
Percent retained 32 micron sieve	--	4.2	--	--	9.9	--	13.8	--	--	--	3.2	1.2
Percent retained 75 micron sieve	--	6	--	--	8.1	--	23.3	--	--	--	0.1 U	0.4
Percent retained 150 micron sieve	--	15.5	--	--	10.7	--	7.5	--	--	--	0.1 U	0.3
Percent retained 250 micron sieve	--	26.2	--	--	14.2	--	7.3	--	--	--	1.4	0.2
Percent retained 425 micron sieve	--	20.3	--	--	13.4	--	5	--	--	--	0.9	0.1
Percent retained 850 micron sieve	--	13.4	--	--	11.2	--	2.5	--	--	--	0.8	0.1 U
Percent retained 2000 micron sieve	--	10.9	--	--	5.5	--	0.7	--	--	--	0.7	0.1 U
Percent retained 4750 micron sieve	--	3.4	--	--	3.6	--	0.1	--	--	--	0.3	0.1 U
Percent retained 9500 micron sieve	--	--	--	--	1.1	--	--	--	--	--	0.1 U	0.1 U
Percent retained 12500 micron sieve	--	--	--	--	5.4	--	--	--	--	--	0.1 U	0.1 U
Percent retained 19000 micron sieve	--	--	--	--	0.1 U	--	--	--	--	--	0.1 U	0.1 U
Percent retained 25K micron sieve	--	--	--	--	17	--	--	--	--	--	0.1 U	0.1 U
Percent retained 37.5K micron sieve	--	--	--	--	--	--	--	--	--	--	0.1 U	0.1 U
Percent retained 50K micron sieve	--	--	--	--	--	--	--	--	--	--	0.1 U	0.1 U
Percent retained 75K micron sieve	--	--	--	--	--	--	--	--	--	--	0.1 U	0.1 U

Table 21b

Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	**8-109A-HSA**	**8-110A-HSA**	**8-110A-HSA**	**8-110A-HSA**	**8-110A-HSA**	**8-110A-HSA**	**8-110A-HSA**	**8-110A-HSA**	**8-110A-HSA**	**8-110A-HSA**	**8-110A-HSA**	**8-110A-HSA**
Sample ID:	**8-109A-HSA-S17**	**8-110A-HSA-S1**	**8-110A-HSA-S2**	**8-110A-HSA-S5**	**8-110A-HSA-S6**	**8-110A-HSA-S7**	**8-110A-HSA-S8**	**8-110A-HSA-S9**	**8-110A-HSA-S10**	**8-110A-HSA-S11**	**8-110A-HSA-S12**	**8-110A-HSA-S13**
Sample Date:	**7/25/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**	**7/24/08**
In-Situ Depth^1 (ft):	**70 - 73.5 ft**	**0 - 1.5 ft**	**2.5 - 4 ft**	**10 - 11.5 ft**	**15 - 16.5 ft**	**20 - 21.5 ft**	**25 - 26.5 ft**	**30 - 31.5 ft**	**35 - 36.5 ft**	**40 - 41.5 ft**	**45 - 46.5 ft**	**50 - 51.5 ft**
Physical Parameters												
Atterberg Classification	**Non-Plastic**	--	--	--	--	--	--	--	**CL**	--	**CL**	--
Specific gravity (su)	**2.77**	--	--	--	--	--	--	--	**2.72**	--	**2.74**	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	**37.7**	--	**30.1**	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	**19.4**	--	**11.8**	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	**18.4**	--	**18.3**	--
Moisture (water) Content (pct)	**20.66**	**3.31**	**3.05**	**6.29**	**6.76**	**24.72**	**19.14**	**31.12**	**33.35**	**23.51**	**18.88**	**34.05**
Grain Size (pct)												
Gravel	--	--	--	--	**40.9**	--	--	**0.2**	--	**0.4**	--	--
Gravel, Coarse	--	--	--	--	**34**	--	--	--	--	--	--	--
Sand, Coarse	--	--	--	--	**6.3**	--	--	**0.2**	--	**2.1**	--	**0.2**
Sand, Fine	--	--	--	--	**7.2**	--	--	**49.4**	--	**62.1**	--	**2.5**
Sand, Medium	--	--	--	--	**8.9**	--	--	**0.6**	--	**5.3**	--	**0.9**
Silt, Coarse	--	--	--	--	--	--	--	**3.5**	--	**2.1**	--	**5.8**
Silt, Fine	--	--	--	--	--	--	--	**3.5**	--	**2.7**	--	**9.9**
Silt, Medium	--	--	--	--	--	--	--	**3.5**	--	**2.1**	--	**9.4**
Silt, Very Coarse	--	--	--	--	**2.7**	--	--	**25.3**	--	**13**	--	**12.2**
Silt, Very Fine	--	--	--	--	--	--	--	**5.2**	--	**3.7**	--	**9.4**
Clay	--	--	--	--	--	--	--	**8.8**	--	**6.5**	--	**49.7**
Total Gravel	--	--	--	--	**74.9**	--	--	**0.2**	--	**0.4**	--	--
Total Sand	--	--	--	--	**22.4**	--	--	**50.2**	--	**69.5**	--	**3.6**
Total Silt	--	--	--	--	**2.7**	--	--	**41**	--	**23.6**	--	**46.7**
Total Clay	--	--	--	--	--	--	--	**8.8**	--	**6.5**	--	**49.7**
Total Fines (Silt + Clay)	--	--	--	--	**2.7**	--	--	**49.8**	--	**30.1**	--	**96.4**
Total Grain Size	--	--	--	--	**100**	--	--	**100.2**	--	**100**	--	**100**
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	**7.6**	--	**5.4**	--	**38.6**
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	**1.2**	--	**1.1**	--	**11.1**
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	**5.2**	--	**3.7**	--	**9.4**
Percent retained 7 micron sieve	--	--	--	--	--	--	--	**2.3**	--	**1.1**	--	**4.1**
Percent retained 9 micron sieve	--	--	--	--	--	--	--	**1.2**	--	**1.6**	--	**5.8**
Percent retained 13 micron sieve	--	--	--	--	--	--	--	**3.5**	--	**2.1**	--	**9.4**
Percent retained 22 micron sieve	--	--	--	--	--	--	--	**3.5**	--	**2.1**	--	**5.8**
Percent retained 32 micron sieve	--	--	--	--	**2.7**	--	--	**25.3**	--	**13**	--	**12.2**
Percent retained 75 micron sieve	--	--	--	--	**1.9**	--	--	**41.3**	--	**26.6**	--	**1**
Percent retained 150 micron sieve	--	--	--	--	**2.3**	--	--	**7.2**	--	**27.3**	--	**0.7**
Percent retained 250 micron sieve	--	--	--	--	**3**	--	--	**0.9**	--	**8.2**	--	**0.8**
Percent retained 425 micron sieve	--	--	--	--	**3.8**	--	--	**0.3**	--	**2.7**	--	**0.5**
Percent retained 850 micron sieve	--	--	--	--	**5.1**	--	--	**0.3**	--	**2.6**	--	**0.4**
Percent retained 2000 micron sieve	--	--	--	--	**6.3**	--	--	**0.2**	--	**2.1**	--	**0.2**
Percent retained 4750 micron sieve	--	--	--	--	**9.1**	--	--	**0.2**	--	**0.4**	--	0.1 U
Percent retained 9500 micron sieve	--	--	--	--	**5.8**	--	--	0.1 U	--	0.1 U	--	0.1 U
Percent retained 12500 micron sieve	--	--	--	--	**6.6**	--	--	0.1 U	--	0.1 U	--	0.1 U
Percent retained 19000 micron sieve	--	--	--	--	**19.4**	--	--	0.1 U	--	0.1 U	--	0.1 U
Percent retained 25K micron sieve	--	--	--	--	**34**	--	--	0.1 U	--	0.1 U	--	0.1 U
Percent retained 37.5K micron sieve	--	--	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U
Percent retained 50K micron sieve	--	--	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U
Percent retained 75K micron sieve	--	--	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-110A-HSA	8-110A-HSA	8-110B-HSA	8-110B-HSA	8-110B-HSA	8-110B-HSA	8-110B-HSA	8-110B-HSA	8-110B-HSA	8-110B-HSA	8-111A-HSA	8-111A-HSA
Sample ID:	8-110A-HSA-S14	8-110A-HSA-S15	8-110B-HSA-S6	8-110B-HSA-S8	8-110B-HSA-S9	8-110B-HSA-S10	8-110B-HSA-S11	8-110B-HSA-S12	8-110B-HSA-S13	8-110B-HSA-S14	8-111A-HSA-S1	8-111A-HSA-S2
Sample Date:	7/24/08	7/24/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/25/08	7/24/08	7/24/08
In-Situ Depth[1] (ft):	55 - 56.5 ft	60 - 63.5 ft	11.5 - 13 ft	21.5 - 25 ft	26.5 - 28 ft	31.5 - 33 ft	36.5 - 38 ft	41.5 - 43 ft	46.5 - 48.5 ft	51.5 - 53 ft	0 - 1.5 ft	2.5 - 4 ft
Physical Parameters												
Atterberg Classification	CL	CL	--	CL	--	CL	CL	--	CL	--	--	--
Specific gravity (su)	2.78	--	--	2.71	--	2.77	2.76	--	2.76	--	--	--
Liquid Limit (pct)	43.7	31.9	--	41.2	--	29.4	38.1	--	40.4	--	--	--
Plastic Limit (pct)	16.7	12.6	--	22.3	--	13.8	19	--	15.4	--	--	--
Plasticity Index (pct)	27.1	19.3	--	18.9	--	15.6	19.1	--	25	--	--	--
Moisture (water) Content (pct)	24.94	21.22	25.23	37.31	21.9	26.19	30.1	30.55	23.09	24.84	2.01	4.43
Grain Size (pct)												
Gravel	--	--	1.4	--	6.4	--	--	0.2	--	0.8	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	4.7	--	5.1	--	--	--	--	1.7	--	--
Sand, Fine	--	--	50.1	--	53.8	--	--	1.7	--	18.6	--	--
Sand, Medium	--	--	35.5	--	11	--	--	1.1	--	5.5	--	--
Silt, Coarse	--	--	--	--	1	--	--	6.9	--	5.4	--	--
Silt, Fine	--	--	--	--	2.5	--	--	10.4	--	9.7	--	--
Silt, Medium	--	--	--	--	3	--	--	10.4	--	5.4	--	--
Silt, Very Coarse	--	--	8.3	--	6.7	--	--	11.4	--	11.5	--	--
Silt, Very Fine	--	--	--	--	2.5	--	--	9.8	--	7.6	--	--
Clay	--	--	--	--	8.1	--	--	48	--	33.7	--	--
Total Gravel	--	--	1.4	--	6.4	--	--	0.2	--	0.8	--	--
Total Sand	--	--	90.3	--	69.9	--	--	2.8	--	25.8	--	--
Total Silt	--	--	8.3	--	15.7	--	--	48.9	--	39.6	--	--
Total Clay	--	--	--	--	8.1	--	--	48	--	33.7	--	--
Total Fines (Silt + Clay)	--	--	8.3	--	23.8	--	--	96.9	--	73.3	--	--
Total Grain Size	--	--	100	--	100.1	--	--	99.9	--	99.9	--	--
Percent passing < 1.3 micron sieve	--	--	--	--	7.1	--	--	37.6	--	27.2	--	--
Percent retained 1.3 micron sieve	--	--	--	--	1	--	--	10.4	--	6.5	--	--
Percent retained 3.2 micron sieve	--	--	--	--	2.5	--	--	9.8	--	7.6	--	--
Percent retained 7 micron sieve	--	--	--	--	1.5	--	--	4.6	--	4.3	--	--
Percent retained 9 micron sieve	--	--	--	--	1	--	--	5.8	--	5.4	--	--
Percent retained 13 micron sieve	--	--	--	--	3	--	--	10.4	--	5.4	--	--
Percent retained 22 micron sieve	--	--	--	--	1	--	--	6.9	--	5.4	--	--
Percent retained 32 micron sieve	--	--	8.3	--	6.7	--	--	11.4	--	11.5	--	--
Percent retained 75 micron sieve	--	--	14.5	--	22.3	--	--	0.7	--	8.7	--	--
Percent retained 150 micron sieve	--	--	17.3	--	22.4	--	--	0.5	--	5.3	--	--
Percent retained 250 micron sieve	--	--	18.3	--	9.1	--	--	0.5	--	4.6	--	--
Percent retained 425 micron sieve	--	--	20.2	--	6.1	--	--	0.6	--	3.2	--	--
Percent retained 850 micron sieve	--	--	15.3	--	4.9	--	--	0.5	--	2.3	--	--
Percent retained 2000 micron sieve	--	--	4.7	--	5.1	--	--	0.1 U	--	1.7	--	--
Percent retained 4750 micron sieve	--	--	0.7	--	3.5	--	--	0.2	--	0.8	--	--
Percent retained 9500 micron sieve	--	--	0.1 U	--	0.7	--	--	--	--	--	--	--
Percent retained 12500 micron sieve	--	--	0.7	--	1.9	--	--	--	--	--	--	--
Percent retained 19000 micron sieve	--	--	--	--	0.3	--	--	--	--	--	--	--
Percent retained 25K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 37.5K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 50K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 75K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-111A-HSA	8-111A-HSA	8-111A-HSA	8-111A-HSA	8-111A-HSA	8-111A-HSA	8-111A-HSA	8-111A-HSA	8-111A-HSA	8-111A-HSA	8-111A-HSA	8-111A-HSA
Sample ID:	8-111A-HSA-S3	8-111A-HSA-S5	8-111A-HSA-S6	8-111A-HSA-S7	8-111A-HSA-S8	8-111A-HSA-S9	8-111A-HSA-S10	8-111A-HSA-S11	8-111A-HSA-S12	8-111A-HSA-S13	8-111A-HSA-S14	8-111A-HSA-S15
Sample Date:	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08
In-Situ Depth[1] (ft):	5 - 6.5 ft	10 - 11.5 ft	15 - 16.5 ft	20 - 21.5 ft	25 - 26.5 ft	30 - 30.5 ft	35 - 36.5 ft	40 - 41.5 ft	45 - 46.5 ft	50 - 51.5 ft	55 - 56.5 ft	60 - 63.5 ft
Physical Parameters												
Atterberg Classification	--	Non-Plastic	--	--	--	--	Non-Plastic	--	Non-Plastic	--	CL	--
Specific gravity (su)	--	2.79	--	--	--	--	2.72	--	2.72	--	2.77	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	31.2	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	19.4	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	11.8	--
Moisture (water) Content (pct)	4.01	4.2	5.28	17.97	31.44	24.32	24.48	22.97	25.02	33.35	23.81	19.93
Grain Size (pct)												
Gravel	6.2	--	7.4	--	--	13.4	--	4.7	--	--	--	3.2
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	12.7	--	13.5	--	--	11.8	--	11.2	--	--	--	2.2
Sand, Fine	38.4	--	40.2	--	--	61.8	--	68.1	--	--	--	21.1
Sand, Medium	32.4	--	33.1	--	--	9.2	--	10.3	--	--	--	4.8
Silt, Coarse	--	--	--	--	--	0.5	--	--	--	--	--	4.2
Silt, Fine	--	--	--	--	--	--	--	--	--	--	--	9.8
Silt, Medium	--	--	--	--	--	--	--	--	--	--	--	6.9
Silt, Very Coarse	10.3	--	5.8	--	--	1.2	--	5.7	--	--	--	11.1
Silt, Very Fine	--	--	--	--	--	--	--	--	--	--	--	7.6
Clay	--	--	--	--	--	2.2	--	--	--	--	--	29.1
Total Gravel	6.2	--	7.4	--	--	13.4	--	4.7	--	--	--	3.2
Total Sand	83.5	--	86.8	--	--	82.8	--	89.6	--	--	--	28.1
Total Silt	10.3	--	5.8	--	--	1.7	--	5.7	--	--	--	39.6
Total Clay	--	--	--	--	--	2.2	--	--	--	--	--	29.1
Total Fines (Silt + Clay)	10.3	--	5.8	--	--	3.9	--	5.7	--	--	--	68.7
Total Grain Size	100	--	100	--	--	100.1	--	100	--	--	--	100
Percent passing < 1.3 micron sieve	--	--	--	--	--	1.1	--	--	--	--	--	22.2
Percent retained 1.3 micron sieve	--	--	--	--	--	1.1	--	--	--	--	--	6.9
Percent retained 3.2 micron sieve	--	--	--	--	--	0.1 U	--	--	--	--	--	7.6
Percent retained 7 micron sieve	--	--	--	--	--	0.1 U	--	--	--	--	--	4.9
Percent retained 9 micron sieve	--	--	--	--	--	0.1 U	--	--	--	--	--	4.9
Percent retained 13 micron sieve	--	--	--	--	--	0.1 U	--	--	--	--	--	6.9
Percent retained 22 micron sieve	--	--	--	--	--	0.5	--	--	--	--	--	4.2
Percent retained 32 micron sieve	10.3	--	5.8	--	--	1.2	--	5.7	--	--	--	11.1
Percent retained 75 micron sieve	6.8	--	6.8	--	--	23.6	--	26.7	--	--	--	9.3
Percent retained 150 micron sieve	12.6	--	13.5	--	--	26.4	--	28.6	--	--	--	7.1
Percent retained 250 micron sieve	19	--	19.9	--	--	11.8	--	12.8	--	--	--	4.7
Percent retained 425 micron sieve	17.5	--	18.5	--	--	4.8	--	5.8	--	--	--	2.8
Percent retained 850 micron sieve	14.9	--	14.6	--	--	4.4	--	4.5	--	--	--	2
Percent retained 2000 micron sieve	12.7	--	13.5	--	--	11.8	--	11.2	--	--	--	2.2
Percent retained 4750 micron sieve	6.2	--	7.4	--	--	9.2	--	4.7	--	--	--	1.1
Percent retained 9500 micron sieve	0.1 U	--	0.1 U	--	--	3.2	--	0.1 U	--	--	--	2.1
Percent retained 12500 micron sieve	0.1 U	--	0.1 U	--	--	1	--	0.1 U	--	--	--	0.1 U
Percent retained 19000 micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U
Percent retained 25K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U
Percent retained 37.5K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U
Percent retained 50K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U
Percent retained 75K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	8-111A-HSA	8-111C-HSA	8-111C-HSA	8-111C-HSA	8-111C-HSA	8-111C-HSA	8-111C-HSA	8-111C-HSA	8-112A-HSA	8-112A-HSA	8-112A-HSA	8-112A-HSA
Sample ID:	8-111A-HSA-S16	8-111C-HSA-S3	8-111C-HSA-S5	8-111C-HSA-S6	8-111C-HSA-S7	8-111C-HSA-S8	8-111C-HSA-S9	8-111C-HSA-S11	8-112A-HSA-S1	8-112A-HSA-S2	8-112A-HSA-S3	8-112A-HSA-S5
Sample Date:	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/24/08	7/23/08	7/23/08	7/23/08	7/23/08
In-Situ Depth[1] (ft):	65 - 66.5 ft	4 - 5.5 ft	10 - 11.5 ft	12.5 - 14 ft	15 - 16.5 ft	25 - 26.5 ft	30 - 31.5 ft	40 - 41.5 ft	0 - 1.5 ft	2.5 - 4 ft	5 - 6.5 ft	10 - 11.5 ft
Physical Parameters												
Atterberg Classification	CL	--	Non-Plastic	--	--	CL	--	CL	--	Non-Plastic	--	--
Specific gravity (su)	2.79	--	2.73	--	--	2.79	--	--	--	2.73	--	--
Liquid Limit (pct)	35.4	--	--	--	--	34.4	--	33.9	--	--	--	--
Plastic Limit (pct)	14	--	--	--	--	14.7	--	15.4	--	--	--	--
Plasticity Index (pct)	21.5	--	--	--	--	19.6	--	18.4	--	--	--	--
Moisture (water) Content (pct)	21.54	17.11	26.08	19.21	14.27	22.2	21.87	23.34	4.81	7.31	3.4	6.39
Grain Size (pct)												
Gravel	--	7.6	--	--	12.7	--	0.5	1.6	--	--	4.4	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	11.4	--	--	15.6	--	1.5	1	--	--	12.2	--
Sand, Fine	--	33	--	--	50.2	--	18.1	13.7	--	--	42.7	--
Sand, Medium	--	41.6	--	--	13	--	5.9	2.7	--	--	33.2	--
Silt, Coarse	--	--	--	--	--	--	4.4	6.5	--	--	--	--
Silt, Fine	--	--	--	--	--	--	9.5	10.1	--	--	--	--
Silt, Medium	--	--	--	--	--	--	8.7	10.1	--	--	--	--
Silt, Very Coarse	--	6.3	--	--	8.6	--	15.9	22.4	--	--	7.4	--
Silt, Very Fine	--	--	--	--	--	--	9.4	9.4	--	--	--	--
Clay	--	--	--	--	--	--	26.2	22.3	--	--	--	--
Total Gravel	--	7.6	--	--	12.7	--	0.5	1.6	--	--	4.4	--
Total Sand	--	86	--	--	78.8	--	25.5	17.4	--	--	88.1	--
Total Silt	--	6.3	--	--	8.6	--	47.9	58.5	--	--	7.4	--
Total Clay	--	--	--	--	--	--	26.2	22.3	--	--	--	--
Total Fines (Silt + Clay)	--	6.3	--	--	8.6	--	74.1	80.8	--	--	7.4	--
Total Grain Size	--	99.9	--	--	100.1	--	100.1	99.8	--	--	99.9	--
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	18.9	14.4	--	--	--	--
Percent retained 1.3 micron sieve	--	--	--	--	--	--	7.3	7.9	--	--	--	--
Percent retained 3.2 micron sieve	--	--	--	--	--	--	9.4	9.4	--	--	--	--
Percent retained 7 micron sieve	--	--	--	--	--	--	5.1	4.3	--	--	--	--
Percent retained 9 micron sieve	--	--	--	--	--	--	4.4	5.8	--	--	--	--
Percent retained 13 micron sieve	--	--	--	--	--	--	8.7	10.1	--	--	--	--
Percent retained 22 micron sieve	--	--	--	--	--	--	4.4	6.5	--	--	--	--
Percent retained 32 micron sieve	--	6.3	--	--	8.6	--	15.9	22.4	--	--	7.4	--
Percent retained 75 micron sieve	--	8.1	--	--	25.1	--	8.2	6.8	--	--	8.3	--
Percent retained 150 micron sieve	--	9.8	--	--	13.6	--	5.3	4.1	--	--	14.6	--
Percent retained 250 micron sieve	--	15.1	--	--	11.5	--	4.6	2.8	--	--	19.8	--
Percent retained 425 micron sieve	--	21.3	--	--	5.7	--	3.3	1.6	--	--	18.1	--
Percent retained 850 micron sieve	--	20.3	--	--	7.3	--	2.6	1.1	--	--	15.1	--
Percent retained 2000 micron sieve	--	11.4	--	--	15.6	--	1.5	1	--	--	12.2	--
Percent retained 4750 micron sieve	--	7.6	--	--	12.7	--	0.5	1.6	--	--	3.4	--
Percent retained 9500 micron sieve	--	--	--	--	--	--	--	--	--	--	1	--
Percent retained 12500 micron sieve	--	--	--	--	--	--	--	--	--	--	0.1 U	--
Percent retained 19000 micron sieve	--	--	--	--	--	--	--	--	--	--	0.1 U	--
Percent retained 25K micron sieve	--	--	--	--	--	--	--	--	--	--	0.1 U	--
Percent retained 37.5K micron sieve	--	--	--	--	--	--	--	--	--	--	0.1 U	--
Percent retained 50K micron sieve	--	--	--	--	--	--	--	--	--	--	0.1 U	--
Percent retained 75K micron sieve	--	--	--	--	--	--	--	--	--	--	0.1 U	--

Table 21b
Subsurface Sediment Geotechnical Testing Results - ASB Interior Sloping Berm

Location ID:	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**	**8-112A-HSA**
Sample ID:	**8-112A-HSA-S6**	**8-112A-HSA-S7**	**8-112A-HSA-S8**	**8-112A-HSA-S9**	**8-112A-HSA-S10**	**8-112A-HSA-S11**	**8-112A-HSA-S12**	**8-112A-HSA-S13**	**8-112A-HSA-S14**	**8-112A-HSA-S15**	**8-112A-HSA-S16**	**8-112A-HSA-S17**	**8-112A-HSA-S18**
Sample Date:	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**	**7/23/08**
In-Situ Depth[1] (ft):	**15 - 16.5 ft**	**20 - 21.5 ft**	**25 - 26.5 ft**	**30 - 31.5 ft**	**35 - 36.5 ft**	**40 - 41.5 ft**	**45 - 46.5 ft**	**50 - 51.5 ft**	**55 - 56.5 ft**	**60 - 63.5 ft**	**65 - 66.5 ft**	**70 - 71.5 ft**	**75 - 76.5 ft**
Physical Parameters													
Atterberg Classification	--	--	--	--	**Non-Plastic**	--	**CL**	--	**CL**	--	--	**CL**	--
Specific gravity (su)	--	--	--	--	**2.68**	--	**2.77**	--	**2.74**	--	--	**2.79**	--
Liquid Limit (pct)	--	--	--	--	--	--	**28.1**	--	**29.3**	--	--	**33.2**	--
Plastic Limit (pct)	--	--	--	--	--	--	**12.9**	--	**12.8**	--	--	**14.8**	--
Plasticity Index (pct)	--	--	--	--	--	--	**15.2**	--	**16.4**	--	--	**18.5**	--
Moisture (water) Content (pct)	**14.01**	**15.43**	**25.23**	**29**	**27.11**	**25.78**	**29.78**	**22.09**	**21.8**	**11.26**	**19.55**	**19.76**	**22.51**
Grain Size (pct)													
Gravel	**16.9**	--	--	**0.7**	--	**3.8**	--	--	--	**8.1**	--	--	**17**
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	**9**	--	--	**2**	--	**3.9**	--	--	--	**10.9**	--	--	**1.7**
Sand, Fine	**20**	--	--	**66**	--	**70.9**	--	--	--	**21.1**	--	--	**14.7**
Sand, Medium	**22.5**	--	--	**23.4**	--	**9.5**	--	--	--	**25.7**	--	--	**4.7**
Silt, Coarse	**1.7**	--	--	--	--	**1.2**	--	--	--	**1.9**	--	--	**2.5**
Silt, Fine	**5.8**	--	--	--	--	**2**	--	--	--	**4.4**	--	--	**7.6**
Silt, Medium	**2.9**	--	--	--	--	**0.8**	--	--	--	**3.7**	--	--	**6.9**
Silt, Very Coarse	**2.3**	--	--	**7.9**	--	**2.2**	--	--	--	**3.2**	--	--	**11.4**
Silt, Very Fine	**4.6**	--	--	--	--	**0.8**	--	--	--	**5**	--	--	**7.5**
Clay	**14.4**	--	--	--	--	**4.9**	--	--	--	**16.1**	--	--	**26.3**
Total Gravel	**16.9**	--	--	**0.7**	--	**3.8**	--	--	--	**8.1**	--	--	**17**
Total Sand	**51.5**	--	--	**91.4**	--	**84.3**	--	--	--	**57.7**	--	--	**21.1**
Total Silt	**17.3**	--	--	**7.9**	--	**7**	--	--	--	**18.2**	--	--	**35.9**
Total Clay	**14.4**	--	--	--	--	**4.9**	--	--	--	**16.1**	--	--	**26.3**
Total Fines (Silt + Clay)	**31.7**	--	--	**7.9**	--	**11.9**	--	--	--	**34.3**	--	--	**62.2**
Total Grain Size	**100.1**	--	--	**100**	--	**100**	--	--	--	**100.1**	--	--	**100.3**
Percent passing < 1.3 micron sieve	**11.5**	--	--	--	--	**4.1**	--	--	--	**12.4**	--	--	**20**
Percent retained 1.3 micron sieve	**2.9**	--	--	--	--	**0.8**	--	--	--	**3.7**	--	--	**6.3**
Percent retained 3.2 micron sieve	**4.6**	--	--	--	--	**0.8**	--	--	--	**5**	--	--	**7.5**
Percent retained 7 micron sieve	**2.9**	--	--	--	--	**0.8**	--	--	--	**1.9**	--	--	**3.8**
Percent retained 9 micron sieve	**2.9**	--	--	--	--	**1.2**	--	--	--	**2.5**	--	--	**3.8**
Percent retained 13 micron sieve	**2.9**	--	--	--	--	**0.8**	--	--	--	**3.7**	--	--	**6.9**
Percent retained 22 micron sieve	**1.7**	--	--	--	--	**1.2**	--	--	--	**1.9**	--	--	**2.5**
Percent retained 32 micron sieve	**2.3**	--	--	**7.9**	--	**2.2**	--	--	--	**3.2**	--	--	**11.4**
Percent retained 75 micron sieve	**3.4**	--	--	**12.9**	--	**28.3**	--	--	--	**5.3**	--	--	**6.6**
Percent retained 150 micron sieve	**5.4**	--	--	**20.8**	--	**32**	--	--	--	**5.3**	--	--	**4.3**
Percent retained 250 micron sieve	**11.2**	--	--	**32.3**	--	**10.6**	--	--	--	**10.5**	--	--	**3.8**
Percent retained 425 micron sieve	**11.4**	--	--	**15.4**	--	**5.5**	--	--	--	**13.7**	--	--	**2.7**
Percent retained 850 micron sieve	**11.1**	--	--	**8**	--	**4**	--	--	--	**12**	--	--	**2**
Percent retained 2000 micron sieve	**9**	--	--	**2**	--	**3.9**	--	--	--	**10.9**	--	--	**1.7**
Percent retained 4750 micron sieve	**9**	--	--	**0.7**	--	**1.3**	--	--	--	**6.7**	--	--	0.1 U
Percent retained 9500 micron sieve	**5.8**	--	--	0.1 U	--	0.1 U	--	--	--	**1.4**	--	--	**9.6**
Percent retained 12500 micron sieve	**2.1**	--	--	0.1 U	--	**2.5**	--	--	--	0.1 U	--	--	**7.4**
Percent retained 19000 micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U
Percent retained 25K micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U
Percent retained 37.5K micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U
Percent retained 50K micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U
Percent retained 75K micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U

Notes:
1. Sample depth is reported as below mudline.
Bold = Detected result
U = Compound analyzed, but not detected above detection limit
pct = percent
su = standard units
-- Sample was not submitted for chemical analysis.

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	2A-101A-HSA	2A-101A-HSA	2A-101A-HSA	2A-101A-HSA	2A-101A-HSA	2A-101A-HSA	2A-101A-HSA	2A-101A-HSA	2A-101A-HSA	2A-101A-HSA	2A-101A-HSA	2A-101C-HSA	2A-101C-HSA
Sample ID:	2A-101A-HSA-S2	2A-101A-HSA-S3	2A-101A-HSA-S4	2A-101A-HSA-S5	2A-101A-HSA-S6	2A-101A-HSA-S7	2A-101A-HSA-S8	2A-101A-HSA-S9	2A-101A-HSA-S10	2A-101A-HSA-S11	2A-101A-HSA-S13	2A-101C-HSA-S2	2A-101C-HSA-S4
Sample Date:	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08
In-Situ Depth[1] (ft):	2.5 - 4 ft	4 - 5.5 ft	7.5 - 9 ft	9 - 10.5 ft	14 - 15.5 ft	19 - 20.5 ft	24 - 25.5 ft	29 - 30.5 ft	34 - 35.5 ft	39 - 40.5 ft	49 - 50.5 ft	3 - 4.5 ft	8 - 9.5 ft
Physical Parameters													
Atterberg Classification	--	--	Non-Plastic	--	--	--	Non-Plastic	--	--	CL	--	--	OH
Specific gravity (su)	--	--	2.66	--	--	--	--	--	--	--	--	--	2.51
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	16.4	--	--	55.9
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	22.7	--	--	57.1
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	39.2	--	--	113
Moisture (water) Content (pct)	9.84	7.02	32.42	29.15	14.6	20.17	23.86	37.01	31.77	33.04	20.5	20.79	128.4
Moisture, percent (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)													
Gravel	--	7.6	--	--	28.6	--	--	--	--	--	--	21	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	5	--	--	10.8	--	--	0.3	--	--	--	18	--
Sand, Medium	--	42.8	--	--	21.3	--	--	0.9	--	--	--	45.4	--
Sand, Fine	--	42.4	--	--	26.8	--	--	13.9	--	--	--	10.8	--
Silt, Very Coarse	--	2.2	--	--	5.4	--	--	24.1	--	--	--	4.8	--
Silt, Coarse	--	--	--	--	0.5	--	--	7.5	--	--	--	--	--
Silt, Medium	--	--	--	--	1	--	--	8.3	--	--	--	--	--
Silt, Fine	--	--	--	--	1	--	--	10	--	--	--	--	--
Silt, Very Fine	--	--	--	--	1.4	--	--	6.7	--	--	--	--	--
Clay	--	--	--	--	3.3	--	--	28.3	--	--	--	--	--
Total Gravel	--	7.6	--	--	28.6	--	--	--	--	--	--	21	--
Total Sand	--	90.2	--	--	58.9	--	--	15.1	--	--	--	74.2	--
Total Silt	--	2.2	--	--	9.3	--	--	56.6	--	--	--	4.8	--
Total Clay	--	--	--	--	3.3	--	--	28.3	--	--	--	--	--
Total Fines (Silt + Clay)	--	2.2	--	--	12.6	--	--	84.9	--	--	--	4.8	--
Total Grain Size	--	100	--	--	100.1	--	--	100	--	--	--	100	--
Percent passing < 1.3 micron sieve	--	--	--	--	1.9	--	--	20	--	--	--	--	--
Percent retained 1.3 micron sieve	--	--	--	--	1.4	--	--	8.3	--	--	--	--	--
Percent retained 3.2 micron sieve	--	--	--	--	1.4	--	--	6.7	--	--	--	--	--
Percent retained 7 micron sieve	--	--	--	--	0.5	--	--	4.2	--	--	--	--	--
Percent retained 9 micron sieve	--	--	--	--	0.5	--	--	5.8	--	--	--	--	--
Percent retained 13 micron sieve	--	--	--	--	1	--	--	8.3	--	--	--	--	--
Percent retained 22 micron sieve	--	--	--	--	0.5	--	--	7.5	--	--	--	--	--
Percent retained 32 micron sieve	--	2.2	--	--	5.4	--	--	24.1	--	--	--	4.8	--
Percent retained 75 micron sieve	--	2.1	--	--	10.2	--	--	10.1	--	--	--	1.4	--
Percent retained 150 micron sieve	--	8.6	--	--	5.5	--	--	2.9	--	--	--	2.7	--
Percent retained 250 micron sieve	--	31.7	--	--	11.1	--	--	0.9	--	--	--	6.7	--
Percent retained 425 micron sieve	--	31.1	--	--	11.8	--	--	0.6	--	--	--	14.8	--
Percent retained 850 micron sieve	--	11.7	--	--	9.5	--	--	0.3	--	--	--	30.6	--
Percent retained 2000 micron sieve	--	5	--	--	10.8	--	--	0.3	--	--	--	18	--
Percent retained 4750 micron sieve	--	3.7	--	--	14	--	--	0.1 U	--	--	--	10.6	--
Percent retained 9500 micron sieve	--	3.9	--	--	4.8	--	--	0.1 U	--	--	--	3.1	--
Percent retained 12500 micron sieve	--	0.1 U	--	--	9.8	--	--	0.1 U	--	--	--	7.3	--
Percent retained 19000 micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--	0.1 U	--
Percent retained 25K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--	0.1 U	--
Percent retained 37.5K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--	0.1 U	--
Percent retained 50K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--	0.1 U	--
Percent retained 75K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--	0.1 U	--

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	2A-101C-HSA	2A-101C-HSA	2A-101C-HSA	2A-101C-HSA	2A-101C-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA
Sample ID:	2A-101C-HSA-S5	2A-101C-HSA-S6	2A-101C-HSA-S7	2A-101C-HSA-S9	2A-101C-HSA-S11	2A-102A-HSA-S2	2A-102A-HSA-S3	2A-102A-HSA-S4	2A-102A-HSA-S5	2A-102A-HSA-S6	2A-102A-HSA-S7	2A-102A-HSA-S8	2A-102A-HSA-S9
Sample Date:	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08
In-Situ Depth[1] (ft):	10.5 - 12 ft	13 - 14.5 ft	18 - 19.5 ft	28 - 29.5 ft	35 - 36.5 ft	2.5 - 3 ft	5 - 5.5 ft	7.5 - 9 ft	9 - 10.5 ft	14 - 15.5 ft	19 - 20.5 ft	24 - 25.5 ft	29 - 30.5 ft
Physical Parameters													
Atterberg Classification	--	--	CL	--	CL	--	--	CL	--	--	--	Non-Plastic	--
Specific gravity (su)	--	--	2.79	--	2.77	--	--	2.8	--	--	--	--	--
Plastic Limit (pct)	--	--	13.6	--	15	--	--	15.7	--	--	--	--	--
Plasticity Index (pct)	--	--	17.4	--	20.7	--	--	21.7	--	--	--	--	--
Liquid Limit (pct)	--	--	31	--	35.8	--	--	37.4	--	--	--	--	--
Moisture (water) Content (pct)	107	55.86	20.33	22.38	22.81	4.26	4.92	26.28	30.99	33.95	25.49	25.14	24.71
Moisture, percent (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)													
Gravel	5.7	--	--	--	--	--	1.6	--	--	--	--	--	0.6
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	4.3	--	--	--	--	--	3.3	--	--	1.3	--	--	0.7
Sand, Medium	16.6	--	--	--	--	--	28.8	--	--	5.9	--	--	2.3
Sand, Fine	21.9	--	--	--	--	--	64.3	--	--	52	--	--	76
Silt, Very Coarse	3.6	--	--	--	--	--	1.9	--	--	12	--	--	20.3
Silt, Coarse	6.4	--	--	--	--	--	--	--	--	2.3	--	--	--
Silt, Medium	6.4	--	--	--	--	--	--	--	--	3	--	--	--
Silt, Fine	13.8	--	--	--	--	--	--	--	--	3.8	--	--	--
Silt, Very Fine	7.4	--	--	--	--	--	--	--	--	4.6	--	--	--
Clay	13.8	--	--	--	--	--	--	--	--	15.2	--	--	--
Total Gravel	5.7	--	--	--	--	--	1.6	--	--	--	--	--	0.6
Total Sand	42.8	--	--	--	--	--	96.4	--	--	59.2	--	--	79
Total Silt	37.6	--	--	--	--	--	1.9	--	--	25.7	--	--	20.3
Total Clay	13.8	--	--	--	--	--	--	--	--	15.2	--	--	--
Total Fines (Silt + Clay)	51.4	--	--	--	--	--	1.9	--	--	40.9	--	--	20.3
Total Grain Size	99.9	--	--	--	--	--	99.9	--	--	100.1	--	--	99.9
Percent passing < 1.3 micron sieve	9.2	--	--	--	--	--	--	--	--	10.6	--	--	--
Percent retained 1.3 micron sieve	4.6	--	--	--	--	--	--	--	--	4.6	--	--	--
Percent retained 3.2 micron sieve	7.4	--	--	--	--	--	--	--	--	4.6	--	--	--
Percent retained 7 micron sieve	6.4	--	--	--	--	--	--	--	--	1.5	--	--	--
Percent retained 9 micron sieve	7.4	--	--	--	--	--	--	--	--	2.3	--	--	--
Percent retained 13 micron sieve	6.4	--	--	--	--	--	--	--	--	3	--	--	--
Percent retained 22 micron sieve	6.4	--	--	--	--	--	--	--	--	2.3	--	--	--
Percent retained 32 micron sieve	3.6	--	--	--	--	--	1.9	--	--	12	--	--	20.3
Percent retained 75 micron sieve	6.4	--	--	--	--	--	5.9	--	--	32.8	--	--	47.2
Percent retained 150 micron sieve	5.9	--	--	--	--	--	20.1	--	--	12.4	--	--	23.2
Percent retained 250 micron sieve	9.6	--	--	--	--	--	38.3	--	--	6.8	--	--	5.6
Percent retained 425 micron sieve	8.9	--	--	--	--	--	21.3	--	--	3.5	--	--	1.5
Percent retained 850 micron sieve	7.7	--	--	--	--	--	7.5	--	--	2.4	--	--	0.8
Percent retained 2000 micron sieve	4.3	--	--	--	--	--	3.3	--	--	1.3	--	--	0.7
Percent retained 4750 micron sieve	3.9	--	--	--	--	--	1.6	--	--	0.1 U	--	--	0.6
Percent retained 9500 micron sieve	1.8	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 12500 micron sieve	0.1 U	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 19000 micron sieve	0.1 U	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 25K micron sieve	0.1 U	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 37.5K micron sieve	0.1 U	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 50K micron sieve	0.1 U	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 75K micron sieve	0.1 U	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102A-HSA	2A-102C-HSA	2A-102C-HSA	2A-102C-HSA	2A-102C-HSA	2A-102C-HSA	2A-102C-HSA
Sample ID:	2A-102A-HSA-S10	2A-102A-HSA-S11	2A-102A-HSA-S12	2A-102A-HSA-S13	2A-102A-HSA-S14	2A-102A-HSA-S15	2A-102A-HSA-S17	2A-102C-HSA-S2	2A-102C-HSA-S3	2A-102C-HSA-S4	2A-102C-HSA-S5	2A-102C-HSA-S6	2A-102C-HSA-S7
Sample Date:	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/14/08	8/14/08	8/14/08	8/14/08	8/14/08	8/14/08
In-Situ Depth^1 (ft):	34 - 35.5 ft	39 - 40.5 ft	44 - 45.5 ft	49 - 50.5 ft	54 - 55.5 ft	59 - 60.5 ft	69 - 70.5 ft	10 - 11.5 ft	12.5 - 14 ft	15 - 16.5 ft	17.5 - 19 ft	21 - 22.5 ft	26 - 27.5 ft
Physical Parameters													
Atterberg Classification	--	CL	--	--	CL	--	CL	--	MH	--	--	--	CL
Specific gravity (su)	--	--	--	--	2.76	--	--	--	2.03	--	--	--	2.77
Plastic Limit (pct)	--	19.2	--	--	18	--	14.3	--	85.6	--	--	--	15.6
Plasticity Index (pct)	--	18.8	--	--	29.4	--	22.4	--	20.4	--	--	--	15.9
Liquid Limit (pct)	--	38	--	--	47.4	--	36.7	--	106	--	--	--	31.5
Moisture (water) Content (pct)	35.98	38.24	30.21	35.23	32.16	20.96	21.14	--	--	--	--	--	--
Moisture, percent (pct)	--	--	--	--	--	--	--	223.8	202.2	394.3	101.3	28.09	26.43
Grain Size (pct)													
Gravel	--	--	--	--	--	4.4	--	0.1	--	--	2.9	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	--	--	--	1.8	--	1.2	--	--	1.7	--	--
Sand, Medium	--	--	0.2	--	--	5.3	--	15	--	--	6.7	--	--
Sand, Fine	--	--	10.4	--	--	18.5	--	18.5	--	--	10.6	--	--
Silt, Very Coarse	--	--	23.4	--	--	12.3	--	6	--	--	8.1	--	--
Silt, Coarse	--	--	6.2	--	--	4.4	--	12	--	--	3	--	--
Silt, Medium	--	--	8.5	--	--	7.3	--	13.5	--	--	9	--	--
Silt, Fine	--	--	10.1	--	--	8.8	--	16.5	--	--	10.6	--	--
Silt, Very Fine	--	--	8.5	--	--	8.8	--	3	--	--	9.8	--	--
Clay	--	--	32.6	--	--	28.6	--	14.2	--	--	37.6	--	--
Total Gravel	--	--	--	--	--	4.4	--	0.1	--	--	2.9	--	--
Total Sand	--	--	10.6	--	--	25.6	--	34.7	--	--	19	--	--
Total Silt	--	--	56.7	--	--	41.6	--	51	--	--	40.5	--	--
Total Clay	--	--	32.6	--	--	28.6	--	14.2	--	--	37.6	--	--
Total Fines (Silt + Clay)	--	--	89.3	--	--	70.2	--	65.2	--	--	78.1	--	--
Total Grain Size	--	--	99.9	--	--	100.2	--	100	--	--	100	--	--
Percent passing < 1.3 micron sieve	--	--	24.8	--	--	20.5	--	9.7	--	--	26.3	--	--
Percent retained 1.3 micron sieve	--	--	7.8	--	--	8.1	--	4.5	--	--	11.3	--	--
Percent retained 3.2 micron sieve	--	--	8.5	--	--	8.8	--	3	--	--	9.8	--	--
Percent retained 7 micron sieve	--	--	5.4	--	--	4.4	--	3	--	--	5.3	--	--
Percent retained 9 micron sieve	--	--	4.7	--	--	4.4	--	13.5	--	--	5.3	--	--
Percent retained 13 micron sieve	--	--	8.5	--	--	7.3	--	13.5	--	--	9	--	--
Percent retained 22 micron sieve	--	--	6.2	--	--	4.4	--	12	--	--	3	--	--
Percent retained 32 micron sieve	--	--	23.4	--	--	12.3	--	6	--	--	8.1	--	--
Percent retained 75 micron sieve	--	--	9.6	--	--	8.5	--	5.8	--	--	4.5	--	--
Percent retained 150 micron sieve	--	--	0.5	--	--	5.3	--	4.9	--	--	2.8	--	--
Percent retained 250 micron sieve	--	--	0.3	--	--	4.7	--	7.8	--	--	3.3	--	--
Percent retained 425 micron sieve	--	--	0.1	--	--	3.3	--	9.1	--	--	3.6	--	--
Percent retained 850 micron sieve	--	--	0.1	--	--	2	--	5.9	--	--	3.1	--	--
Percent retained 2000 micron sieve	--	--	0.1 U	--	--	1.8	--	1.2	--	--	1.7	--	--
Percent retained 4750 micron sieve	--	--	0.1 U	--	--	2.6	--	0.1	--	--	0.6	--	--
Percent retained 9500 micron sieve	--	--	0.1 U	--	--	1.8	--	0.1 U	--	--	2.3	--	--
Percent retained 12500 micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 19000 micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 25K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 37.5K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 50K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--
Percent retained 75K micron sieve	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA
Sample ID:	2A-103A-HSA-S2	2A-103A-HSA-S3	2A-103A-HSA-S4	2A-103A-HSA-S5	2A-103A-HSA-S6	2A-103A-HSA-S7	2A-103A-HSA-S8	2A-103A-HSA-S9	2A-103A-HSA-S10	2A-103A-HSA-S11	2A-103A-HSA-S12	2A-103A-HSA-S13	2A-103A-HSA-S14
Sample Date:	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08
In-Situ Depth[1] (ft):	2.5 - 4 ft	5 - 6.5 ft	8 - 9.5 ft	10 - 11.5 ft	13 - 14.5 ft	19 - 20.5 ft	24 - 25.5 ft	29 - 30.5 ft	34 - 35.5 ft	39 - 40.5 ft	44 - 45.5 ft	49 - 50.5 ft	54 - 55.5 ft
Physical Parameters													
Atterberg Classification	--	--	--	--	--	--	Non-Plastic	--	--	Non-Plastic	--	--	CL
Specific gravity (su)	--	--	2.67	--	--	--	--	--	--	--	--	--	2.79
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	11.5
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	--	--	11
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	22.5
Moisture (water) Content (pct)	69.59	65.78	36.43	20.52	20.87	22.31	17.55	27.1	14.98	22.7	27.13	28.31	20.85
Moisture, percent (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)													
Gravel	--	22.3	--	--	17.8	--	--	--	--	--	0.5	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	9.8	--	--	6.6	--	--	--	--	--	0.4	--	--
Sand, Medium	--	19.6	--	--	30.6	--	--	0.7	--	--	1.3	--	--
Sand, Fine	--	33.7	--	--	32.6	--	--	26.7	--	--	8.7	--	--
Silt, Very Coarse	--	7.4	--	--	7.1	--	--	15.9	--	--	13	--	--
Silt, Coarse	--	--	--	--	--	--	--	2.3	--	--	5.4	--	--
Silt, Medium	--	0.5	--	--	1.1	--	--	6.2	--	--	9.2	--	--
Silt, Fine	--	1.5	--	--	2.2	--	--	8.6	--	--	12.4	--	--
Silt, Very Fine	--	1.6	--	--	1.1	--	--	8.5	--	--	10	--	--
Clay	--	3.7	--	--	1.1	--	--	31.1	--	--	39.3	--	--
Total Gravel	--	22.3	--	--	17.8	--	--	--	--	--	0.5	--	--
Total Sand	--	63.1	--	--	69.8	--	--	27.4	--	--	10.4	--	--
Total Silt	--	11	--	--	11.5	--	--	41.5	--	--	50	--	--
Total Clay	--	3.7	--	--	1.1	--	--	31.1	--	--	39.3	--	--
Total Fines (Silt + Clay)	--	14.7	--	--	12.6	--	--	72.6	--	--	89.3	--	--
Total Grain Size	--	100.1	--	--	100.2	--	--	100	--	--	100.2	--	--
Percent passing < 1.3 micron sieve	--	2.1	--	--	1.1	--	--	23.3	--	--	29.3	--	--
Percent retained 1.3 micron sieve	--	1.6	--	--	0.1 U	--	--	7.8	--	--	10	--	--
Percent retained 3.2 micron sieve	--	1.6	--	--	1.1	--	--	8.5	--	--	10	--	--
Percent retained 7 micron sieve	--	1	--	--	1.1	--	--	4.7	--	--	6.2	--	--
Percent retained 9 micron sieve	--	0.5	--	--	1.1	--	--	3.9	--	--	6.2	--	--
Percent retained 13 micron sieve	--	0.5	--	--	1.1	--	--	6.2	--	--	9.2	--	--
Percent retained 22 micron sieve	--	0.1 U	--	--	0.1 U	--	--	2.3	--	--	5.4	--	--
Percent retained 32 micron sieve	--	7.4	--	--	7.1	--	--	15.9	--	--	13	--	--
Percent retained 75 micron sieve	--	12.6	--	--	6.8	--	--	16.7	--	--	5	--	--
Percent retained 150 micron sieve	--	9.7	--	--	6.5	--	--	7.7	--	--	2.2	--	--
Percent retained 250 micron sieve	--	11.4	--	--	19.3	--	--	2.3	--	--	1.5	--	--
Percent retained 425 micron sieve	--	10.5	--	--	18.9	--	--	0.5	--	--	0.8	--	--
Percent retained 850 micron sieve	--	9.1	--	--	11.7	--	--	0.2	--	--	0.5	--	--
Percent retained 2000 micron sieve	--	9.8	--	--	6.6	--	--	0.1 U	--	--	0.4	--	--
Percent retained 4750 micron sieve	--	11.4	--	--	4.7	--	--	0.1 U	--	--	0.5	--	--
Percent retained 9500 micron sieve	--	5.7	--	--	2.3	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 12500 micron sieve	--	5.2	--	--	10.8	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 19000 micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 25K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 37.5K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 50K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 75K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	2A-103A-HSA	2A-103A-HSA	2A-103A-HSA	2A-103C-HSA	2A-103C-HSA	2A-103C-HSA	2C-101C-HSA	2C-101C-HSA	2C-101C-HSA	2C-101C-HSA	2C-101C-HSA	2C-101C-HSA	3B-101A-HSA
Sample ID:	2A-103A-HSA-S15	2A-103A-HSA-S16	2A-103A-HSA-S18	2A-103C-HSA-S5	2A-103C-HSA-S6	2A-103C-HSA-S7	2C-101C-HSA-S2	2C-101C-HSA-S3	2C-101C-HSA-S4	2C-101C-HSA-S5	2C-101C-HSA-S6	2C-101C-HSA-S7	3B-101A-HSA-S2
Sample Date:	8/6/08	8/6/08	8/6/08	8/15/08	8/15/08	8/15/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/5/08
In-Situ Depth^1 (ft):	59 - 60.5 ft	64 - 65.5 ft	74 - 75.5 ft	14.5 - 16 ft	19.5 - 21 ft	24.5 - 26 ft	10 - 11.5 ft	12.5 - 14 ft	15 - 16.5 ft	17.5 - 19 ft	22.5 - 24 ft	27.5 - 29 ft	2.5 - 4 ft
Physical Parameters													
Atterberg Classification	--	--	--	CL	--	CL	--	--	CL	--	--	CL	--
Specific gravity (su)	--	--	--	2.78	--	2.76	--	--	2.78	--	--	2.78	--
Plastic Limit (pct)	--	--	--	19.2	--	16.5	--	--	18.6	--	--	18.6	--
Plasticity Index (pct)	--	--	--	28.3	--	18.9	--	--	18.4	--	--	18.4	--
Liquid Limit (pct)	--	--	--	47.5	--	35.4	--	--	37	--	--	37	--
Moisture (water) Content (pct)	28.11	18.13	16.21	--	--	--	--	--	--	--	--	--	19.18
Moisture, percent (pct)	--	--	--	40.86	34.04	27.63	25.58	39.14	30.7	33.42	30.62	28.98	--
Grain Size (pct)													
Gravel	0.2	--	3.4	--	--	--	--	--	--	--	--	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	1.9	--	0.1	--	--	--	--	--	--	--	--
Sand, Medium	0.3	--	8	--	0.2	--	0.3	--	--	0.3	--	--	--
Sand, Fine	3.3	--	22.6	--	2.9	--	18.2	--	--	4.3	--	--	--
Silt, Very Coarse	13.7	--	12.4	--	3.7	--	18.8	--	--	28.6	--	--	--
Silt, Coarse	7.8	--	4.4	--	7.2	--	4.6	--	--	6.2	--	--	--
Silt, Medium	7.1	--	5.9	--	8.8	--	7.7	--	--	8.6	--	--	--
Silt, Fine	12.6	--	8.1	--	12	--	8.5	--	--	8.6	--	--	--
Silt, Very Fine	11	--	7.4	--	12	--	7	--	--	7	--	--	--
Clay	43.9	--	25.8	--	53	--	34.8	--	--	36.6	--	--	--
Total Gravel	0.2	--	3.4	--	--	--	--	--	--	--	--	--	--
Total Sand	3.6	--	32.5	--	3.2	--	18.5	--	--	4.6	--	--	--
Total Silt	52.2	--	38.2	--	43.7	--	46.6	--	--	59	--	--	--
Total Clay	43.9	--	25.8	--	53	--	34.8	--	--	36.6	--	--	--
Total Fines (Silt + Clay)	96.1	--	64	--	96.7	--	81.4	--	--	95.6	--	--	--
Total Grain Size	99.9	--	99.9	--	99.9	--	99.9	--	--	100.2	--	--	--
Percent passing < 1.3 micron sieve	33.7	--	19.2	--	39.3	--	25.5	--	--	26.5	--	--	--
Percent retained 1.3 micron sieve	10.2	--	6.6	--	13.7	--	9.3	--	--	10.1	--	--	--
Percent retained 3.2 micron sieve	11	--	7.4	--	12	--	7	--	--	7	--	--	--
Percent retained 7 micron sieve	6.3	--	3.7	--	5.6	--	4.6	--	--	4.7	--	--	--
Percent retained 9 micron sieve	6.3	--	4.4	--	6.4	--	3.9	--	--	3.9	--	--	--
Percent retained 13 micron sieve	7.1	--	5.9	--	8.8	--	7.7	--	--	8.6	--	--	--
Percent retained 22 micron sieve	7.8	--	4.4	--	7.2	--	4.6	--	--	6.2	--	--	--
Percent retained 32 micron sieve	13.7	--	12.4	--	3.7	--	18.8	--	--	28.6	--	--	--
Percent retained 75 micron sieve	2.3	--	9.8	--	2.1	--	14.7	--	--	3.9	--	--	--
Percent retained 150 micron sieve	0.6	--	6.6	--	0.5	--	2.5	--	--	0.2	--	--	--
Percent retained 250 micron sieve	0.4	--	6.2	--	0.3	--	1	--	--	0.2	--	--	--
Percent retained 425 micron sieve	0.2	--	4.3	--	0.1	--	0.2	--	--	0.2	--	--	--
Percent retained 850 micron sieve	0.1	--	3.7	--	0.1	--	0.1	--	--	0.1	--	--	--
Percent retained 2000 micron sieve	0.1 U	--	1.9	--	0.1	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 4750 micron sieve	0.2	--	2.4	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 9500 micron sieve	0.1 U	--	1	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 12500 micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 19000 micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 25K micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 37.5K micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 50K micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 75K micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA	3B-101A-HSA
Sample ID:	3B-101A-HSA-S3	3B-101A-HSA-S4	3B-101A-HSA-S5	3B-101A-HSA-S6	3B-101A-HSA-S7	3B-101A-HSA-S8	3B-101A-HSA-S9	3B-101A-HSA-S10	3B-101A-HSA-S11	3B-101A-HSA-S12	3B-101A-HSA-S14	3B-101A-HSA-S15	3B-101A-HSA-S16
Sample Date:	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08	8/5/08
In-Situ Depth[1] (ft):	4 - 5.5 ft	7.5 - 9 ft	9 - 10.5 ft	14 - 15.5 ft	19 - 20.5 ft	24 - 25.5 ft	29 - 30.5 ft	34 - 35.5 ft	39 - 40.5 ft	44 - 45.5 ft	54 - 55.5 ft	59 - 60.5 ft	64 - 68 ft
Physical Parameters													
Atterberg Classification	--	Non-Plastic	--	--	--	CL	--	--	CL	--	CL	--	--
Specific gravity (su)	--	2.7	--	--	--	--	--	--	--	--	2.79	--	--
Plastic Limit (pct)	--	--	--	--	--	15.4	--	--	13.8	--	14.4	--	--
Plasticity Index (pct)	--	--	--	--	--	19.4	--	--	17.9	--	20.5	--	--
Liquid Limit (pct)	--	--	--	--	--	34.9	--	--	31.6	--	35	--	--
Moisture (water) Content (pct)	20.8	20.59	18.44	21	18.87	36.15	23.56	22.53	22.78	26.64	20.34	24.23	--
Moisture, percent (pct)	--	--	--	--	--	--	--	--	--	--	--	--	28.77
Grain Size (pct)													
Gravel	33.9	--	--	28	--	--	--	--	--	1.4	--	1	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	10.7	--	--	8.8	--	--	--	--	--	0.4	--	0.1	--
Sand, Medium	26.6	--	--	21	--	--	2	--	--	2.8	--	0.4	0.5
Sand, Fine	20.9	--	--	33.4	--	--	41.5	--	--	7.3	--	15	9.6
Silt, Very Coarse	7.9	--	--	9	--	--	25.5	--	--	8.9	--	19.2	18.8
Silt, Coarse	--	--	--	--	--	--	4.6	--	--	5.3	--	6.1	6.2
Silt, Medium	--	--	--	--	--	--	4.6	--	--	8.4	--	7.7	8.5
Silt, Fine	--	--	--	--	--	--	5.4	--	--	12.2	--	10.8	10.8
Silt, Very Fine	--	--	--	--	--	--	3.9	--	--	10.7	--	7.7	10
Clay	--	--	--	--	--	--	12.4	--	--	42.7	--	32.2	35.6
Total Gravel	33.9	--	--	28	--	--	--	--	--	1.4	--	1	--
Total Sand	58.2	--	--	63.2	--	--	43.5	--	--	10.5	--	15.5	10.1
Total Silt	7.9	--	--	9	--	--	44	--	--	45.5	--	51.5	54.3
Total Clay	--	--	--	--	--	--	12.4	--	--	42.7	--	32.2	35.6
Total Fines (Silt + Clay)	7.9	--	--	9	--	--	56.4	--	--	88.2	--	83.7	89.9
Total Grain Size	100	--	--	100.2	--	--	99.9	--	--	100.1	--	100.2	100
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	10.1	--	--	32.8	--	24.5	26.3
Percent retained 1.3 micron sieve	--	--	--	--	--	--	2.3	--	--	9.9	--	7.7	9.3
Percent retained 3.2 micron sieve	--	--	--	--	--	--	3.9	--	--	10.7	--	7.7	10
Percent retained 7 micron sieve	--	--	--	--	--	--	3.1	--	--	6.1	--	5.4	5.4
Percent retained 9 micron sieve	--	--	--	--	--	--	2.3	--	--	6.1	--	5.4	5.4
Percent retained 13 micron sieve	--	--	--	--	--	--	4.6	--	--	8.4	--	7.7	8.5
Percent retained 22 micron sieve	--	--	--	--	--	--	4.6	--	--	5.3	--	6.1	6.2
Percent retained 32 micron sieve	7.9	--	--	9	--	--	25.5	--	--	8.9	--	19.2	18.8
Percent retained 75 micron sieve	3.8	--	--	13.2	--	--	28.5	--	--	3.3	--	10.7	7.3
Percent retained 150 micron sieve	5.5	--	--	8	--	--	8.3	--	--	2	--	3.1	1.6
Percent retained 250 micron sieve	11.6	--	--	12.2	--	--	4.7	--	--	2	--	1.2	0.7
Percent retained 425 micron sieve	14.2	--	--	12	--	--	1.7	--	--	1.5	--	0.3	0.3
Percent retained 850 micron sieve	12.4	--	--	9	--	--	0.3	--	--	1.3	--	0.1	0.2
Percent retained 2000 micron sieve	10.7	--	--	8.8	--	--	0.1 U	--	--	0.4	--	0.1	0.1 U
Percent retained 4750 micron sieve	13.8	--	--	12.3	--	--	0.1 U	--	--	1.4	--	0.1 U	0.1 U
Percent retained 9500 micron sieve	16.1	--	--	8.6	--	--	0.1 U	--	--	0.1 U	--	1	0.1 U
Percent retained 12500 micron sieve	4	--	--	7.1	--	--	0.1 U	--	--	0.1 U	--	0.1 U	0.1 U
Percent retained 19000 micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	0.1 U	0.1 U
Percent retained 25K micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	0.1 U	0.1 U
Percent retained 37.5K micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	0.1 U	0.1 U
Percent retained 50K micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	0.1 U	0.1 U
Percent retained 75K micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	0.1 U	0.1 U

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	3B-101C-HSA	3B-101C-HSA	3B-101C-HSA	3B-101C-HSA	3B-101C-HSA	3B-101C-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA
Sample ID:	3B-101C-HSA-S2	3B-101C-HSA-S3	3B-101C-HSA-S4	3B-101C-HSA-S5	3B-101C-HSA-S6	3B-101C-HSA-S7	3B-102A-HSA-S2	3B-102A-HSA-S3	3B-102A-HSA-S4	3B-102A-HSA-S5	3B-102A-HSA-S6	3B-102A-HSA-S7	3B-102A-HSA-S8
Sample Date:	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08
In-Situ Depth[1] (ft):	2.5 - 4 ft	5 - 6.5 ft	7.5 - 9 ft	10 - 11.5 ft	15 - 16.5 ft	20 - 21.5 ft	2.5 - 4 ft	4 - 5.5 ft	7.5 - 9 ft	9 - 10.5 ft	14 - 15.5 ft	19 - 20.5 ft	24 - 25.5 ft
Physical Parameters													
Atterberg Classification	--	OH	--	--	--	CL	--	--	Non-Plastic	--	--	--	CL
Specific gravity (su)	--	2.6	--	--	--	2.78	--	--	2.67	--	--	--	--
Plastic Limit (pct)	--	83.3	--	--	--	18	--	--	--	--	--	--	16.3
Plasticity Index (pct)	--	77.4	--	--	--	15.2	--	--	--	--	--	--	22.7
Liquid Limit (pct)	--	161	--	--	--	33.2	--	--	--	--	--	--	38.9
Moisture (water) Content (pct)	33.15	192	34.08	28.92	28.72	27.23	10.2	13.25	23.66	28.33	17.49	33.74	32.2
Moisture, percent (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)													
Gravel	--	--	0.4	2.3	--	--	--	37	--	--	25	--	--
Gravel, Coarse	--	--	--	--	--	--	--	23.3	--	--	--	--	--
Sand, Coarse	--	--	0.3	0.6	--	--	--	8.8	--	--	14.1	--	--
Sand, Medium	--	--	2.05	1.8	--	--	--	17.2	--	--	31	--	--
Sand, Fine	--	--	16.7	5.3	--	--	--	10	--	--	24.8	--	--
Silt, Very Coarse	--	--	7.4	16.1	--	--	--	3.8	--	--	5.1	--	--
Silt, Coarse	--	--	4.7	6.8	--	--	--	--	--	--	--	--	--
Silt, Medium	--	--	8.7	9.1	--	--	--	--	--	--	--	--	--
Silt, Fine	--	--	11.8	12.9	--	--	--	--	--	--	--	--	--
Silt, Very Fine	--	--	9.4	9.9	--	--	--	--	--	--	--	--	--
Clay	--	--	38.6	35	--	--	--	--	--	--	--	--	--
Total Gravel	--	--	0.4	2.3	--	--	--	60.3	--	--	25	--	--
Total Sand	--	--	19.05	7.7	--	--	--	36	--	--	69.9	--	--
Total Silt	--	--	42	54.8	--	--	--	3.8	--	--	5.1	--	--
Total Clay	--	--	38.6	35	--	--	--	--	--	--	--	--	--
Total Fines (Silt + Clay)	--	--	80.6	89.8	--	--	--	3.8	--	--	5.1	--	--
Total Grain Size	--	--	100.05	99.8	--	--	--	100.1	--	--	100	--	--
Percent passing < 1.3 micron sieve	--	--	27.6	25.9	--	--	--	--	--	--	--	--	--
Percent retained 1.3 micron sieve	--	--	11	9.1	--	--	--	--	--	--	--	--	--
Percent retained 3.2 micron sieve	--	--	9.4	9.9	--	--	--	--	--	--	--	--	--
Percent retained 7 micron sieve	--	--	7.1	6.1	--	--	--	--	--	--	--	--	--
Percent retained 9 micron sieve	--	--	4.7	6.8	--	--	--	--	--	--	--	--	--
Percent retained 13 micron sieve	--	--	8.7	9.1	--	--	--	--	--	--	--	--	--
Percent retained 22 micron sieve	--	--	4.7	6.8	--	--	--	--	--	--	--	--	--
Percent retained 32 micron sieve	--	--	7.4	16.1	--	--	--	3.8	--	--	5.1	--	--
Percent retained 75 micron sieve	--	--	5.2	2.8	--	--	--	1.9	--	--	3.7	--	--
Percent retained 150 micron sieve	--	--	6.1	1.3	--	--	--	2.2	--	--	5.9	--	--
Percent retained 250 micron sieve	--	--	5.4	1.2	--	--	--	5.9	--	--	15.2	--	--
Percent retained 425 micron sieve	--	--	1.6	1	--	--	--	9.4	--	--	17.5	--	--
Percent retained 850 micron sieve	--	--	0.45	0.8	--	--	--	7.8	--	--	13.5	--	--
Percent retained 2000 micron sieve	--	--	0.3	0.6	--	--	--	8.8	--	--	14.1	--	--
Percent retained 4750 micron sieve	--	--	0.4	2.3	--	--	--	9.6	--	--	13.5	--	--
Percent retained 9500 micron sieve	--	--	0.1 U	0.1 U	--	--	--	3.3	--	--	6.7	--	--
Percent retained 12500 micron sieve	--	--	0.1 U	0.1 U	--	--	--	14.1	--	--	4.8	--	--
Percent retained 19000 micron sieve	--	--	0.1 U	0.1 U	--	--	--	10	--	--	0.1 U	--	--
Percent retained 25K micron sieve	--	--	0.1 U	0.1 U	--	--	--	23.3	--	--	0.1 U	--	--
Percent retained 37.5K micron sieve	--	--	0.1 U	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 50K micron sieve	--	--	0.1 U	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 75K micron sieve	--	--	0.1 U	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	--

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102A-HSA	3B-102C-HSA	3B-102C-HSA	3B-102C-HSA	3B-102C-HSA
Sample ID:	3B-102A-HSA-S9	3B-102A-HSA-S10	3B-102A-HSA-S11	3B-102A-HSA-S12	3B-102A-HSA-S13	3B-102A-HSA-S14	3B-102A-HSA-S15	3B-102A-HSA-S16	3B-102A-HSA-S18	3B-102C-HSA-S2	3B-102C-HSA-S3	3B-102C-HSA-S4	3B-102C-HSA-S5
Sample Date:	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/6/08	8/12/08	8/12/08	8/12/08	8/12/08
In-Situ Depth[1] (ft):	29 - 30.5 ft	34 - 35.5 ft	39 - 40.5 ft	44 - 45.5 ft	49 - 50.5 ft	54 - 55.5 ft	59 - 60.5 ft	64 - 65.5 ft	74 - 75.5 ft	10 - 11.5 ft	12.5 - 14 ft	15 - 16.5 ft	17.5 - 19 ft
Physical Parameters													
Atterberg Classification	--	--	CL	--	--	CL	--	--	CL	--	--	CL	--
Specific gravity (su)	--	--	--	--	--	2.81	--	--	--	--	--	2.76	--
Plastic Limit (pct)	--	--	14.1	--	--	12.5	--	--	13.3	--	--	14.8	--
Plasticity Index (pct)	--	--	9.3	--	--	7.9	--	--	18.8	--	--	13.2	--
Liquid Limit (pct)	--	--	23.5	--	--	20.4	--	--	32.1	--	--	28	--
Moisture (water) Content (pct)	21.48	17.72	18.36	18.89	21.23	20.62	18.28	19.95	15.58	--	--	--	--
Moisture, percent (pct)	--	--	--	--	--	--	--	--	--	79.11	20.98	22.55	20.34
Grain Size (pct)													
Gravel	--	--	--	0.6	--	--	0.5	--	--	1.6	--	--	3.6
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	0.1	--	--	0.5	--	--	2	--	--	1.1	--	--	2
Sand, Medium	0.8	--	--	2.4	--	--	4.7	--	--	4	--	--	6.2
Sand, Fine	22.1	--	--	26.2	--	--	17.8	--	--	22.3	--	--	18.7
Silt, Very Coarse	15.9	--	--	22.1	--	--	9.9	--	--	7	--	--	8.7
Silt, Coarse	5.4	--	--	9.9	--	--	5.3	--	--	4.6	--	--	5.8
Silt, Medium	8.5	--	--	8.4	--	--	8.3	--	--	7.7	--	--	6.5
Silt, Fine	10	--	--	8.4	--	--	9.8	--	--	12.3	--	--	9.4
Silt, Very Fine	8.5	--	--	6.1	--	--	8.3	--	--	8.5	--	--	6.5
Clay	28.7	--	--	15.3	--	--	33.3	--	--	30.8	--	--	32.6
Total Gravel	--	--	--	0.6	--	--	0.5	--	--	1.6	--	--	3.6
Total Sand	23	--	--	29.1	--	--	24.5	--	--	27.4	--	--	26.9
Total Silt	48.3	--	--	54.9	--	--	41.6	--	--	40.1	--	--	36.9
Total Clay	28.7	--	--	15.3	--	--	33.3	--	--	30.8	--	--	32.6
Total Fines (Silt + Clay)	77	--	--	70.2	--	--	74.9	--	--	70.9	--	--	69.5
Total Grain Size	100	--	--	99.9	--	--	99.9	--	--	99.9	--	--	100
Percent passing < 1.3 micron sieve	21.7	--	--	10.7	--	--	25	--	--	20.8	--	--	23.2
Percent retained 1.3 micron sieve	7	--	--	4.6	--	--	8.3	--	--	10	--	--	9.4
Percent retained 3.2 micron sieve	8.5	--	--	6.1	--	--	8.3	--	--	8.5	--	--	6.5
Percent retained 7 micron sieve	4.6	--	--	3.8	--	--	5.3	--	--	5.4	--	--	4.3
Percent retained 9 micron sieve	5.4	--	--	4.6	--	--	4.5	--	--	6.9	--	--	5.1
Percent retained 13 micron sieve	8.5	--	--	8.4	--	--	8.3	--	--	7.7	--	--	6.5
Percent retained 22 micron sieve	5.4	--	--	9.9	--	--	5.3	--	--	4.6	--	--	5.8
Percent retained 32 micron sieve	15.9	--	--	22.1	--	--	9.9	--	--	7	--	--	8.7
Percent retained 75 micron sieve	15.5	--	--	16.7	--	--	8.6	--	--	9.4	--	--	8.7
Percent retained 150 micron sieve	4.7	--	--	6.2	--	--	4.9	--	--	7.6	--	--	5.3
Percent retained 250 micron sieve	1.9	--	--	3.3	--	--	4.3	--	--	5.3	--	--	4.7
Percent retained 425 micron sieve	0.7	--	--	1.7	--	--	2.9	--	--	2.6	--	--	3.6
Percent retained 850 micron sieve	0.1	--	--	0.7	--	--	1.8	--	--	1.4	--	--	2.6
Percent retained 2000 micron sieve	0.1	--	--	0.5	--	--	2	--	--	1.1	--	--	2
Percent retained 4750 micron sieve	0.1 U	--	--	0.6	--	--	0.5	--	--	1.3	--	--	2.6
Percent retained 9500 micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.3	--	--	0.1 U
Percent retained 12500 micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	1
Percent retained 19000 micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 25K micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 37.5K micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 50K micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 75K micron sieve	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	3B-102C-HSA	3B-102C-HSA	3B-103A-HSA	3B-103A-HSA	3B-103A-HSA	3B-103A-HSA	3B-103A-HSA	3B-103A-HSA	3B-103A-HSA	3B-103A-HSA	3B-103A-HSA	3B-103C-HSA	3B-103C-HSA
Sample ID:	3B-102C-HSA-S6	3B-102C-HSA-S7	3B-103A-HSA-S2	3B-103A-HSA-S3	3B-103A-HSA-S4	3B-103A-HSA-S5	3B-103A-HSA-S6	3B-103A-HSA-S7	3B-103A-HSA-S8	3B-103A-HSA-S9	3B-103A-HSA-S10	3B-103C-HSA-S2	3B-103C-HSA-S3
Sample Date:	8/12/08	8/12/08	8/7/08	8/8/08	8/8/08	8/8/08	8/8/08	8/8/08	8/8/08	8/8/08	8/8/08	8/6/08	8/6/08
In-Situ Depth^1 (ft):	22.5 - 24 ft	27.5 - 29 ft	2.5 - 3 ft	4 - 5.5 ft	7.5 - 9 ft	9 - 10.5 ft	14 - 15.5 ft	19 - 20.5 ft	24 - 25.5 ft	29 - 30.5 ft	34 - 35.5 ft	5 - 6.5 ft	7.5 - 9 ft
Physical Parameters													
Atterberg Classification	--	CL	--	--	Non-Plastic	--	--	--	Non-Plastic	--	--	OH	--
Specific gravity (su)	--	2.76	--	--	2.72	--	--	--	--	--	--	2.35	--
Plastic Limit (pct)	--	13.8	--	--	--	--	--	--	--	--	--	87.3	--
Plasticity Index (pct)	--	16.8	--	--	--	--	--	--	--	--	--	82.9	--
Liquid Limit (pct)	--	30.6	--	--	--	--	--	--	--	--	--	170	--
Moisture (water) Content (pct)	--	--	10.78	19.13	9.06	32.45	13.54	15.3	17.78	25.56	31	204.3	119.6
Moisture, percent (pct)	19.36	19.72	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)													
Gravel	--	--	--	8.8	--	--	39.9	--	--	--	--	--	2.2
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	--	4.1	--	--	6.6	--	--	0.5	--	--	2.4
Sand, Medium	--	--	--	17.4	--	--	16.5	--	--	3.9	--	--	6.8
Sand, Fine	--	--	--	39.6	--	--	26.8	--	--	10.4	--	--	15.6
Silt, Very Coarse	--	--	--	30.1	--	--	10	--	--	28.1	--	--	10.8
Silt, Coarse	--	--	--	--	--	--	--	--	--	9.3	--	--	4.5
Silt, Medium	--	--	--	--	--	--	--	--	--	8.5	--	--	6.8
Silt, Fine	--	--	--	--	--	--	--	--	--	9.3	--	--	12.9
Silt, Very Fine	--	--	--	--	--	--	--	--	--	6.2	--	--	7.6
Clay	--	--	--	--	--	--	--	--	--	23.9	--	--	30.3
Total Gravel	--	--	--	8.8	--	--	39.9	--	--	--	--	--	2.2
Total Sand	--	--	--	61.1	--	--	49.9	--	--	14.8	--	--	24.8
Total Silt	--	--	--	30.1	--	--	10	--	--	61.4	--	--	42.6
Total Clay	--	--	--	--	--	--	--	--	--	23.9	--	--	30.3
Total Fines (Silt + Clay)	--	--	--	30.1	--	--	10	--	--	85.3	--	--	72.9
Total Grain Size	--	--	--	100	--	--	99.8	--	--	100.1	--	--	99.9
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	--	--	16.2	--	--	21.2
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	--	--	7.7	--	--	9.1
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	--	--	6.2	--	--	7.6
Percent retained 7 micron sieve	--	--	--	--	--	--	--	--	--	5.4	--	--	6.8
Percent retained 9 micron sieve	--	--	--	--	--	--	--	--	--	3.9	--	--	6.1
Percent retained 13 micron sieve	--	--	--	--	--	--	--	--	--	8.5	--	--	6.8
Percent retained 22 micron sieve	--	--	--	--	--	--	--	--	--	9.3	--	--	4.5
Percent retained 32 micron sieve	--	--	--	30.1	--	--	10	--	--	28.1	--	--	10.8
Percent retained 75 micron sieve	--	--	--	11	--	--	10.8	--	--	6.7	--	--	7.5
Percent retained 150 micron sieve	--	--	--	11.9	--	--	6.1	--	--	1.7	--	--	4.4
Percent retained 250 micron sieve	--	--	--	16.7	--	--	9.9	--	--	2	--	--	3.7
Percent retained 425 micron sieve	--	--	--	11.9	--	--	10.2	--	--	2.5	--	--	3.4
Percent retained 850 micron sieve	--	--	--	5.5	--	--	6.3	--	--	1.4	--	--	3.4
Percent retained 2000 micron sieve	--	--	--	4.1	--	--	6.6	--	--	0.5	--	--	2.4
Percent retained 4750 micron sieve	--	--	--	4.2	--	--	9.7	--	--	0.1 U	--	--	2.2
Percent retained 9500 micron sieve	--	--	--	0.5	--	--	8	--	--	0.1 U	--	--	0.1 U
Percent retained 12500 micron sieve	--	--	--	4.1	--	--	12.8	--	--	0.1 U	--	--	0.1 U
Percent retained 19000 micron sieve	--	--	--	0.1 U	--	--	9.4	--	--	0.1 U	--	--	0.1 U
Percent retained 25K micron sieve	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 37.5K micron sieve	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 50K micron sieve	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U
Percent retained 75K micron sieve	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U

Table 22
Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	**3B-103C-HSA**	**3B-103C-HSA**	**3B-103C-HSA**	**3B-103C-HSA**	**3B-104A-HSA**	**3B-104A-HSA**	**3B-104A-HSA**	**3B-104A-HSA**	**3B-104A-HSA**	**3B-104A-HSA**	**3B-104A-HSA**	**3B-104A-HSA**	**3B-104A-HSA**
Sample ID:	**3B-103C-HSA-S4**	**3B-103C-HSA-S5**	**3B-103C-HSA-S6**	**3B-103C-HSA-S7**	**3B-104A-HSA-S2**	**3B-104A-HSA-S3**	**3B-104A-HSA-S4**	**3B-104A-HSA-S5**	**3B-104A-HSA-S6**	**3B-104A-HSA-S7**	**3B-104A-HSA-S8**	**3B-104A-HSA-S9**	**3B-104A-HSA-S10**
Sample Date:	**8/6/08**	**8/6/08**	**8/6/08**	**8/6/08**	**8/7/08**	**8/7/08**	**8/7/08**	**8/7/08**	**8/7/08**	**8/7/08**	**8/7/08**	**8/7/08**	**8/7/08**
In-Situ Depth[1] (ft):	**10 - 11.5 ft**	**12.5 - 14 ft**	**17.5 - 19 ft**	**22.5 - 24 ft**	**2.5 - 4 ft**	**6 - 7.5 ft**	**7.5 - 9 ft**	**9 - 10.5 ft**	**14 - 15.5 ft**	**19 - 20.5 ft**	**24 - 25.5 ft**	**29 - 30.5 ft**	**34 - 35.5 ft**
Physical Parameters													
Atterberg Classification	--	--	--	**CL**	--	--	**Non-Plastic**	--	--	--	**Non-Plastic**	--	--
Specific gravity (su)	--	--	--	**2.79**	--	--	**2.75**	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	**12.1**	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	**6.9**	--	--	--	--	--	--	--	--	--
Liquid Limit (pct)	--	--	--	**19.1**	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	**31.36**	**22.18**	**36.63**	**16.34**	**11.65**	**12.49**	**15.89**	**30.82**	**35.23**	**43.35**	**24.26**	**22.58**	**28.95**
Moisture, percent (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)													
Gravel	--	**1.6**	--	--	--	**16.6**	--	--	**36**	--	--	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	**2.4**	--	--	--	**12.5**	--	--	**9.3**	--	--	--	--
Sand, Medium	--	**6.8**	--	--	--	**30.1**	--	--	**22.3**	--	--	**1.4**	--
Sand, Fine	--	**19.8**	--	--	--	**25.4**	--	--	**22.1**	--	--	**59.3**	--
Silt, Very Coarse	--	**10.2**	--	--	--	**15.3**	--	--	**10.2**	--	--	**39.2**	--
Silt, Coarse	--	**3.7**	--	--	--	--	--	--	--	--	--	--	--
Silt, Medium	--	**7.4**	--	--	--	--	--	--	--	--	--	--	--
Silt, Fine	--	**9.6**	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Fine	--	**8.1**	--	--	--	--	--	--	--	--	--	--	--
Clay	--	**30.4**	--	--	--	--	--	--	--	--	--	--	--
Total Gravel	--	**1.6**	--	--	--	**16.6**	--	--	**36**	--	--	--	--
Total Sand	--	**29**	--	--	--	**68**	--	--	**53.7**	--	--	**60.7**	--
Total Silt	--	**39**	--	--	--	**15.3**	--	--	**10.2**	--	--	**39.2**	--
Total Clay	--	**30.4**	--	--	--	--	--	--	--	--	--	--	--
Total Fines (Silt + Clay)	--	**69.4**	--	--	--	**15.3**	--	--	**10.2**	--	--	**39.2**	--
Total Grain Size	--	**100**	--	--	--	**99.9**	--	--	**99.9**	--	--	**99.9**	--
Percent passing < 1.3 micron sieve	--	**20**	--	--	--	--	--	--	--	--	--	--	--
Percent retained 1.3 micron sieve	--	**10.4**	--	--	--	--	--	--	--	--	--	--	--
Percent retained 3.2 micron sieve	--	**8.1**	--	--	--	--	--	--	--	--	--	--	--
Percent retained 7 micron sieve	--	**4.4**	--	--	--	--	--	--	--	--	--	--	--
Percent retained 9 micron sieve	--	**5.2**	--	--	--	--	--	--	--	--	--	--	--
Percent retained 13 micron sieve	--	**7.4**	--	--	--	--	--	--	--	--	--	--	--
Percent retained 22 micron sieve	--	**3.7**	--	--	--	--	--	--	--	--	--	--	--
Percent retained 32 micron sieve	--	**10.2**	--	--	--	**15.3**	--	--	**10.2**	--	--	**39.2**	--
Percent retained 75 micron sieve	--	**8.2**	--	--	--	**6.7**	--	--	**6.6**	--	--	**37.4**	--
Percent retained 150 micron sieve	--	**5.9**	--	--	--	**7**	--	--	**6.5**	--	--	**17.1**	--
Percent retained 250 micron sieve	--	**5.7**	--	--	--	**11.7**	--	--	**9**	--	--	**4.8**	--
Percent retained 425 micron sieve	--	**4.2**	--	--	--	**16.1**	--	--	**11**	--	--	**1.2**	--
Percent retained 850 micron sieve	--	**2.6**	--	--	--	**14**	--	--	**11.3**	--	--	**0.2**	--
Percent retained 2000 micron sieve	--	**2.4**	--	--	--	**12.5**	--	--	**9.3**	--	--	0.1 U	--
Percent retained 4750 micron sieve	--	**1.6**	--	--	--	**12**	--	--	**8**	--	--	0.1 U	--
Percent retained 9500 micron sieve	--	0.1 U	--	--	--	**4.6**	--	--	**7.5**	--	--	0.1 U	--
Percent retained 12500 micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	**5**	--	--	0.1 U	--
Percent retained 19000 micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	**15.5**	--	--	0.1 U	--
Percent retained 25K micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--
Percent retained 37.5K micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--
Percent retained 50K micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--
Percent retained 75K micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--

Table 22

Subsurface Sediment Geotechnical Testing Results - Inner Waterway

Location ID:	3B-104A-HSA	3B-104A-HSA	3B-104A-HSA	3B-104A-HSA	3B-104A-HSA	3B-104A-HSA	3B-104A-HSA	3B-104A-HSA	3B-104C-HSA	3B-104C-HSA	3B-104C-HSA	3B-104C-HSA	3B-104C-HSA	3B-104C-HSA
Sample ID:	3B-104A-HSA-S11	3B-104A-HSA-S12	3B-104A-HSA-S13	3B-104A-HSA-S14	3B-104A-HSA-S15	3B-104A-HSA-S16	3B-104A-HSA-S17	3B-104A-HSA-S18	3B-104C-HSA-S2	3B-104C-HSA-S3	3B-104C-HSA-S4	3B-104C-HSA-S5	3B-104C-HSA-S6	3B-104C-HSA-S8
Sample Date:	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08	8/7/08
In-Situ Depth[1] (ft):	39 - 40.5 ft	44 - 45.5 ft	49 - 50.5 ft	54 - 55.5 ft	59 - 60.5 ft	64 - 65.5 ft	69 - 71 ft	74 - 75.5 ft	10.5 - 12 ft	13 - 14.5 ft	15.5 - 17 ft	18 - 19.5 ft	23 - 24.5 ft	28 - 29.5 ft
Physical Parameters														
Atterberg Classification	**CL**	--	--	**CL**	--	--	**CL**	--	--	--	**CL**	--	--	**CL**
Specific gravity (su)	--	--	--	**2.77**	--	--	--	--	--	--	**2.79**	--	--	**2.79**
Plastic Limit (pct)	**16.4**	--	--	**14.3**	--	--	**19.7**	--	--	--	**11.7**	--	--	**9.8**
Plasticity Index (pct)	**23.5**	--	--	**22.4**	--	--	**29.8**	--	--	--	**21.2**	--	--	**16.5**
Liquid Limit (pct)	**39.9**	--	--	**36.7**	--	--	**49.5**	--	--	--	**32.9**	--	--	**26.3**
Moisture (water) Content (pct)	**28.51**	**19.52**	**17.88**	**15.39**	**19.38**	**28.73**	--	**29.02**	**32.09**	**23.11**	**20.6**	**20.29**	**21.52**	**18.09**
Moisture, percent (pct)	--	--	--	--	--	--	**20.47**	--	--	--	--	--	--	--
Grain Size (pct)														
Gravel	--	--	--	--	**3.4**	--	--	**2**	--	--	--	**0.6**	--	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	**0.4**	--	--	**2.1**	--	--	**0.1**	**0.4**	--	--	**1.7**	--	--
Sand, Medium	--	**1.7**	--	--	**5.2**	--	--	**0.6**	**0.4**	--	--	**5.3**	--	--
Sand, Fine	--	**63.6**	--	--	**17**	--	--	**5.4**	**5.1**	--	--	**17.7**	--	--
Silt, Very Coarse	--	**34.4**	--	--	**12.4**	--	--	**14.1**	**7.4**	--	--	**11.2**	--	--
Silt, Coarse	--	--	--	--	**5.2**	--	--	**4.6**	**5.5**	--	--	**4.5**	--	--
Silt, Medium	--	--	--	--	**6.7**	--	--	**9.2**	**9.4**	--	--	**7.6**	--	--
Silt, Fine	--	--	--	--	**10.3**	--	--	**11.6**	**13.3**	--	--	**9.8**	--	--
Silt, Very Fine	--	--	--	--	**8.9**	--	--	**11.6**	**11.7**	--	--	**9.1**	--	--
Clay	--	--	--	--	**28.8**	--	--	**40.8**	**46.8**	--	--	**32.6**	--	--
Total Gravel	--	--	--	--	**3.4**	--	--	**2**	--	--	--	**0.6**	--	--
Total Sand	--	**65.7**	--	--	**24.3**	--	--	**6.1**	**5.9**	--	--	**24.7**	--	--
Total Silt	--	**34.4**	--	--	**43.5**	--	--	**51.1**	**47.3**	--	--	**42.2**	--	--
Total Clay	--	--	--	--	**28.8**	--	--	**40.8**	**46.8**	--	--	**32.6**	--	--
Total Fines (Silt + Clay)	--	**34.4**	--	--	**72.3**	--	--	**91.9**	**94.1**	--	--	**74.8**	--	--
Total Grain Size	--	**100.1**	--	--	**100**	--	--	**100**	**100**	--	--	**100.1**	--	--
Percent passing < 1.3 micron sieve	--	--	--	--	**21.4**	--	--	**30**	**35.1**	--	--	**25**	--	--
Percent retained 1.3 micron sieve	--	--	--	--	**7.4**	--	--	**10.8**	**11.7**	--	--	**7.6**	--	--
Percent retained 3.2 micron sieve	--	--	--	--	**8.9**	--	--	**11.6**	**11.7**	--	--	**9.1**	--	--
Percent retained 7 micron sieve	--	--	--	--	**4.4**	--	--	**5.4**	**5.5**	--	--	**3.8**	--	--
Percent retained 9 micron sieve	--	--	--	--	**5.9**	--	--	**6.2**	**7.8**	--	--	**6**	--	--
Percent retained 13 micron sieve	--	--	--	--	**6.7**	--	--	**9.2**	**9.4**	--	--	**7.6**	--	--
Percent retained 22 micron sieve	--	--	--	--	**5.2**	--	--	**4.6**	**5.5**	--	--	**4.5**	--	--
Percent retained 32 micron sieve	--	**34.4**	--	--	**12.4**	--	--	**14.1**	**7.4**	--	--	**11.2**	--	--
Percent retained 75 micron sieve	--	**34.8**	--	--	**7.9**	--	--	**3.6**	**3.6**	--	--	**8.1**	--	--
Percent retained 150 micron sieve	--	**22.9**	--	--	**4.8**	--	--	**1.1**	**1.1**	--	--	**5.1**	--	--
Percent retained 250 micron sieve	--	**5.9**	--	--	**4.3**	--	--	**0.7**	**0.4**	--	--	**4.5**	--	--
Percent retained 425 micron sieve	--	**1.3**	--	--	**3.2**	--	--	**0.5**	**0.3**	--	--	**3.2**	--	--
Percent retained 850 micron sieve	--	**0.4**	--	--	**2**	--	--	**0.1**	**0.1**	--	--	**2.1**	--	--
Percent retained 2000 micron sieve	--	**0.4**	--	--	**2.1**	--	--	**0.1**	**0.4**	--	--	**1.7**	--	--
Percent retained 4750 micron sieve	--	0.1 U	--	--	**3.4**	--	--	**2**	0.1 U	--	--	**0.6**	--	--
Percent retained 9500 micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--
Percent retained 12500 micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--
Percent retained 19000 micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--
Percent retained 25K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--
Percent retained 37.5K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--
Percent retained 50K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--
Percent retained 75K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--

Notes:
1. Sample depth is reported as below mudline.
Bold = Detected result
U = Compound analyzed, but not detected above detection limit
pct = percent
su = standard units
-- Sample was not submitted for chemical analysis.

Table 23
Subsurface Sediment Geotechnical Testing Results - Outer Waterway

Location ID:	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101B-HSA**	**1C-101C-HSA**	**1C-101C-HSA**	**1C-102A-HSA**	**1C-102A-HSA**	**1C-102A-HSA**	**1C-102A-HSA**	**1C-102A-HSA**	**1C-102A-HSA**	**1C-102A-HSA**
Sample ID:	**1C-101B-HSA-S3**	**1C-101B-HSA-S5**	**1C-101B-HSA-S6**	**1C-101B-HSA-S7**	**1C-101B-HSA-S8**	**1C-101C-HSA-S5**	**1C-101C-HSA-S6**	**1C-102A-HSA-S2**	**1C-102A-HSA-S3**	**1C-102A-HSA-S4**	**1C-102A-HSA-S5**	**1C-102A-HSA-S6**	**1C-102A-HSA-S7**	**1C-102A-HSA-S8**
Sample Date:	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/16/08**	**10/16/08**	**7/14/08**	**7/14/08**	**7/14/08**	**7/14/08**	**7/14/08**	**7/14/08**	**7/14/08**
In-Situ Depth^1 (ft):	**14.3 - 15.8 ft**	**21.8 - 23.3 ft**	**26.8 - 28.3 ft**	**31.8 - 33.3 ft**	**36.8 - 38.3 ft**	**17.5 - 19 ft**	**22.5 - 24 ft**	**1.5 - 3 ft**	**4.5 - 6 ft**	**6.5 - 8 ft**	**9 - 10.5 ft**	**14 - 15.5 ft**	**19 - 20.5 ft**	**24 - 25.5 ft**
Physical Parameters														
Atterberg Classification	--	--	--	--	**CL**	--	--	--	--	--	--	--	--	**Non-Plastic**
Specific gravity (su)	--	**2.74**	--	--	**2.76**	--	--	--	--	**2.73**	--	--	--	--
Plastic Limit (pct)	--	--	--	--	**17.3**	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	--	**25.8**	--	--	--	--	--	--	--	--	--
Liquid Limit (pct)	--	--	--	--	**43.1**	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	--	--	--	--	--	--	--	**2.3**	**3.92**	**3.93**	**9.38**	**8.82**	**15.38**	**25.28**
Moisture, percent (pct)	**19.61**	**27.6**	**24.74**	**29.18**	**36.88**	**26.53**	**47.21**	--	--	--	--	--	--	--
Grain Size (pct)														
Gravel	**0.7**	--	--	--	--	--	--	--	**49.7**	--	--	**70.1**	--	--
Sand, Very Coarse	--	--	--	--	--	--	--	--	**9.5**	--	--	**7.4**	--	--
Sand, Coarse	**0.9**	--	**0.3**	--	--	**1**	--	--	**10.4**	--	--	**6.8**	--	--
Sand, Medium	**13**	--	**2**	--	--	**2.1**	--	--	**11.5**	--	--	**7.2**	--	--
Sand, Fine	**65.4**	--	**67.9**	--	--	**58.3**	--	--	**7.9**	--	--	**3.9**	--	--
Sand, Very Fine	--	--	--	--	--	--	--	--	**3.9**	--	--	**1.7**	--	--
Silt, Very Coarse	**20**	--	**29.9**	--	--	**19.9**	--	--	--	--	--	--	--	--
Silt, Coarse	--	--	--	--	--	**2.2**	--	--	**1.7**	--	--	**0.4**	--	--
Silt, Medium	--	--	--	--	--	**3.3**	--	--	**1.2**	--	--	**0.4**	--	--
Silt, Fine	--	--	--	--	--	**3.3**	--	--	**1**	--	--	**0.5**	--	--
Silt, Very Fine	--	--	--	--	--	**1.7**	--	--	**0.8**	--	--	**0.3**	--	--
Clay	--	--	--	--	--	**8.3**	--	--	--	--	--	--	--	--
Clay, Coarse	--	--	--	--	--	--	--	--	**0.5**	--	--	**0.2**	--	--
Clay, Medium	--	--	--	--	--	--	--	--	**0.4**	--	--	**0.2**	--	--
Clay, Fine	--	--	--	--	--	--	--	--	**1.4**	--	--	**0.7**	--	--
Total Gravel	**0.7**	--	--	--	--	--	--	--	**49.7**	--	--	**70.1**	--	--
Total Sand	**79.3**	--	**70.2**	--	--	**61.4**	--	--	**43.2**	--	--	**27**	--	--
Total Silt	**20**	--	**29.9**	--	--	**30.4**	--	--	**4.7**	--	--	**1.6**	--	--
Total Clay	--	--	--	--	--	**8.3**	--	--	**2.3**	--	--	**1.1**	--	--
Total Fines (Silt + Clay)	**20**	--	**29.9**	--	--	**38.7**	--	--	**7**	--	--	**2.7**	--	--
Total Grain Size	**100**	--	**100.1**	--	--	**100.1**	--	--	**99.9**	--	--	**99.8**	--	--
Percent passing < 1.3 micron sieve	0.1 U	--	0.1 U	--	--	**7.2**	--	--	--	--	--	--	--	--
Percent retained 1.3 micron sieve	0.1 U	--	0.1 U	--	--	**1.1**	--	--	--	--	--	--	--	--
Percent retained 3.2 micron sieve	0.1 U	--	0.1 U	--	--	**1.7**	--	--	--	--	--	--	--	--
Percent retained 7 micron sieve	0.1 U	--	0.1 U	--	--	**2.2**	--	--	--	--	--	--	--	--
Percent retained 9 micron sieve	0.1 U	--	0.1 U	--	--	**1.1**	--	--	--	--	--	--	--	--
Percent retained 13 micron sieve	0.1 U	--	0.1 U	--	--	**3.3**	--	--	--	--	--	--	--	--
Percent retained 22 micron sieve	0.1 U	--	0.1 U	--	--	**2.2**	--	--	--	--	--	--	--	--
Percent retained 32 micron sieve	**20**	--	**29.9**	--	--	**19.9**	--	--	--	--	--	--	--	--
Percent retained 75 micron sieve	**18.4**	--	**37.1**	--	--	**41.2**	--	--	--	--	--	--	--	--
Percent retained 150 micron sieve	**26.1**	--	**24.2**	--	--	**15**	--	--	--	--	--	--	--	--
Percent retained 250 micron sieve	**20.9**	--	**6.6**	--	--	**2.1**	--	--	--	--	--	--	--	--
Percent retained 425 micron sieve	**9.3**	--	**1.3**	--	--	**0.8**	--	--	--	--	--	--	--	--
Percent retained 850 micron sieve	**3.7**	--	**0.7**	--	--	**1.3**	--	--	--	--	--	--	--	--
Percent retained 2000 micron sieve	**0.9**	--	**0.3**	--	--	**1**	--	--	--	--	--	--	--	--
Percent retained 4750 micron sieve	**0.7**	--	0.1 U	--	--	0.1 U	--	--	--	--	--	--	--	--
Percent retained 9500 micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--	--	--	--	--
Percent retained 12500 micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--	--	--	--	--
Percent retained 19000 micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--	--	--	--	--
Percent retained 25K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--	--	--	--	--
Percent retained 37.5K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--	--	--	--	--
Percent retained 50K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--	--	--	--	--
Percent retained 75K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	--	--	--	--	--	--	--

Table 23
Subsurface Sediment Geotechnical Testing Results - Outer Waterway

Location ID:	1C-102A-HSA	1C-102A-HSA	1C-102A-HSA	1C-102A-HSA	1C-102A-HSA	1C-102A-HSA	1C-102A-HSA	1C-102A-HSA	1C-102A-HSA	1C-102A-HSA	1C-102A-HSA	1C-102C-HSA	1C-102C-HSA
Sample ID:	1C-102A-HSA-S9	1C-102A-HSA-S10	1C-102A-HSA-S11	1C-102A-HSA-S12	1C-102A-HSA-S13	1C-102A-HSA-S14	1C-102A-HSA-S15	1C-102A-HSA-S16	1C-102A-HSA-S17	1C-102A-HSA-S18	1C-102A-HSA-S19	1C-102C-HSA-S5	1C-102C-HSA-S6
Sample Date:	7/14/08	7/14/08	7/14/08	7/14/08	7/14/08	7/14/08	7/14/08	7/14/08	7/14/08	7/14/08	7/14/08	10/13/08	10/13/08
In-Situ Depth[1] (ft):	29 - 30.5 ft	34 - 35.5 ft	39 - 41.5 ft	44 - 45.5 ft	49 - 50.5 ft	54 - 55.5 ft	59 - 60.5 ft	64 - 65.5 ft	67 - 69 ft	69.5 - 70.5 ft	74 - 75.5 ft	17.6 - 19.1 ft	22.6 - 24.1 ft
Physical Parameters													
Atterberg Classification	--	--	Non-Plastic	--	--	Non-Plastic	--	CL	CL	--	--	--	--
Specific gravity (su)	--	--	--	--	--	2.71	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	18.2	18.5	--	--	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	27.4	31.3	--	--	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	45.7	49.8	--	--	--	--
Moisture (water) Content (pct)	37.03	24.91	22.29	20.16	18.26	18.92	24.25	33.81	30.66	33.04	26.31	--	--
Moisture, percent (pct)	--	--	--	--	--	--	--	--	--	--	--	18.44	32.24
Grain Size (pct)													
Gravel	6.8	--	--	1.3	--	--	--	--	--	0.1 U	--	--	2.4
Sand, Very Coarse	7.5	--	--	4.5	--	--	--	--	--	0.2	--	--	--
Sand, Coarse	10.5	--	--	15.9	--	--	--	--	--	0.4	--	--	1.5
Sand, Medium	19.4	--	--	35.1	--	--	--	--	--	1.1	--	--	5.7
Sand, Fine	20.5	--	--	19.5	--	--	--	--	--	3.7	--	--	52.9
Sand, Very Fine	9.3	--	--	11	--	--	--	--	--	18.4	--	--	--
Silt, Very Coarse	--	--	--	--	--	--	--	--	--	--	--	--	17
Silt, Coarse	2	--	--	5.7	--	--	--	--	--	15.5	--	--	2.1
Silt, Medium	3.4	--	--	1.7	--	--	--	--	--	13.1	--	--	2.7
Silt, Fine	4.4	--	--	1	--	--	--	--	--	9.8	--	--	3.5
Silt, Very Fine	3.9	--	--	0.7	--	--	--	--	--	7.6	--	--	1.4
Clay	--	--	--	--	--	--	--	--	--	--	--	--	11
Clay, Coarse	2.9	--	--	0.5	--	--	--	--	--	6.4	--	--	--
Clay, Medium	2.5	--	--	0.8	--	--	--	--	--	5.8	--	--	--
Clay, Fine	6.9	--	--	2.4	--	--	--	--	--	18.1	--	--	--
Total Gravel	6.8	--	--	1.3	--	--	--	--	--	--	--	--	2.4
Total Sand	67.2	--	--	86	--	--	--	--	--	23.8	--	--	60.1
Total Silt	13.7	--	--	9.1	--	--	--	--	--	46	--	--	26.7
Total Clay	12.3	--	--	3.7	--	--	--	--	--	30.3	--	--	11
Total Fines (Silt + Clay)	26	--	--	12.8	--	--	--	--	--	76.3	--	--	37.7
Total Grain Size	100	--	--	100.1	--	--	--	--	--	100.1	--	--	100.2
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	9.6
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	1.4
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	1.4
Percent retained 7 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	1.4
Percent retained 9 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	2.1
Percent retained 13 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	2.7
Percent retained 22 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	2.1
Percent retained 32 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	17
Percent retained 75 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	24.9
Percent retained 150 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	15.8
Percent retained 250 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	12.2
Percent retained 425 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	4.1
Percent retained 850 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	1.6
Percent retained 2000 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	1.5
Percent retained 4750 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	2.4
Percent retained 9500 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U
Percent retained 12500 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U
Percent retained 19000 micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U
Percent retained 25K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U
Percent retained 37.5K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U
Percent retained 50K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U
Percent retained 75K micron sieve	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U

Table 23
Subsurface Sediment Geotechnical Testing Results - Outer Waterway

Location ID:	**1C-102C-HSA**	**1C-102C-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**
Sample ID:	**1C-102C-HSA-S7**	**1C-102C-HSA-S9**	**1C-103A-HSA-S2**	**1C-103A-HSA-S3**	**1C-103A-HSA-S4**	**1C-103A-HSA-S5**	**1C-103A-HSA-S6**	**1C-103A-HSA-S7**	**1C-103A-HSA-S8**	**1C-103A-HSA-S9**	**1C-103A-HSA-S10**	**1C-103A-HSA-S11**	**1C-103A-HSA-S12**	**1C-103A-HSA-S13**
Sample Date:	**10/13/08**	**10/13/08**	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**
In-Situ Depth[1] (ft):	**27.6 - 29.1 ft**	**34.6 - 36.1 ft**	**1.5 - 3 ft**	**4 - 5.5 ft**	**6.5 - 8 ft**	**9 - 10.5 ft**	**14 - 15.5 ft**	**19 - 20.5 ft**	**24 - 25.5 ft**	**29 - 30.5 ft**	**34 - 35.5 ft**	**39 - 40.5 ft**	**44 - 45.5 ft**	**49 - 50.5 ft**
Physical Parameters														
Atterberg Classification	--	--	--	--	--	--	--	--	--	**Non-Plastic**	--	--	--	--
Specific gravity (su)	--	**2.76**	--	--	**2.71**	--	--	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	--	--	**2.1**	**3.8**	**5.38**	**17.48**	**22.72**	**32.31**	**25.45**	**28.32**	**22.23**	**23.56**	**22.66**	**22.19**
Moisture, percent (pct)	**25**	**35.18**	--	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)														
Gravel	--	--	--	**8.7**	--	--	**1.1**	--	**0.7**	--	--	--	**1.1**	--
Sand, Very Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	--	**2.7**	--	--	**3.7**	--	**2.1**	--	--	--	**1.5**	--
Sand, Medium	--	**0.3**	--	**23.9**	--	--	**32.4**	--	**35.3**	--	--	--	**19.2**	--
Sand, Fine	--	**1.7**	--	**61.3**	--	--	**59.9**	--	**58.1**	--	--	--	**65.6**	--
Sand, Very Fine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Coarse	--	**6.5**	--	**3.3**	--	--	**2.9**	--	**3.8**	--	--	--	**12.6**	--
Silt, Coarse	--	**5.5**	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Medium	--	**10.2**	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Fine	--	**12.6**	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Fine	--	**11.7**	--	--	--	--	--	--	--	--	--	--	--	--
Clay	--	**51.6**	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Medium	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Fine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Gravel	--	--	--	**8.7**	--	--	**1.1**	--	**0.7**	--	--	--	**1.1**	--
Total Sand	--	**2**	--	**87.9**	--	--	**96**	--	**95.5**	--	--	--	**86.3**	--
Total Silt	--	**46.5**	--	**3.3**	--	--	**2.9**	--	**3.8**	--	--	--	**12.6**	--
Total Clay	--	**51.6**	--	--	--	--	--	--	--	--	--	--	--	--
Total Fines (Silt + Clay)	--	**98.1**	--	**3.3**	--	--	**2.9**	--	**3.8**	--	--	--	**12.6**	--
Total Grain Size	--	**100.1**	--	**99.9**	--	--	**100**	--	**100**	--	--	--	**100**	--
Percent passing < 1.3 micron sieve	--	**39.1**	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 1.3 micron sieve	--	**12.5**	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 3.2 micron sieve	--	**11.7**	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 7 micron sieve	--	**6.3**	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 9 micron sieve	--	**6.3**	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 13 micron sieve	--	**10.2**	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 22 micron sieve	--	**5.5**	--	--	--	--	--	--	--	--	--	--	--	--
Percent retained 32 micron sieve	--	**6.5**	--	**3.3**	--	--	**2.9**	--	**3.8**	--	--	--	**12.6**	--
Percent retained 75 micron sieve	--	**1.3**	--	**6.4**	--	--	**4.3**	--	**4.5**	--	--	--	**10.4**	--
Percent retained 150 micron sieve	--	**0.3**	--	**18.8**	--	--	**18**	--	**16.5**	--	--	--	**23.6**	--
Percent retained 250 micron sieve	--	**0.1**	--	**36.1**	--	--	**37.6**	--	**37.1**	--	--	--	**31.6**	--
Percent retained 425 micron sieve	--	**0.2**	--	**17.6**	--	--	**23.6**	--	**24.7**	--	--	--	**14.4**	--
Percent retained 850 micron sieve	--	**0.1**	--	**6.3**	--	--	**8.8**	--	**10.6**	--	--	--	**4.8**	--
Percent retained 2000 micron sieve	--	0.1 U	--	**2.7**	--	--	**3.7**	--	**2.1**	--	--	--	**1.5**	--
Percent retained 4750 micron sieve	--	0.1 U	--	**4.8**	--	--	**0.6**	--	**0.7**	--	--	--	**0.3**	--
Percent retained 9500 micron sieve	--	0.1 U	--	0.1 U	--	--	**0.5**	--	0.1 U	--	--	--	**0.8**	--
Percent retained 12500 micron sieve	--	0.1 U	--	**3.9**	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--
Percent retained 19000 micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--
Percent retained 25K micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--
Percent retained 37.5K micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--
Percent retained 50K micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--
Percent retained 75K micron sieve	--	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--

Table 23
Subsurface Sediment Geotechnical Testing Results - Outer Waterway

Location ID:	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103A-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103B-HSA**	**1C-103C-HSA**
Sample ID:	**1C-103A-HSA-S14**	**1C-103A-HSA-S15**	**1C-103A-HSA-S16**	**1C-103A-HSA-S18**	**1C-103B-HSA-S4**	**1C-103B-HSA-S5**	**1C-103B-HSA-S6**	**1C-103B-HSA-S7**	**1C-103B-HSA-S8**	**1C-103B-HSA-S10**	**1C-103B-HSA-S11**	**1C-103B-HSA-S13**	**1C-103C-HSA-S5**
Sample Date:	**7/16/08**	**7/16/08**	**7/16/08**	**7/16/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/15/08**	**10/13/08**
In-Situ Depth[1] (ft):	**54 - 55.5 ft**	**59 - 60.5 ft**	**64 - 65.5 ft**	**74 - 75.5 ft**	**9.5 - 11 ft**	**14.5 - 16 ft**	**19.5 - 21 ft**	**24.5 - 26 ft**	**29.5 - 31 ft**	**39.5 - 41 ft**	**44.5 - 46 ft**	**51.5 - 53 ft**	**10 - 11.5 ft**
Physical Parameters													
Atterberg Classification	**Non-Plastic**	--	**CL**	**CL**	**Non-Plastic**	--	--	--	**Non-Plastic**	--	**CL**	--	--
Specific gravity (su)	**2.74**	--	--	--	**2.69**	--	--	--	--	--	**2.77**	--	--
Plastic Limit (pct)	--	--	**19.8**	**18.6**	--	--	--	--	--	--	**18.2**	--	--
Plasticity Index (pct)	--	--	**26.9**	**20.9**	--	--	--	--	--	--	**15.3**	--	--
Liquid Limit (pct)	--	--	**46.7**	**39.5**	--	--	--	--	--	--	**33.5**	--	--
Moisture (water) Content (pct)	**21.5**	**21.77**	**23.27**	**25.57**	--	--	--	--	--	--	--	--	--
Moisture, percent (pct)	--	--	--	--	**23.08**	**19.35**	**31.8**	**23.25**	**24.32**	**23.63**	**24.35**	**23.6**	**25.13**
Grain Size (pct)													
Gravel	--	--	--	--	--	--	--	--	--	**1**	--	--	--
Sand, Very Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	**0.4**	--	--	--	**1.5**	--	--	--	**2.2**	--	--	--
Sand, Medium	--	**14.3**	--	--	--	**19.9**	--	--	--	**12.7**	--	--	--
Sand, Fine	--	**70.7**	--	--	--	**62.5**	--	--	--	**35.4**	--	--	--
Sand, Very Fine	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Coarse	--	**14.5**	--	--	--	**16.2**	--	--	--	**3.1**	--	--	--
Silt, Coarse	--	--	--	--	--	--	--	--	--	**2.6**	--	--	--
Silt, Medium	--	--	--	--	--	--	--	--	--	**3.9**	--	--	--
Silt, Fine	--	--	--	--	--	--	--	--	--	**5.2**	--	--	--
Silt, Very Fine	--	--	--	--	--	--	--	--	--	**5.2**	--	--	--
Clay	--	--	--	--	--	--	--	--	--	**28.7**	--	--	--
Clay, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Medium	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Fine	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Gravel	--	--	--	--	--	--	--	--	--	**1**	--	--	--
Total Sand	--	**85.4**	--	--	--	**83.9**	--	--	--	**50.3**	--	--	--
Total Silt	--	**14.5**	--	--	--	**16.2**	--	--	--	**20**	--	--	--
Total Clay	--	--	--	--	--	--	--	--	--	**28.7**	--	--	--
Total Fines (Silt + Clay)	--	**14.5**	--	--	--	**16.2**	--	--	--	**48.7**	--	--	--
Total Grain Size	--	**99.9**	--	--	--	**100.1**	--	--	--	**100**	--	--	--
Percent passing < 1.3 micron sieve	--	--	--	--	--	0.1 U	--	--	--	**22.8**	--	--	--
Percent retained 1.3 micron sieve	--	--	--	--	--	0.1 U	--	--	--	**5.9**	--	--	--
Percent retained 3.2 micron sieve	--	--	--	--	--	0.1 U	--	--	--	**5.2**	--	--	--
Percent retained 7 micron sieve	--	--	--	--	--	0.1 U	--	--	--	**2.6**	--	--	--
Percent retained 9 micron sieve	--	--	--	--	--	0.1 U	--	--	--	**2.6**	--	--	--
Percent retained 13 micron sieve	--	--	--	--	--	0.1 U	--	--	--	**3.9**	--	--	--
Percent retained 22 micron sieve	--	--	--	--	--	0.1 U	--	--	--	**2.6**	--	--	--
Percent retained 32 micron sieve	--	**14.5**	--	--	--	**16.2**	--	--	--	**3.1**	--	--	--
Percent retained 75 micron sieve	--	**26.4**	--	--	--	**14.5**	--	--	--	**8.8**	--	--	--
Percent retained 150 micron sieve	--	**23.2**	--	--	--	**21.6**	--	--	--	**12.2**	--	--	--
Percent retained 250 micron sieve	--	**21.1**	--	--	--	**26.4**	--	--	--	**14.4**	--	--	--
Percent retained 425 micron sieve	--	**11.1**	--	--	--	**14.6**	--	--	--	**8.6**	--	--	--
Percent retained 850 micron sieve	--	**3.2**	--	--	--	**5.3**	--	--	--	**4.1**	--	--	--
Percent retained 2000 micron sieve	--	**0.4**	--	--	--	**1.5**	--	--	--	**2.2**	--	--	--
Percent retained 4750 micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	--	**1**	--	--	--
Percent retained 9500 micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	--	0.1 U	--	--	--
Percent retained 12500 micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	--	0.1 U	--	--	--
Percent retained 19000 micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	--	0.1 U	--	--	--
Percent retained 25K micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	--	0.1 U	--	--	--
Percent retained 37.5K micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	--	0.1 U	--	--	--
Percent retained 50K micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	--	0.1 U	--	--	--
Percent retained 75K micron sieve	--	0.1 U	--	--	--	0.1 U	--	--	--	0.1 U	--	--	--

Table 23

Subsurface Sediment Geotechnical Testing Results - Outer Waterway

Location ID:	1C-103C-HSA	1C-103C-HSA	1C-103C-HSA	1C-103C-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA
Sample ID:	1C-103C-HSA-S7	1C-103C-HSA-S8	1C-103C-HSA-S9	1C-103C-HSA-S10	1C-104A-HSA-S2	1C-104A-HSA-S3	1C-104A-HSA-S4	1C-104A-HSA-S5	1C-104A-HSA-S6	1C-104A-HSA-S7	1C-104A-HSA-S8	1C-104A-HSA-S9	1C-104A-HSA-S10	1C-104A-HSA-S11
Sample Date:	10/13/08	10/13/08	10/13/08	10/13/08	7/15/08	7/15/08	7/15/08	7/15/08	7/15/08	7/15/08	7/15/08	7/16/08	7/16/08	7/16/08
In-Situ Depth[1] (ft):	20 - 21.5 ft	25 - 26.5 ft	30 - 31.5 ft	37.5 - 39 ft	1.5 - 3 ft	4 - 5.5 ft	6.5 - 8 ft	11.5 - 13 ft	14 - 15.5 ft	19 - 20.5 ft	24 - 25.5 ft	29 - 30.5 ft	34 - 35.5 ft	39 - 40.5 ft
Physical Parameters														
Atterberg Classification	--	Non-Plastic	--	CL	--	--	--	--	--	--	Non-Plastic	--	--	Non-Plastic
Specific gravity (su)	2.74	--	--	--	--	--	2.75	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	--	18.4	--	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	26.8	--	--	--	--	--	--	--	--	--	--
Liquid Limit (pct)	--	--	--	45.2	--	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	--	--	--	--	5.92	5.25	5.47	33.45	26.8	38.38	22.76	21.8	25.35	18.65
Moisture, percent (pct)	22.92	31.26	28.83	33.06	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)														
Gravel	--	--	--	--	--	60.5	--	--	0.4	--	--	2.1	--	--
Sand, Very Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	--	0.3	--	--	13.3	--	--	1.9	--	--	2.4	--	--
Sand, Medium	--	--	10.9	--	--	10.7	--	--	26.9	--	--	19	--	--
Sand, Fine	--	--	86.8	--	--	8.4	--	--	61.9	--	--	59.9	--	--
Sand, Very Fine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Coarse	--	--	2	--	--	7.1	--	--	8.9	--	--	16.6	--	--
Silt, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Medium	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Fine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Fine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Medium	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Fine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Gravel	--	--	--	--	--	60.5	--	--	0.4	--	--	2.1	--	--
Total Sand	--	--	98	--	--	32.4	--	--	90.7	--	--	81.3	--	--
Total Silt	--	--	2	--	--	7.1	--	--	8.9	--	--	16.6	--	--
Total Clay	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Fines (Silt + Clay)	--	--	2	--	--	7.1	--	--	8.9	--	--	16.6	--	--
Total Grain Size	--	--	100	--	--	100	--	--	100	--	--	100	--	--
Percent passing < 1.3 micron sieve	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 1.3 micron sieve	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 3.2 micron sieve	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 7 micron sieve	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 9 micron sieve	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 13 micron sieve	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 22 micron sieve	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Percent retained 32 micron sieve	--	--	2	--	--	7.1	--	--	8.9	--	--	16.6	--	--
Percent retained 75 micron sieve	--	--	11.7	--	--	2.1	--	--	11.4	--	--	15.4	--	--
Percent retained 150 micron sieve	--	--	46.4	--	--	2.5	--	--	18.7	--	--	19.9	--	--
Percent retained 250 micron sieve	--	--	28.7	--	--	3.8	--	--	31.8	--	--	24.6	--	--
Percent retained 425 micron sieve	--	--	8.6	--	--	4.5	--	--	20.4	--	--	13.2	--	--
Percent retained 850 micron sieve	--	--	2.3	--	--	6.2	--	--	6.5	--	--	5.8	--	--
Percent retained 2000 micron sieve	--	--	0.3	--	--	13.3	--	--	1.9	--	--	2.4	--	--
Percent retained 4750 micron sieve	--	--	0.1 U	--	--	24.8	--	--	0.4	--	--	2.1	--	--
Percent retained 9500 micron sieve	--	--	0.1 U	--	--	10.8	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 12500 micron sieve	--	--	0.1 U	--	--	8	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 19000 micron sieve	--	--	0.1 U	--	--	16.9	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 25K micron sieve	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 37.5K micron sieve	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 50K micron sieve	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 75K micron sieve	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--

Table 23
Subsurface Sediment Geotechnical Testing Results - Outer Waterway

Location ID:	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104A-HSA	1C-104B-HSA	1C-104B-HSA	1C-104B-HSA	1C-104B-HSA	1C-104B-HSA	1C-104B-HSA
Sample ID:	1C-104A-HSA-S12	1C-104A-HSA-S13	1C-104A-HSA-S14	1C-104A-HSA-S15	1C-104A-HSA-S16	1C-104A-HSA-S17	1C-104A-HSA-S18	1C-104B-HSA-S5	1C-104B-HSA-S6	1C-104B-HSA-S7	1C-104B-HSA-S8	1C-104B-HSA-S9	1C-104B-HSA-S10
Sample Date:	7/16/08	7/16/08	7/16/08	7/16/08	7/16/08	7/16/08	7/16/08	10/14/08	10/14/08	10/14/08	10/14/08	10/14/08	10/14/08
In-Situ Depth[1] (ft):	44 - 45.5 ft	49 - 50.5 ft	54 - 55.5 ft	59 - 60.5 ft	64 - 65.5 ft	69 - 70.5 ft	79 - 81 ft	17.1 - 18.6 ft	22.1 - 23.6 ft	27.1 - 28.6 ft	32.1 - 33.6 ft	37.1 - 38.6 ft	42.1 - 43.6 ft
Physical Parameters													
Atterberg Classification	--	--	Non-Plastic	--	Non-Plastic	--	--	--	--	--	Non-Plastic	--	--
Specific gravity (su)	--	--	2.83	--	--	--	--	--	--	2.75	--	--	2.8
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	18.58	16.4	17.93	14.46	11.99	23.66	25.77	--	--	--	--	--	--
Moisture, percent (pct)	--	--	--	--	--	--	--	24.57	17.41	17.86	21.74	27.6	37.21
Grain Size (pct)													
Gravel	--	--	--	--	--	0.5	1.1	--	0.7	--	--	--	--
Sand, Very Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	1.5	--	--	--	--	0.5	0.3	--	4.4	--	--	0.8	--
Sand, Medium	42.6	--	--	--	--	2.9	1.5	--	39.6	--	--	8.8	--
Sand, Fine	48.2	--	--	--	--	18.7	4.9	--	46.8	--	--	15.8	--
Sand, Very Fine	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Coarse	7.6	--	--	--	--	27.5	5.8	--	8.5	--	--	14.2	--
Silt, Coarse	--	--	--	--	--	11.2	4.6	--	--	--	--	3.8	--
Silt, Medium	--	--	--	--	--	5.6	8.5	--	--	--	--	6.3	--
Silt, Fine	--	--	--	--	--	7.5	11.6	--	--	--	--	8.8	--
Silt, Very Fine	--	--	--	--	--	3.7	12.3	--	--	--	--	8.8	--
Clay	--	--	--	--	--	21.9	49.3	--	--	--	--	32.7	--
Clay, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Medium	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Fine	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Gravel	--	--	--	--	--	0.5	1.1	--	0.7	--	--	--	--
Total Sand	92.3	--	--	--	--	22.1	6.7	--	90.8	--	--	25.4	--
Total Silt	7.6	--	--	--	--	55.5	42.8	--	8.5	--	--	41.9	--
Total Clay	--	--	--	--	--	21.9	49.3	--	--	--	--	32.7	--
Total Fines (Silt + Clay)	7.6	--	--	--	--	77.4	92.1	--	8.5	--	--	74.6	--
Total Grain Size	99.9	--	--	--	--	100	99.9	--	100	--	--	100	--
Percent passing < 1.3 micron sieve	--	--	--	--	--	15	38.5	--	0.1 U	--	--	23.9	--
Percent retained 1.3 micron sieve	--	--	--	--	--	6.9	10.8	--	0.1 U	--	--	8.8	--
Percent retained 3.2 micron sieve	--	--	--	--	--	3.7	12.3	--	0.1 U	--	--	8.8	--
Percent retained 7 micron sieve	--	--	--	--	--	5	6.2	--	0.1 U	--	--	3.8	--
Percent retained 9 micron sieve	--	--	--	--	--	2.5	5.4	--	0.1 U	--	--	5	--
Percent retained 13 micron sieve	--	--	--	--	--	5.6	8.5	--	0.1 U	--	--	6.3	--
Percent retained 22 micron sieve	--	--	--	--	--	11.2	4.6	--	0.1 U	--	--	3.8	--
Percent retained 32 micron sieve	7.6	--	--	--	--	27.5	5.8	--	8.5	--	--	14.2	--
Percent retained 75 micron sieve	5.5	--	--	--	--	11.4	2.6	--	6	--	--	9.4	--
Percent retained 150 micron sieve	10.8	--	--	--	--	4.3	1.3	--	12.8	--	--	2.1	--
Percent retained 250 micron sieve	31.9	--	--	--	--	3	1	--	28	--	--	4.3	--
Percent retained 425 micron sieve	30.8	--	--	--	--	1.9	0.7	--	25.5	--	--	5.4	--
Percent retained 850 micron sieve	11.8	--	--	--	--	1	0.8	--	14.1	--	--	3.4	--
Percent retained 2000 micron sieve	1.5	--	--	--	--	0.5	0.3	--	4.4	--	--	0.8	--
Percent retained 4750 micron sieve	0.1 U	--	--	--	--	0.5	0.1 U	--	0.7	--	--	0.1 U	--
Percent retained 9500 micron sieve	0.1 U	--	--	--	--	0.1 U	1.1	--	0.1 U	--	--	0.1 U	--
Percent retained 12500 micron sieve	0.1 U	--	--	--	--	0.1 U	0.1 U	--	0.1 U	--	--	0.1 U	--
Percent retained 19000 micron sieve	0.1 U	--	--	--	--	0.1 U	0.1 U	--	0.1 U	--	--	0.1 U	--
Percent retained 25K micron sieve	0.1 U	--	--	--	--	0.1 U	0.1 U	--	0.1 U	--	--	0.1 U	--
Percent retained 37.5K micron sieve	0.1 U	--	--	--	--	0.1 U	0.1 U	--	0.1 U	--	--	0.1 U	--
Percent retained 50K micron sieve	0.1 U	--	--	--	--	0.1 U	0.1 U	--	0.1 U	--	--	0.1 U	--
Percent retained 75K micron sieve	0.1 U	--	--	--	--	0.1 U	0.1 U	--	0.1 U	--	--	0.1 U	--

Table 23
Subsurface Sediment Geotechnical Testing Results - Outer Waterway

Location ID:	1C-104C-HSA	1C-104C-HSA	1C-104C-HSA	1C-104C-HSA	1C-105A-HSA	1C-105A-HSA	1C-105A-HSA	1C-105A-HSA	1C-105A-HSA	1C-105A-HSA	1C-105A-HSA	1C-105A-HSA	1C-105A-HSA	1C-105A-HSA
Sample ID:	1C-104C-HSA-S5	1C-104C-HSA-S6	1C-104C-HSA-S7	1C-104C-HSA-S9	1C-105A-HSA-S2	1C-105A-HSA-S3	1C-105A-HSA-S4	1C-105A-HSA-S5	1C-105A-HSA-S6	1C-105A-HSA-S7	1C-105A-HSA-S8	1C-105A-HSA-S9	1C-105A-HSA-S10	1C-105A-HSA-S11
Sample Date:	10/14/08	10/14/08	10/14/08	10/14/08	7/15/08	7/15/08	7/15/08	7/15/08	7/15/08	7/15/08	7/15/08	7/15/08	7/15/08	7/15/08
In-Situ Depth[1] (ft):	13.5 - 15 ft	18.5 - 20 ft	23.5 - 25 ft	30.5 - 32 ft	1.5 - 3 ft	4 - 5.5 ft	6.5 - 8 ft	9 - 10.5 ft	14 - 15.5 ft	19 - 20.5 ft	24 - 25.5 ft	29 - 30.5 ft	34 - 35.5 ft	39 - 40.5 ft
Physical Parameters														
Atterberg Classification	--	--	CL	--	--	--	--	--	--	--	Non-Plastic	--	--	Non-Plastic
Specific gravity (su)	--	--	2.76	--	--	--	2.69	--	--	--	--	--	--	--
Plastic Limit (pct)	--	--	20.2	--	--	--	--	--	--	--	--	--	--	--
Plasticity Index (pct)	--	--	20.9	--	--	--	--	--	--	--	--	--	--	--
Liquid Limit (pct)	--	--	41.1	--	--	--	--	--	--	--	--	--	--	--
Moisture (water) Content (pct)	--	--	--	--	8.23	4.72	4.73	15.75	24.78	22.44	28.22	26.45	25.27	19.37
Moisture, percent (pct)	20.94	33.28	36.69	34.64	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)														
Gravel	2	--	--	--	--	20	--	--	1.2	--	--	0.7	--	--
Sand, Very Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	1.1	--	--	--	--	10.2	--	--	3.8	--	--	2.3	--	--
Sand, Medium	1.8	--	--	0.1	--	24.8	--	--	19.3	--	--	17.6	--	--
Sand, Fine	61	--	--	4.3	--	32.5	--	--	70.6	--	--	59	--	--
Sand, Very Fine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Coarse	34.1	--	--	21.5	--	0.6	--	--	5.1	--	--	2.3	--	--
Silt, Coarse	--	--	--	6.2	--	1.7	--	--	--	--	--	2.9	--	--
Silt, Medium	--	--	--	8.5	--	2.1	--	--	--	--	--	2.3	--	--
Silt, Fine	--	--	--	11.6	--	2.2	--	--	--	--	--	4.6	--	--
Silt, Very Fine	--	--	--	9.3	--	1.3	--	--	--	--	--	0.6	--	--
Clay	--	--	--	38.6	--	4.7	--	--	--	--	--	7.6	--	--
Clay, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Medium	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Fine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Gravel	2	--	--	--	--	20	--	--	1.2	--	--	0.7	--	--
Total Sand	63.9	--	--	4.4	--	67.5	--	--	93.7	--	--	78.9	--	--
Total Silt	34.1	--	--	57.1	--	7.9	--	--	5.1	--	--	12.7	--	--
Total Clay	--	--	--	38.6	--	4.7	--	--	--	--	--	7.6	--	--
Total Fines (Silt + Clay)	34.1	--	--	95.7	--	12.6	--	--	5.1	--	--	20.3	--	--
Total Grain Size	100	--	--	100.1	--	100.1	--	--	100	--	--	99.9	--	--
Percent passing < 1.3 micron sieve	0.1 U	--	--	29.2	--	3	--	--	--	--	--	4.1	--	--
Percent retained 1.3 micron sieve	0.1 U	--	--	9.4	--	1.7	--	--	--	--	--	3.5	--	--
Percent retained 3.2 micron sieve	0.1 U	--	--	9.3	--	1.3	--	--	--	--	--	0.6	--	--
Percent retained 7 micron sieve	0.1 U	--	--	6.2	--	1.3	--	--	--	--	--	2.3	--	--
Percent retained 9 micron sieve	0.1 U	--	--	5.4	--	0.9	--	--	--	--	--	2.3	--	--
Percent retained 13 micron sieve	0.1 U	--	--	8.5	--	2.1	--	--	--	--	--	2.3	--	--
Percent retained 22 micron sieve	0.1 U	--	--	6.2	--	1.7	--	--	--	--	--	2.9	--	--
Percent retained 32 micron sieve	34.1	--	--	21.5	--	0.6	--	--	5.1	--	--	2.3	--	--
Percent retained 75 micron sieve	31.9	--	--	4.1	--	4.7	--	--	11.1	--	--	12.3	--	--
Percent retained 150 micron sieve	22.6	--	--	0.1	--	9.7	--	--	24.5	--	--	20.4	--	--
Percent retained 250 micron sieve	6.5	--	--	0.1	--	18.1	--	--	35	--	--	26.3	--	--
Percent retained 425 micron sieve	1.2	--	--	0.1	--	15	--	--	13.3	--	--	12.1	--	--
Percent retained 850 micron sieve	0.6	--	--	0.1 U	--	9.8	--	--	6	--	--	5.5	--	--
Percent retained 2000 micron sieve	1.1	--	--	0.1 U	--	10.2	--	--	3.8	--	--	2.3	--	--
Percent retained 4750 micron sieve	2	--	--	0.1 U	--	9.5	--	--	1.2	--	--	0.7	--	--
Percent retained 9500 micron sieve	0.1 U	--	--	0.1 U	--	5.5	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 12500 micron sieve	0.1 U	--	--	0.1 U	--	5	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 19000 micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 25K micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 37.5K micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 50K micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--
Percent retained 75K micron sieve	0.1 U	--	--	0.1 U	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--

Table 23
Subsurface Sediment Geotechnical Testing Results - Outer Waterway

Location ID:	**1C-105A-HSA**	**1C-105A-HSA**	**1C-105A-HSA**	**1C-105A-HSA**	**1C-105A-HSA**	**1C-105A-HSA**	**1C-106C-HSA**	**1C-106C-HSA**	**1C-106C-HSA**	**1C-106C-HSA**	**1C-106C-HSA**	**1C-106C-HSA**
Sample ID:	**1C-105A-HSA-S12**	**1C-105A-HSA-S13**	**1C-105A-HSA-S14**	**1C-105A-HSA-S15**	**1C-105A-HSA-S17**	**1C-105A-HSA-S18**	**1C-106C-HSA-S2**	**1C-106C-HSA-S3**	**1C-106C-HSA-S4**	**1C-106C-HSA-S5**	**1C-106C-HSA-S6**	**1C-106C-HSA-S7**
Sample Date:	**7/15/08**	**7/15/08**	**7/15/08**	**7/15/08**	**7/15/08**	**7/15/08**	**8/11/08**	**8/11/08**	**8/11/08**	**8/11/08**	**8/11/08**	**8/11/08**
In-Situ Depth[1] (ft):	**44 - 45.5 ft**	**49 - 50.5 ft**	**54 - 55.5 ft**	**59 - 60.5 ft**	**69 - 70.5 ft**	**74 - 75.5 ft**	**10.5 - 12 ft**	**13 - 14.5 ft**	**15.5 - 17 ft**	**18 - 19.5 ft**	**23.5 - 25 ft**	**28.5 - 30 ft**
Physical Parameters												
Atterberg Classification	--	--	**Non-Plastic**	--	**CL**	--	--	--	**CH**	--	--	**CL**
Specific gravity (su)	--	--	--	--	--	--	--	--	**2.79**	--	--	**2.77**
Plastic Limit (pct)	--	--	--	--	**18.7**	--	--	--	**20.4**	--	--	**20.1**
Plasticity Index (pct)	--	--	--	--	**24.8**	--	--	--	**30**	--	--	**25.2**
Liquid Limit (pct)	--	--	--	--	**43.6**	--	--	--	**50.4**	--	--	**45.3**
Moisture (water) Content (pct)	**20.79**	**16.59**	**18.77**	**26.17**	**34.41**	**35.5**	**137.6**	**34.9**	**39.76**	**26.3**	**31.33**	**37.97**
Moisture, percent (pct)	--	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)												
Gravel	**0.2**	--	--	--	--	--	--	**1.7**	--	**0.2**	--	--
Sand, Very Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	**3.4**	--	**0.4**	--	--	--	--	**2.3**	--	**0.1**	--	--
Sand, Medium	**45.1**	--	**13**	--	--	**0.1**	--	**4.2**	--	**5.3**	--	--
Sand, Fine	**37.5**	--	**51.3**	--	--	**1.2**	--	**13.3**	--	**23.5**	--	--
Sand, Very Fine	--	--	--	--	--	--	--	--	--	--	--	--
Silt, Very Coarse	**13.9**	--	**19.5**	--	--	**33**	--	**4.2**	--	**7.3**	--	--
Silt, Coarse	--	--	**2.4**	--	--	**1.2**	--	**4.5**	--	**4.6**	--	--
Silt, Medium	--	--	**2.4**	--	--	**3.7**	--	**8.3**	--	**8.4**	--	--
Silt, Fine	--	--	**1.8**	--	--	**8.7**	--	**10.6**	--	**8.4**	--	--
Silt, Very Fine	--	--	**0.6**	--	--	**8.7**	--	**8.3**	--	**6.1**	--	--
Clay	--	--	**8.5**	--	--	**43.4**	--	**42.8**	--	**36.1**	--	--
Clay, Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Medium	--	--	--	--	--	--	--	--	--	--	--	--
Clay, Fine	--	--	--	--	--	--	--	--	--	--	--	--
Total Gravel	**0.2**	--	--	--	--	--	--	**1.7**	--	**0.2**	--	--
Total Sand	**86**	--	**64.7**	--	--	**1.3**	--	**19.8**	--	**28.9**	--	--
Total Silt	**13.9**	--	**26.7**	--	--	**55.3**	--	**35.9**	--	**34.8**	--	--
Total Clay	--	--	**8.5**	--	--	**43.4**	--	**42.8**	--	**36.1**	--	--
Total Fines (Silt + Clay)	**13.9**	--	**35.2**	--	--	**98.7**	--	**78.7**	--	**70.9**	--	--
Total Grain Size	**100.1**	--	**99.9**	--	--	**100**	--	**100.2**	--	**100**	--	--
Percent passing < 1.3 micron sieve	--	--	**6.7**	--	--	**30.4**	--	**34.5**	--	**28.4**	--	--
Percent retained 1.3 micron sieve	--	--	**1.8**	--	--	**13**	--	**8.3**	--	**7.7**	--	--
Percent retained 3.2 micron sieve	--	--	**0.6**	--	--	**8.7**	--	**8.3**	--	**6.1**	--	--
Percent retained 7 micron sieve	--	--	**0.6**	--	--	**5**	--	**5.3**	--	**4.6**	--	--
Percent retained 9 micron sieve	--	--	**1.2**	--	--	**3.7**	--	**5.3**	--	**3.8**	--	--
Percent retained 13 micron sieve	--	--	**2.4**	--	--	**3.7**	--	**8.3**	--	**8.4**	--	--
Percent retained 22 micron sieve	--	--	**2.4**	--	--	**1.2**	--	**4.5**	--	**4.6**	--	--
Percent retained 32 micron sieve	**13.9**	--	**19.5**	--	--	**33**	--	**4.2**	--	**7.3**	--	--
Percent retained 75 micron sieve	**6.9**	--	**24.3**	--	--	**1**	--	**5.8**	--	**8.9**	--	--
Percent retained 150 micron sieve	**8.6**	--	**13.7**	--	--	**0.1**	--	**4.7**	--	**5.6**	--	--
Percent retained 250 micron sieve	**22**	--	**13.3**	--	--	**0.1**	--	**2.8**	--	**9**	--	--
Percent retained 425 micron sieve	**29.4**	--	**10**	--	--	**0.1**	--	**1.7**	--	**4.9**	--	--
Percent retained 850 micron sieve	**15.7**	--	**3**	--	--	0.1 U	--	**2.5**	--	**0.4**	--	--
Percent retained 2000 micron sieve	**3.4**	--	**0.4**	--	--	0.1 U	--	**2.3**	--	**0.1**	--	--
Percent retained 4750 micron sieve	**0.2**	--	0.1 U	--	--	0.1 U	--	**1.7**	--	**0.2**	--	--
Percent retained 9500 micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 12500 micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 19000 micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 25K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 37.5K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 50K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--
Percent retained 75K micron sieve	0.1 U	--	0.1 U	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--

Notes:
1. Sample depth is reported as below mudline.
Bold = Detected result
U = Compound analyzed, but not detected above detection limit
pct = percent
su = standard units
-- Sample was not submitted for chemical analysis.

Table 24
Subsurface Sediment Geotechnical Testing Results - Log Pond

Location ID:	**4-101B-HSA**	**4-101B-HSA**	**4-101B-HSA**	**4-101B-HSA**	**4-101B-HSA**	**4-101B-HSA**	**4-101B-HSA**	**4-101B-HSA**	**4-101B-HSA**	**4-101B-HSA**	**4-101B-HSA**
Sample ID:	**4-101B-HSA-S2**	**4-101B-HSA-S3**	**4-101B-HSA-S4**	**4-101B-HSA-S5**	**4-101B-HSA-S6**	**4-101B-HSA-S7**	**4-101B-HSA-S8**	**4-101B-HSA-S9**	**4-101B-HSA-S10**	**4-101B-HSA-S11**	**4-101B-HSA-S13**
Sample Date:	**8/13/08**	**8/13/08**	**8/13/08**	**8/13/08**	**8/13/08**	**8/13/08**	**8/13/08**	**8/13/08**	**8/13/08**	**8/13/08**	**8/13/08**
In-Situ Depth[1] (ft):	**3.5 - 5 ft**	**6 - 7.5 ft**	**8.5 - 10 ft**	**11 - 12.5 ft**	**16 - 17.5 ft**	**21 - 22.5 ft**	**26 - 27.5 ft**	**31 - 32.5 ft**	**36 - 37.5 ft**	**41 - 42.5 ft**	**51 - 52.5 ft**
Physical Parameters											
Atterberg Classification	--	--	--	--	--	--	**Non-Plastic**	--	--	**CL**	--
Specific gravity (su)	--	--	**2.68**	--	--	--	--	--	--	**2.8**	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	**22.2**	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	**25.6**	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	**47.8**	--
Moisture, percent (pct)	**43.14**	**25.85**	**23.13**	**19.4**	**18.94**	**21.26**	**16.94**	**19.51**	**37.58**	**38.45**	**34.51**
Grain Size (pct)											
Gravel	--	**0.6**	--	--	**0.5**	--	--	**1.4**	--	--	--
Sand, Coarse	--	**2.2**	--	--	**2.2**	--	--	**4.6**	--	--	--
Sand, Medium	--	**31.6**	--	--	**27.6**	--	--	**24.3**	--	--	--
Sand, Fine	--	**57**	--	--	**58.7**	--	--	**49.3**	--	--	--
Silt, Very Coarse	--	**8.6**	--	--	**11**	--	--	**20.6**	--	--	--
Total Gravel	--	**0.6**	--	--	**0.5**	--	--	**1.4**	--	--	--
Total Sand	--	**90.8**	--	--	**88.5**	--	--	**78.2**	--	--	--
Total Silt	--	**8.6**	--	--	**11**	--	--	**20.6**	--	--	--
Total Fines (Silt + Clay)	--	**8.6**	--	--	**11**	--	--	**20.6**	--	--	--
Total Grain Size	--	**100**	--	--	**100**	--	--	**100.2**	--	--	--
Percent retained 32 micron sieve	--	**8.6**	--	--	**11**	--	--	**20.6**	--	--	--
Percent retained 75 micron sieve	--	**9.3**	--	--	**11.4**	--	--	**12.3**	--	--	--
Percent retained 150 micron sieve	--	**16.9**	--	--	**18.8**	--	--	**15.5**	--	--	--
Percent retained 250 micron sieve	--	**30.8**	--	--	**28.5**	--	--	**21.5**	--	--	--
Percent retained 425 micron sieve	--	**26.4**	--	--	**18.4**	--	--	**15.3**	--	--	--
Percent retained 850 micron sieve	--	**5.2**	--	--	**9.2**	--	--	**9**	--	--	--
Percent retained 2000 micron sieve	--	**2.2**	--	--	**2.2**	--	--	**4.6**	--	--	--
Percent retained 4750 micron sieve	--	**0.6**	--	--	**0.5**	--	--	**1.4**	--	--	--
Percent retained 9500 micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 12500 micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 19000 micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 25K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 37.5K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 50K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--
Percent retained 75K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--

Notes:

1. Sample depth is reported as below mudline.

Bold = Detected result

U = Compound analyzed, but not detected above detection limit

pct = percent

su = standard units

-- Sample was not submitted for chemical analysis.

Table 25
Sediment Vane Shear and Co-Located Surface Sediment Physical Testing Results

Location ID:	4-01-VS	4-01-VS	4-02-VS	4-03-VS	4-03-VS	4-03-VS	4-04-VS	4-04-VS	4-04-VS	4-05-VS	4-05-VS	4-05-VS	4-06-VS	4-06-VS
Sample ID:	4-01-VS	4-01-VS	4-02-VS	4-03-VS	4-03-VS	4-03-VS	4-04-VS	4-04-VS	4-04-VS	4-05-VS	4-05-VS	4-05-VS	4-06-VS	4-06-VS
Sample Date:	8/20/08	8/20/08	8/20/08	8/18/08	8/18/08	8/18/08	8/18/08	8/18/08	8/18/08	8/19/08	8/19/08	8/19/08	8/19/08	8/19/08
In-Situ Depth[1] (ft):	0 - 1 ft	1 - 2 ft	0 - 1 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	0 - 1 ft	1 - 2 ft
In Field Measurements (lbs/ft^2)														
Peak	236	1039	671	302	444	378	661	520	1153	208	321	+1228	170	227
Residual	170	236	246	113	189	208	208	208	378	94	227	378	57	123
Physical Parameters														
Atterberg Classification	Non-Plastic	--	Non-Plastic	Non-Plastic	--	--	Non-Plastic	--	--	ML	--	--	ML	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	41.8	--	--	25.2	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	33.6	--	--	24.7	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	8.2	--	--	0.5	--
Moisture, percent (pct)	28.83	--	40.65	--	--	--	--	--	--	110.4	--	--	79.01	--
Moisture (water) Content (pct)	--	--	--	37.49	--	--	35.74	--	--	--	--	--	--	--
Grain Size (pct)														
Gravel	8.4	--	2.7	1.5	--	--	4.3	--	--	--	--	--	0.2	--
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	15.5	--	6.7	1.6	--	--	10	--	--	0.2	--	--	0.7	--
Sand, Fine	29.1	--	61.4	49.1	--	--	24.8	--	--	4.4	--	--	36.7	--
Sand, Medium	44.1	--	25.9	39.5	--	--	55.7	--	--	3.7	--	--	4.4	--
Silt, Coarse	--	--	--	--	--	--	--	--	--	17.2	--	--	11.6	--
Silt, Fine	--	--	--	--	--	--	--	--	--	14	--	--	7	--
Silt, Medium	--	--	--	--	--	--	--	--	--	17.2	--	--	8.5	--
Silt, Very Coarse	2.9	--	3.4	8.3	--	--	5.2	--	--	18.9	--	--	15.7	--
Silt, Very Fine	--	--	--	--	--	--	--	--	--	7	--	--	2.3	--
Clay	--	--	--	--	--	--	--	--	--	17.2	--	--	13.1	--
Total Gravel	8.4	--	2.7	1.5	--	--	4.3	--	--	--	--	--	0.2	--
Total Sand	88.7	--	94	90.2	--	--	90.5	--	--	8.3	--	--	41.8	--
Total Silt	2.9	--	3.4	8.3	--	--	5.2	--	--	74.3	--	--	45.1	--
Total Clay	--	--	--	--	--	--	--	--	--	17.2	--	--	13.1	--
Total Fines (Silt + Clay)	2.9	--	3.4	8.3	--	--	5.2	--	--	91.5	--	--	58.2	--
Total Grain Size	100	--	100.1	100	--	--	100	--	--	99.8	--	--	100.2	--
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	--	--	13.3	--	--	10	--
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	--	--	3.9	--	--	3.1	--
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	--	--	7	--	--	2.3	--
Percent retained 7 micron sieve	--	--	--	--	--	--	--	--	--	7	--	--	3.1	--
Percent retained 9 micron sieve	--	--	--	--	--	--	--	--	--	7	--	--	3.9	--
Percent retained 13 micron sieve	--	--	--	--	--	--	--	--	--	17.2	--	--	8.5	--
Percent retained 22 micron sieve	--	--	--	--	--	--	--	--	--	17.2	--	--	11.6	--
Percent retained 32 micron sieve	2.9	--	3.4	8.3	--	--	5.2	--	--	18.9	--	--	15.7	--
Percent retained 75 micron sieve	2	--	3.1	4.2	--	--	1.1	--	--	0.8	--	--	13.5	--
Percent retained 150 micron sieve	9	--	8.3	11.8	--	--	6.9	--	--	1	--	--	13.7	--
Percent retained 250 micron sieve	18.1	--	50	33.1	--	--	16.8	--	--	2.6	--	--	9.5	--
Percent retained 425 micron sieve	21.8	--	20.3	33.3	--	--	32.6	--	--	2.3	--	--	2.8	--
Percent retained 850 micron sieve	22.3	--	5.6	6.2	--	--	23.1	--	--	1.4	--	--	1.6	--
Percent retained 2000 micron sieve	15.5	--	6.7	1.6	--	--	10	--	--	0.2	--	--	0.7	--
Percent retained 4750 micron sieve	6.5	--	2	1.3	--	--	2.6	--	--	0.1 U	--	--	0.2	--
Percent retained 9500 micron sieve	1.6	--	0.7	0.2	--	--	1.7	--	--	0.1 U	--	--	0.1 U	--
Percent retained 12500 micron sieve	0.3	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--
Percent retained 19000 micron sieve	0.1 U	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--
Percent retained 25K micron sieve	0.1 U	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--
Percent retained 37.5K micron sieve	0.1 U	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--
Percent retained 50K micron sieve	0.1 U	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--
Percent retained 75K micron sieve	0.1 U	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--

Table 25
Sediment Vane Shear and Co-Located Surface Sediment Physical Testing Results

Location ID:	**4-06-VS**	**4-07-VS**	**4-07-VS**	**4-07-VS**	**4-08-VS**	**4-08-VS**	**4-08-VS**	**4-09-VS**	**4-09-VS**	**4-09-VS**	**5B-01-VS**	**5B-01-VS**	**5B-02-VS**	**5B-02-VS**
Sample ID:	**4-06-VS**	**4-07-VS**	**4-07-VS**	**4-07-VS**	**4-08-VS**	**4-08-VS**	**4-08-VS**	**4-09-VS**	**4-09-VS**	**4-09-VS**	**5B-01-VS**	**5B-01-VS**	**5B-02-VS**	**5B-02-VS**
Sample Date:	**8/19/08**	**8/19/08**	**8/19/08**	**8/19/08**	**8/19/08**	**8/19/08**	**8/19/08**	**8/19/08**	**8/19/08**	**8/19/08**	**8/25/08**	**8/25/08**	**8/25/08**	**8/25/08**
In-Situ Depth^1 (ft):	**2 - 3 ft**	**0 - 1 ft**	**1 - 2 ft**	**2 - 3 ft**	**0 - 1 ft**	**1 - 2 ft**	**1 - 2.75 ft**	**0 - 1 ft**	**1 - 2 ft**	**2 - 3 ft**	**0 - 1 ft**	**1 - 2 ft**	**0 - 1 ft**	**1 - 1.75 ft**
In Field Measurements (lbs/ft^2)														
Peak	1087	265	548	869	444	274	794	491	340	1135	406	236	542	813
Residual	350	189	265	217	189	189	548	151	208	425	283	113	387	426
Physical Parameters														
Atterberg Classification	--	--	--	--	Non-Plastic	--	--	Non-Plastic	--	--	ML	--	ML	--
Liquid Limit (pct)	--	--	--	--	--	--	--	--	--	--	48.7	--	28.5	--
Plastic Limit (pct)	--	--	--	--	--	--	--	--	--	--	34.5	--	25.6	--
Plasticity Index (pct)	--	--	--	--	--	--	--	--	--	--	14.2	--	2.9	--
Moisture, percent (pct)	--	1.82	--	--	13.26	--	--	37.21	--	--	132.7	--	80.55	--
Moisture (water) Content (pct)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)														
Gravel	--	12.7	--	--	19.5	--	--	0.1	--	--	2.7	--	2.2	--
Gravel, Coarse	--	83.2	--	--	67.2	--	--	--	--	--	--	--	--	--
Sand, Coarse	--	1.1	--	--	1.7	--	--	0.4	--	--	2.6	--	2.2	--
Sand, Fine	--	0.8	--	--	6.1	--	--	60.1	--	--	32.4	--	50.1	--
Sand, Medium	--	1.9	--	--	5	--	--	37.1	--	--	6.2	--	10.6	--
Silt, Coarse	--	--	--	--	--	--	--	--	--	--	4.5	--	2.1	--
Silt, Fine	--	--	--	--	--	--	--	--	--	--	11.3	--	7.7	--
Silt, Medium	--	--	--	--	--	--	--	--	--	--	4.5	--	2.1	--
Silt, Very Coarse	--	0.4	--	--	0.4	--	--	2.4	--	--	3.3	--	6.5	--
Silt, Very Fine	--	--	--	--	--	--	--	--	--	--	8.3	--	2.1	--
Clay	--	--	--	--	--	--	--	--	--	--	24.1	--	14.6	--
Total Gravel	--	95.9	--	--	86.7	--	--	0.1	--	--	2.7	--	2.2	--
Total Sand	--	3.8	--	--	12.8	--	--	97.6	--	--	41.2	--	62.9	--
Total Silt	--	0.4	--	--	0.4	--	--	2.4	--	--	31.9	--	20.5	--
Total Clay	--	--	--	--	--	--	--	--	--	--	24.1	--	14.6	--
Total Fines (Silt + Clay)	--	0.4	--	--	0.4	--	--	2.4	--	--	56	--	35.1	--
Total Grain Size	--	100.1	--	--	99.9	--	--	100.1	--	--	99.9	--	100.2	--
Percent passing < 1.3 micron sieve	--	--	--	--	--	--	--	--	--	--	16.6	--	9.7	--
Percent retained 1.3 micron sieve	--	--	--	--	--	--	--	--	--	--	7.5	--	4.9	--
Percent retained 3.2 micron sieve	--	--	--	--	--	--	--	--	--	--	8.3	--	2.1	--
Percent retained 7 micron sieve	--	--	--	--	--	--	--	--	--	--	3.8	--	5.6	--
Percent retained 9 micron sieve	--	--	--	--	--	--	--	--	--	--	7.5	--	2.1	--
Percent retained 13 micron sieve	--	--	--	--	--	--	--	--	--	--	4.5	--	2.1	--
Percent retained 22 micron sieve	--	--	--	--	--	--	--	--	--	--	4.5	--	2.1	--
Percent retained 32 micron sieve	--	0.4	--	--	0.4	--	--	2.4	--	--	3.3	--	6.5	--
Percent retained 75 micron sieve	--	0.1 U	--	--	0.6	--	--	2.9	--	--	9.6	--	23.2	--
Percent retained 150 micron sieve	--	0.1	--	--	1.8	--	--	15.4	--	--	13.2	--	14.2	--
Percent retained 250 micron sieve	--	0.7	--	--	3.7	--	--	41.8	--	--	9.6	--	12.7	--
Percent retained 425 micron sieve	--	1	--	--	3.3	--	--	32.6	--	--	3.8	--	7.3	--
Percent retained 850 micron sieve	--	0.9	--	--	1.7	--	--	4.5	--	--	2.4	--	3.3	--
Percent retained 2000 micron sieve	--	1.1	--	--	1.7	--	--	0.4	--	--	2.6	--	2.2	--
Percent retained 4750 micron sieve	--	3.2	--	--	1.7	--	--	0.1	--	--	2.3	--	2.2	--
Percent retained 9500 micron sieve	--	0.1 U	--	--	2.6	--	--	0.1 U	--	--	0.4	--	0.1 U	--
Percent retained 12500 micron sieve	--	9.5	--	--	5.6	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--
Percent retained 19000 micron sieve	--	0.1 U	--	--	9.6	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--
Percent retained 25K micron sieve	--	0.1 U	--	--	36	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--
Percent retained 37.5K micron sieve	--	83.2	--	--	31.2	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--
Percent retained 50K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--
Percent retained 75K micron sieve	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	--	0.1 U	--

Table 25
Sediment Vane Shear and Co-Located Surface Sediment Physical Testing Results

Location ID:	5B-03-VS	5B-03-VS	5B-04-VS	5B-04-VS	6C-01-VS	6C-01-VS	6C-02-VS	6C-02-VS	6C-03-VS	6C-03-VS	6C-03-VS	6C-04-VS
Sample ID:	5B-03-VS	5B-03-VS	5B-04-VS	5B-04-VS	6C-01-VS	6C-01-VS	6C-02-VS	6C-02-VS	6C-03-VS	6C-03-VS	6C-03-VS	6C-04-VS
Sample Date:	8/25/08	8/25/08	8/25/08	8/25/08	8/25/08	8/25/08	8/25/08	8/25/08	8/25/08	8/25/08	8/25/08	8/25/08
In-Situ Depth[1] (ft):	0 - 1 ft	1 - 1.5 ft	0 - 1 ft	1 - 1.5 ft	0 - 1 ft	1 - 1.5 ft	0 - 1 ft	1 - 1.5 ft	0 - 1 ft	1 - 2ft	2 - 3 ft	0 - 1 ft
In Field Measurements (lbs/ft^2)												
Peak	**945**	**1550**	**697**	**968**	**378**	**945**	**1142**	**1258**	**348**	**348**	**1239**	**1007**
Residual	**293**	**756**	**232**	**445**	**378**	**378**	**426**	**465**	**232**	**232**	**542**	**387**
Physical Parameters												
Atterberg Classification	**ML**	--	**Non-Plastic**	--	**ML**	--	**Non-Plastic**	--	**Non-Plastic**	--	--	**Non-Plastic**
Liquid Limit (pct)	**35.2**	--	--	--	**24.5**	--	--	--	--	--	--	--
Plastic Limit (pct)	**29.7**	--	--	--	**22**	--	--	--	--	--	--	--
Plasticity Index (pct)	**5.5**	--	--	--	**2.5**	--	--	--	--	--	--	--
Moisture, percent (pct)	**106**	--	**47.29**	--	**62.88**	--	**46.72**	--	**56.24**	--	--	**33.33**
Moisture (water) Content (pct)	--	--	--	--	--	--	--	--	--	--	--	--
Grain Size (pct)												
Gravel	**9.9**	--	**10.7**	--	**0.2**	--	**0.2**	--	**0.2**	--	--	**4**
Gravel, Coarse	--	--	--	--	--	--	--	--	--	--	--	--
Sand, Coarse	**5.7**	--	**4.3**	--	**0.1**	--	**0.6**	--	**0.2**	--	--	**5.4**
Sand, Fine	**41.5**	--	**41.2**	--	**50.2**	--	**82.4**	--	**56.7**	--	--	**57.2**
Sand, Medium	**15**	--	**27.6**	--	**2.9**	--	**1.7**	--	**2.4**	--	--	**24.4**
Silt, Coarse	**0.7**	--	**1**	--	**3.1**	--	**1.1**	--	**1.4**	--	--	--
Silt, Fine	**7.2**	--	**3.5**	--	**5.4**	--	**3.4**	--	**3.5**	--	--	**1.6**
Silt, Medium	**2**	--	**0.5**	--	**3.8**	--	**1.1**	--	**2.8**	--	--	**0.5**
Silt, Very Coarse	**1.2**	--	**0.9**	--	**19.6**	--	**2.4**	--	**19.2**	--	--	**0.6**
Silt, Very Fine	**2.6**	--	**2**	--	**2.3**	--	--	--	**2.8**	--	--	**1.1**
Clay	**14.4**	--	**8.1**	--	**12.2**	--	**7.2**	--	**11.1**	--	--	**5.3**
Total Gravel	**9.9**	--	**10.7**	--	**0.2**	--	**0.2**	--	**0.2**	--	--	**4**
Total Sand	**62.2**	--	**73.1**	--	**53.2**	--	**84.7**	--	**59.3**	--	--	**87**
Total Silt	**13.7**	--	**7.9**	--	**34.2**	--	**8**	--	**29.7**	--	--	**3.8**
Total Clay	**14.4**	--	**8.1**	--	**12.2**	--	**7.2**	--	**11.1**	--	--	**5.3**
Total Fines (Silt + Clay)	**28.1**	--	**16**	--	**46.4**	--	**15.2**	--	**40.8**	--	--	**9.1**
Total Grain Size	**100.2**	--	**99.8**	--	**99.8**	--	**100.1**	--	**100.3**	--	--	**100.1**
Percent passing < 1.3 micron sieve	**8.5**	--	**5.6**	--	**8.4**	--	**5.5**	--	**8.3**	--	--	**4.8**
Percent retained 1.3 micron sieve	**5.9**	--	**2.5**	--	**3.8**	--	**1.7**	--	**2.8**	--	--	**0.5**
Percent retained 3.2 micron sieve	**2.6**	--	**2**	--	**2.3**	--	0.1 U	--	**2.8**	--	--	**1.1**
Percent retained 7 micron sieve	**3.3**	--	**0.5**	--	**3.1**	--	**1.7**	--	**1.4**	--	--	0.1 U
Percent retained 9 micron sieve	**3.9**	--	**3**	--	**2.3**	--	**1.7**	--	**2.1**	--	--	**1.6**
Percent retained 13 micron sieve	**2**	--	**0.5**	--	**3.8**	--	**1.1**	--	**2.8**	--	--	**0.5**
Percent retained 22 micron sieve	**0.7**	--	**1**	--	**3.1**	--	**1.1**	--	**1.4**	--	--	0.1 U
Percent retained 32 micron sieve	**1.2**	--	**0.9**	--	**19.6**	--	**2.4**	--	**19.2**	--	--	**0.6**
Percent retained 75 micron sieve	**8.2**	--	**4.5**	--	**27.4**	--	**28.1**	--	**27.3**	--	--	**7.6**
Percent retained 150 micron sieve	**15.8**	--	**11.4**	--	**14.1**	--	**42.5**	--	**18.5**	--	--	**13.9**
Percent retained 250 micron sieve	**17.5**	--	**25.3**	--	**8.7**	--	**11.8**	--	**10.9**	--	--	**35.7**
Percent retained 425 micron sieve	**10**	--	**18.9**	--	**2.3**	--	**1**	--	**2**	--	--	**17.9**
Percent retained 850 micron sieve	**5**	--	**8.7**	--	**0.6**	--	**0.7**	--	**0.4**	--	--	**6.5**
Percent retained 2000 micron sieve	**5.7**	--	**4.3**	--	**0.1**	--	**0.6**	--	**0.2**	--	--	**5.4**
Percent retained 4750 micron sieve	**4.1**	--	**3.7**	--	**0.2**	--	**0.2**	--	**0.2**	--	--	**4**
Percent retained 9500 micron sieve	**1.2**	--	**3.1**	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U
Percent retained 12500 micron sieve	**1.9**	--	**3.9**	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U
Percent retained 19000 micron sieve	**2.7**	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U
Percent retained 25K micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U
Percent retained 37.5K micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U
Percent retained 50K micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U
Percent retained 75K micron sieve	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	0.1 U	--	--	0.1 U

Notes:

1. Sample depth is reported as below mudline and presented for VST measurements. Physical testing depths are presented in Table 4.

Bold = Detected result

U = Compound analyzed, but not detected above detection limit

pct = percent

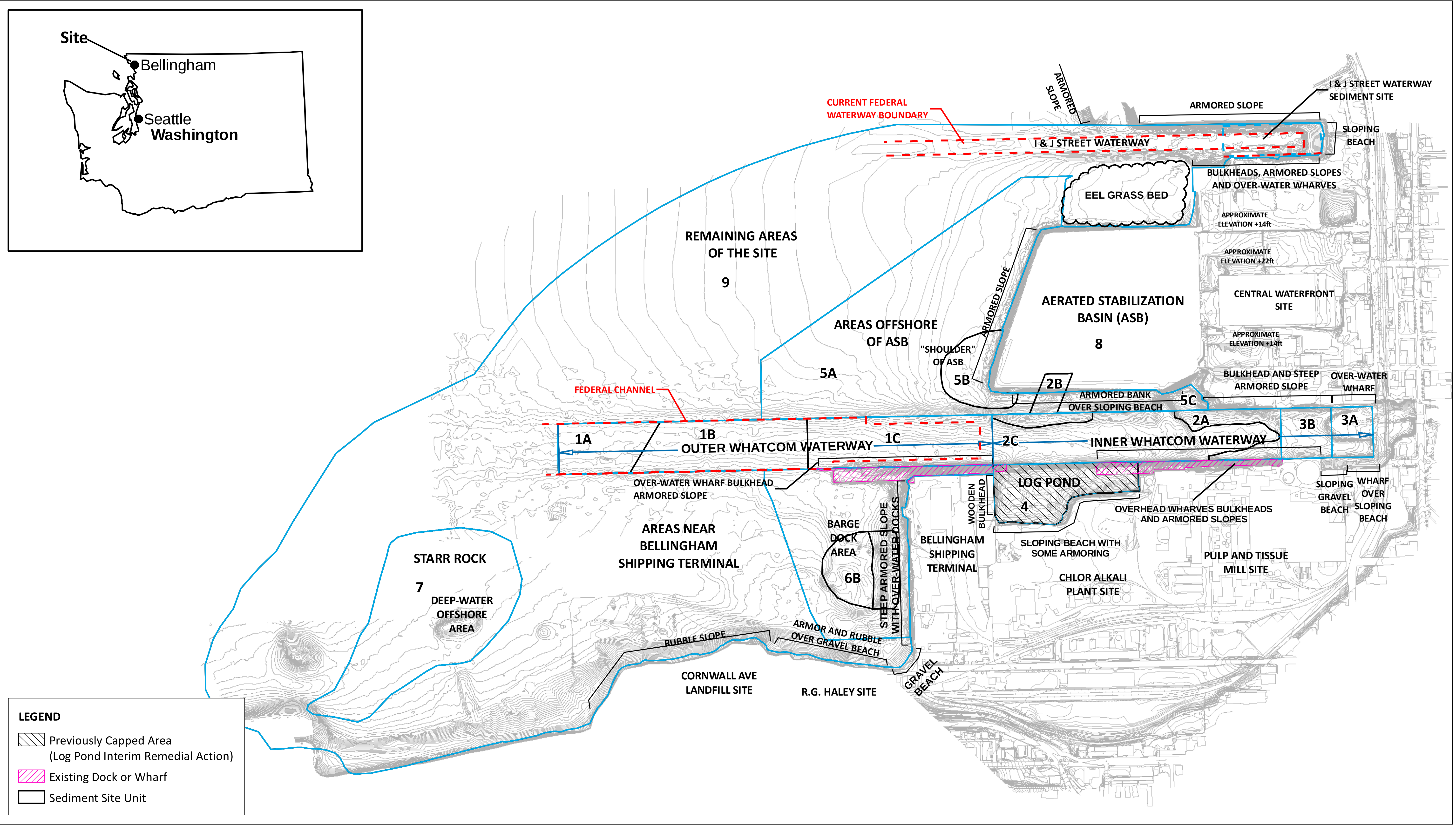
su = standard units

-- Sample was not submitted for chemical analysis.

Table 26
Sediment Consolidated-Undrained Triaxial and Consolidation Testing Results

Station ID		Boring Location	Sample ID	In-Situ Depth (ft):	Atterberg Limits[1] PI (%)	Atterberg Limits[1] USCS	Consolidation[2] $C_c/(1+e_0)$	Consolidation[2] $C_r/(1+e_0)$	Consolidation[2] σ_p (psi) [4]	Consolidated-Undrained Trixial [3] σ_{3f} (psi)	Consolidated-Undrained Trixial [3] $\sigma_{Df} = (\sigma_1 - \sigma_3)_f$ (psi)	Consolidated-Undrained Trixial [3] Δu_f (psi)
Outer Waterway												
1C	1C-102A-HSA	Upland	1C-102A-HSA- S17	67 - 69	31.3	CL	0.122	0.021	7	20	18.1	12.1
										40	24.9	25.7
										80	39.5	55.5
	1C-102C-HSA	In-Water	1C-102C-HSA-S8	32.6 - 34.6	29.3	CH	0.194	0.026	28	7	13.9	3.1
										14	16.3	7.6
										28	20.6	17.6
	1C-103B-HSA	In-Water	1C-103B-HSA-S12	49.5 - 51.5	23.3	CL	0.122	0.016	28	15	18.9	9.2
										30	35.5	17.1
										60	47.5	37.8
	1C-104A-HSA	Upland	1C-104A-HSA-S18	79 - 81	27.0	CL	0.224	0.030	15	25	23.3	15.0
										50	43.6	33.2
										80	40.5	54.7
Inner Waterway												
3B	3B-101A-HSA	Upland (Yard Area)	3B-101A-HSA-S16	64 - 66	43.7	CH	0.143	0.026	28	20	17.7	13.4
										40	69.0	18.3
										75	48.3	42.3
	3B-102C-HSA	In-Water	3B-102C-HSA-S8	32.5 - 34.5	29.9	CL	0.091	0.011	10	7	14.6	3.2
										14	21.1	7.4
										28	32.3	15.5
	3B-104A-HSA	Upland (Yard Area)	3B-104A-HSA-S17	69 - 71	29.8	CL	0.131	0.027	14	20	23.1	10.2
										40	38.1	23.5
										75	53.1	46.0
	3B-104C-HSA	In-Water	3B-104C-HSA-S8	33 - 35	31.8	CH	0.156	0.028	28	7	18.2	1.7
										14	26.3	5.0
										28	32.5	16.1
Log Pond												
4	4-101B-HSA	In-Water	4-101B-HSA-S12	46 - 48	31.9	CH	0.125	0.017	29	12	20.4	4.7
										25	27.0	13.4
										50	92.3	17.9
ASB												
8	8-105A-HSA	Berm	8-105A-HSA-S18	75 -77	38.4	CH	0.036	0.005	1	25	24.6	17.9
										50	28.1	30.0
										80	47.3	56.0
	8-105C-HSA	ASB In-Water	8-105C-HSA-S14	49 - 51	25.8	CL	0.074	0.018	18	12	16.4	5.4
										25	27.2	15.1
										50	33.0	31.5
	8-110A-HSA	Berm	8-110A-HSA-S15	60 - 62	19.3	CL	0.202	0.020	26	20	26.5	9.4
										40	33.0	25.9
										80	52.9	55.3
	8-110B-HSA	ASB In-Water	8-110B-HSA-S13	46.5 - 48	25.0	CL	0.099	0.012	21	12	16.5	4.5
										25	30.3	9.4
										50	34.7	33.7

Notes:
1. Atterberg Limits testing conducted according to ASTM D-4318
2. Consolidation testing conducting according to ASTM D-2435, Method B.
3. Consolidated-Undrained Triaxial testing conducted according to ASTM D-4767
4. Preconsolidation stress estimated using the Cassagrande procedure.



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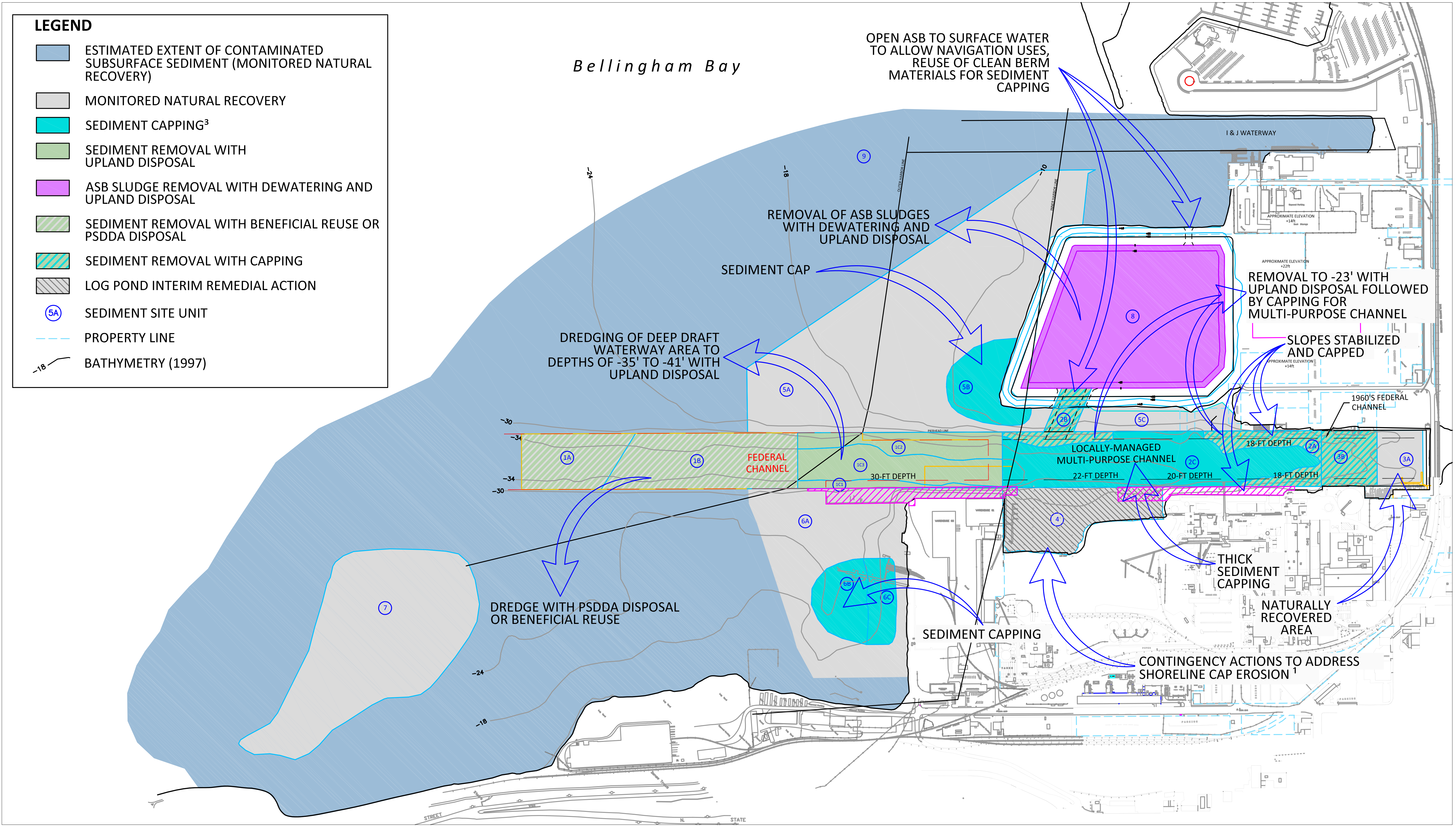
ANCHOR QEA

NOTES:
1. Source: Figure 2-3 Cleanup Action Plan, Whatcom Waterway Site, September 2007.
2. Horizontal datum: Washington State Plane North, NAD 83 Feet.
3. Vertical datum: Mean Lower Low Water (MLLW).

Feet
0 300 600 900 1,200

Figure 1
Site Vicinity and Location Features
Whatcom Waterway PRDI Data Report



B:\Projects\0007_PortofBellingham\080007-01_Whatcom Waterway\CAD\Working\EBP\PRDI\080007-01-PL-PRDI FIG 2.dwg FIG2-AQ

Sep 14, 2010 2:25pm epipkin

NOTES:

1. Contingency actions to address shoreline cap erosion include additional material placed along the shoreline and construction of energy dissipating groins. See Appendix A, Figure A-2 for a complete description of planned contingency actions for log pond.
2. For details regarding monitored natural recovery areas see CAP Section 2.3.
3. Some dredging in shallow-water areas of unit 5-B will be performed prior to cap placement to achieve a cap surface elevation that minimizes wave energies affecting the cap.

ANCHOR QEA

Figure 2
Cleanup Action Plan
Site Cleanup Action
Whatcom Waterway PRDI Data Report

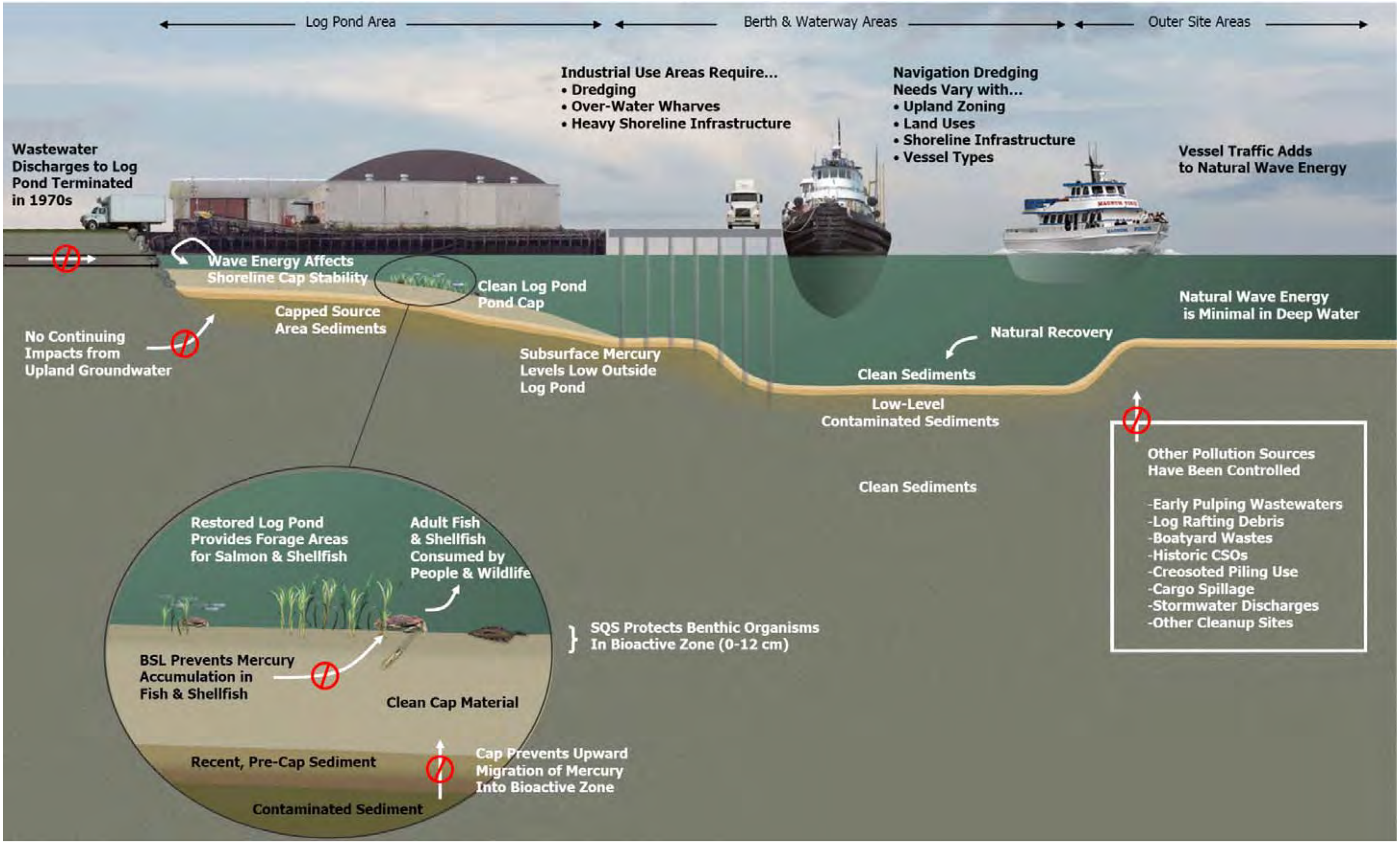
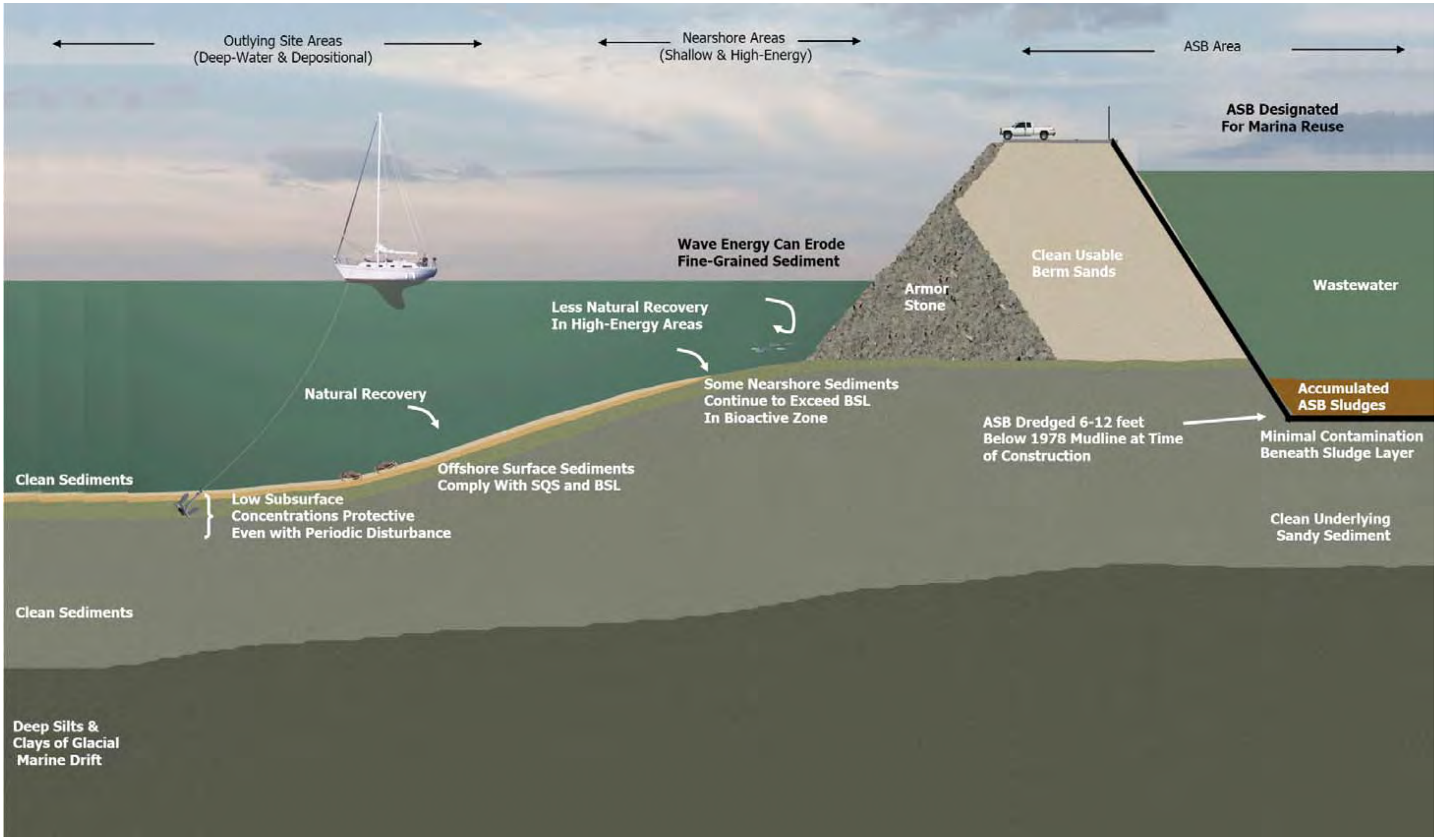
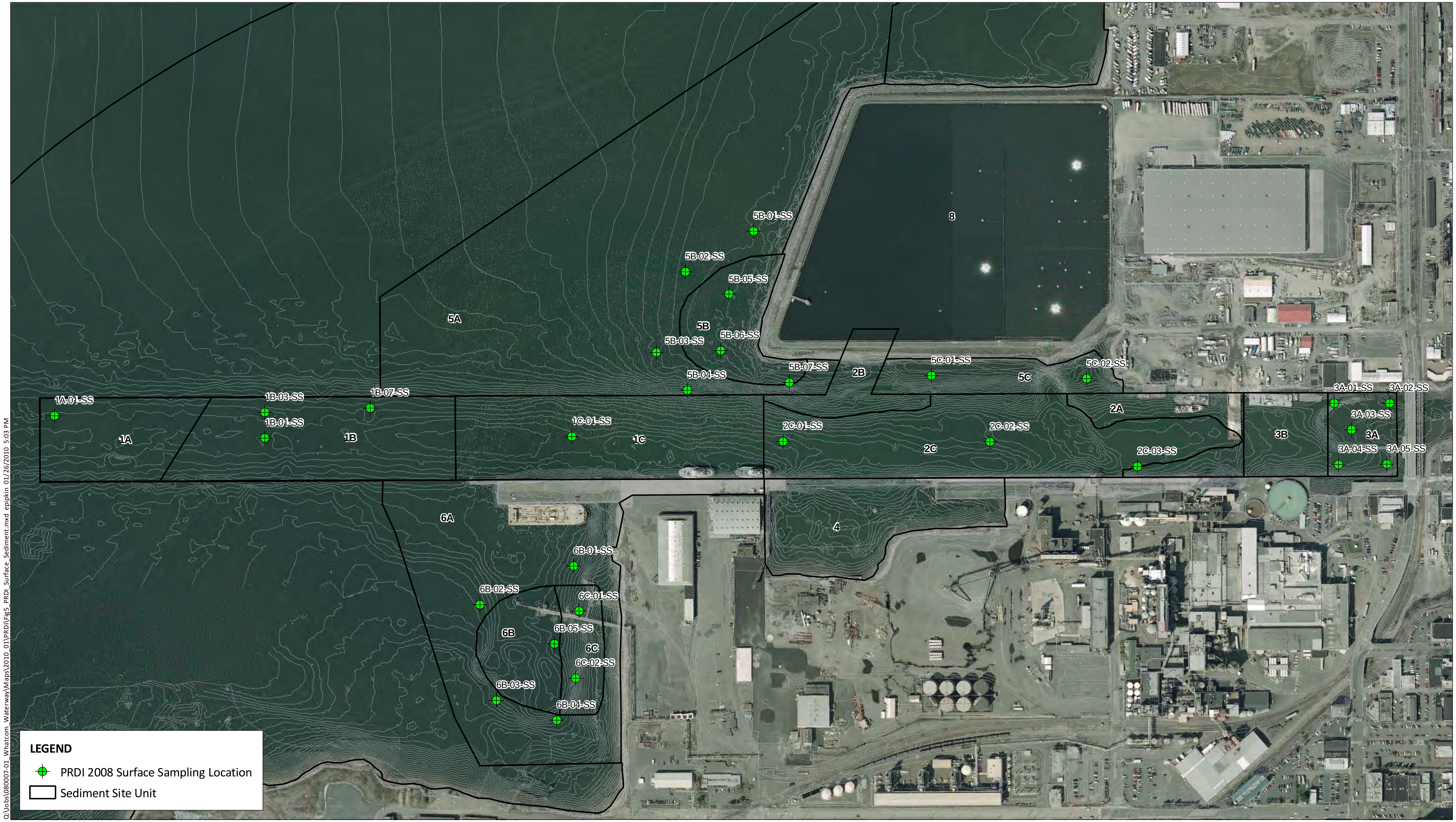


Figure 3
Conceptual Site Model (1 of 2)
Whatcom Waterway PRDI Data Report



ANCHOR QEA

Figure 4
Conceptual Site Model (2 of 2)
Whatcom Waterway PRDI Data Report



Q:\Jobs\080007-01_Whatcom_Waterway\Maps\2010_01\PRDI\Fig5_PRDI_Surface_Sediment.mxd epipkin 01/26/2010 5:03 PM

NOTES:
1. See table 1 for testing details.
2. Sediment Site Units and boundaries source: Figure 4-6, Cleanup Action Plan, Whatcom Waterway Site, September 2007.
3. Mercury speciation testing conducted at locations: 1B-01-SS, 1C-01-SS, 2C-01-SS, 2C-02-SS, 5C-01-SS, 6B-05-SS
4. Reference locations in Samish Bay: REF-01-SS, REF-02-SS.
5. Horizontal datum: Washington State Plane North, NAD 83 Feet.
6. Vertical Datum: Mean Lower Low Water (MLLW).
7. Aerial photo taken in 2004.

Feet
0 200 400 600 800

Figure 5
PRDI Surface Sediment Sampling Locations
Whatcom Waterway PRDI Data Report

LEGEND

⊕ PRDI 2008 Vibracore Locations

— ASB Transect Lines

☐ Sediment Site Unit

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NOTES:
1. See tables 2a & 2b for testing details.
2. Sediment Site Units and boundaries source: Figure 4-6, Cleanup Action Plan, Whatcom Waterway Site, September 2007.
3. Horizontal datum: Washington State Plane North, NAD 83 Feet.
4. Vertical Datum: Mean Lower Low Water (MLLW).
5. Aerial photo taken in 2004.

Feet
0 200 400 600 800

ANCHOR QEA

Figure 6
PRDI Subsurface Sediment Vibracore Sampling Locations
Whatcom Waterway PRDI Data Report

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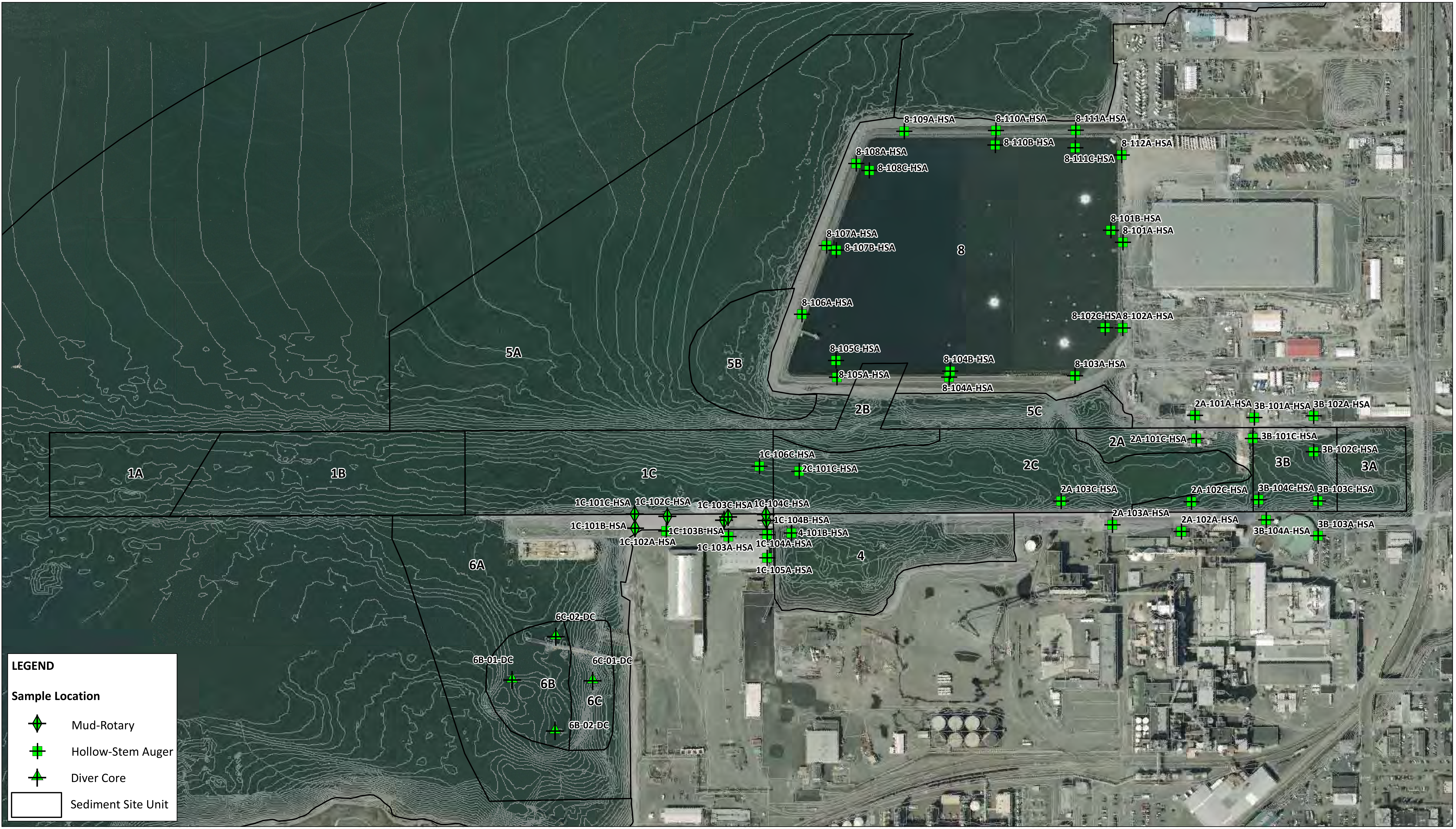
NOTES:
1. See Table 2b for testing details.
2. Sediment Site Units and boundaries source: Figure 4-6, Cleanup Action Plan, Whatcom Waterway Site, September 2007.
3. Horizontal datum: Washington State Plane North, NAD 27 Feet.
4. Vertical Datum: Mean Lower Low Water (MLLW).
5. Aerial photo from NAIP 2006.

ANCHOR QEA

Figure 7
PRDI Unit 9 Subsurface Sediment Vibracore Sampling Locations
Whatcom Waterway PRDI Data Report



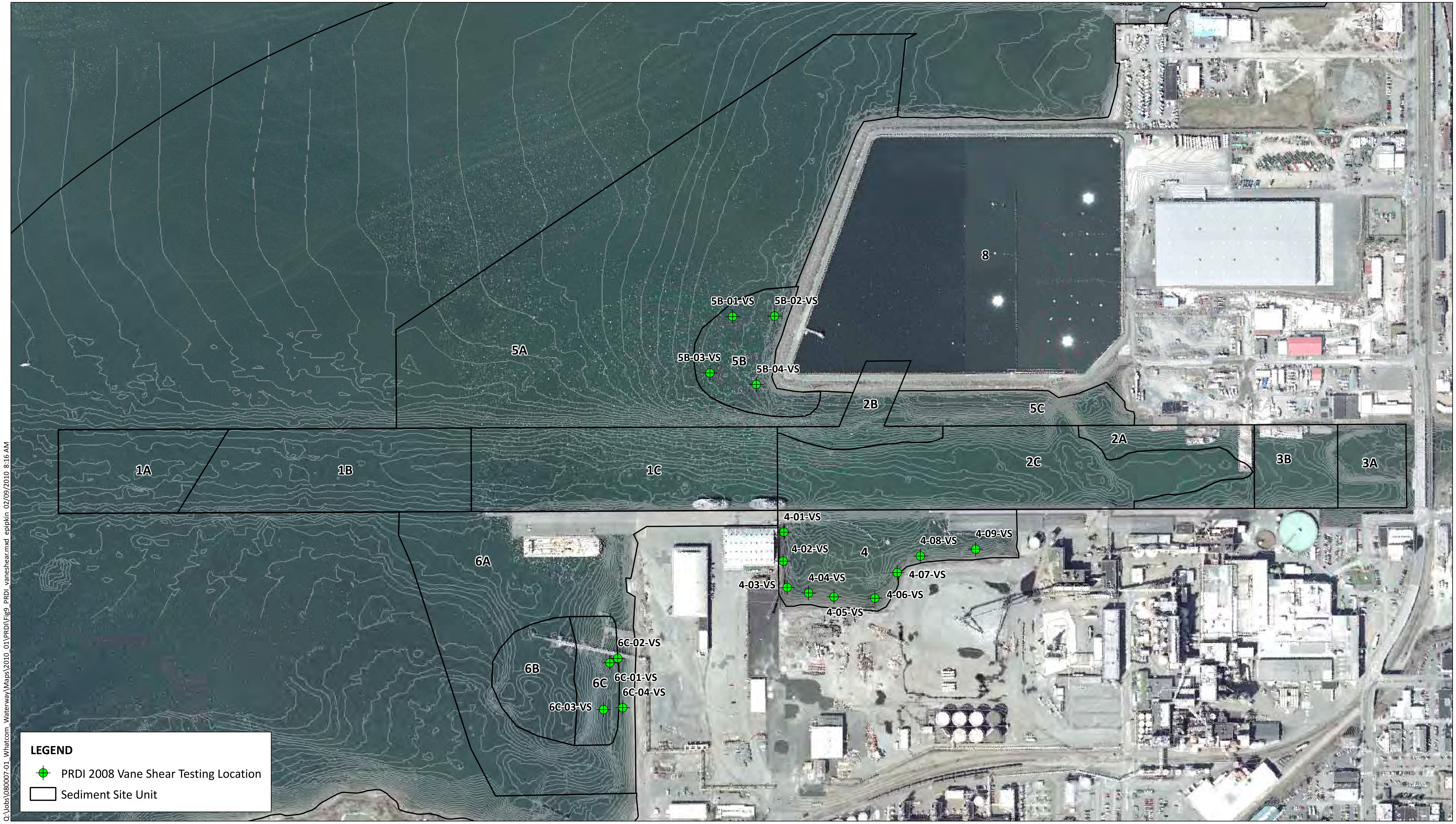
\\orcas\gis\Jobs\080007-01_Whatcom_Waterway\Maps\2010_01\PRDI\Fig8_PRDI_HSA_divercore_rotary.mxd epipkin 05/26/2010 10:11 AM

NOTES:
1. See tables 3a & 3b for testing details.
2. Mud rotarty methodology was used at the BST dock locations.
3. Sediment Site Units and boundaries source: Figure 4-6, Cleanup Action Plan, Whatcom Waterway Site, September 2007.3
4. Horizontal datum: Washington State Plane North, NAD 27/98.
5. Vertical Datum: Mean Lower Low Water (MLLW).
6. 1C-102B-HSA was not collected due to refusal.
7. Aerial photo taken in 2004.
8. BST stations 1C-101B-HSA and 1C-101C-HSA included co-located diver cores.

Feet
0 200 400 600 800

ANCHOR QEA

Figure 8
PRDI Hollow-Stem Auger, Mud-Rotary, and Diver Core Locations
Whatcom Waterway PRDI Data Report



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NOTES:
1. Surface sediment grabs were co-located with vane shear locations (grain size testing) to facilitate standardization of the field VST measurements.
2. See table 4 for testing details.
3. Sediment Site Units and boundaries source: Figure 4-6, Cleanup Action Plan, Whatcom Waterway Site, September 2007.
4. Horizontal datum: Washington State Plane North, NAD 27/98.
5. Vertical Datum: Mean Lower Low Water (MLLW).
6. Aerial photo taken in 2004.

Figure 9
PRDI Vane Shear Testing Locations
Whatcom Waterway PRDI Data Report

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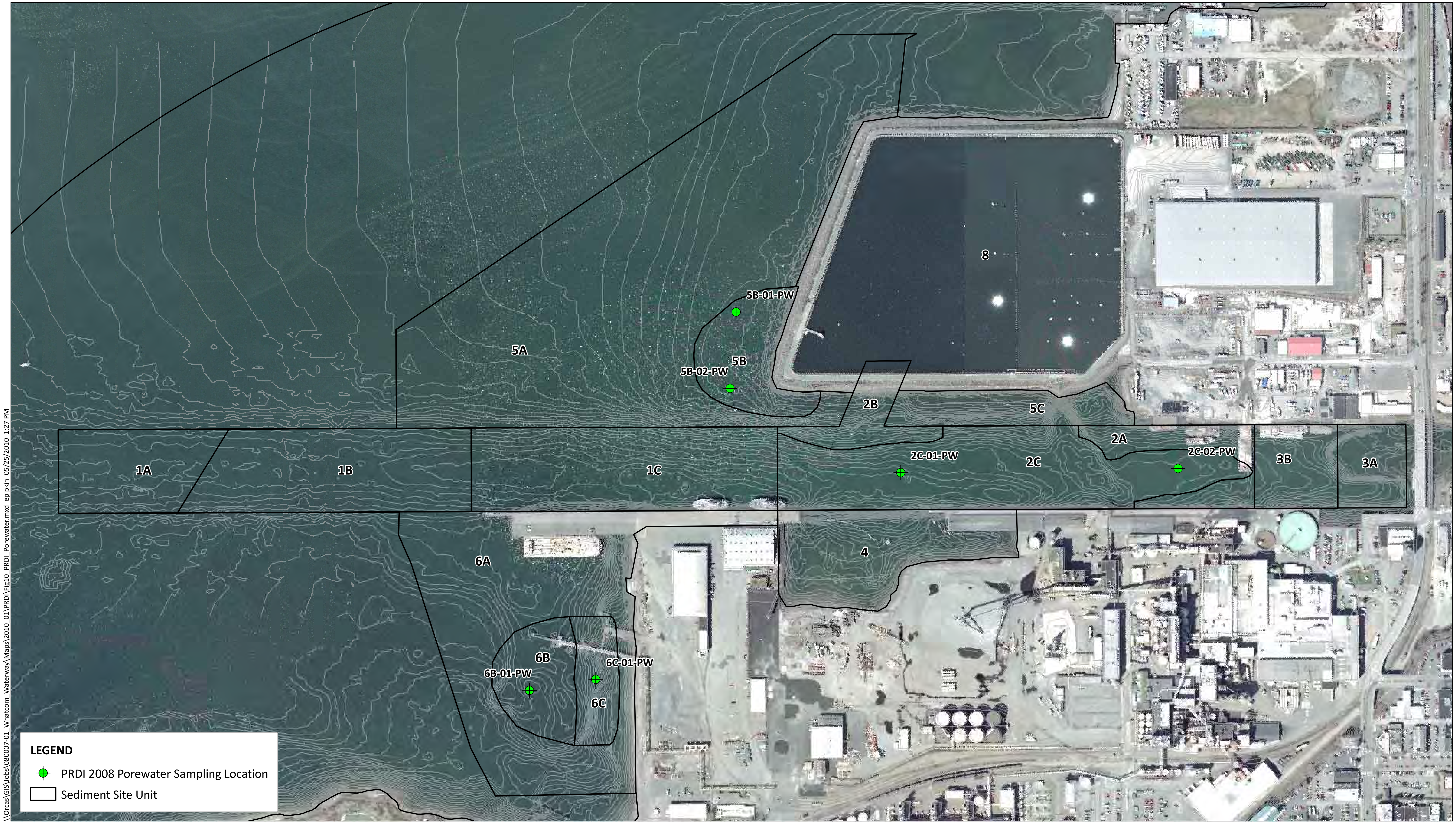
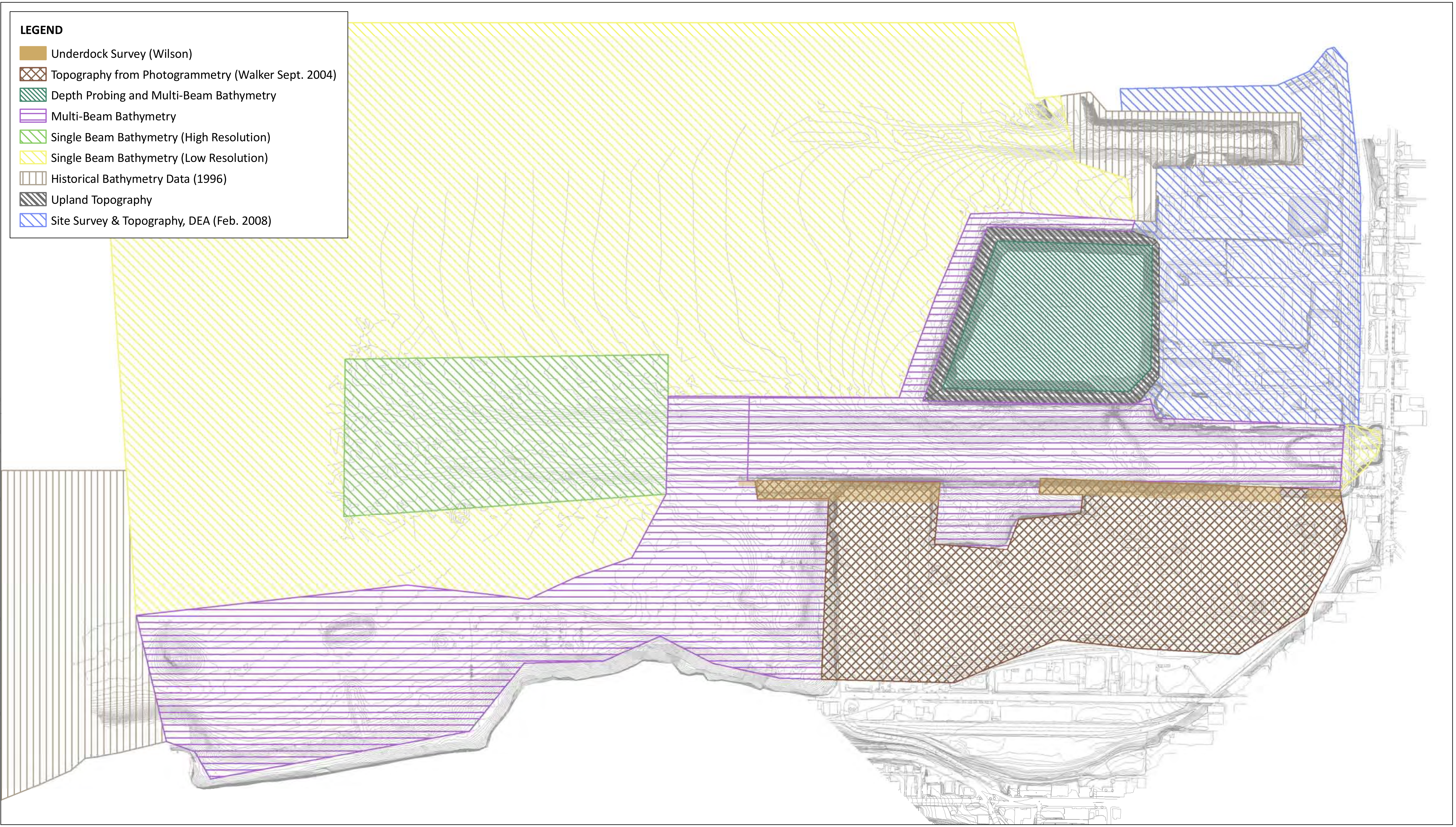


NOTES:
1. See table 5 for testing details.
2. Sediment Site Units and boundaries source: Figure 4-6, Cleanup Action Plan, Whatcom Waterway Site, September 2007
3. Horizontal datum: Washington State Plane North, NAD 27/98.
4. Vertical Datum: Mean Lower Low Water (MLLW).
5. Aerial photo taken in 2004.

Feet
0 200 400 600 800

ANCHOR QEA

Figure 10
PRDI Porewater Sampling Locations
Whatcom Waterway PRDI Data Report



\\bellingham1\bell1\Projects\0007_PortofBellingham\080007-01_Whatcom Waterway\GIS\Maps\2010_02\PRDI\Fig11_PRDI_Basemap_Surveys.mxd epipkin 05/25/2010 2:22 PM

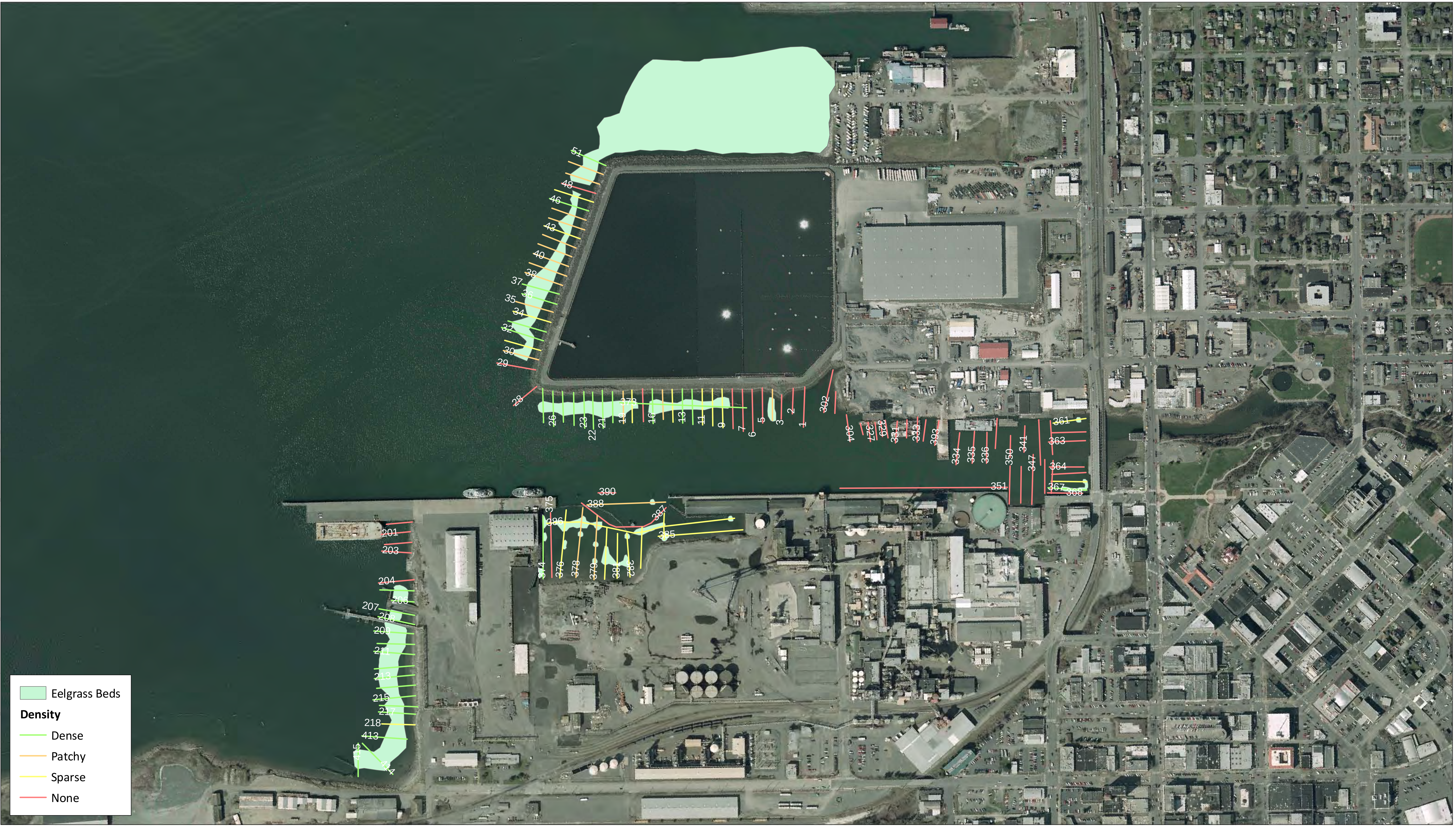
NOTE:

1. These surveys were completed in Washington State Plane North, NAD 83 (feet) and North American Vertical Datum (NAVD) 88 (feet) and were converted to MLLW (feet) for incorporation into the project basemap. The conversion from NAVD 88 (ft) to MLLW (ft) used for the project is +0.48 ft and was taken from NOAA Benchmark No. 9449211 (Bellingham, WA).
2. Bathymetry for the remainder of Bellingham Bay taken from NOAA navigation charts.
3. ASB contours are based on multi-beam survey data.

Feet
0 250 500 750 1,000

Figure 11
Summary of PRDI Site Surveys
Whatcom Waterway PRDI Data Report

Figure 12
Oceanographic Data Collection Stations
Whatcom Waterway PRDI Data Report



\\bellingham1\bell1\Projects\0007_PortofBellingham\080007-01_Whatcom Waterway\GIS\Maps\2010_02\PRDI\Fig13_PRDI_eelgrass_findings.mxd epipkin 02/09/2010 10:35 AM

NOTES:

1. Source: Anchor QEA. *Draft Underwater Video and Dive Survey of Eelgrass and Macroalgae Report*. March 2009.
2. Horizontal datum: Washington State Plane North, NAD 27/98.
3. Vertical datum: Mean Lower Low Water (MLLW).
4. Transect 351 is a combination of transects 352 and 353 per this figure.
5. Sector A includes transects 029-051.
6. Sector B includes transects 001-028, 302-304, 325, 327-338, 341-343, 361-363, 373, and 392-393.
7. Sector C includes transects 200-218, 344-345, 347, 349, 350, 364-368, 374-376, 378-388, 390, and 413-415.

ANCHOR QEA

Figure 13
Eelgrass Survey Findings
Whatcom Waterway PRDI Data Report

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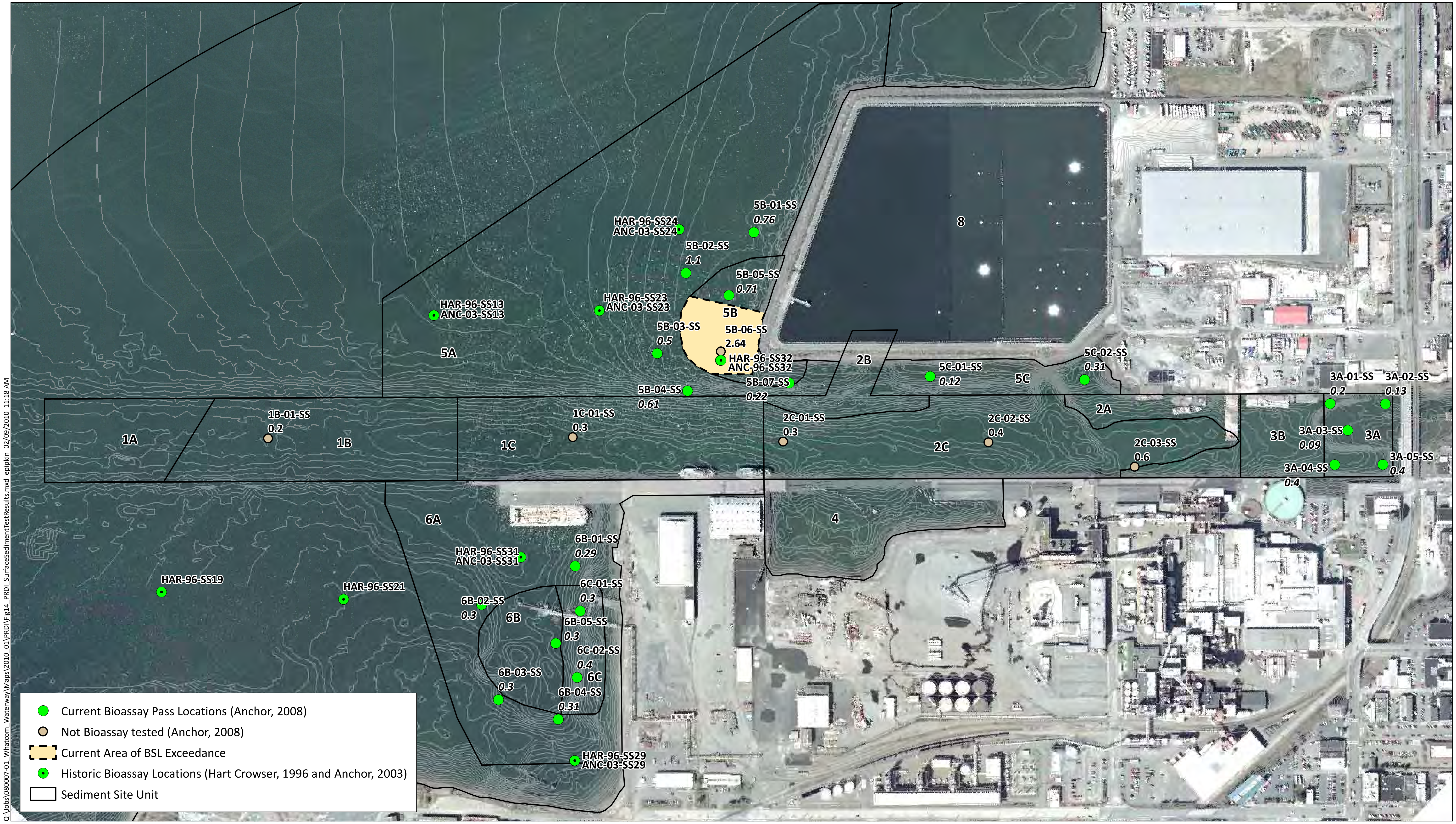
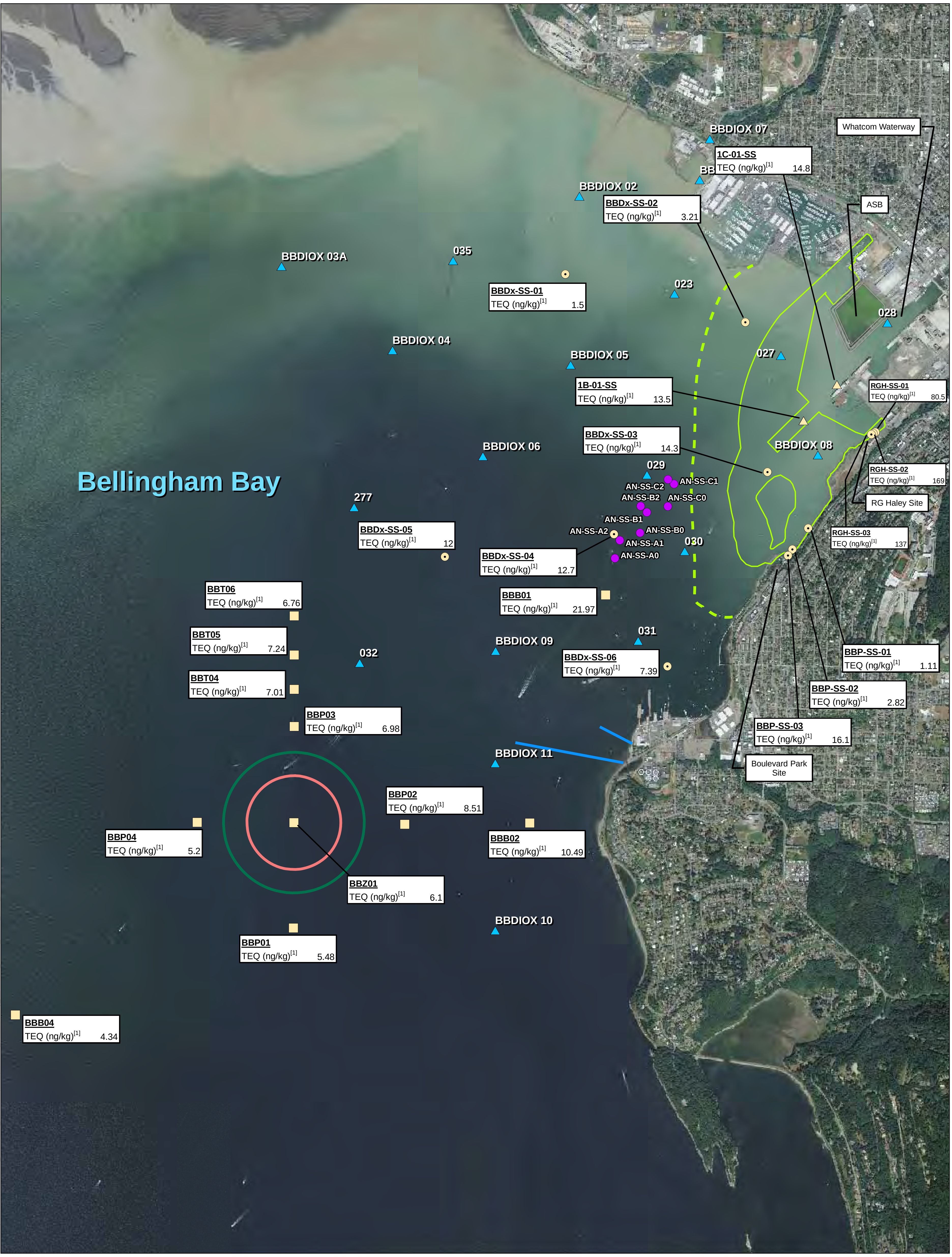


ANCHOR QEA

NOTES:
1. 2008 Mercury results presented as mg/kg, see tables 7 &14 for chemical and biological testing results.
2. Sediment Site Units and boundaries source: Figure 4-6,
Cleanup Action Plan, Whatcom Waterway Site, September 2007.
3. Horizontal datum: Washington State Plane North, NAD 27/98.
4. Vertical Datum: Mean Lower Low Water (MLLW).

Feet
0 200 400 600 800

Figure 14
Surface Sediment Mercury Testing Results
Whatcom Waterway PRDI Data Report



\\orcas\gis\Jobs\080007-01_Whatcom_Waterway\Maps\2010_01\PRD\Fig_15Recent_Dioxin_Furon_Data_v2.mxd ckiblinger 08/17/2010 12:09 PM

△ Anchor Sample Location (2008)

□ SAIC Sample Location (2008)

⊙ Ecology/Hart Crowser Sample Location (2009)

● GP Outfall Testing Location

▲ Ecology 2010 Dioxin/Furan Sampling Locations

▭ Bellingham Disposal Site Disposal Zone

▭ Bellingham Disposal Site Target Area

- - Updated Area 9 Boundary[6]

▭ Previously Defined Whatcom Waterway Site Unit Boundaries

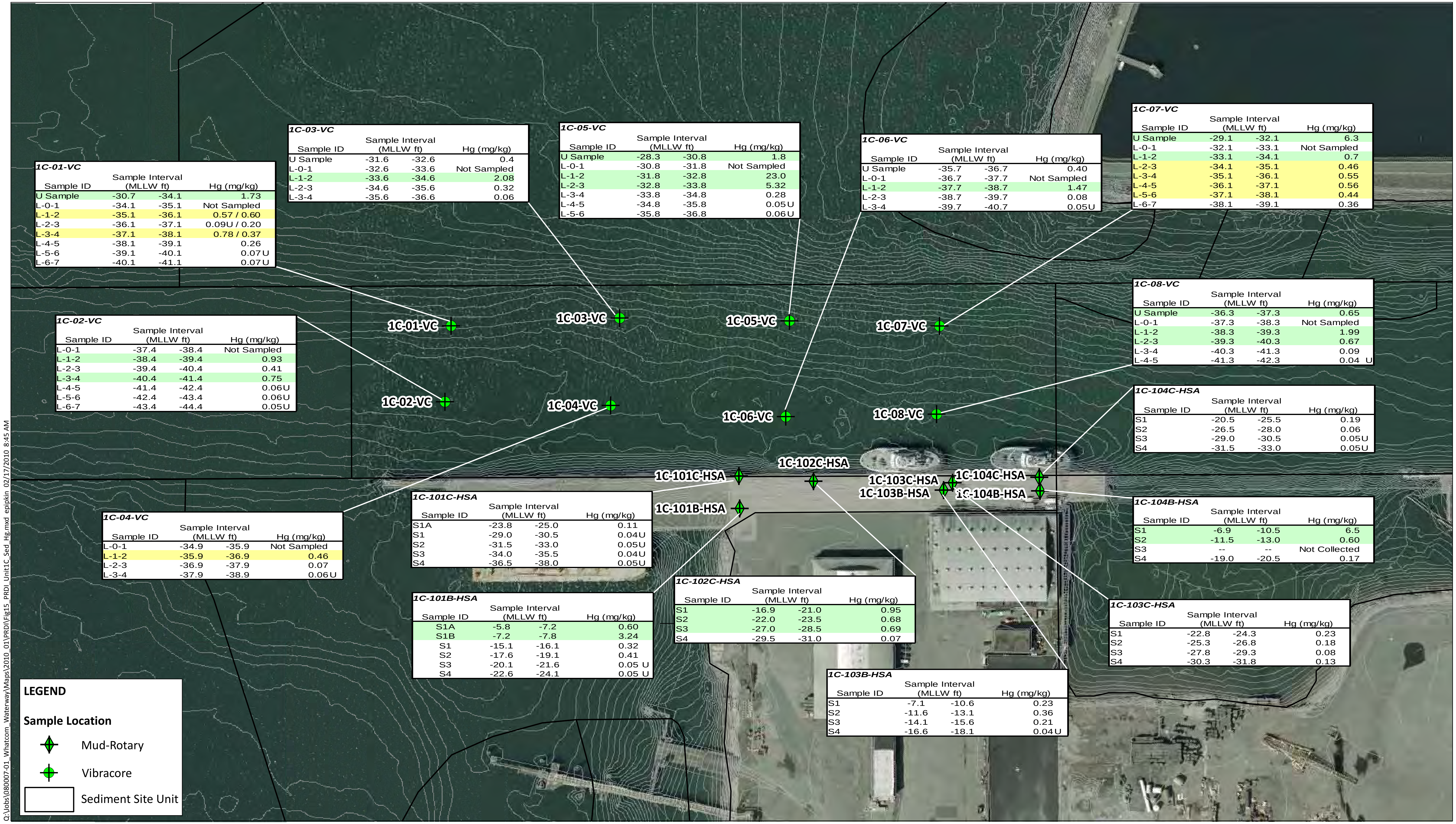
— City of Bellingham NPDES Outfall (Approximate Locations)

Notes:
1. TEQ concentrations plotted were calculated using WHO 2005 mammalian TEF values, and assume non-detected compounds at 1/2 the method reporting limit.
2. Sediment Site Units and boundaries source: Figure 4-6, Cleanup Action Plan, Whatcom Waterway Site, September 2007.
3. Horizontal datum: Washington State Plane North, NAD 27/98.
4. Vertical Datum: Mean Lower Low Water (MLLW).
5. Aerial photo from NAIP 2006.
6. The boundary for Unit 9 has been updated based on the extent of site-associated subsurface mercury contamination as described in Section 2-2 and Figure 19.
7. Over 10 years have elapsed since collection of the GP outfall testing samples in 1999. Older date are available in EIM, but resampling in 2008 at location BBDx-SS-04 showed substantial declines in surface sediment TEQ concentrations.

Feet
0 1,250 2,500 3,750 5,000

ANCHOR QEA

Figure 15
Summary of Recent Dioxin/Furan Data for Bellingham Bay Surface Sediments
Whatcom Waterway PRDI Data Report



1C-01-VC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
U Sample	-30.7	-34.1	1.73
L-0-1	-34.1	-35.1	Not Sampled
L-1-2	-35.1	-36.1	0.57 / 0.60
L-2-3	-36.1	-37.1	0.09U / 0.20
L-3-4	-37.1	-38.1	0.78 / 0.37
L-4-5	-38.1	-39.1	0.26
L-5-6	-39.1	-40.1	0.07U
L-6-7	-40.1	-41.1	0.07U

1C-03-VC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
U Sample	-31.6	-32.6	0.4
L-0-1	-32.6	-33.6	Not Sampled
L-1-2	-33.6	-34.6	2.08
L-2-3	-34.6	-35.6	0.32
L-3-4	-35.6	-36.6	0.06

1C-05-VC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
U Sample	-28.3	-30.8	1.8
L-0-1	-30.8	-31.8	Not Sampled
L-1-2	-31.8	-32.8	23.0
L-2-3	-32.8	-33.8	5.32
L-3-4	-33.8	-34.8	0.28
L-4-5	-34.8	-35.8	0.05U
L-5-6	-35.8	-36.8	0.06U

1C-06-VC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
U Sample	-35.7	-36.7	0.40
L-0-1	-36.7	-37.7	Not Sampled
L-1-2	-37.7	-38.7	1.47
L-2-3	-38.7	-39.7	0.08
L-3-4	-39.7	-40.7	0.05U

1C-07-VC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
U Sample	-29.1	-32.1	6.3
L-0-1	-32.1	-33.1	Not Sampled
L-1-2	-33.1	-34.1	0.7
L-2-3	-34.1	-35.1	0.46
L-3-4	-35.1	-36.1	0.55
L-4-5	-36.1	-37.1	0.56
L-5-6	-37.1	-38.1	0.44
L-6-7	-38.1	-39.1	0.36

1C-02-VC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
L-0-1	-37.4	-38.4	Not Sampled
L-1-2	-38.4	-39.4	0.93
L-2-3	-39.4	-40.4	0.41
L-3-4	-40.4	-41.4	0.75
L-4-5	-41.4	-42.4	0.06U
L-5-6	-42.4	-43.4	0.06U
L-6-7	-43.4	-44.4	0.05U

1C-08-VC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
U Sample	-36.3	-37.3	0.65
L-0-1	-37.3	-38.3	Not Sampled
L-1-2	-38.3	-39.3	1.99
L-2-3	-39.3	-40.3	0.67
L-3-4	-40.3	-41.3	0.09
L-4-5	-41.3	-42.3	0.04 U

1C-104C-HSA

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
S1	-20.5	-25.5	0.19
S2	-26.5	-28.0	0.06
S3	-29.0	-30.5	0.05U
S4	-31.5	-33.0	0.05U

1C-04-VC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
L-0-1	-34.9	-35.9	Not Sampled
L-1-2	-35.9	-36.9	0.46
L-2-3	-36.9	-37.9	0.07
L-3-4	-37.9	-38.9	0.06U

1C-101C-HSA

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
S1A	-23.8	-25.0	0.11
S1	-29.0	-30.5	0.04U
S2	-31.5	-33.0	0.05U
S3	-34.0	-35.5	0.04U
S4	-36.5	-38.0	0.05U

1C-104B-HSA

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
S1	-6.9	-10.5	6.5
S2	-11.5	-13.0	0.60
S3	--	--	Not Collected
S4	-19.0	-20.5	0.17

1C-102C-HSA

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
S1	-16.9	-21.0	0.95
S2	-22.0	-23.5	0.68
S3	-27.0	-28.5	0.69
S4	-29.5	-31.0	0.07

1C-101B-HSA

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
S1A	-5.8	-7.2	0.60
S1B	-7.2	-7.8	3.24
S1	-15.1	-16.1	0.32
S2	-17.6	-19.1	0.41
S3	-20.1	-21.6	0.05 U
S4	-22.6	-24.1	0.05 U

1C-103C-HSA

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
S1	-22.8	-24.3	0.23
S2	-25.3	-26.8	0.18
S3	-27.8	-29.3	0.08
S4	-30.3	-31.8	0.13

1C-103B-HSA

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
S1	-7.1	-10.6	0.23
S2	-11.6	-13.1	0.36
S3	-14.1	-15.6	0.21
S4	-16.6	-18.1	0.04U

LEGEND

Sample Location

- Mud-Rotary
- Vibracore
- Sediment Site Unit

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NOTES:

1. 2008 Mercury results presented as mg/kg, see tables 17a & 17b for testing results.
2. Station 1C-102B-HSA was not sampled due to refusal.
3. Results of duplicate analyses are averaged to assess compliance with numeric screening levels.
4. Sample intervals presented as Mean Lower Low Water (MLLW) elevation.
5. Sediment Site Units and boundaries source: Figure 4-6, Cleanup Action Plan, Whatcom Waterway Site, September 2007.
6. BST stations 1C-101B-HSA and 1C-101C-HSA included co-located mud-rotary and diver core sampling.
7. Horizontal datum: Washington State Plane North, NAD 27/98.
8. Aerial photo taken in 2004.

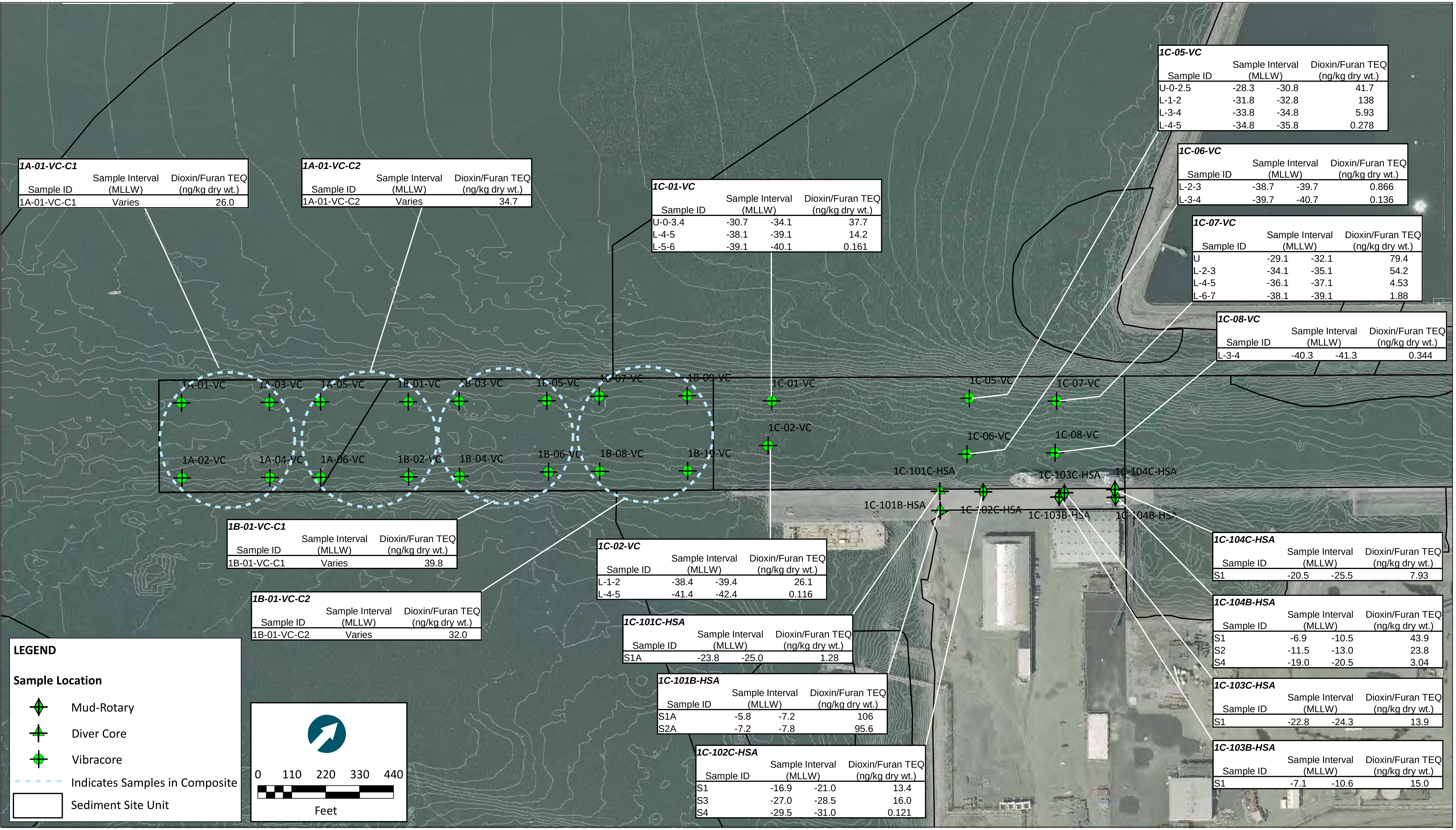
Feet
0 80 160 240 320

ANCHOR QEA

Figure 16

Subsurface Sediment Mercury Testing Results - Unit 1C

Whatcom Waterway PRDI Data Report



1A-01-VC-C1

Sample ID	Sample Interval (MLLW)	Dioxin/Furan TEQ (ng/kg dry wt.)
1A-01-VC-C1	Varies	26.0

1A-01-VC-C2

Sample ID	Sample Interval (MLLW)	Dioxin/Furan TEQ (ng/kg dry wt.)
1A-01-VC-C2	Varies	34.7

1C-01-VC

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
U-0-3.4	-30.7	-34.1	37.7
L-4-5	-38.1	-39.1	14.2
L-5-6	-39.1	-40.1	0.161

1C-05-VC

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
U-0-2.5	-28.3	-30.8	41.7
L-1-2	-31.8	-32.8	138
L-3-4	-33.8	-34.8	5.93
L-4-5	-34.8	-35.8	0.278

1C-06-VC

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
L-2-3	-38.7	-39.7	0.866
L-3-4	-39.7	-40.7	0.136

1C-07-VC

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
U	-29.1	-32.1	79.4
L-2-3	-34.1	-35.1	54.2
L-4-5	-36.1	-37.1	4.53
L-6-7	-38.1	-39.1	1.88

1C-08-VC

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
L-3-4	-40.3	-41.3	0.344

1B-01-VC-C1

Sample ID	Sample Interval (MLLW)	Dioxin/Furan TEQ (ng/kg dry wt.)
1B-01-VC-C1	Varies	39.8

1B-01-VC-C2

Sample ID	Sample Interval (MLLW)	Dioxin/Furan TEQ (ng/kg dry wt.)
1B-01-VC-C2	Varies	32.0

1C-02-VC

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
L-1-2	-38.4	-39.4	26.1
L-4-5	-41.4	-42.4	0.116

1C-101C-HSA

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
S1A	-23.8	-25.0	1.28

1C-101B-HSA

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
S1A	-5.8	-7.2	106
S2A	-7.2	-7.8	95.6

1C-102C-HSA

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
S1	-16.9	-21.0	13.4
S3	-27.0	-28.5	16.0
S4	-29.5	-31.0	0.121

1C-104C-HSA

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
S1	-20.5	-25.5	7.93

1C-104B-HSA

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
S1	-6.9	-10.5	43.9
S2	-11.5	-13.0	23.8
S4	-19.0	-20.5	3.04

1C-103C-HSA

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
S1	-22.8	-24.3	13.9

1C-103B-HSA

Sample ID	Sample Interval (MLLW)		Dioxin/Furan TEQ (ng/kg dry wt.)
S1	-7.1	-10.6	15.0

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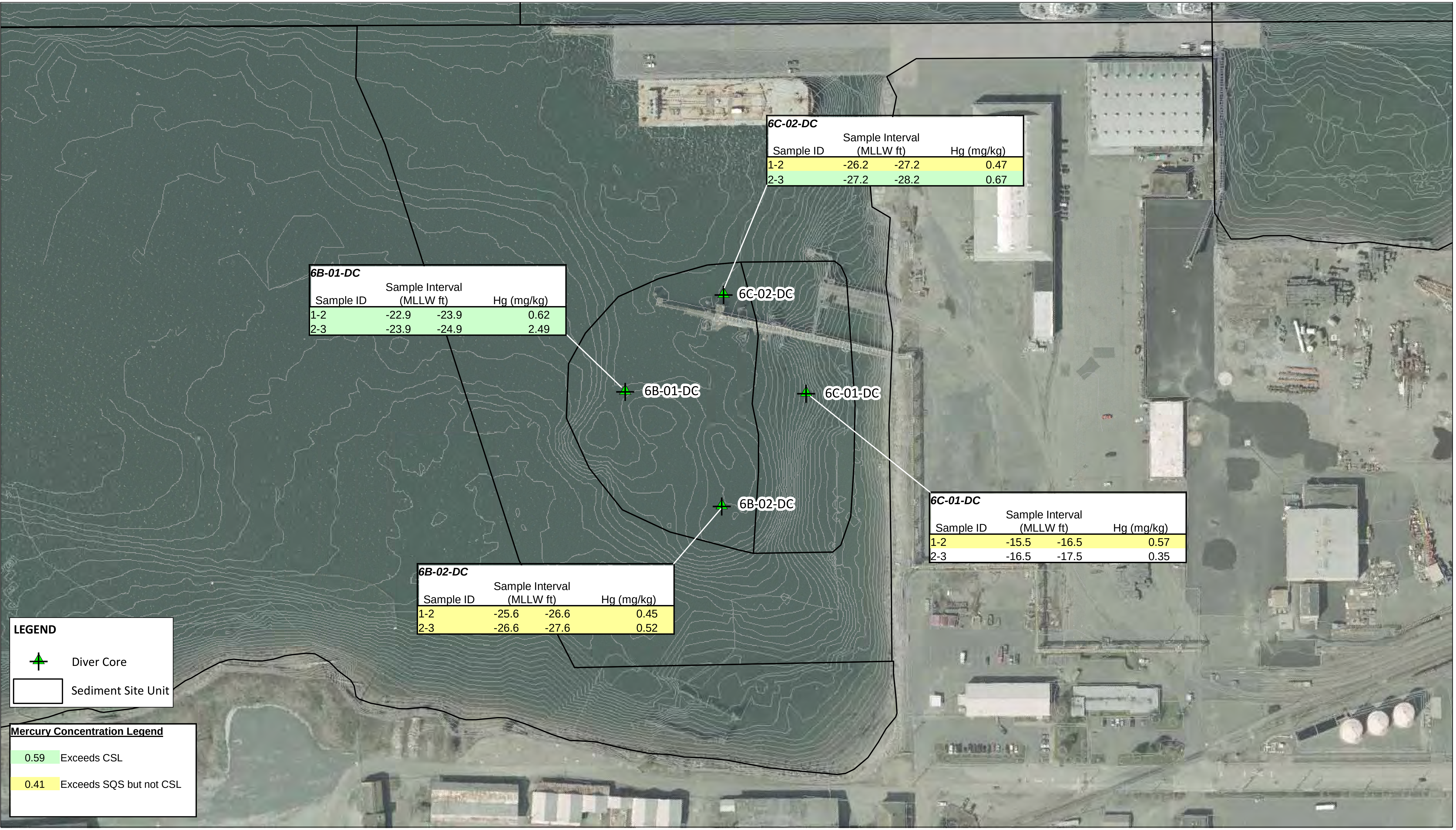
NOTES:
1. Horizontal Datum: WA State Plane North NAD 83 (Feet)
2. Sample intervals presented as Mean Lower Low Water (MLLW) elevation.
3. Toxic equivalency (TEQ) values were calculated for the validated dioxin/furan congeners using the 2005 World Health Organization's toxic equivalency factors for mammals. Undetected congeners were assigned a concentration equal to 1/2 the detection limit (ND=1/2).
4. Unit 1A/1B Vibracore samples are composite core samples collected 0-4 feet below the existing mudline. Table 2b and core logs (Appendix B) present the individual sampling elevations.
5. Aerial photo is 2004.
6. BST stations 1C-101B-HSA and 1C-101C-HSA included co-located mud-rotary and diver core sampling.

ANCHOR QEA

Figure 17
Outer Waterway Subsurface Sediment Dioxin/Furan Testing Results
Whatcom Waterway PRDI Data Report



6C-02-DC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
1-2	-26.2	-27.2	0.47
2-3	-27.2	-28.2	0.67

6B-01-DC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
1-2	-22.9	-23.9	0.62
2-3	-23.9	-24.9	2.49

6C-01-DC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
1-2	-15.5	-16.5	0.57
2-3	-16.5	-17.5	0.35

6B-02-DC

Sample ID	Sample Interval (MLLW ft)		Hg (mg/kg)
1-2	-25.6	-26.6	0.45
2-3	-26.6	-27.6	0.52

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ANCHOR QEA

NOTES:
1. 2008 mercury results presented as mg/kg, see Table 18 for testing results.
2. Horizontal Datum: WA State Plane North NAD 83 (Feet)
3. Sample intervals presented as Mean Lower Low Water (MLLW) elevation.
4. Aerial photo is 2004.

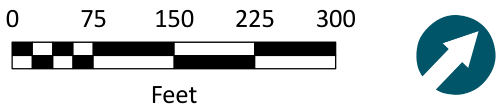
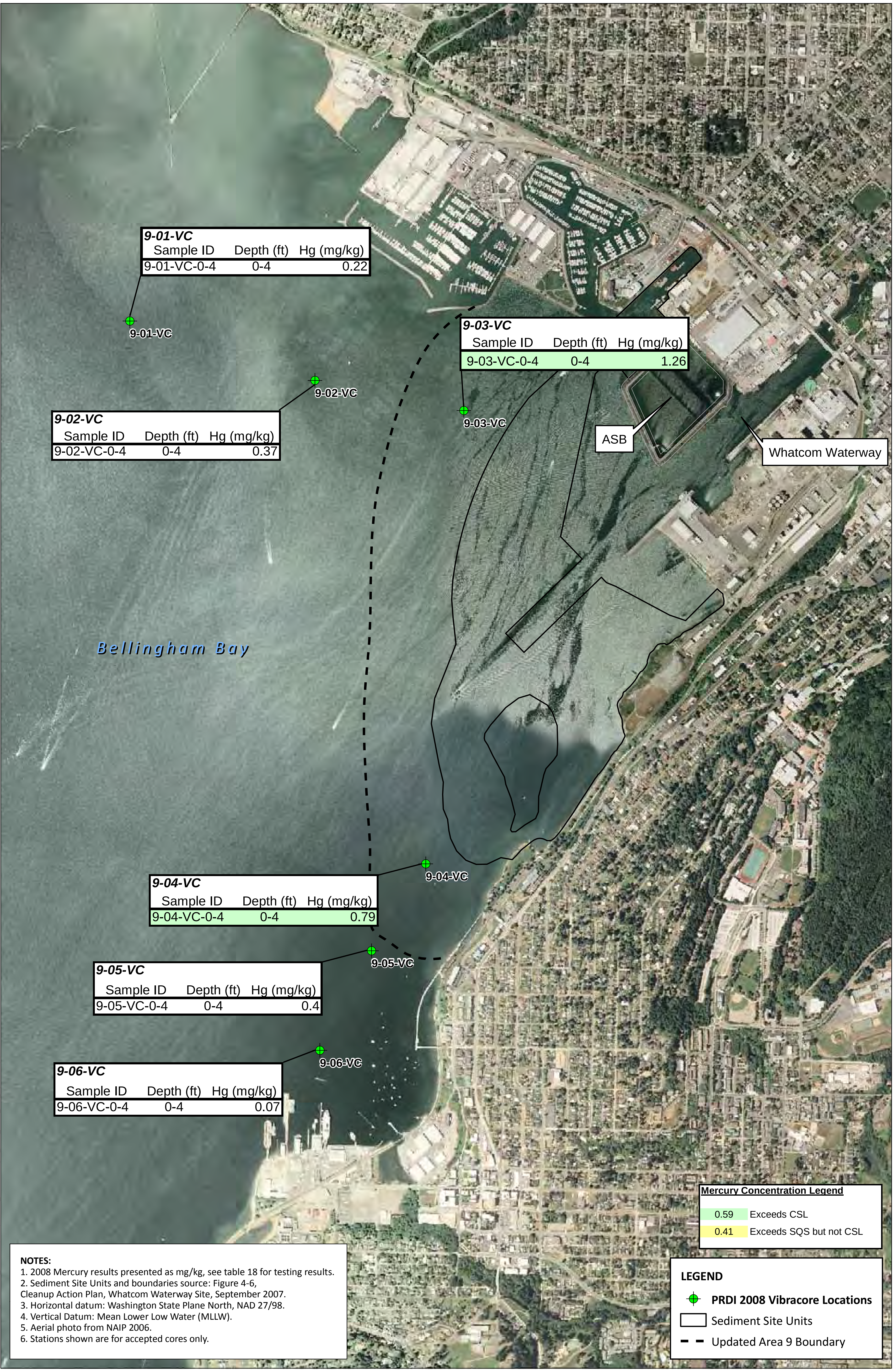


Figure 18

Shallow Subsurface Sediment Mercury Testing Results - Units 6B & 6C
Whatcom Waterway PRDI Data Report



NOTES:
1. 2008 Mercury results presented as mg/kg, see table 18 for testing results.
2. Sediment Site Units and boundaries source: Figure 4-6, Cleanup Action Plan, Whatcom Waterway Site, September 2007.
3. Horizontal datum: Washington State Plane North, NAD 27/98.
4. Vertical Datum: Mean Lower Low Water (MLLW).
5. Aerial photo from NAIP 2006.
6. Stations shown are for accepted cores only.

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ANCHOR QEA

Feet
0 500 1,000 1,500 2,000

Figure 19
Subsurface Sediment Mercury Testing Results - Unit 9
Whatcom Waterway PRDI Data Report

PRE-REMEDIAL DESIGN
INVESTIGATION DATA REPORT

APPENDIX A – PRDI METHODS

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1 PRDI METHODS

A.1 Sample Station Location and Identification

Tables 1 through 5 in the Pre-Remedial Design Investigation (PRDI) Data Report present a detailed summary of the sampling design including sample nomenclature and testing for each station and sampling interval. The sample nomenclature is described below.

Each surface and subsurface sediment sample was assigned a unique alphanumeric identifier according to the following method:

- Each location was identified by Site Sediment Unit (e.g., 5B) and a number (e.g., 01), resulting in a station identifier: 5B-01
- This nomenclature was followed by letters that identify the method: SS for surface sediment, VC for vibracore, VS for vane shear, HSA for hollow stem auger, associated diver cores, or mud-rotary methodology. The resulting station identifier was:
  - 5B-01-SS for a surface sediment sample collected from Station 5B-01
  - 5B-01-VC for a subsurface vibracore sample collected from Station 5B-01
  - 5B-01-VS for a vane shear reading taken from Station 5B-01
  - 5B-01-HSA for a hollow stem auger, supplemental diver core, or mud rotary sample collected from station 5B-01
- Additional descriptors were added to vibracore samples taken from Unit 1C: U for upper signifies samples taken above the estimated deepest dredge (U) and L for lower signifies samples taken below the estimated deepest dredge (L). The resulting nomenclature was: 1C-01-VC-U or 1C-01-VC-L
- Hollow-stem auger samples were identified by a number 101 and transect letter (e.g., A) to identify the station, followed by the method identifier of HSA. The resulting nomenclature is: 8-101A-HSA. This represents a subsurface hollow-stem auger sample collected from transect 8-101, position A, which indicates the top of slope.
- A homogenization duplicate collected from a surface or subsurface sediment sample was followed with -XX, where XX is the station number plus 50.
- For equipment rinsate blank samples, ERB was appended to the sample identification number. The resulting nomenclature was: 5B-01-SS-ERB. This represents the equipment rinsate blank of the decontaminated sample processing equipment after sediments from Station 5B-01.

Composite samples were identified using a CX nomenclature as indicated in the sampling tables and were collected from several locations.

Horizontal positioning was determined in the field by a differential global positioning system (DGPS) based on target coordinates. The actual sample coordinates are provided in the PRDI Data Report Tables 1 through 5. The horizontal datum was North American Datum (NAD) 83/98, Washington State Plane. Measured geographical coordinates for station positions were recorded and reported to the nearest 0.01 second. In addition, state plane coordinates were reported to the nearest foot. The DGPS accuracy is less than 1 meter and generally less than 30 centimeters (cm), depending on the satellite coverage and the number of data points collected. Various locations were photographed to aid in understanding the station location.

The vertical elevation of each sediment station was measured using a fathometer or lead line and converted to mean lower low water (MLLW) elevation. Tidal elevations were determined using the program WTides, a subset of XTides, which uses merged harmonics to predict tides for Bellingham Bay from Rosario Strait, Washington. Upland geotechnical stations were surveyed in feet-MLLW by Wilson Engineering, a licensed surveyor.

A.2 Surface Sediment Collection and Sampling

Surface sediment collection was performed using a hydraulically pressurized Van Veen sampler. The objectives of surface sediment sampling are provided in Section 2 of the PRDI Data Report. Co-located surface samples were taken at areas of Vane Shear testing to confirm geotechnical properties of sediment.

A.2.1 Van Veen Grab Collection Methods

Surface sediment samples were collected from the 0- to 12-cm biologically active zone at locations presented on Figure 5 in the PRDI Data Report. Table 1 presents a summary of the surface sediment locations and sampling scheme details including chemical and physical testing analyses as well as coordinates and sample depths.

A pneumatically controlled power Van Veen grab was used to collect surface sediment samples. Sampling locations were approached at slow boat speeds with minimal wake to minimize disturbance of bottom sediments prior to sampling. Sediment samples were handled carefully to minimize disturbance during collection and transportation to the laboratory.

The grab sampler was lowered over the side of the boat from a cable at an approximate speed of 0.3 feet per second. When the sampler reached the mudline, the cable was drawn taut and DGPS measurements were recorded. Each surface grab sample was retrieved aboard the vessel and evaluated for the following acceptance criteria:

- Overlying water was present and has low turbidity
- Adequate penetration depth was achieved
- Sampler was not overfilled
- Sediment surface was undisturbed
- No signs of winnowing or leaking from sampling device were present

Grab samples not meeting these criteria were rejected near the location of sample collection, and the steps were repeated until the criteria were met. Deployments were repeated within a 20-foot radius of the proposed sample location. Once accepted, overlying water was siphoned off and a decontaminated stainless steel trowel, spoon, or equivalent were used to collect only the upper 12 cm of sediment from inside the sampler without touching the sidewalls. The sampler was decontaminated between stations and rinsed with site water between grabs.

After sample collection, the following information was recorded on the Sediment Sampling Form:

- Date, time, and name of person logging sample
- Weather conditions
- Sample location number, coordinates, and attempts
- Project designation
- Depth of water at the location and time to tide-correct mudline elevations
- Sediment penetration and depth
- Sediment sample interval

- Sample recovery
- Physical observations such as apparent grain size, color, odor, density, layering, anoxic contact, and presence of sheen, shells, and/or debris

A summary of physical observations for each grab sample is provided in Table A-1 located in Appendix A of the Whatcom Waterway PRDI Work Plan.

A.2.2 Van Veen Grab Sample Processing

Sulfide samples were collected from discrete grabs prior to compositing to minimize potential loss of volatiles. Each sulfide sample jar was completely filled with sediments followed by 2 milliliters (mL) of zinc acetate added on top. In addition, the sample jar was sealed with a Teflon-lined cap to ensure proper preservation of the sample.

Surface sediment samples were homogenized in decontaminated stainless steel bowls using stainless steel spoons. Homogenized sediment was spooned immediately into appropriate pre-cleaned, pre-labeled sample containers, placed in coolers filled with ice, and maintained at 4 degrees centigrade. Debris and materials more than 0.5-inch in diameter were omitted from the sample containers. Surface sediment samples were submitted for chemical and testing analysis. Sufficient surface sediment quantity was collected and archived for bioassay testing and future chemical testing.

In addition to the location information collected in the field, sample logging involved physical characterization in general accordance with the visual-manual description procedure (Method American Society for Testing and Materials [ASTM] D-2488 modified). The information was recorded on the standard field collection forms and is summarized in Table A-1 of the Whatcom Waterway PRDI Work Plan, Appendix A. Refer to the Whatcom Waterway PRDI Work Plan, Appendix A, Attachment A to view the log templates (Anchor 2008). Physical characterization included the following:

- Grain size distribution
- Density/consistency
- Color
- Biological structures (e.g., shells, tubes, macrophytes, bioturbation)

- Presence of debris (e.g., woodchips or fibers, paint chips, concrete, sand blast grit, metal debris)
- Presence of oily sheen
- Odor (e.g., hydrogen sulfide)

Surface sediment samples collected for chemical and physical analysis were packed and shipped to Analytical Resources, Inc. (ARI) in Tukwila, Washington. The surface sediment samples collected for methyl mercury analysis were packed with dry ice and taken by courier to Brooks Rand Labs in Seattle, Washington. Surface sediment collected for bioassay analyses were packed on ice and driven by courier to NewFields, LLC (NewFields) in Port Gamble, Washington.

A.2.3 Van Veen Grab Bioassay Testing

Surface sediment (0 to 12cm) was collected and archived for contingent bioassay testing. Marine bioassay testing species selections were coordinated with Ecology and depended on grain size, salinity, and season in which testing was performed. Based on the project schedule, the following bioassay testing was performed:

- *Eohaustorius estuarius*
- *Dendraster excentricus*
- *Neanthes arenaceodentata*

Bioassay testing was performed by NewFields, a laboratory accredited by Ecology to perform each of the above testing procedures according to PSEP guidelines (PSEP 1995). NewFields provided a detailed Biological Testing of Sediment for Whatcom Waterway report that is contained in Appendix H. The discussion below provides a summary of the testing performed.

A.2.3.1 Amphipod Test

The amphipod test involved exposing the amphipod to test sediment for 10 days and counting the surviving animals at the end of the exposure period. Daily emergence data and the number of amphipods failing to rebury at the end of the test were recorded as well.

Eohaustorius estuaries exhibit sensitivity to high clay content (greater than 30 percent) despite being relatively insensitive to salinity changes and other effects of grain size.

A.2.3.2 Larval Test

The larval test monitored larval development of a suitable echinoderm or bivalve species in the presence of test sediment. The test was run until the appropriate stage of development was achieved in a sacrificial seawater control. At the end of the test, larvae from each test sediment exposure were examined to quantify abnormality and mortality.

Initial counts were made for a minimum of five 10-mL aliquots. Final counts for seawater control, reference sediment, and test sediment were made on 10-mL aliquots. The sediment larval bioassay has a variable endpoint (not necessarily 48 hours) that is determined by the developmental stage of organisms in a sacrificial seawater control.

Ammonia and sulfide toxicity may interfere with test results for this bioassay. Aeration was conducted to provide sufficient oxygenation to maintain control and reference sample replicates at ASTM oxygenation levels throughout the test to minimize these effects.

Adults were collected in spawning condition or were induced to spawn in the laboratory. Therefore, seasonality played a role in selecting a test organism.

Larvae of *Dendraster excentricus* do not show an adverse response to increasing silt and clay fractions, and under conditions of expected high silts and clay, the sand dollar test is preferable (EPA 1993).

Prior to initiating bioassay testing, sediment grain size and interstitial salinity were determined to confirm selection of the appropriate test species. If there was headspace in the jars, nitrogen was added prior to storage (PSEP 1995).

A.2.3.3 Neanthes Growth Test

The neanthes growth test utilized the polychaete *Neanthes arenaceodentata* in a 20-day growth test. The growth rate of organisms exposed to test sediments was compared to the growth rate of organisms exposed to the reference sediment. Note that in one sample, the growth rate was compared to the control. This sample is discussed in depth in the Biological Testing of Sediment for Whatcom Waterway report (Appendix H) and is summarized in Section 6.2 of the PRDI Data Report.

A.2.3.4 Reference Sediment

Two reference samples were collected from Samish Bay. Reference sediments were collected using a pneumatically controlled power Van Veen grab as described in Section A.2.1.

A.3 Subsurface Vibracore Collection and Sampling

Subsurface sediment sampling was carried out by vibratory core sampler (vibracore) to collect chemical and geotechnical data. Multiple sets of core samples were collected and analyzed throughout the study area. Figures 6 and 7 in the PRDI Data Report show the subsurface vibracore sampling locations. Tables 2a and 2b present the subsurface sediment sampling details for the ASB (Aerated Stabilization Basin) and Waterway areas, respectively.

The subsequent sections provide details regarding vibracore collection methods and vibracore processing and sample methods.

A.3.1 Vibracore Collection Methods

Subsurface sediment was collected by vibracore. A vibracore collects a continuous profile of subsurface sediments by utilizing a high frequency vibrating coring device that penetrates into the underlying sediments with minimal distortion. A vibracore is ideal for collecting long, relatively undisturbed cores from a variety of sediment types.

Prior to deployment, the following procedure was used to decontaminate sample tubes:

- Rinse and pre-clean with potable water
- Wash and scrub the tubes in a solution of laboratory grade, non-phosphate-based soap and potable water
- Rinse with potable water
- Rinse three times with distilled water
- Seal both ends of each core tube with aluminum foil or decontaminated cap

The aluminum foil or cap was removed immediately prior to placement into the coring device. Care was taken during sampling to avoid contact of the sample tube with potentially contaminated surfaces.

Sediment samples were collected in the following manner:

- Vessel maneuvered to the proposed sample location.
- A decontaminated core tube the length of the desired penetration depth was secured to the vibratory assembly and deployed from the vessel.
- The cable umbilical to the vibrator assembly was drawn taut and perpendicular, as the core rested on the bottom sediment.
- A 4-inch-diameter, thin-walled, aluminum tube was driven into the sediment using two counter-rotating vibrating heads.
- The coordinates of the actual sampling location were recorded.
- A continuous core sample was collected to the designated coring depth or until refusal.
- The depth of core penetration was measured and recorded as indicated by sonar.
- When the sonar was not functional, the depth to sediment was measured from the waterline to the head assembly with a survey tape.
- The vibracore assembly was extracted from the sediment using a winch.
- While suspended from the A-frame, the assembly and core barrel were sprayed off and then placed on the vessel deck.
- The core barrel was removed from the vibracore assembly for evaluation.
- The amount of headspace and overlying water were recorded and the sediment was evaluated at the core shoe.
- The length of recovered sediment was recorded, and, if accepted, the core tube was sectioned as necessary for transport.

Acceptance criteria for sediment core samples were as follows:

- Overlying water was present and the surface is intact
- The core tube appeared intact without obstruction or blocking
- The accepted core recovery was greater than 75 percent of drive length. Exceptions to this criterion included: a) when multiple attempts were made, the core with the deepest penetration depth was kept regardless of the core recovery, and b) when the

recovery of cores collected from the ASB were lower than 75 percent, these cores were kept as long as the native sand layer was present. Within the ASB, the recovery measurements were based on recovered length and drive length within the native sand layer. Low recovery of the overlying ASB sludges was presumed based on previous sampling at the ASB. Refer to Appendix B for additional information on core recovery and in-situ depths.

If sample acceptance criteria were not achieved, the sample was rejected unless modified acceptance criteria were approved by the field coordinator, and collection was attempted again. Three attempts were made at stations were driving conditions were difficult; the best of these attempts was kept per the acceptance criteria listed above.

Anchor QEA personnel recorded field conditions and drive notes on a standard core log. Refer to the Whatcom Waterway PRDI Work Plan Appendix A, Attachment A to view the log templates (Anchor 2008). Logs included the following information:

- Depth to mudline as measured by leadline deployed beside the vibracore assembly
- Depth to mudline as measured by the calibrated boat depth sounder
- Location of each station as determined by DGPS
- Date and time of collection of each sediment core sample
- Names of field personnel collecting and handling the samples
- Observations made during sample collection, including weather conditions, complications, ship traffic, and other details associated with the sampling effort
- Sample station identification
- Length and depth intervals of each core section and estimated recovery for each sediment sample as measured from MLLW
- Qualitative notation of apparent resistance of sediment column to coring (how the core drove), with depths determined by the sonar
- Any deviation from the approved Sampling and Analysis Plan (SAP)

Once the core samples were deemed acceptable, the cutterhead was removed and a cap was placed over the end of the tube and secured firmly in place with duct tape. The core tube was then removed from the sampler and the other end of the core was capped and taped. The core tube was labeled with permanent black pen and scribed with the location ID and an arrow pointing to the top of core. The cores were then cut into appropriate lengths for transport to the laboratory for processing. Cores were cut to a maximum length of 5.5 feet. The cores were sealed tightly enough to prevent leakage or disturbance during transport to the processing station. Cores were stored overnight in a secure refrigerated truck and transported in the truck every morning to the processing laboratory at ARI in Tukwila, Washington. A Chain of Custody form was logged by Anchor QEA field staff and maintained by the courier to the processing lab.

Mudline elevations were determined after core collection using the depth to mudline measurements, the time of sample collection, and tidal elevations. Tidal elevations were determined using the WTides software version 3.1.7, which predicts tides through merged harmonic analysis (Thorton 2005). Mudline elevations for samples collected by vibracore are presented in Tables 2a and 2b. The vibracore sampling mudline elevations in the ASB were calculated using subsequent probing methodology described in Section A.8 below.

A.3.2 Vibracore Processing and Sample Methods

The vibracore processing station was located at the ARI laboratory in Tukwila, Washington. Transported cores were handled consistent with ASTM procedures (ASTM D 4220) and stored upright in the ARI refrigerators until processed. When processed, the core caps were removed and the core was cut longitudinally using a circular saw. The core was split with decontaminated stainless steel wire core splitters or spatulas into two halves for sampling.

Prior to sampling, color photographs were taken and a sediment description of each core was recorded on a standard core processing log. The following parameters were noted:

- Sample recovery measurements
- Physical soil description in accordance with ASTM procedures (ASTM D 2488 and ASTM D 2487 - Unified Soil Classification System) including soil type, density/consistency of soil, and color
- Odor (e.g., hydrogen sulfide, petroleum)
- Visual stratification, structure, and texture
- Vegetation and debris (e.g., woodchips or fibers, paint chips, concrete, sand blast grit, metal debris)

- Biological activity (e.g., detritus, shells, tubes, bioturbation, live or dead organisms)
- Presence of oil sheen

Cores were compaction-corrected and sampled as actual (in-situ) depths based on the core lithology and observations during core collection. Final core logs are provided in Appendix B and additional details on compaction-corrections and in-situ depths can be found in Section B.1 of Appendix B.

Samples were then taken per the PRDI Work Plan (Anchor 2008a). Where applicable, the first samples to be taken were volatile organic compounds (VOCs). Separate containers were completely filled with sample sediment for volatiles; no headspace was allowed to remain.

Discrete and composite samples were taken directly from the selected depth interval, homogenized in a decontaminated stainless steel bowl and then spooned into laboratory supplied jars using decontaminated stainless steel mixing tools. The homogenized sediment was mixed until homogenous in color and texture and then spooned into laboratory supplied jars for analyses. A Chain of Custody form was logged by the processing staff and relinquished to the ARI lab staff.

A.4 Subsurface Hollow-stem Auger, Mud-Rotary, and Piston Coring

Subsurface sediment was collected for geotechnical testing and chemical sampling, as needed, by hollow-stem auger, mud-rotary, and diver-assisted piston cores at selected locations to obtain data, and at other locations where vibracore methods were not practical due to logistical considerations. Locations of these borings are shown on Figure 8 in the PRDI Data Report. The sampling intervals and testing parameters for borings along the ASB berm are listed in Table 3a and parameters for borings taken in the Waterway areas are identified in Table 3b, both tables are located in the PRDI Data Report. The subsequent sections provide details regarding hollow-stem auger, mud-rotary, and diver-assisted piston cores collection methods and processing methods.

A.4.1 Hollow-stem Auger and Mud-Rotary Collection Methods

Soil samples were collected by hollow-stem auger and mud-rotary consistent with ASTM procedures (ASTM D 1452). The over-water auger locations in the ASB were placed using a truck-mounted drill rig positioned in the center of the flexi-float barge. In the Waterway, a truck-mounted drill rig was placed on a much larger vessel, named the Sea Vulture, to conduct the borings. The 3.375-inch inside diameter hollow-stem auger was advanced into the sediment to the top of the depth interval of interest. After the target depth was reached, sediment was collected by advancing a 2-inch outside diameter, decontaminated split spoon or Shelby tube. The split spoon was advanced using a 140-pound hammer dropped 30 inches. The Shelby tube is pushed 2 feet in a slow constant motion using the drill rig's hydraulics. Decontamination procedures for the split spoon and Shelby tube were the same as for the vibracore (see Section A.3.1).

Sampling for upland locations were collected in the same manner as described above. However, at these locations, the barge was not required. Upland locations at the ASB berm, Georgia Pacific (GP) shoreline areas, Central Waterfront south shoreline, and Bellingham Shipping Terminal (BST) locations were accessed using a standard truck-mounted drilling rig. Three of the BST locations were located within a warehouse structure and encountered no problems with the same drilling equipment. Wharf locations at BST were sampled through existing access ports located in the wharf structure using a mud-rotary drilling method.

Mud-rotary drilling was employed at the BST rather than hollow stem auger sampling methodology because of potential to encounter rip rap and because the augers were not small enough to fit through the existing drainage holes in the dock. Mud-rotary drilling involved lowering a casing and pushing through the access ports. Sampling, recovery and drilling all took place through this casing. Liquid mud was used to remove soil cuttings up through the boring and the casing, while a drill bit drilled down to predetermined depths. There, Shelby tube and split spoon sampling followed the same sampling procedures as that of the hollow-stem auger.

During split spoon penetration, the number of blows required to advance the spoon in 6-inch increments were recorded as a measure of soil density using the Standard Penetration Test.

This test was used as an approximate measure of soil density and consistency. As described in ASTM D 1586, this test employed a standard 2-inch outside diameter split-spoon sampler. Using a 140 pound hammer, free falling 30 inches, the sampler was driven into the soil for 18 inches. The number of blows required to drive the sampler the last 12 inches is the Standard Penetration Resistance. This resistance, or blow count, measured the relative density of granular soils and the consistency of cohesive solids. The blow counts were plotted on boring logs at their respective sample depths. Boring logs are provided in Appendix B.

When dense materials precluded driving the total 18-inch sample, the penetration resistance was entered in one of two ways: if less than 6-inches, the total number of blows over the number of inches of penetration was entered on the boring log; if greater than 6 inches, the total number of blows completed after the first 6 inches of penetration was summed and recorded. The sum was expressed over the number of inches driven that exceeded the first 6 inches (the number of blows needed to drive the first 6 inches were not reported). If extremely soft materials allowed the sampler to advance 18 inches without any blows, a "push" was recorded on the raw boring logs along with a blow count of 0. In the attached boring logs this is reflected as WOR, or weight of the rods.

Anchor QEA personnel recorded field conditions and drive notes on a standard boring log. Refer to the Whatcom Waterway PRDI Work Plan Appendix A, Attachment A to view the log templates (Anchor 2008). The logs included the following information:

- Date and time of collection of each sediment core sample
- Names of field personnel collecting and handling the samples
- Observations made during sample collection, including weather conditions, complications, and other details associated with the sampling effort
- The sample station identification
- Length and depth intervals of each core section and estimated recovery
- Qualitative notation of apparent resistance during driving
- Any deviation from the approved SAP

A.4.2 Diver Assisted Piston Core Collection Methods

Diver assisted piston cores were collected at two locations beneath the BST in order to collect the upper 2 feet of sediment that was not captured during mud-rotary drilling. Diver assisted piston cores were collected by Anchor QEA and Wilson Engineering staff by boat and with diver. Locations were marked by attaching a rope with a weight through the existing drain holes on the BST dock to the mudline in order to retain position control and to sample in the same location as the mud-rotary drilling effort. A diver set the piston core in place in the soft sediment while a two-person crew worked from a boat to manually advance the piston core to the appropriate depth, which was verified by diver. The piston core was retrieved by diver and passed to the sampling crew in the boat. A cap was placed over the end of the tube and secured firmly in place with duct tape. The top of the core tube was then slit just above the mudline to allow overlying water to seep out. Once the water was removed, the top end of the core was capped and taped. The core tube was labeled with permanent black pen with the location ID and an arrow pointing to the top of core. Cores were secured vertically for transport back to the dock.

A.4.3 Hollow-stem Auger and Mud-Rotary Processing Methods

Hollow-stem auger and mud-rotary samples were logged on-site by Anchor QEA field staff. Prior to sampling, color photographs were taken and a sediment description of each core was recorded on a standard boring log. Refer to the Whatcom Waterway PRDI Work Plan Appendix A, Attachment A to view the log templates (Anchor 2008). The following parameters were noted:

- Sample recovery
- Physical soil description in accordance with the Unified Soil Classification System (includes soil type, density/consistency of soil, color)
- Odor (e.g., hydrogen sulfide, petroleum)
- Visual stratification, structure, and texture
- Vegetation and debris (e.g. woodchips or fibers, paint chips, concrete, sand blast grit, metal debris
- Biological activity (e.g., detritus, shells, tubes, bioturbation, live or dead organisms)
- Presence of oil sheen

Discrete samples were taken directly from the selected depth interval and spooned into laboratory supplied jars. Composited samples were then placed in a decontaminated stainless steel bowl and mixed using decontaminated stainless steel mixing. The composited soil was mixed until homogenous in color and texture and then spooned into laboratory supplied jars for analyses. All jars were kept on ice for transport to ARI. A Chain of Custody form was logged by the processing staff and relinquished to the courier and then to ARI lab staff. The final boring logs are presented in Appendix B.

A.4.4 Diver Assisted Piston Core Processing Methods

The piston core processing station was located on-site. Cores were transported consistent with ASTM procedures (ASTM D 4220) and stored upright until processed. When processed, the core caps were removed and the core was cut longitudinally using a set of electric shears. The core was split with decontaminated spatulas into two halves for sampling. Refer to Section A.3.2 for details on documenting, logging, and sampling the piston cores.

A.5 Subsurface Diver Coring

Subsurface diver coring was carried out in Site Units 6B and 6C in order to collect supplemental chemistry data in the shallow subsurface (to 3 feet below mudline). Diver coring occurred at four locations in order assess potential impacts from scouring, propeller wash, and anchoring. Locations are depicted on Figure 6 and the sampling scheme is listed in Table 2b, both located in the PRDI Data Report.

A.5.1 Diver Core Collection Methods

Diver cores were collected by deploying the core and the diver to the subsurface. The diver used a manually-driven slide hammer to penetrate into the shallow subsurface. After achieving the appropriate penetration depth, the diver retrieved the core and passed it to the sampling crew in the boat. The core catcher was removed and a cap was placed over the end of the tube and secured firmly in place with duct tape. The top of the core tube was then slit just above the mudline to allow overlying water to seep out. Once the water was removed, the top end of the core was capped and taped. The core tube was labeled with permanent black pen with the location ID and an arrow pointing to the top of core. Cores were secured vertically for transport back to the dock.

A.5.2 Diver Core Processing Methods

The diver core processing station was located at the ARI laboratory in Tukwila, Washington. Transported cores were handled consistent with ASTM procedures (ASTM D 4220) and stored upright in the ARI refrigerators until processed. When processed, the core caps were removed and the core was cut longitudinally using a pair of electric shears. The core was split with decontaminated stainless steel spatulas into two halves for sampling. Refer to Section A.3.2 for details on documenting, logging, and sampling the diver cores.

A.6 Vane Shear Tests

In situ strength of the sediments was measured using field vane shear equipment. Collected strength data was compared to geotechnical index parameters. The subsequent section provide details regarding vane shear collection methodology. Figure 9 in the PRDI Data Report illustrates the vane shear testing locations.

A.6.1 Vane Shear Testing Methods

Vane shear data was collected from a shallow draft boat using vane shear testing (VST) equipment. VST was performed consistent with ASTM D 2573; however, some depths had to be abandoned due to refusal. The VST equipment was operated by pushing the vane into the sediment to the required depth and making sure that the scale-ring was set to the zero-position. The handle was turned clockwise until the lower part followed the upper part around or fell back. Failure and maximum shear strengths were obtained in the sediment at the vane and were recorded on field forms. Refer to the Whatcom Waterway PRDI Work Plan Appendix A, Attachment A to view the log templates (Anchor 2008). The data recorded included the values on the graduated scale, the position of the hole, and the depth. After recording the data, the handle was held firmly and allowed to return to the zero-position. The vanes were then rotated approximately ten times and the test rerun to obtain remolded shear strength.

Surface grabs were co-located with vane shear locations in order to characterize the material and to standardize the field VST results using laboratory tests. Surface sediment was collected via pneumonic Van Veen (Section A.2.1) and trowel sampling in the Log Pond. A summary of VST measurements is presented in Table 4 of the PRDI Data Report.

A.7 Porewater Collection and Sampling

Sediment porewater mercury concentration data was collected at selected locations to supplement information available from previous studies. Sampling locations included Unit 2C, Unit 5B, and Unit 6C. Sampling locations and analysis are listed in Table 5 and locations are presented on Figure 10, both located in the PRDI Data Report. The following subsections provide details of the porewater collection field procedures.

A.7.1 Porewater Collection and Processing

The porewater sampling design included collecting porewater from six locations within the project area. Two stations were located in each of the following Site Units: Unit 2C, Unit 5B, and Unit 6B. A third station was added within Unit 2C, 2C-03-PW, however, sample was unable to be collected here due to a high degree of silty material that clogged the piezometer screen.

Porewater was collected using diver-assisted push-point mini-piezometers. A mini-piezometer is a mini well point constructed of a stainless-steel rod with a screened end at the tip. The design included a probe with a heavier-weight stainless-steel construction, approximately 2-inch screened (0.5-millimeter [mm] slot) interval with a smaller aperture size near the tip of the probe, and a base plate attachment that sat at the mudline elevation to minimize drawdown from the overlying surface water. A schematic of the porewater sampling device is shown on Figure A-1. Larger screen (4- and 6-inch) intervals were available when field conditions encountered clogging of the screen due to fine grained sediment. Clean polyethylene tubing was connected to the end (opposite end of screened portion) of the mini-piezometer and extended through the water column to the deck of the sampling vessel and into a peristaltic pump or similar type pumping device. The samples were field filtered and pumped directly into the sampling jars from the tubing.

Seven steps for collection of the porewater samples are discussed below:

1. **Purging Volume Determination and Field Blank Collection** – Prior to the diver entering the water, the polyethylene tubing was inserted through the water-tight stopper in the end of the decontaminated mini-piezometer; tubing was pushed through the probe to the non-screened end of the mini-piezometer. The approximate

volume contained within the mini-piezometer was calculated, as well as the volume for a full length of polyethylene tubing with sufficient length to reach the mudline from the peristaltic pump. One tube volume of distilled water was pumped through the full length of tubing and into the mini-piezometer. The flow was then reversed in order to collect a field blank. After field blank collection, the tubing and mini-piezometer were again filled with distilled water in order to limit intake of surface water into the apparatus during transport and placement by the diver.

2. **Sampling Depth Determination** – For each station, the mini-piezometer was placed so that the center of the screen was located 1-foot below mudline. In order to verify placement and to minimize the potential collection of overlying water, a circular, stainless-steel baseplate was clamped to the piezometer so that the center of the screened interval of the probe laid 1-foot below it. This allowed the diver to easily and accurately drive the minipiezometer to the correct depth below the mudline and eliminated the potential for capturing overlying water during sampling (Figure A-1).
3. **Porewater Volume Determination** – Prior to the diver entering the water, the required porewater volume was calculated. Initial purging of porewater (described in detail in Step 5 below) involved purging approximately three to five pore volumes prior to sampling in order to ensure porewater capture and minimize the potential for collection of overlying water. The available porewater can be conservatively estimated by the following equation:

$$\textbf{PV} = \text{Surface area of baseplate (ft}^2\text{) * length of tubing (ft) * porosity}$$

4. **Sampling Location** – Once on station, the diver was handed the mini-piezometer for placement. The diver descended to the sample location and drove the minipiezometer until the stainless-steel baseplate was secured in the sediment.
5. **Initial Purging** – While the diver was descending, the sampling crew connected the tubing to a peristaltic pump. Once the diver surfaced, the crew began purging the mini-piezometer using a low-flow pump rate. The low-flow pump rate was maintained between approximately 80 to 100 mL per minute and was quality checking during sampling. Purging occurred until between three to five purge volumes were reached, as indicated in Step 1. The waste volume was discarded (i.e., distilled water).

6. **Porewater Sample Collection** – The low-flow pump rate was maintained per Step 5, and sample volume was collected for total suspended solids (TSS) and dissolved mercury directly into laboratory-supplied certified, pre-cleaned, and pre-labeled sampling containers until the calculated porewater volume was reached (per Step 3) or the laboratory volume requirements were satisfied, whichever occurred first. If additional porewater volume was necessary to fulfill the laboratory volume requirements, a clip was placed across the tubing to completely close the tubing and the mini-piezometer apparatus was relocated, per Step 7.
7. **If Necessary, Piezometer Reinstallation** – When it was necessary, the mini-piezometer apperatus was relocated in order to obtain sufficient sample volume. Communications were maintained with the diver to reinstall the mini-piezometer at an adjacent location. A low-flow pump rate (i.e., approximately 80 to 100 mL per minute) was re-established, and the tubing was purged until the calculated purge volume was reached (per Step 1). The waste volume was discarded and the required remaining porewater volume was collected into the laboratory certified, pre-cleaned, and pre-labeled containers. This procedure was repeated until sufficeint porewater volumes were collected.

Detailed notes were maintained on field logs during both the diver installation and porewater collection activities. Refer to the Whatcom Waterway PRDI Work Plan Appendix A, Attachment A to view the log templates (Anchor 2008).

A.7.2 Porewater Analysis

Porewater was analyzed for total suspended solids and low-level dissolved mercury by ARI in Tukwila, Washington. Field measurements of pH, temperature, conductivity, dissolved oxygen, and oxidation reduction potential (redox) were measured at the time of porewater collection. A summary of field measurements along with qualitative observations recorded during sample collection is provided in Table A-2.

A.8 Surface Sediment Mercury Speciation

Mercury speciation was evaluated in surface sediments at select locations as listed on Figure 5 in the PRDI Data Report. A sample was also collected from a Samish Bay clean reference station. Table 1 in the PRDI Data Report lists the surface sediment methyl mercury sampling locations, coordinates, sample depth, and testing.

A.8.1 Methyl Mercury Collection Methods

Surface sediment sampling for methyl mercury analysis was performed at seven locations including the reference station. Samples were collected from the 0- to 12-cm biologically active zone using a pneumatically controlled power Van Veen grab. Section A.2.1 describes the methods for deploying the grab, the acceptance criteria, and decontamination procedures used.

A.8.2 Methyl Mercury Processing and Sample Methods

Surface sediment from the Van Veen grab was immediately spooned into a polyethylene sterile bag and homogenized in the sealed bag with no headspace for methyl mercury sampling. Homogenized sediment was then placed directly from the polyethylene sterile bag into laboratory-supplied certified, pre-cleaned, plastic sampling containers with headspace for methyl mercury analysis. The bottom corner of the polyethylene sterile bag was cut with decontaminated equipment for direct placement into the sampling container. Samples were immediately put on dry ice for separate storage and transport to the laboratory. Immediate freezing was required to avoid potential microbe-induced speciation changes after disturbance of the sediment during sampling. Headspace within the plastic container was necessary to avoid container breakage from freezing.

Remaining sediment from the Van Veen grab was then homogenized and sampled for additional parameters and placed into pre-cleaned sample containers. Containers were stored and transported in coolers filled with ice maintained at 4 degrees Centigrade. Surface sediment samples were submitted for chemical analyses at ARI.

Field probe measurements were performed directly in an undisturbed portion of the surface sediment contained within the Van Veen grab sampling device. Field probe measurements included oxidation-reduction potential (redox), dissolved oxygen, pH, conductivity, and temperature. These measurements are presented in Table A-3.

A.9 ASB Sludge and Hard Bottom Surveys

Multiple survey methods, in addition to vibracore sampling, were used in order to assess the potential thickness of unconsolidated and consolidated ASB sludges above/below the measured mudline and to verify the "hard bottom" contact located between the ASB sludges and the underlying native sand. These different survey methods resulted in defining a general sludge consolidation profile and estimating the native sand contact. These methods included:

- ASB Site survey
  - multi-beam survey (measured mudline)
- ASB vibracore sampling measurements
  - plate-pole measurements (lighter sludge)
  - leadline measurements (more dense sludge)
- ASB probing survey
  - plate-pole measurements (lighter sludge)
  - closed-end pole measurements (hard bottom)
  - hollow-tipped pole measurements (hard bottom verification)
  - vertical water column turbidity measurements

A.9.1 ASB Site Survey

A multi-beam survey was performed by Wilson Engineering in May 2008 to provide bathymetry data for the ASB. In reviewing this data, the bathymetry proved to be a conservative estimate of the mudline because the flocculant nature of the ASB solids caused the multi-beam signal to bounce back at a shallower depth than where the bulk of the consolidated sediment lay. Therefore, this survey data marked the top of the unconsolidated sludges. The multi-beam mudline surface was used to develop the contours as presented in the associated PRDI Data Report figures.

A.9.2 ASB Vibracore Sampling Measurements

Plate pole measurements were taken at each vibracore station. This method was used to create enough surface area so as not to sink into the soft sludge and to estimate the top of the lighter consolidated sludge. The plate pole consisted of a telescoping pole and a light-weight, round piece of aluminum ("plate") that was manually lowered to assess the depth of lighter consolidated sludge. This depth was measured and recorded as the plate-pole depth and was shallower than the leadline depth due to increased surface area. This depth yielded the top layer of unconsolidated (lighter) sludge.

Leadline measurements were taken at each vibracore station using a standard 2-pound weight suspended by a measuring tape. This was measured as the depth at which the leadline contacted a solid surface and was intended to mark the top of the more dense consolidated sludges.

A.9.3 ASB Probing Survey

The ASB probing survey was a stand-alone, two part series of measurements taken in the ASB. The probing survey was performed at approximately 125 grid-based test locations, which were established using a rectangular grid with parallel grid lines spaced approximately 100 feet apart. The hard bottom survey included 25 primary stations and 100 secondary stations. Figure A-2 presents both the primary and secondary stations. At each primary station, three measurements and vertical water column turbidity readings were recorded to confirm the general sludge consolidation profile estimated from the previous mudline measurements. The three measurements recorded at each primary station included the plate pole, closed-end pole, and hollow-tipped pole methods. At each secondary station, two measurements were recorded and these included the plate pole and hollow-tipped pole methods, which are described below.

The plate pole method was similar to the method used during vibracore sampling as described in the previous section. The closed-end pole method consisted of lowering a pole with a sealed end until a hard contact was encountered. The depth at which the pole could not be inserted further without mechanical assistance was measured and recorded as the "hard bottom" (native sand) elevation for that station. The hollow-tipped pole method was similar to the closed-end pole method, however the pole had a hollow tip and was used to verify the presence of sand upon encountering a hard contact. Sediment recovered in the hollow-tip of the sediment probe was visually inspected to ensure that full penetration to the native sand layer was achieved. This depth marked the contact between the ASB sludges and the underlying native sand.

In addition to the probing measurements, turbidity measurements were recorded at each primary station at approximately 1- to 2-foot vertical intervals until an increase of turbidity was observed. In general, the turbidity measurements were very low (less than 10 Nephelometric Turbidity Unit [NTU] then sharply increased (greater than 500 NTU) at a similar depth as the plate pole measurement. These turbidity measurements were used as additional verification that the top layer of the unconsolidated (lighter) sludge was reached.

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Table A-1
Summary of Surface Sediment Collection

			Sample Recovery Details			Field Observations of Sample					
Station ID		Date Collected	Recovery Depth (cm)	Depth of Sample (cm)	Water Depth-Leadline (ft)	Color	Sediment Type	Biological	Odor	Sheen	Comments
Inner Waterway and Unit 5 and Unit 6											
2C	2C-01-SS	8/20/2008	21.5	0-12	35.8	Black	Silt	1/2" long snails	none	none	Wet, soft stiffens with depth, 1mm oolids
	2C-02-SS	8/20/2008	17.5	0-12	33.3	Black	Silt	Trace snails at surface	none	none	wet, soft
	2C-03-SS	8/21/2008	22	0-12	29.3	Dark Grey	Clayey Silt	Abundant polychaetes	Slight H2S	none	wet, very thin olive veneer
5B	5B-01-SS	8/21/2008	21	0-12	15.4	Olive Grey to Dark Grey	Sandy Silt	Small worm tubes	Slight H2S	none	very soft, wet,~10% wood debris twigs and chips
	5B-02-SS	8/21/2008	20	0-12	16.6	Olive to Grey	Sandy Silt	Worm tubes	Slight H2S	none	Very soft, wet, <5% wood debris, turbid water form waves
	5B-03-SS	8/21/2008	22	0-12	17.1	Olive to Dark Grey	Sandy Silt	polychaete and snails	H2S	Occasional small spec metallic sheen	Sampled next to dolphin, wet, soft, with some wood debris
	5B-04-SS	8/21/2008	21	0-12	22.1	Olive to Dark Grey	Silt	One worm tube	Moderate H2S	none	8cm long wood chip, soft, wet, slightly turbid water
	5B-05-SS	8/21/2008	19	0-12	12.8	Olive to Dark Grey	Sandy Silt	Shell fragments	Moderate H2S	none	Soft, wet, 20-30% wood, slight water turbidity, abundant wood debris
	5B-06-SS	8/21/2008	22	0-12	12.7	Dark Grey	Sandy Silt	Shell fragments	Moderate H2S	none	Olive sandy veneer, soft, wet to firm wet
	5B-07-SS	8/21/2008	18	0-12	11.4	Grey	Silty Sand	Few shell fragments, 12cm albino shrimp	none	none	Olive silt veneer, soft, wet wood debris
6B	6B-01-SS	8/22/2008	21	0-12	28.4	Black	Silt w/ few Clay	none	none	none	Olive brown mottling, trace wood debris, increase competency with depth
	6B-02-SS	8/22/2008	15	0-12	27.9	Black	Silt	Trace snails, few worms	none	none	Olive brown mottling, increase competency with depth
	6B-03-SS	8/22/2008	20.5	0-12	25.5	Black	Silt	Trace sculpin fish, snail	none	none	Olive brown mottling, 4" long vertebrate (bird?), increase competency with depth
	6B-04-SS	8/22/2008	23	0-12	25.8	Black	Silt	none	none	none	Soft, moist, olive brown mottling, 4" thick piece of red debris (boat bottom?)
	6B-05-SS	8/20/2008	23	0-12	28.8	Black	Silt w/ few Clay	none	none	Occasional rainbow sheen 2cm blebs	wet, soft
6C	6C-01-SS	8/22/2008	18	0-12	19.9	Black	Silt	Trace mussel shells, polychaetes, snail, seaweed	none	Trace rainbow sheen	Moist, soft, olive brown mottling, wood debris
	6C-02-SS	8/22/2008	20	0-12	21.4	Black	Silt w/ few Clay	Half cockle shell, trace snail substantial worm tubes	none	none	Moist, soft, olive brown mottling, wood debris
Monitored Natural Recovery Areas											
3A	3A-01-SS	8/21/2008	21	0-12	16.5	Black	Silt with Sand	Plants and few shell fragments	Stung H2S	Occasional metallic sheen	Soft, wet, organic, with wood debris
	3A-02-SS	8/22/2008	21.5	0-12	9.3	Black	Sandy Silt	Trace barnacles, shell frags, whole cockle and mussel shells and organic fibers	none	none	Moist, soft to med stiff, with olive brown mottling
	3A-03-SS	8/22/2008	16	0-12	8.2	Black	Silty Sand	Trace cockles and shell frags, substantial worm tubes	none	Trace rainbow bleb	Moist, medium stiff, olive brown mottling with wood debris
	3A-04-SS	8/22/2008	20	0-12	19.5	Black	Silt w/ few Clay	Trace half intact cockle and worms	none	none	Moist, medium stiff, olive brown mottling with wood debris
	3A-05-SS	8/22/2008	23	0-12	16.9	Black	Silt	1 1/2" female crab, trace blue worms, worm tubes, snails, polychaetes 1 1/2" bivalve	none	none	moist, soft, olive brown mottling, wood debris, clay is clump when homogenized
5C	5C-01-SS	8/20/2008	19	0-12	10.1	Black	Silt w/ coarse Sand	Trace worm burrows and live clam	none	Slight sheen bleb (2cm)	grab located with in 10' of creosote pile
	5C-02-SS	8/21/2008	18	0-12	13.9	Olive Grey to Dark Grey	Silt	Shell fragments, clam and polychaete	Strong H2S	none	soft, wet, large rocks and gravel
Outer Waterway Areas											
1B	1B-01-SS	8/20/2008	18	0-12	41.6	Black	Silt	none	Slight H2S	Slight (1cm)	Mottled olive grey, Trace oolids (black round)
1C	1C-01-SS	8/20/2008	34	0-12	39.8	Black	Silt	none	Moderate H2S	<1cm sheen	Wet, loose, olive brown mottling
Reference Area											
REF	REF-01-SS	8/20/2008	22	0-12	60.2	Black	Silt	Trace worm tubes and trace polychaetes	none	none	Wet, soft, olive brown mottling
	REF-02-SS	8/20/2008	21	0-12	61.0	Black	Silt	One blade of eel grass	none	none	Wet, soft, olive brown mottling, 1" wood debris

Notes:

All samples collected using pneumonically controlled Van Veen grab sampler.

Table A-2
Summary of Sediment Porewater Collection

Station ID	Date Collected	Field Observations and In Situ Measurements							
		Water Depth-Leadline (ft)	Color	Odor	pH	Cond. (mS/cm, mS/cm3)	Temp. (C)	D. O. (mg/L)	Redox (ORP)
2C-01-PW	8/18/2008	37.0	Black to grey	Strong H2S	7.61	35.2, 41.9	16.6	0.86	-366.5
2C-02-PW	8/19/2008	26.8	NA	NA	7.39	36.1, 41.7	17.9	0.30	-311.1
5B-01-PW	8/18/2008	10.0	Black to clear	Strong H2S	6.92	NA, 40.4	17.3	0.09	-304.6
5B-02-PW	8/18/2008	13.0	Grey	Strong H2S	6.80	40.7, 34.3	16.8	6.8	-321.6
6B-01-PW	8/19/2008	23.5	Milky to clear	Strong H2S	6.89	35.0, 42.7	15.6	6.9	-372.1
6C-01-PW	8/19/2008	19.0	Chalky grey	Strong H2S	7.77	34.5, 41.7	15.9	2.9	-181.5

Notes:
All samples collected using a diver assisted mini-piezometer using low-flow methodology.
Cond = conductivity, Temp.= temperature, D.O.= dissolved oxygen, ORP= oxidation reduction potential

Table A-3
Summary of Surface Sediment Methyl Mercury Sampling In Situ Measurements

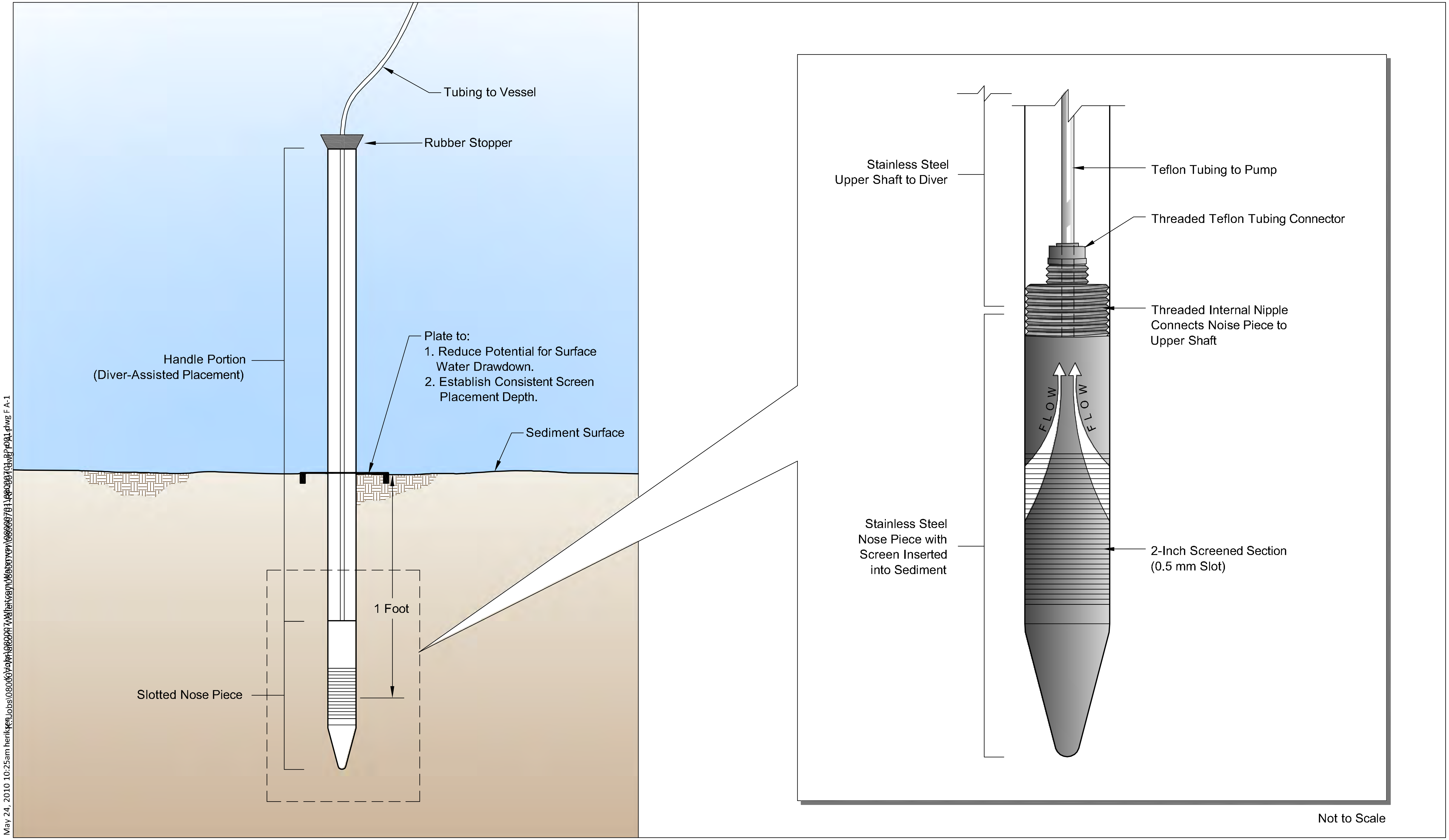
Station ID	Date Collected	In Situ Field Measurements		
		pH	Temp. (C)	Redox (ORP)
1B-01-SS	8/20/2008	7.4	13.7	27.5
1C-01-SS	8/20/2008	7.45	13.39	-212.7
2C-01-SS	8/20/2008	7.46	13.54	-105.4
2C-02-SS	8/20/2008	7.59	15.33	-4.9
5C-01-SS	8/20/2008	7.51	15.51	-118.4
6B-05-SS	8/20/2008	7.54	14.89	8.2
REF-01-SS	8/20/2008	7.68	12.97	39.6

Notes:

All samples collected using pneumonically controlled Van Veen grab sampler.

Temp.= temperature, ORP= oxidation reduction potential

Refer to Table B-1 for surface sediment sampling field observations.



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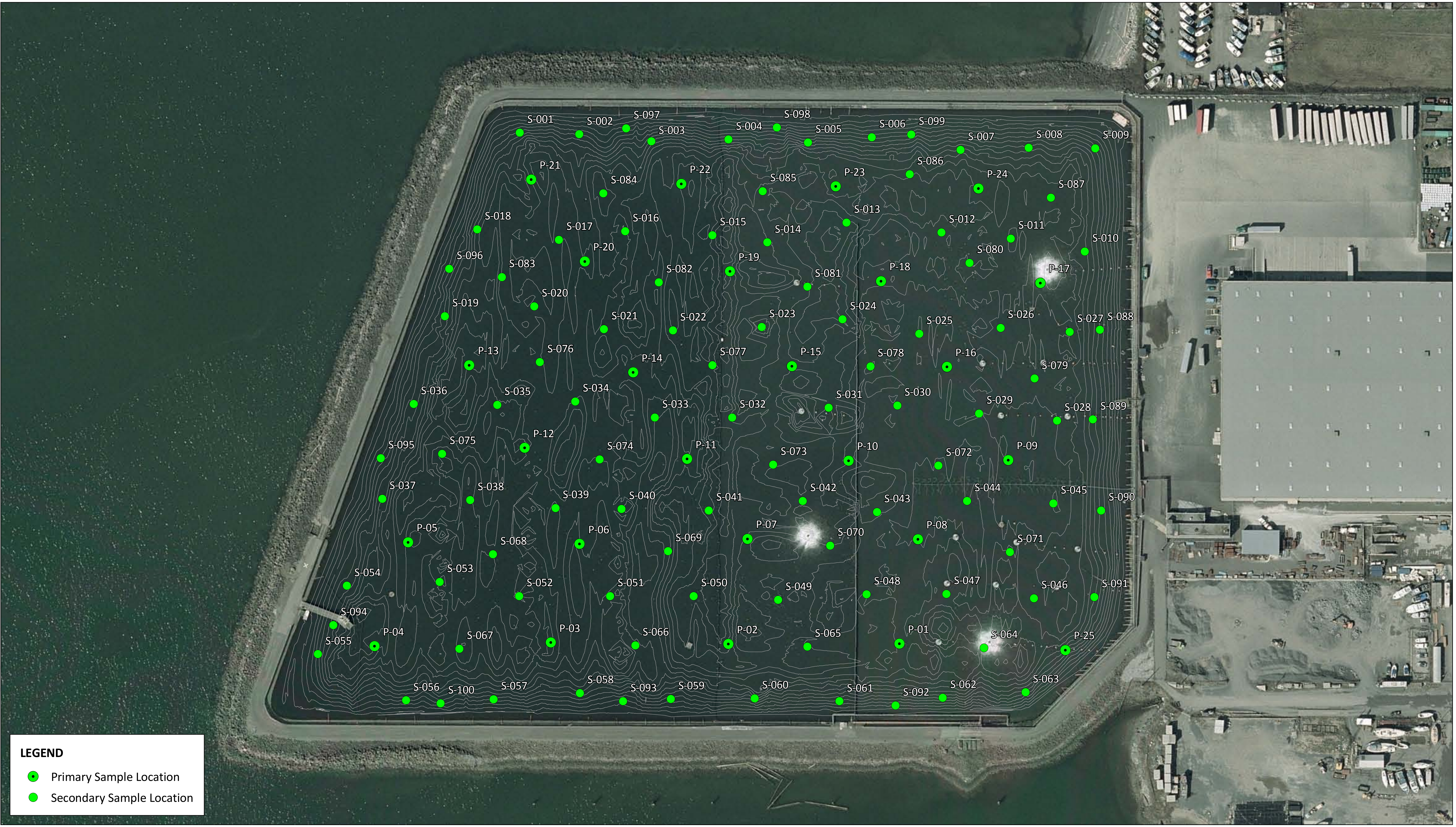
ANCHOR QEA

Figure A-1
Porewater Piezometer Schematic
PRDI Data Report
Whatcom Waterway



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ANCHOR QEA

NOTES:

1. Horizontal Datum: WA State Plane North NAD27 (Feet).
2. ASB contours presented were created from the mult-beam bathymetry survey.

Feet

0 75 150 225 300

Figure A-2

ASB Hard Bottom Investigation Stations

Whatcom Waterway PRDI Data Report

PRE-REMEDIAL DESIGN INVESTIGATION DATA REPORT

APPENDIX B – VIBRACORE RECOVERY APPLICATION

B.1 VIBRACORE RECOVERY APPLICATION

Subsurface sediment sampling was carried out by vibratory core sampler (vibracore) to collect chemical and geotechnical data. Multiple sets of core samples were collected and analyzed throughout the study area. Appendix A describes the vibracore collection and sampling details. The following describes the vibracore penetration and recovery results and how this was applied to determine sample intervals during core processing. The sediment vibracore logs included in Appendix B present the recovered sediment lithology and compaction-corrected (in-situ) sample intervals. Core collection notes, including penetration and recovery information, is also presented on the sediment core logs. Chart B-1 presents a summary of the core recovery results.

Chart B-1: Summary of PRDI Vibracore Recovery Results

Recovery Percentage Range	Unit 1A/1B	Unit 1C	Unit 2B/2C	Unit 3A/3B	Unit 5B/5C	Unit 6B/6C	Unit 8 (basin)	Unit 8 (slope)	Unit 9
Number of Cores	**16**	**8**	**3**	**6**	**6**	**4**	**25**	**24**	**6**
90 - 100%	14	7	1	2	5	1	17	8	5
80 - 90%	2	1	1	2	--	1	8	4	1
75 – 80%	--	--	1	--	--	1	--	1	--
<75%	--	--	--	2	1	1	--	11	--

Note:
Per the SAP, the target acceptable recovery percentage was 75%.
The Unit 8 slope recoveries are presented as observed in the field during core collection.

Compaction-corrected (in-situ) sediment sample depths were calculated during core processing as follows:

Recovery Length (ft) / Penetration Depth (ft) = Calculated Recovery (Equation 1)
Recovered Length (ft) x Calculated Recovery = In-Situ Depth (ft) (Equation 2)

The compaction-corrected (in-situ) sample intervals were applied selectively based on the core lithology and observations during core collection and generally applied to cores collected in individual Site Units as described below.

Unit 1A/1B, 1C, 2A/2B, 3A/3B, 5B/5C, 6B/6C, 9

Core recovery in the Whatcom Waterway (outside ASB) cores were generally well above target acceptable criteria (Chart B-1) and sample intervals were compaction-corrected uniformly throughout the core during core processing in the laboratory. The limited cores with recovery below 75% had multiple collection attempts and the core with the greatest recovery was retained for processing.

Unit 8 (ASB Basin)

Core recovery in the ASB basin cores were well above target acceptable criteria (Chart B-1). Based on field observations at the time of core collection, compaction was only applied to the overlying soft solids. The underlying sand was sampled as recovered and not compaction-corrected during core processing in the laboratory.

Unit 8 (ASB Slope "B" cores)

Core recovery in the ASB upper slope ("B") cores were generally below target acceptable criteria (Chart B-1). Based on field observations at the time of core collection, the penetration length was adjusted to account for pile driving in compact berm sand. The adjusted penetration length is presented on each sediment core log. Sample intervals were compaction-corrected (based on the adjusted penetration length) uniformly throughout the core during core processing in the laboratory.

Unit 8 (ASB Slope "C" cores)

Core recovery in the ASB lower slope ("C") cores were well above target acceptable criteria (Chart B-1). Based on field observations at the time of core collection, compaction was only applied to the overlying soft solids. The underlying sand was sampled as recovered and not compaction-corrected during core processing in the laboratory.

APPENDIX M
RESULTS OF ADDITIONAL GEOTECHNICAL AND ENVIRONMENTAL TESTING ALONG THE CENTRAL WATERFRONT SITE

(Appendix M data reports are available on CD from Ecology)

ANCHOR QEA

720 Olive Way, Suite 1900
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131

MEMORANDUM

To: Lucille T. McInerney, P.E., Ecology
Brian Sato, P.E., Ecology

Date: February 5, 2013

From: Tom Wang, P.E., Anchor QEA, LLC

Project: 080007-01.02

Cc: John Hergesheimer, Port of Bellingham
Mike Stoner, Port of Bellingham
Brian Gouran, Port of Bellingham

Re: Whatcom Waterway Site – Consent Decree No. 07-2-02257-7 – Pre-Remedial Design Investigation Work Plan Addendum #2
Central Waterfront Site – Agreed Order No. DE3341 – RI/FS Work Plan Addendum #4
Supplemental Central Waterfront Shoreline Design Investigation Results

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Anchor QEA, LLC is currently conducting remedial design and permitting activities in support of the Whatcom Waterway Site Cleanup project. This work is being performed in accordance with the First Amendment to Consent Decree No. 07-2-02257-7, which was filed in Whatcom County Court on August 19, 2011. The design and permitting work is being performed on behalf of the Port of Bellingham and other signatories to the Consent Decree. In addition, ongoing Remedial Investigation/Feasibility Study (RI/FS) activities are being performed at the Central Waterfront site in accordance with Agreed Order No. DE 3441.

PURPOSE AND BACKGROUND

In support of the Whatcom Waterway engineering design, supplemental geotechnical and environmental data needs were identified relating to the partially exposed containment wall and Maple Street bulkhead replacement design along the northern shoreline of the Whatcom Waterway site. The alignment of the proposed wall and bulkhead replacement is presented on Figure 1. The shoreline is located within the cleanup area of the Whatcom Waterway site and includes the southern portion of the Central Waterfront site where the presence of concrete debris and petroleum impacted soils and groundwater has been documented.

A supplemental investigation was performed between October 25 and October 29 to fill identified data needs. Investigation work included seven geoprobe transects perpendicular to the shoreline (20 borings total) and two hollow-stem auger soil borings to collect geotechnical information. Work was performed consistent with the Supplemental Central Waterfront Shoreline Investigation Work Plan Addendum dated October 19, 2012. This memorandum presents the investigation methods and findings of environmental and geotechnical work to support the proposed wall and bulkhead design. In addition to supporting the Whatcom Waterway site engineering design, these investigation results will inform the anticipated revisions to the Central Waterfront RI/FS, which is currently undergoing Ecology review.

INVESTIGATION METHODS AND FINDINGS

The following section describes the soil environmental and geotechnical investigation methodologies and findings. All work was performed in compliance with the site-specific health and safety plan. The investigation locations are presented on Figure 1.

Wall Alignment Survey and Utility Locates

A licensed surveyor, Wilson Engineering LLC (Wilson) surveyed and marked the proposed wall and bulkhead replacement alignment along the shoreline as shown on Figure 1. Permanent survey point markers were installed to allow access to the future wall alignment throughout the design process as needed.

A private locating contractor, Applied Professional Services, Inc., performed a utility locate to identify potential utilities in the investigation areas as well as to inform potential design needs related to utility abandonment or replacement. Findings of the utility locate are shown on Figure 1. The following utilities were identified:

- Electrical: Three electrical lines were identified in the following locations:
    - Along the eastern shoreline
    - A loading ramp to a small utility shed
    - The western area in the boatyard from the shoreline to the utility shed
- Hydraulic: One hydraulic line was identified from the loading ramp to the small utility shed.

- Water: One potable water line in the western area along the shoreline.
- Monitoring wells: Two existing monitoring wells were identified in the eastern area.
- Surface stormwater system features: Visible stormwater system features (e.g., catch basins) were identified and surveyed by Wilson.

Concrete Debris Survey and Soil Analytical Testing

Direct push borings were completed by Geoprobe methodology on October 25 and 26 to delineate the presence or absence of subsurface concrete debris and petroleum and metals contamination along the proposed wall alignment. All temporary borings were advanced to depths of 15 to 20 feet below ground surface (bgs). Final boring locations were determined in the field based on rig access and locations of subsurface utilities. Final sampling locations are shown on Figure 1.

A total of seven transects were completed as shown on Figure 1. Direct push borings at each transect were first attempted approximately 5 feet from the shoreline, if access allowed, along the proposed wall alignment markings. The first boring at each transect where no concrete debris (refusal) was encountered was advanced to 20 feet bgs and continuously logged and sampled at select depth intervals. Soils observed in these borings were logged by the field geologist; boring logs are included in Attachment A. Additional direct push borings were completed in each transect and along the proposed wall alignment to a depth of 15 feet bgs to observe the presence or absence of concrete debris (refusal). Refusal was encountered in only one area at transect CWSI-06 at the first and third attempt (second attempt was logged and sampled). Refusal was encountered at 3 feet bgs and 1.5 feet bgs, respectively.

Soil sampling was performed at multiple depth intervals at each direct push boring location; generally at approximately 3 feet bgs (overburden) and 7 feet bgs (smear zone) with additional deeper samples collected based on field observations. Samples were field screened for sheen, PID readings, and hydrocarbon odors. A total of 16 soil samples were submitted for laboratory analysis including:

- Gasoline range hydrocarbons
- Diesel/motor oil range hydrocarbons (using silica gel cleanup procedures)
- BTEX compounds

- Priority pollutant metals

Soil sampling results are presented in Table 1 and laboratory analytical reports are included in Attachment B. To evaluate potential disposal requirements for soils excavated in conjunction with construction of source control structures, soil analytical results are compared to Model Toxics Control Act (MTCA) Method A criteria for unrestricted site use rather than site-specific screening levels developed as part of the RI/FS. The analytical data will also be analyzed separately as part of the Central Waterfront Site RI/FS. Gasoline range hydrocarbon concentrations detected above the MTCA A cleanup level of 30 mg/kg (with the presence of benzene) were identified at 2 of the 7 sampling areas. CWSI-05 and CWSI-06 both had gasoline range hydrocarbon concentrations greater than 30 mg/kg only at the water table depth within the smear zone between a depth of 8 to 14 feet bgs. Benzene was detected above the MTCA cleanup level of 30 µg/kg at only one location (CWSI-05), also within the water table smear zone. No soil samples had petroleum concentrations detected above the MTCA Method A cleanup level of 2,000 mg/kg (sum of diesel and motor oil).

Priority pollutant metals were analyzed at all sampling locations except CWSI-03. Arsenic, cadmium, chromium, and lead exceeded applicable MTCA cleanup levels, as defined by Method A and Method B soil cleanup levels, and by natural background concentrations. Arsenic was detected above the MTCA cleanup level (20 mg/kg) at CWSI-02 at a concentration of 25 mg/kg. Cadmium was detected at above the MTCA cleanup level (2.0 mg/kg) at CWSI-05 at a concentration of 11.7 mg/kg. Total chromium concentrations were detected above the MTCA Method A cleanup level applicable to hexavalent chromium (19 mg/kg), but all soil samples were well below the cleanup level applicable for trivalent chromium. The total chromium results at CWSI-01 (57 mg/kg) and CWSI-02 (128 mg/kg) were both above the natural background concentration determined for Puget Sound Region soils (48 mg/kg; Ecology 1994). Lead was detected at three locations (CWSI-02, CWSI-4, and CWSI-06) above the MTCA cleanup level of 250 mg/kg. Lead concentrations ranged between 452 mg/kg to 1,260 mg/kg.

Geotechnical Borings and Testing

The hollow-stem auger soil borings were drilled to an approximate depth of 50 feet bgs. The purposes of the explorations were to investigate the subsurface conditions and obtain soil samples for laboratory analysis. Two samplers were utilized to obtain soil samples—2-inch outside diameter Standard Penetration Test (SPT) split-spoon sampler and 3-inch outside diameter Shelby tube. A total of 16 samples were obtained from SPT samplers and 6 from Shelby tubes. Geotechnical laboratory tests performed include the following:

- 22 – Moisture Content (ASTM D2216)
- 8 – Sieve Analysis (ASTM D422)
- 6 – Atterberg Limits (ASTM D4318)
- 6 – One-dimensional Consolidation (ASTM D4235)
- 6 – Undrained Unconsolidated Triaxial Compression (ASTM D2850)

The explorations performed along the Central Waterfront shoreline encountered three distinct soil units—fill, alluvium, and glacial marine drift. At the subsurface locations, the ground surface is approximately +13 feet mean lower low water (MLLW). Groundwater was observed at approximately 6 feet bgs at the time of drilling. Descriptions of the soil units encountered are provided below:

Fill (SP/SM): The unit was observed to consist primarily of loose to medium dense, poorly graded sand with varying silt and gravel. Construction debris such as wood and brick was encountered at various locations between depths of 10 and 17 feet bgs. The SPT N-values ranged from 3 to 24 blows per foot. Thickness of the layer ranged from approximately 17 feet at CWS – B1, near the northeastern region of the shoreline, to 20 feet at CWS – B2, near the middle region of the shoreline.

Alluvium (SM): This unit was observed to consist primarily of medium dense, fine-grained silty sand. The SPT N-values ranged from 13 to 34 blows per foot. Thickness of the layer is approximately 7 feet.

Glacial Marine Drift (CL): This soil unit consists of stiff, silty clay of medium plasticity. The SPT N-values ranged from 3 to 18 blows per foot. Moisture contents ranged from 18% to 31%. Undrained shear strength derived from tri-axial compression tests were found to range from 1,350 to 2,150 psf. The soil borings were terminated in this layer.

The geotechnical laboratory reports are included in Attachment C.

CONCLUSIONS

The results of the geotechnical laboratory analysis were used to update earth pressure recommendations for structural design for the source control structures and Maple Street bulkhead replacement. The soil borings and in situ testing allowed a more refined estimate of elevations of soil unit contacts and physical characteristics of soil properties. In general, the in-situ and laboratory test results confirmed the assumptions originally made for the fill and alluvium, therefore no changes were made to the earth pressures developed for the 60% design. The glacial marine drift (i.e., clay), however, was found to exhibit a higher undrained shear strength than originally assumed prior to the supplemental investigation. This higher undrained shear strength translates to an increase in the passive earth pressures originally developed for the 60% design and ultimately justifies a reduction of materials required for walls and foundation elements.

The results of soil sampling and probing confirmed the presence of petroleum contamination in the eastern portion of the project area. Analytical results will be incorporated into the Central Waterfront RI/FS development. However, based on the comparison of analytical results to MTCA Method A criteria for unrestricted site use, all vadose zone soils (above the water table fluctuation or smear zone) that are excavated in conjunction with implementation of the Whatcom Waterway cleanup can be reused on site as fill. Soils within the smear zone that are excavated in conjunction with source control structure construction will be profiled for off-site disposal. Probing observations generally indicated that concrete debris is not present in the area of the proposed wall, except at location CWSI-06 in near surface soils. Concrete was present at the surface in all probing locations.

Please do not hesitate to contact us with any questions or comments.

Sincerely,

Tom Wang, P.E.

Figure:

Figure 1: Investigation Locations

Attachments:

Attachment A: Boring Logs

Attachment B: Analytical Laboratory and Data Validation Reports

Attachment C: Geotechnical Laboratory Reports

FIGURES

Sampling Locations

- ▲ Hollow-stem Auger Boring
- ⊙ Soil Logging/Sample Boring
- ● Debris Probe
- ▨ TPH-G Concentration >30 mg/kg

Design Feature

- ━ Proposed Partially-Exposed Containment Wall
- ━ Proposed Maple Street Bulkhead Replacement

Utilities

- ╍ Approximate Electrical Locate
- ╍ Approximate Hydraulic Locate
- ╍ Approximate Water Locate

Notes:
1. Proposed wall alignment is approximate and subject to change pending final design.
2. Utilities were identified prior to subsurface sampling activities and were conducted by a private locating contractor. Utility locate did not include identification of stormwater conveyance due to piping material (e.g. OVC).
3. Direct push transects were performed in areas that allowed for access based on tenant operations.
4. Refusal was encountered at one transect (CWSI-06) at two probing locations at depths of 3-feet and 1.5-feet bgs.

Project North
True North

Feet
0 50 100

ANCHOR QEA

Figure 1
Investigation Locations
Central Waterfront Shoreline Investigation
Whatcom Waterway Cleanup in Phase 1 Area

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TABLES

Table 1
Summary of Chemical Testing Results

Area	**MTCA Method A/B Cleanup Level**	**East Transects**							
Location ID		**CWSI-01**		**CWSI-02**			**CWSI-03**		**CWSI-07**
Sample ID		**CWSI-01-3-5**	**CWSI-01-11-13**	**CWSI-02-1-3**	**CWSI-02-7-8**	**CWSI-02-12-13**	**CWSI-03-2-4**	**CWSI-03-7-9**	**CWSI-07-2-4**
Sample Date		**10/25/2012**		**10/25/2012**			**10/25/2012**		**10/26/2012**
Depth		**3 - 5 ft**	**11 - 13 ft**	**1 - 3 ft**	**7 - 8 ft**	**12 - 13 ft**	**2 - 4 ft**	**7 - 9 ft**	**2 - 4 ft**
Easting		**1241515.069**		**1241464.667**			**1241277.725**		**1241414.839**
Constiuent **Northing**		**643326.409**		**643255.767**			**643079.964**		**643208.870**
Total Petroleum Hydrocarbons (mg/kg)									
Gasoline Range Hydrocarbons	30	10 U	6.4 U	6.5 U	**7.6**	7 U	9.5 U	8.8 U	7.3 U
Diesel Range Hydrocarbons	2,000	**41**	**95**	5.2 U	**150**	**39**	**100**	**300**	**230**
Motor Oil Range	2,000	**140**	**120**	10 U	**280**	**98**	**84**	**410**	**220**
Total Diesel and Motor Oil (U = 1/2)	2,000	**181**	**215**	10 U	**430**	**137**	**184**	**710**	**450**
Total Diesel and Motor Oil (U = 0)	2,000	**181**	**215**	10 U	**430**	**137**	**184**	**710**	**450**
BTEX Compounds (µg/kg)									
Benzene	30 (A)	**1.2 J**	1 U	**1.1 J**	**0.9 J**	**0.8 J**	1.4 U	**2.3**	**2.7**
Ethylbenzene	6,000 (A)	1.3 U	1 U	1.2 U	1.2 U	**0.6 J**	1.4 U	**0.6 J**	1.2 U
Toluene	7,000 (A)	**0.7 J**	1 U	**1 J**	1.2 U	**0.6 J**	**1.6**	**2.7**	**2.8**
m,p-Xylene	9,000 (A)	1.3 U	1 U	1.2 U	1.2 U	1 U	1.4 U	**1.6**	**1.1 J**
o-Xylene	9,000 (A)	1.3 U	1 U	1.2 U	1.2 U	1 U	1.4 U	**0.8 J**	1.2 U
Priority Pollutant Metals (mg/kg)									
Antimony	3.2 (B)	20 UJ	30 UJ	**5 J**	60 UJ	30 UJ	--	--	6 UJ
Arsenic	20 (A)	20 U	30 U	**25**	60 U	30 U	--	--	**11**
Beryllium	--	0.3 U	0.6 U	**0.1**	1 U	0.6 U	--	--	**0.2**
Cadmium	2.0 (A)	**1.4**	1 U	0.2 U	2 U	**1**	--	--	**0.3**
Chromium	19 (A)/48	**38**	**57**	**14.2**	**128**	**30**	--	--	**34.1**
Copper	2,960 (B)	**148**	**359**	**41.4**	**403**	**209**	--	--	**33 J**
Lead	250 (A)	**166**	**110**	**16**	**1,260**	**40**	--	--	**25**
Mercury	2.0 (A)	**0.06**	**0.22**	0.03 U	**0.05**	0.02 U	--	--	**0.04**
Nickel	1,600 (B)	**39**	**109**	**19**	**160**	**39**	--	--	**28**
Selenium	400 (B)	20 U	30 U	5 U	60 U	30 U	--	--	6 U
Silver	400 (B)	0.9 U	2 U	0.3 U	4 U	2 U	--	--	0.3 U
Thallium	--	20 U	30 U	5 U	60 U	30 U	--	--	6 U
Zinc	24,000 (B)	**347**	**273**	**52**	**250**	**162**	--	--	**106 J**

Table 1
Summary of Chemical Testing Results

Area	MTCA Method A/B Cleanup Level	West Transects							
Location ID		CWSI-04			CWSI-05			CWSI-06	
Sample ID		CWSI-04-2-4	CWSI-04-6-8	CWSI-04-13.5-15	CWSI-05-2-4	CWSI-05-7-9	CWSI-05-12-14	CWSI-06-8-10	CWSI-06-12-14
Sample Date		10/25/2012			10/26/2012			10/26/2012	
Depth		2 - 4 ft	6 - 8 ft	13.5 - 15 ft	2 - 4 ft	7 - 9 ft	12 - 14 ft	8 - 10 ft	12 - 14 ft
Easting		1241207.421			1241174.122			1241144.947	
Constiuent Northing		643013.658			642980.831			642965.046	
Total Petroleum Hydrocarbons (mg/kg)									
Gasoline Range Hydrocarbons	30	6.4 U	7.8 U	**19**	**24**	7.6 U	**160**	**1,300**	**62**
Diesel Range Hydrocarbons	2,000	**67**	**24**	**200**	**69**	**200**	**420**	**1,300**	**240**
Motor Oil Range	2,000	**97**	**37**	**260**	**130**	**250**	**590**	**640**	**330**
Total Diesel and Motor Oil (U = 1/2)	2,000	**164**	**61**	**460**	**199**	**450**	**1,010**	**1,940**	**570**
Total Diesel and Motor Oil (U = 0)	2,000	**164**	**61**	**460**	**199**	**450**	**1,010**	**1,940**	**570**
BTEX Compounds (µg/kg)									
Benzene	30 (A)	1.1 U	1.2 U	**17**	**1.6**	1.5 U	**63**	2.4 U	**3**
Ethylbenzene	6,000 (A)	1.1 U	1.2 U	1.2 U	1.3 U	1.5 U	**7.5**	2.4 U	**1.8**
Toluene	7,000 (A)	1.1 U	**0.6 J**	**1.1 J**	**1.3 J**	1.5 U	**11**	3.5 U	**1.3**
m,p-Xylene	9,000 (A)	1.1 U	1.2 U	1.2 U	1.3 U	1.5 U	**29**	2.4 U	**3**
o-Xylene	9,000 (A)	1.1 U	1.2 U	1.2 U	1.3 U	1.5 U	**5.4**	2.4 U	**0.5 J**
Priority Pollutant Metals (mg/kg)									
Antimony	3.2 (B)	6 UJ	6 UJ	10 UJ	6 UJ	6 UJ	6 UJ	7 UJ	6 UJ
Arsenic	20 (A)	6 U	6 U	10 U	6 U	**18**	**7**	**9**	6 U
Beryllium	--	**0.2**	**0.1**	0.3 U	**0.1**	**0.2**	0.1 U	0.1 U	0.1 U
Cadmium	2.0 (A)	**0.7**	0.3 U	**11.7**	**0.3**	**0.4**	**0.3**	**0.7**	**0.5**
Chromium	19 (A)/48	**35.9**	**37.8**	**22**	**27.4**	**22.7**	**21.1**	**29.8**	**15.8**
Copper	2,960 (B)	**40.9**	**34.5**	**30.3**	**27.2 J**	**50.1 J**	**35.3 J**	**89.4 J**	**41.4 J**
Lead	250 (A)	**30**	**22**	**452**	**23**	**33**	**69**	**145**	**511**
Mercury	2.0 (A)	**0.16**	**0.08**	**0.2**	**0.17**	**0.12**	**0.09**	**0.38**	**0.33**
Nickel	1,600 (B)	**40**	**23**	**17**	**30**	**26**	**18**	**33**	**15**
Selenium	400 (B)	6 U	6 U	10 U	6 U	6 U	6 U	7 U	6 U
Silver	400 (B)	0.3 U	0.4 U	0.9 U	0.3 U	0.4 U	0.4 U	0.4 U	0.4 U
Thallium	--	6 U	6 U	10 U	6 U	6 U	6 U	7 U	6 U
Zinc	24,000 (B)	**84**	**48**	**5,050**	**73 J**	**100 J**	**156 J**	**202 J**	**180 J**

Notes:

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit