URS

January 20, 2011

Mr. David South
Senior Engineer
Toxics Cleanup Program
Washington Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008–5452

Re: Proposed Additional Data Gap Investigation Sampling Activities, Laurel Station, 1009 East Smith Road, Bellingham, Washington

Dear Mr. South:

In June and August 2010, Kinder Morgan Canada (Kinder Morgan) and URS Corporation (URS) performed the proposed data gap investigation outlined in Section 9.0 and Appendix G (Sampling and Analysis Plan [SAP]) of the Final Supplemental Remedial Investigation/Feasibility Study (RI/FS) Work Plan (URS, 2010a) and the Work Plan Addendum (URS, 2010b) for the Laurel Station facility. The following data gap investigation sampling activities were performed in August 2010:

- Drilling in Area 1 (borings A1-B1 through A1-B25) and Area 2 (boring A2-B1 [Figure 35 of URS, 2010a])
- Drilling in Study Unit 1 (borings SU1-B13, SU1-B15 and SU1-B21 through SU1-B26) (Figure 1)
- One transect of sediment samples was collected on the downstream side of the March 7, 1992 Spill Containment Dam (Figure 40 of URS, 2010a)
- Groundwater samples were collected from existing site monitoring wells SW-1, SW-2 and SW-4 in August 2010 (Figure 1, monitoring wells SW-3 and SW-5 were dry).

The groundwater analytical results showed detections of total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAHs) in groundwater at the site above Preliminary Cleanup Levels (PCLs), which was not consistent with historical groundwater analytical results. Based on this apparently anomalous data, monitoring wells SW-1 through SW-5 were redeveloped in November 2010 and re-sampled on December 1, 2010.

The preliminary analytical data for the soil samples (Tables 1a and 1b) collected during the June and August 2010 data gap investigation activities indicate that additional borings are necessary to define the lateral extent of petroleum impacts identified at borings SU1-B12, SU1-B14, and SU1-B22 near the piping manifold and SU1-B26 near the pump station building (Figure 1).

The preliminary analytical data for the groundwater samples collected from monitoring wells SW-1, SW-2, and SW-4 on December 1, 2010 did not identify TPH or PAHs above PCLs with the exception of the groundwater sample collected from SW-1, which contained concentrations of carcinogenic PAHs (cPAHs) above PCLs (Tables 2a and 2b). Monitoring wells SW-3 and SW-5 were dry during the December 1, 2010 monitoring event.

URS Corporation
1501 4th Avenue, Suite 1400
Seattle, WA 98101-1616
Tel: 206.438.2700
Fax: 206.438.2699

PROPOSED ADDITIONAL FIELD INVESTIGATION

To further characterize the lateral extent of hydrocarbon impacts to soil in the piping manifold and pump station areas, and to confirm the presence or absence of shallow groundwater in these areas of soil contamination, 8 soil borings (MW-1 through MW-5 and SU1-B27 through SU1-B29) will be drilled in the proposed locations depicted on Figure 1. The rationale for each proposed location is presented in Table 3. These borings will be completed using sonic drilling techniques.

The next phase of field work is scheduled for the weeks of January 31 and February 7, 2010, and will include soil sample collection using Sonic drilling methods, groundwater monitoring well installations, and the collection of groundwater samples from the new (if groundwater is present) and existing monitoring wells. This additional field work will be performed based on procedures approved in Appendix G of the Final Supplemental RI/FS Work Plan (URS, 2010a) and the Work Plan Addendum (URS, 2010b) and is discussed in more detail below.

Soil Sampling

The proposed boring and monitoring well locations are shown on Figure 1. The proposed sampling depths and analytical methods are outlined in Table 3. Sample collection and handling will be performed as described in the SAP.

Monitoring Well Installation

Proposed monitoring wells MW-1 and MW-2 will be installed and screened across the area of contamination within the unconsolidated glacial deposits present in the piping manifold and former oily water sump areas (Figures 1 and 2). Proposed monitoring wells MW-3 through MW-5 will be installed and screened just below the Bellingham Drift and within the unconsolidated glacial deposits present in these areas of the site. The wells will be constructed with 2-inch-diameter, flush-threaded, blank and screened polyvinyl chloride (PVC) well casing. The wells will have a bottom, flush-threaded cap, 10 to 25 feet of screened well casing, and blank well casing to complete the wells to ground surface. The wells will be constructed with 0.020-inch slotted screen and 20/40 filter sand. Following installation, the location and elevation of the groundwater monitoring well network will be surveyed by a licensed land surveyor.

Groundwater Sampling

If groundwater is present in the new wells, the wells will be included in a groundwater sampling program to assess potential impacts to shallow groundwater. Groundwater samples will be collected from the new and existing monitoring wells and will be analyzed for gasoline-range petroleum hydrocarbons by Method NWTPH-Gx, diesel and motor oil-range petroleum hydrocarbons by Method NWTPH-Dx, BTEX by EPA Method 8021B, and PAHs by 8270D-SIM. Groundwater samples may also be analyzed for monitored natural attenuation (MNA) parameters or other parameters that may be valuable for assessing future remedial alternatives at the site.

Groundwater sampling will be conducted using disposable bailers designed to accommodate suspended solids in the water column that previously precluded the use of downhole pumps for low flow sampling. Groundwater field parameters will be monitored until stabilized readings are obtained or three well casing volumes have been purged. Groundwater elevation measurements recorded during the well monitoring will be used to confirm groundwater flow conditions at the site.

If groundwater is not present in the new wells, MW-1 potentially will be used as an extraction/injection well and MW-2 through MW-5 will be used as observation wells for pilot testing of in-situ soil remediation technologies, if appropriate at a later date.

We trust this information meets your current requirements. Please contact us if you have any questions.

Sincerely,
URS CORPORATION

Karen L. Mixon
Project Manager

Copy: Mike Droppo – Kinder Morgan Canada
Patrick Davis – Kinder Morgan
Dale McClary – Kinder Morgan
Matt Annis – URS

References

URS, 2010a. *Final Supplemental Remedial Investigation/Feasibility Study Work Plan, Laurel Station, 1009 East Smith Road, Bellingham, Washington*. May 28.

URS, 2010b. Proposed Additional Data Gap Investigation Sampling Activities, Laurel Station, 1009 East Smith Road, Bellingham, Washington. August 5.

Attachments:

Table 1a – Summary of Soil Analytical Results – TPH and BTEX, June and August 2010
Table 1b – Summary of Soil Analytical Results – PAHs, June and August 2010
Table 2a – Summary of 2010 Groundwater Analytical Results – TPH and BTEX
Table 2b – Summary of 2010 Groundwater Analytical Results – PAHs
Table 3 – Proposed Sampling Locations and Rationale
Figure 1 – Proposed Soil Boring/Monitoring Well Locations (Study Unit 1)
Figure 2 – Geologic Cross Section A-A'

Table 1a
Summary of Soil Analytical Results - TPH and BTEX
June and August 2010
Study Unit 1
Laurel Station
Bellingham, Washington

Location ID	Location Type	Sample ID	Sample Date	Depth	TPH - gasoline range mg/kg	TPH - diesel range mg/kg	TPH - lube oil mg/kg	benzene ug/kg	toluene ug/kg	ethylbenzene ug/kg	m,p-xylene ug/kg	o-xylene ug/kg
Preliminary Cleanup Level					**100/30[1]**	**460**	**2,000**	**30**	**7,000**	**6,000**	**9,000[2]**	**9,000[2]**
SU1-B1	BH	SU1-B1-5	6/15/2010	5-5 ft	8.1 U	6.7 U	21	20 U	20 U	20 U	40 U	20 U
SU1-B1	BH	SU1-B1-10	6/15/2010	10-10 ft	5.6 U	5.6 U	11 U	14 U	14 U	14 U	28 U	14 U
SU1-B1	BH	SU1-B1-15	6/15/2010	15-15 ft	5.4 U	5.3 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B10	BH	SU1-B10-5	6/14/2010	5-5 ft	12 U	5.7 U	11 U	29 U	29 U	29 U	58 U	29 U
SU1-B10	BH	SU1-B10-10	6/14/2010	10-10 ft	11 U	5.7 U	12 U	28 U	28 U	28 U	57 U	28 U
SU1-B10	BH	SU1-B10-15	6/14/2010	15-15 ft	10 U	5.5 U	11 U	25 U	25 U	25 U	51 U	25 U
SU1-B11	BH	SU1-B11-5	6/14/2010	5-5 ft	**1800**	140	130	*33 U*	190	3700	65 U	33 U
SU1-B11	BH	SU1-B11-10	6/14/2010	10-10 ft	5.8 U	5.6 U	11 U	15 U	15 U	15 U	29 U	110
SU1-B11	BH	SU1-B11-15	6/14/2010	15-15 ft	5.3 U	5.4 U	11 U	13 U	13 U	13 U	26 U	13 U
SU1-B11	BH	SOIL DUP2	6/14/2010	15-15 ft	10 U	5.5 U	11 U	26 U	26 U	26 U	52 U	26 U
SU1-B12	BH	SU1-B12-6	6/7/2010	6-6 ft	5.8	6.4	12	11 U	18	11 U	23 U	20
SU1-B12	BH	SU1-B12-10	6/7/2010	10-10 ft	**1200**	**940**	1100	18	150	2300	120	1000
SU1-B12	BH	SU1-B12-15	6/7/2010	15-15 ft	**8400**	**3700**	**3400**	*180 U*	1100	16000	680	2800
SU1-B12	BH	SU1-B12-20	6/7/2010	20-20 ft	**2200**	**1200**	1100	30 U	250	4400	170	1800
SU1-B12	BH	SU1-B12-34	6/7/2010	34-34 ft	63	54	63	13 U	13 U	61	26 U	34
SU1-B12	BH	SU1-B12-45	6/7/2010	45-45 ft	**350**	140	140	13 U	41	570	34	240
SU1-B14	BH	SU1-B14-5	6/8/2010	5-5 ft	15	45	71	12 U	12 U	12 U	24 U	12 U
SU1-B14	BH	SU1-B14-10	6/8/2010	10-10 ft	5.6 U	5.1 U	10 U	14 U	14 U	14 U	28 U	14 U
SU1-B14	BH	SU1-B14-15	6/8/2010	15-15 ft	**1500**	**1200**	1200	26 U	240 J	4400 J	190 J	26 U
SU1-B14	BH	Soil Dup 1	6/8/2010	15-15 ft	**1000**	**920**	920	12 U	110 J	1800 J	85 J	12 U
SU1-B14	BH	SU1-B14-20	6/8/2010	20-20 ft	**920**	**840**	900	14 U	86	1600	110	430
SU1-B14	BH	SU1-B14-25	6/8/2010	25-25 ft	**160**	240	260	14 U	14 U	170	27 U	74
SU1-B14	BH	SU1-B14-30	6/8/2010	30-30 ft	5.6 U	5.0 U	10 U	14 U	14 U	14 U	28 U	14 U
SU1-B14	BH	SU1-B14-35	6/8/2010	35-35 ft	11	5.2 U	10 U	13 U	33	13 U	36	19
SU1-B14	BH	SU1-B14-40	6/8/2010	40-40 ft	6.1 U	5.1 U	10 U	15 U	15	15 U	30 U	15 U
SU1-B14	BH	SU1-B14-45	6/8/2010	45-45 ft	6.6 U	5.1 U	10 U	16 U	16 U	16 U	33 U	16 U
SU1-B16	BH	SU1-B16-5	6/8/2010	5-5 ft	5.6 U	93 J	59 J	14 U	14 U	14 U	28 U	14 U
SU1-B16	BH	SU1-B16-15	6/8/2010	15-15 ft	5.5 U	5.3 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B16	BH	SU1-B16-20	6/8/2010	20-20 ft	6.0 U	5.1 U	10 U	15 U	15 U	15 U	30 U	15 U
SU1-B16	BH	SU1-B16-25	6/8/2010	25-25 ft	5.4 U	5.3 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B16	BH	SU1-B16-30	6/8/2010	30-30 ft	5.0 U	5.2 U	10 U	12 U	12 U	12 U	25 U	12 U
SU1-B16	BH	SU1-B16-35	6/8/2010	35-35 ft	5.7 U	5.1 U	10 U	14 U	14 U	14 U	28 U	14 U
SU1-B17	BH	SU1-B17-3	6/15/2010	3-3 ft	6.2 U	5.4 U	11 U	16 U	16 U	16 U	31 U	16 U
SU1-B17	BH	SU1-B17-5	6/15/2010	5-5 ft	5.7 U	5.6 U	11 U	14 U	14 U	14 U	28 U	14 U
SU1-B17	BH	SU1-B17-10	6/15/2010	10-10 ft	5.5 U	5.6 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B18	SED	SU1-B18-5	6/16/2010	5-5 ft	6.3 U	6.0 U	12 U	16 U	16 U	16 U	32 U	16 U
SU1-B18	SED	SU1-B18-10	6/16/2010	10-10 ft	5.5 U	5.6 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B19	BH	SU1-B19-6	6/14/2010	6-6 ft	14	7.6	23	14 U	14 U	14 U	28 U	570
SU1-B19	BH	SU1-B19-8	6/14/2010	8-8 ft	8.8 U	5.4 U	11 U	22 U	22 U	22 U	44 U	110
SU1-B19	BH	SU1-B19-10	6/14/2010	10-10 ft	6.4 U	5.6 U	11 U	16 U	16 U	16 U	32 U	16 U
SU1-B2	BH	SU1-B2-5	6/15/2010	5-5 ft	**190**	95	17	13 U	13 U	450	27 U	13 U
SU1-B2	BH	SU1-B2-10	6/15/2010	10-10 ft	5.4 U	5.7 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B2	BH	SU1-B2-15	6/15/2010	15-15 ft	5.4 U	5.3 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B20	BH	SU1-B20-29	6/7/2010	29-29 ft	7.3 U	14	19	18 U	18 U	18 U	36 U	18 U
SU1-B20	BH	SU1-B20-30	6/7/2010	30-30 ft	5.7 U	5.1 U	10 U	14 U	14 U	14 U	28 U	14 U
SU1-B3	BH	SU1-B3-5	6/16/2010	5-5 ft	9.1 U	7.2 U	14 U	23 U	23 U	23 U	45 U	23 U
SU1-B3	BH	SU1-B3-10	6/16/2010	10-10 ft	6.0 U	5.8 U	12 U	15 U	15 U	15 U	30 U	15 U
SU1-B3	BH	SU1-B3-15	6/16/2010	15-15 ft	5.3 U	5.8 U	12 U	13 U	13 U	13 U	26 U	13 U

Location ID	Location Type	Sample ID	Sample Date	Depth	TPH - gasoline range mg/kg	TPH - diesel range mg/kg	TPH - lube oil mg/kg	benzene ug/kg	toluene ug/kg	ethylbenzene ug/kg	m,p-xylene ug/kg	o-xylene ug/kg
Preliminary Cleanup Level					**100/30[1]**	**460**	**2,000**	**30**	**7,000**	**6,000**	**9,000[2]**	**9,000[2]**
SU1-B4	BH	SU1-B4-5	6/15/2010	5-5 ft	85	7.6 U	15 U	28 U	28 U	240	57 U	28 U
SU1-B4	BH	SU1-B4-10	6/15/2010	10-10 ft	6.1 U	5.9 U	12 U	15 U	15 U	15 U	31 U	15 U
SU1-B4	BH	SU1-B4-15	6/15/2010	15-15 ft	6.0 U	5.6 U	11 U	15 U	15 U	15 U	30 U	15 U
SU1-B5	BH	SU1-B5-2	6/16/2010	2-2 ft	6.6 U	6.0 U	12 U	17 U	17 U	17 U	33 U	17 U
SU1-B5	BH	SU1-B5-5	6/16/2010	5-5 ft	5.6 U	5.7 U	12 U	14 U	14 U	14 U	28 U	14 U
SU1-B6	BH	SU1-B6-3	6/16/2010	3-3 ft	6.1 U	5.9 U	12 U	15 U	15 U	15 U	30 U	15 U
SU1-B6	BH	SU1-B6-5	6/16/2010	5-5 ft	**41**	47	12 U	**46**	32	100	100	15 U
SU1-B6	BH	SU1-B6-10	6/16/2010	10-10 ft	5.2 U	5.8 U	12 U	13 U	13 U	13 U	26 U	13 U
SU1-B7	BH	SU1-B7-3	6/16/2010	3-3 ft	6.7 U	5.9 U	12 U	17 U	17 U	17 U	34 U	17 U
SU1-B7	BH	SU1-B7-5	6/16/2010	5-5 ft	**40**	6.4 U	13 U	**1100**	20 U	560	4900	170
SU1-B7	BH	SU1-B7-10	6/16/2010	10-10 ft	9.2	6.0 U	12 U	15 U	15 U	15 U	31 U	15 UJ
SU1-B7	BH	SU1-B7-12	6/16/2010	12-12 ft	6.0 U	5.8 U	12 U	15 U	15 U	15 U	30 U	15 UJ
SU1-B8	BH	SU1-B8-5	6/16/2010	5-5 ft	**30**	8.2 U	20	**420**	30 U	47	220	30 UJ
SU1-B8	SED	SU1-B8-10	6/16/2010	10-10 ft	6.3 U	5.5 U	11 U	16 U	16 U	16 U	31 U	16 U
SU1-B8	SED	SU1-B8-12	6/16/2010	12-12 ft	5.4 U	5.7 U	11 U	13 U	13 U	13 U	27 U	13 U
SU1-B9	BH	SU1-B9-3	6/16/2010	3-3 ft	6.0 U	8.8	40	15 U	15 U	15 U	30 U	15 U
SU1-B9	BH	SU1-B9-5	6/16/2010	5-5 ft	9.4	6.0 U	12 U	**680**	14 U	190	1300	88
SU1-B9	BH	SU1-B9-10	6/16/2010	10-10 ft	6.4 U	5.8 U	12 U	16 U	16 U	16 U	32 U	16 U
SU1-B9	BH	SU1-B9-12.5	6/16/2010	12.5-12.5 ft	5.8 U	5.8 U	12 U	15 U	15 U	15 U	29 U	15 U
SU1-B9	BH	SOIL DUP4	6/16/2010	12.5-12.5 ft	5.4 U	5.6 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B13	BH	SU1-B13-5	8/18/2010	5-5 ft	4.9 U	5.3 U	11 U	12 U	12 U	12 U	25 U	12 U
SU1-B13	BH	SU1-B13-10	8/18/2010	10-10 ft	4.2 U	20 J	28	10 U	10 U	10 U	21 U	10 U
SU1-B13	BH	SOILDUP5	8/18/2010	10-10 ft	11	13	18	13 U	13 U	13 U	26 U	13 U
SU1-B13	BH	SU1-B13-15	8/18/2010	15-15 ft	5.2 U	5.0 U	10 U	13 U	13 U	13 U	26 U	13 U
SU1-B13	BH	SU1-B13-20	8/18/2010	20-20 ft	5.6 U	5.5 U	11 U	14 U	14 U	14 U	28 U	14 U
SU1-B13	BH	SU1-B13-25	8/18/2010	25-25 ft	5.2 U	5.3 U	11 U	13 U	13 U	13 U	26 U	13 U
SU1-B13	BH	SU1-B13-30	8/18/2010	30-30 ft	5.3 U	5.3 U	11 U	13 U	13 U	13 U	26 U	13 U
SU1-B15	BH	SU1-B15-5	8/18/2010	5-5 ft	6.1 U	5.4 U	11 U	15 U	15 U	15 U	31 U	15 U
SU1-B15	BH	SU1-B15-10	8/18/2010	10-10 ft	5.0 U	5.0 U	10 U	12 U	12 U	12 U	25 U	12 U
SU1-B15	BH	SU1-B15-15	8/18/2010	15-15 ft	14	**570**	590	17	19	13 U	25 U	13 U
SU1-B15	BH	SU1-B15-20	8/18/2010	20-20 ft	5.2 U	5.1 U	10 U	13 U	13 U	13 U	26 U	13 U
SU1-B15	BH	SU1-B15-25	8/19/2010	25-25 ft	6.2 U	5.2 U	10 U	16 U	16 U	16 U	31 U	16 U
SU1-B15	BH	SU1-B15-30	8/19/2010	30-30 ft	5.5 U	5.3 U	10 U	14 U	14 U	14 U	27 U	14 U
SU1-B21	BH	SU1-B21-32	8/17/2010	32-32 ft	5.5 U	8.0 J	42	14 U	14 U	14 U	28 U	14 U
SU1-B21	BH	SU1-B21-45	8/17/2010	45-45 ft	5.0 U	5.0 U	10 U	12 U	12 U	12 U	25 U	12 U
SU1-B21	BH	SU1-B21-50	8/17/2010	50-50 ft	5.5 U	5.3 U	11 U	14 U	14 U	14 U	28 U	14 U
SU1-B22	BH	SU1-B22-5	8/17/2010	5-5 ft	5.6 U	5.0 U	10 U	14 U	14 U	14 U	28 U	14 U
SU1-B22	BH	SU1-B22-10	8/17/2010	10-10 ft	**190**	85 J	100	14 U	29	310	33	80
SU1-B22	BH	SU1-B22-15	8/17/2010	15-15 ft	5.7 U	5.3 U	11 U	14 U	14 U	14 U	28 U	14 U
SU1-B22	BH	SU1-B22-20	8/17/2010	20-20 ft	5.1 U	5.2 U	10 U	13 U	13 U	13 U	26 U	13 U
SU1-B22	BH	SU1-B22-25	8/17/2010	25-25 ft	5.2 U	5.0 U	10 U	13 U	13 U	13 U	26 U	13 U
SU1-B22	BH	SU1-B22-30	8/18/2010	30-30 ft	6.0 U	5.2 U	10 U	15 U	15 U	15 U	30 U	15 U
SU1-B22	BH	SU1-B22-35	8/18/2010	35-35 ft	5.4 U	5.3 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B22	BH	SU1-B22-40	8/18/2010	40-40 ft	4.8 U	5.3 U	11 U	12 U	12 U	12 U	24 U	12 U
SU1-B22	BH	SU1-B22-45	8/18/2010	45-45 ft	5.6 U	5.0 U	10 U	14 U	14 U	14 U	28 U	14 U
SU1-B23	BH	SU1-B23-5	8/19/2010	5-5 ft	5.5 U	10	81	14 U	14 U	14 U	28 U	14 U
SU1-B23	BH	SU1-B23-10	8/19/2010	10-10 ft	4.9 U	5.0 U	10 U	12 U	12 U	12 U	24 U	12 U
SU1-B23	BH	SU1-B23-15	8/19/2010	15-15 ft	5.7 U	5.3 U	10 U	14 U	14 U	14 U	29 U	14 U
SU1-B23	BH	SU1-B23-20	8/19/2010	20-20 ft	6.6 U	5.7 U	12 U	17 U	17 U	17 U	33 U	17 U
SU1-B23	BH	SU1-B23-25	8/19/2010	25-25 ft	5.3 U	5.2 U	10 U	13 U	13 U	13 U	26 U	13 U

Location ID	Location Type	Sample ID	Sample Date	Depth	TPH - gasoline range mg/kg	TPH - diesel range mg/kg	TPH - lube oil mg/kg	benzene ug/kg	toluene ug/kg	ethylbenzene ug/kg	m,p-xylene ug/kg	o-xylene ug/kg
Preliminary Cleanup Level					**100/30[1]**	**460**	**2,000**	**30**	**7,000**	**6,000**	**9,000[2]**	**9,000[2]**
SU1-B24	BH	SU1-B24-5	8/19/2010	5-5 ft	6.2 U	5.3 U	11 U	15 U	15 U	15 U	31 U	15 U
SU1-B24	BH	SOIL-DUP6	8/19/2010	5-5 ft	7.4 U	5.3 U	11 U	19 U	19 U	19 U	37 U	19 U
SU1-B24	BH	SU1-B24-10	8/19/2010	10-10 ft	5.5 U	5.3 U	11 U	14 U	14 U	14 U	28 U	14 U
SU1-B24	BH	SU1-B24-15	8/19/2010	15-15 ft	5.4 U	5.1 U	10 U	13 U	13 U	13 U	27 U	13 U
SU1-B24	BH	SU1-B24-20	8/19/2010	20-20 ft	5.6 U	5.0 U	10 U	14 U	14 U	14 U	28 U	14 U
SU1-B24	BH	SU1-B24-25	8/19/2010	25-25 ft	5.9 U	5.1 U	10 U	15 U	15 U	15 U	30 U	15 U
SU1-B25	BH	SU1-B25-5	8/19/2010	5-5 ft	6.5 U	5.0 U	10 U	16 U	16 U	16 U	33 U	16 U
SU1-B25	BH	SU1-B25-10	8/19/2010	10-10 ft	5.4 U	5.3 U	11 U	14 U	14 U	14 U	27 U	14 U
SU1-B25	BH	SU1-B25-15	8/19/2010	15-15 ft	5.1 U	5.2 U	10 U	13 U	13 U	13 U	26 U	13 U
SU1-B25	BH	SU1-B25-20	8/19/2010	20-20 ft	4.8 U	5.3 U	11 U	12 U	12 U	12 U	24 U	12 U
SU1-B26	BH	SU1-B26-5	8/20/2010	5-5 ft	5.8 U	5.0 U	10 U	14 U	14 U	14 U	29 U	14 U
SU1-B26	BH	SU1-B26-10	8/20/2010	10-10 ft	**320**	100 J	110	14 U	56	680	41	140
SU1-B26	BH	SU1-B26-15	8/20/2010	15-15 ft	56	130 J	140	15 U	38	53	29 U	35
SU1-B26	BH	SU1-B26-20	8/20/2010	20-20 ft	**110**	14 J	35	11 U	81	100	22 U	35
SU1-B26	BH	SU1-B26-23	8/20/2010	23-23 ft	7.2 U	6.1 J	72	18 U	18 U	18 U	36 U	18 U

J - Estimated value

U - Parameter was anayzed for but not detected above the reporting limit shown

UJ - Parameter was anayzed for but not detected above the reporting limit shown. The reporting limit is an estimated value.

[1] gasoline mixtures without benzene/gasoline mixtures with benzene

[2] Preliminary Cleanup Level for Total Xylenes

Bold values indicate the Preliminary Cleanup Level was exceeded

Table 1b
Summary of Soil Analytical Results - PAHs
June and August 2010
Study Unit 1
Laurel Station
Bellingham, Washington

Boring Location	SU1-B12			SU1-B14			SU1-B15	Preliminary Cleanup Level (ug/kg)
Sample ID	SU1-B12-10	SU1-B12-15	SU1-B12-20	SU1-B14-15	Soil Dup 1	SU1-B14-20	SU1-B15-15	
Sample Date	6/7/2010	6/7/2010	6/7/2010	6/8/2010	6/8/2010	6/8/2010	8/18/2010	
Sample Depth	10-10 ft	15-15 ft	20-20 ft	15-15 ft	15-15 ft	20-20 ft	15-15 ft	
naphthalene	180	4600	1400	1600	970	150 J	850	**5,000**
2-methylnaphthalene	860	17000	4900	6500 J	3100 J	710	230	**320,000**
1-methylnaphthalene	700	12000	3300	4400 J	2200 J	510 J	150	**NE**
acenaphthylene	38 UJ	200 UJ	62 UJ	81 UJ	44 UJ	19 UJ	26	**NE**
acenaphthene	38 UJ	270 J	95 J	97 J	110 J	14 U	9.7 U	**4,800,000**
fluorene	230	1500	540	710 J	390 J	95	42	**3,200,000**
phenanthrene	230	2900	1000	1300 J	630 J	140	62	**NE**
anthracene	15 U	30 U	14 U	15 U	14 U	14 U	16 J	**24,000,000**
fluoranthene	15 U	73 UJ	32 UJ	18 UJ	14 U	14 U	12 J	**3,200,000**
pyrene	98 J	360 J	130 J	150 J	71 J	60 J	16	**2,400,000**
benzo(a)anthracene	28	150	48	53 J	18 J	22 J	9.7 U	**See Note 1**
chrysene	180	620	230	280 J	130 J	120 J	44	**See Note 1**
benzo(b)fluoranthene	15 U	36	15	15 U	14 U	14 U	--	**See Note 1**
benzo(k)fluoranthene	15 U	36	15	15 U	14 U	14 U	--	**See Note 1**
benzo(a)pyrene	18 J	40 J	14 U	15 U	14 U	14 U	9.7 U	**100**
indeno_1,2,3-cd_pyrene	15 U	30 U	14 U	15 U	14 U	14 U	9.7 U	**See Note 1**
dibenz(a,h)anthracene	15 U	30 U	14 U	15 U	14 U	14 U	9.7 U	**See Note 1**
benzo(g,h,i)perylene	22	49	25	24	14 U	14	9.7 U	**NE**
dibenzofuran	40 UJ	300 J	120 J	130 J	89 J	17 J	9.7 U	**160,000**
total benzofluoranthenes	15 U	72	30	15 U	14 U	14 U	9.7 J	**NE**
TTEC	20	83	17	16	10	2.9	1.4	**100**

Results in ug/kg
NE - not established
J - Estimated value
U - Parameter was anayzed for but not detected above the reporting limit shown
UJ - Parameter was anayzed for but not detected above the reporting limit shown. The reporting limit is an estimated value.
1 - Carcinogenic PAH cleanup levels are based on calculated total toxicity using the Toxicity Equivalency methodology in WAC 173-340-708 (8).

Table 2a
Summary of 2010 Groundwater Analytical Results - TPH and BTEX
Laurel Station
Bellingham, Washington

Location ID	Location Type	Sample ID	Sample Date	TPH - gasoline range mg/l	TPH - diesel range mg/l	TPH - lube oil mg/l	benzene ug/l	toluene ug/l	ethylbenzene ug/l	m,p-xylene ug/l	o-xylene ug/l
Preliminary Cleanup Level				**0.8/1.0[1]**	**0.5**	**0.5**	**0.795**	**640**	**700**	**1,000[2]**	**1,000[2]**
SW-1	GW	SW-1	8/26/2010	0.10 U	0.10 U	0.20 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U
		SW-1	12/1/2010	0.10 U	0.10 U	0.20 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U
SW-2	GW	SW-2	8/26/2010	0.29 *	**0.51**	**3.4**	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U
		SW-DUP1	8/26/2010	0.34 *	0.43	**2.5**	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U
		SW-2	12/1/2010	0.10 U	0.10 U	0.20 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U
		DUP	12/1/2010	0.10 U	0.10 U	0.20 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U
SW-4	GW	SW-4	8/26/2010	0.10 U	0.10 U	0.20 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U
		SW-4	12/1/2010	0.10 U	0.10 U	0.20 U	0.25 U	0.25 U	0.25 U	0.50 U	0.25 U

Notes:
Bold indicates result above preliminary groundwater cleanup level (as applicable).
*Sample chromatogram does not match the laboratory standard chromatogram
[1] gasoline mixtures without benzene/gasoline mixtures with benzene
[2] preliminary cleanup level for total xylenes
BTEX - benzene, toluene, ethylbenzene, and xylenes
mg/l - milligrams per liter
TPH - total petroleum hydrocarbons
ug/l - micrograms per liter
U - Parameter was analyzed for but not detected above the reporting limit shown

Table 2b
Summary of 2010 Groundwater Analytical Results - Polynuclear Aromatic Hydrocarbons
Laurel Station
Bellingham, Washington

Well ID	SW-1		SW-2				SW-4		Preliminary Cleanup Level (ug/L)
Sample ID	SW-1	SW-1	SW-2	SW-DUP1	SW-2	DUP	SW-4	SW-4	
Sample Date	8/26/2010	12/1/2010	8/26/2010	8/26/2010	12/1/2010	12/1/2010	8/26/2010	12/1/2010	
naphthalene	0.059	0.045	0.020	0.028 J	0.014	0.010 U	0.028	0.010 U	**160**
2-methylnaphthalene	0.22	0.021	0.015	0.025 J	0.028	0.010 U	0.028	0.010 U	**32**
1-methylnaphthalene	0.29	0.019	0.010 U	0.018 J	0.017	0.010 U	0.016	0.010 U	**NE**
acenaphthylene	0.010 U	0.010 U	0.010 U	0.010 UJ	0.010 U	0.010 U	0.010 U	0.010 U	**NE**
acenaphthene	0.026	0.010 U	0.010 U	0.010 UJ	0.010 U	0.010 U	0.010 U	0.010 U	**960**
fluorene	0.050	0.010 U	0.010 U	0.020 J	0.010 U	0.010 U	0.016	0.010 U	**640**
phenanthrene	0.013	0.025	0.014 J	0.12 J	0.017	0.010 U	0.055	0.010 U	**NE**
anthracene	0.010 U	0.01 U	0.010 U	0.022 J	0.010 U	0.010 U	0.010 U	0.010 U	**4,800**
fluoranthene	0.010 U	0.05	0.010 U	0.072 J	0.010 U	0.010 U	0.027	0.010 U	**640**
pyrene	0.010 U	0.056	0.010 U	0.077 J	0.010 U	0.010 U	0.032	0.010 U	**480**
benzo(a)anthracene	0.010 U	0.054	0.010 U	0.030 J	0.010 U	0.010 U	0.010 U	0.010 U	**See Note 1**
chrysene	0.010 U	0.072	0.010 U	0.033 J	0.010 U	0.010 U	0.015	0.011	**See Note 1**
benzo(a)pyrene	0.010 U	**0.082**	0.010 U	**0.028 J**	0.010 U	0.010 U	0.010 U	0.010 U	**0.012**
indeno_1,2,3-cd_pyrene	0.010 U	0.038	0.010 U	0.010 UJ	0.010 U	0.010 U	0.010 U	0.010 U	**See Note 1**
dibenz(a,h)anthracene	0.010 U	0.022	0.010 U	0.010 UJ	0.010 U	0.010 U	0.010 U	0.010 U	**See Note 1**
benzo(g,h,i)perylene	0.010 U	0.041	0.010 U	0.010 UJ	0.010 U	0.010 U	0.010 U	0.010 U	**NE**
dibenzofuran	0.015	0.01 U	0.010 U	0.011 J	0.010 U	0.010 U	0.013	0.010 U	**32**
total benzofluoranthenes	0.010 U	0.1	0.010 U	0.042 J	0.010 U	0.010 U	0.023	0.010 U	**NE**
TTEC [1]	NA	**0.104**	NA	**0.036**	NA	NA	0.003	NA	**0.012**

Results in ug/L
Bold indicates result above preliminary groundwater cleanup level.
J - Estimated value
NC - not calculable
TTEC - total toxicity equivalency concentration
ug/l - micrograms per liter
U - Parameter was analyzed for but not detected above the reporting limit shown.
UJ - Parameter was analyzed for but not detected above the reporting limit shown. The reporting limit is an estimated value.
1- Carcinogenic PAH cleanup levels are based on calculated total toxicity using the Toxicity Equivalency methodology in WAC 173-340-708 (8).
The mixture of cPAHs shall be considered a single hazardous substance and compared to the applicable MTCA Method B cleanup level for benzo(a)pyrene.

Table 3
Proposed Sampling Locations and Rationale - Additional/Changed Scope
Study Unit 1
Laurel Station
Bellingham, Washington

Proposed Sample Location/Sample ID	Reference Figure	Media	Proposed Sampling Depth (feet bgs)	Analytical Parameters	Rationale
MW-1[a]	Figure 1	Soil	20 and 25	NWTPH-Gx, NWTPH-Dx, BTEX, and PAHs[b]	Confirm vertical extent of hydrocarbon impacts exceeding PCLs at soil borings SU1-B12 and SU1-B21. A groundwater monitoring well will be installed and screened across the area of contamination within the unconsolidated glacial deposits present this area (see Figure 2). This well will help confirm the presence or absence of shallow groundwater in the area of soil contamination. If groundwater is present, th well will be included in a groundwater sampling program to assess potential impacts to shallow groundwater. If groundwater is not present, the well will be used as an extraction/injection well for pilot testing of in-situ soil remediation technologies.
MW-2[a]	Figure 1	Soil	5, 10, 15, 20, 25 and 30	NWTPH-Gx, NWTPH-Dx, BTEX, and PAHs[b]	Characterization of the lateral extent of hydrocarbon impacts exceeding PCLs at soil boring SU1-B22, especially with regard to whether petroleum hydrocarbons in soil SU1-B22 are contiguous with petroleum hydrocarbons in soil at SU1-B26. A groundwater monitoring well will be installed and screened across the area of contamination within the unconsolidated glacial deposits present in this area (see Figure 2). This well will help confirm the presence or absence of shallow groundwater in the area of soil contamination. If groundwater is present, the well will be included in a groundwater sampling program to assess potential impacts to shallow groundwater. If groundwater is not present, the well will be used as an observation well for pilot testing of in-situ soil remediation technologies.
MW-3[a] and MW-4[a]	Figure 1	Soil	5, 10, 15, 20, 25 and 30	NWTPH-Gx, NWTPH-Dx, BTEX, and PAHs[b]	Characterization of the lateral extent of hydrocarbon impacts exceeding PCLs to the northwest of the piping manifold area. Groundwater monitoring wells will be installed and screened just below the Bellingham Drift and within the unconsolidated glacial deposits present in this area. These wells will help confirm the presence or absence of shallow groundwater in the estimated downgradient direction from the area of soil contamination. If groundwater is present, the wells will be included in a groundwater sampling program to assess potential impacts to shallow groundwater. If groundwater is not present, the wells will be used as distant observation wells for pilot testing of in-situ soil remediation technologies.
MW-5[a]	Figure 1	Soil	5, 10, 15, 20, 25 and 30	NWTPH-Gx, NWTPH-Dx, BTEX, and PAHs[b]	Characterization of the lateral extent of hydrocarbon impacts exceeding PCLs to the southeast of the piping manifold area. A groundwater monitoring well will be installed and screened just below the Bellingham Drift (if present) and within the unconsolidated glacial deposits present in this area (see Figure 2). This well will help confirm the presence or absence of shallow groundwater in the estimated upgradient direction from the area of soil contamination. If groundwater is present, the well will be included in a groundwater sampling program to assess potential impacts to shallow groundwater. If groundwater is not present, the well will be used as an observation well for pilot testing of in-situ soil remediation technologies.
SU1-B27	Figure 1	Soil	5, 10, 15, 20, 25 and 30	NWTPH-Gx, NWTPH-Dx, BTEX, and PAHs[b]	Characterization of the lateral extent of hydrocarbon impacts exceeding PCLs at soil boring SU1-B26. A groundwater monitoring well may be installed if groundwater is encountered in MW-1 through MW-5.
SU1-B28[c]	Figure 1	Soil	20, 25, 30, 35 and 40	NWTPH-Gx, NWTPH-Dx, BTEX, and PAHs[b]	Characterization of the lateral extent of hydrocarbon impacts exceeding PCLs to the east of the piping manifold area. A groundwater monitoring well may be installed if groundwater is encountered in MW-1 through MW-5.
SU1-B29[c]	Figure 1	Soil	20, 25, 30, 35 and 40	NWTPH-Gx, NWTPH-Dx, BTEX, and PAHs[b]	Characterization of the lateral extent of hydrocarbon impacts exceeding PCLs at soil boring SU1-B26. A groundwater monitoring well may be installed if groundwater is encountered in MW-1 through MW-5.

Notes:
PCL - Preliminary Cleanup Level
NWTPH-Gx - Northwest Total Petroleum Hydrocarbons Gasoline
NWTPH-Dx - Northwest Total Petroleum Hydrocarbons Diesel extended (diesel and oil-range)
BTEX - Benzene, toluene, ethylbenzene, and xylenes
PAHs - Polycyclic aromatic hydrocarbons
bgs - below ground surface
[a] Proposed groundwater monitoring well
[b] PAH analysis will be conducted where NWTPH-Dx exceeds the Preliminary Cleanup Level of 460 milligrams per kilogram
[c] Ground surface elevation estimated to be approximately 15 higher than ground surface elevations at MW-1 through MW-4 and SU1-B27. Proposed sampling depths for these borings are estimated to be equal in elevation to the proposed sampling depths at 1 through MW-4 and SU1-B27.

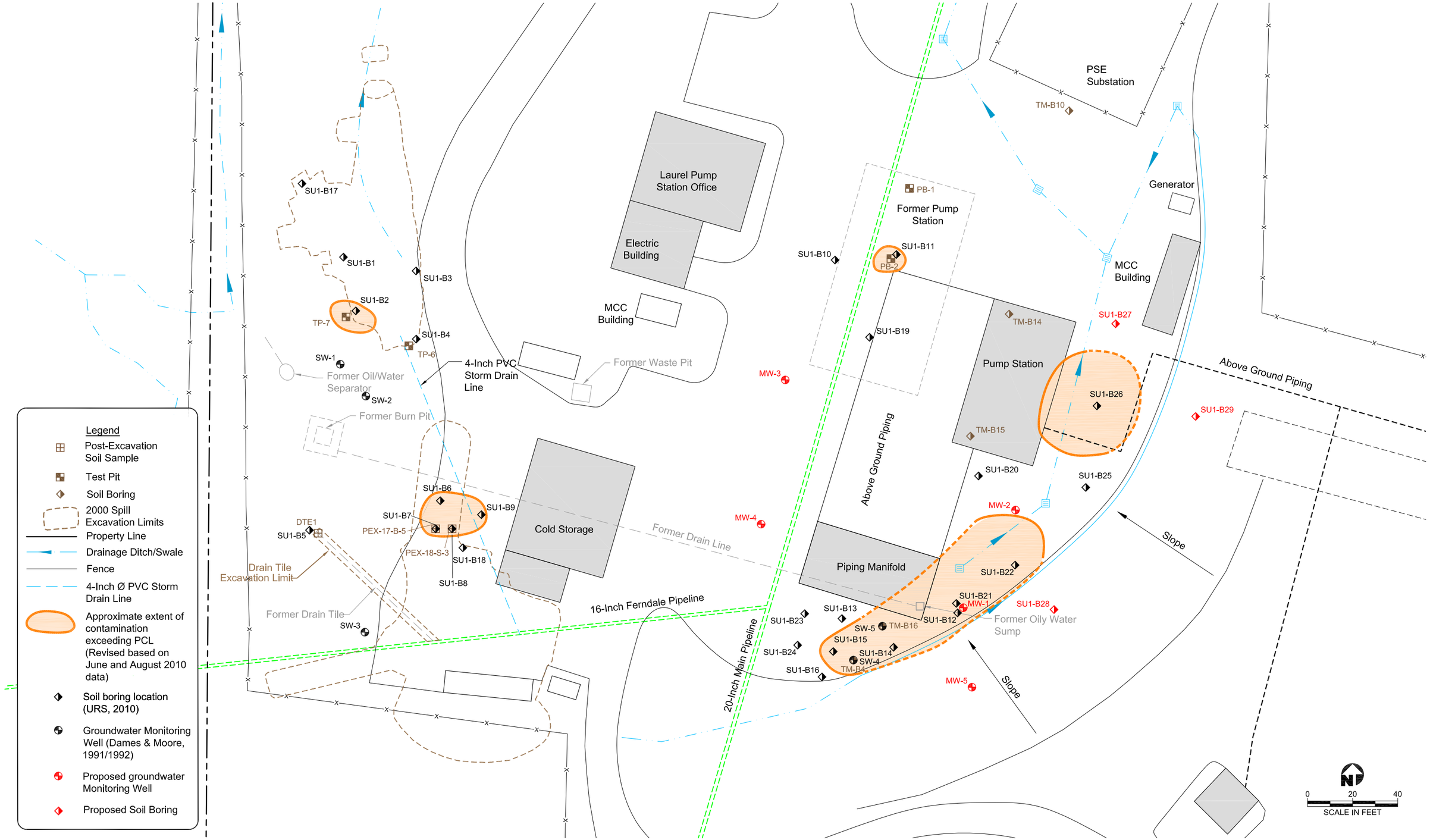


Figure 1
Proposed Soil Boring/Monitoring Well Locations (Study Unit 1)

Laurel Station
Bellingham, Washington

Q:\geo\Kinder Morgan\Laurel Pump Station\SubTasks\RI-FS\WP Add Dec 2010\Fig 1 Prop Soil Samp Unit 1.dwg
Mod: 12/28/2010, 10:21 | Plotted: 01/20/2011, 12:31 | chad_stickel

URS

33762344_06.cdr

A
Southwest

A'
Northeast

Elevation (Feet MSL)

310
300
290
280
270
260
250
240

Former Oily Water Sump

TM-B10
SU1-B26
SU1-B25
SU1-B22
SU1-B12/ SU1-B21
TM-B16 (SW-5)
TM-B4 (SW-4)
SU1-B15
SU1-B16
SU1-B23
SU1-B24

Fill

Silty Clay (Bellingham Drift)

Unconsolidated Glacial Deposits

SM
ML
CL
SM
GP/SP
SM

SP
CL
320/100
GP
56/130
110/14
GP/SP
ND/6.1

SP
GP
SP
GP

SP
ND/ND
198/85
ND/ND
GP

SP
GP/SP
5.8/6.4
GP
1,200/940
8,400/3,700
SP
2,200/1,200
GP
ND/8
63/64
350/140
SP
ND/ND

SP
GP/ GM
GM
ND
3,100
GP
510
1,200
GP
1,300
ND
SP/GM

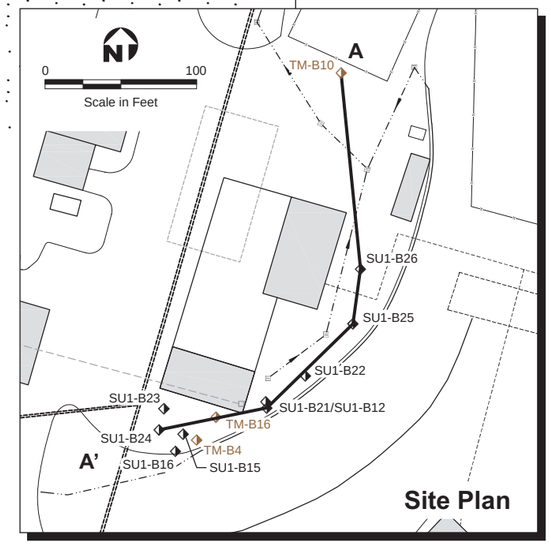
SP
ND/ ND
GP
ND/ ND
GP
14/ 570
1,200
ND/ ND
GP
ND

CL
GM
SP
GP
GP
GP
SP
SP
GP
GP

0 30 100
Horizontal Scale in Feet
Vertical Exaggeration = 3x

LEGEND

- Boring with screened well interval
- SM — USCS classification
- Geologic unit boundary
- Groundwater elevation at time of drilling
- Static groundwater elevation (August 2010)
- Fill
- Silty clay (Bellingham Drift)
- Unconsolidated glacial deposits
- 3,100 — TPH Concentration in mg/kg
- **bold** — Bolded values indicate the PCL was exceeded
- ND — Not detected above reporting limit
- Soil sample below PCL
- Soil sample above PCL
- Area of residual contamination exceeding PCLs



Job No. 33762344

Figure 2
Geologic Cross Section A-A'

URS

Kinder Morgan
Laurel Station